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Public Investment Policy Project

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PUBLIC INVESTMENT POLICY PROJECT

HIGH-LEVEL WORKSHOP ON INTEGRATION OF PLANNING, BUDGETING AND INVESTMENT PROGRAMMING IN AZERBAIJAN

APRIL 12, 2006

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Integration of Planning, Budgeting and Investment Programming in Azerbaijan

DATE: April 12, 2006
Venue: Afurja Ballroom, Excelsior Hotel, Baku

A G E N D A

09:30 - 10:00	Opening Statements by Avez Alekberov, Minister of Finance, Heydar Babayev, Minister of Economic Development and Reno Harnish, the Ambassador of the United States of America
10:00 - 10:30	"Importance of Having a Common National and Sectoral Development Framework for the SPPRSD, State Budget and the PIP, and the " Speaker World Bank
10:30 – 11:00	"Institutional and Procedural Arrangements for Linking Planning, Public Investment Policy, and Budgeting" Speaker Mete Durdag, PIPP Chief of Party
11:00 - 11:15	Coffee Break
11:15 - 11:45	Discussions
11:45 - 12:15	"Challenges for the 2007-2010 Macroeconomic, Budgetary and Public Investment Planning" Speakers Azer Bayramov, Deputy Minister of Finance and Shahin Sadigov, Ministry of Economic Development
12:15 - 12:40	Discussions
12:40 - 13:00	Summing up and the next steps by Avez Alekberov, Minister of Finance, Heydar Babayev Minister of Economic Development and Reno Harnish, The Ambassador of the United States of America

List of Participants

Government of Azerbaijan

1. Avaz Alekberov, Minister of Finance
2. Heydar Babayev, Minister of Economic Development
3. Musa Panahov, Deputy Minister of Transport
4. Valeh Alasgarov, Deputy Speaker
5. Safar Mehdiyev, Deputy Chairman of Customs Committee
6. Azer Bayramov, Deputy Minister of Finance
7. Mikayil Jabbarov, Deputy Minister of Economic Development
8. Mehman Abbasov, Head of SPPRED Secretariat
9. Shahin Sadigov, Head of EPFD
10. Ogtay Hagverdiyev, Head of Economy and Finance-Credit Division
11. Elman Rustamov, Chairman of the National Bank
12. Sedreddin Mammadov, Ministry of Transport

International Financial Institutions/Revenue Management Group

13. Valeriu Razlog, Associate Banker, European Bank of Reconstruction and Development
14. Saida Bagirova, World Bank
15. Gregory T. Gedrzdjczwak, World Bank
16. Christos Kostopoulos, World Bank
17. Christian Peterson, World Bank
18. Basil Zavoico, IMF
19. Matthew Westfall, Asian Development Bank
20. Gulshan Rzayeva, Senior Development Advisor, UNDP
21. Bernard Du-Chaffaut, Ambassador of France
22. Sylvain Guiaugue, Embassy of France
23. Michele Jelinine, Embassy of France
24. Carsten Meyer-Wiefhausen, Embassy of Germany
25. Laurie Bristow, Ambassador of the United Kingdom
26. Colin Wells, Embassy of the United Kingdom
27. Kenichi Osugi, Embassy of Japan
28. Reno Harnish, Ambassador of the United States of America
29. David McCormick, Embassy of the United States of America
30. Jason Hyland, Embassy of the United States of America
31. Linda Decker, the US Dept. of Treasury
32. James Goggin, USAID
33. Geoffrey Minott, USAID
34. Aydin Gashimov, BP Azerbaijan Performance and Public Reporting Manager, Communications and Public Affairs
35. Vladimir Drebentsov, BP Chief Economist on CIS, BP Economics Team, Moscow

REPUBLIC OF AZERBAIJAN
The USAID-Funded "Public Investment Policy" TA Project

The High-Level Workshop on
INTEGRATION OF PLANNING, BUDGETING, AND INVESTMENT PROGRAMMING

The purpose of the proposed High-Level Workshop on April 10, 2006 is to arrive at a consensus, if possible, on the required institutional framework for the preparation of the GOAZ's Budget, including the capital budget, as an effective instrument for the national and sectoral development of the economy over the medium- to long-term. This in turn requires that the proposed institutional framework should enhance the inter-linkages among development planning (SPPRSD and SPSEDR), government budgeting, and public investment programming.

The required institutional (i.e., organizational and procedural) framework is envisaged to include the following:

1. The preparation of SPPRSD, SPSEDR or their Annual Progress Reports, the State Budget, and the PIP will start with the President's guidance and instructions on the long- and medium-term national and sectoral development objectives/goals, strategies, and targets (after checking them carefully for consistency with each other and for their feasibility vis-à-vis the current and expected constraints).
2. A rolling Medium-Term Macroeconomic and Sectoral Development Framework (MTMF) and a rolling Medium-Term Fiscal Framework (MTFF) will be used:
   - to check consistency and feasibility of the national and sectoral development objectives, strategies and targets, and
   - to identify both the overall resource envelope and sectoral spending ceilings.
3. All this work will be led, supervised, and pre-approved by a Cabinet cluster of economic ministers (Socio-Economic High Policy and Planning Council –HPPC) before considered by the Cabinet of Ministers (COM).
4. Upon the HPPC's proposal, COM will issue early in every FY to all government/ budgetary agencies a Joint Call Circular (JCC) to provide them with the necessary guidance and instructions to prepare their submissions to MOF and MOED for the State Budget, PIP, and SPPRSD/SPSEDR.
5. Each line ministry will prepare its Sector Development Program as an operational document, with time-bound specific targets and adequate attention to the resource and other constraints, and use it as the basis of its submissions to MOF and MOED for spending proposals and planned activities.
6. All technical work for the above will be provided by MOED as Secretariat to the HPPC in close cooperation of and concurrence with MOF and NBA.

The statements by the representatives of the Ministry of Finance and the Ministry of Economic Development, and the US Ambassador are expected to support the above proposal as follows:

The Minister of Finance:

- Over the past decade, the **MOF has adopted a number of significant improvements in the budgetary system**, including its format, preparation, and review and approval, which all make it more effective and transparent than before. **[Name some examples of the said improvements].**
- On the other hand, similar improvements were lacking in the relationship among the budgetary system, the planning process, and the formulation of public investment policy and program, despite some serious efforts in this respect. Until recently, **MOF has been the host to a UK-funded (subsequently ADB-funded) Macro Policy Unit** that has provided a useful analytical framework to MOF work. Although this Unit ceased to exist three years ago (?) when external funding ended, several MOF staff members who received on-the-job training there can now contribute to **reviving the required macro framework** for the integration of planning and budgeting work.
- While there is need for better and more effective guidance by MOF and MOED of the line ministries' planning and budgetary work, the line ministries, on the other hand, have to base their spending proposals and planned activities on their **Sector Development Programs**, whose technical and financial feasibility and consistency with the national and sectoral development objectives and strategies must be verified by MOF and MOED.
- Another critically important issue is the need to bring the **externally funded public investment projects** within the budgetary system.
- The above-noted processes will not only help to establish **better linkage between planning and budgeting**, but will also improve budgeting for current expenditure implications of capital spending proposals.
- Finally, MOF expects that the action program that would emerge from this Seminar will also contribute to our progress towards the **Program Budgeting System.**

The Minister of Economic Development:

- Since early 1990s Azerbaijan has been going through a transition from a centrally planned to a market-based economy. In the process, **the old regulatory system has been dismantled** and almost all markets, prices, and asset ownership have been mostly liberalized.
- In parallel to market reforms, the central planning (Gosplan) mechanism has become dysfunctional. **The alternative institutional developments have of course been emerging, albeit slowly, for sound governance of the economy.** Particularly lagging, however, is the development of appropriate institutions to ensure adequate integration among planning (SPPRED and SPSEDR), budgeting, and investment programming (PIP).

- On the other hand, **the existing legislative framework, as noted below, includes many elements of a good governance system**, though requiring better coordination and further strengthening for functioning fully satisfactorily.
- In this regard, we have just heard **Mr. Alekberov's presentation** about the recent and ongoing developments as well as further improvements required in the budgetary system. **MOED, on the hand, has the lead responsibility** to prepare the Medium-Term Social and Economic Development Prognoses (**MTSEDP**); the main development planning instruments such as **SPPRSD** and **SPSEDR**; and the public investment policy and program (**PIP**).
- **The most crucial element in the good governance of the economy could be Sector Development Programs**, which are now widely adopted by line ministries without any guidance and instructions by the Central Government as to their relation to the national and sectoral development objectives, priorities, and resource constraints.
- Each of these planning documents, once adequately improved and better coordinated with each other and with the State Budget, could serve as an effective instrument for most efficient use of Azerbaijan's rapidly rising oil funds.
- **We greatly appreciate the Donor Agencies' TA in this area**, including the WB and IMF assistance for general development of the budgetary system; the UNDP and ADB assistance for capacity improvement in the preparation of SPPRSD and a macroeconomic model, and the USAID assistance for capacity improvement to prepare sound public investment policy and program.
- The success of such donors' assistance and the government's own efforts to improve planning and budgeting work will greatly depend on:
    - establishment of an effective guidance, evaluation, and overview of all planning and budgetary work of both the central and line ministries by the top leadership (the President and, on his behalf, the CoM); and
    - ensuring consistency and feasibility of sectoral spending proposals and planned activities with the national and sectoral development objectives and priorities, with each other, and with resource and other constraints by using an appropriate macroeconomic and sectoral development framework.
- The USAID-funded "Public Investment Policy Project" has looked over the past year into the current practices of planning and budgeting in Azerbaijan, particularly on the two points above, and had extensive discussions of their evaluations and draft proposals with the technical and managerial cadres of MOED, MOF, and several line ministries.
- The PIP Project proposal could be summarized as follow:
    - The President or the CoM will issue in early FY to all government agencies the national and sectoral development objectives and strategies over the medium- to long-term together with detailed guidance and instructions in one combined document (Joint Call Circular) how to prepare and submit their spending proposals for the State budget and the PIP and planned activities for the SPPRSD and SPSEDR or their Annual Progress Reports.

- The above work will be based on a formal Medium-Term Macroeconomic and Sectoral Development Framework that will be continuously updated and used to maintain the Central Authorities' finger at the thumb of the economy.
- Line ministries will prepare their Sector Development Programs as realistic and operational documents that will serve as the source of their budgetary and planning submissions to MOF and MOED.
- All the above work will be guided, supervised, and pre-approved on behalf of the President/CoM by a Cluster of Economic Ministers (plus the Chairman of NBA) that will be provided with secretariat services by MOED in close cooperation and concurrence with MOF and NBA.

- The PIP Project proposal aims at addressing a crucial issue without creating any new agency or organization, and any new policy instrument, and without shifting any responsibility from the agency that it should normally belong to.

Major points for speech of Mr. Azer Bayramov, Deputy Minister of Finance:

1. **Current status of** linkage and consistency between national development plans (mid term national Socio-Economic Development Concept, draft SPPRSD, SPSEDR), sector development programs, public investment program and Consolidated Budget in MOF:

- progress in ensuring linkage;
- issues/problems in ensuring proper linkages and consistencies;
- to what extent will the proposals in the workshop help solve existing problems (ensure more effective justification of state and consolidated budget expenditure; improve efficiency and transparency of budget expenditure; bring formulation of sector development programs to a more systemized manner, ensure their linkage with the budget and thus, ensure their sustainability; provide sector ministries with a more approximate resource envelope)

2. **Ministry of Finance's plans** with regard to public expenditure management, improving its efficiency and basing expenditure on final results. In other words, how MOF sees public expenditure reforms:

   - Discussions with the World Bank;
   - Sharing experience from Warshaw seminars;
   - Program based and result oriented budgeting experience in other CIS countries' (Ukraine, Russia);
   - Review of legislative frameworkd for program based budgeting in Azerbaijan: 1) Relevant article of Budget System Law; 2) Provisions of Budget Formulation and Implementation guidelines; 3) relevant provisions of Decree of the President of Azerbaijan on Strengthening Anti-inflation Measures.

- Step-by-step implementation of public expenditure reforms over 2007-2009???? And formulation of 2010-2013 budget expenditure on basis of relevant programs. To this end, it is imperative that donors provide significant technical assistance and Ministry's staff go through a comprehensive training program.

3. Below are the **improvements that may be applied in 2006** in formulation of 2007-2010 mid term budget forecast:

   - Further modification of budget call circular: comprehensive guidelines on preparation of sector development programs[1], better linking of current expenditure proposals with capital expenditure; and better justification,
   - Formulation of the budget of MInistry of Education, as a pilot project, on the basis of Education Sector Development Program. To this end, provision of technical assistance by the World Bank and PIP Project
   - Discussion of initial results of changes implemented late 2006 with MOED, MOF and Ministry of Education and conclusions.

Main points of speech for Mr. Shahin Sadikhov, Head of Department at MOED:

1. **Current situation** at MOED with linking and coordination of macroeconomic planning, state development programs (medium term Socio-Economic Development Concept, Draft SPPRSD, SPSEDR), sector development programs and public investment program with each other:

   - Progress in ensuring linkages: linking external sector projections with real sector projections; preparation of overall financial balance of the state; supporting long-term (10 year) development papers (draft SPPRSD) with medium term (5 years) more specific programs;
   - Difficulties in ensuring inter sector consistencies in macroeconomic forecasting: difficulties in ensuring linkages between monetary and fiscal sectors;
   - Fragmented preparation, approval and implementation of sector development programs, gaps in linking them with budget and PIP and lack of any other unified guidelines,
   - Difficulties in formulation of Public Investment Program: disapproval of relevant guidelines, different approach to externally and internally funded projects.

2. **Development plans of Ministry of Economic Development** in relation with macroeconomic planning, preparation and implementation of national and

[1] Please refer to Technical Note on Preparation of Sector Development Programs prepared by PIP Project

sectoral development programs, formulation and improving efficiency of public investment policy:

- Discussions with the World Bank;
- Sharing experience from Warshaw seminars;
- Experiences of other countries (Ireland, Turkey, Philippines) in linking policy, planning and investment;
- Development of IMF's financial programming model and the World Bank's RMSM-X model in MOED for ensuring inter sector consistency in macroeconomic forecasting. For this purpose, MOED, MOF and NBA should cooperate closely.
- Step-by-step reforms to ensure better formulation of 2006-2008 public capital expenditure policy and public investment program ??? and preparation of 2008-2011 Public Investment Program based on improved procedures. To this end it is imperative that PIP Project provide significant technical assistance and Ministry's staff go through a comprehensive training program.

3. **Improvements/changes which may be applied in 2006** for preparation of 2007-2010 macroeconomic forecasts and public investment program:

- Develop simplified version of IMF financial programming model with support of PIP Project and in cooperation with MOED and NBA and ensure examination of consistency of 2007-2010 real, monetary, fiscal and external sector projections within the model.
- Improve PIP Call Circular;
- Prepare, at the end of the year, comprehensive guidelines reflecting procedures that comply with international PIP standards;
- Discuss initial results of changes implemented as of end 2006 with MOED, MOF and NBA and draw conclusions;
- Work together with MOF and NBA on Joint Call Circular for 2008-2011 rolling budget year.

Action Plan

Activity	Formulation of 2007-10 draft budget	Formulation of 2008-11 draft budget	Formulation of 2009-12 draft budget
Application of simplified financial programming model	x	x	x
Application of simplified model for cross sectoral resource distribution	-	x	x
Sector development plans	-	x	x
Ensure that Economic block ov CoM functions as a single group	-	x	x
Application of Joint Call Circular based on macroeconomic framework that sets sector expenditure limits	-	x	x
Application of Joint Call Circular which identifies national strategies, sector plans, macroeconomic consistency and sector expenditure limits	-	-	x
Application of procedures consistent with international best practices in formulation of public investment policy and program	-	x	x

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AZERBAIJAN: PUBLIC INVESTMENT POLICY PROJECT

INTEGRATION OF PLANNING, BUDGETING AND INVESTMENT PROGRAMMING

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Coordination of Planning, Budgeting and Investment Programming in Azerbaijan

- Azerbaijan has all planning, budgeting and investment programming instruments for effective economic management:
  - ESDCFI, SPPRSD, SPSEDR and SSDP
  - MTBF, State Budget and Consolidated Budget
  - PIP
- Azerbaijan has adequate capacity to prepare the above documents.
- Further progress can still be made in effective macroeconomic management by improving the existing instruments and enhancing their linkages with each other.

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Main Improvement Requirements

- Improve their consistency and linkages with national and sectoral development objectives and strategies;
- Improve their consistency and feasibility in relation to the country's constraints (e.g. resource constraints, skilled labor shortages, limited management capacity, etc.);
- Improve their linkages with each other; and,
- Improve the monitoring and evaluation of their implementation results.

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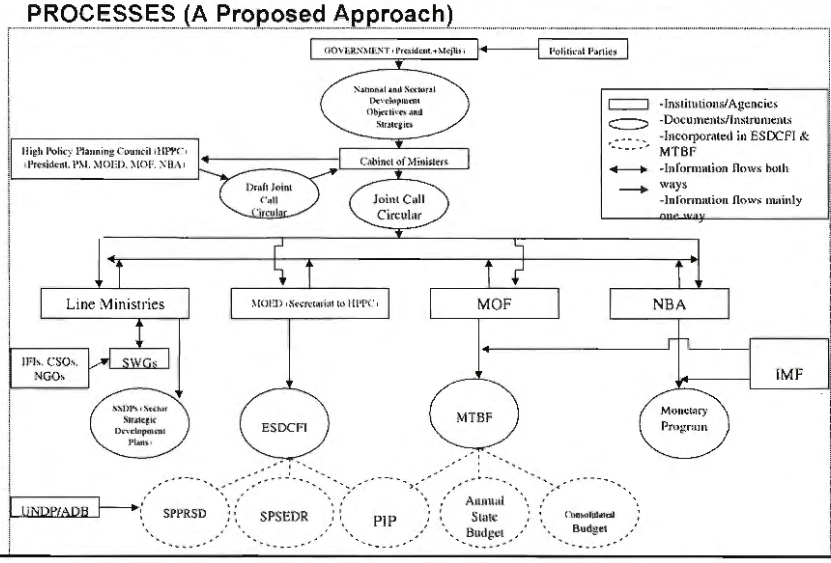
FLOW OF INFORMATION FOR PLANNING & BUDGETING PROCESSES (A Proposed Approach)



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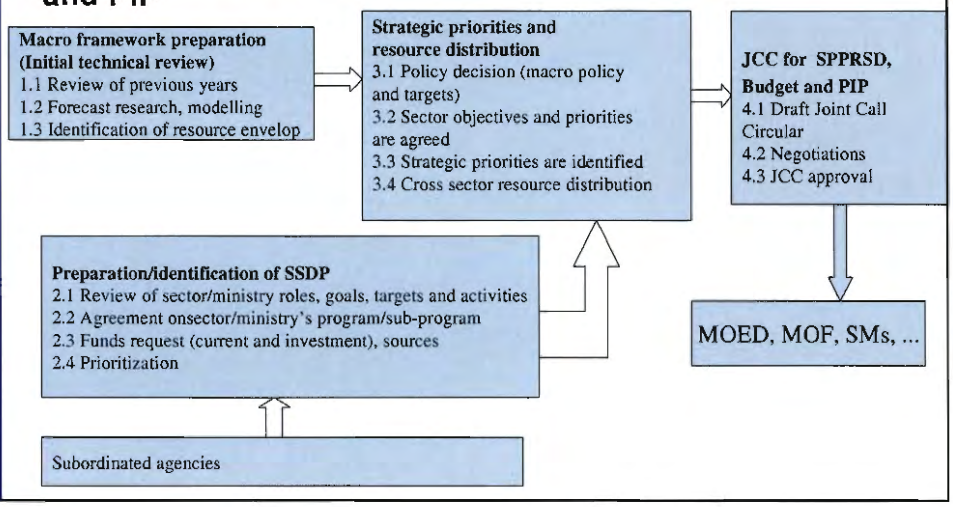
Linkages between planning (macro, sector), budgeting and PIP



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Joint Call Circular

- Medium term national and sectoral development goals and strategic priorities and intervention mechanism of the government;
- Medium term macroeconomic policy and projections (MTMF, MTBF, inflation and exchange rate targets);
- MTBF (calculation method, income, expenditure, deficit, adjusting to MTMF);
- Budget's sector spending ceilings;
- PIP sector ceilings, PIP total resource envelope;
- Budget classification guidelines and templates;
- PIP submission guidelines and templates;
- SPPRSD submission guidelines and templates.

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Proposed Organizational Scheme

- All the work involved in preparing the JCC will be led and supervised by a group of key economic ministers and the Chairman of the National Bank.
- The practice of having an Economic Cluster of the Cabinet of Ministers for key economic decisions is used by many countries.
- The proposed cabinet cluster in Azerbaijan can be called the High Policy Planning Council (HPPC), or any other name that may be considered more appropriate.
- HPPC will need substantial secretariat services of essentially economic planning nature, but also involving significant amount of work and expertise in fiscal and monetary areas.
- Therefore, Secretariat services to the HPPC will need to be provided by MOED jointly with MOF and NBA.

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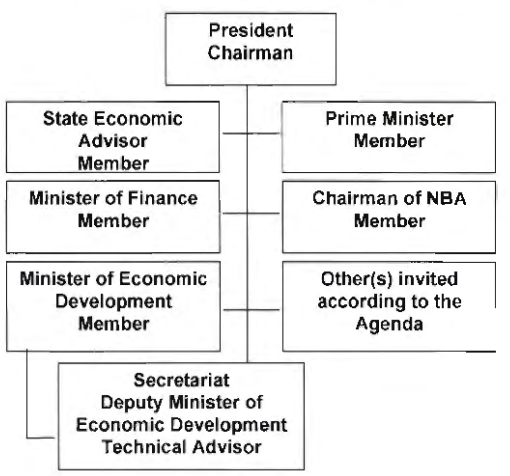
Azerbaijan Proposed Structure of the HPPC



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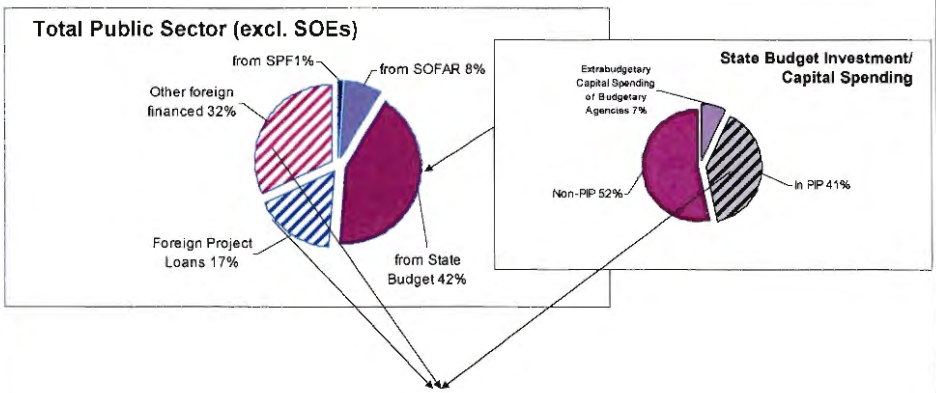
Public Sector Investment 2005 (Planned)



PIP
(66% of Total Public Investment)

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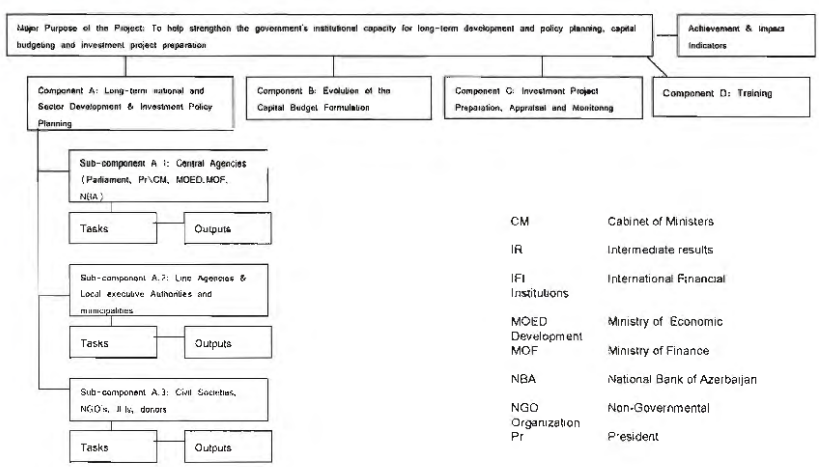
PIP Project Roadmap



CM	Cabinet of Ministers
IR	Intermediate results
IFI	International Financial Institutions
MOED	Ministry of Economic Development
MOF	Ministry of Finance
NBA	National Bank of Azerbaijan
NGO	Non-Governmental Organization
Pr	President

Coordination of Economic Management, the Budget and the Public Investment Program

World Bank
April 12, 2006

Coordination of Economic Management, the Budget, and the Public Investment Program

A. INTRODUCTION

BIG – 3: Results from a Good Budget System

1. Macroeconomic Stability
2. Allocating Funds to Highest Needs
3. Efficiency in Public Spending

3

In Azerbaijan we already have excellent building blocks for a good budget system ..

- **Legal infrastructure**: Good Budget Systems Law and Implementing Regulations
- **Vision, Investment & Structural Reform Needs**: SPPRED 2003-2005; LTORMS; State Program for the Economic Development of the Regions; SPPRED II 2006-2015
- **Capacity**: A lot of internal capacity at central ministries, and partner assistance available when needed

4

..which have produced good results

- Non-oil growth, averaging 11% for 2001-2005
- Poverty reduction, reaching 35% in 2004, from 45% in 2002
- Low inflation 2001-2003, averaging 2%, and increased to 7% in 2004.
- Stable exchange rate 2001-2004, AzM/$ 4873

5

But needs are changing..

- Higher levels of public spending have led to higher inflation and an appreciated currency
  - Inflation for 2005 was 9.5%
  - The AzM/$ appreciated to 4593 in 2005
- And pressures are bound to increase in the medium term
  - Consolidated budget increases (nominal) percent increases over previous year: 31% in 2005, and 66% in 2006.

6

.. Suggesting the budget system needs continued improvements

We shall discuss two improvements:

- In the short term, **strengthening the current budget system** by improving institutional and policy linkages, especially on macroeconomic policies
- In the medium term, introducing **greater strategic content** to the budget by adopting program based budgeting

7

Coordination of Economic Management, the Budget, and the Public Investment Program

B. PROPOSALS TO STRENGTHEN POLICY COORDINATION IN THE BUDGET

(ensuring the BIG-3)

8

The foundations for the "BIG-3" results are already in the Azeri budget calendar (BSL)

COM identifies budget agencies	Med.-term Economic and Social Dev. Prog. From MED to MOF	COM receives prelim. State Budget PIP proposals from MOF and MED	MOF sends circular to Budget agencies	Budget submissions to COM and MOF	MED sends adjusted indicators to MOF	MOF and MED discussions with budget agencies	Draft budget to COM Econ Dev and PIP to COM	COM sends budget to PO	PO submits budget to MM
Jan 20-30	Mar 1	Apr 15	May 1	Jul 1	Aug 1	Jul - Aug	By Sept 10	By Sept 25	By Oct 15

I. Mostly macro → I. Some macro →

II. Prioritization: ceilings, program identification, selection →

III. Efficiency: programs, PIP

9

B1. Macro stability

Primary challenge with the current calendar:

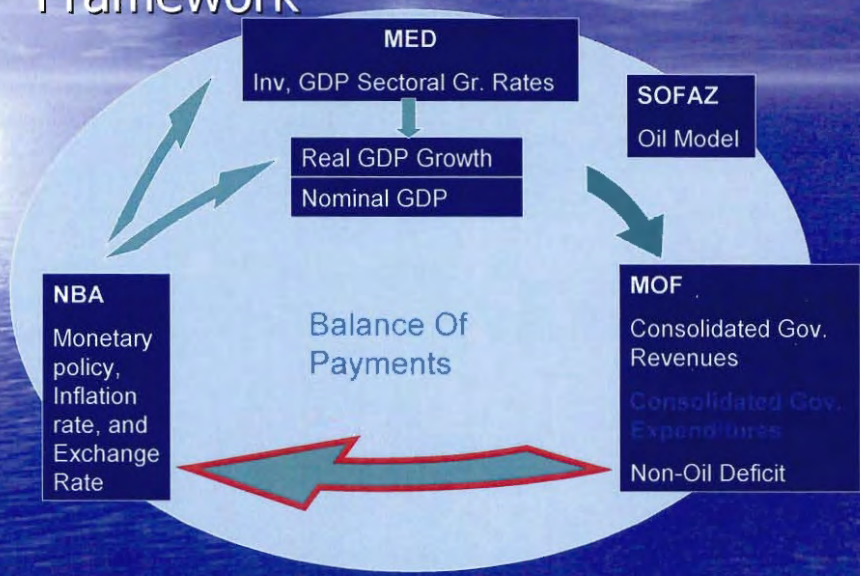
- Public spending, non-oil deficit, inflation, exchange rate for 4 year framework not always consistent with each other

Proposals:

- Improve quality of macro framework and get political support
  - Introduce **inter-agency working group** in preparation of macroeconomic framework (MOF, MED, NBA)
  - Set **internally consistent macroeconomic objectives**; resolve non-oil revenue issue and comprehensiveness of expenditures
  - High level buy-in on preparation and use of macro framework (**Presid Decree**)
- Results:
  - Obtain consolidated budget expenditure envelope within internally consistent macro framework (and an envelope that is sustainable).

10

Iterative Macroeconomic Framework



11

B2. Allocating Budgets to Highest Needs

Challenges with budget allocation:

- There are multiple sources of GOA policy and priorities, so a consensus building mechanism is necessary
- Initial allocations made mostly on Line Ministry needs, but are removed from political consultations which usually occur in September –January period
- Functional ceilings currently exclude the Public Investment Program
- Functional allocations revised at end of budget cycle

12

B2. Resources linked to priorities: how to strengthen it

Proposals – short-term:

- Base budget prioritization and Line Ministry submissions on development objectives (SPPRED II)
- Divide the 4 year consolidated budget expenditure envelope according to priorities for each function, including PIP.
- **Adjust call circular** for the State Budget to refer to: SPPRED II objectives, recurrent and capital expenditure ceilings, and reference PIP call circular

Proposals – medium and long term:

- Strengthen high-level coordination process during April – August period, with a **Budget Council and technical working groups**
- Move to **Program-Based Budgeting**
- Base budget prioritization on SPPRED II (2006-2015)
- Issue Joint Call Circular (State Budget and PIP)

13

The foundations for the "BIG-3" results are already in the Azeri budget calendar

COM identifies budget agencies	Med.-term Economic and Social Dev. Prog. From MED to MOF	COM receives prelim. State Budget PIP proposals from MOF and MED	MOF sends circular to Budget agencies	Budget submissions to COM and MOF	MED sends adjusted indicators to MOF	MOF and MED discussions with budget agencies	Draft budget to COM Econ Dev and PIP to COM	COM sends budget to PO	PO submits budget to MM
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I. Mostly macro → I. Some macro →

II. Prioritization: ceilings, program identification, selection →

III. Efficiency: programs, PIP

14

The foundations for the "BIG-3" results are already in the Azeri budget calendar

COM identifies budget agencies	Med. - term Economic and Social Dev. Prog. From MED to MOF	COM receives prelim. State Budget PIP proposals from MOF and MED	MOF sends circular to Budget agencies	Budget submissions to COM and MOF	MED sends adjusted indicators to MOF	MOF and MED discussions with budget agencies	Draft budget to COM Econ Dev and PIP to COM	COM sends budget to PO	PO submits budget to MM
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I. Mostly macro → I. Some macro →

II. Prioritization: ceilings, program identification, selection →

III. Efficiency: programs, PIP →

15

B3. Efficiency: How to increase impact of public expenditures?

Challenges with efficiency:

- Many sectoral strategies are in the process of being drafted, so results-based **monitoring indictors** not currently used
- PIP not yet subject to same evaluation and approval criteria as the rest of the budget
- Current norms are restrictive; as budget increases, increasingly large share of budget allocations will be based on restrictive norms
- Internal control strong, but internal audit limited. External audit limited.
- Performance audit not introduced yet

16

B3. Efficiency: How to get more out of it?

Short term proposals

- Review State Budget submissions relative to SPPRED II objectives
- Review the PIP submissions relative to draft SPPRED II
- Develop the PIP document and present to Milli Mejlis with rest of Budget

Medium term proposals

- Strengthen PIP appraisal capacity with proper financial analysis and fiscal implications
- Phase out Norms and
- Move to Program-based budgeting

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Coordination of Economic Management, the Budget, and the Public Investment Program

C. CONCLUDING REMARKS

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Proposals

	"UNFINISHED BUSINESS" Short term (5/1 or 8/1, 2006)	"NEW BUSINESS" Medium and Long Term
Macro Stability	•Revise macro methodology (iterative) •Create macro working group •Decree on Consolidated Envelope & Ceilings	•Budget Council & technical working groups
Allocation	•Improve Call Circular for State Budget •Use SPPRED II objectives as guide in SB and PIP strategic prioritization •Produce PIP and subm. to Milli Mejlis	•Joint Call Circular (SB and •Program-Based Budgeting •Subject all PIP projects to appraisal standards
Efficiency		•Internal control •Internal, External audit •Improve Procurement •Phase out norms
For All BIG-3	•Complete Budget Process Manual (BPM) •Capacity Building •Communication with budget agencies	•Evolving Web-Based BPM supporting Program Budg. •**Capacity Building** •**Communication** •PEFA Assessment

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Workshop Recommendations by Shahin Sadigov, Head of Macroeconomic Policy Development and Forecast Dept., MOED:

1. **Improving economic coordination:**

- Establish High Economic Council;
- Create a work group for identifying mid-term macroeconomic framework and sector funding (resource) constrains under the decree of the Cabinet of Ministers.

2. **Preparing budget on the basis of targeted programs:**

- Prepare proposals with regard to selecting a model for Azerbaijan and identifying programming level.

3. **Developing Public Investment Program:**

- Improve guidelines for preparation of Public Investment Program;
- Ensure transparency in project evaluation and prioritization.

4. **Establishing effective monitoring (supervision) system of public funds utilization:**

- Improve legislative basis for supervision system;
- Prepare recommendations on organizational structure of supervision system.

5. **Strengthening qualifications and capacity in the relevant agencies for performing aforementioned work:**

- Improve capacity at MOED, MOF;
- Improve capacity in line ministries.

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PUBLIC INVESTMENT POLICY PROJECT

IMPORTANCE OF A MACROECONOMIC AND SECTORAL FRAMEWORK FOR PUBLIC INVESTMENT POLICY AND PROGRAM (PIPP)

NOVEMBER 2005

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IMPORTANCE OF A MACROECONOMIC AND SECTORAL FRAMEWORK FOR PUBLIC INVESTMENT POLICY AND PROGRAM (PIPP)

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ABBREVIATIONS

CGC	Caspian Group Consulting
COM	Cabinet of Ministers
EBRD	European Bank of Reconstruction and Development
GOAZ	Government of Azerbaijan
IMF	International Monetary Fund
LOI	Letter of Intention
M&E	Monitoring and Evaluation
MOED	Ministry of Economic Development
MOF	Ministry of Finance
MOIE	Ministry of Industry and Energy
MPF	Macroeconomic Policy and Forecasting Department at MOED
MTEF	Medium-term Expenditure Framework
NBA	National Bank of Azerbaijan
PCU	Project Coordination Units
PIP	Public Investment Program
PIPP	Public Investment Policy Project
PIU	Project Implementation Unit
RDP	Regional Development Program (State Program for Social Development of Regions)
SDP	Sector Development Plan
SOC	State Owned Companies
SOE	State Owned Enterprises
SPPRED	State Program for Poverty Reduction and Economic Development
SSDP	Strategic Sector Development Plan
STTS	Short-Term Technical Specialists
TP	Training Plan
WB	World Bank
WP	Work Plan

Executive Summary

At present, the Government of Azerbaijan (GOAZ) does not have a systematically thought-out public investment policy and investment program. Approximately half of **the State Budget's capital spending** (and its composition) is determined between the MOF and line ministries and not included in the Public Investment Program. Most of the other half represents domestically funded projects in the Public Investment Program and is shown only as a line item in the budget to be distributed by sector and project **after** the Annual Budget Law is enacted by the Milli Mejlis. Finally, about 7-8 percent of the State Budget capital spending is included in the "extra-budgetary spending" of the budgetary organizations. The State Budget capital spending, however, makes just over 40 percent of the **total public sector investment** (excluding investments of both partly and fully state owned enterprises). About half of the total public sector investment, which is funded by external loans and grants, is not included in the Budget even though it is mostly (but not all) in the Public Investment Program. The remaining part (about 10 percent) of the total public sector investment belongs to the SOFAR and the Social Protection Fund, which are in neither the State Budget nor the Public Investment Program.

Obviously, with such fragmented and ambiguous public investment programming, it is not possible to speak of any public investment policy in Azerbaijan. This might be due to the lack of adequate recognition by GOAZ of the importance of the public investment policy and program. This note by the PIPP aims at briefly explaining: (a) the importance of having a properly formulated public investment policy and program, and (b) the required institutional, technical and organizational framework for it.

To remedy this fragmentation in public investment programming and use it as an effective tool for the management of economic and social development, PIPP recommends that GOAZ consider to:

1. Clearly identify the long- and medium-term national and sectoral development objectives and strategies;
2. Adopt SMART (**S**pecific, **M**easurable, **A**chievable, **R**ealistic, and **T**ime-bound) medium-term targets and the necessary policies and projects to attain them;
3. Assure the consistency of all major targets, strategies and policies with national and sectoral development objectives as well as with each other within a formal macroeconomic and sectoral development framework;
4. Based on all these, formulate and issue early in each fiscal year a "Joint Call Circular" (JCC) to all government/budget organizations to guide and instruct them for their submissions to MOF and MOED for the preparation of the planning (e.g. SPPRED, RDP or their annual performance reviews and PIP) and budgeting (State Budget, Consolidated Budget and MTBF) documents;
5. Make the Public Investment Program an all-comprehensive review and evaluation instrument of the government's public investment policy; and,
6. Instruct all line ministries to prepare a Sector Strategic Development Program (SSDP) for each sector incorporating all sub-sector programs and serving as the basis for each ministry's unified response to the JCC.

GOAZ has already been practicing many elements of each of the above-mentioned policies and procedures. What is essentially required are not so much adopting radical changes in current practices and organization of the relevant agencies but instead better and more systematic

coordination and supervision of them. To this effect, PIPP recommends the following organizational arrangements:

- Determining the long- and medium-term development objectives and strategies are the most important political decisions that should be made only by the elected leadership (i.e., the President and the Parliamentarian Group of the political party in power) because only they have political responsibility and accountability for such decisions. The present practice in this respect needs to be better coordinated and based on technical grounds by a sub-group of the Cabinet of Ministers.
- This sub-group of the Cabinet, that may be called the High Policy Planning Council (HPPC), would be chaired by the President and composed of his Economic Advisor, the Prime Minister, MOED, MOF, the ANB Chairman (even though he is not a member of the Cabinet), and the line minister(s) who may be invited by the President to participate depending on the agenda of each meeting.
- Secretariat services to the HPPC would be provided by MOED, in close cooperation with MOF and ANB, considering that the work involved is essentially of the planning nature.

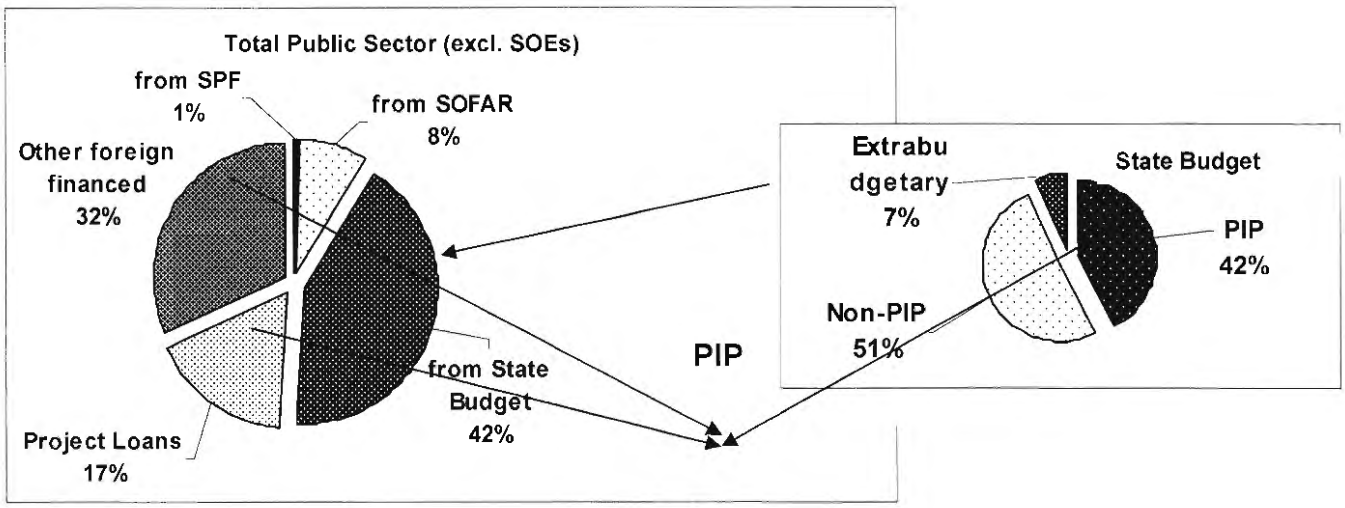
PIPP's recommendations above essentially aim at developing an appropriate macroeconomic and sectoral development framework that will serve as both a reference point and a consistency framework for the public investment policy and program formulation. The same development framework will, however, be shared by all other planning and budgeting documents, thus helping to better integrate the public investment programming with both the planning and budgeting documents. This would in turn result in better integration of planning (e.g., SPPRED) and budgeting (e.g., State budget) documents, particularly considering that the public investment program will largely be included in both categories.

Introduction

1. At present, Azerbaijan does not have a systematically thought-out and well-designed PIPP. Of total public capital (investment) spending (excluding that of fully or partly State Owned Enterprises -SOEs), just over 40 percent appears in the State Budget and the rest funded externally as well as by SOFAR and SPF does not. Of the part included in the State Budget, only less than a half is also included in the Public Investment Program (PIP). Most of externally funded public capital spending, which is not in the Budget, is however included in the PIP. In other words, there is a part of total public capital spending (other than that of SOEs) which is in neither the Budget nor the PIP. This sounds almost incomprehensible, and yet it describes the actual situation (see Diagram 1). The picture becomes even more perplexing considering that the PIP-related draft regulations, waiting for the Presidential approval, call for the inclusion of the SOE projects as well as the private sector projects of public importance. Obviously, with such fragmented and ambiguous public investment programming, it is not possible even to speak of any public investment policy in Azerbaijan. Hence, it would not be inappropriate to state that PIPP's importance is not adequately recognized by the Government of Azerbaijan (GOAZ).

This note aims at briefly explaining: (a) the importance of PIPP, and (b) the required institutional and technical framework to formulate a proper PIPP. The note is solely interested in effectively communicating the PIPE's position on these two issues to the top decision makers in the Government. To this end, it relies on elementary economics and national income accounting and on repetition of some key points to drive them home.

Diagram 1: Public Sector Investments



Importance of PIPP

2. PIPP is important because of crucial effects of investment in general and public investment in particular, on the economy and well-being of the population. The overall goal of government in every country is (or should be) to maximize the country's total resource use in the most efficient way. Resources can be used up for either consumption or investment. The word "efficient" is a highly loaded adjective in the context it is used here: it refers to the way national resources should be used to give the population the greatest possible satisfaction increasing at a steady rate over the long-term.

3. Population derives satisfaction from consumption, as opposed to investment, of national resources (goods and services). Hence, as consumptions' share of total national resources increases, the population becomes better provided for and happier, and consequently the government becomes more successful and popular. Population's overall satisfaction from consumption depends not only on the size of total consumption but also on the quality of consumption and on its distribution both between government (collective) and private consumption and by income groups.

4. On the other hand, investment is important because it represents an addition to the existing production capacity and thus makes a higher future consumption possible. Hence, keeping investment lower to allow for greater satisfaction (consumption) by population now comes at the expense of lower future satisfaction (consumption).

5. Investment is also important because its quality (technology) and distribution between government and private investment, between foreign and domestic investors, by sectors, by regions, by size of investors, etc. are all very relevant to the level, composition, and quality of consumption, hence satisfaction, that would become possible in future.

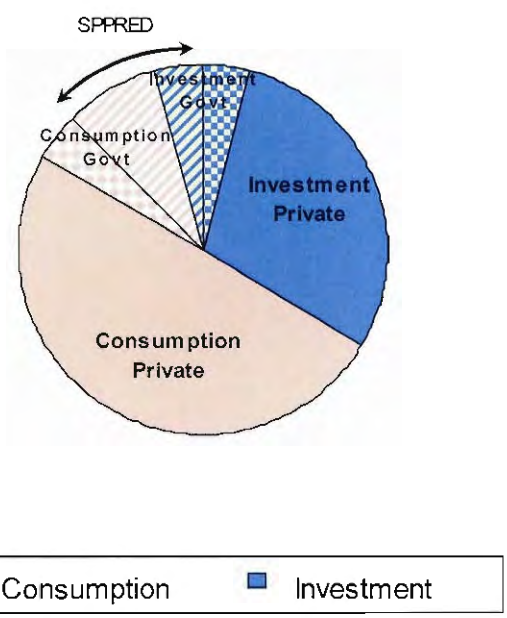
6. Finally, investment is important not only because it represents additional productive capacity but also because it directly and one-to-one increases current total demand, thus constituting an important element of demand management policies for macroeconomic stability.

7. GOAZ has all the power (authority) and the means (e.g., the fiscal, monetary, exchange rate, and other policies) to determine or influence the overall size, composition and growth path of national consumption, and thus well-being of the people, both directly through consumption-related policies and activities and indirectly by investment-related policies and activities. Reciprocally, this means that the Government could determine or influence the overall size, composition and growth path of national investment, and thus the future well-being of the population, both directly through investment-related policies and activities and indirectly by consumption-related policies and activities.

8. More specifically, once GOAZ decides on what should be the size and growth path of total resource use by the public sector, it has an immense task of allocating and prioritizing public resource use between collective consumption (current expenditures) and collective investment (capital expenditure) and the each among various sectors. Finally, the size and composition of public investment and its growth path will be the main factor determining both the size and composition of future public consumption, and it will also greatly influence both composition and productivity of future private sector investment.

9. The following pie diagram (Diagram 2) illustrates the main components of national resource use in any economy as described above, except for the distribution of private consumption by income groups and that of public resource use by economic sectors. Public investment and consumption expenditures are each shown as broken-down by poverty-reduction-related expenditures and otherwise, thus identifying the share of total national resources used by the public sector for poverty reduction purposes (i.e., for SPPRED in Azerbaijan).

Diagram 2:
AZERBAIJAN
TOTAL RESOURCE USE IN 2004



10. Diagram 2 delineates the distribution of national resource use between consumption and investment at about 60/40, which roughly corresponds to that in Azerbaijan in 2004. Unfortunately, it is not possible to give the specific Azerbaijan data for any other components of the diagram because of the lack of such statistics in the national accounts publications of the State Statistics Committee (SSC). The allocation of total investment between the public and private sector and that of the former between SPPRED and non-SPPRED are not known. The estimation of "public sector consumption" in national accounting terms is of doubtful reliability, and what part of it goes to SPPRED is not known. Obviously, GOAZ cannot have a sound macroeconomic and sectoral planning, nor can it formulate and pursue healthy macroeconomic, fiscal, investment and monetary policies without correctly defined and estimated (i.e., by national accounting concepts and methodology) components of national resource use as described above.

11. The following sums up the important **conclusions of this section**:

- The formulation of a sound public investment policy and program is of utmost importance for Azerbaijan as for all countries;
- This is a highly skill-requiring technical task and that it should be handled by expert cadres in line with national and sectoral objectives and major strategies determined by the government;
- A corollary of the above is that the PIPP process should not be subject to arbitrary interventions by the politicians and high government officials;
- GOAZ, however, does not have a PIPP even slightly resembling to that described above; and,
- Both GOAZ and all major IFIs seem to have overlooked the need for correctly defined and estimated national and government accounting components, which are the bread-and-butter tools of proper macroeconomic analysis and management. It is time now to act on this serious shortcoming.

Required Macroeconomic Framework for a Proper PIPP

12. What emerges from all that was said so far is that a sound PIPP cannot be formulated in isolation from other major planning (SPPRED, SPRDP, and Sector Development Plans) and budgeting (State Budget, Consolidated Budget and MTEF) instruments, because (a) they all aim at formulating the future course of the same or inter-related components of the macroeconomic and sector development framework as the PIPP does and (b) the PIPP is either fully or partly included in all of them. It also follows that all major planning and budgeting instruments, including the PIPP, should be guided by the same macroeconomic and sector development framework. The latter should also be used as a consistency framework to align the planning and budgeting instruments with each other.

13. At present, in the absence of such a macroeconomic and sectoral development framework, the Azerbaijan economy is like a rudderless boat at sea, without the necessary instruments to keep it on a desired course. For instance, it has the following policy and planning instruments each suffering, as indicated below, from major shortcomings:

1. A Macroeconomic Financial Model (MFM) was used to be worked out essentially by the IMF, with the help of MOF and the National Bank of Azerbaijan (NBA), for defining the key fiscal and monetary magnitudes compatible with macroeconomic

stability required by the Fund's PRGF for Azerbaijan. GOAZ, however, has decided not to seek continuation of PRGF beyond 2005. Besides, the PRGF model does not have any sectoral content, nor has any consideration of the private (non-government) sector. It is interesting that this framework, which used to serve as the basis of the GOAZ's Letter of Intent presented to the IMF and the WB for PRGF and PRC , respectively, was observed in the formulation of only the monetary program but not in that of the State Budget, SPPRED and SPRD.

2. MOED/EPFD prepares a set of macroeconomic projections, without using any formal model, which is inserted into the text of SPPRED without being integrated with its content. The State Budget uses the MOED/EPFD projections for its revenue estimates and the PRGF model for expenditure ceilings (the logic of MOF approach in this case is beyond PIPE's comprehension).
3. A poverty reduction strategy paper (SPPRED) and a regional development program (SPRD), which are both without any framework of their own and both lack any linkage to an economy-wide macro and sectoral framework. The SPPRED purports to plan the government's poverty reduction policies, but it does so without identifying what parts of public investment (which itself is not known as noted above) and public consumption expenditures will be used for that purpose. Nor does it have a clear one-to-one relationship to the government budget as its policies and activities are not annualized and adequately specified.
4. Sector Development Plans by a number of line ministries, each reflecting aspirations of its sector irrespective of any resource and consistency concerns.
5. An annual State Budget that leaves out all foreign funded investment projects, and most projects of the extra-budgetary organizations (namely, SPF and SOFAR). The Budget has only a "notional" link to SPPRED and SPRD as line ministries claim that all their spending proposals are in line with government priorities for poverty reduction policies.
6. A so-called Consolidated Budget that includes only the domestically funded part of the present PIP just as one line item.
7. A four year rolling Medium-Term Budgetary Framework (MTBF) compressed into a one-page table.
8. Finally, a Public Investment Program (PIP), which has an "indeterminate" and partial coverage as noted at the beginning of this paper.

14. What emerge from the above review are the following basic initial requirements, should Azerbaijan have a sound and effective PIPP:

i. The PIPP preparation should start with the adoption of:
   a) a correct definition and coverage of public investment as a basis for the formulation of a comprehensive public investment policy; and
   b) a set of comprehensive and adequately detailed government instructions and guidance as to national and sectoral development objectives and strategies over the medium- to long-term.

ii. For logical and consistency reasons, this set of instructions and guidance should be shared and complied by all those planning and budgeting tools named above.

iii. The determination of national and sectoral objectives and strategies, which is essentially a political decision by the government, should nevertheless be based on a national and sectoral development framework (model) in order to ensure their feasibility and inter-consistency.

iv. Similarly, the PIPP should be developed by using one and the same national and sectoral development framework that should also be shared by all other planning and

budgeting instruments. This would ensure both intra-consistency of the PIPP as well as its integration and consistency with other plan and budget documents.

Required Institutional and Organizational Setting

15. At present, Azerbaijan does not have a PIPP satisfying the above requirements. The PIPE project aims at helping the GOAZ to develop its institutional and technical capacity to meet these requirements. To this end, the PIPE WP's first three tasks address the following issues:

1. Identifying the necessary organizational set-up for the Government to determine national and sectoral development objectives and strategies;
2. Developing an appropriate national and sectoral development framework (model) at the MOED with the cooperation of MOF and NBA; and,
3. Enhancing the institutional and technical capacity of the sectoral agencies (ministries) as well vis-à-vis these two aspects.

16. As already explained, these three tasks are not specific to the PIPP alone. They are equally important for all other planning (SPPRED and SPRD) and budgeting (MTBF, State Budget, Consolidated Budget) instruments and, therefore, have to be addressed so as to serve the common requirement of all the major documents. PIPE is addressing the first issue in this paper, and leaving the other two to be addressed in separate technical notes.

17. **Government's Political Responsibility:** Defining national and sectoral development objectives and strategies is essentially a political decision that can (and should) be made only by the government. It involves accepting certain trade-offs, in terms of economic, social and political costs, for choosing one alternative against another. For instance, in order to allow greater current and capital spending on education, the government may opt to reduce productive investments now, entailing a lower annual rate of growth and lower consumption by the population. This decision might yield adverse political consequences for the government in the short run. Besides, in a democratic country, only the elected government should have the authority and responsibility for decisions involving trade-offs between the current and the future generations' benefits.

18. The elected central Government in Azerbaijan comprises the Parliament, representing the legislative power, and the President the executive power. The major planning and budgeting documents mentioned above should be prepared and implemented by the Administration, on behalf of the President, and endorsed by the Parliament, all in accordance with the relevant legislation. The successful formulation and implementation of the plan and budget documents will greatly contribute to Azerbaijan's having a satisfactory social and economic development; and to the Government and the political party it belongs to remaining in power. It is thus of crucial importance that the Government (the President and, on his behalf, the Cabinet of Ministers) uses the plan and budget documents as the effective vehicles to implement its Party program, its last election platform, its recently announced promises in connection with the recent Parliamentary elections, and recent official statements to various IFIs and international forums.

19. This requires that the Government provides all its central and line agencies with a comprehensive but adequately detailed set of guidance and instructions for national and sectoral development objectives and strategies as perceived by its elected leadership and

political cadres. At present, however, the GOAZ is indifferent to such a critical issue as reflected in the absence of any meaningful guidance by the government to the agencies in charge of the plan and budget documents. This not only leads to weaknesses and inefficiencies in the management of the economy but also deprives the Government of a major opportunity to strengthen its political standing with the electorate. Once the proposed conceptual and organizational linkage is publicly established between the plan/budget targets and the Government/public's political choices, this will greatly contribute to the strengthening of participatory and democratic governance in the country. Otherwise, the government's apathy in this respect cannot be rectified by the bureaucratic/technical cadres because both responsibility and accountability of providing the required guidance to the plan and budget preparation are of political nature and belong to the elected leadership.

20. **Organizational Set-up for Undertaking and Evaluating Technical Work:** Identifying national and sectoral development objectives and strategies is a political task with responsibility and accountability belonging to the Government (President and on his behalf the Cabinet). But as already explained in the previous section, this task involves extensive and highly skill-intensive work that should be undertaken by technical cadres. This is particularly the case considering that the work to be done should provide guidance not only to the PIPP but, as explained above, simultaneously to all the plan and budget documents. On the other hand, the review and evaluation of such an extensive and technical work cannot be done by the whole Cabinet and the President.

21. It is therefore suggested here that an "Inner Cabinet" comprising the economic ministries/agencies is formed to review, evaluate and screen the decisions and documents relating to major economic and social programs before submitting them to the Cabinet and the President for approval. This Cabinet cluster can be called the "**High Policy Planning Council (HPPC)** for Socio-Economic Programs and Policies". Technical work to be done for the HPPC essentially involves development planning (i.e., developing a macroeconomic and sectoral framework; identifying appropriate development targets and policies; and checking their inter-consistency). Therefore, such "**Secretariat Services**" should be provided by MOED in close cooperation with MOF, NBA and all technical ministries and agencies. While providing secretariat services to the HPPC, MOED could also benefit from its participation in and/or consultation with such cross-cutting inter-agency bodies as the WB-proposed Budget Commission and the existing Revenue Commission, the Expenditure Commission, and the Revenue Management Group (of the major donors).

22. **A Unified Process for Launching Preparation of the Plan and Budget Documents:** It is hoped that this note has by now established that:

1. The preparation of PIPP should be guided by the **same set of macroeconomic and sectoral development objectives and strategies** that should also guide all other plan and budget documents;
2. **The one-and-the-same macroeconomic and sectoral development framework (model)** should be used to ensure both linkages and consistencies of these documents with both government objectives and strategies and with each other;
3. **Responsibility and accountability** for determining national objectives and strategies rest with the **Government (the elected leadership)**; and,
4. The government should exercise this responsibility through a Cabinet cluster (**HPPC**) and a Planning Agency **(MOED)** provide secretariat services to it.

23. The next issue is how to assure that the individual plan and budget documents will conform to government objectives and strategies and will be interlinked and consistent with each other. This requires that the initial guidance and instructions (e.g., Budget Call Circular) issued to set-off the preparation of each document by the relevant ministry/agency are designed with a proper concern for all the issues raised above, and that this is verified by MOED. At present, however, the work on the individual documents is started by different ministries and even different departments within a ministry at different times and perhaps with little ad hoc guidance by and consultation with the elected leadership of the Government. Moreover, the MOED is neither authorized nor technically equipped with for evaluating and endorsing the separate Call Circulars (e.g., for SEDP, SPPRED or its Annual Performance Review, the State Budget and MTBF, and the PIP).

24. The remedy to the fragmented state of macroeconomic and public expenditure management in Azerbaijan can be provided by:

- Unifying the separate guidance and instructions issued at different times for each plan and budget documents into a "Joint Call Circulars" (JCC);
- Unifying each line agency's responses to the JCC's request for inputs to different plan and budget documents into one combined response; and
- Supplying the same set of information from all the budget organizations to the central ministries (MOED and MOF) to serve as the common base for the preparation of both planning and budgeting documents, thus assuring their linkages and consistency with each other.

25. There will be a need, however, to synchronize the preparation of all planning and budgeting documents. This should not cause much difficulty because the preparation of MTBF and State Budget is a combined annual process with a definite time-table while the planning documents can both be flexible with regard to their inception date and work perfectly well with a few months old information. On the other hand, the budget organizations will benefit immensely from the proposed approach of issuing a JCC to them for a unified response that will simplify and reduce reporting responsibilities and will ease achieving consistency between their planning and budgeting submissions.

26. The proposed organizational set-up for effective linkage and integration of the main plan and budget instruments with national and sectoral objectives and strategies as well as with each other is delineated below by an organogram (organizational chart). The main issues of the PIPE-proposed approach which are highlighted by Diagram 3 are as follows[1]:

The diagram shows the main flows of information both among the key agencies and between the each agency and the main document(s) it is responsible for.

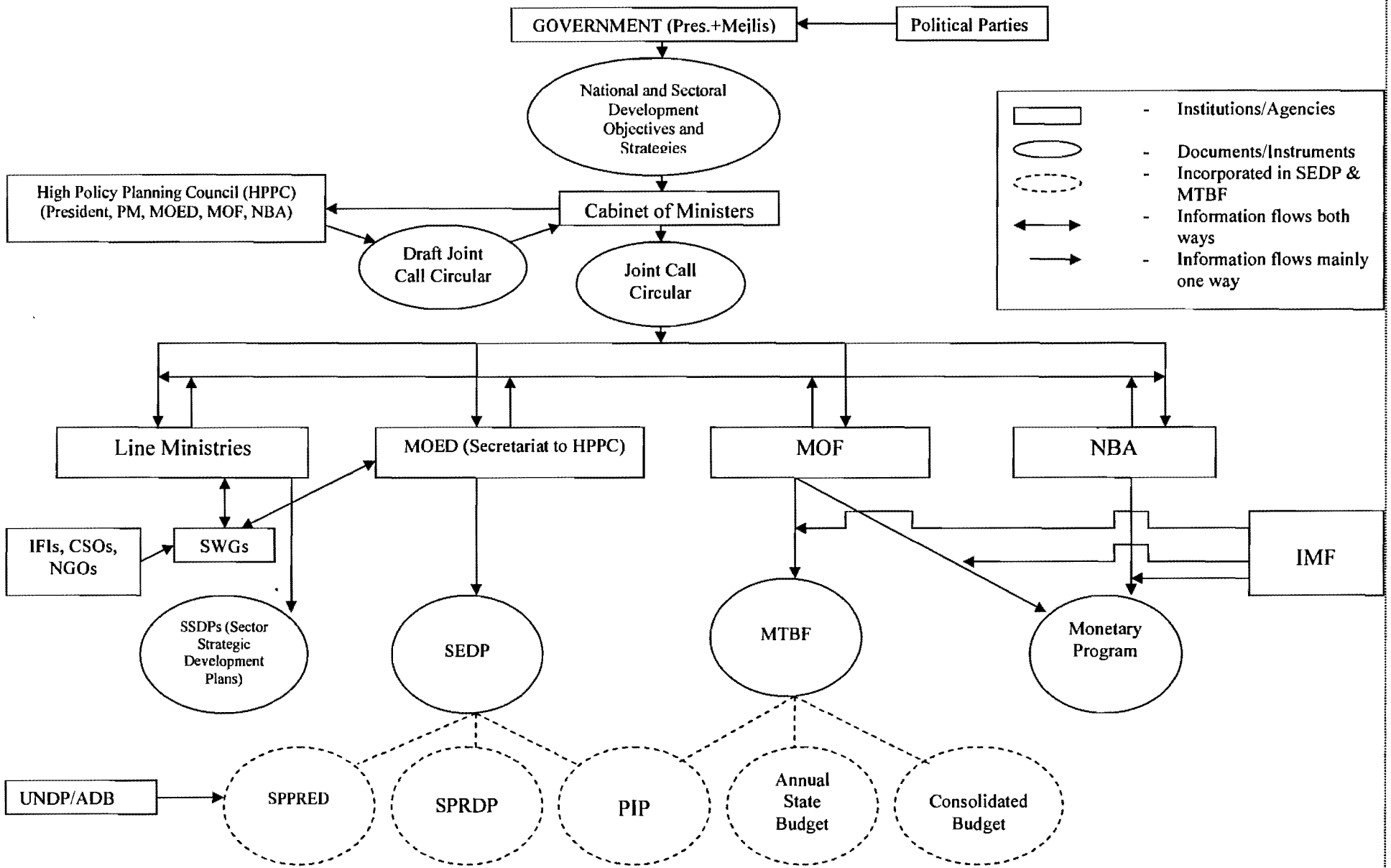
- The preparation of all the key plan and budget documents starts with the issuance to the Cabinet of Ministers (and the public) of national and sectoral development objectives and strategies by the GOAZ (the elected leadership);
- The HPPC reviews and evaluates the alternative macroeconomic and sectoral development scenarios prepared by MOED (with the help of MOF, NBA and line

[1] **Note:** The Diagram shows the information flow among the agencies and from each agency to its main document(s). But it does not show the inter-documents flows, which will make a diagram to a clumsy. Obviously, inter-documents flows take place through the exchange of raw data and agencies draft copies as well as among free use of thru each document by all agencies.

agencies) with their fiscal and monetary implications, and decides on a base-line as well as an optimistic scenario to recommend to the COM.

- Based on the Cabinet's decision, a detailed draft JCC, with tentative sector spending ceilings, is issued to all budgetary organizations. The JCC will require line ministries to simultaneously submit to MOED and MOF their responses, which should each combine inputs for SPPRED, SPRD (or their Annual Progress Reports), MTBF, Consolidated Budget, State Budget, and PIP.
- In the light of the draft JCC, each line ministry will prepare (or revise the existing) SSDP for its sector. In this endeavor, it will also benefit from the recent SWG findings and recommendations as well as from consultations with non-government stakeholders of the sector.
- If prepared in line with the guidance and instructions of the JCC, particularly with its sector resource/spending ceiling, SSDP will serve as an ideal source for the ministry's joint submission to MOED and MOF of its unified input for all plan and budget documents.
- MOED must have already developed a medium-term (4-year) macroeconomic and sector development framework (Social and Economic Development Concept and Prognoses- SEDCP) while preparing the draft JCC for the HPPC. Line ministries' responses to the JCC will be now used to revise and update SEDCP, which would in turn be used, in conjunction with the former, as the basis for the preparation of SPPRED, SPRD, and PIPP.
- It is only rational to assume that no policies, activities and projects will be included in the base-case scenarios of SPPRED, SPRD, and PIPP which are not already in line ministries' submissions for the MTBF and Budget documents. This, however, requires that the said documents are transformed from being wish-lists, including "every good thing under the sun", to the operational documents recognizing the economic, social and political constraints of the country.
- While MOED is working on the plan documents, MOF will simultaneously work, using the JCC and line ministries' unified responses to it, on the MTBF, the Consolidated Budget and the State Budget, which will all incorporate the PIPP. The MTBF will in fact provide a macroeconomic and sector framework and justification to all the budget documents, linking them to SEDCP, SPPRED and SPRD.
- Finally, the NBA will develop, in cooperation with MOF and the IMF, the Monetary Program which should be compatible with, and instrumental in achieving, the growth, inflation, and exchange rate targets of GOAZ within the framework of SEDCP.

DIAGRAM 3: FLOW OF INFORMATION FOR PLANNING & BUDGETING PROCESSES (A Proposed Approach)



Proposed Structure and SOW for the HPPC

27. **The Structure of HPPC**: In Azerbaijan, the President alone represents the executive (and administrative) power and shares with the Parliament (the legislative power) the responsibility for governing the country. The President exercises the executive power through a Cabinet of Ministers appointed by him, though the appointment of the Prime Minister (PM), who has mainly a coordination role, is to be approved by the Parliament. Thus, the preparation and execution of all the plan and budget documents are the responsibility of the President, who discharges it with the help of the PM and the Cabinet. Within the Cabinet, the planning work (e.g., SPPRED, SPRD, PIP) is led and mainly undertaken by MOED and the budgeting work (MTBF, State Budget, Consolidated Budget) by MOF. These tasks, however, are too wide-ranging and widely cross-cutting in coverage, involving the whole economic and social development spectrum, and too specialized in skill requirements for the whole Cabinet to carry out the guidance, oversight, appraisal, and approval of them as a team[2]. As in most countries, it is, therefore, advisable to form a special "Cabinet cluster" to guide, evaluate and screen major planning and budgeting decisions and documents before their final submission to the Cabinet and the President[3]. To this effect, PIPE proposes establishment of a **"High Policy Planning Council (HPPC) for Economic and Social Development"**.

28. **The HPPC will be established by a Presidential Decree that will also sanction its charter.** The President himself will be its chairman, and its statutory members will include the State Economic Advisor (SEA), the PM, MOED, MOF, and the Chairman of NBA. The President may ask SEA or PM to chair some meetings on his behalf. The chairman may also invite other ministers/agency heads to participate in parts of meetings as he deems necessary depending on the agenda. As secretariat services are to be provided by MOED, the Deputy MOED or Director of MPFD/MOED should also be present as advisor and reporter. Participating ministers and agency heads will be accompanied by their advisers, whom may be called upon to present technical information on and justification for their agency's case. The HPPC meetings will be convened by the President to discuss the issues identified in its charter as they become due for decision as well as on ad hoc basis when he needs its advice. The meeting may last from a few days to a week or even longer depending on the subject(s) of its agenda.

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[2] At present, ministers and non-ministerial members of the Cabinet of Ministers in Azerbaijan amount to 38. However, as distinct from the countries with a parliamentarian system of government, a Cabinet decision in Azerbaijan is not expected to be signed by all members. For instance, in the case of the draft Budget, about 25 signatures are needed for its submission to the President.

[3] When met with such proposals, the government officials in Azerbaijan are usually interested to first know if they are implemented in some countries. However, the PIPE proposal for the establishment of HPPC does not need examples for convincing anyone as it is based on an undeniable need for a centralized determination of national and sectoral objectives and strategies and is obviously the most logical and simplest approach to meeting this need. Nonetheless, the following examples are still quoted here to satisfy those who will not be content with rationality alone. The World Bank prepared a note (dated June 2005) on "Azerbaijan: Ideas for a Budget Reform Action Plan", which also suggests the establishment of a "Cabinet sub-structure" for the same purpose as that of the PIPP's HPPC, and briefly explains the examples of South Africa and Uganda. We would like to add to this the examples of Turkey ("Yuksek Planlama kurulu" –High Planning Council—since early 1960s) and the Philippine.

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AZERBAIJAN: PIP PROJECT

PUBLIC INVESTMENT POLICY PROJECT

December, 2005

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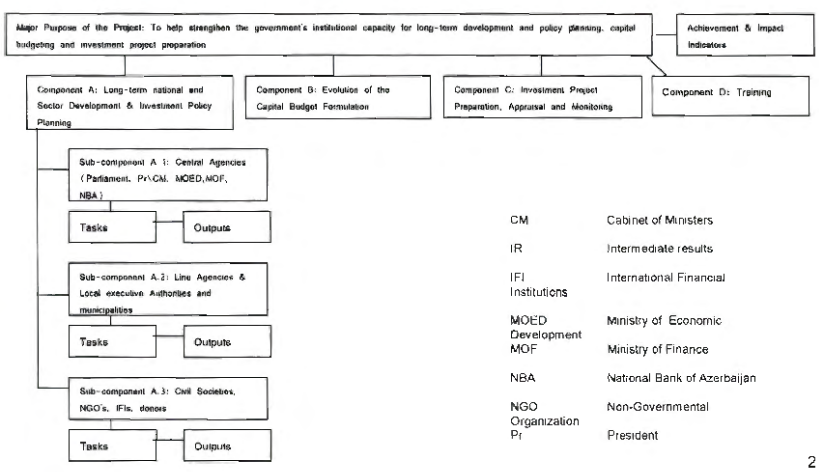
PIP Project Roadmap



CM	Cabinet of Ministers
IR	Intermediate results
IFI Institutions	International Financial
MOED Development	Ministry of Economic
MOF	Ministry of Finance
NBA	National Bank of Azerbaijan
NGO Organization	Non-Governmental
Pr	President

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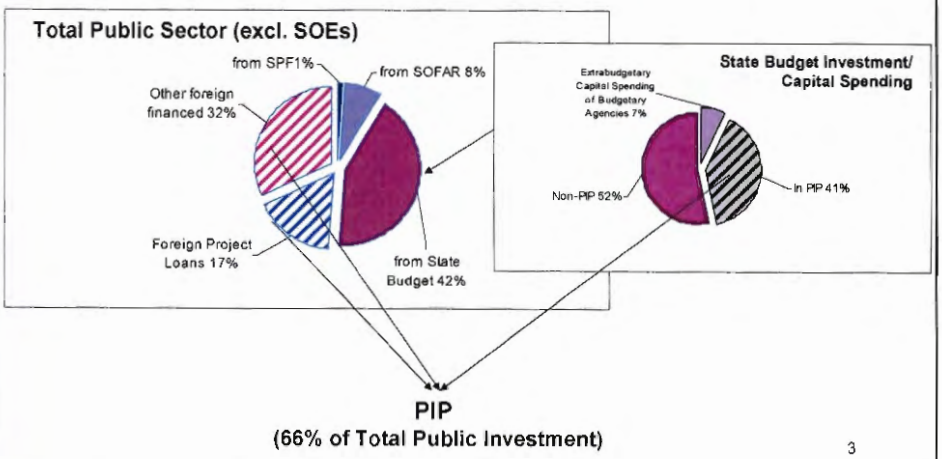
Public Sector Investment 2005 (Planned)



PIP
(66% of Total Public Investment)

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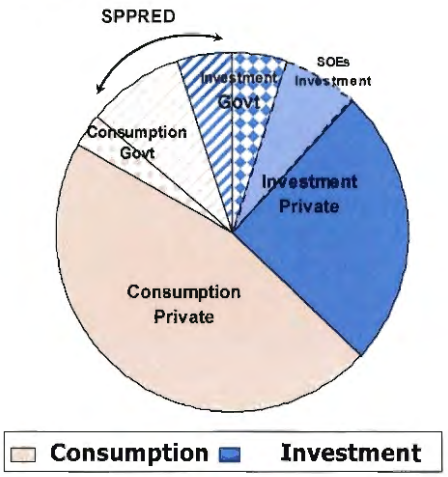
Public Sector Investment Programming
The Current Situation

- Total Public Sector investment is determined in a highly fragmented manner.
- There is no any comprehensive public investment policy formulation.
- The PIP is only a collection of some public investment projects selected on ad hoc basis.
- The present fragmented state of public investment policy in Azerbaijan deprives the government of the opportunity to accelerate the social and economic development of the country.

AZERBAIJAN TOTAL RESOURCE USE IN 2004



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Importance of Investment

- **Total resources** = Gross Domestic Product + net imports (- net exports).
- Total resources are used for either **consumption or investment**.
- The people's **welfare and satisfaction with the Government** depends on the level of total consumption and its distribution by **income classes, social groups, and regions**.
- **Investment** is very important because it increases:
  - **Production capacity** and thus **future consumption**; and
  - **Aggregate demand** and thus **inflationary pressure** that may reduce real consumption
- Both the **quality (technology) and distribution of investment** is critical to the level, quality and distribution of future consumption, and hence the people's future welfare.

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Importance of Public Investment

- Government can decide how much of the total resources it will use and how to divide it between **public consumption** and **public investment**. This strongly affects the people's welfare.
- Everything said before for investment is also valid for public investment.
- In addition, public investment influences the future level and composition of public consumption, and thus the people's future welfare.
- Public investment also influences the level, composition and productivity of future private investment, which in turn affects future consumption (welfare) of the people.
- Government also influences SOEs' investments, which are part of non-government investment in a market economy.

Conclusion

- Public investment policy is a **very powerful instrument** in managing social and economic development of the economy; and,
- The formulation of a sound public investment policy and program is a skill-intensive task, and , hence, should be left to specialists once the government sets the national and sectoral development objectives and strategies.

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How remedy the fragmentation in Public Investment Programming

- Clearly identify the long- and medium-term national and sectoral development objectives and strategies;
- Adopt **SMART** (**S**pecific, **M**easurable, **A**chievable, **R**esult-oriented, and **T**ime-bound) medium-term targets and the necessary policies and projects to attain them;
- Assure the **consistency** of all major targets, strategies and policies with national and sectoral development objectives as well as with each other;
- Based on all these, issue early in each fiscal year a "**Joint Call Circular" (JCC)** to all government organizations to guide and instruct them for their planning and budgeting submissions to MOF and MOED;
- Make the **PIP a policy instrument** for a comprehensive review, evaluation and guidance of the government's public investment policy;
- Instruct all line ministries to prepare a **SSDP** incorporating all sub-sector programs and serving as the basis for each ministry's unified response to JCC.
- This practice could be coordinated and based on technical grounds by a Cabinet sub-group that may be called the **High Policy Planning Council (HPPC)**.
- **Secretariat services** to the HPPC could be provided by MOED, in close cooperation with MOF and ANB, considering that the work involved is essentially of the planning nature.

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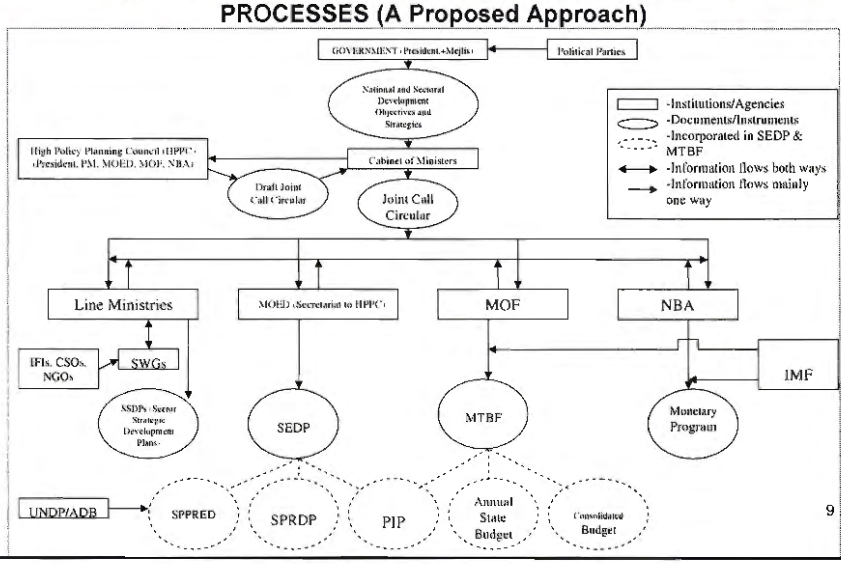
FLOW OF INFORMATION FOR PLANNING & BUDGETING PROCESSES (A Proposed Approach)



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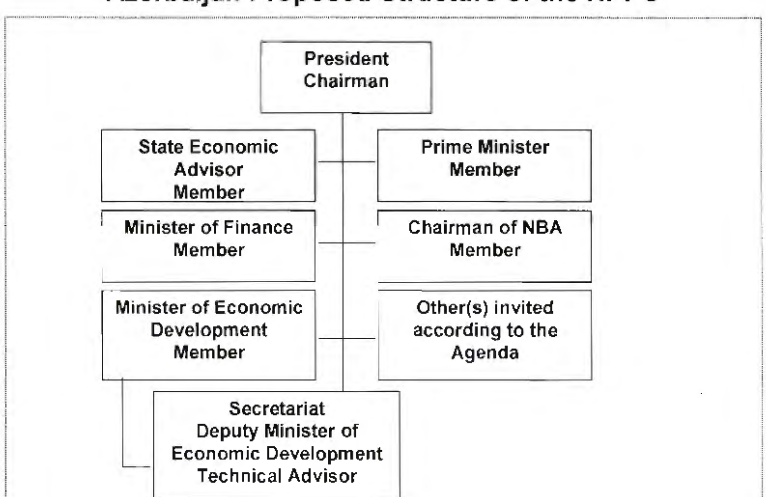
Azerbaijan Proposed Structure of the HPPC



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PUBLIC INVESTMENT POLICY PROJECT

TECHNICAL NOTE ON PREPARATION OF SECTOR STRATEGIC DEVELOPMENT PLAN

OCTOBER 2005

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TECHNICAL NOTE ON PREPARATION OF SECTOR STRATEGIC DEVELOPMENT PLAN

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ABBREVIATIONS

CGC	Caspian Group Consulting
COM	Cabinet of Ministers
EBRD	European Bank of Reconstruction and Development
GOAZ	Government of Azerbaijan
IMF	International Monetary Fund
LOI	Letter of Intention
M&E	Monitoring and Evaluation
MOED	Ministry of Economic Development
MOF	Ministry of Finance
MOIE	Ministry of Industry and Energy
MPF	Macroeconomic Policy and Forecasting Department at MOED
MTEF	Medium-term Expenditure Framework
NBA	National Bank of Azerbaijan
PCU	Project Coordination Units
PIP	Public Investment Program
PIPP	Public Investment Policy Project
PIU	Project Implementation Unit
RDP	Regional Development Program (State Program for Social Development of Regions)
SDP	Sector Development Plan
SOC	State Owned Companies
SOE	State Owned Enterprises
SPPRED	State Program for Poverty Reduction and Economic Development
SSDP	Strategic Sector Development Plan
STTS	Short-Term Technical Specialists
TP	Training Plan
WB	World Bank
WP	Work Plan

EXECUTIVE SUMMARY

Sector Programs have been developed for many of the sectors reviewed by the PIPP. As stand alone sector programs, many have merit and clearly have been arrived at after some careful but solely sector-centric strategic consideration. The difficulty lies with how these sector programs are integrated into and aligned within a single national development strategy. Consequently, what might be described as outstanding individual sector efforts combine to result in an inefficient and only partially relevant public investment program. Successful sector development programming in one sector cannot be achieved in isolation of the national development objectives and strategies and of the other sector development programs. In fact, the preparation of a successful sector development program is predicated upon:

- The specification of a single national and sectoral development framework that clearly articulates the long- and medium term objectives and strategies and is constrained by a macro-economic envelope providing the top-down discipline to the sector public investment programs.
- The planning process having a clearly defined coordination body that facilitates the reconciliation of bottom-up sector development demands with top-down strategic and macro-economic constraints.
- The adoption of a consistent rationale for prioritization of projects across all four tiers of Government that justifies projects based upon alignment with the strategic objectives as well as economic efficiency.
- The synchronization of planning, programming and budgetary processes across all four tiers of Government

The PIPP has prepared a "Technical Note on the Preparation of Sector Strategic Development Program" that provided both a "Guide" for successful programming and reviews of the current practice in this respect in the five selected sectors included in the first year Work Program of the Project. The sectoral programming reviews suggest that some of the requirements for the successful preparation of SSDPs are absent in practice. The key issues are highlighted below:

1. ***Issue**: Sector Development Strategies are not directly derived from the National and Regional Development goals and objectives and do not include quantifiable, measurable, time-bound targets.*

   Recommendation: Sector Development Programs must be derived directly from the National and Regional Development Programs. The Sector Development Programs must incorporate measurable, time-bound targets, in relation to which the effectiveness of sector development investments can be assessed through the institution of an effective monitoring and evaluation mechanism and by which the sector leaders may be held accountable. The top-down discipline should be limited to strategic direction and sector allocation balance. The exception would be in the case of nationally strategic projects.

2. ***Issue**: Coordination within the current sector development process is limited to endorsement of individual Sector Program project lists submitted for Presidential approval at different times and circulated to the Central as well as the Line Ministries. This is an ineffective substitute for a coordination process.*

   Recommendation: The process would benefit from a more comprehensive integrated coordination process centered at the MOED. Such coordination should aim at the reconciliation of sector investment demands with macro-economic and budgetary constraints. It must also incorporate a scrutiny by the MOED of the alignment of sector programs with each other and with national and regional development objectives. Reconciliation of sectoral investment demands with both strategic framework and resource constraints should be based upon prioritization criteria that emanate from the national and sectoral development objectives and strategies.

3. ***Issue**: Projects are developed by sector departments and agencies without consideration for resource envelope constraints or strategic priorities derived directly from the National and Regional Development objectives.*

   Recommendation: Sector Ministries should coordinate selection of projects on a prioritization basis aligned with sector strategic priorities (in turn aligned with national strategic objectives) and resource constraints along with technical feasibility and cost benefit analysis of different projects. In coordinating the inclusion of projects careful consideration should also be given to inter-sector linkages.

   ***Issue**: Monitoring is for the most part currently limited to audit and project tracking and consequently, the planning process is not informed by development outcomes.*

   Recommendation: Monitoring and Evaluation frameworks must be established as early as possible to effectively guide the planning process and ensure that public investment is efficient and effective in meeting the country's strategic objectives.

4. ***Issue**: There are no formal guidelines for the preparation of sector development programs and PIP call circulars do not provide enough detail to be effective in systemizing or standardizing the public investment programs.*

   Recommendation: Adopt the use of a Joint Call Circular that addresses the planning and sector development program as well as the PIP formulation process.

A few specific actions, if undertaken, would substantially improve sector development planning and budget formulation in Azerbaijan along the above lines:

1. Use a synchronized and integrated approach to planning, programming and budgeting.
2. Adopt the application of a Joint Call Circular.
3. Shift away from circulating individual SSDPs for endorsement by different ministries and adopt a definite coordination role for the MOED and MOF.
4. Embark upon an accelerated program of specifying a set of sector performance indicators and set up the requisite sector monitoring units.

CHAPTER 1. TECHNICAL NOTE

INTRODUCTION

The PIPP project aims at developing the Government's institutional and technical capacity to formulate sound public investment policies, programs and projects both at the central and line agencies level. PIPP's detailed Work Plan (WP), with specific tasks involving Ministry of Economic Development (MOED), Ministry of Finance (MOF) and all line ministries, was presented to all stakeholders and the public through a conference on August 26th, 2005. The PIPP WP, which had been distributed as an attachment of the conference invitations, can also be downloaded from MOED's website (www.economy.gov.az).

The initial tasks of the WP focus on development planning as the Government's public investment policy is to be guided by the country's national and sectoral development objectives and strategies. PIPP experts have therefore started working simultaneously on macro and sector planning and will need cooperation of experts at MOED, MOF and line ministries. This note will briefly explain what should be done with respect to Sector Strategic Development Plans (SSDPs).

PLANNING IN STAGES

For operational purposes, PIPP recommends that the GOAZ should consider development planning as a three-stage exercise:

1. Macro planning;
2. Sectoral planning; and,
3. Projects planning.

All government investment activities (i.e., programs and projects) are realized through the implementation of the third stage, the projects planning, which essentially brings together all government/budgetary agencies' capital spending proposals for the plan period. It is, however, obvious that individual agencies' proposals will need to be guided and constrained by the Central Government in order to ensure that:

- Their total requirements for critical resources (e.g., funding, skilled labor, foreign currency, etc) remain within the national (and feasible) availability of such resources;
- The envisaged growth pattern will satisfy necessary inter-linkages among sectors; and,
- The implied pattern of structural development and income distribution will conform to aspirations of the people as perceived by the Government (i.e., the political party in power).

Such guidance and constraints to be determined by the Central Government will require substantial technical work by the MOED, MOF, NBA and other agencies. This work is to be done at the Macro Planning stage. To this end, the PIPP WP envisages providing the relevant agencies with necessary assistance to develop their institutional and technical capacity for planning (WP tasks #1-4). At the Macro Planning stage, the Central Government will determine both national and sectoral development objectives, strategies, and sectoral resource ceilings within a socio-economic consistency framework. At this point, it is important to make sure that the three stage planning process has adequate built-in mechanisms to stop

it from becoming a top-down "command" exercise but to allow a reconciliation of top-down and bottom-up planning processes. Such reconciliation is attained through Sectoral Planning, which serves as a two-way bridge between Macro and Projects Planning stages.

CONDITIONS FOR SUCCESSFUL SECTOR PLANNING

It is thus clear that for Sectoral Planning to be a useful and effective policy and implementation tool, the following conditions should be fulfilled:

- **A correct assessment should be made of the sector's current state of resources, capabilities, and limitations;**
- **The Agency's mission and its own vision over the plan period should properly be identified in line with the national and sectoral objectives stated by the Central Government;**
- **The Agency's goals should be defined ambitiously but at the same time realistically so as to carry out its mission and attain its vision;**
- **The Agency should determine time-bound and measurable targets so as to realize its goals over the plan period;**
- **All activities and projects necessary to attain the Agency's goals and targets should be properly cost, prioritized, sequenced, and assigned.**
- **In the above processes, the Agency should consult all its stakeholders as much as possible through an effective participatory process.**
- **All such activities and projects envisaged by the SSDP should fully be incorporated in the Government's MTEF for the corresponding period if the SSDP is to be a meaningful (i.e., operational) document rather than a wish-list. Having activities and projects included in SSDP but not in MTEF/Budget serves no purpose other than causing the ministry staff feel disappointed.**
- **While the SSDP's "basic scenario" should fully correspond to the Agency's overall budget (recurrent plus capital), it could also contain an alternative scenario to provide the Central Ministries with a better insight as to the sector's needs and its stakeholders' aspirations.**
- **Finally, SSDP should contain appropriate performance benchmarks and measurements for Monitoring and Evaluation to render it an effective tool for implementation and future planning.**

PIPP has prepared a draft internal **Guide for Sector Strategic Development Planning** (see Chapter 2). This Guide, as all other guides, provides a description of all elements of the sectoral planning process without distinguishing between crucial and routine ones. Therefore, this technical note (like a preamble) is intended to "guide" MOED and line agencies' staff not to miss the crucial issues while using the Guide for SSDP.

RECOMMENDATIONS TO LINE MINISTRIES

At present, almost all line ministries in Azerbaijan have at least one Sector Development Plan *(SDP)*, with varying coverage and sophistication among them. The PIPP Diagnostic Review in May 2005 gathered information about the current processes and documents of sector planning in all major line ministries. With the help of this information, PIPP has produced brief notes (see Chapter 3-7) on the current status of SDPs of the Ministries of Transportation, Energy and Industry, Education, Tourism, and Environment. The Government objective of establishing the necessary capacity to formulate a sound public investment policy and

program will very much depend on adapting the current practice of sectoral planning to that envisaged by the proposed Guide for SSDP. This involves, most importantly, breaking the long-term plan period, ranging from ten to twenty years among ministries, into a medium-term (e.g. four years to correspond to the MTEF period) and beyond. The PIPP WP (Tasks # 5-7) envisages assisting MOED, MOF and line ministries (initially the five ministries noted above) to make such an adaptation, which will particularly involve the following:

1. **Observe the guidance and instructions from the Government (i.e., President or the COM) regarding national and sectoral development objectives, strategies and resource ceilings** (at present, the Government does not issue such guidance);
2. **Have sector "Goals – Targets – Activities and Projects" linked to each other within a result-oriented logical process, which will pave the way for program budgeting;**
3. **Make sure that all planned activities and projects of the sector agency are identified in annual terms (or at least for the first year of the plan period) and are exactly the same as those submitted for the Medium-Term Budget purposes (both recurrent and capital spending). Hence, there is no need for separate costing of SSDP activities and projects.**
4. **Stop sending draft SSDPs to the COM before they are scrutinized by MOED and MOF for their consistency, both in policy and technical terms, with the economy's macro and sectoral development framework over the plan period.**
5. **In the planning process, the role of the COM and President's Office should be confined to (a) setting the objectives and broad strategies and (b) approval of the final plan.**

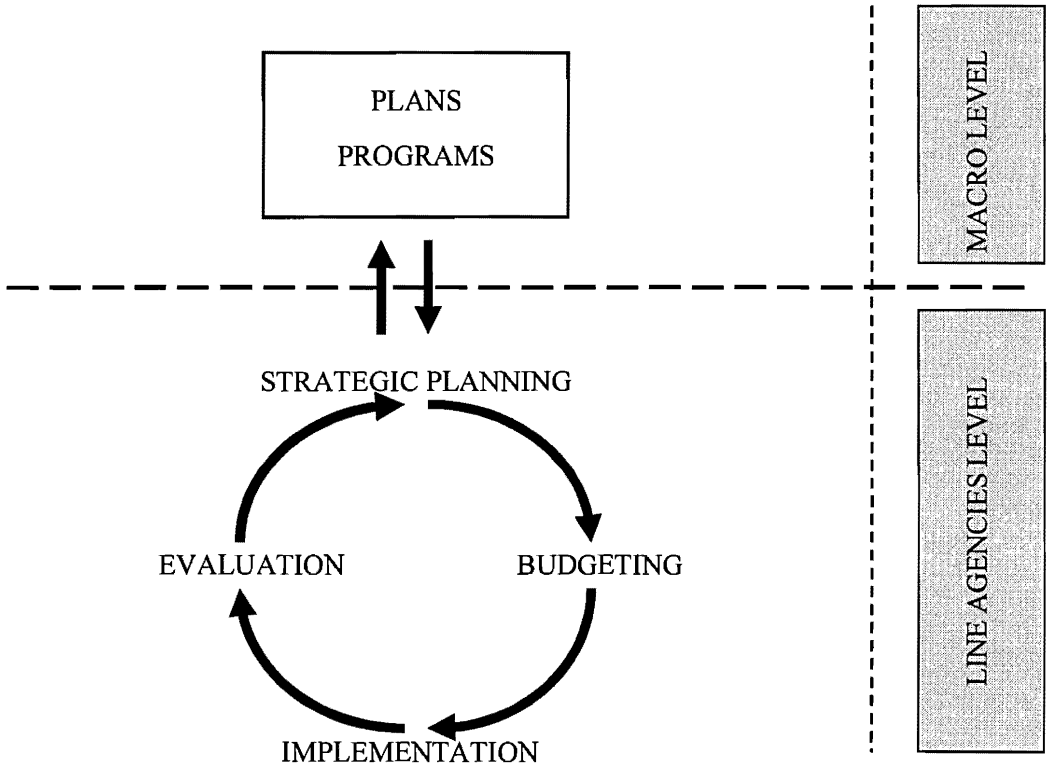
CHAPTER 2. PIPP PROJECT INTERNAL GUIDE

PREPARING A SECTOR STRATEGIC/DEVELOPMENT PLAN (SSDP)

PURPOSE

- SSDPs will help the allocation of scarce public resources to priority areas in line with macro, sectoral and regional objectives and strategies.
- SSDP serves as a two-way bridge between macro- and micro (projects)-planning
- It will also serve as a main reference source to the Agency staff as well as to all stakeholders for information on the sector's current and medium-term development prospects.

Diagram 1: Strategic Planning – Macro Planning Relationship



STRATEGIC SECTOR PLANNING CYCLE

Strategic Planning Process

1. STATE THE AGENCY'S MISSION AND PRINCIPLES
    - The Agency's main mission (the main reason for its existence)

- Its key principles

2. IDENTIFY THE AGENCY'S VISION: Where does the Agency/Sector want to go? What is it aiming at?

3. ANALYZE THE CURRENT STATUS: Where is the Agency/Sector at present?
   - Target population and its demands
   - Current sector plan and programs
   - SWOT analysis

4. IDENTIFY STRATEGIC GOALS AND TARGETS
   - Medium-term goals
   - Specific, concrete and measurable targets

5. DETERMINE REQUIREDTASKS/ACTIVITIES AND PROJECTS: How to reach where the Agency wants to be?
   - Approaches/means to attain goals and targets
   - Detailed work/business plans
   - Costing

6. DETERMINE THE MONITORING SYSTEM: How to measure and evaluate progress?
   - Reviewing and reporting
   - Comparison with (4) above

7. EVALUATION AND PERFORMANCE MEASUREMENT
   - Feedback
   - Identify measurement methods
   - Performance indicators
   - Performance measurement

Strategic Planning: What is it about?

- aims at **planning development** in desired directions, with periodic revisions as needed;
- **result-oriented** instead of input-oriented;
- targets and approaches must be **realistic and feasible**;
- an **instrument for high quality management**;
- a **tool for accountability**;
- based on a **participatory approach,** involving all concerned staff of the Agency as well as the representatives of all stakeholders of the Agency's services; and,
- guides and directs the annual budget rather than the other way round.

The Planning Team:

- should include representatives of all key departments of the Agency;
- team members should have such knowledge and skills as necessary for the strategic planning process;
- team members should have adequate knowledge of the Agency and the sector;
- they should be adequately familiar with the target population of the Agency; and,
- should be able to devote the necessary time and effort to strategic planning work.

MISSION STATEMENT

An Agency's "mission" is the reason for its existence: it states what, how, and for whom the Agency does whatever it is doing.

A meaningful mission statement should address the following points:

- What is the reason for Agency's existence? State the purpose, but not the process to attain it.
- What are the Agency's statutory responsibilities and obligations?
- Who is the audience/target population for the Agency's services and outputs?
- Which needs does the Agency meet? Identify the Agency's services and outputs.
- The mission statement should be succinct (i.e., brief, clear and to the point).

An example of meaningful mission statement by a "Social Services Unit": *To help individuals and families in meeting their basic needs and in becoming self-sustainable as envisaged in the relevant statutory framework. (Why meaningful? Because it indicates the task, the target population for the output/services, and the legal constraint).*

AGENCY'S VISION

The Agency vision symbolizes its future, and powerfully states what it aspires to achieve in the future. It should answer and/or satisfy the following points:

- It must be brief, inspiring and challenging;
- What is the ideal future for the Agency?
- How does it want to be perceived by all its employees, target population and other stakeholders?

An example of good vision statement by a bank: *To become a financial institution having the largest network and providing the best service throughout the country.*

Both the mission and vision of the Agency are based on certain principles that should answer the following questions:

- What is the Agency's work/business philosophy?
- What are the basic value systems, standards and ideals which serve as the foundation of the Agency's operations?
- What are the systems of values and beliefs subscribed to by the employees of the Agency?

Two examples of such "principles" *are given below:*

Principle: *Participation, transparency and equal opportunity are essential elements of our decision making process.*

Principle: *We cannot compromise on the quality of our services and outputs.*

ANALYSIS OF THE AGENCY'S CURRENT STATUS

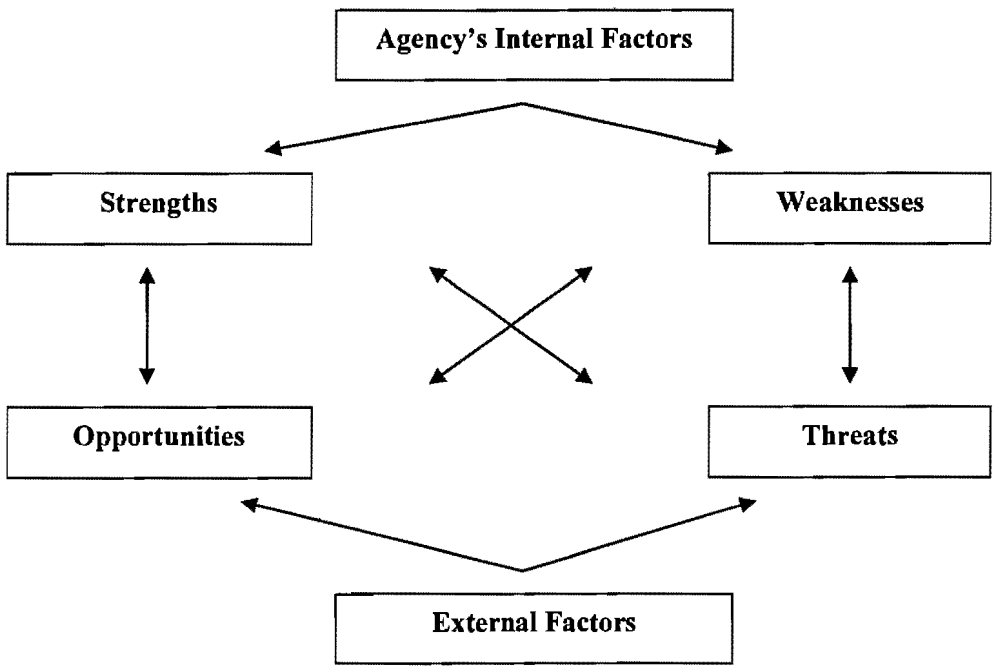
Coverage

- A brief history of the Agency and its sector's recent performance and policies;
- Analysis of the Agency/sector's structure and organization (its statutory powers_and responsibilities; performance; problems; technologies; potentials; human resources; institutional culture, etc.);
- Analysis of the external environment where the Agency operates;
- Analysis of the future developments that may affect the Agency/sector; and,
- Analysis of the stakeholders (the target population and others that may be affected positively or otherwise by the Agency's activities).

Methodology

The current state of the Agency/sector can be evaluated through the SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis.

Diagram 2: SWOT Analysis



Analysis of Internal Factors

- Agency's recent history, related statutory/legal framework, and statutory functions;
- Its place in the Public Administration and organizational structure;
- Agency's internal information and decision making process;
- Size and quality of its workforce;
- Its funding sources (Budget, other official funds, banks, etc.);
- Its personnel and wage policies;
- Employees' motivation level and their views on the Agency's current status and prospects;
- Its technological/information technology capacity and skills level;
- Its inventory of buildings, vehicles and other assets;
- The reporting system used in the Agency;
- Its monitoring and evaluation system;
- Important activities and projects, both completed and ongoing;
- Recent changes in the Agency's organization structure and operational areas;
- Important changes envisaged in the structure and operations of the Agency; and,
- Other Agencies undertaking the same or similar functions and causing clash of responsibilities.

Analysis of External Factors

- World situation and development trends in the area the Agency operates;
- Current domestic situation and trends in the area the Agency operates;
- The critical points in the world and domestic development prospects that may affect the Agency;
- Harmony and consistency between the Agency's activities and objectives, strategies and policies of the national, sectoral, and regional development plans;
- Main operational risks and uncertainties faced by the Agency.

Analysis of the Target Population and Other Stakeholders' Satisfaction

- Agency's suppliers/creditors;
- Other institutions the Agency should cooperate with to carry out its operations;
- Target population/institutions, ordered according to their importance, and their main expectations from the Agency;
- Monitoring and measurement of satisfaction of the target population and institutions; and,
- Methods of evaluation system for comments and complaints by the stakeholders.

Assumptions

While preparing SSDP, Agency has to make **assumptions** about certain internal and external factors (as listed above), which are important for the success of the SSDP but are outside the Agency's control. Any SSDP's success greatly depends on the realization of its assumptions. They should therefore be decided through a thorough review of all relevant factors with the participation of all key Agency staff.

STRATEGIC GOALS

- Agency's goals must be consistent with its mission, vision and principles;
- should contribute to and facilitate the realization of the Agency's mission;
- must be ambitious and challenging, but also realistic and feasible;
- should be appropriate for attaining Agency's vision;
- must be shaped according to the Agency's priorities and the analysis of its current situation;
- should have a medium-term perspective; and,
- must be kept unchanged until important external developments take place.

An example of well-defined strategic goal: *In order to protect health of the society, the whole country will be provided with clean and adequate supply of water with the help of environment protection and pollution control (Why is it well-defined? The goal is clearly identified; its coverage is stated; it is linked to water quality and supply, which are in turn related to environment and pollution. Thus, a direction is given for identifying targets).*

TARGETS

Targets are specific, measurable, and time-bound "sub-goals" aiming at the realization of Agency's strategic goals. Hence, they are:

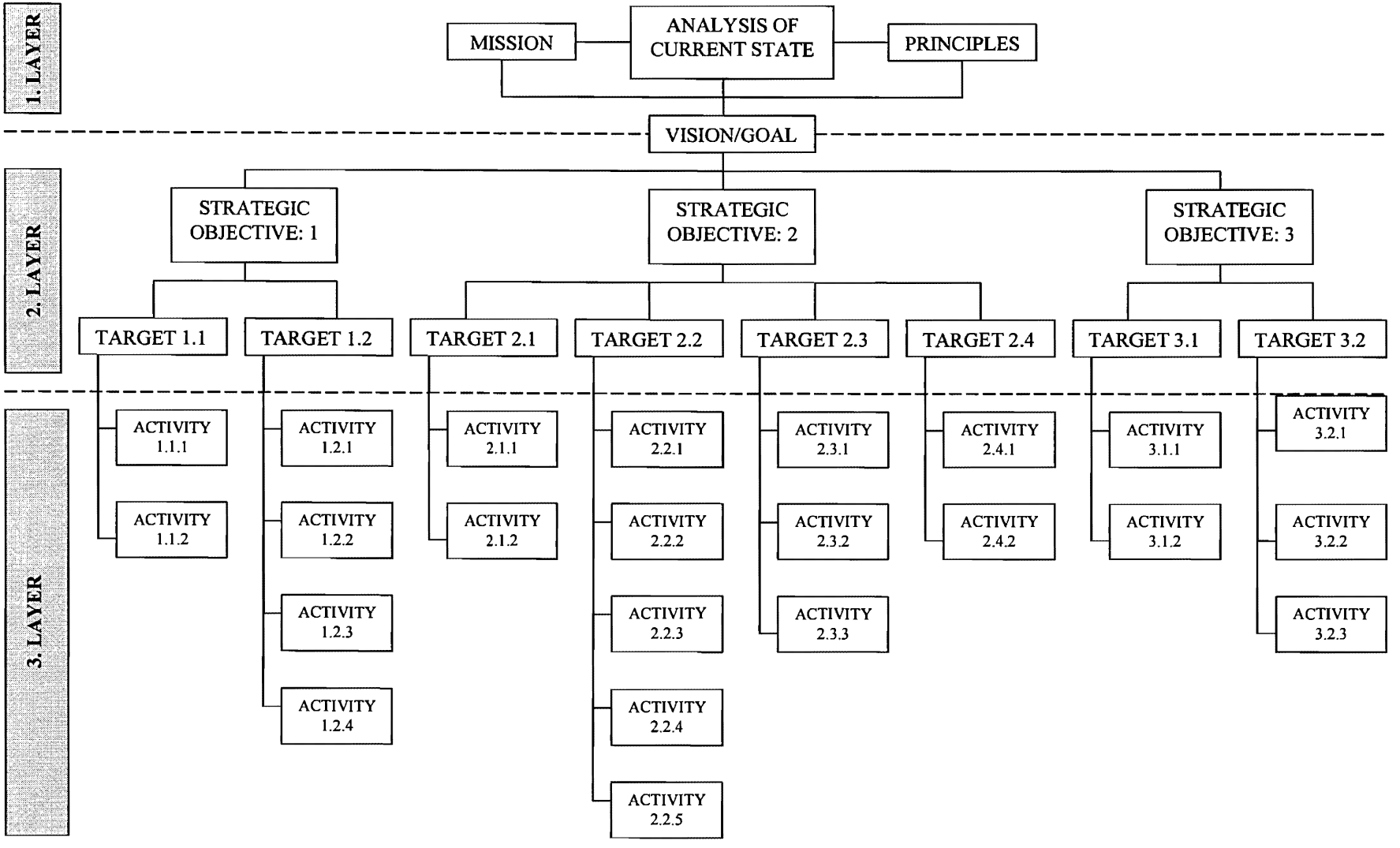
- ambitious but feasible;
- result-oriented;
- measurable;
- time-bound; and,
- stated clearly and understandably.

An example of well-identified target: *The infant mortality rate will be reduced by 0.5 percent by 2007 (Why is it well-identified? Target is specific, time-bound, and can be evaluated if feasible or not by checking it against the recent years' performance).*

REQUIRED ACTIVITIES AND PROJECTS

- SSDP should explain in detail all tasks (activities and projects) needed to attain the Agency's targets and goals;
- Prioritize all targets under each strategic goal;
- Identity the departments/units responsible with implementation of each task;
- Prioritize all activities and projects under each target by considering:
    - Development plans (SPPRED and RDP);
    - Annual performance reviews and programs of SPPRED and RDP;
    - Other comprehensive government programs (e.g., LOIs given to the IMF);
    - Special government programs (e.g., President's Anti-Inflation Decree);
    - Activity/Project's sustainability;
    - Effectiveness;
    - Rate of return and/or efficiency.
- Interactions and linkages among activities/projects should be paid the necessary attention for rightly placing and sequencing them;
- Activities/projects should not clash with each other;
- Selection of activities/projects should be made with a view to medium- to long-term expectations; and,
- Necessary coordination with other Agencies should be secured in the case of activities/projects requiring such coordination.

Diagram 3: Structure of Strategic Planning



SSDP – BUDGET RELATIONSHIP

- Agencies should base their budgets on their SSDPs, not the other way around;
- SSDPs will pave the way to "program budgeting":
  - Strategic goals/objectives correspond to programs;
  - Targets correspond to sub-programs; and,
  - Tasks (activities/projects) in a SSDP are the same as activities and projects in the program budget.
- SSDP should relate its activities/projects under each target to the State Budget:
  - Agency should present its resources (by source) and uses (by targets/sub-programs) for last two years and next three years;
  - This will show the cost of each policy and program;
  - By discussing alternative activities/projects, Agency will show the basis of its prioritization
- SSDP's annual programs will better help to establish its linkage with the State Budget.

MONITORING AND EVALUATION (M&E)

- Monitoring means systematic following up and reporting on the progress in realizing the targets of SSDP;
- Evaluation means both discussing implementation results against strategic goals and targets and analyzing the consistency and appropriateness of the latter;
- The general approach and methodology to be used for monitoring and evaluation are to be identified in SSDP;
- Implementation results are reported annually and their evaluation in terms of timing and conformity with planned goals and targets provides useful feedbacks for reviewing SSDP and determining its feasibility.
- M&E contributes to the establishment of accountability in the Agency.

A separate guide will be prepared for M&E.

CHAPTER 3. EDUCATION SECTOR

OVERVIEW OF THE EDUCATION SECTOR SSDPS

Key monitorable objectives and strategies for the education sector to be achieved over the medium-term are found in a number of documents: State Program on Poverty Reduction and Economic Development, 2003-05 (SPPRED); State Program on Regional Development, 2004-2008 (RDP); Education Sector Development Project (2003-2007)[1]; the Medium-Term Education Development Programs (for the four-year rolling MTBF) included in the annual budget envelope, and a number of specific sector related programs. The following are the education sector objectives derived from these documents:

- Improve quality and equity in access to education;
- Enhance quality of pre-service and in-service teacher training system and increase teacher salaries;
- Improve the learning environment through better access to textbooks, basic teaching and learning materials, equipment and physical facilities;
- New curriculums to meet the needs of changing social institutions and the market economy;
- Improve the education information management system;
- Encourage efficient utilization of resources;

The sector programs are initiated by different stakeholders (local authorities, donors, line ministries, etc.) for different audiences (MOF, MOED, COM, Donors, Executive Committees, etc.). Thus, the set of objectives and their relative priorities vary between them. For example, **the SPPRED** focuses on access to services by the poor and efficient utilization of resources, while **the RDP** is driven primarily by region-specific needs. Although the SPRD also acknowledges the importance of better access to social services by the poor, there is no mention of specific measures or strategies to achieve it.

Ten-year **Education Reform Project** had been initiated by the World Bank (WB), which has allocated $18 mln. for its first phase over 2003-07. (See Box 1)

Both substance and detail of the education sector program in the MTBF (2005-008) are quite different. The **Education Development Program for 2005-08**, included in the 2005-08 budget envelop, is mainly focused on issues and planned activities at different levels of the education system. There is relatively little discussion about access by the poor to schools and teaching materials, more efficient utilization of existing resources, and improvements in quality of teaching. As a rolling program to be revised and prolonged annually, it could be easily improved and will therefore be the main focus of this note.

The Ministry of Education has also developed several **sector specific programs** mainly driven by SPPRED and SPRD, some of which have been approved by President or the COM while others are under discussion. The following lists such education programs:

State Program on New School Construction, Expansion and Repair of Existing Schools over 2003-07 (approved by a Presidential Decree in 2003): about 145 new

[1] See Table 1.

schools will be constructed over five years at a cost of AZM270 b . Only AZM30 b were allocated for school construction in 2004 and AZM29.8 b in 2005. In the 2005-08 PIP another AZM100 bln is allocated for 2006-08. Although initially the program was developed up to 2007, due to lack of financing it will continue beyond 2008. For this project, MOE has established a separate self-financing Construction Department employing 28 people - mainly engineers (see: MOE structure). The Construction Department is financed by 1.1% of investment expenditure allocated for school construction. At the same time, the construction of 5 schools in Baku, financed by Saudi Arab Fund credit, will cost about $11 mln. The average cost per student in this case is about 2.2 times higher than in the State budget financed school construction. Higher cost is due to the use of new construction materials, equipments, modern school design, additional facilities (swimming pool, large sport facilities, modern catering). The cost-effectiveness of this investment has most probably not been considered because it is not clear why there should be only 5 such luxury schools in Baku while other new schools are to be constructed in accordance with the Program without the same facilities.

State Program on Information Communication Technology Supplies to Schools approved by the Presidential Decree of August 21, 2004. The Program envisions establishment of computer classes in each school, with one computer for 33 children, as well as teacher training and use of ICTs in training process. Total cost of the Program is estimated at AZM100 b over 2005-07, 20% of which was allocated to the MOE for the FY2005.

- **Program on Improvement of School Material-Technical Bases for 2005-09,** waiting for approval by the COM, envisions purchase of desks, tables, chairs and blackboards At a cost of AZM 100 b. 10percent of the program cost is already included in the MOE's 2005 budget.
- **Program on Improvement of Boarding Schools Material-Technical Bases for 2005-09** was approved by the COM on February 3, 2005 and provides for construction, repair and equipment purchases at a cost of AZM10 b.
- An ADB-funded feasibility study ($0.6 m grant) for the **Early Childhood Care Program** ($15 m credit).
- **Program on Teacher Training and Provision for 2005-09** was approved by the COM on November 4, 2004 and envisions improving teachers' availability in rural areas.
- **Program on Rehabilitation of Heating System in the Schools, for 2005-09** is being prepared and will be submitted to the COM.
- Five more programs are under preparation in the MOE on: 1) development of vocational schools, 2) development of pre-school education (kindergartens), 3) support to gifted children, 4) improvement of school libraries, and 5) evaluation of children progress.

Table 1. Education Sector Development Project (2003-2007)

In May 2003 the World Bank approved a US$18 million equivalent Credit to Azerbaijan to help finance the Education Sector Development Project, which constitutes the first phase of the Education Reform Program. The proposed credit is the first in a series of credits with an Adaptable Program Credit (APC) not exceeding the aggregate the amount of US$63 million over the next ten years.

The Education Sector Development Project (2003-2007), which is the First Phase of the Education Reform Program, will have duration of four years and will assist the Government to strengthen its capacity to plan, manage and monitor the reform program more effectively and efficiently and initiate the highest priority investments in selected districts. 21USD mln (18 WB + 2.8 GOAZ share and 0.2 USD mn Soros Foundation)

The Project consists of the following components, each of which includes several subcomponents and/or activities:

(i) quality and relevance of general education (through curriculum reform, teacher development, provision of reading materials for all general school libraries in the country);

(ii) efficiency and finance reforms (through financing and budgeting reforms and rationalization and school improvement in the three selected districts, i.e., Ali Bayramli, Ujar, and Ismayilli);

(iii) equity and access (through the provision of school grants in selected less advantaged districts); and

(iv) management strengthening (through the establishment of a new system of student assessment; the establishment of education management information systems; and the development of management, planning and monitoring capacity). Finally, the project management and evaluation component would finance project management and monitoring and evaluation activities. These specific reforms and interventions would be expanded under the Second Phase and completed under the Third Phase of the Program.

Source:
http://lnweb18.worldbank.org/eca/eca.nsf/0/E006868052CDE70785256D35004A9DD6?OpenDocument

MOE STRUCTURES RESPONSIBLE FOR SSDPS

The Economy Division of MOE with a total staff of 21 in five divisions is responsible for the preparation/coordination of the PIP, Budget, MTBF, SPPRED, sector programs, and regional developments programs (see the attached organizational chart).

With assistance from the World Bank, the MOE has embarked on a program to enhance its capacity to prepare sector programs and strategies. Although the program is still in its initial phase and no specific results are yet available, there is a commitment to change (e.g., establishing three new departments) with further support of resources and technical assistance from another donor.

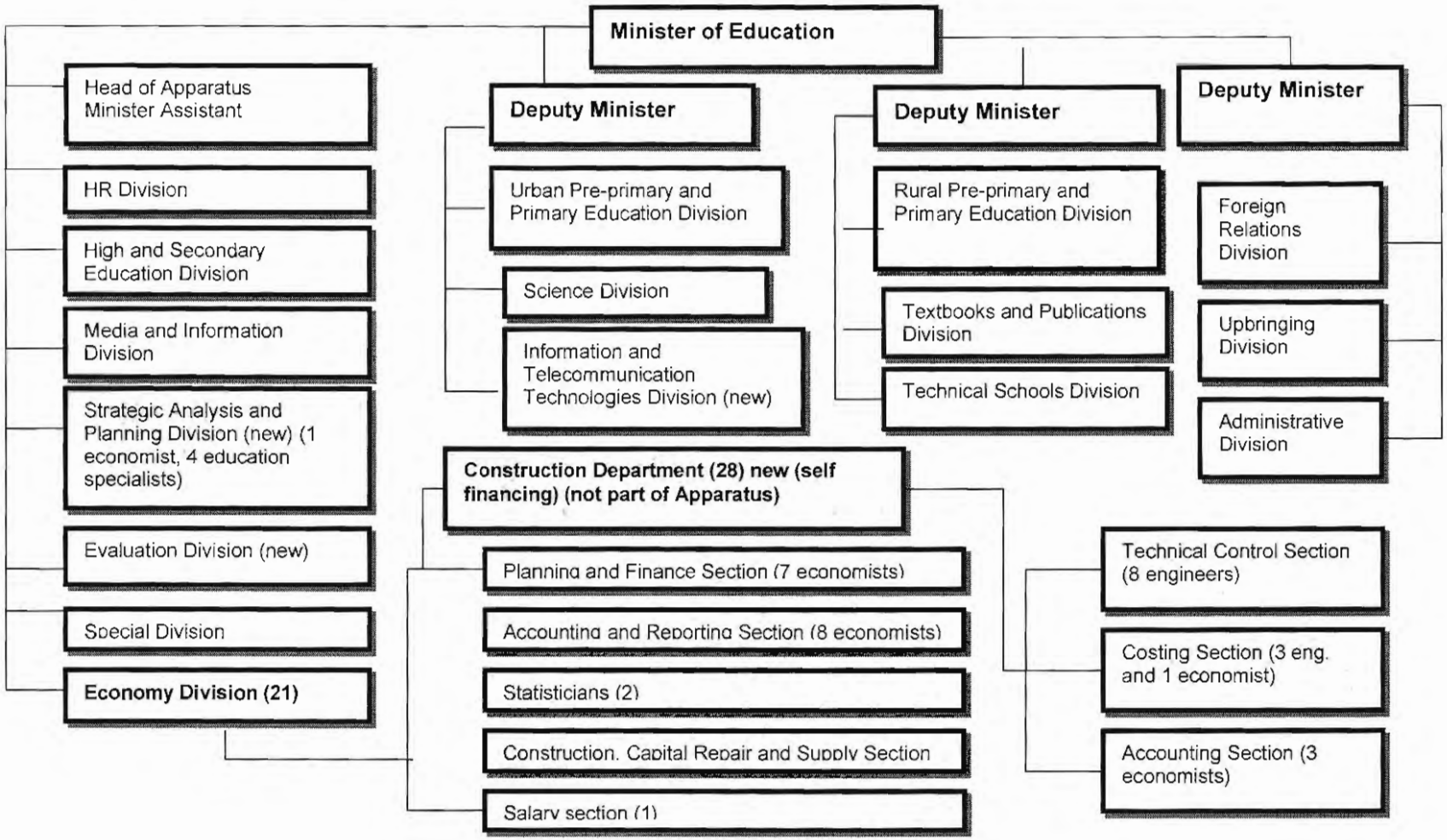
The new Strategic Analysis and Planning Department, which has five economists, has taken over strategy and programming responsibilities of the Economy Division. This department is in charge of program and strategy development as well as management

information systems and expected to address the stakeholders' concerns about weak database and presence of multiple developing programs.

The new Construction Department is responsible for technical preparation of projects, including preparation and evaluation of bids, costing, and monitoring of implementation. The Department has a staff of 11 engineers and 4 economist/finance professionals. The Department meets its expenses through fees charged to individual projects, and administratively reports to the Economy Department.

The new Education Evaluation Division, with five education specialists, is assigned to enhance the Ministry's management information system. It is expected to systematically evaluate educational performance, disseminate critical information across departments within and outside the Ministry, and develop an information strategy.

Table 2. Administrative Structure of Central Apparatus (as of May 2005)



SSDP PROCESS

In the MOE, the Strategic Planning and Analysis Division (SPAD) (established in 2004) coordinates, analyzes and comments on strategic program identification and preparation. Project and/or program ideas could originate from SPPRED, RDP or other state programs. Once an idea is identified, relevant departments prepare their views and send information request to local education offices, schools, and other education institutions. MOE establishes a working group of experts from all relevant departments, including SPAD. The working group analyzes existing situation, identifies problem areas, prepares preliminary cost implication, and drafts the project proposal.

All relevant departments review the proposal and send their comments to the working group. Working group analyzes comments and make amendments to the project and presents to the Minister revised draft, which again is discussed with the Minister involving all related parties. At this stage, financing needs are clearly determined and implementation is phased.

Draft approved by the Minister is presented to the Cabinet of Ministers, from where it is disseminated to MOF, MOED, Ministry of Justice, SCAC, or other relevant institutions, which review the project and send comments to Cabinet of Ministers.

MOE receives comments and considers the relevant amendments, or provides strong arguments in case of disagreement (major discussions are held with the MOF about the financing of projects), and prepares final draft for Cabinet of Ministers or President's approval, which also needs to be agreed with central ministries. This more or less clear and transparent procedure could be further improved and taken as an example for improving PIP identification process as well as strategic policy formulation in other ministries, and could be reflected in PIP preparation instructions.

ANALYSIS OF EDUCATION DEVELOPMENT PROGRAM ON THE BASIS OF PIPP GUIDE ON SSDP

A medium-term Sector Development Program is prepared in accordance with article __ of the Budget System Law. Four sector programs (Science, Education, Health and Culture) are being included in the Annual Budget package since 2000. In 2003 MOF and MOED jointly improved the sector development programs submitted by the line agencies and established a unified structure for them, which includes:

1. Introduction
2. Program goal
3. Program tasks
4. Main priority directions
5. Program financing

However, the **Ministry of Education has been ignoring** the proposed structure and presenting Education Development Program in the old format. So, it will be helpful to

include the proposed Guide on SSDPs in the Joint Call Circular or at least in the Budget Call Circular to assure full compliance of all budgetary agencies.

As already noted, MOE prepares a four-year (rolling) Education Development Program (EDP), which is included in the Annual Budget package and submitted to Parliament. The Program is prepared on the basis of Education Reform Program (see Box 1), SPPRED, RDP and sector development programs and mainly focuses on the current situation, problems and development directions at different levels of the education system. EDP consists of the following sections:

- Introduction
- Pre school education
- General education
- Current status of technical professional education
- Current status, development traditions and problems of secondary education
- Current status, development traditions and problems of tertiary education
- Development directions of the tertiary education
- Skill raising and retraining
- Main directions of education financing.

Correspondence between EDP and the PIPP Guide on SSDP is shown in the following matrix.

PIPP SSDP Guidelines	Education Development Program
1.Mission statement • An Agency's "mission" is the reason for its existence: it states what, how, and for whom the Agency does whatever it is doing.	Clear mission statement is not provided.
2.Agency's vision • The Agency vision symbolizes its future, and powerfully states what it aspires to achieve in the future.	Clear agency's vision is not provided.
3.Analysis of the agency's current status • A brief history of the Agency and its sector's recent performance and policies; • Analysis of the Agency/sector's structure and organization (its statutory powers and responsibilities; performance; problems; technologies; potentials; human resources; institutional culture, etc.); • Analysis of the external environment where the Agency operates; • Analysis of the future developments that may affect the Agency/sector; and, • Analysis of the stakeholders (the target population and others that may be affected positively or otherwise by the Agency's activities).	• Partially provides for current status of the different level of education. • Only the sector problems are emphasized. • Not covered. • Development directions are listed. • Targeted population is briefly touched in the secondary education part.

4. Strategic goals • Agency's goals must be consistent with its mission, vision and principles; • should contribute to and facilitate the realization of the Agency's mission; • must be ambitious and challenging, but also realistic and feasible; • should be appropriate for attaining Agency's vision; • must be shaped according to the Agency's priorities and the analysis of its current situation; • should have a medium-term perspective; and, • must be kept unchanged until important external developments take place.	Sector's general problems are highlighted, however no realistic and feasible medium term goals are determined.
5. Targets Targets are specific, measurable, and time-bound "sub-goals" aiming at the realization of Agency's strategic goals. Hence, they are: • ambitious but feasible; • result-oriented; • measurable; • time-bound; and, • stated clearly and understandably.	Targets are represented with the wish list of measures to be implemented w/o time-bound and result orientation.

6. Required activities and projects
 	
• SSDP should explain in detail all tasks (activities and projects) needed to attain the Agency's targets and goals;
• Prioritize all targets under each strategic goal;
• Identity the departments/units responsible with implementation of each task;
• Prioritize all activities and projects under each target by considering:
  o Development plans (SPPRED and RDP);
  o Annual performance reviews and programs;
  o Other comprehensive government
	Not covered

programs (e.g., LOIs given to the IMF); o Special government programs (e.g., President's Anti-Inflation Decree); o Activity/Project's sustainability; o Effectiveness; o Rate of return and/or efficiency. • Interactions and linkages among activities/projects should be paid the necessary attention for rightly placing and sequencing them; • Activities/projects should not clash with each other; • Selection of activities/projects should be made with a view to medium- to long-term expectations; and, • Necessary coordination with other Agencies should be secured in the case of activities/projects requiring such coordination.	
7. SSDP – budget relations • Agencies should base their budgets on their SSDPs, not the other way around; • SSDPs will pave the way to "program budgeting": o Strategic goals/objectives correspond to programs; o Targets correspond to sub-programs; and, o Tasks (activities/projects) in a SSDP are the same as activities and projects in the program budget. • SSDP should relate its activities/projects under each target to the State Budget: o Agency should present its resources (by source) and uses (by targets/sub-programs) for last two years and next three years; o This will show the cost of each policy and program; o By discussing alternative activities/projects, Agency will show the basis of its prioritization	• SSDP financing depends on the available resources in the budget and annual allocations quite differ from the programmed schedule. • Could potentially serve as a program budgeting tool. • Does partially relate projects to the State Budget. Resources are not presented by sources and uses. Coverage of EDP financing is fragmented: only State Budget financed SPPRED and sector specific programs' actions have been included in the Program financing, while PIP, externally financed programs as well as non-SPPRED and non-SSP activities financed from State Budget were not mentioned. No prioritization of

• SSDP's annual programs will better help to establish its linkage with the State Budget.	programs is presented. • Annual revision of the Program partially helps to link program to the MTBF
8. Monitoring and evaluation • The general approach and methodology to be used for monitoring and evaluation are to be identified in SSDP	Not covered

CONCLUSION AND RECOMMENDATIONS

With purpose of bringing Education Sector Development Program in compliance with the proposed Guidelines, it is recommended to make following changes:

- Agencies clear mission statement and vision (articles 1-2, see table above) should be provided. For this purpose Charter of the Ministry, Education Law and Education Development Program developed jointly with the World Bank could be useful;
- Current status of all education types should be compiled and analyzed separately in one section. Ministry's statutory powers and responsibilities, performance, problems, technologies, potentials, human resources, institutional structure etc. should be reviewed;
- Overall development framework should be delineated, mid-term strategic goals should be specific, targets should be time-bound, result-oriented and measurable;
- With purpose of achieving strategic goals and targets, pursuant to article 6 of the above table, medium term activities and programs should be indicated;
- Program – budget relationship should be described in a more comprehensive manger. It should clearly identify not only funds prescribed for financing individual programs of state budget's education section, but also education section, including expenditure on extra-budgetary funds, as well as education expenditure to be funded through Public Investment Program and foreign loans and grants;
- All education branches, taking into account their specificity, could be analyzed as sub-component in each section;
- Finally, Program should include monitoring and evaluation methods.

Education Development Program, as done previously, was already developed and submitted to the President's Office along with draft budget envelope for next budget year and following three (2006-2009). Thus, it is imperative that PIPP Project starts preparing for development of the aforementioned program for 2007-2010 jointly with relevant executive authorities.

For the purpose of achieving the aforementioned, proposed changes and recommendations should be discussed with Ministry of Education's Economy and Strategic Analysis Divisions,

MOED's Macroeconomic Policy and Forecasting Department and MOF's Social Sectors' Financing Division.

CHAPTER 4. INDUSTRY AND ENERGY SECTOR

STRATEGIC SECTOR PLANNING CYCLE. ANALYSIS OF THE AGENCY'S CURRENT STATUS.

On December 18, 2004 the Ministry of Fuel and Energy was *restructured* into the Ministry of Industry and Energy (MOIE) with a broader mandate to oversee the development of the industrial and energy sectors. The mission of MOIE is to:

1. Formulate and implement state policies regarding industrial development and the fuel and electric power sectors;
2. Provide for efficient utilization of resources and protect state interests in industry and energy;
3. Govern tariffs-setting and pricing work and submit proposals for changes to MOED and COM;
4. Serve as a GOAZ representative in reviewing licensing requests and issue/renew licenses to the energy companies; and
5. Promote development of international relations in the industry, fuel and electric power sectors and attract foreign investments to the sector.

In respect to energy sector operations and developments, the main functions of MOIE are to:

1. Prepare the fuel-energy balance of the Azerbaijan Republic and ensure its implementation in collaboration with appropriate authorities;
2. Forecast energy demand and plan for necessary capacity build-up;
3. Develop and implement necessary policies for energy independence;
4. Participate in preparation of programs and projects that require domestic and foreign investments;
5. Participate in defining energy consumption limits for state budget enterprises;
6. Participate in state regulation of natural monopolies in the energy sector;
7. Prepare and approve the regulatory and normative acts as well as technical standards for the sector and oversee their implementation;
8. Participate in activities of the commissions for privatization of state-owned energy enterprises;
9. Promote training and refreshment courses for the energy sector staff;
10. Prepare procedures for energy saving and environmental safety in energy consumption;
11. Provide expertise for feasibility studies and design characteristics to energy sector enterprises;
12. Develop and implement appropriate measures to create a favorable environment for foreign investment in the energy sector; and
13. Implement appropriate measures for timely repayment of government-guaranteed loans by energy sector enterprises.

The MOIE does not yet have its new functional and organizational structure approved by the COM. The new charter for the MOIE cannot therefore be analyzed here (we were also unable to obtain the draft charter from MOIE and MOED) but it is anticipated to include the major functions and responsibilities of the former Ministry of Fuel and Energy.

Department for Foreign Investments and Contracts and Department of Strategic Development of key projects, with seven staff in total, were directly involved in preparation of investment projects and sector submissions for PIP. At present, MOIE has an urgent need for capacity building and staff training in its departments that deal with investment projects and sector PIP. There is no need for additional computer hardware and software, yet new knowledge of the project cycle and project finance is urgently required. Discussions with MOIE staff have indicated some new ideas and initiatives for setting up a separate department for project preparation and implementation as well as a Monitoring and Evaluation Unit to follow up the progress and feedbacks of project implementation.

Comment: MOED, MOIE and MOF share responsibilities for policy development and regulatory oversight in the industry and energy sectors. Both the President's office and state-owned enterprises also play a role in policy-making. This introduces potential conflicts between political and economic decision making.[1]

Initial conclusions and recommendations, based on findings of the May 2005 PIPP diagnostic work, and may be summarized as follows:

1. The functional responsibilities of MOIE provide a general framework for sector oversight yet there is not a clearly established mechanism for MOIE to align the sectoral development plans (including those of the subordinate enterprises) with the national development agenda (coordination with MOED) and the medium-term rolling budgeting agenda (coordination with MOF).
2. There is little, if any, linkage between the State Program for Development of Fuel and Energy Sector of Azerbaijan (2005-15), including energy projects listed in PIP, on the one side, and SPPRED and RDP, on the other. There is no clearly expressed integration of planning priorities into the budgeting agenda through an MTEF.
3. There is need for greater clarity in policy making responsibilities in the industry and energy sectors. In particular, there is an overlap and potential for confusion in the roles of MOED and MOIE. In order to address this issue, their respective roles and responsibilities should be redefined in a new decree.[2]
4. A key role for MOIE should be the establishment and monitoring of service quality standards. Any development (esp. green field) project needs to be analyzed from the angle of its contribution to achieving the established quality standards.
5. Development of Sector Service Standards is critical in defining problem areas that require capital investment programs and projects. In Azerbaijan not a single industry

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[1] Azerbaijan: Issues and Options Associated with Energy Sector Reform, World Bank Report No: 32371-AZ, March 2005

[2] Ibid, p. 76

has yet developed its **service standards** and enterprises do not consider themselves bound with delivery of particular standards.

6. There is not a specialized unit in MOIE dealing with medium-term development agenda that could be readily linked to the budget process (and PIP in particular). The State Development Plan for the fuel and energy sector over 2005-15 sets targets and lists 69 projects to be implemented through 2015. The SDP, however, has serious shortcomings including the following:

   a) It does not provide a judgment on project prioritization; and
   b) Projects are not part of programs addressing a particular development goal and a number of interrelated goals.

   c) Programs need to address specific goals. Projects need to address clearly defined objectives and have certain measurable impact and results.

7. Finally, there is not a mechanism (and institutional capacity) in MOIE to evaluate the impact and performance of projects commissioned. Currently this effort is limited to reporting on the physical progress (in % terms) of construction and funds utilized. In this context, there is need to for a comprehensive format for quarterly or semi-annual reporting on project implementation and operation. Establishing a good mechanism for impact evaluation will enable to: (a) analyze projects for their effectiveness and efficiency; (b) provide resource information and tips for management controls during project implementation and commissioning, and (c) evaluate budget implications after project commissioning.

SWOT ANALYSIS

Strengths:
- MOIE is a new ministry and able to align its structure to govern the National Energy Development Program.
- Azerbaijan has a unique geopolitical location with rich trading opportunities
- Relatively inexpensive and skilled engineering cadres.
- Possession of sizeable yet limited reserves of oil and natural gas.
- Existence of a satisfactorily maintained industry and energy network.
- High potential for industrial and energy exports (machinery, hi-tech goods, oil, gas, and electricity).
- A relatively satisfactory development of industrial and social infrastructure in recent years compared to previous years.

Weaknesses:
- Sector strategic planning and management do not exist in MOIE as virtually in all GOAZ organizations.
- The organizational structure of MOIE and staff may not adequately correspond to the sector's development agenda.
- There are no clearly expressed statements of the MOIE goals, mission, and objectives.
- Absence of service quality standards and enforcement.

- Maintenance of strong control by MOIE over the SOEs in the sector.
- Poor financial performance due to low tariffs and uncollectible payments.
- State subsidization of the energy sector.
- Weak regulatory framework and existence of several agencies with overlapping oversight responsibilities.
- Lack of conducive environment for direct private investment in the absence of fair and predictable regulations, and cost recovery tariffs.

Opportunities:
- MOIE goals, mission and objectives need to be clearly formulated.
- MOIE needs to establish parameters and later – standards – for quality of goods and service.
- Strategic sector development plans (10 years' vision) need to be formulated on-line with macroeconomic development goals and nation's priorities.
- Medium-term development plans (3 years) need to be formulated in a form of programs that address specific problems. In turn, programs need to consist of projects with clearly defined objectives and have certain measurable impact and results.
- MOIE needs to establish a department to specifically design and track programs and project implementation, and measure impact per the defined criteria.

Threats:
- Inability to create a single body to regulate and oversee sector development may delay implementation of investment opportunities considered by private investors.
- Further sector deterioration and resultant diversion of limited budget resources to the development of other sectors.
- This may all contribute to some social discomfort and political disillusionment.

SSDP – BUDGET RELATIONSHIP

- The senior staff in the Economy Department of MOIE claims that all development projects are proposed and financed **in accordance with the SSDP**. In addition, state-owned companies in the sector fund their capital works and small projects from their internal resources pursuant to the MOIE approval.
- As referred above, the SSDP has certain core weaknesses relating to capital budgeting:

  a) there are no clearly formulated development goals, supported by programs and projects, to provide a logical structure of sector development;
  b) there is not a sound development program – budgeting relationship, which needs to be developed;
  c) the general motto of the sector remains "to build up capacity" without due consideration to least cost options and to alternative investment opportunities in the long run;
  d) engineering appraisals on expansion options (Burns & Roe, 2003) are not considered and accounted for in strategic planning for capacity expansion.

- In the absence of a **program-based budgeting** approach, the entire PIP and MTEF processes become a merely pro-forma exercise and cannot serve as planning and control tools.

- **Performance indicators** should be developed to use in guides setting to measure effectiveness and efficiency of services delivered to citizens (standards of quality, standards of electricity services, safety, other).

- MOIE does not seem to feel adequate ownership of its PIP, viewing PIP expenditures as grants from the annual State Budget. Thus, in the PIP process, various sector agencies compete for financing rather than for getting approval of benefit-cost effectiveness of their projects.

- Finally, GOAZ's capacity for **strategic planning and management** should be enhanced for successful management of development program-budget relations.

PROJECT DEVELOPMENT, IMPLEMENTATION AND MONITORING CAPACITY

- Representatives of both ministries – MOED and MOIE – strongly emphasized the need to clearly **define "Rules of the Game"** in program and project preparation, implementation and monitoring.
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- There is no "Monitoring and Evaluation Unit" established in MOIE to **evaluate the implementation of SSDP**. MOIE officials indicated a need to establish such a unit but its functions have not yet been clearly defined

- The staff of MOIE and other agencies in the sector requires a major training in project management and program/project evaluation. A sector specific training agenda needs to be developed with requirements of MOED separately focused than that of the operating companies as the former can be addressed by PIPP while the latter by commercial training providers.

- The PIPP diagnostic review of the electric power sector PIP process revealed the following conceptual and technical shortcomings, which are most probably shared by other sub-sectors of industry and energy. First, all electric power development (extension and new constructions) projects were prepared by the branch institutes that obviously followed the old Soviet norms and patterns of capital development. Second, it seems that planning of capital investment projects is undertaken without considering all available opinions of international non-partisan technical experts (e.g., a thorough technical due diligence of investment needs and options for the electric power sector in Azerbaijan commissioned by the EBRD to Burns and Roe, Inc. has gone completely unnoticed).

- Finally, the current State Program for Energy Sector Development (2005-15) does not provide flexibility in periodic review and plan revision.

CONCLUSIONS AND RECOMMENDATIONS

1. MOIE is a new ministry responsible for industrial and energy sectors operation and development. The MOIE's mission and its own vision of strategic objectives for both a 10-year perspective plan period and a more realistic medium-term (3-5 years) plan period should properly be identified and brought in harmony with central and regional development objectives as well as those of other sectors of the economy.

2. The current SSDP for Energy Sector Development focuses mainly on capital construction works without any discussion of the overall strategic objectives and targets and of measurable performance indicators of impacts on and benefits to the sector and the economy at large.

3. Standards for Quality Service (in the electric power sector: voltage, disconnections, customer satisfaction, other parameters) need to be developed, and reaching the Standards by certain year may become the strategic objective. In fact, Quality Standards existed in the former Soviet Union (State Standard - ГОСТ) and until 1990 served exclusively as a quality mark for certain (mostly, internationally tradable domestic-manufactured) goods.

4. The newly developed SSDP may be the MOIE internal document to define programs and projects aimed at contributing to achieving the defined strategic objective (Standards for Quality of Goods and Services).

5. While the 10-year SSDP may remain unchanged for a number of years, its medium-term component may be a flexible document and revised on an annual (rolling) basis owing to priority changes or urgency (e.g., new energy substations required by obsolesce or client base expansion). Such flexibility will enable both the State and the sector to make adjustments in and maneuver resources for their capital outlays.

6. Programs and projects need to be prioritized per their importance in reaching medium-term development targets and their impact on strategic objectives.

7. Programming of projects and resources is a new area of expertise and specialization. It is advisable to plan and establish a Development Program Monitoring and Evaluation (PME) Department to systematically monitor and report on the progress in realizing the targets of SSDP.

8. A system of performance measures may be developed to track programs and projects' implementation and contain such measures as resource input, result output, effectiveness, and benefit.

9. The PME Department staff needs to be provided with sufficient authority to demand information needed and require rationale from the subordinate industrial and energy agencies and organizations. Program monitoring and evaluation will contribute to establishing accountability in the implementing agencies.

CHAPTER 5. TRANSPORTATION SECTOR

DRAFTING AND APPROVAL PROCESS – MAJOR STEPS

The transport sector development policy is currently planned for a ten-year period. At present, the draft Transport Sector Development Program for 2005-14 is going through additional reviews at the Ministry of Transport (MOT) and will then be forwarded for approval to the President's Office. The development of sector policy is done by the MOT in consultation with the transport sector state operating companies and the MOED. In addition to the Transport SDP, the MOT has also prepared a draft State Roads Construction and Renovation Program for the same period (2005-14), similarly waiting for the Presidential approval.

The SDP is being prepared by a ministerial commission established for this purpose by the Minister of Transport. The commission consists of representatives of the MOT's central apparatus (economic analysis, finance and credit, and legal departments), the transport sector SOCs, MOED, MOF, and State Construction and Architecture Committee and is chaired by the Deputy Minister of Transport. The commission collects submissions from every transport sector SOC with brief justifications and evaluates them by taking into account long term priorities and needs of the transport sector. The MOED and other central ministries' representatives in the SDP Commission are directly involved in the project prioritization and selection process. It should be pointed out though that the final decision on whether to include or not to include a particular project in the SDP is made by Ministry of Transport's leadership. Upon completion of the draft Program and approval by the Minister of Transport, it is forwarded to COM for clearance.

The draft sector program is then circulated by the COM to all relevant ministries and agencies for their comments. The MOT's SDP Commission receives comments and views from the ministries and agencies and makes required revisions in the draft SDP. After final clearance by the COM, it is submitted by the Prime Minister to the President for final approval and issuance as a Presidential Decree.

In line with the above described procedures, the 2005-14 Transport Sector Development Program has gone through the initial stage, and the MOT is currently preparing its final draft to be forwarded to the Prime-Minister. It is expected that the Transport SDP will be approved by President in October 2005. In the meantime, however, draft Program is being kept as "An Internal Use Only" document and not shared with civil society or donors representatives. This is different from other line ministries' practice, per which their SDP drafts are available for public use and discussion.

LINKAGES BETWEEN THE TRANSPORT SDP AND THE TRANSPORT SECTOR PUBLIC INVESTMENT PROGRAM

The draft Transport Sector Development Program is a major source document for selecting projects into the 4-year Transport Sector Public Investment Program, which is submitted by MOT to the EPF Department of MOED.

It should be pointed out that a significant share of investments in the transport sector is being financed by the State Owned Enterprises, such as Caspian Shipping, AZAL, Azerbaijan Railroads, etc, out of their own funds. Under these conditions the MOT proposes in the Transport Sector PIP only those projects which are to compete for State Budget's

funds. Accordingly, transport sector is represented in the draft 2006 PIP is represented by road and bridge construction and renovation projects and two important projects, namely Lenkoran Airport Reconstruction and Baku Metro Renovation Works.

As the MOT was instructed by the President to finalize construction of all major national and local roads by the end of 2008, the Ministry has worked out a draft Roads Construction and Renovations State Program, which is currently the major concern of the Ministry while considering the 2006-2009 Transport Sector PIP.

COORDINATION OF TRANSPORT SDP WITH THE SPPRED AND RDP

The ministerial commission on drafting the Transport Sector Development Program includes a representative from the MOED's Economic Policy and Forecasting (EPF) Department and this assures an active involvement of MOED in the process of drafting Transport SDP. Nevertheless, meetings at MOT have not led to locating direct links between the current draft Transport Sector Development Program and State Program for Poverty Reduction and Economic Development, which is treated as a major national economic development platform document. Along with other reasons, this may be due to the rather poor coordination within MOED between the EPF Department and the SPPRED Secretariat.

While there is no formal alignment between the draft Sector Development Program and the SPPRED, there is certainly notional alignment and consistency between them with regard to the objectives of economic growth and poverty reduction. Also, the Regional Development Program does highlight the development of transport highways and road infrastructure especially in the rural areas and small districts. These objectives are also located in the Transport Sector Development Program, but they are not given strategic priority.

CONCLUSIONS AND RECOMMENDATIONS

The current process of drafting and further developing the Transport Sector Development Program needs a closer alignment of the sector policy with the overarching national policy framework for economic growth and poverty reduction (SPPRED) and regional balance (RDP). In addition, it is important that active participation of the central ministries, particularly of MOED's, is assured not only at the stage of drafting the SDP, but throughout the entire process of its coordination, clearance, and final approval.00

The process certainly needs consideration of some resource constraints to provide realism and a prioritization basis to the 10-year Transport Sector Development Program. Proper information on resource availability to the transport sector should also be made timely available by MOED and MOF to MOT for it to work on a draft 4-year Transport PIP. This will then assure that 10-year SDP and 4-year PIP for the transport sector is properly backed up financially, so its accomplishment is secured. Also, consideration of resource constraints into the process will better coordinate the 10-year SDP and 4-year PIP with the current financial stage of the state and its budget process and will play an important role while prioritizing investment decisions.

MOT's officials responsible for drafting and processing Transport SDP agree that the Ministry needs a standardized procedure to better organize, coordinate, and process the preparation of Transport SDP. The same procedure is also needed while drafting Transport Sector PIP for 4 years. Taking these into consideration, technical assistance to MOT should help in establishing standard operating procedures for drafting the SDP and PIP documents as well as in adopting unified source documents, such as Project Concept Note, which

would guide MOT experts in technical work for the development of the Ten-Year SDP and Four-Year PIP.

It is critical that upon drafting Transport SDP is made available for public use and discussion, so that the process of preparing the SDP benefits the most from independent industry experts and professional organizations.

CHAPTER 6. TOURISM SECTOR

AGENCY'S MISSION AND PRINCIPLES, IT'S VISION AND CURRENT STATUS.

Azerbaijan has a good potential for both domestic and international tourism. This potential can be utilized with a well coordinated set of policies, bringing together public and private sector resources for a sustainable development of tourism. The tourist industry is strongly linked with the government's strategy for poverty reduction through income generation. Tourism can generate income at regional and local levels by creating demand for specific services, ranging from high- to low-skill jobs. It can also create demand for SMEs' production in a variety of areas. At the same time, it will enhance local participation in environmental preservation and development. The main idea by the government is to encourage tourism through public investment in infrastructure.

The tourism strategy in Azerbaijan is designed and implemented by the Ministry of Youth, Sport and Tourism, led by the minister Mr. Abulfaz Garayev. The Ministry has three Deputy Ministers, including one in charge of the Tourism Department. The staff of the Tourism Department comprises a Director, a Deputy Director, four Division Chiefs, and 19 experts as shown below. The staff has a background in public administration, international relations, linguistics, law, economics, and journalism. The Ministry also has an office in every rayon each with 4 to 7 employees.

Deputy Minister ------ Tourism Director ---------- Tourism Deputy Director

Domestic Tourism Development Division
(5 people)

External Tourism Division
(4 people)

Announcements & Information Division
(3 people)

Licensing Division
(4 people)

SSDP preparation procedures are common to all sector agencies and include the following steps: 1) The policy making division collects necessary information from the relevant divisions of the ministry; 2) Draft of SSDP is submitted to the Cabinet of Ministers and them disseminated by COM to the is sent to the line ministries for comments; 3) After all comments and recommendations are considered, the draft SSDP is again distributed to all agencies for final clearance; 4) The final draft of SSDP is sent to the COM for approval; and 5) The COM submits SSDP to the President's Office for final approval in the form of presidential order.

EXISTING PLAN DOCUMENTS AND AGENCY'S SWOT ANALYSIS

There are three main sector development documents followed by the Tourism Department:

1) **State Program on Tourism Development** (2002-05);
2) State Program for the Socio-Economic Development of the Regions in the Azerbaijan Republic (2004-08); and
3) State Program for Poverty Reduction and Economic Development – SPPRED (2003-05).

The diagnostic review work for PIPP in May 2005 made the following general observations on the above documents: The first document reads like "a wish list" of issues (see below) to be addressed without any implementation plan or specific project analysis or justification. The second document included some 30 projects items without reference to any analysis undertaken by the Tourism Department. They are just line entries in the RDP to be possibly adopted by relevant ministries for implementation. The SPPRED have a limited number of projects mainly focused on: establishment of an investment environment (new licensing rules and simplified visa regime); advertisement and PR actions (establishment of the regional information centers); PIP funded infrastructure refurbishment; ministry's staff training and promotion of tourism in the rayons.

The 2005-08 Budget summarily states the following principles for Tourism Sector development with an accompanying budget for M3,500 million for the Department's combined operating and investment spending in 2005:

-Develop entrepreneurship in the tourism sector;

-Encourage competition in the tourism market;

-Raise service standards to international levels; and

-Develop infrastructure that supports tourism.

The medium-term strategic goals and targets are specified in the **2002-2005 State Program on Tourism Development** approved by the Presidential decree of 22nd August 2002. The main goal of the program is to ensure effective use of tourism resources. The main tasks of this program include:

- Development of entrepreneurship in the tourism sector, particularly in small and medium businesses;
- Establishment of a competitive tourism market;
- Increase the flow of revenues from tourism into the State and local budgets;
- Improve the quality of services in the tourism sector;
- Improve tourism infrastructure and its technical-financial base;

- Attraction of foreign investment;
- Creating favorable conditions for the participation of local tourism institutions in international tourism programs.

The main directions of the program are as follow:

- Assessment of tourism resources and their extension;
- Creation of tourist resorts, excursions, and other cultural services;
- Encouraging hotel construction and development of new tourism routes;
- Publication and dissemination of rayon and city profiles with their historical-cultural overview;
- Promoting production of national handicrafts and souvenirs;
- PR and information activities to advertise Azerbaijan worldwide as a country with favorable business environment in the tourism sector;
- Extension of international cooperation in tourism development.

The state, through its public investment policy, is planning to ensure that necessary infrastructure for the development of tourism will be put in place over the medium-term. While Azerbaijan can boast of considerable tourism potential, the government will focus on improving roads, electricity supply, telecommunications, water supply and sewage systems to support tourism development and contribute to the country's regional economic development. In this regard, the role of municipalities and local communities is very important.

The government will also encourage the development of so-called green or rural tourism, concentrating initially on domestic tourism. In this respect, the existing capacity and quality of museums, arts galleries and music venues need considerable upgrading in both urban centers and regions, as these can bring in more foreign and domestic visitors.

The tourist information centers, which are being established in Sheki and Ismailli and 8 other rayons, will coordinate advertising and publicity work for tourism, as well as providing information on local services and sights for tourists. It is planned to develop well-defined routes to guide tourists to the most interesting sights. The government will also organize courses to train specialists in the tourism industry.

The government is going to prepare and approve new licensing rules for simplifying licensing in the tourism industry. It will also make the tourist visa regime as simple as possible to encourage foreign tourists.

Finally, in line with its policy to encourage SMEs development, the government also plans to ease their access to credit in order to promote private sector development.

Almost all the measures foreseen by this program are currently implemented, and a new Tourism Sector Development Study is now being undertaken by a team of three foreign consultants financed by US Trade & Development Agency. The bid was won by the DC based Caspian Group Consulting (CGC) in partnership with PA Consulting of the UK. The study is not a Tourism Master Plan but aims to identify priority development areas for tourism, propose organizational and procedural changes (visa processing at borders, etc.), and suggest changes in the law that would encourage tourism development. The CGC has just completed the **draft Strategic Development Plan** and submitted it to the top management of the Ministry. After preliminary approval by the Minister, it will be sent to the Tourism Department for further review. It will eventually serve as the basis for the preparation of draft Presidential decree on "2006-2010 Tourism Development Perspectives".

The deputy head of the Tourism Department has kindly offered to provide the PIPP project with a copy of the draft Plan as soon as he receives it.

SWOT ANALYSIS

Strengths:

- Presence of a Tourism Sector Development Study, undertaken by the CGC consultants, that identifies priority areas and administrative changes needed in the department;
- A new SSDP, to be prepared on the basis of the CGS study, is expected to remedy most weaknesses of the previous SSDP;
- Strong willingness shown by the department staff to improve the SSDP preparation process.
- The Department has basic statistics over the country's natural resources, human resources, infrastructure, superstructure (hotels, restaurants, conference centers, sites, etc.) and support services (transportation means, medical facilities, sport facilities, etc.). These resources, combined with the TA Study due to be finalized shortly, should enable the Department to articulate a medium-term (2006-10) Tourism Development Strategy;

Weaknesses:

- Lack of any clear linkage to the annual budgeting process (capital expenditure formulation), PIP, and MTEF as no sources of funding are referred to in the existing SSDP;
- There is no reference to the SPPRED, RDP or any other State program;
- Capital expenditures are simply forecasted through annual increases of budget lines without any reference to specific programs and projects;
- There is no any performance-based measurement of projects, and no appropriate performance indicators are used;

Opportunities:

- The implementation of SSDP would be substantially enhanced should the Tourism Department's capabilities were enhanced adequately to conduct pre-feasibility studies. This is particularly relevant for the Tourism Department as its mandate is to operate as an enabling body for tourism development while actual projects are to be developed by other ministries when infrastructure is involved and by the private sector when superstructures are involved.
- Organizing and properly training a Planning and Evaluation Division within the Department to do such work would turn this group into being pro-active in tourism development.

Threats:

- Inability to link (administratively and technically) strategic goals with proper funding (regardless if it is from the annual budget, MTEF, PIP or private funding) could result in those actions remaining fully or partially on paper.

REVIEW OF CORRESPONDENCE TO PIPP GUIDELINES

Correspondence to PIPP Guidelines:

- SSDP defines the ministry as responsible for its implementation, but it is not clear which units within the ministry are responsible for implementation and the M&E process;
- SSDP contains clear targets, directions and expected results;
- The Agency's goals fit well its mission, vision and principles;
- SSDP actions are prioritized and categorized by its five main strategic goals over a medium-term perspective;
- The SSDP's goals are time-bound but no sources of funding are referred to in SSDP;
- SSDP's actions are stated clearly and understandably.

Non-Correspondence to PIPP Guidelines:

- SSDP does not state which units are responsible with the implementation of each task;
- SSDP's performance is to be reviewed only on **ad hoc** basis when ordered by the President's Office;
- No link with other comprehensive (SPPRED or RDP) or special government programs;
- No prioritization is made depending on projects' sustainability, effectiveness and cost efficiency;
- Agency's budget is not based on its SSDP;
- SSDP activities are not costed;
- SSDP does not include any procedures for M&E process.

MONITORING AND EVALUATION

The monitoring and evaluation of the measures foreseen by the State Program on Tourism Development is carried out by the Tourism Department based on feedbacks from line ministries identified as the responsible agencies in the action plan. This reporting is implemented irregularly when demanded by the President's Office.

- There is no any unit in the Ministry with responsibility for regular M&E;
- The annual SSDP Progress Reports are very simple and descriptive, providing only superficial information (e.g., which activities have been implemented, by which institutions, the overall funds and time spent);
- No performance-based approach is used in the M&E process;

In addition to internal M&E, the SPPRED Secretariat, based in the MOED, prepares Annual Progress Reports, which review the implementation of key measures (e.g., activities implemented, training carried, legislation approved, etc.) over different sectors of the economy, including tourism.

CONCLUSIONS AND RECOMMENDATIONS

The organizational and administrative structure of the ministry should be adjusted to provide the Tourism Department and other appropriate divisions with the necessary capacities to formulate the sound sector development strategies;

There is good chance to have a comprehensive link between new SPPRED and 2006-2010 Tourism Strategy as both documents are being drafted at the moment and there is good opportunity to determine the transparent and well argued liaisons among both strategies;

Comprehensive training should be provided to the budget department to formulate annual capital and recurrent budget and MTBF on the basis of SSDP. (Some temporary on-job training may be provided by the STTS at the time of its visit in November and regular by the local expert through the period of project);

- The Ministry's goals should be defined ambitiously but at the same time realistically so as to carry out its mission and attain its vision;
- The Ministry should ensure an active co-ordination with all stakeholders and their participation to the above mentioned processes;
- A correct assessment should be made of the sector's current state of resources, capabilities, and limitations;
- The Agency should determine time-bound and measurable targets so as to realize its goals over the plan period;
- While the SSDP's "basic scenario" should fully correspond to the Agency's overall budget (recurrent plus capital), it could also contain an alternative scenario to provide the Central Ministries with a better insight as to the sector's needs and its stakeholders' aspirations.
- The Agency's mission and its own vision over the plan period should properly be identified in line with the national and sectoral objectives stated by the Central Government;
- All activities and projects necessary to attain the Agency's goals and targets should be properly prioritized, sequenced, and assigned.
- All such activities and projects envisaged by the SSDP should fully be incorporated in the Government's MTEF for the corresponding period if the SSDP is a meaningful operational document rather than a wish-list. Having activities and projects included in SSDP but not in MTEF/Budget serves no purpose other than causing the ministry staff feel disappointed.
- Finally, SSDP should contain appropriate performance benchmarks and measurements for Monitoring and Evaluation to render it an effective tool for implementation and future planning.

CHAPTER 7. ECOLOGY AND NATURAL RESOURCES SECTOR

AGENCY'S MISSION AND PRINCIPLES

State environmental policy is implemented by the Ministry of Ecology and Natural Resources, which has been created on 23rd may 2001 and since led by minister Mr. Huseyn Bagirov.

The Ministry is a central executive authority responsible for carrying out state policy on environment protection, the regulation of the use of nature, a sustainable use of ground waters, raw mineral deposits, surface natural resources, their rehabilitation, the observation and forecasting of hydro-meteorological processes within the territory of the Republic of Azerbaijan including the Azerbaijan sector of the Caspian Sea.

The main responsibilities of the Ministry identified by it's regulation are:

The Ministry's Central Operations Department is the central decision making body where all policies and projects take their final form. It has 122 staff distributed along 10 divisions. The Ecology and Nature Preservation Policy Division is responsible for the environmental policy and SSDP preparation (15 staff). It's functions include: environmental forecasting and coordination, planning of the environment actions.

The procedures of SSDP preparation are common for any sector agency and includes the following steps: 1) The policy making division collects information from the relevant divisions of the ministry; 2) Draft SSDP is submitted to the Cabinet of Ministers and them disseminated by COM to the line ministries for their comments; 3) After all the comments and recommendations are included into the draft SSDP, it is again distributed among the line agencies for final approval; 4) Final SSDP version is sent to the COM 5) COM submit the SSDP to the Presidential Office for presidential approval in the form of presidential order.

EXISTING SSDPs

The vision of the ministry can be formulated as: The well-being of the population is also affected by the environmental conditions in which it lives. Poverty and vulnerability are closely linked to environmental problems, in that land which has been ruined by environmentally detrimental practices cannot be used for agriculture; polluted air and drinking water leads to increased health risks for the population.

On the basis of what is known about poverty and living standards in the country, the government has designed a SPPRED based on six key strategic aims: cleaning up mercury sludge and improving waste management; reconstruction of purification units and sewerage systems in selected areas; protection of the bio-diversity of the Caspian Sea; protection of soil from pollution and re-cultivation of polluted soil; improved management of the country's forests and prudent re-forestation projects; improvement of the monitoring of environmental indicators.

There are five SSDPs (National Programs) existing in the environment sector:

1) **National Action Plan on Protection of Environment** (with no concrete time bound);
2) **State Programme on Restoration and Expansion of Forests in the Azerbaijan Republic;**

3) **State Programme on the prevention of desertification, the efficient utilization of hayfields and summer-winter pastures in Azerbaijan Republic;**
4) **State Programme on the Development of Hydrometereology in Azerbaijan Republic;**
5) **2003-2010 National Program on Environmentally Sustainable Socio-Economic Development.** (approved by the Presidential order).

1. The National Action Plan on Protection of Environment (NAPPE) has been prepared jointly by the Government of Azerbaijan and World Bank in 1998 (identifying the main environmental actions to be risen by the Government in medium-term and short-term running. This Action Plan has been developed by the former State Committee on Ecology and Control over the use of Nature in Azerbaijan and identifies the initial state measures in the environmental sector. The main goal of NAPPE is to identify the main problems with regard to environmental protection in Azerbaijan, define the environmental priorities and develop a consequent strategy for their resolution while considering the changing economic and community conditions.

The NAPPE's actions have the following characteristics referred in the Action Plan: ecological category; main target; name of action; degree of priority and approximate value.

The following tasks of NAPPE's Action Plan are already fulfilled (funding is provided by WB):

1) Construction of toxic waste polygon in Pirekeshkul settlement; 2) Institutional capacities improvement; 3) Construction of the sturgeon-breeding plant in Neftchala; 4) Treatment of the Absheron peninsula from oil waste.

2. The main idea of the State Programme on Restoration and Expansion of Forests in the Azerbaijan Republic is to restore the forests based on their geographical (rayon) diversification, improve their quality and productivity, expand the greenland areas by using additional land plots for newly sowed forests and plants. The actions referred in the Programme are categorized by the following data: geographic category; covered area and volume; implementation period; funding source; implementation counterparts and criteria.

3. The main directions of the State Programme on the prevention of desertification, the efficient utilization of hayfields and summer-winter pastures in Azerbaijan Republic are: to improve the current legislation required to ensure the rational utilization of the pastures and hayfields; their protection; reduce the degree of salinization; effective use of the water fund and other reserves. The initial responsibility on implementation of this programme is given to the MENR, though it is considered more appropriate for the most of Program's actions to be fulfilled under the State Land and Cartography Committee and Ministry of Agriculture.

4. The main task of the State Programme on the Development of Hydrometereology in Azerbaijan Republic is to improve the hydrometeorological situation in the country. The programme identifies the consequent actions diversified by the implementation period covering 2004-2010 years; by categories; and by entity responsible for implementation.

5. **The National Programme on Environmentally Sustainable Socio-Economic Development (NPESSED)** does not contain any link with the above-mentioned state programs and **recognized by the MENR as a main SSDP on environment**. This programme identifies the strategic goals and targets of the existing environmental policy in long-term run. However, being different from other SSDPs, which belong to the various economic sectors, this programme summarizes the measures relevant to other sectors, which have a direct or indirect impact on environment. This factor seriously affects and complicates an implementation and effective development of this programme.

The programme is based on time-tested environmental principles, national culture and experience with due consideration to up-to-date knowledge available worldwide and determines the main areas of sustainable development and includes plan of actions for 2003-2010.

The overall goal of the National Program is to preserve existing environmental systems and economic potential and effective use of natural resources for the sake of current and future generations. In order to achieve this, it is important to develop ways of natural resource use and development of economy should base on the sustainability principles. From result-based viewpoint, it is possible to increase this capacity, improve it and achieve development of an economic base that would held improve its quality. This implies effective use of economic potential and natural resources to develop various sectors of economy and generate jobs.

The Program's action plan includes the list of measures divided by five main sections:

1) Protection of environment and effective use of natural resources
2) Global Environmental Problems
3) Industrial complex
4) Agriculture and tourism
5) Education, science and culture

There is World Bank Rural Environment Project for Azerbaijan based in the Ministry. It is started in March 2005 and aimed to improve biodiversity conservation and introduce more sustainable natural resource management and economic activities in two mountainous areas of Azerbaijan, to restore the ecological health and productivity of their natural forests and pastures. The project consists of the following four components:

Component №1 will support the establishment of Shah Dag National Park (SDNP) and expanded Ordubad National Park (ONP), and adjacent Protected Areas (Pas);

Component №2 will assist residents of 55 villages inside or immediately adjacent to the two national parks and surrounding Pas to shift their traditional agricultural and natural resource, use practices towards more modem and efficient approaches that place less pressure on natural resources and ecosystems;

Component №3 aims to stimulate economic diversification in the project areas by assisting local entrepreneurs to start or expand environmentally sustainable small and medium commercial enterprises;

Component №4 will support overall project management and administration, including the staffing and operating costs of a central Project Implementation Unit and three field offices (Project Coordination Units, PCU): two in the Shah Dag area, and one in the Ordubad area.

SWOT ANALYSIS

Strengths:

- There are policy making and finance and accounting bodies within the structure of the ministry, which are able to design and formulate the sound environmental policy within ministerial budget, MTEF and PIP if their institutional capacity would be improved in order to meet all the PIPP requirements;
- There is willingness shown by those divisions to improve the existing SSDP;
- There is good experience of PIU (World Bank Rural Environment Project) created in the ministry, which could share or extend it's capacities on project management and administration with relevant divisions.

Weaknesses:

- The working procedures between the policy making division (Ecology and Nature Preservation Policy Division) and budget preparing body (Finance and Accounting Division) are not well defined unless the existing SSDP, which cover 2003-2010 does not have any clear identification of funding source for any action foreseen by the relevant action plan and does not list the procedures how those activities would be linked to the annual budget preparation process, PIP or MTEF;
- The current **NPESSED** does not identify any clear link with existing sector development plans of SPPRED and RDP;
- MTEF capital expenditures are simply based on the annual forecasted increase of the budget lines and not argued by the programme-based approach;
- There are not any performance-based measurement of the projects and any appropriate performance indicators to be used.

Opportunities:

- There is need to strengthen an institutional capacity of the policy making division in order to let it develop or adapt the medium and long-term goals and strategies in line with expected budget, PIP or MTEF. Simultaneously, there is urgent need to improve an institutional capacity of the Finance and Accounting Division to forecast, estimate and evaluate the possible cost and benefit as well prioritize the foreseen projects depending on their cost value, importance and budget capacity.

Threats:

- Inability to link (administratively and technically) the strategic goals with proper funding (regardless it is annual budget, MTEF, PIP or private funding) would lead to situation when all those actions would remain stated on the paper and fully unexecuted or partially implemented.

ANALYSIS OF COMPLIANCE WITH PROPOSED SSDP GUIDELINES

- The agency's mission, vision, statutory responsibilities and obligations are well formulated in the SSDP and internal regulations. Agency's work/business philosophy, future and perspectives are exists and formulated in the SPPRED, however agency's SSDP's goals are not clear in terms of feasibility;

- Agency's goals are consistent with it's mission and they are ambitious and challenging, however it's budget is not based on it's SSDP;
- SSDP is providing the detailed breakdown of all activities categorized by five main sections, however no prioritization of activities in SSDP based on funding capacities and under each strategic goal;
- Targets are result-oriented, measurable, have concrete time-bound and clearly stated in long-term perspective, however they do not have any link with SPPRED, RDP, PIP and other government programs. Moreover, projects sustainability, effectiveness and rate of return are not considered;
- There is necessary coordination with other line agencies involved into SSDP process, however SSDP does not identify at all any responsibilities by the interministerial departments regarding implementation of SSDP and there is not any methodology or general approach to be used for M&E (described below).

MONITORING AND EVALUATION

At present the monitoring and evaluation of the existing SSDP is carried out by the Ecology and Nature Preservation Policy Division, which collects the relevant progress information from the line ministries and based on those feedbacks prepares an annual progress report regarding implementation of the measures included into the Action Plan of the National Programme on Environmentally Sustainable Socio-Economic Development

- The existing SSDP does not identify any approach or methodology to be used for the monitoring and evaluation. Moreover, there is no clear definition of the responsible bodies, which would carry out the M&E process.

- The monitoring and evaluation carried out by the Ecology and Nature Preservation Division is primitively stating which actions have been carried out in certain period of time, which agency was an executor, used funding and it's source, albeit there are no any performance measurement or indicators used to estimate the project's benefit.

In addition to internal M&E, the SPPRED Secretariat, based in the MOED, prepares Annual Progress Reports, which review the implementation of key measures (e.g., activities implemented, training carried, legislation approved and etc.) over different sectors of the economy, including environment.

CONCLUSIONS AND RECOMMENDATIONS

- The Ministry's goals should be defined ambitiously but at the same time realistically so as to carry out its mission and attain its vision;
- The Ministry should ensure an active co-ordination with all stakeholders and their participation to the above mentioned processes;
- A correct assessment should be made of the sector's current state of resources, capabilities, and limitations;
- The Agency should determine time-bound and measurable targets so as to realize its goals over the plan period;
- While the SSDP's "basic scenario" should fully correspond to the Agency's overall budget (recurrent plus capital), it could also contain an alternative scenario to provide

the Central Ministries with a better insight as to the sector's needs and its stakeholders' aspirations.

- The Agency's mission and its own vision over the plan period should properly be identified in line with the national and sectoral objectives stated by the Central Government;
- All activities and projects necessary to attain the Agency's goals and targets should be properly prioritized, sequenced, and assigned.
- All such activities and projects envisaged by the SSDP should fully be incorporated in the Government's MTEF for the corresponding period if the SSDP is a meaningful operational document rather than a wish-list. Having activities and projects included in SSDP but not in MTEF/Budget serves no purpose other than causing the ministry staff feel disappointed.
- Finally, SSDP should contain appropriate performance benchmarks and measurements for Monitoring and Evaluation to render it an effective tool for implementation and future planning.

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SECTOR STRATEGIC

DEVELOPMENT PLANNING

1a

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Successful Sector Development Planning (pre-requisites)

1. **National Development Framework**
   - National Strategic Macro-economic Goals and a predictable Budget Envelope provide a source for a significantly improved top-down discipline
   - Reconciliation of Top-Down discipline and Bottom-Up program initiatives through the clearly defined coordination patterns
2. **Synchronized Planning, Programming and Budgetary Processes**
   - Consistent time frames for national plans, sector programs, PIP and MTBF
   - Consultation with the stakeholders and public-at-large
3. **Mission, Development Goals and Objectives of Line Ministries**
   - SSDPs and Medium-Term Development Plans need to correspond to the National Development Framework
   - Capital programs need to be prioritized, sequenced and assigned
4. **Results Framework Needs to be Formulated**
   - PIP programs/projects' impact needs to be measured through the well-formulated performance benchmarks and measurable indicators

2

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Development Planning (existing procedures)

Macroeconomic Planning:

Macroeconomic goals and sector funds allocations are not explicitly considered

Sector Planning:

- Sector programs are developed from project submissions and circulated for endorsement by the Cabinet of Ministers, MOED, MOF and other designated GOAZ agencies
- No direct links between sector planning and budgetary process

Project Planning:

- Sector-specific, no macroeconomic impact consideration
- Absence of rigid benefit-cost analysis and resource constraint considerations

3

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Sector Strategic Development Planning
Current Situation

- SSDPs are **not linked** to a national development strategy framework
- No unified **Guidelines** exist for preparation of SSDPs
- SSDPs are not subject to **strategic constraint** or reconciliation through an integrated coordination process
- SSDPs limited consideration of **inter-sector linkages**
- The **SSDP – budget relationship** is weak
- Limited **monitoring and evaluation**
- Limited **participation of stakeholders**, particularly independent experts and NGOs

4

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Coordinated Development Planning (proposed guidelines)

Macro Planning:

- National and sector development goals and strategies formulated
- Sector resource limitations established

Sector Planning:

- Sector strategic plans for 10 years developed per National goals
- Medium-term programs (4 years) aligned with MTEF
- Coordination, information-sharing and updating

Programs/ Project Planning:

- Investment proposals consistent with macro-planning and sector development priorities
- Investment programs bear clearly defined goals and objectives
- Projects are appraised per the techniques of benefit-cost analysis and prioritized

5

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Conditions for Successful Sector Development Planning:

- SSDPs formulate sector objectives within the established National Development Framework. Medium-term development plans need to be dynamic and maneuverable documents to correspond with the GOAZ mid-term development priorities.
- PIP should stem from SSDP's with clear delineation of capital and recurrent expenditure
- Prioritize and sequence all projects
- Establish performance indicators and benchmarks for Monitoring and Evaluation
- Delineate inter-sector linkages
- Consult all stakeholders and counterparts

6

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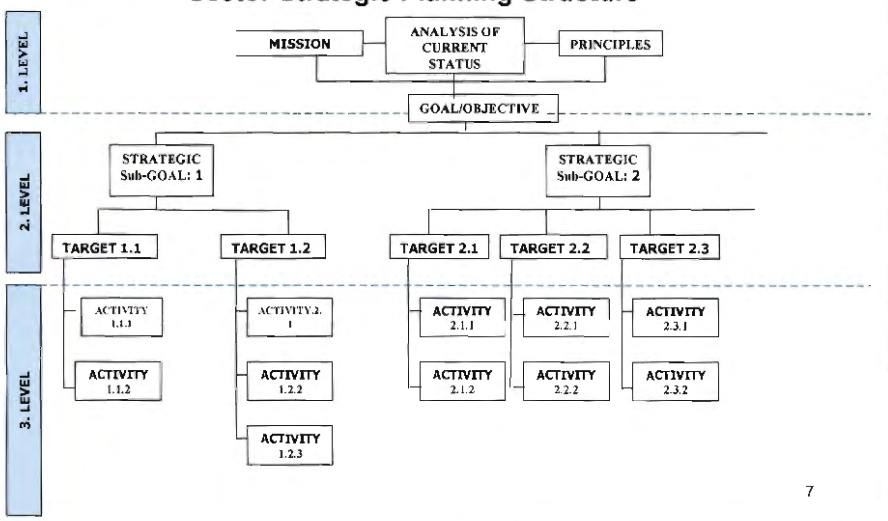
Sector Strategic Planning Structure



7

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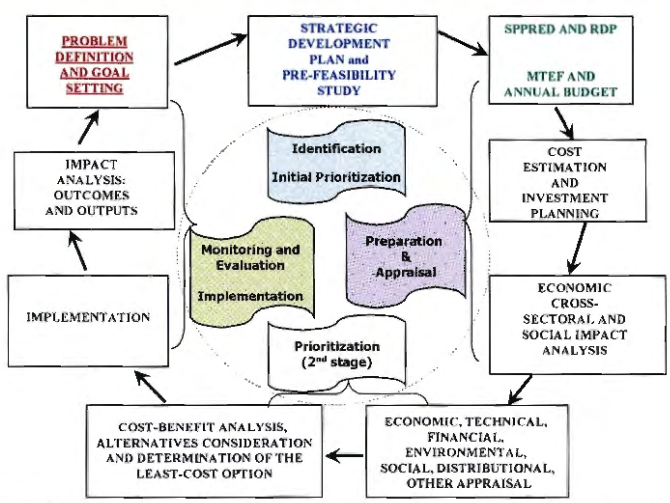
PUBLIC INVESTMENT PROGRAM LIFECYCLE



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Sector Development Plans – Recommendations

- Implement a more synchronized and integrated approach between planning, programming and budgeting through a Joint Call Circular
- Have sector "Goals – Targets – Activities – Projects" linked to each other within a result-oriented process that will gradually lead to performance program budgeting
- Adopt a definite integrated coordination role to reconcile top-down discipline to bottom-up programming in PIPP
- Accelerate a program of Monitoring and Evaluation through a well-defined results measurement framework.

9

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PUBLIC INVESTMENT POLICY PROJECT

TRAININGS ON PUBLIC INVESTMENT PROJECTS DEVELOPMENT CYCLE

April 16, 2007; June 14, 2007; June 19, 2007

This publication was produced for review by the United States Agency for International Development. It was prepared by Development Alternatives, Inc.

Public Investment Policy Project

Trainings on Public Investment Projects Development Cycle

April 16, 2007
June 14, 2007
June 19, 2007

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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5. Instruction for completing the 2008-11 Public Investment Program Call Circular for Line Ministries
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Training Evaluation Report

Introduction

On April 16, 2007 the PIP-Project and Public Investments Department, MOED conducted the technical training for selected 6 line ministries and 4 state enterprises in Public Investment Program Call Circular Requirements for 2008-2011. Half-day workshop was conducted in Scientific-Research Economic Reform Institute which provided trainer and training facilities. This report summarizes the training, strengthening the positive sides and provides recommendation for further improvement.

Overview and Objective of the workshop

This half-day workshop has been designed to facilitate the line ministries and state agencies in preparing the Public Investment Projects for 2008-2011, specifically by introduce the new forms, namely Project Proposal Paper and 2008-2011 Public Investment Program Call Circular, issued by MOED as part of Public Investment Program Preparation Process for 2008-2011. The purpose of this workshop is to bring relevant line ministries officials together to discuss recently issued PIP Call Circular. It was expected that the consultation would identify and comment upon areas of difficulties and problems faced by the line ministries by preparing the public investment projects with a view to recommending future course of action by the relevant authorities.

The workshop began with opening greetings, chaired by Ms.Sabira Shikhaliyeva, PIP-Project Training Coordinator. She presented the training team and gave the floor to Mr.Natiq Pashayev, PI Department Deputy Head. He provided the participants with brief background information on the goals and purposes of 2008-2011 PIP CC and participants expressed their expectations in relations to the workshop.

This was followed by a presentation on the "Public Investment Policy and Programming Overview" by Mr.Elvin Efendi, Scientific-research Economic Reform Institute Specialist. The presentation focused on the goals and objectives of Public Investment Program, stages of project development cycle.

Then, the Project Proposal Paper template was presented to the participants by Mr.Samir Mamedov, Senior Adviser, Public Investment Policy and Programs section and two complete samples based on existing projects were discussed. The Project Proposal is usually the first document outlining what change is proposed. It is the document that converts an idea or policy into the details of a potential project, including the goals, outputs, major risks, costs, and an estimate of the resources and time required. The Project Proposal expands the initial concepts in order to: provide broad details of the objectives, scope, resources, budget, milestones, risks and gain authorization to proceed to the next step of the initiative.

After break the 2008-2011 PIP Call Circular tables were presented by Mr.Anar Samedov, Senior Adviser, Public Investment Project Expertise section, and this presentation prompted stimulating reactions and interventions from each participant, based on its own practical experience with last year PIP Call Circular.

Agenda

2008-11 PIP Call Circular technical training
Agenda
April 16, 2007

Time	Topic	Lecturer	Facilitator
9-45 –10-00	Introduction & interactive discussion on difficulties with the completion of PIP Call Circular	Natiq Pashayev	Samir Mamedov Anar Samedov
10.00 – 10.30	Public Investment Policy and Programming Overview	Elvin Afandi	Samir Mamedov, Nigar Ismaylova
10.30 – 11.00	Project Proposal Paper Presentation and discussions	Samir Mamedov	Nigar Ismaylova
11.00 – 11.20	Coffee break		
11.30 - 12.30	2008-11 PIP Call Circular tables (Task –Completion of the Circular)	Anar Samedov	Nigar Ismaylova
12.30-13.00	Discussion and questions	Natiq Pashayev	Samir Mamedov Anar Samedov
13.00- 14.00	Lunch		

List of participants

MOED participation : Mr.Natiq Pashayev, Public Investments Department Deputy Head
Mr. Samir Mamedov, Senior Adviser, Public Investment Policy and Programs Section
Mr.Anar Samedov, Public Investment Projects Expertise Section

PIP-Project participation: Ms. Sabira Shikhaliyeva, Training Coordinator
Ms.Nigar Ismaylova , Fiscal and Sector Expert-Economist

N	Agency name	Participant name	Participant`s position
1	"Azersu" Open Joint Stock Company	Muslim Rzayev	Head of Division, Water chanel Scientific-research Institute
2	"Azersu" Open Joint Stock Company	Mirhəshim Miryahyayev	Specialist
3	"Azersu" Open Joint Stock Company	Farruh Heybatov	Procurment specialist, Internations relations and development department
4	Azerbaijan Melioration and Irrigation Open Joint Stock Company	Mammed Asadov	Head, Science, project, construction and foreign relations department
5	"Azerenerji" Open Joint Stock Company	Aydemir Shihmetov	Head, Capital constructions department
6	"Azerenerji" Open Joint Stock Company	Hikmet Hasanov	Head, Economic department
7	"Azerigas Open Joint Stock Company	Madat Həshimov	Baş mütəxəssis
8	"Azerigas Open Joint	Salakhaddin	Baş mütəxəssis

	Stock Company	Allahverdiyev	
9	"Azerigas Open Joint Stock Company	Khabib Makhmudov	Tikinti şöbəsinin rəis müavini
10	Ministry of Youth and Sport	Seymur Salmanov	Leading adviser, Capital construction and transport department
11	Ministry of Health	Kazım Kazımov	Head, Planning of heath objects network development department
12	Ministry of Ecology and Natural Recourses	Gulshan Hadjiyeva	Senior Adviser, Finance and economy department
13	Minsitry of Transport	Izzet Ismaylov	Head, Transport policy and economy deprtment, Economy and statistics section
14	Minsitry of Transport	Mustafa Bashirov	Main adviser, Finance and credit department, Investment policy section
15	Minsitry of Transport	Rovshan Khalilov	Leading specialist, "Avtonagliyyatservis" Department
16	Minsitry of Education	Natiq Mammadov	Strategic analysis, planning and human recourse management department
17	Minsitry of Education	Orkhan Kerimov	Deputy Head, Economy department
18	Ministry of Culture nad Tourism	Azer Salmanov	Deputy Head, Investment and technical programs department

Observations

According to participant's comments gathered at the end of the sessions, the workshop was successful. It was effective in enhancing participant's appreciation of the importance of a sound and effective public investment program. It also allowed the participants to gain a comprehensive and practical understanding of public investment projects preparation in the context of their day-to-day work. The workshop furthermore allowed participants a forum to exchange ideas and present experience in relation of sector public investment programs development and formulation in their agencies.

Follow-up and Recommendations for PIP-Project

- To conduct such a workshops for wider auditorium and longer period (until 15.00 p.m.) in order to have enough time for practice exercises, questions and discussions
- To get the target auditorium in order the workshop be more effective and useful
- Improve the presentation skills and training capacity of PI Department staff

Follow-up and Recommendations for PI Department

- Conduct a series of on-the-job training sessions on requirements of PIP Call Circular for line ministries
- To establish close relations with Scientific-research Institute and use the technical and training capacity in conducting of the technical trainings

Workshop Evaluation Report

Introduction

On June 14, 2007 the PIP-Project conducted half-day workshop for officials of Ministry of Education and Azerbaijan Melioration and Water Economy Open Joint Stock Company in Public investment projects development cycle. This report summarizes the objectives, agenda, list of participants and observations of the workshop.
Overview and Objective of the workshop

This half-day workshop has been designed to build competence with the project analysts in understanding of project cycle, project preparation and appraisal stages, preparation of responses to the annual PIP Call Circular; and objectives of integrated (cost-benefit) analysis. It was expected that the consultation would identify and comment upon areas of difficulties and problems faced by the designated line ministries by preparing the public investment projects with a view to recommending future course of action by the relevant authorities.

Public investment projects development cycle
Workshop
Agenda
June 14, 2007

Time	Topic	Lecturer	Facilitator
10.00 – 10.45	Public Investment Policy and Programming Overview	Ramil Maharramov	
10.45 – 11.15	Standardization of project presentation format- Project Proposal Paper	Nigar Ismaylova	Ramil Maharramov
11.15 – 11.30	Coffee break		
11.30 - 12.00	2008-11 PIP Call Circular	Nigar Ismaylova	Ramil Maharramov
12.00-13.00	Discussion and questions	Ramil Maharramov	

List of participants

PIP-Project : Ms. Sabira Shikhaliyeva, Training Coordinator
Ms. Nigar Ismaylova , Fiscal and Sector Expert-Economist
Mr.Ramil Maharramov, Fiscal and Sector Expert-Economist
Mr.Elchin Rashidov, Specialist for Project Preparation, Appraisal and Management

Minsitry of Education :
Mr. Jeyhun Mamedov, Advisor

Azerbaijan Melioration and Irrigation Open Joint Stock Company
Mr. Mamed Asadov, Head, Science, project, construction and foreign relations department
Mr. Rasul Pashayev, Deputy Head, Science, project, construction and foreign relations department
Mr. Aslan Mustafayev, Leading specialist, Science, project, construction and foreign relations department
Mr. Telman Mustafayev, Leading specialist, United Administration of the

melioration and irrigation projects under construction

Observations and comments

According to participant's comments gathered at the end of the sessions, the workshop was successful. It was effective in enhancing participant's appreciation of the importance of a sound and effective public investment program. The workshop furthermore allowed participants a forum to exchange ideas and present experience in relation of sector public investment programs development and formulation in their agencies.

The participants made the following comments in respect of public investment projects development process:

- To learn the experience of developed countries in public investment project development
- To establish the Public Investment Units in line ministries
- To adopt the procedure and regulations to formalize the process of considering the public investment projects during the fiscal year starting from project proposal approval, through allocation the fund for feasibility study preparation, to inclusion the project to public investment program
- To adopt one unified format and standard for public investment project presentation and submission in order to avoid repetition of the data in different reports requested by MOF, MOED and COM. Due to the nature and format of information required by PIP CC and the Budget Call Circular (CC) are different, the line ministries find it extremely difficult to reconcile responses/information to PIP CC and the Budget CC.
- The forms of PIP Call Circular, especially Form 1, should be simplified and integrated with other sections
- To elaborate the methodology and instructions for considering the additional funds in project cost for an unforeseen contingencies like price adjustments and additional works required in the process of project implementation
- To establish certain ceiling on project cost which are required availability of feasibility study. Projects requiring lower amount of financing from the state budget are not subject to the feasibility study requirements
- To use the markets prices in financial analysis and cost estimation for state funded projects as it is done for foreign funded projects

Workshop Evaluation Report

Introduction

On June 19, 2007 the PIP-Project conducted half-day workshop for officials of Ministry of Agriculture and its subordinated agencies in Public investment projects development cycle. This report summarizes the objectives, agenda, list of participants and observations of the workshop.

Overview and Objective of the workshop

This half-day workshop has been designed to build competence with the project analysts in understanding of project cycle, project preparation and appraisal stages, preparation of responses to the annual PIP Call Circular; and objectives of integrated (cost-benefit) analysis. It was expected that the consultation would identify and comment upon areas of difficulties and problems faced by the designated line ministries by preparing the public investment projects with a view to recommending future course of action by the relevant authorities.

Public investment projects development cycle
Workshop
Agenda
June 19, 2007

Time	Topic	Lecturer	Facilitator
14.00 – 14.45	Public Investment Policy and Programming Overview	Ramil Maharramov	
14.45 – 15.15	Standardization of project presentation format- Project Proposal Paper	Nigar Ismaylova	Ramil Maharramov
15.15 – 15.30	Coffee break		
15.30 - 16.00	2008-11 PIP Call Circular	Nigar Ismaylova	Ramil Maharramov
16.00-17.00	Discussion and questions	Ramil Maharramov	Elchin Rashidov

List of participants

PIP-Project : Ms. Sabira Shikhaliyeva, Training Coordinator
Ms. Nigar Ismaylova , Fiscal and Sector Expert-Economist
Mr.Ramil Maharramov, Fiscal and Sector Expert-Economist
Mr.Elchin Rashidov, Specialist for Project Preparation, Appraisal and Management

Ministry of Agriculture

Mr.Bahram Aliyev, Deputy Minister

Mr. Rahman Hadjiyev, Department Head, Investment Programs and Projects Development Deparment

Mr. Hikmet Kerimov, Division Head, Investment Programs and Projects Development Deparment

Mr. Ali Veliyev, Leading Advisor, Investment Programs and Projects Development Deparment

Mr. Nadirshakh Israfilov, Senoir Advisor, Investment Programs and Projects Development Deparment

Mr. Vilayet Suleymanov, Senior Advisor, Investment Programs and Projects Development Deparment

Mr. Ilyas Veliyev, Interntional Cooperation and Protocol Division Head
Mr. Vagiv Ahmedov, Deputy Head, Phytosanitation Service

Agriculture Scientific Center

Mr. Elshan Aliyev, Architecture
Mr. Rauf Abbasov, Chief specialist
Mr. Vali Ibadov, Chief Deputy Direktor

State Veterinary Service

Mr. Rashid Abbasov, Deputy Head
Mr. Ramiz Salmanov, Division Head

Observations and comments

According to participant's comments gathered at the end of the sessions, the workshop was successful. It was effective in enhancing participant's appreciation of the importance of a sound and effective public investment program. The workshop furthermore allowed participants a forum to exchange ideas and present experience in relation of sector public investment projects development and formulation in their agencies.

The participants made the following comments in respect of public investment projects development process:

- To adopt the sound legal basis, including procedure and regulations to formalize the process of consideration the public investment projects during the fiscal year starting from project proposal approval, through allocation the fund for feasibility study preparation, to inclusion the project to public investment program
- To adopt one unified format and standard for public investment project presentation and submission in order to avoid repetition of the data in different reports requested by MOF, MOED and COM. Due to the nature and format of information required by PIP CC and the Budget Call Circular (CC) are different, the line ministries find it extremely difficult to reconcile responses/information to PIP CC and the Budget CC.
- To elaborate the methodology and instructions for considering the additional funds in project cost for an unforeseen contingencies like price adjustments and additional works required in the process of project implementation
- To adopt the procedures for allocation the funds of project documentation preparation (budgets for pre-feasibility study, feasibility study)
- To establish certain ceiling on project cost which are required availability of feasibility study. Projects requiring lower amount of financing from the state budget are not subject to the feasibility study requirements
- To create the database of investment projects in line ministries in consistent with the database in MOED

İqtisadi Planlaşdırma və İdarəetmədə Dövlət İnvestisiyalarının Əhəmiyyəti və Aktuallığl

Ramil Məhərrəmov

14 Iyun 2007-ci il

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İnvestisiyaların əhəmiyyəti

- İnvestisiyalar ümumilikdə:
  - istehsal gücünü və gələcək istehlakı artırır
  - inflyasiya təzyiqini azaldır
  - Itisadi böyümənin əsas amillərindən biridir.
- Dövlət investisiyaları isə, o cümlədən:
  - özəl investisiyaların səviyyəsinə, tərkibinə və rentabelliyinə təsir edir
  - davamlı və stabil inkişafın əsasını təşkil edir
  - Özəl sektor üçün qeyri-müəyyənliyi azaldır

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DİS-nin əhəmiyyəti

- İctimai resurslar üzərində operativ nəzarəti təmin edir
- İctimai resurslardan maksimum səmərəli istifadə etməyə imkan verir
- Makro-sahəvi planlaşdıra-büdcə arasında optimal əlaqələrin yaradılmasına imkan yaradır

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Makro-sahəvi planlaşdırma-büdcə çərçivəsi

Makro Planlaşdırma

- Milli və Sektor inkişaf məqsədləri və strategiyaları formalaşdırılır
- Sektor üzrə vəsait məhdudiyyəti müəyyən edilir

Sahəvi Planlaşdırma

- 10 illik sektor strateji planlar Milli məqsədlərə müvafiq olaraq hazırlanır
- Orta-müddətli proqramlar(4 illik) OMXS-ilə uyğunlaşdırılır
- Koordinasiya, informasiya paylaşması və məlumatın daim yenilənməsi təmin edilir

Proqram/Layihə Planlama

- İnvestisiya təklifləri makro-planlaşdırma və sektor inkişaf prioritetlərinə uyğunlaşdırılır
- İnvestisiya proqramlarında aydın şəkildə müəyyən edilmiş məqsədlər və hədəflər olur
- Layihələr mənfəət-xərc təhlilindən keçir və prioritetləşdirilir

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Dövlət investisiyalarının planlaşdırma və icra dövrü

1. Xərc məhdudiyyətlərinin hesablanması və investisiyaların sahələrarası bölüşdürülməsi
2. Dövlət İnvestisiya Proqramının Təlimat Məktubu
3. Konsepsiya sənədi
   - Problemin müəyyən olunması və məqsədin müəyyənləşdirilməsi
4. Ilkin TİƏ
   - İqtisadi, sektorlar-arası və sosial təsirin təhlili
   - Mənfəət-xərc təhlili, alternativlərin nəzərdən keçirilməsi və ən aşağı xərc variantının müəyyənləşdirilməsi
   - Layihə smeta sənədlərinin hazırlanması
   - İqtisadi, texniki, maliyyə, ətraf mühit, sosial və digər müsbət təsirlərin qiymətləndirilməsi
5. Layihə qiymətləndirmə sənədinin hazırlanması
6. Ətraflı layihə mühəndislik sənədlərinin hazırlanması
7. İcra (İşlərin gedişi ilə bağlı monitorinq)
8. Təsirin Təhlili: Nəticələr və Məhsul

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Dövlət investisiyalarının planlaşdırma və icra dövrü

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Dövlət İnvestisiyalarının Mərhələləri

- **Konsepsiya Sənədi**
  - Planlaşdırılan investisiya layihəsinin məqsədini, region və ya sahənin inkişafına potensial töhfəsini, gözlənilən nəticə və faydalananları, ö cümlədən həcmini, müddətini və ilkin maliyyə dəyərini əks etdirən sənəddir.
- **Dövlət İnvestisiya Proqramının Təlimat Məktubu**
  - Dövlət İnvestisiya Proqramının tərtibi üçün lazımi məlumatların əldə olunması məqsədilə İqtisadi İnkişaf Nazirliyinin hər il sərəncamçı təşkilatlara göndərdiyi rəsmi təlimat məktubudur.
- **Ilkin TİƏ**
  - Müasir xərc-mənfəət üsulları vasitəsilə investisiya layihəsinin səmərəliliyi və həyata keçirilmə potensialı barədə araşdırma və təhlillərin nəticələrini əks etdirən layihə sənədidir.
  - İlkin maliyyə, sosial, iqtisadi, texniki, risk, tələb, institusional, hüquqi və ətraf mühit təhlillərini əhatə etməlidir (XCD, DRN)

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Dövlət İnvestisiyalarının Mərhələləri

- **Bütün alternativlər nəzərdən keçirilir**
- **Layihə TİƏ-sinin qiymətləndirilməsi aparılır.**
  - İnvestisiya layihəsinin texniki və iqtisadi parametrlərinin Azərbaycan Respublikası İqtisadi İnkişaf Nazirliyi və səlahiyyətli təşkilatlar tərəfindən qiymətləndirilməsini əks etdirən və layihənin Dövlət İnvestisiya Proqramına daxil edilməsinin məqsədəuyğunluğunu müəyyən edən sənəddir.
- **Spesifik, Ölçülə Bilən, Real və Məlum İcra Müddətli layihələr qəbul edilir**
- **Layihənin gedişatı mütəmadi monitorinq edilir**
- **Sonda məqsəd və nəticələr tutuşdurulur**

USAID AMERİKA XALQINDAN | Dövlət İnvestisiya Siyasəti Layihəsi

Xülasə

- İnvestisiyalar, xüsusilə dövlət investisiyaları iqtisadi inkişafda əhəmiyyətli rola malikdir;
- Etibarlı dövlət investisiya siyasətinin və proqramlarının formalaşdırılması zəruridir;
- İnvestisiya siyasəti milli iqtisadiyyatın və sahələrin inkişafının vahid məqsədlərinə və başlıca strategiyalara müvafiq olaraq hazırlanmalıdır;
- • Və...

Instruction for completing the 2008-11 Public Investment Program Call Circular

List of objects to be constructed under capital expenditure investment from state budget in 2008-2011(Template 1/LM)

1- Give the number
2- Give the full name of the project
3- Indicate the project capacity, for example, construction of 10 schools, construction 10 km road
4- Give the project cost according to the basis price
5- Give the conversion factor used for this project
6- Give the project cost according to the estimate
7- Give the project cost according to the contract
8- Give the total cost of construction -assembly works at contractual prices
9-11 Indicate the capacity, basis prices and contract actual expenditures for the given year
12-14 Indicate the capacity, basis prices and contract remaining balance of expenditures for the given year
15-17 Indicate the capacity, basis prices and contract forecasted expenditures for the given year
18-20 Indicate the contract demand for the given years
21- Give the full name of the contractor
22- For the various notes

PUBLIC INVESTMENT PROJECTS EVALUATION FORMS (3/LM)

3-1 Project background information

1- Indicate the project status among the options: proposed new project, project under preparation (please submit the feasibility study, if it is not provided before) and on-going projects
2- Give the name of sector. For example, Energy sector, Education sector
3- Give the name of executive agency. For example, Azerenergy, Ministry of Education
4- Give the full name of the project
5- Give the number of the project, if it is available from the credit agreement. For example, 3923-AZ
6- Give the location of the project. For example, Baku city, Sumgayit city
7- Give the start and completion dates of the project (day/month/year)
8- Indicate the goods and services that the project is planned to produce, for example, the road construction, power station rehabilitation, airport construction
9- Indicate the project capacity in terms of cost and output. For example, 20 mln USD / 10 schools, 100 km of road
10- Give full name, position, telephone number and e-mail address of project responsible persons
11- Give full name, position, telephone number and e-mail address of person responsible for project preparation
12- Give full name, position, telephone number and e-mail address of person responsible for project approval
13- Give full name, position, telephone number and e-mail address of project contact person
14- Indicate the priority of the project with justification based on the country economic and sector strategy development goals

3.2 On-going project implementation report

1- Give the sector name
2- Give the agency name
3- Give the full project name
4- Give the amounts of project planned allocation both from local and external financing
5- Give the amounts of approved PIP allocation both from local and external financing
6- Give the amounts of adjusted PIP allocation both from local and external financing
7- Give the amounts of actual PIP allocation both from local and external financing
8- Give the amounts of actual project expenditures both from local and external financing
9- Calculate the Project physical execution percentage (%) = (Actual project works/ Project planned works) X 100
10- Calculate the Project financial execution percentage (%) = (Actual project expenditures / Project planned expenditures) X 100
11- Give the information requested in items 4/-8/ for past years
12- Give the information requested in items 4/-8/ for forthcoming years

3.3 Foreign funding projection of the project for 2008-2011

1- Give the sector name
2- Give the full agency name
3- Give the full project name
4- Indicate the country or institution name providing foreign financing, for example, German Government, Asian Development Bank. If there is more than one external funding please fill in additional parts of this form.
5- Give the effectiveness date of the project, that could be same or different from the date of agreement
6- Indicate the type of financing: credit, grant and equity
7- Give the total amount in USD
8- Indicate the grace period, usually 3-5 year during which the disbursement of funds and interest payment are made, and the amortization period - period for credit principal amount repayment.
9- Indicate the annual interest rate
10- Give the breakdown of planned disbursement according to the funding agreement for given years
11- Give the breakdown of actual disbursement for given years
12- Give the average annual exchange rate if the funds received in foreign currency other than US dollar (Euro, Japanese yen)

3.4 Financing projection for 2008-2011 by sources (capital expenditure/investment demand)

1- Give the sector name
2- Give the full agency name
3- Give the full project name
4- Indicate the source of financing. The project could be financed from different sources: state budget as government share in the project, enterprises` own funds, foreign credits and other sources like grants and local credits

5- Indicate the total project cost in AZN
6- Give the exchange rate AZN/USD
7- Indicate the actual disbursement of the project for given year
8- Indicate the approved and adjusted amount of financing for given year
9-11 Indicate the estimated amount of financing for given years
12- Indicate the remaining amount of financing
13- Use the following exchange rate for the years indicated in 8-12 column 1 USD = 0.86 AZN

3.5 Project justification and analysis summary

1- Give the sector name
2- Give the agency name
3- Give the full project name
4- Indicate the project linkages and relations with the state programs, like, SSDP - Sector Strategy Development Plan, SRPRSD - State Program on Poverty Reduction and Sustainable Development, SPSEDR - State Program on the Social-Economic Development of the Regions
5- Indicate the contribution to the development in non-oil sector
6- Indicate the project contribution to the development of employment in non-oil sector
7- Indicate the contribution to the development of new technology
8- Indicate the project environmental impact and related investment
9- Give the project economic life, for example 10 years
10- Indicate the detailed information on project performance
11- Indicate the project current and anticipated issues, problems and proposed measures, for example, shortage of financing weak legal basis, natural disasters
12- Provide the major project analysis indicators like NPV, IRR and CEA in financial and economic prices

Net Present Value (NPV) is calculated through the formula

$$\sum_{t=0}^{T} (Bt - Ct) \frac{1}{(1+i)t}$$

where B and C represent the Project's benefits and costs, respectively, in a given year (t) during a period of a number of years (T=0.....n), equal to the project's construction time plus its economic life. "i" represents the discount rate used in transforming the future benefits and costs to their present equivalent values.

Internal Rate of Return (IRR) is the particular rate of discount that equates the present value of the flow of net benefits during the economic life of the project to the present value of the total investment costs. *It is calculated through the formula:*

$$\sum_{t=0}^{T} \frac{Bt - Ct}{(1+r)t} = \sum_{t=0}^{T} \frac{Kt}{(1+r)t}$$

where Kt represents investments in year and r the particular rate of discount (IRR) under which the equation holds true. Cost effectiveness aims at identifying the least cost alternative among a number of projects that will all produce the same outcome.

Conversion ratio Other Financial/Economic Analysis: the above named indicators of the results of project analysis can be calculated by using market prices (financial analysis) or economic prices (economic analysis). It will be preferable to have calculated through both financial and economic analysis.

Information on Capital Expenditure and Intangible Asset Purchase Items of State Budget for 2005-2011 Template 4/LM

1- Give the sector name
2- Give the agency name
3- Indicate the expenditures in AZN according to the article N 282200 of Economic Classification under the Unified Budget Classification
4- Indicate the expenditures in AZN according to the article N 310000 of Economic Classification under the Unified Budget Classification
5- Indicate the total expenditures in AZN according to the articles N 282200 and N 310000 of Economic Classification under the Unified Budget Classification
6- Provide the detailed information on the actual scope of work for the indicated years
7- Provide the detailed information on the anticipated scope of work for the indicated years
8- Provide the detailed information on the forecasted scope of work for the indicated years

Instruction for completing the 2008-11 Public Investment Program Call Circular

List of objects to be constructed under capital expenditure investment from state budget in 2008-2011 (Template 1/REG)

1- Give the number
2- Give the full name of the project
3- Indicate the project capacity, for example, construction of 10 schools, construction 10 km road
4- Give the project cost according to the basis price
5- Give the conversion factor used for this project
6- Give the project cost according to the estimate
7- Give the project cost according to the contract
8- Give the total cost of construction -assembly works at contractual prices
9-11 Indicate the capacity, basis prices and contract actual expenditures for the given year
12-14 Indicate the capacity, basis prices and contract remaining balance of expenditures for the given year
15-17 Indicate the capacity, basis prices and contract forecasted expenditures for the given year
18-20 Indicate the contract demand for the given years
21- Give the full name of the contractor
22- For various notes

Information on Capital Expenditure and Intangible Asset Purchase Items of State Budget for 2005-2011 (Template 2/REG)

1- Give the sector name
2- Give the agency name
3- Indicate the expenditures in AZN according to the article N 282200 of Economic Classification under the Unified Budget Classification
4- Indicate the expenditures in AZN according to the article N 310000 of Economic Classification under the Unified Budget Classification
5- Indicate the total expenditures in AZN according to the articles N 282200 and N 310000 of Economic Classification under the Unified Budget Classification
6- Provide the detailed information on the actual scope of work for the indicated years
7- Provide the detailed information on the anticipated scope of work for the indicated years
8- Provide the detailed information on the forecasted scope of work for the indicated years

PUBLIC INVESTMENT PROJECTS EVALUATION FORMS (3/LM)

3-1 Project background information

1- Indicate the project status among the options: proposed new project, project under preparation (please submit the feasibility study, if it is not submitted before) and on-going projects
2- Give the name of sector, for example, Energy sector, Education sector
3- Give the name of rayon or city
4- Give the name of executive agency, for example, Azerenergy, Ministry of Education
5- Give the full name of the project
6- Give the number of the project, if it is available from the credit agreement, for example, 3923-AZ

7- Give the location of the project, for example, Sumgayit city, Guba region
8- Give the start and completion dates of the project (day/month/year)
9- Indicate the goods and services that the project is planned to produce, for example, the road construction, power station rehabilitation, airport construction
10- Indicate the project capacity in terms of cost and output, for example, 20 mln USD / 10 schools, 100 km of road
11- Give full name, position, telephone number and e-mail address and date of project responsible persons
12- Give full name, position, telephone number and e-mail address and date of person responsible for project preparation
13- Give full name, position, telephone number and e-mail address and date of person responsible for project approval
14- Give full name, position, telephone number and e-mail address and date of project contact person
15- Indicate the priority of the project with justification based on the country economic and sector strategy development goals
16- Indicate the source of financing. The project could be financed from different sources: state budget and other sources like grants and local credits. Indicate the project actual and forecasted expenditures in AZN

TEMPLATE 3.3/LM

PUBLIC INVESTMENT PROJECT EVALUATION FORM

(USD)

1	Sector							
2	Agency							
3	Project name							
4	Country/Institution Providing External Funding							
5	Effectiveness Date							
6	Type of financing(Grant, Loan, Equity)							
7	Total Amount							
8	Repayment/Grace Period							
9	Interest Rate							
10	Annual amount planned to be disbursed under the funding agreement Total GOAZ's share Foreign funding	Cumulative	As of 2006	2007	2008	2009	2010	2011
11	Annual disbursement Total GOAZ's share Foreign funding	Cumulative	Used as of 2006	2007	2008	2009	2010	2011
12	Average annual exchange rate of other foreign currency in respect of US dollar		As of 2006	2007	2008	2009	2010	2011

Attachment 1

Explanatory notes on Preparation of Draft 2007-2010 Public Investment Program

1. National, sectoral, regional and inter-project priorities of 2008-2011 PIP

This year Ministry of Economic Development is planning to further improve PIP and use it as an effective policy instrument for identifying and achieving national and sectoral development goals and priorities for 2008-2011. In order to achieve the effective execution of the program all state enterprises are requested to submit the required information on time.

The required information should be in accordance with the forms attached. In case of any clarification, the following contact telephone numbers are used: 492 41 10 (ext 1-58,1-65,1-47), 492 99 76 State Public Investments Department. E-mail samir.mammadov@economy.gov.az

In the event where the abovementioned information on projects is not presented, they **will not be considered** for inclusion in 2008-2011 Public Investment Program.

Submitted projects should be justified in accordance with following national, sectoral, regional priorities:

National Priorities for 2008-2011 Public Investment Policy and Program: in accordance with approved and pending National Programs GoAz considers advisable to direct investment to following spheres in 2008-2011:

- Projects supporting social sectors' development,
- Infrastructure projects supporting non-oil sector and fostering private sector investments,
- Regional and cross-regional projects eliminating inter-regional social-economic inequality,
- Projects creating new work places (fostering employment).

GoAz also is trying to pertain from investment in commercial sectors, attempting to attract private investors to such.

Cross sector priorities: 2008-2011 Public Investment Program will give preference to projects in following sectors:

- Infrastructure
- Irrigation
- Education
- Health

At the same time in each sector based on the state medium and long-term development strategy the priority projects should be submitted sequentially, with proper justification, to the Ministry of Economic Development.

Priorities for pending projects: 2008-2011 Public Investment Program shall give preference to project particularly meeting following criteria:

- Project to be completed or which are close to completion (i.e. projects completed by 75% or more) in 2008;
- Project completed by 50%-75% or those meeting the abovementioned national, sectoral and regional priorities;
- Projects considered essential for implementation of other pending projects supporting above national, sectoral and regional priorities.

New public investment projects: New projects shall be selected to 2008-2011 Public Investment Program based on their technical, financial and economic analyses among those meeting national, sectoral and regional priorities.

2. Macroeconomic indicators used in public investment project assessment

Indictor	Measure unit	2007 expected	2008 forecast	2009 forecast	2010 forecast	2011 forecast
Nominal GDP	mln. AZN	22625.8	28137.4	32128.7	34508.7	35695.2
Actual GDP increase	%	129.1	123.7	113.6	107	102.5
GDP deflator	%	98.8	100.6	100.5	100.4	100.9
Average annual exchange rate*	AZN/US dollar	0,86	0,81	0,77	0,73	0,70
Discount rate **	Annual %	12	12	12	12	12
Consumer rate index	%	109	109	108	107	105

* Conventional rate is taken for calculations

** Rate used by the World Bank and Asian Development Bank (ADB) for projects funded in Azerbaijan.

TEMPLATE 2 /LM

..... sector

Information on the Sector and Public Investment in the Sector

1. SECTOR OVERVIEW AND INFORMATION ON MAJOR PARTICIPANTS

1.1. Sector overview and the role of the sector in country's economic development;
1.2. Sector structure and major organization;
1.3. Sector's major goals and objectives and their linkage with various state programs;
1.4. Main government activities and service in the sector, and actual increase in their indicators for 2003-2006[1].

2. SECTOR EXISTING PROBLEMS, IMPLEMENTED REFORMS IN 2003-2007 AND EXPECTED REFORMS IN 2008-2011

3. MEDIUM TERM (2008-2011) SECTOR GOALSAND STRATEGIES AND INVESTMENT PROJECTS PROPOSED FOR ACHIEVING THESE GOALS:

Sector/sub-sector/goal	Strategies/ activities	Investment projects	Required funding					Outcome/results
			total	2008	2009	2010	2011	

4. USE OF PUBLIC INVESTMENT

4.1. Sources and uses of investment funds attracted from all sources for 2003-2006;
4.2. Volume of investment expenditure from state budget to the sector for 2003-2007;
4.3. Sector's funding priorities and major funding sources of public investment (for 2003-2007);
4.4. List of crucial state projects suspended in past years (if any), their list, reasons for suspension and percent implemenated:

Project name	Total project cost	Amount paid	Resources needed for completion	Reasons for suspending implementation	Project starting date	Project suspending date

[1] Give the information on the sector main activities, including te indicators of real growth and development in 2003-2006, for example, created value added, profit, new job places created. This information could be presented on 2-3 pages.

FORM PP-1

Project proposal

1	Sector	
2	Agency name	
3	Project name	
4	Contact person name and his position	
5	Contact person phone number	
6	Contact person e-mail address	
7	Type of investment project	1.Infrastructural project ☐
		2.Social project ☐
		3.Innovative project ☐
		4. Productive project ☐
8	Objectives of proposed project	
9	Anticipated results	
10	How the work will contribute to sustainable development in the sector	
11	Risks and uncertainties to consider during the project implementation	
12	Alternative projects considered	
13	Project territory (regional) coverage	
14	Information about the of buildings, equipment and works features	
15	Amount of labor to be employed	
16	Estimated project cost (1+2)	
	1 - cost for project preparation	
	2 - cost for project realization	
17	The planned current expenditures after the investment project implentation	
18	Structure of investment project with breakdown by components	
19	Proposed duration of investment project preparation	
20	Proposed duration of invetsment project implementation	
21	Proposal on defining of authorized executing agency and brief description of the proposed agency's previous experience with the same and/or similar types of proposed project	

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PUBLIC INVESTMENT POLICY PROJECT
ADVANCED TRAINING-WORKSHOP ON PROJECT COST-BENEFIT ANALYSIS

By Emmanuel Lopez- Dee

JUNE 18-21, 2007

This publication was produced for review by the United States Agency for International Development. It was prepared by Development Alternatives, Inc.

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ADVANCED TRAIN ING/WORKSHOP ON PROJECT COST-BENEFIT ANALYSIS (CBA)
Course Agenda

Time	Topic/Activity	Person Responsible
Day 1		
9:00 – 9:30	Arrival of training team and participant's registration	Training Secretariat
9:30 – 10:00	Session 1: Opening program: • Introduction of participants and training team • Setting the learning atmosphere (Leveling of expectations and course overview)	DAI Training Coordinator
10:00 – 10:45	Session 2: Overview of the Project FS Format: • Why use the project FS format • Generic FS outline • Advantages/limitations of project FS format • Current use of project analysis tools by multilateral lending institutions	DAI Consultant, PIP-Project and ERSRI facilitators
10:45 – 11:00	Coffee Break	
11:00 – 13:00	Session 3: Computer-aided Case Study presentation and short exercises: • Use of shadow prices • Derivation of parity prices • Use of farm models and farm income analysis (FIA)	DAI Consultant, PIP-Project and ERSRI facilitators
13:00 – 14:00	Lunch	
Day 2		
9:00 - 9:15	Participant's Registration	
9:15 – 10:45	Session 3: Continuation of previous day's activity: Computer-aided Case Study presentation and short exercises: • Cost/benefit identification and valuation • Aggregation of costs and benefits •	DAI Consultant, PIP-Project and ERSRI facilitators
10:45 -11:00	Coffee break	
11:00 -13:00	• Viability analysis • Sensitivity/risks analyses	
13:00 – 14:00	Lunch	
Day 3		
9:00 - 9:15	Participant's Registration	
9:15– 10:45	Session 4: Participants' Workshop • Computer-aided replication of case study in Session 2 under different set of assumptions	DAI Consultant, PIP-Project and ERSRI facilitators
10:45 -11:00	Coffee break	
11:00 -13:00	Session 4: Participants' Workshop-Continued Computer-aided replication of case study in Session 2 under different set of assumptions	DAI Consultant, PIP-Project and ERSRI facilitators
13:00 – 14:00	Lunch	

Day 4		
9:00 - 9:15	Participant's Registration	
9:15– 10:45	Session 5: Group presentation of case study results	Participants, DAI Consultant, PIP-Project and ERSRI facilitators
10:45 -11:00	Coffee break	
11-00-11:45	Session 6: Course evaluation	DAI Consultant, PIP-Project and ERSRI facilitators
11:45 -13:00	Closing program	DAI Training Coordinator
13:00 – 14:00	Lunch	

Public Investment Policy Project
Project's Cost-Benefit Analysis Technical Training
June 18-21, 2007

#	Agency	Name	Position/Dept.	Contact Tel.
1	Corporation for Irrigation and Water Economy JSC	Aslanaga Mustafayev	Senior Advisor	493 13 63
2	Corporation for Irrigation and Water Economy JSC	Telman Mustafayev	Senior Specialist, Production and Projects Acceptance Dept.	4311183
3	Joint Association of Amelioration and Irrigation units under Construction	Asif Hajiyev	Monitoring Engineer	4311183
4	Joint Associationt of Amelioration and Irrigation units under Construction	Shukur Husseynov	Engineer, Project Estimate Dept.	4311183
5	Azerbaijan Hydrotechnics and Amelioration Scientific Production Association	Ahliman Verdiyev	Scientific Deputy Director	5635430
6	Economic Reforms Scientific Research Institute	Orkhan Javadov	Specialist	050-597 96 66
7	Economic Reforms Scientific Research Institute	Shovgi Guliyev	Leading Scientific Associate	050-386 75 64
8	Economic Reforms Scientific Research Institute	Namig Tagiyev	Director	2115209
9	AZSUTECLAYIHE Institute (Azerbaijan Water Supply Project)	Samir Asgarov	Engineer	5380520
10	Meliorasiya və Su Təsərrüfatı ASC	Telman Musayev	Senior Engineer	438-05-20
11	AZSUTECLAYIHE Institute (Azerbaijan Water Supply Project)	Alimusa Ahmadov	Engineer	4386034
12	AZSUTECLAYIHE Institute (Azerbaijan Water Supply Project)	Mehman Gasimov	Leading Engineer	4386034
13	AZSUTECLAYIHE Institute (Azerbaijan Water Supply Project)	Tural Novruzov	Leading Engineer	4386034
14	AZSUTECLAYIHE Institute (Azerbaijan Water Supply Project)	Vusal Samadov	Engineer	4386034
15	Ministry of Economic Development	Zahira Mahmudova	Advisor, PI Dept.	4924110 (20-93)
16	Ministry of Economic Development	Gunduz Mirzayev	Sector Head	4924110
17	Water Problems Scientific Research Institute	Azer Mustafayev	Leading Engineer	4319091
18	Ministry of Finance	Vusal Azimov	Senior Advisor	4938103

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PUBLIC INVESTMENT POLICY PROJECT

ADVANCED TRAINING-WORKSHOP ON PROJECT COST-BENEFIT ANALYSIS (CBA)

MODULE 1: OVERVIEW OF THE PROJECT FEASIBILITY STUDY (FS) FORMAT

JUNE 18-21, 2006

This publication was produced for review by the United States Agency for International Development. It was prepared by Development Alternatives, Inc.

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Why Use Project FS Format - Objectives

1. To lay-out and analyze information from a broad range of sources. The information should include objectives and strategies as well as the general socio-political context. This permits you to compare information drawn from several sources and to make an overall judgment on its reliability, quality and timing to estimate the needs for resources for development;
2. To develop an appreciation or understanding of the administrative and organizational situation and alternative proposals for the medium and long term future;
3. To provide a basis against which to control, measure and evaluate the effectiveness of project implementation (physical, financial and social considerations); and
4. To provide a clear presentation of alternative development actions and policies.

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Generic FS Outline – Checklist of Requirements -1/5

I. **BACKGROUND**

Macroeconomic context (relevance of project vis-à-vis country's broader dev't. objectives, resources and economic outlook)
General features of the sector (i.e., Agriculture: what is the prevailing economic and natural environment, what are the key problems and issues to be addressed)
Description of the sub-sector ((i.e., Irrigation: what is the prevailing economic and natural environment, what are the key problems and issues to be addressed)
Past developments and former programs (nature, scope and results)
Development trends, necessities, potentials, markets)
Government policies and services

II. **PROJECT AREA (if applicable)**

Geographical location
Climate, soils, topography, hydrology
Infrastructure (roads, railways, other communications)
Socio-economic conditions (population, labor force, income and wage levels)
Land use, farming systems, cropping patterns
Land tenure, farm size patterns, land reform
Processing and marketing facilities

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Generic FS Outline – Checklist of Requirements – 2/5

III. THE PROJECT

A. General description, objectives, timing

B. Detailed features

Area to be developed (number and size of farms involved)
Investment items and investment period
Production methods and operating patterns
Engineering arrangements, plans and data
Technical services, research and surveys
Development schedule (phasing of major investments and beneficiary participation)

C. Project costs

Basic assumptions (wages, prices, exchange rate)
Basic investment costs (labor, materials, etc.)
Ancillary installations, processing plants
Cost of administration and technical services, etc.
Working capital and contingencies
Total costs and annual distribution
Foreign exchange component

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Generic FS Outline – Checklist of Requirements – 3/5

III. THE PROJECT

D. Financing

Present financing situation
Proposed foreign loans (amount and terms required)
Government's contribution (including subsidies)
Beneficiaries' contribution (cash, labor, materials)
Loans to beneficiaries and others (terms and procedures)

E. Procurement and Disbursements

Import regulations and procedures
Distribution systems and supply of local market
Local or international bidding, contracts
Transport and insurance arrangements for procured goods
Disbursement schedules and procedures
Accounts and auditing

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Generic FS Outline – Checklist of Requirements – 4/5

IV. ORGANIZATION AND MANAGEMENT

A. The organizing authority

- Structure, functions and legal basis
- Relationships to other agencies, coordinating body
- Top management positions (qualifications and responsibilities)

B. Operational details

- Project implementation
- Technical and other services
- Lending operations
- Monitoring and evaluation

C. Staffing

- Existing staff (number, education, capability)
- Additional requirements (number and timing)
- Prospects for recruitment
- Training program and training activities

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Generic FS Outline – Checklist of Requirements -5/5

V. PRODUCTION, MARKETS AND PRICES

- Production patterns and yield
- Incremental production
- Market and price prospects
- Price policies, taxes and subsidies
- Marketing and storage facilities

VI. FINANCIAL ANALYSIS

- Beneficiaries' income projections and financial rates of returns (i.e., use of farm models and farm income/investment analysis)
- Financial projections for project entities
- Cost recovery and related policies
- Impact on government budget

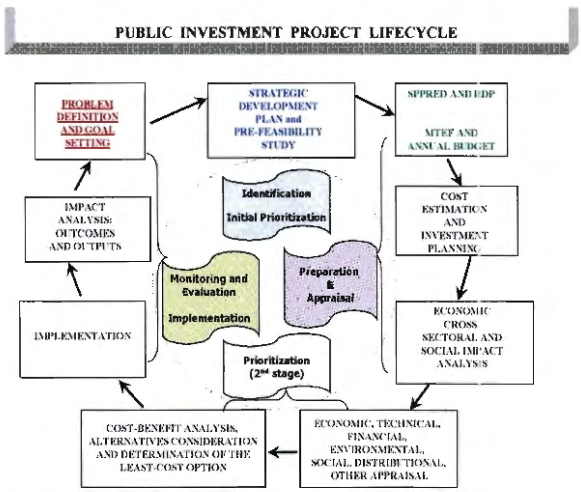
VII. BENEFITS AND JUSTIFICATION

- Project benefits and beneficiaries
- Foreign exchange effects
- Employment effects
- Economic analysis and rates of returns
- Sensitivity analysis and risks

IX. CONCLUSIONS AND RECOMMENDATIONS

- Summary of the need for and justification of the project
- Proposed borrower's arrangements for appraisal

Inter-relationship of FS Components - Flow Chart of FS Preparation Process



Current Use of Project Analysis Tools by Multilateral Lending Institutions

1. Valuation of Benefits:
   - ✓ Benefit/cost analysis more dominant than cost-effectiveness analysis
2. Use of Shadow Prices:
   - ✓ Frequent in agricultural/rural development projects (e.g. irrigation projects)
   - ✓ Infrequent in industry and public utilities
   - ✓ When used, most frequent are in: wages and border prices for traded goods
3. Sensitivity analysis generally applied while quantitative risks analysis rarely used;
4. Social weights not used; and
5. Use of conversion factors dominant

Advantages of the Project FS Format

1. Framework to analyze information from many sources;
2. Framework to involve many specialists (i.e., project development is a multi-disciplinary activity);
3. Costs are estimated year by year;
4. Estimate effects on various participants;
5. Judgment about administrative and organizational problems;
6. Criteria for monitoring progress implementation;
7. Encourages systematic examination of alternatives; and
8. Helps contain the data problem.

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Limitations of the Project FS Format

1. Depends on quality of data used;
2. Limited usefulness in judging risks;
3. Partiality (maybe influenced by project analyst, data quality and availability);
4. Difficult to compare widely differing projects;
5. Best for unique investment incentives;
6. Limitations of prices as indicators of value;
7. Difficulties of dealing with non-quantifiable objectives;
8. Not suitable for many key development activities; and
9. Not suitable for political decision making.

3

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PUBLIC INVESTMENT POLICY PROJECT

ADVANCED TRAINING-WORKSHOP ON PROJECT COST-BENEFIT ANALYSIS (CBA)

MODULE 2: CASE STUDY OF THE SAMUR-APSHERON IRRIGATION PROJECT

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SAMUR-APSHERON IRRIGATION PROJECT
- A Case Study -

Introduction

This case study is intended for use as an instructional material in the **Advanced Training/Workshop on Project Cost-Benefit Analysis (CBA)** for technical personnel of the State Amelioration and Irrigation Committee (SAIC). The case study is adapted from the World Bank's Project Appraisal Document (PAD) on a Proposed Credit to the Government of Azerbaijan for the Rehabilitation and Completion of Irrigation and Drainage Infrastructure Project (RIDIP).

The case study, to the extent practicable, substantively adapted the contents of the PAD. To enhance its value as an instructional material, the PAD is restructured into a Feasibility Study (FS) document to guide training participants on the essentials of project formulation work (i.e., **Ex-Ante Project Evaluation**). Moreover, new financial, economic and technical assumptions/coefficients are introduced to simulate the FS stage of the project development cycle.

As a caveat, therefore, participants are requested to refrain from paying so much particular attention on the assumptions used but are rather encouraged to concentrate on familiarizing themselves with the methodologies employed in the case study. By so doing, training participants would be able to have a better handle and appreciation of project formulation work and the step-by-step process of cost-benefit analysis. At the end of the course, it is expected that the participants would be able to realize that the utility of this training material extends as well to the **Project Appraisal** and **Ex-Post Project Evaluation** phases of the project development cycle.

As participants proceed in reading the case study in preparation for the practicum component of the training, explanatory notes and helpful tips in boxes are provided after every chapter or section of the paper. These are intended to aid any FS preparer, or a project appraiser as the case maybe, in setting the minimum information requirement and the analytical approach necessary for evaluating a project. As far as possible, the main text of a FS report should present the project in a form that even a non-specialist can understand; specialized back-up information – including maps, charts, and detailed tables – should be reserved for the annexes/appendices or the project file. Therefore, participants during the case study presentations are encouraged to provide additional details to what is already given based on their knowledge and understanding of the project or on any other information deemed relevant to the case study.

To give the case study more emphasis as a practical instructional material for project cost-benefit analysis, Microsoft Excel spreadsheets are appended to the case study to enhance the participants' knowledge of the various computational steps or procedures followed in CBA. Specifically, the spreadsheets enable the participants to; (a) estimate concisely and easily the financial and economic implications of all components of a project; (b) test the financial and economic feasibility of a project using base project assumptions; and (c) conduct sensitivity analysis on key project variables. Finally, the spreadsheets can prove handy as a tool in the planning and negotiation phases of rural infrastructure project development.

I. MACRO-ECONOMIC CONTEXT

One of the key development challenges identified by the Government of Azerbaijan (GOAz) is the need to put in place productivity enhancing policies and investment in the agricultural

sector which is providing major opportunities to non-oil business development. It is also the sector which most directly addresses poverty alleviation. The government has also identified the need for continuing reforms in the coverage and delivery of services in the sector as well as substantial investment programs, particularly in the irrigation sub-sector.

Agriculture is one of the major contributors to Azerbaijan's Gross Domestic Product (GDP). During the past few years, the sector contributed between 20 and 25% of GDP and around 35% of employment. Before independence in 1991, Azerbaijan was a main producer of cotton, wheat, grapes and vegetables for the former Soviet Union (FSU) markets. Real output declined rapidly between 1991 and 1995 when production of grains fell by 19%, of cotton by 48%, of grapes by 66% and of vegetables by 43%. The decline in agricultural production has leveled out during the past few years, but has yet to rebound.

From 1996 to date, fundamental changes have been introduced. Yet major issues remain that slow the transition to an efficient agricultural sector. These issues include: (i) the need to improve the legal and institutional framework to support a land market, promote the development of rural credits and to use land as collateral; (ii) the need for agro-industry restructuring, caused by the over-capacity and lack of working capital; (iii) lack of market information; (iv) lack of agricultural diversification; (v) lack of advisory services and new productivity enhancing technologies; (vi) deteriorating irrigation infrastructure.

The country has favorable growing conditions for a wide variety of crops, the cultivation of which is largely dependent on irrigation. Almost all agricultural lands is under arid or semi-arid conditions, more than half of which falls outside the main growing season from April to September. The only agriculture possible without irrigation is low intensity livestock production on natural pasture severely limited by low rainfall, which would not meet the country's food needs, much less the employment and income requirements of its large rural population. Consequently, irrigation is a key input for reliable crop production.

The total area equipped for irrigation is about 1.45 million hectares, covering over 80% of all arable land in the country. Many irrigation systems were developed during the FSU period. The State Amelioration and Irrigation Committee (SAIC) is the corporate entity responsible for the operation and maintenance of irrigation and drainage infrastructure. With a small budget spent on reconstruction works, the main irrigation systems have not been maintained well and consequently infrastructure facilities are deteriorating. This has resulted in irregular and inadequate availability of irrigation water at the farm level, which in turn results in yields that are much below the irrigated yield potential.

Other sub-sector issues that affect sustainability are; (i) high reliance on pumped irrigation which for a number of farms may prove non-viable if valued at their economic costs; (ii) beneficiary participation rate is still low, in regard to negligible contributions to SAIC for water supply and delivery services; (iii) on-farm distribution systems are not well-suited to the new, smaller farm structures that are emerging from privatization; and (iv) farmers lack experience in the management of irrigation systems and remain largely unorganized.

Realizing the water users' low ability to pay at the moment, SAIC has set the tariff at rates varying from 5 to 15% of the needed tariff (i.e., US$5.40 per 1,000 cu. m). Since its introduction in 1998, less than 25% of this reduced amount was actually collected on an annual basis.

SAIC is not only responsible for the development of policies and planning of the irrigation sub-sector, but also for the operation and maintenance (O&M) of all irrigation dams and canal systems. SAIC has recently gone through restructuring and reduced its staff, and further staff reduction is expected during the next years. With water users remaining largely unorganized and contributing little to O&M by way of the Irrigation Service Fee (ISF), Water Users' Association (WUAs) have been organized on a pilot basis for the management and O&M of distribution systems

One of the conclusions of the National Environmental Action Plan (NEAP, 1998) is the general lack of environmental monitoring, including monitoring of land and water. Major identified environmental issues that relate to the sub-sector are: (i) ineffective water resource management; (ii) increasing areas affected by water logging and salinization; (iii) pollution of major rivers; and (iv) worsening soil erosion problem due to poorly designed on-farm irrigation systems.

Note to Participants: *The macroeconomic context of a feasibility study (FS) discusses the relevance of a project at hand vis-à-vis the country's broader objectives, resources and economic outlook. Included in this section are discussions on the relevant sector and sub-sector such as the prevailing economic and natural environments, key problems and issues that need to be addressed, present and past development programs/projects, government policies and services, rationale for public sector involvement, etc.*

II. THE PROJECT

A. Detailed Features of the Project

The proposed project envisages support to the Government to re-establish the sustainability of the irrigation sub-sector. The project would constitute three (3) components described as follows:

(i) Rehabilitation and Completion of Irrigation Infrastructure – The project would support rehabilitation of critical main infrastructure of the Samur-Apsheron Canal (SAC) System, located in the north-eastern part of the country. SAC comprises head-works across the Samur River, a 182 km long main supply canal, a reservoir near Baku, pumping stations, three sediment basins and a number of secondary canals that supply water to the irrigation areas. The system is seriously deteriorated and its vulnerability to failure threatens the continuity of both the irrigation supplies to about 86,000 hectares and the water supply to the population of the Baku-Apsheron peninsula. Government has prepared a plan for the SAC to meet future domestic and industrial water demands. This plan proposes new dams and a realignment of the main supply canal from 50 km onwards to avoid pumping.

In particular, the project would: (a) rehabilitate the 50-year old Samur head-works, where past flood damage and lack of regular maintenance jeopardize the integrity of the barrage, and replace all seriously deteriorated gates and lifting gear; (b) repair the concrete lining of the first 50 km of the canal; (c) rehabilitate sedimentation extraction works at the head of and along the SAC; (d) rehabilitate inter-farm canals leading from the first 50 km of the main canal that supplies to about 65,000 hectares; and (e) support design and construction supervision services.

(ii) Institutional Strengthening – The project would support institutional development to make a start with the improvement of the quality and sustainability of irrigation management. It would have four (4) sub-components, viz.: (a) institutional support for SAC management in order to develop an organization that is cost-effective and efficient with strong customer orientation and delivers quality water services that customers want and eventually prepared to pay for in full; (b) preparation of an Irrigation Sub-Sector review; (c) training and study tours for SAIC and PIU staff; and (d) preparation of a comprehensive Feasibility Study (FS) to review the technical, environmental, social and economic viability of the expansion in capacity of the SAC.

(iii) Project Implementation Support – This component would have four (4) sub-components, viz.: (a) support for Project Implementation Unit (PIU) in terms of incremental staff salaries, vehicles and equipment during the first 2 years of the project; (b) a Technical Assistance (TA) team of international specialists to advice and train PIU staff, and assist PIU in project implementation; (c) annual monitoring and evaluation (M&E) and environmental monitoring surveys; and (d) annual audit of project accounts.

The project would directly benefit around 40,000 farm families in the 86,000 hectares that are directly supplied by the SAC system. The primary project benefits would be in terms of increased crop production, based on an overall increase in yields which are estimated to double after rehabilitation, due to improved water supply to the farms in the SAC area.

Project implementation would take 5 years. The project's physical works are confined to the service areas of SAC system.

Note to Participants: *To enhance the immediate acceptability in principle of a project at hand, it is necessary that alternatives to the proposal are presented and reasons for rejecting them discussed in the FS. For instances, alternatives to this project are the full and comprehensive rehabilitation of the SAC, new construction as against rehabilitation of existing canals/head-works, etc. Lessons learned from previous project experiences (i.e., from project design and preparation to implementation) may also be presented in this section.*

B. Project Costs

Table 1. Estimated Project Costs by Component

Project Component	Cost (AZN '000)	% of Total Base Cost
A. Irrigation Infrastructure		
Technical assistance for design and supervision	829.84	4
Rehabilitation/construction of SAC	17,119.19	83
Sub-total	**17,949.03**	**87**
B. Institutional Strengthening		
Development of SAC management	148.56	1
FS for SAC expansion	1,012.00	5
Irrigation sub-sector review	179.12	1
Training and study tours	126.50	1
Sub-total	**1,466.18**	**7**

C. Project Implementation Support		
Technical Assistance (TA) to PIU	548.50	3
Project implementation and administration support	215.95	1
Equipment	138.74	
Monitoring and evaluation	101.20	1
Incremental operating cost	170.77	1
Project account auditing	40.48	
Sub-total	**1,215.65**	**6**
Total Baseline Costs	**20,630.86**	**100**
Physical Contingencies (11% of base cost)	2,269.39	11
Total Project Costs	**22,900.25**	**111**

Table 2. Estimated Project Costs by Expenditure Account

Expenditure Account	Cost (AZN '000)	% of Total Base Cost
A. Investment Costs		
Civil works	17,119.19	83
Goods	138.74	
Consultants' services and training	2,887.22	14
Sub-total	**20,145.15**	**97**
B. Recurrent Costs		
Incremental operating costs (national professional and support staff, M&E, project accounts auditing)	485.71	3
Sub-total	**485.71**	**3**
Total Baseline Costs	**20,630.86**	**100**
Physical Contingencies (11% of base cost)	2,269.39	11
Total Project Costs	**22,900.25**	**111**

Note to Participants: *A textual discussion of the above tables may or may not be presented in the FS. A de facto standard in a FS for consideration by multilateral lenders is the preparation of Estimated Project Costs appended to the FS. Here, detailed costs and their underlying assumptions are given.*

C. Financing (by year and by source)

Table 3: Summary of Project Financing by Year (AZN '000)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Investment Costs	4,673.47	5,165.42	6082.22	4,897.08	1,542.92	22,361.12
Total Recurrent Costs	104.59	105.67	108.37	108.91	111.60	539.14
Total Project Costs	**4,778.06**	**5,271.09**	**6,190.59**	**5,005.99**	**1,654.52**	**22,900.25**

Table 4: Summary of Project Financing by Source (AZN '000)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
World Bank (90%)	4,300.25	4,743.98	5,571.53	4,505.39	1,489.07	20,610.22
GOAz (10%)	477.81	527.11	619.06	500.60	165.45	2,290.03
Total Project Costs	**4,778.06**	**5,271.09**	**6,190.59**	**5,005.99**	**1,654.52**	**22,900.25**

Note to Participants: *A textual discussion of the above tables may or may not be presented in the FS. A de facto standard in a FS for consideration by multilateral lenders is the preparation of a Financial Summary appended to the FS. The Financial Summary itemizes financing by project component costs and by source.*

D. Procurement and Disbursement

Procurement of works and goods would be done in accordance with the Bank's "Guidelines for Procurement under IBRD Loans and IDA Credits" (January 1995, revised January and August 1996, September 1997 and January 1999). The Borrower would use the Bank's standard bidding documents for goods and works, including the Bank's regional sample documents. Consulting services and training would be procured in accordance with the Bank's "Guidelines – Selection and Employment of Consultants by World Bank Borrowers" (January 1997, revised September 1997 and January 1999). Any goods, works and services not financed by the Bank would be procured in accordance with the National Public Procurement Legislation. The General Procurement Notice has been published in the January 31, 2000 issue of the United Nations "Development Business"

Note to Participants: *A de facto standard in a FS for consideration by multilateral lenders is the preparation of Procurement and Disbursement Arrangements appended to the FS. The Procurement Section of the document would provide a detailed assessment of the Borrower's current capacity to implement project procurement, define procurement responsibilities and procurement methods. The Disbursement Section of the document would also provide a detailed assessment of the Borrower's capacity to implement financial management arrangements for the project and detail the proposed used of Special Accounts, audit arrangements and project management reporting.*

III. Institutional and Implementation Arrangements

SAIC would have overall responsibility for implementing the project. Responsibility for day-to-day management and administration would be delegated to a Project Implementation Unit (PIU). To be established within the SAIC, the PIU would have a core staff directly responsible for all implementation tasks, including preparation of programs, monitoring and evaluation (M & E), procurement, accountancy, disbursement, management of special accounts and reporting to both the Government and the Bank. The PIU would contract out the services for design and supervision to a consulting firm for the duration of the project. As required and based on workloads, manpower requirements would be evaluated jointly by the

Bank and the Government during regular supervision missions to determine necessary changes.

An inter-ministerial Steering Commission would be established as a condition for Loan Effectiveness. It would be mandated to review progress and provide guidance to project implementation, resolve problems of inter-agency coordination and review and approve the annual work plan. The Commission would be composed of the Deputy Prime Minister (as Chair of the Commission), the Chairman of SAIC, Deputy Minister for Finance, authorized representative of the State Committee on Ecology, Deputy Minister for Agriculture, Chair of the Apsheron Water Supply Company and the PIU Director (as Secretary of the Commission).

Note to Participants: *Project organization and management considerations in the FS should include legal constraints, staff capability, cost and revenue sharing, resource sharing, and other issues deemed relevant to the project. Implementation/organizational management arrangements during both the pre-operating and operating stages of the project should be discussed. At the pre-operating stage, questions such as: (i) who will manage the pre-operations; (ii) who will prepare bid documents; (iii) who will be responsible for survey and designs; (iv) who will review and approve contracts, should be answered. During the operational stage, questions that may be raised include: (i) what is the more effective organization which should manage the project; (ii) is the structure lean and mean or inefficient; and (iii) does the structure facilitate communication and decision making?*

IV. Financial Analysis

The SAC project covers the specific area that is irrigated by the Samur-Apsheron Canal (SAC) between the Samur River and the Velvelichay River (50 km of main canal) and the area that is or will be irrigated by the Khanarkh Canal. An estimated 40,000 farm families, each having an average cultivable area of 2.5 hectares, would be directly affected by the project.

A. Farm Level Financial Analysis

"Without the Project" (WOP), the irrigated area in 2012 in the three raions located within the first 50 km of the SAC (i.e., Guba, Gusan and Khachnaz) would fall to 22,244 ha from the 1998 level of 27,806 ha. This represents a decline of about 20%. Without the Project in the four (4) raions (i.e., Davachi, Siazan, Khizi and Apsheron) of the first 50 km of the SAC, the projected irrigated area in 2012 would only be about 12,014 ha or just about half of the 1998 level. "With the Project" (WP), the projected irrigated area in 2012 would be approximately 69,071 ha with 42,598 ha coming from the three raions within the first 50 km of SAC, and 26,473 ha coming from the raions located downstream of the SAC.

Most of the state and cooperative farms in the project area were privatized in 1997-98. The new farms in the project area are very small (2-3 ha). The current and projected cropping patterns and yields of crops presently grown in the area are given in the table below.

Table 5. Projected Cropping Intensity and Yields, "With" and "Without" the Project

Crops	Cropping Intensity		Yields (mt/ha)	
	WOP	WP	WOP	WP
Wheat	47.55	60.00	1.7	3.2
Fruits	33.51	40.51	3.7	6.6
Vegetables	8.14	10.40	12.5	15.6
Grapes	4.40	2.32	0.7	1.5
Total	**93.6**	**113.23**		

The major financial benefit of the project is an increase in agricultural incomes of farmers within the influence areas resulting mainly from the reliable delivery of irrigation water. Based on the projected cropping patterns, yields and farm-gate prices, farmer-beneficiaries' financial farm incomes from a 2.5 hectare farm are projected to increase from AZN 68 to AZN 279. This represents an incremental income of AZN 211.

Note to Participants: *In the case of agricultural or rural development projects, farm income analysis (including the analysis of farm enterprises income and net farm income) and farm budgets for financial resources are carried out to determine the financial profitability because the outcome will determine whether and to what extent farmers may be expected to actively participate in the project.*
Farm income analysis, which is similar to standard income analysis, has the objective of determining the incremental returns that the farm households may be expected to generate as a result of the incremental inputs that they would be bound to put in as a result of the project. The biggest difference between standard income analysis and farm income analysis is that farm income analysis sometimes includes non-cash income, for example vegetables produced and consumed by the farm family. In cases where the farm produces more than one product, it is helpful to treat each production activity as a separate enterprise, carry out financial analysis for each enterprise, and a then later stage, combine all these into a financial analysis of the entire farm.
Microsoft Excel Spreadsheets are provided in this case study to guide participants in carrying out farm income analysis on a "without" and "with" project basis.

B. Fiscal Impact

The proposed rehabilitation of the SAC system would likely reduce the expenditures on the maintenance for the irrigation infrastructure in the long-run, as the planned rehabilitation works proposed for SAC would repair the heavily deteriorated head-works, concrete canal lining and diversion structures. The amounts of sediments would also be reduced due to the project interventions. Consequently, less maintenance would be required. However, in the short-run, the operation and maintenance (O&M) expenditures of SAIC in the SAC command area would increase as it would resume proper maintenance works and practices which have been deferred for a long time.

Also, under Component 2 of the project, the institutional support for SAC management to assist in developing programs to improve canal management and develop solid accounting and pricing principles to establish transparency and accountability are aimed at providing a more efficient and cost-effective water supply and service delivery.

Note to Participants: *The purpose of a fiscal impact analysis is to estimate the impact of a development or a land-use change on the costs and revenues of governmental units serving the development. The analysis is generally based on the fiscal characteristics of the project area/community – e.g., revenues, expenditures, land values, and characteristics of the development intervention or land use change – e.g., type of land use, distance from central facilities. The analysis enables the government to estimate the difference between the costs of providing the services to a new development and the revenues – taxes and user fees for example – that will be generated by the development.*

V. Benefits and Justifications

An economic analysis was carried out for this project proposed to be financed by the World Bank. In general, the project's main economic benefits would come from: (a) increases in yields; and (b) conversions to higher value crops (HVCs). The scenario developed in this economic analysis is rather optimistic, and reflects the discussions above. For example, increases in yields and crop conversions are assumed to take place a year after rehabilitation. It is also assumed that the level of irrigation after project completion would reach 80% (or 69,071 ha) of the irrigated area recorded in 1989 (86,657 ha).

The economic rate of return (ERR) and net present value (NPV at 12%) estimated for the project are 14.6% and AZN 2.5 million, respectively, showing that the project has sufficient viability.

A sensitivity analysis was also undertaken to assess the sensitivity of the project to such risks as: (a) 20% increase in rehabilitation costs; (b) 20% decrease in farm revenues; and (c) the simultaneous occurrence of risks (a) and (b). The sensitivity test results show the project's vulnerability to the identified risks.

Note to Participants: *A de facto standard in a FS for consideration by multilateral lenders is the preparation of an Economic Analysis of the project appended to the FS, the objective of which is to ascertain a project's desirability in terms of its contribution to the economic and social welfare of the country as a whole. The steps involved in economic evaluation are: (a) identification of costs and benefits which reflect the additions to and reductions from national income as a result of project implementation; (b) valuation of costs and benefits; and (c) measurement of economic desirability and sensitivity analysis.*
Step 1: - Cost items are usually classified into types: capital costs (e.g., civil works, equipment, D&E, etc.) and O&M costs (e.g., raw materials, rent, insurance, etc.). Benefits, on the other hand, constitute an increase in output or savings in resource use, and may also include positive externalities (e.g., improved recreation provided by a water storage dam) and secondary benefits (e.g., beneficial forward or backward linkages of the project).
Step 2:- The valuation of costs and benefits should be in constant prices at the current year's level. Where price levels are not current, appropriate price indices shall be applied to inflate or deflate prices accordingly. It should be noted that this step of the economic analysis is preceded by the estimation of national economic parameters which in practice should be provided by the central planning agency of the government. The national parameters to be determined are the social discount rate (SDR) or the economic opportunity cost of capital

(OCC) and the foreign exchange premium. The latter grossly represents the additional amount that the economy is willing to pay to obtain one more unit of traded good.

On the application of the foreign exchange premium in CBA, two approaches are used, i.e., the specific conversion factors (CFs) for the commodities produced/used by the project or the average of these conversion factors which is the Standard Conversion Factor (SCF), and the Shadow Exchange Rate Factor (SERF).

The concept of a conversion factor, defined as the ratio of the value of all exports and imports at border/world prices to their value at the domestic price, plays an important role in translating financial prices to economic prices. If the CFs or the SCF is to be used to allow for the foreign exchange premium, the economic value of a traded item would be obtained by converting the foreign exchange price to its domestic currency equivalent using the official exchange rate (OER). The effect of such procedure is to reduce the domestic currency values for non-traded items by an amount sufficient to reflect the foreign exchange premium. The unit of account or numeraire in this case is domestic currency at world or border price level.

The SERF, on the other hand, is derived by multiplying the OER by 1 plus the foreign exchange premium stated in decimal terms. If the SERF is to be used allow for the foreign exchange premium, the economic value of a traded item would be obtained by converting the foreign exchange price to its domestic currency equivalent using the shadow exchange rate. The effect is to make traded items relatively more expensive in domestic currency by the amount of foreign exchange premium. Therefore, the unit of account or numeraire in this case is the domestic currency at the domestic price level.

Another parameter that should be determined by the central planning agency is the Shadow Wage Rate (SWR) of labor. The SWR is used to estimate the economic cost of labor inputs. It should be noted that labor, being a heterogeneous or diverse input, commands a SWR that may differ according to the type of labor, location, tenure and type of labor market.

The line-by-line application of these parameters on the financial cash flows yields the statement of economic costs and benefits.

Step 3: - The SDR or OCC will be used to discount the net economic benefits to derive the economic net present values. The OCC, which is the marginal productivity of capital, can be approximated by a variety of formulas. The simplest approach is to take the rates of return of a range projects in the public sector. Yields in different financial markets of an economy could also be good indicator of the OCC.

The indicator to be used for estimating the economic desirability of the project is the Economic Internal Rate of Return (EIRR) defined as that discount rate which equates the economic net present values (NPVs) or discounted values of the cost and benefit streams at the OCC to "0" and benefit-cost (B/C) ratio to "1".

Sensitivity analysis, as a form of risk analysis, is also undertaken in projects with quantified benefits and costs. It involves recalculating project outcomes (NPVs and EIRRs) for different values of major variables and/or combination of variables.

Microsoft Excel spreadsheets are provided in this case study to guide participants in carrying out the aggregation of project accounts, the conduct of economic analysis and sensitivity analysis, and finding their switching values.

VI. Social and Distribution Analysis

The anticipated social development outcomes of the project would be manifested on the macro level, strengthening the creation of the physical framework for sustainable irrigated agriculture. This is a major infrastructure project that would affect a large part of the Azeri

population. The SAC rehabilitation works are necessary to avoid the collapse of the existing diversion and increase the amount diverted for irrigation. This project would therefore reduce vulnerability. This project is the first in the program that would address issues of access and social cohesion through improvements in inter-farm and on-farm system improvements in the irrigation infrastructure that are essential for agriculture and rural livelihoods in Azerbaijan.

Note to Participants: *The objective of social analysis is to determine if the project is responsive to the national objectives of poverty alleviation, employment generation and income redistribution. Based on a social assessment of the affected communities in the command/influence area, the following aspects may be considered in the qualitative assessment of social benefits: (a) income distribution – the extent to which the income of the poorest sector of the rural population is improved as a result of the project may be improved; (b) employment – the extent to which the project reduces underemployment may be assessed; the number of jobs created may be compared with expected increase in labor force of the project; (c) access to land; (d) rural-urban migration; and (e) nutrition and health which may be quantified in terms of the daily intake of calories in protein expected as a result of the project.*

An extension of distribution analysis is the derivation of Poverty Impact Ratio (PIR) with stakeholders further defined by income or other poverty indicators. PIR determines how much of the NPV goes to the poor or how much NPV goes to the poor per unit of project cost. Its application is limited to transport, energy and communication sectors. Another limitation is that only general statements with limited interpretations could be made out from the estimated PIR.

VII. Sustainability and Risks

Adequate and regular maintenance would be critical for the sustainability of project benefits and should be important focus for the country. During the past years the contribution from state budget to O&M of irrigation infrastructure has been insufficient, while the contribution of water users towards financing the O&M of the irrigation infrastructure is still very low and is expected to remain low during the next few years. Emphasis should first be on improving the collection rate of the existing ISF and not focus increasing the charge until an adequate system of collection and enforcement is in place. This also reflects concerns about the current low income in the rural areas and the Government's desire not to increase charges until incomes begin to rise.

Government would therefore still have to make more funds available for O&M. Assurance has been obtained from the Government that SAIC shall request an annual budget adequate for the proper operation and maintenance of the SAC system.

Note to Participants*: The purpose of this section is to outline the courses of action that the project proponent would undertake to sustain the expected gains of the project (e.g., ensuring adequate O&M funds) and to minimize or manage risks (e.g., via better information and education campaigns among water users) attendant to project implementation.*

VIII. Conclusion and Recommendation

The Samur-Apsheron Irrigation Project aims to re-establish the sustainability of the irrigation sub-sector. Specifically, the project would support the rehabilitation of the seriously deteriorating main infrastructure of the Samur-Apsheron Canal (SAC) System, located in the north-eastern part of the country. To be implemented by the State Amelioration and Irrigation Committee (SAIC) over a five-year period and at a cost of about AZN 23.0 million, the project would benefit an estimated 40,000 farm families spread in some 70,000 hectares of the influence area. The major financial benefit of the project is an increase in agricultural incomes of these farmers resulting mainly from the reliable delivery of irrigation water. Based on the projected cropping patterns, yields and farm-gate prices, farmer-beneficiaries' incremental financial farm incomes from a 2.5 hectare farm are projected at AZN 211 per annum.

The economic analysis conducted shows that the project has sufficient viability. The EIRR and NPV at 12% are estimated at 14.6% and AZN 2.5 million, respectively. The project's immediate implementation would therefore be the first in the country's rural infrastructure program. Its completion after five years would address issues of access and social cohesion through improvements in inter-farm and on-farm system improvements in the irrigation infrastructure that are essential for agriculture and rural livelihoods in Azerbaijan.

***Note to Participants**: The purpose of this section is to summarize the need and justification for a project. The responsible government entity may at this instance also propose arrangements for the appraisal of the project by the funding institution.*

Table 1. National and Project-Specific Parameters and Other Assumptions

Assumption	Value	
National Parameters:		
Official Exchange Rate, OER (AZN/US$)		0.86
Standard Conversion Factor, SCF*		0.95
Shadow Exchange Rate Factor, SERF*		1.05
Opportunity Cost of Capital, OCC*		0.12
Project-Specific Parameters:		
Unskilled Labor Wage Rate per manday, AZN/day		2.00
Shadow Wage Rate, SWR - unskilled *		0.75
Shadow Wage Rate, SWR - skilled*		0.95
Other Assumptions:		
Potential irrigable area, ha		86,657
Irrigated area without the Project, ha		34,258
Irrigated area with the Project, at full development, ha		69,071
Phasing of development/rehabilitation	Yearly Area Dev't, ha	Cumulative Area, ha
Year 2	14,450	14,450
Year 3	15,990	30,440
Year 4	18,767	49,207
Year 5	15,117	64,324
Year 6	4,747	69,071
Investment Costs/Civil Works:		
Goods, as content of civil works		0.60
Skilled labor content, as % of civil works		0.25
Unskilled labor content, as % of civil works		0.15
Operation and Maintenance (O&M) Costs:		
O&M cost as percent of investment/civil works cost*		0.03
Goods as % of O&M		0.35
Skilled labor content as % of O&M		0.35
Unskilled labor content as % of O&M		0.30
Estimated economic life of the Project (yrs.)		25.00
Average farm size, ha		2.50

*Assumptions lifted from World Bank and ADB-funded project documents for Azerbaijan.

Table 2: Derivation of Economic Prices of Wheat by Using SERF and SCF, Constant Prices

Wheat @ Import Parity	Wheat		
	Financial	SERF	SCF
World Bank Price of Wheatflour (Dec. 2006) per US $/ton a	192.000	192.000	192.000
Freight & Insurance in Baku	9.000	9.000	9.000
CIF Price, Baku, US $/ton	201.000	201.000	201.000
Equivalent CIF Price in Baku at OER, AZN/ton b	172.860	172.860	172.860
Equivalent CIF Price in Baku at SER, AZN/ton c		181.503	
Port handling and storage	1.070	1.070	1.017
Average transport cost from distribution/milling centers	2.500	2.500	2.375
Distributors'/millers' margins (3%)	5.186	5.186	4.927
Wholesale price of wheatflour (WP)	181.616	190.259	181.178
Raw Wheat equivalent (based on 60% recovery rate)	108.969	114.155	108.707
Milling cost, transport and marketing cost (5% of Raw wheat)	5.448	5.708	5.164
Import parity at farmgate price of raw wheat, AZN/ton	103.521	108.448	103.543
Import parity at farmgate price of raw wheat, AZN/kg	0.1035	0.108	0.1035

a Average price in Dec. 2006 as estimated by WB		US$/ton
b Exchange rate: AZN 0.86 = $1.00		0.86
c Shadow Exchange Rate Factor, SERF		1.05
d Standard Conversion Factor		0.95

Table 3: Derivation of Financial and Economic Prices of Fertilizers by Using SCF

Fertilizers @ Import Parity	Urea		TSP		MOP	
	Financial	Economic	Financial	Economic	Financial	Economic
World Bank Price (Dec. 2006), US$/ ton a (fob Black Sea, US Gulf and Vancouver, respectively)	222.90	222.90	204.90	204.90	174.50	174.50
Freight & Insurance in Baku	63.00	63.00	63.00	63.00	63.00	63.00
CIF Price, Baku US$/ton	285.90	285.90	267.90	267.90	237.50	237.50
Equivalent CIF Price in Baku (AZN/ton) at OER b	245.87	245.87	230.39	230.39	204.25	204.25
Port handling and storage	9.00	8.55	9.00	8.55	9.00	8.55
Average transport cost to distribution centers	4.00	3.80	4.00	3.80	4.00	3.80
Dealers' margins	2.00	1.90	2.00	1.90	2.00	1.90
Wholesale price	260.87	260.12	245.39	244.64	219.25	218.50
Transport to project site	2.00	1.90	2.00	1.90	2.00	1.90
Import parity at farmgate price, AZN/ton	262.87	262.02	247.39	246.54	221.25	220.40
Import parity at farmgate price, AZN/kg	0.263	0.262	0.247	0.247	0.221	0.220

a Average price in Dec. 2006 as estimated by WB	US$/ton
b Exchange rate: AZN 0.86 = $1.00	0.86
c Standard Conversion Factor, SCF	0.95

Table 4: Derivation of Financial and Economic Prices of Fertilizers by Using SERF

Fertilizers @ Import Parity	Urea		TSP		MOP	
	Financial	Economic	Financial	Economic	Financial	Economic
World Bank Price (Dec. 2006) US$/ton a (fob Black Sea, US Gulf and Vancouver, respectively)	222.90	222.90	204.90	204.90	174.50	174.50
Freight & Insurance in Baku	63.00	63.00	63.00	63.00	63.00	63.00
CIF Price, Baku US$/ton	285.90	285.90	267.90	267.90	237.50	237.50
Equivalent CIF Price in Baku (AZN/ton) at OER b	245.87	245.87	230.39	230.39	204.25	204.25
Equivalent CIF Price in Baku (AZN/ton) at SER c		258.17		241.91		214.46
Port handling and storage	9.00	9.00	9.00	9.00	9.00	9.00
Average transport cost to distribution centers	4.00	4.00	4.00	4.00	4.00	4.00
Dealers' margins	2.00	2.00	2.00	2.00	2.00	2.00
Wholesale price	260.87	273.17	245.39	256.91	219.25	229.46
Transport to project site	2.00	2.00	2.00	2.00	2.00	2.00
Import parity at farmgate price, AZN/ton	262.87	275.17	247.39	258.91	221.25	231.46
Import parity at farmgate price, AZN/kg	0.263	0.275	0.247	0.259	0.221	0.231

a Average price in Dec. 2006 as estimated by WB	US$/ton
b Exchange rate: AZN 0.86 = $1.00	0.86
c Shadow Exchange Rate Factor, SERF	1.05

Table 5: Yields, Cropping Pattern and Intensity, Per Hectare

Crop	Yields, kg/ha		Cropping Pattern, % of Area	
	Without Proj	With Proj.	Without Proj.	With Proj.
Wheat	1,700.00	3,200.00	0.48	0.60
Other Crops:				
Fruits	3,700.00	6,600.00	0.34	0.41
Vegetables	12,500.00	19,500.00	0.08	0.10
Grapes	700.00	3,000.00	0.04	0.02
Cropping Intensity			**0.94**	**1.13**

Table 6: Crop Enterprise Budget Per Hectare - Without Project, Using SCF

Item	Unit	Without Project				
		Quantity	Price		Fin. Value	Econ. Value (SCF)
			Financial	Econ.(SCF)		
Revenues:						
Wheat	AZN/kg	808.35	0.104	0.104	83.68	83.70
Wheatstraw*	AZN/kg	404.18	0.050	0.048	20.21	19.198
Other crops:						
Fruits	AZN/kg	1,239.87	0.050	0.048	61.99	58.894
Vegetables	AZN/kg	1,017.50	0.037	0.035	37.55	35.668
Grapes	AZN/kg	30.80	0.338	0.321	10.41	9.887
Total revenues					**213.84**	**207.35**
Expenses:						
Land preparation:						
Plowing and leveling	Mandays	16.67	2.00	1.43	33.34	23.75
Diking	Mandays	8.33	2.00	1.43	16.66	11.87
Seeds	kg	250.00	0.2	0.19	50.00	47.50
Seeding	Mandays	5.00	2.00	1.43	10	7.13
Fertilizers:						
Urea	kg	100.00	0.263	0.262	26.29	26.20
TSP	kg	-	0.247	0.247	0	0
MOP	kg	-	0.221	0.220	0	0
Pesticides	liter	-	0	0	0	0
Herbicides	kg	-	0	0	0	0
Labor costs:	Mandays					
Irrigation	Mandays	5.00	2.00	1.43	10	7.13
Harvesting and drying	Mandays	16.70	2.00	1.43	33.4	23.80
Other farm chores	Mandays	-				
Water charges**	AZN/ha		3.84	-	3.84	-
Land tax	AZN/ha		3.10	-	3.10	-
Production Cost before water charge and land tax	**AZN/ha**				**179.69**	**147.37**
Total cost excluding farm labor	AZN/ha				83.23	73.70
Total cost including farm labor	AZN/ha				186.63	147.37
Net Farm Income	**AZN/ha**				**130.61**	**133.64**
Net Farm Income with labor deducted and land tax and water charge added back)	**AZN/ha**				**27.21**	**59.97**

Assumptions:

*Quantity of production of wheatstraw assumed at 50% of wheat.	0.5
**Amount of irrigation water delivered assumed at 4,800 cu m/ha priced at AZN 0.80/1000 cu m.	3.84

Table 7: Crop Enterprise Budget Per Hectare - With Project, Using SCF

Item	Unit	With Project				
		Quantity	Price		Fin. Value	Econ. Value (SCF)
			Financial	Econ.(SCF)		
Revenues:						
Wheat	AZN/kg	1920.00	0.104	0.104	198.76	198.80
Wheatstraw	AZN/kg	960.00	0.05	0.05	48.00	45.60
Other crops:						
Fruits	AZN/kg	2,673.65	0.050	0.048	133.68	127.00
Vegetables	AZN/kg	2,028.00	0.037	0.035	74.83	71.09
Grapes	AZN/kg	69.51	0.338	0.321	23.49	22.31
Total revenues					**478.76**	**464.81**
Expenses:						
Land preparation:						
Plowing and leveling	Mandays	16.67	2.00	1.43	33.34	23.75
Diking	Mandays	8.33	2.00	1.43	16.66	11.87
Seeds	kg	230	0.2	0.19	46.00	43.70
Seeding	Mandays	5	2.00	1.43	10.00	7.13
Fertilizers:						
Urea	kg	300	0.263	0.262	78.86	78.61
TSP	kg	200	0.247	0.247	49.48	49.31
MOP	kg	100	0.221	0.220	22.13	22.04
Organic material	MT	5	2.56	2.432	12.80	12.16
Pesticides	liter	2.5	18	18	45.00	45.00
Herbicides	kg	2	3	3	6.00	6.00
Labor costs:						
Irrigation	Mandays	5	2.00	1.43	10.00	7.13
Harvesting and drying	Mandays	26.7	2.00	1.43	53.40	38.05
Other farm chores	Mandays	6.67	2.00	1.43	13.34	9.50
Water charges	AZN/ha		5.60	0.00	5.60	-
Land tax	AZN/ha		3.10	0.00	3.10	-
Production Cost before water charge and land tax	**AZN/ha**				**405.71**	**354.24**
Total cost excluding farm labor	AZN/ha				268.97	256.82
Total cost including farm labor	AZN/ha				405.71	354.24
Net Farm Income	**AZN/ha**				**209.80**	**207.99**
Net Farm Income with labor deducted and land tax and water charge added back)	**AZN/ha**				**73.06**	**110.56**

Assumptions:

*Quantity of production of wheatstraw assumed at 50% of wheat.	0.50
**Amount of irrigation water delivered assumed at 7000 cu m/ha priced at AZN 0.80/1000 cu m.	5.60

Table 8: Annual Farm Household Income, Without and With Project (2.5 ha)

	At financial prices		
	Without Project	With Project	Incremental
Average farm size, ha	**2.50**	**2.50**	
Cropping intensity, %	**0.94**	**1.13**	**0.20**
Wheat	0.48	0.60	0.12
Other crops:			
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	(0.02)
Wheat yield per hectare, kg/ha	1,700.00	3,200.00	1,500.00
Wheat production, kg	2,020.875	4,800.00	2,779.13
Farm gate price, AZN/kg	0.104	0.104	
Value of production, wheat	**209.20**	**496.90**	**287.70**
Wheatstraw (50% of wheat)	1,010.44	2,400.00	1,389.56
Farm gate price, AZN/kg	0.05	0.05	
Value of production, wheatstraw	**50.52**	**114.00**	**63.48**
Fruit, yield per hectare	3,700.00	6,600.00	2,900.00
Fruit production, kg	3,099.68	6,684.13	3,584.46
Farm gate price, AZN/kg	0.05	0.05	
Value of production, fruits	**154.98**	**317.50**	**162.51**
Vegetable, yield per hectare	12,500.00	19,500.00	7,000.00
Vegetable production, kg	2,543.75	5,070.00	2,526.25
Farm gate price, AZN/kg	0.04	0.04	
Value of production, vegetable	**93.86**	**177.73**	**83.86**
Grape, yield per hectare	700.00	3,000.00	2,300.00
Grape production, kg	77.00	173.78	96.78
Farm gate price, AZN/kg	0.34	0.34	
Value of production, grapes	**26.02**	**58.72**	**32.70**
Gross value of production, AZN	**534.59**	**1,164.84**	**630.25**
Production costs, AZN	**466.57**	**885.61**	**419.04**
Net income, AZN	**68.02**	**279.24**	**211.21**

Table 9: Annual One-Hectare Farm Income in Economic Prices, Using SCF

	At Economic Prices		Incremental
	Without Project	With Project	
Cropping intensity, %	**0.94**	**1.13**	**0.20**
Wheat	0.48	0.60	0.12
Other crops:			
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	(0.02)
Wheat yield per hectare, kg/ha	1,700.00	3,200.00	1,500.00
Wheat production, kg	808.35	1,920.00	1,111.65
Econ. farm gate price, AZN/kg	0.104	0.104	
Econ. value of production, wheat	**83.70**	**198.80**	**115.10**
Wheatstraw (50% 0f wheat)	404.18	960.00	555.83
Econ. farm gate price, AZN/kg	0.048	0.048	
Econ. value of production, wheatstraw	**19.20**	**45.60**	**26.40**
Fruit, yield per hectare	3,700.00	6,600.00	2,900.00
Fruit production, kg	1,239.87	2,673.65	1,433.78
Econ. farm gate price, AZN/kg	0.048	0.048	
Econ. value of production, fruits	**58.89**	**127.00**	**68.10**
Vegetable, yield per hectare	12,500.00	19,500.00	7,000.00
Vegetable production, kg	1,017.50	2,028.00	1,010.50
Econ. farm gate price, AZN/kg	0.035	0.035	
Econ. value of production, vegetables	**35.67**	**71.09**	**35.42**
Grape, yield per hectare	700.00	3,000.00	2,300.00
Grape production, kg	30.80	69.51	38.71
Econ. farm gate price, AZN/kg	0.321	0.321	
Econ. value of production, grapes	**9.89**	**22.31**	**12.43**
Gross econ. value of production, AZN/ha	**207.35**	**464.81**	**257.46**
Production costs, at econ. Prices, AZN/ha	**147.37**	**354.24**	**206.87**
Net income/ha, at econ. Prices, AZN/ha	**59.97**	**110.56**	**50.59**

Table 10 : Investment Costs and Phase of Development

Year	Investment Cost*	O&M Costs	Recurrent Costs	Area Rehabilitated, ha/yr**	Cumulative Area Rehabilitated, ha
1	4,196,180	-	105,068	-	-
2	4,637,880	125,885	106,152	14,450	14,450
3	5,461,060	265,022	108,860	15,990	30,440
4	4,396,955	428,854	109,401	18,767	49,207
5	1,385,340	560,762	112,109	15,117	64,324
6	-	602,322	-	4,747	69,071
Total	**20,077,415**			**69,071**	

* O&M costs as % of investment costs =	0.03
**Yield increases are expected during these years.	

Table 11: Investment Costs in Economic Prices, Using SCF

Year	Investment Cost, AZN			Total Investment Cost in Econ Prices
	Goods	Skilled Labor	Unskilled Labor	
1	2,517,708	946,763	448,467	3,912,938
2	2,782,728	1,046,422	495,673	4,324,823
3	3,276,636	1,232,152	583,651	5,092,438
4	2,638,173	992,063	469,925	4,100,161
5	831,204	312,567	148,058	1,291,830
Total	**12,046,449**	**4,529,967**	**2,145,774**	**18,722,189**

Table 12: O&M Costs in Economic Prices, Using SCF

Year	O & M Costs, AZN			Total O&M Costs in Econ Prices
	Goods	Skilled Labor	Unskilled Labor	
1	-	-	-	-
2	44,060	41,857	26,908	112,825
3	92,758	88,120	56,648	237,526
4	150,099	142,594	91,667	384,360
5	196,267	186,453	119,863	502,583
6	210,813	200,272	128,746	539,831

Table13 : Aggregate Economic Analysis of the Project, Using SCF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	3,912,938	-	105,068	4,018,006	-	(4,018,006)
2	14,450	4,324,823	112,825	106,152	4,543,800	731,041	(3,812,759)
3	15,990	5,092,438	237,526	108,860	5,438,824	1,539,992	(3,898,832)
4	18,767	4,100,161	384,360	109,401	4,593,922	2,489,435	(2,104,487)
5	15,117	1,385,340	502,583	112,109	2,000,032	3,254,220	1,254,187
6	4,747		539,831		539,831	3,494,375	2,954,544
7			539,831		539,831	3,494,375	2,954,544
8			539,831		539,831	3,494,375	2,954,544
9			539,831		539,831	3,494,375	2,954,544
10			539,831		539,831	3,494,375	2,954,544
11			539,831		539,831	3,494,375	2,954,544
12			539,831		539,831	3,494,375	2,954,544
13			539,831		539,831	3,494,375	2,954,544
14			539,831		539,831	3,494,375	2,954,544
15			539,831		539,831	3,494,375	2,954,544
16			539,831		539,831	3,494,375	2,954,544
17			539,831		539,831	3,494,375	2,954,544
18			539,831		539,831	3,494,375	2,954,544
19			539,831		539,831	3,494,375	2,954,544
20			539,831		539,831	3,494,375	2,954,544
21			539,831		539,831	3,494,375	2,954,544
22			539,831		539,831	3,494,375	2,954,544
23			539,831		539,831	3,494,375	2,954,544
24			539,831		539,831	3,494,375	2,954,544
25			539,831		539,831	3,494,375	2,954,544
						NPV @12%	**2,494,524**
						EIRR	**14.58%**

Table 14: Sensitivity Analysis: Scenario A, 20% Increase in Rehabilitation Costs, Using SCF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,695,525	-	105,068	4,800,593	-	(4,800,593)
2	14,450.00	5,189,788	135,390	106,152	5,431,329	731,041	(4,700,289)
3	15,990.00	6,110,926	285,031	108,860	6,504,817	1,539,992	(4,964,825)
4	18,767.00	4,920,193	461,232	109,401	5,490,826	2,489,435	(3,001,391)
5	15,117.00	1,662,408	603,100	112,109	2,377,617	3,254,220	876,603
6	4,747.00	-	647,798	-	647,798	3,494,375	2,846,578
7	0	-	647,798	-	647,798	3,494,375	2,846,578
8	0	-	647,798	-	647,798	3,494,375	2,846,578
9	0	-	647,798	-	647,798	3,494,375	2,846,578
10	0	-	647,798	-	647,798	3,494,375	2,846,578
11	0	-	647,798	-	647,798	3,494,375	2,846,578
12	0	-	647,798	-	647,798	3,494,375	2,846,578
13	0	-	647,798	-	647,798	3,494,375	2,846,578
14	0	-	647,798	-	647,798	3,494,375	2,846,578
15	0	-	647,798	-	647,798	3,494,375	2,846,578
16	0	-	647,798	-	647,798	3,494,375	2,846,578
17	0	-	647,798	-	647,798	3,494,375	2,846,578
18	0	-	647,798	-	647,798	3,494,375	2,846,578
19	0	-	647,798	-	647,798	3,494,375	2,846,578
20	0	-	647,798	-	647,798	3,494,375	2,846,578
21	0	-	647,798	-	647,798	3,494,375	2,846,578
22	0	-	647,798	-	647,798	3,494,375	2,846,578
23	0	-	647,798	-	647,798	3,494,375	2,846,578
24	0	-	647,798	-	647,798	3,494,375	2,846,578
25	0	-	647,798	-	647,798	3,494,375	2,846,578
						EIRR	11.19%

Table 15: Sensitivity Test: Scenario B, 20% Decrease in Revenues, Using SCF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	3,912,938	-	105,068	4,018,006	-	(4,018,006)
2	14,450.00	4,324,823	112,825	106,152	4,543,800	584,833	(3,958,967)
3	15,990.00	5,092,438	237,526	108,860	5,438,824	1,231,994	(4,206,831)
4	18,767.00	4,100,161	384,360	109,401	4,593,922	1,991,548	(2,602,374)
5	15,117.00	1,385,340	502,583	112,109	2,000,032	2,603,376	603,344
6	4,747.00	-	539,831	-	539,831	2,795,500	2,255,669
7	-	-	539,831	-	539,831	2,795,500	2,255,669
8	-	-	539,831	-	539,831	2,795,500	2,255,669
9	-	-	539,831	-	539,831	2,795,500	2,255,669
10	-	-	539,831	-	539,831	2,795,500	2,255,669
11	-	-	539,831	-	539,831	2,795,500	2,255,669
12	-	-	539,831	-	539,831	2,795,500	2,255,669
13	-	-	539,831	-	539,831	2,795,500	2,255,669
14	-	-	539,831	-	539,831	2,795,500	2,255,669
15	-	-	539,831	-	539,831	2,795,500	2,255,669
16	-	-	539,831	-	539,831	2,795,500	2,255,669
17	-	-	539,831	-	539,831	2,795,500	2,255,669
18	-	-	539,831	-	539,831	2,795,500	2,255,669
19	-	-	539,831	-	539,831	2,795,500	2,255,669
20	-	-	539,831	-	539,831	2,795,500	2,255,669
21	-	-	539,831	-	539,831	2,795,500	2,255,669
22	-	-	539,831	-	539,831	2,795,500	2,255,669
23	-	-	539,831	-	539,831	2,795,500	2,255,669
24	-	-	539,831	-	539,831	2,795,500	2,255,669
25	-	-	539,831	-	539,831	2,795,500	2,255,669
						EIRR	10.40%

Table 16: Sensitivity Test, Scenario C: Simultaneous 20% Increase in Rehabilitation Cost and 20% Decrease in Revenues, Using SCF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,695,525.42	-	105,068.00	4,800,593.42	-	(4,800,593.42)
2	14,450.00	5,189,787.72	135,389.75	106,152.00	5,431,329.47	584,832.71	(4,846,496.76)
3	15,990.00	6,110,926.14	285,030.95	108,860.00	6,504,817.09	1,231,993.61	(5,272,823.48)
4	18,767.00	4,920,192.65	461,232.05	109,401.00	5,490,825.69	1,991,547.62	(3,499,278.08)
5	15,117.00	1,662,408.00	603,099.80	112,109.00	2,377,616.80	2,603,375.72	225,758.92
6	4,747.00	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
7	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
8	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
9	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
10	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
11	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
12	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
13	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
14	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
15	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
16	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
17	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
18	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
19	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
20	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
21	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
22	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
23	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
24	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
25	-	-	647,797.79	-	647,797.79	2,795,500.34	2,147,702.55
					-	**EIRR**	**7.43%**

Table 17: Estimated ERRs and Results of Sensitivity Tests

	Base Case	Scenario A	Scenario B	Scenario C
EIRR	**14.58%**	**11.19%**	**10.40%**	**7.43%**

where:
Scenario A = 20% increase in rehabilitation costs
Scenario B = 20% decrease in product prices or revenues
Scenario C = Simultaneous 20% increase in rehabilitation costs and 20% decrease in revenues

Table 18: Switching Value 1: Maximum Increase in Rehabilitation Cost Before ERR Falls Below 12%, Using SCF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,480,314	-	105,068	4,585,382	-	(4,585,382)
2	14,450.00	4,951,922	129,184	106,152	5,187,259	731,041	(4,456,218)
3	15,990.00	5,830,842	271,967	108,860	6,211,669	1,539,992	(4,671,677)
4	18,767.00	4,694,684	440,092	109,401	5,244,177	2,489,435	(2,754,743)
5	15,117.00	1,586,214	575,458	112,109	2,273,781	3,254,220	980,439
6	4,747.00	-	618,107	-	618,107	3,494,375	2,876,268
7	-	-	618,107	-	618,107	3,494,375	2,876,268
8	-	-	618,107	-	618,107	3,494,375	2,876,268
9	-	-	618,107	-	618,107	3,494,375	2,876,268
10	-	-	618,107	-	618,107	3,494,375	2,876,268
11	-	-	618,107	-	618,107	3,494,375	2,876,268
12	-	-	618,107	-	618,107	3,494,375	2,876,268
13	-	-	618,107	-	618,107	3,494,375	2,876,268
14	-	-	618,107	-	618,107	3,494,375	2,876,268
15	-	-	618,107	-	618,107	3,494,375	2,876,268
16	-	-	618,107	-	618,107	3,494,375	2,876,268
17	-	-	618,107	-	618,107	3,494,375	2,876,268
18	-	-	618,107	-	618,107	3,494,375	2,876,268
19	-	-	618,107	-	618,107	3,494,375	2,876,268
20	-	-	618,107	-	618,107	3,494,375	2,876,268
21	-	-	618,107	-	618,107	3,494,375	2,876,268
22	-	-	618,107	-	618,107	3,494,375	2,876,268
23	-	-	618,107	-	618,107	3,494,375	2,876,268
24	-	-	618,107	-	618,107	3,494,375	2,876,268
25	-	-	618,107	-	618,107	3,494,375	2,876,268
-	-	-	-	-	-	EIRR	12.02%

Answer: Maximum allowable increase in rehabilitation costs is about 14.5%

Table 19: Switching Value: Maximum Decrease in Revenues Before ERR Falls 12%, Using SCF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	3,912,938	-	105,068	4,018,006	-	(4,018,006)
2	14,450.00	4,324,823	112,825	106,152	4,543,800	639,661	(3,904,139)
3	15,990.00	5,092,438	237,526	108,860	5,438,824	1,347,493	(4,091,331)
4	18,767.00	4,100,161	384,360	109,401	4,593,922	2,178,255	(2,415,666)
5	15,117.00	1,385,340	502,583	112,109	2,000,032	2,847,442	847,410
6	4,747.00	-	539,831	-	539,831	3,057,579	2,517,747
7	-	-	539,831	-	539,831	3,057,579	2,517,747
8	-	-	539,831	-	539,831	3,057,579	2,517,747
9	-	-	539,831	-	539,831	3,057,579	2,517,747
10	-	-	539,831	-	539,831	3,057,579	2,517,747
11	-	-	539,831	-	539,831	3,057,579	2,517,747
12	-	-	539,831	-	539,831	3,057,579	2,517,747
13	-	-	539,831	-	539,831	3,057,579	2,517,747
14	-	-	539,831	-	539,831	3,057,579	2,517,747
15	-	-	539,831	-	539,831	3,057,579	2,517,747
16	-	-	539,831	-	539,831	3,057,579	2,517,747
17	-	-	539,831	-	539,831	3,057,579	2,517,747
18	-	-	539,831	-	539,831	3,057,579	2,517,747
19	-	-	539,831	-	539,831	3,057,579	2,517,747
20	-	-	539,831	-	539,831	3,057,579	2,517,747
21	-	-	539,831	-	539,831	3,057,579	2,517,747
22	-	-	539,831	-	539,831	3,057,579	2,517,747
23	-	-	539,831	-	539,831	3,057,579	2,517,747
24	-	-	539,831	-	539,831	3,057,579	2,517,747
25	-	-	539,831	-	539,831	3,057,579	2,517,747
						EIRR	**12.01%**

Answer: Maximum allowable decrease in revenues is about 12.5%.

Exercise 1: Derivation of Economic Farm-Gate Prices
Aside from wheat, cotton is also widely grown in the irrigated farm lands of Azerbaijan. In 2006, the financial price of cotton at the point of first sale was estimated at AZN 0.071/kg. Based on the table below, derive the economic farm-gate prices of cotton using the SERF of 1.05 and SCF of 0.95.

Note to Participants: *In projects that produce a commodity significant in international trade, the economic value of that traded item - either an export or an import - at the farm gate is its export or import parity value. This exercise require participants to derive these values by adjusting the c.i.f (cost, insurance and freight) or f.o.b (free-on-board) prices (converted to economic values) by all relevant charges (again converted to to economic values) between the farm gate and the point where the c.i.f. or f.ob. price is quoted.*

Cotton @ Import Parity	Cotton		
	Financial	SERF	SCF
World Bank Price of Cotton (Dec. 2006) US $/ton a	133.50	133.50	133.50
Freight & Insurance in Baku	9.00	9.00	9.00
CIF Price, Baku US $/ton	142.50	142.50	142.50
Equivalent CIF Price in Baku (AZN/ton) at OER b	122.55	122.55	122.55
Equivalent CIF Price in Baku (AZN/ton) at SER c		?	-
Port handling and storage	0.75	?	?
Average transport cost from distribution/milling centers	1.70	?	?
Distributors'/millers' margins (3%)	3.60	?	?
Wholesale price (WP)	128.60	?	?
Raw Cotton equivalent (based on 60% recovery rate)	77.160	?	?
Milling cost, transport and marketing cost (5% of raw cotton)	6.430	?	?
Farmgate price/ton of raw cotton, AZN/ton	70.730	?	?
Farmgate price, AZN/kg	**0.071**	**???**	**???**

a Average price in Dec. 2006 as estimated by WB	US$/ton
b Exchange rate: AZN 0.86 = $1.00	0.86
c Shadow Exchange Rate, SERF	1.05
d Standard Conversion Factor	0.95

Exercise 1: Derivation of Economic Farm-Gate Prices
Aside from wheat, cotton is also widely grown in the irrigated farm lands of Azerbaijan. In 2006, the financial price of cotton at the point of first sale was estimated at AZN 0.071/kg. Based on the table below, derive the economic farm-gate prices of cotton using the SERF of 1.05 and SCF of 0.95.

Solution to Exercise 1:

Cotton @ Import Parity	Cotton		
	Financial	SERF	SCF
World Bank Price (Dec. 2006) US $/ton a	133.5000	133.5000	133.5000
Freight & Insurance in Baku	9.0000	9.0000	9.0000
CIF Price, Baku US$/ton	142.5000	142.5000	142.5000
Equivalent CIF Price in Baku (AZN/ton) at OER b	122.5500	122.5500	122.5500
Equivalent CIF Price in Baku (AZN/ton) at SERF c		128.6775	-
Port handling and storage	0.7500	0.7500	0.7125
Average transport cost from distribution/milling centers	1.7000	1.7000	1.6150
Distributors'/millers' margins (3%)	3.6000	3.6000	3.4200
Wholesale price (WP)	128.6000	134.7275	128.2975
Cotton equivalent (based on 60% recovery rate)	77.1600	80.8365	76.9785
Milling cost, transport and marketing cost (5% of raw cotton)	6.4300	6.7364	6.4149
Farmgate price, AZN/ton	70.7300	74.1001	70.5636
Farmgate price, AZN/kg	**0.0707**	**0.0741**	**0.0706**

a Average price in Dec. 2006 as estimated by WB	US$/ton
b Exchange rate: AZN 0.86 = $1.00	0.86
c Shadow Exchange Rate, SERF	1.05
d Standard Conversion Factor	0.95

Exercise 2: Deriving Incremental Farm Income of Farmer-Beneficiaries
The implementation of the project by the state has suddenly given farmers the opportunity to own and cultivate another 1.0 hectare each in addition to the 2.5 hectares of farm land they already have. Given the same projected crop yields, cropping intensities of crops, production costs/hectare, and farm gate prices under the "with project" scenario, compute the incremental farm income at financial prices of each farmer-beneficiary. (Please refer to the spreadsheets provided).

Note to Participants: *A far more important measure of a project worth to a farmer-beneficiary is the actual amount of additional income he expects to receive. The incremental net benefit provides a basis for determining whether the increased income will be sufficient to attract farmer's participation in a project and for comparing easily the relative attractiveness to a farmer of alternative project possibilities. This exercise requires participants to calculate a farmer's projected income under a "without" and "with" project scenario.*

	At financial prices		Incremental
	Without Project	With Project	
Average farm size, ha	**2.50**	**3.50**	**1.00**
Cropping intensity, %	0.94	1.13	0.20
Wheat	0.48	0.60	0.12
Other crops:	-	-	-
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	(0.02)
Wheat yield per hectare, kg/ha	1,700.00	3,200.00	1,500.00
Wheat production, kg	2,020.88	?	?
Farm gate price, AZN/kg	0.104	0.104	-
Value of production, wheat	**209.20**	**?**	**?**
		-	-
Wheatstraw (50% of wheat)	1,010.44	?	?
Farm gate price, AZN/kg	0.05	0.05	-
Value of production, wheatstraw	**50.52**	**?**	**?**
		-	-
Fruit, yield per hectare	3,700.00	6,600.00	2,900.00
Fruit production, kg	3,099.68	?	?
Farm gate price, AZN/kg	0.05	0.05	-
Value of production, fruits	**154.98**	**?**	**?**
		-	-
Vegetable, yield per hectare	12,500.00	19,500.00	7,000.00
Vegetable production, kg	2,543.75	?	?
Farm gate price, AZN/kg	0.04	0.04	-
Value of production, vegetable	**93.86**	**?**	**?**
		-	-
Grape, yield per hectare	700.00	3,000.00	?
Grape production, kg	77.00	?	?
Farm gate price, AZN/kg	0.34	0.34	-
Value of production, grapes	**26.02**	**?**	**?**
		-	-
Gross value of production, AZN	**534.59**	**?**	**?**
	-	-	-
Production costs, AZN	**466.57**	**?**	**?**
		-	-
Net income, AZN	**68.02**	**?**	**?**

Exercise 2: Deriving Incremental Farm Income of Farmer-Beneficiaries
The implementation of the project by the state has suddenly given farmers the opportunity to own and cultivate another 1.0 hectare each in addition to the 2.5 hectares of farm land they already have. Given the same projected crop yields, cropping intensities of crops, production costs/hectare, and farm gate prices under the "with project" scenario, compute the incremental farm income at financial prices of each farmer-beneficiary. (Please refer to spreadsheets provided).

Solution to Exercise 2:

	At financial prices		Incremental
	Without Project	With Project	
Average farm size, ha	**2.50**	**3.50**	**1.00**
Cropping intensity, %:	**0.94**	**1.13**	**0.20**
Wheat	0.48	0.60	0.12
Other crops:	-	-	-
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	(0.02)
	-		
Wheat yield per hectare, kg/ha	1,700.00	3,200.00	1,500.00
Wheat production, kg	2,020.88	6,720.00	4,699.13
Farm gate price, M/kg	0.104	0.104	
Value of production, wheat	**209.20**	**695.66**	**486.46**
	-		
Wheatstraw (50% of wheat)	1,010.44	3,360.00	2,349.56
Farm gate price, M/kg	0.05	0.05	
Value of production, wheatstraw	**50.52**	**159.60**	**109.08**
	-		
Fruit, yield per hectare, kg/ha	3,700.00	6,600.00	2,900.00
Fruit production, kg	3,099.68	9,357.79	6,258.11
Farm gate price, M/kg	0.05	0.05	
Value of production, fruits	**154.98**	**444.49**	**289.51**
	-		
Vegetable, yield per hectare, kg/ha	12,500.00	19,500.00	7,000.00
Vegetable production, kg	2,543.75	7,098.00	4,554.25
Farm gate price, M/kg	0.04	0.04	
Value of production, vegetable	**93.86**	**248.82**	**154.96**
	-		
Grape, yield per hectare, kg/ha	700.00	3,000.00	2,300.00
Grape production, kg	77.00	243.29	166.29
Farm gate price, M/kg	0.34	0.34	
Value of production, grapes	**26.02**	**82.21**	**56.19**
	-		
Gross value of production, M	**534.59**	**1,630.78**	**1,096.19**
	-		
Production costs, M	**466.57**	**1,419.97**	**953.40**
	-		
Net income	**68.02**	**210.81**	**142.79**
	-		

Exercise 3: Farm Income Analysis and Sensitivity Test, Using SCF
One of the risks of the project is the inability of the farmers to implement improved farm pracices. If an across-the-board 5% decrease in crop yields "With Project" is expected, assess the sensitivity of the project to such risk. (Please refer to the spreadsheets provided).

Note to Participants: *A real advantage of CBA is that it may be used to test what happens to the earning capacity of a project if events differ from guesses made about them in planning. How sensitive is a project's NPV or EIRR to decreases in crop yields? In this exercise, participants will rework an analysis to see what happens under these changed circumstances. Participants will draw attention to a central reality of project analysis that projections are inevitably subject to a high degree of uncertainty about what will actually happen. Participants are required to use the SCF in reworking the economic analysis.*

Table 9: Annual One-Hectare Farm Income in Economic Prices, Using SCF

	At Economic Prices		Incremental
	Without Project	With Project	
Cropping intensity, %	**0.94**	**1.13**	**0.20**
Wheat	0.48	0.60	0.12
Other crops:			
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	(0.02)
Wheat yield per hectare, kg/ha	1,700.00	?	?
Wheat production, kg	808.35	?	?
Econ. farm gate price, AZN/kg	0.10	0.10	
Econ. value of production, wheat	**83.70**	**?**	**?**
Wheatstraw (50% 0f wheat)	404.18	?	?
Econ. farm gate price, AZN/kg	0.05	0.05	
Econ. value of production, wheatstraw	**19.20**	**?**	**?**
Fruit, yield per hectare	3,700.00	?	?

Fruit production, kg	1,239.87	?	?
Econ. farm gate price, AZN/kg	0.05	0.05	
Econ. value of production, fruits	**58.89**	**?**	**?**
Vegetable, yield per hectare	12,500.00	?	?
Vegetable production, kg	1,017.50	?	?
Econ. farm gate price, AZN/kg	0.04	0.04	
Econ. value of production, vegetables	**35.67**	**?**	**?**
Grape, yield per hectare	700.00	?	?
Grape production, kg	30.80	?	?
Econ. farm gate price, AZN/kg	0.32	0.32	
Econ. value of production, grapes	**9.89**	**?**	**?**
Gross econ. value of production, AZN/ha	**207.35**	**?**	**?**
Production costs, at econ. Prices, AZN/ha	**147.37**	**354.24**	**206.87**
Net income/ha, at econ. Prices, AZN/ha	**59.97**	**?**	**?**

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1		3,912,938		105,068	4,018,006		
2	14,450	4,324,823	112,825	106,152	4,543,800		
3	15,990	5,092,438	237,526	108,860	5,438,824		
4	18,767	4,100,161	384,360	109,401	4,593,922		
5	15,117	1,385,340	502,583	112,109	2,000,032		
6	4,747		539,831		539,831		
7			539,831		539,831		
8			539,831		539,831		
9			539,831		539,831		
10			539,831		539,831		
11			539,831		539,831		
12			539,831		539,831		
13			539,831		539,831		

14			539,831		539,831		
15			539,831		539,831		
16			539,831		539,831		
17			539,831		539,831		
18			539,831		539,831		
19			539,831		539,831		
20			539,831		539,831		
21			539,831		539,831		
22			539,831		539,831		
23			539,831		539,831		
24			539,831		539,831		
25			539,831		539,831		
						NPV @12%	**???**
						EIRR	**???**

Exercise 3: Farm Income Analysis and Sensitivity Test Using SCF
One of the risks of the project is the inability of the farmers to implement improved farm pracices. If an across-the-board 5% decrease in crop yields "With Project" is expected, assess the sensitivity of the project to such risk. (Please refer to the spreadsheets provided).

Solution to Exercise 3:
Table 9: Annual One-Hectare Farm Income in Economic Prices, Using SCF

	At Economic Prices		Incremental
	Without Project	With Project	
Cropping intensity, %	**0.94**	**1.13**	**0.20**
Wheat	0.48	0.60	0.12
Other crops:	-		
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	-0.02
	-		
Wheat yield per hectare, kg/ha	1,700.00	3040.00	1340.00
Wheat production, kg	808.35	1824.00	1015.65
Econ. farm gate price, M/kg	0.10	0.10	0.00
Econ. value of production, wheat	**83.70**	**188.86**	**105.16**
	-		
Wheatstraw (50% 0f wheat)	404.18	912.00	507.83
Econ. farm gate price, M/kg	0.05	0.05	0.00
Econ. value of production, wheatstraw	**19.20**	**43.32**	**24.12**
	-		
Fruit, yield per hectare	3,700.00	6270.00	2570.00
Fruit production, kg	1,239.87	2539.97	1300.10
Econ. farm gate price, M/kg	0.05	0.05	0.00
Econ. value of production, fruits	**58.89**	**120.65**	**61.75**
	-		
Vegetable, yield per hectare	12,500.00	18525.00	6025.00
Vegetable production, kg	1,017.50	1926.60	909.10
Econ. farm gate price, M/kg	0.04	0.04	0.00
Econ. value of production, vegetables	**35.67**	**67.54**	**31.87**
	-		
Grape, yield per hectare	700.00	2850.00	2150.00
Grape production, kg	30.80	66.03	35.23
Econ. farm gate price, M/kg	0.32	0.32	0.00

Econ. value of production, grapes	9.89	21.20	11.31
Gross econ. value of production	207.35	441.57	248.20
Production costs, at econ. prices	147.37	354.24	206.87
Net income/ha, at econ. prices	59.97	87.32	27.35

Sensistivity Analysis Results: 5% Decrease in Crop Yields, Using SCF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	3,912,938	-	105,068	4,018,006	-	(4,018,006)
2	14,450	4,324,823	112,825	106,152	4,543,800	395,218	(4,148,581)
3	15,990	5,092,438	237,526	108,860	5,438,824	832,557	(4,606,267)
4	18,767	4,100,161	384,360	109,401	4,593,922	1,345,849	(3,248,073)
5	15,117	1,385,340	502,583	112,109	2,000,032	1,759,310	(240,722)
6	4,747		539,831		539,831	1,889,144	1,349,313
7			539,831		539,831	1,889,144	1,349,313
8			539,831		539,831	1,889,144	1,349,313
9			539,831		539,831	1,889,144	1,349,313
10			539,831		539,831	1,889,144	1,349,313
11			539,831		539,831	1,889,144	1,349,313
12			539,831		539,831	1,889,144	1,349,313
13			539,831		539,831	1,889,144	1,349,313
14			539,831		539,831	1,889,144	1,349,313
15			539,831		539,831	1,889,144	1,349,313
16			539,831		539,831	1,889,144	1,349,313
17			539,831		539,831	1,889,144	1,349,313
18			539,831		539,831	1,889,144	1,349,313
19			539,831		539,831	1,889,144	1,349,313
20			539,831		539,831	1,889,144	1,349,313
21			539,831		539,831	1,889,144	1,349,313
22			539,831		539,831	1,889,144	1,349,313
23			539,831		539,831	1,889,144	1,349,313
24			539,831		539,831	1,889,144	1,349,313
25			539,831		539,831	1,889,144	1,349,313
		18,815,700	12,033,924	541,590	31,391,214	EIRR	4.18%

Exercise 4: Farm Income Analysis and Sensitivity Test, Using SERF
One of the risks of the project is the inability of the farmers to implement improved farm pracices. If an across-the-board 5% decrease in crop yields "With Project" is expected, assess the sensitivity of the project to such risk. (Please refer to the spreadsheets provided).

Note to Participants: *A real advantage of CBA is that it may be used to test what happens to the earning capacity of a project if events differ from guesses made about them in planning. How sensitive is a project's NPV or EIRR to decreases in crop yields? In this exercise, participants will rework an analysis to see what happens under these changed circumstances. Participants will draw attention to a central reality of project analysis that projections are inevitably subject to a high degree of uncertainty about what will actually happen. Participants are required to use the SERF in reworking the economic analysis.*

Table 9: Annual One-Hectare Farm Income in Economic Prices, Using SERF

	At Economic Prices		
	Without Project	With Project	Incremental
Cropping intensity, %	0.94	1.13	0.20
Wheat	0.48	0.60	0.12
Other crops:			
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	(0.02)
Wheat yield per hectare, kg/ha	1,700.00	?	?
Wheat production, kg	808.35	?	?
Econ. farm gate price, AZN/kg	0.11	0.11	
Econ. value of production, wheat	**87.66**	**?**	**?**
Wheatstraw (50% 0f wheat)	404.18	?	?
Econ. farm gate price, AZN/kg	0.05	0.05	
Econ. value of production, wheatstraw	**20.21**	**?**	**?**
Fruit, yield per hectare	3,700.00	?	?
Fruit production, kg	1,239.87	?	?
Econ. farm gate price, AZN/kg	0.05	0.05	

Econ. value of production, fruits	**61.99**	**?**	**?**
Vegetable, yield per hectare	12,500.00	?	?
Vegetable production, kg	1,017.50	?	?
Econ. farm gate price, AZN/kg	0.04	0.04	
Econ. value of production, vegetables	**37.55**	**?**	**?**
Grape, yield per hectare	700.00	?	?
Grape production, kg	30.80	?	?
Econ. farm gate price, AZN/kg	0.34	0.34	
Econ. value of production, grapes	**10.41**	**?**	**?**
Gross econ. value of production, AZN/ha	**217.82**	**?**	**?**
Production costs, at econ. Prices AZN/ha	**155.07**	**372.38**	**217.32**
Net income/ha, at econ. Prices AZN/ha	**62.75**	**?**	**?**

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,112,256	-	105,068	4,217,324		
2	14,450.00	4,545,122	116,444	106,152	4,767,718		
3	15,990.00	5,351,839	245,145	108,860	5,705,844		
4	18,767.00	4,309,016	396,690	109,401	4,815,106		
5	15,117.00	1,385,340	518,705	112,109	2,016,154		
6	4,747.00		557,148		557,148		
7			557,148		557,148		
8			557,148		557,148		
9			557,148		557,148		
10			557,148		557,148		
11			557,148		557,148		
12			557,148		557,148		
13			557,148		557,148		
14			557,148		557,148		
15			557,148		557,148		
16			557,148		557,148		

17			557,148		557,148		
18			557,148		557,148		
19			557,148		557,148		
20			557,148		557,148		
21			557,148		557,148		
22			557,148		557,148		
23			557,148		557,148		
24			557,148		557,148		
25			557,148		557,148		
						NPV @12%	**???**
						EIRR	**???**

Exercise 4: Farm Income Analysis and Sensitivity Test Using SERF
One of the risks of the project is the inability of the farmers to implement improved farm pracices. If an across-the-board 5% decrease in crop yields "With Project" is expected, assess the sensitivity of the project to such risk. (Please refer to the spreadsheets provided).

Solution to Exercise 4:
Table 9: Annual One-Hectare Farm Income in Economic Prices, Using SERF

	At Economic Prices		Incremental
	Without Project	With Project	
Cropping intensity, %	**0.94**	**1.13**	**0.20**
Wheat	0.48	0.60	0.12
Other crops:			
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	-0.02
Wheat yield per hectare, kg/ha	1700.00	3040.00	1340.00
Wheat production, kg	808.35	1824.00	1015.65
Econ. farm gate price, AZN/kg	0.11	0.11	
Econ. value of production, wheat	**87.66**	**197.81**	**110.14**
Wheatstraw (50% 0f wheat)	404.18	912.00	507.83
Econ. farm gate price, AZN/kg	0.05	0.05	
Econ. value of production, wheatstra	**20.21**	**45.60**	**25.39**
Fruit, yield per hectare	3700.00	6270.00	2570.00
Fruit production, kg	1239.87	2539.97	1300.10
Econ. farm gate price, AZN/kg	0.05	0.05	
Econ. value of production, fruits	**61.99**	**127.00**	**65.01**
Vegetable, yield per hectare	12500.00	18525.00	6025.00
Vegetable production, kg	1017.50	1926.60	909.10
Econ. farm gate price, AZN/kg	0.04	0.04	
Econ. value of production, vegetable	**37.55**	**71.09**	**33.55**
Grape, yield per hectare	700.00	2850.00	2150.00
Grape production, kg	30.80	66.03	35.23
Econ. farm gate price, AZN/kg	0.34	0.34	
Econ. value of production, grapes	**10.41**	**22.31**	**11.91**

Gross econ. value of production, AZI	217.82	463.81	245.99
Production costs, at econ. Prices AZ	155.07	372.38	217.32
Net income/ha, at econ. Prices AZN/h	62.75	91.43	28.68

Sensitivity Analysis Result: 5% Decrease in Crops Yields, Using SERF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1		4,112,256	-	105,068	4,217,324	-	(4,217,324)
2	14,450.00	4,545,122	116,444	106,152	4,767,718	414,354	(4,353,365)
3	15,990.00	5,351,839	245,145	108,860	5,705,844	872,867	(4,832,977)
4	18,767.00	4,309,016	396,690	109,401	4,815,106	1,411,011	(3,404,096)
5	15,117.00	1,385,340	518,705	112,109	2,016,154	1,844,491	(171,663)
6	4,747.00		557,148		557,148	1,980,611	1,423,463
7			557,148		557,148	1,980,611	1,423,463
8			557,148		557,148	1,980,611	1,423,463
9			557,148		557,148	1,980,611	1,423,463
10			557,148		557,148	1,980,611	1,423,463
11			557,148		557,148	1,980,611	1,423,463
12			557,148		557,148	1,980,611	1,423,463
13			557,148		557,148	1,980,611	1,423,463
14			557,148		557,148	1,980,611	1,423,463
15			557,148		557,148	1,980,611	1,423,463
16			557,148		557,148	1,980,611	1,423,463
17			557,148		557,148	1,980,611	1,423,463
18			557,148		557,148	1,980,611	1,423,463
19			557,148		557,148	1,980,611	1,423,463
20			557,148		557,148	1,980,611	1,423,463
21			557,148		557,148	1,980,611	1,423,463
22			557,148		557,148	1,980,611	1,423,463
23			557,148		557,148	1,980,611	1,423,463
24			557,148		557,148	1,980,611	1,423,463
25			557,148		557,148	1,980,611	1,423,463
						NPV @12%	(6,903,579)
						EIRR	4.27%

Exercise 5: Using the SERF approach in translating financial prices to economic prices, and retaining all other assumptions used in the case study presented, do the following: (a) recompute the NPV (@12%) and ERR of the project: (b) assess the sensitivity of the project to the same risk assumptions used in the case study;and © find their switching values.

Note to Participants: *A step-by-step economic analysis of the case study was provided using the Standard Conversion Factor (SCF) to convert financial prices of non-traded items into economic prices. This exercise requires the participants to rework the economic analysis of the sample project discussed by using the Shadow Exchange Rate Factor in converting the financial prices of traded items into economic prices. Specifically, the exercise asks the participants to rework the analysis based on the same assumptions and thereafter to produce the necessary spreadsheets showing the following: (a) derivation of farm gate prices; (b) crop budgets under a "without" and "with" project scenario; © farm income analysis; (d) aggregation of project accounts; (e) incremental cash flow analysis: (f) sensivity analysis; and (g) switching values. At the end of the exercise, participants are also required to discuss the results vis-à-vis case study solution using the SCF.*

Solution to Exercise 5

Table 1. National and Project-Specific Parameters and Other Assumptions

Assumption	Value	
National Parameters:		
Official Exchange Rate, OER (AZN/US$)		0.86
Standard Conversion Factor, SCF*		0.95
Shadow Exchange Rate Factor, SERF*		1.05
Opportunity Cost of Capital, OCC*		0.12
Project-Specific Parameters:		
Unskilled Labor Wage Rate, AZN/manday		2.00
Shadow Wage Rate, SWR - unskilled *		0.75
Shadow Wage Rate, SWR - skilled*		0.95
Other Assumptions:		
Potential irrigable area, ha		86,657
Irrigated area without the Project, ha		34,258
Irrigated area with the Project, at full development, ha		69,071
Phasing of development/rehabilitation	Yearly Area Dev't, ha	Cumulative Area, ha
Year 2	14,450	14,450
Year 3	15,990	30,440
Year 4	18,767	49,207
Year 5	15,117	64,324
Year 6	4,747	69,071
Investment Costs/Civil Works:		
Goods, as content of civil works		0.60
Skilled labor content, as % of civil works		0.25
Unskilled labor content, as % of civil works		0.15
Operation and Maintenance (O&M) Cost		
O&M cost as percent of investment/civil works cost*		0.03
Goods as % of O&M		0.35
Skilled labor content as % of O&M		0.35
Unskilled labor content as % of O&M		0.30
Average farm size, ha		2.50

*Assumptions lifted from World Bank and ADB funded project documents for Azerbaijan.

Table 2: Derivation of Economic Prices of Wheat by Using SERF and SCF, Constant Prices

Wheat @ Import Parity	Wheat		
	Financial	SERF	SCF
World Bank Price of Wheatflour (Dec. 2006) per ton a	192.000	192.000	192.000
Freight & Insurance in Baku	9.000	9.000	9.000
CIF Price, Baku US$/ton	201.000	201.000	201.000
Equivalent CIF Price in Baku (AZN/ton) at OER b	172.860	172.860	172.860
Equivalent CIF Price in Baku (AZN/ton) at SER c		181.503	
Port handling and storage	1.070	1.070	1.017
Average transport cost from distribution/milling centers	2.500	2.500	2.375
Distributors'/millers' margins (3%)	5.186	5.186	4.927
Wholesale price (WP) of wheatflour	181.616	190.259	181.178
Raw Wheat equivalent (based on 60% recovery rate)	108.969	114.155	108.707
Milling cost, transport and marketing cost (5% of raw wheat)	5.448	5.708	5.164
Import parity at farmgate price, AZN/ton	103.521	108.448	103.543
Import parity at farmgate price, AZN/kg	0.104	0.108	0.104

a Average price in Dec. 2006 as estimated by WB		US$/ton
b Exchange rate: AZN 0.86 = $1.00		0.86
c Shadow Exchange Rate Factor, SERF		1.05
d Standard Conversion Factor		0.95

Table 3: Derivation of Financial and Economic Prices of Fertilizers by Using SCF

Fertilizers @ Import Parity	Urea		TSP		MOP	
	Financial	Economic	Financial	Economic	Financial	Economic
World Bank Price (Dec. 2006) per ton a	222.90	222.90	204.90	204.90	174.50	174.50
(fob Black Sea, US Gulf and Vancouver, respectively)						
Freight & Insurance in Baku	63.00	63.00	63.00	63.00	63.00	63.00
CIF Price, Baku US$/ton	285.90	285.90	267.90	267.90	237.50	237.50
Equivalent CIF Price in Baku (AZN/ton) at OER b	245.87	245.87	230.39	230.39	204.25	204.25
Port handling and storage	9.00	8.55	9.00	8.55	9.00	8.55
Average transport cost to distribution centers	4.00	3.80	4.00	3.80	4.00	3.80
Dealers' margins	2.00	1.90	2.00	1.90	2.00	1.90
Wholesale price	260.87	260.12	245.39	244.64	219.25	218.50
Transport to project site	2.00	1.90	2.00	1.90	2.00	1.90
Import parity at farmgate price, AZN/ton	262.87	262.02	247.39	246.54	221.25	220.40
Import parity at farmgate price, AZN/kg	0.263	0.262	0.247	0.247	0.221	0.220

a Average price in Dec. 2006 as estimated by WB	US$/ton
b Exchange rate: AZN 0.86 = $1.00	0.86
c Standard Conversion Factor, SCF	0.95

Table 4: Derivation of Financial and Economic Prices of Fertilizers by Using SERF

Fertilizers @ Import Parity	Urea		TSP		MOP	
	Financial	Economic	Financial	Economic	Financial	Economic
World Bank Price (Dec. 2006) per ton a	222.90	222.90	204.90	204.90	174.50	174.50
(fob Black Sea, US Gulf and Vancouver, respectively)						
Freight & Insurance in Baku	63.00	63.00	63.00	63.00	63.00	63.00
CIF Price, Baku US$/ton	285.90	285.90	267.90	267.90	237.50	237.50
Equivalent CIF Price in Baku (AZN/ton) at OER b	245.87	245.87	230.39	230.39	204.25	204.25
Equivalent CIF Price in Baku (AZN/ton) at SERF c		258.17		241.91		214.46
Port handling and storage	9.00	9.00	9.00	9.00	9.00	9.00
Average transport cost to distribution centers	4.00	4.00	4.00	4.00	4.00	4.00
Dealers' margins	2.00	2.00	2.00	2.00	2.00	2.00
Wholesale price	260.87	273.17	245.39	256.91	219.25	229.46
Transport to project site	2.00	2.00	2.00	2.00	2.00	2.00
Import parity at farmgate price, AZN/ton	262.87	275.17	247.39	258.91	221.25	231.46
Import parity at farmgate price, AZN/kg	0.263	0.275	0.247	0.259	0.221	0.231

a Average price in Dec. 2006 as estimated by WB	US$/ton
b Exchange rate: AZN 0.86 = $1.00	0.86
c Shadow Exchange Rate Factor, SERF	1.05

Table 5: Yields, Cropping Pattern and Cropping Intensity

Crop	Yields, kg/ha		Cropping Pattern, % of Area	
	Without Proj	With Proj.	Without Proj.	With Proj.
Wheat	1,700.00	3,200.00	0.48	0.60
Other Crops:				
Fruits	3,700.00	6,600.00	0.34	0.41
Vegetables	12,500.00	19,500.00	0.08	0.10
Grapes	700.00	3,000.00	0.04	0.02
Cropping Intensity			**0.94**	**1.13**

Table 6: Crop Enterprise Budget Per Hectare - Without Project, Using SERF

Item	Unit	Without Project				
		Quantity	Price		Fin. Value	Econ. Value (SERF)
			Financial	Econ.(SERF)		
Revenues:						
Wheat	AZN/kg	808.35	0.104	0.108	83.68	87.66
Wheatstraw*	AZN/kg	404.18	0.050	0.050	20.21	20.209
Other crops:						
Fruits	AZN/kg	1,239.87	0.050	0.050	61.99	61.994
Vegetables	AZN/kg	1,017.50	0.037	0.037	37.55	37.546
Grapes	AZN/kg	30.80	0.338	0.338	10.41	10.407
Total revenues					**213.84**	**217.82**
Expenses:						
Land preparation:						
Plowing and leveling	Mandays	16.67	2.00	1.50	33.34	25.01
Diking	Mandays	8.33	2.00	1.50	16.66	12.50
Seeds	kg	250.00	0.20	0.20	50.00	50.00
Seeding	Mandays	5.00	2.00	1.50	10	7.50
Fertilizers:						
Urea	kg	100.00	0.263	0.275	26.29	27.52
TSP	kg	-	0.247	0.259	0	0
MOP	kg	-	0.221	0.231	0	0
Pesticides	liter	-	0	0	0	0
Herbicides	kg	-	0	0	0	0
Labor costs:	Mandays					
Irrigation	Mandays	5.00	2.00	1.50	10.00	7.50
Harvesting and drying	Mandays	16.70	2.00	1.50	33.40	25.05
Other farm chores	Mandays	-				
Water charges**	AZN/ha		3.84	-	3.84	-
Land tax	AZN/ha		3.10	-	3.10	-
Production Cost before water charge and land tax	**AZN/ha**				**179.69**	**155.07**
Total cost excluding farm labor	AZN/ha				83.23	77.52
Total cost including farm labor	AZN/ha				186.63	155.07
Net Farm Income	**AZN/ha**				**130.61**	**140.30**
Net Farm Income with labor deducted and land tax and water charge added back)	**AZN/ha**				**27.21**	**62.75**

Assumptions:

*Quantity of production of wheatstraw assumed at 50% of wheat.	0.5
**Amount of irrigation water delivered assumed at 4,800 cu m/ha priced at AZN 0.80/1000 cu m.	3.84

Table 7: Crop Enterprise Budget Per Hectare - With Project, Using SERF

Item	Unit	With Project				
		Quantity	Price		Fin. Value	Econ. Value
			Financial	Econ.(SERF)		
Revenues:						
Wheat	AZN/kg	1920.00	0.104	0.108	198.76	208.22
Wheatstraw	AZN/kg	960.00	0.05	0.05	48.00	48.00
Other crops:						
Fruits	AZNkg	2,673.65	0.050	0.050	133.68	133.68
Vegetables	AZN/kg	2,028.00	0.037	0.037	74.83	74.83
Grapes	AZN/kg	69.51	0.338	0.338	23.49	23.49
Total revenues					**478.76**	**488.22**
Expenses:						
Land preparation:						
Plowing and leveling	Mandays	16.67	2.00	1.50	33.34	25.01
Diking	Mandays	8.33	2.00	1.50	16.66	12.50
Seeds	kg	230	0.2	0.20	46.00	46.00
Seeding	Mandays	5	2.00	1.50	10.00	7.50
Fertilizers:						
Urea	kg	300	0.263	0.275	78.86	82.55
TSP	kg	200	0.247	0.259	49.48	51.78
MOP	kg	100	0.221	0.231	22.13	23.15
Organic material	MT	5	2.56	2.560	12.80	12.80
Pesticides	liter	2.5	18	18.90	45.00	47.25
Herbicides	kg	2	3	3.15	6.00	6.30
Labor costs:						
Irrigation	Mandays	5	2.00	1.50	10.00	7.50
Harvesting and drying	Mandays	26.7	2.00	1.50	53.40	40.05
Other farm chores	Mandays	6.67	2.00	1.50	13.34	10.01
Water charges	AZN/ha		5.60	0.00	5.60	-
Land tax	AZN/ha		3.10	0.00	3.10	-
Production Cost before water charge and land tax	**AZN/ha**				**405.71**	**372.38**
Total cost excluding farm labor	AZN/ha				268.97	269.83
Total cost including farm labor	AZN/ha				405.71	372.38
Net Farm Income	**AZN/ha**				**209.80**	**218.39**
Net Farm Income with labor deducted and land tax and water charge added back)	**AZN/ha**				**73.06**	**115.84**

Assumptions:

*Quantity of production of wheatstraw assumed at 50% of wheat.	0.50
**Amount of irrigation water delivered assumed at 7000 cu m/ha priced at AZN 0.80/1000 cu m.	5.60

Table 8: Annual Farm Household Income, Without and With Project (2.5 ha)

	At financial prices Without Project	With Project	Incremental
Average farm size, ha	**2.50**	**2.50**	
Cropping intensity, %	**0.94**	**1.13**	**0.20**
Wheat	0.48	0.60	0.12
Other crops:			
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	(0.02)
Wheat yield per hectare, kg/ha	1,700.00	3,200.00	1,500.00
Wheat production, kg	2,020.88	4,800.00	2,779.13
Farm gate price, AZN/kg	0.10	0.10	
Value of production, wheat	**209.20**	**496.90**	**287.70**
Wheatstraw (50% of wheat)	1,010.44	2,400.00	1,389.56
Farm gate price, AZN/kg	0.05	0.05	
Value of production, wheatstraw	**50.52**	**120.00**	**69.48**
Fruit, yield per hectare	3,700.00	6,600.00	2,900.00
Fruit production, kg	3,099.68	6,684.13	3,584.46
Farm gate price, AZN/kg	0.05	0.05	
Value of production, fruits	**154.98**	**334.21**	**179.22**
Vegetable, yield per hectare	12,500.00	19,500.00	7,000.00
Vegetable production, kg	2,543.75	5,070.00	2,526.25
Farm gate price, AZN/kg	0.04	0.04	
Value of production, vegetable	**93.86**	**187.08**	**93.22**
Grape, yield per hectare	700.00	3,000.00	2,300.00
Grape production, kg	77.00	173.78	96.78
Farm gate price, AZN/kg	0.34	0.34	
Value of production, grapes	**26.02**	**58.72**	**32.70**
Gross value of production, AZN	**534.59**	**1,196.91**	**662.32**
Production costs, AZN	**466.57**	**930.96**	**464.39**
Net income, AZN	**68.02**	**265.95**	**197.93**

Table 9: Annual One-Hectare Farm Income in Economic Prices, Using SERF

	At Economic Prices		
	Without Project	With Project	Incremental
Cropping intensity, %	**0.94**	**1.13**	**0.20**
Wheat	0.48	0.60	0.12
Other crops:			
Fruits	0.34	0.41	0.07
Vegetables	0.08	0.10	0.02
Grapes	0.04	0.02	(0.02)
Wheat yield per hectare, kg/ha	1,700.00	3,200.00	1,500.00
Wheat production, kg	808.35	1,920.00	1,111.65
Econ. farm gate price, AZN/kg	0.108	0.108	
Econ. value of production, wheat	**87.66**	**208.22**	**120.56**
Wheatstraw (50% 0f wheat)	404.18	960.00	555.83
Econ. farm gate price, AZN/kg	0.050	0.050	
Econ. value of production, wheatstraw	**20.21**	**48.00**	**27.79**
Fruit, yield per hectare	3,700.00	6,600.00	2,900.00
Fruit production, kg	1,239.87	2,673.65	1,433.78
Econ. farm gate price, AZN/kg	0.050	0.050	
Econ. value of production, fruits	**61.99**	**133.68**	**71.69**
Vegetable, yield per hectare	12,500.00	19,500.00	7,000.00
Vegetable production, kg	1,017.50	2,028.00	1,010.50
Econ. farm gate price, AZN/kg	0.037	0.037	
Econ. value of production, vegetables	**37.55**	**74.83**	**37.29**
Grape, yield per hectare	700.00	3,000.00	2,300.00
Grape production, kg	30.80	69.51	38.71
Econ. farm gate price, AZN/kg	0.338	0.338	
Econ. value of production, grapes	**10.41**	**23.49**	**13.08**
Gross econ. value of production, AZN/ha	**217.82**	**488.22**	**270.40**
Production costs, at econ. Prices AZN/ha	**155.07**	**372.38**	**217.32**
Net income/ha, at econ. Prices AZN/ha	**62.75**	**115.84**	**53.09**

Table 10 : Investment Costs and Phase of Development

Year	Investment Cost*	O&M Costs	Recurrent Costs	Area Rehabilitated, ha/yr**	Cumulative Area Rehabilitated, ha
1	4,196,180.00	-	105,068.00	0	0
2	4,637,880.00	125,885.40	106,152.00	14,450.00	14,450.00
3	5,461,060.00	265,021.80	108,860.00	15,990.00	30,440.00
4	4,396,955.00	428,853.60	109,401.00	18,767.00	49,207.00
5	1,385,340.00	560,762.25	112,109.00	15,117.00	64,324.00
6	-	602,322.45	-	4,747.00	69,071.00
Total	**20,077,415.00**			**69,071.00**	

* O&M costs as % of investment costs =	0.03
**Yield increases are expected during these years.	

Table 11: Investment Costs in Economic Prices, Using SERF

Year	Investment Cost, AZN			Total Investment Cost in Econ Prices
	Goods	Skilled Labor	Unskilled Labor	
1	2,643,593.40	996,592.75	472,070.25	4,112,256.40
2	2,921,864.40	1,101,496.50	521,761.50	4,545,122.40
3	3,440,467.80	1,297,001.75	614,369.25	5,351,838.80
4	2,770,081.65	1,044,276.81	494,657.44	4,309,015.90
5	872,764.20	329,018.25	155,850.75	1,357,633.20
Total	**12,648,771.45**	**4,768,386.06**	**2,258,709.19**	**19,675,866.70**

Table 12: O&M Costs in Economic Prices, Using SERF

Year	O & M Costs, AZN			Total O&M Costs in Econ Prices
	Goods	Skilled Labor	Unskilled Labor	
1	-	-	-	-
2	46,262.88	41,856.90	28,324.22	116,444.00
3	97,395.51	88,119.75	59,629.91	245,145.17
4	157,603.70	142,593.82	96,492.06	396,689.58
5	206,080.13	186,453.45	126,171.51	518,705.08
6	221,353.50	200,272.21	135,522.55	557,148.27

Table13 : Aggregate Economic Analysis of the Project, Using SERF

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,112,256	-	105,068	4,217,324	-	(4,217,324)
2	14,450	4,545,122	116,444	106,152	4,767,718	767,095	(4,000,624)
3	15,990	5,351,839	245,145	108,860	5,705,844	1,615,942	(4,089,902)
4	18,767	4,309,016	396,690	109,401	4,815,106	2,612,209	(2,202,897)
5	15,117	1,385,340	518,705	112,109	2,016,154	3,414,712	1,398,558
6	4,747		557,148		557,148	3,666,712	3,109,564
7			557,148		557,148	3,666,712	3,109,564
8			557,148		557,148	3,666,712	3,109,564
9			557,148		557,148	3,666,712	3,109,564
10			557,148		557,148	3,666,712	3,109,564
11			557,148		557,148	3,666,712	3,109,564
12			557,148		557,148	3,666,712	3,109,564
13			557,148		557,148	3,666,712	3,109,564
14			557,148		557,148	3,666,712	3,109,564
15			557,148		557,148	3,666,712	3,109,564
16			557,148		557,148	3,666,712	3,109,564
17			557,148		557,148	3,666,712	3,109,564
18			557,148		557,148	3,666,712	3,109,564
19			557,148		557,148	3,666,712	3,109,564
20			557,148		557,148	3,666,712	3,109,564
21			557,148		557,148	3,666,712	3,109,564
22			557,148		557,148	3,666,712	3,109,564
23			557,148		557,148	3,666,712	3,109,564
24			557,148		557,148	3,666,712	3,109,564
25			557,148		557,148	3,666,712	3,109,564
						NPV @12%	**2,707,206**
						EIRR	**14.67%**

Table 14: Sensitivity Analysis: Scenario A, 20% Increase in Rehabilitation Costs

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,934,708	-	105,068	5,039,776	-	(5,039,776)
2	14,450.00	5,454,147	139,733	106,152	5,700,032	767,095	(4,932,937)
3	15,990.00	6,422,207	294,174	108,860	6,825,241	1,615,942	(5,209,299)
4	18,767.00	5,170,819	476,027	109,401	5,756,248	2,612,209	(3,144,038)
5	15,117.00	1,662,408	622,446	112,109	2,396,963	3,414,712	1,017,749
6	4,747.00	-	668,578	-	668,578	3,666,712	2,998,134
7	0	-	668,578	-	668,578	3,666,712	2,998,134
8	0	-	668,578	-	668,578	3,666,712	2,998,134
9	0	-	668,578	-	668,578	3,666,712	2,998,134
10	0	-	668,578	-	668,578	3,666,712	2,998,134
11	0	-	668,578	-	668,578	3,666,712	2,998,134
12	0	-	668,578	-	668,578	3,666,712	2,998,134
13	0	-	668,578	-	668,578	3,666,712	2,998,134
14	0	-	668,578	-	668,578	3,666,712	2,998,134
15	0	-	668,578	-	668,578	3,666,712	2,998,134
16	0	-	668,578	-	668,578	3,666,712	2,998,134
17	0	-	668,578	-	668,578	3,666,712	2,998,134
18	0	-	668,578	-	668,578	3,666,712	2,998,134
19	0	-	668,578	-	668,578	3,666,712	2,998,134
20	0	-	668,578	-	668,578	3,666,712	2,998,134
21	0	-	668,578	-	668,578	3,666,712	2,998,134
22	0	-	668,578	-	668,578	3,666,712	2,998,134
23	0	-	668,578	-	668,578	3,666,712	2,998,134
24	0	-	668,578	-	668,578	3,666,712	2,998,134
25	0	-	668,578	-	668,578	3,666,712	2,998,134
						EIRR	11.27%

Table 15: Sensitivity Test: Scenario B, 20% Decrease in Revenues

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,112,256	-	105,068	4,217,324	-	(4,217,324)
2	14,450.00	4,545,122	116,444	106,152	4,767,718	613,676	(4,154,043)
3	15,990.00	5,351,839	245,145	108,860	5,705,844	1,292,753	(4,413,091)
4	18,767.00	4,309,016	396,690	109,401	4,815,106	2,089,767	(2,725,339)
5	15,117.00	1,385,340	518,705	112,109	2,016,154	2,731,770	715,616
6	4,747.00	-	557,148	-	557,148	2,933,370	2,376,221
7	-	-	557,148	-	557,148	2,933,370	2,376,221
8	-	-	557,148	-	557,148	2,933,370	2,376,221
9	-	-	557,148	-	557,148	2,933,370	2,376,221
10	-	-	557,148	-	557,148	2,933,370	2,376,221
11	-	-	557,148	-	557,148	2,933,370	2,376,221
12	-	-	557,148	-	557,148	2,933,370	2,376,221
13	-	-	557,148	-	557,148	2,933,370	2,376,221
14	-	-	557,148	-	557,148	2,933,370	2,376,221
15	-	-	557,148	-	557,148	2,933,370	2,376,221
16	-	-	557,148	-	557,148	2,933,370	2,376,221
17	-	-	557,148	-	557,148	2,933,370	2,376,221
18	-	-	557,148	-	557,148	2,933,370	2,376,221
19	-	-	557,148	-	557,148	2,933,370	2,376,221
20	-	-	557,148	-	557,148	2,933,370	2,376,221
21	-	-	557,148	-	557,148	2,933,370	2,376,221
22	-	-	557,148	-	557,148	2,933,370	2,376,221
23	-	-	557,148	-	557,148	2,933,370	2,376,221
24	-	-	557,148	-	557,148	2,933,370	2,376,221
25	-	-	557,148	-	557,148	2,933,370	2,376,221
						EIRR	10.49%

Table 16: Sensitivity Test, Scenario C: Simultaneous 20% Increase in Rehabilitation Cost and 20% Decrease in Revenues

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,934,708	-	105,068	5,039,776	-	(5,039,776)
2	14,450.00	5,454,147	139,733	106,152	5,700,032	613,676	(5,086,356)
3	15,990.00	6,422,207	294,174	108,860	6,825,241	1,292,753	(5,532,487)
4	18,767.00	5,170,819	476,027	109,401	5,756,248	2,089,767	(3,666,480)
5	15,117.00	1,662,408	622,446	112,109	2,396,963	2,731,770	334,807
6	4,747.00	-	668,578	-	668,578	2,933,370	2,264,792
7	-	-	668,578	-	668,578	2,933,370	2,264,792
8	-	-	668,578	-	668,578	2,933,370	2,264,792
9	-	-	668,578	-	668,578	2,933,370	2,264,792
10	-	-	668,578	-	668,578	2,933,370	2,264,792
11	-	-	668,578	-	668,578	2,933,370	2,264,792
12	-	-	668,578	-	668,578	2,933,370	2,264,792
13	-	-	668,578	-	668,578	2,933,370	2,264,792
14	-	-	668,578	-	668,578	2,933,370	2,264,792
15	-	-	668,578	-	668,578	2,933,370	2,264,792
16	-	-	668,578	-	668,578	2,933,370	2,264,792
17	-	-	668,578	-	668,578	2,933,370	2,264,792
18	-	-	668,578	-	668,578	2,933,370	2,264,792
19	-	-	668,578	-	668,578	2,933,370	2,264,792
20	-	-	668,578	-	668,578	2,933,370	2,264,792
21	-	-	668,578	-	668,578	2,933,370	2,264,792
22	-	-	668,578	-	668,578	2,933,370	2,264,792
23	-	-	668,578	-	668,578	2,933,370	2,264,792
24	-	-	668,578	-	668,578	2,933,370	2,264,792
25	-	-	668,578	-	668,578	2,933,370	2,264,792
					-	EIRR	7.52%

Table 17: Estimated ERRs and Results of Sensitivity Tests

	Base Case	Scenario A	Scenario B	Scenario C
EIRR	14.67%	11.27%	10.49%	7.52%

where:
Scenario A = 20% increase in rehabilitation costs
Scenario B = 20% decrease in product prices or revenues
Scenario C = Simultaneous 20% increase in rehabilitation costs and 20% decrease in revenues

Table 18: Switching Value 1: Maximum Increase in Rehabilitation Cost Before EIRR Falls Below 12%

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,667,411	-	105,068	4,772,479	-	(4,772,479)
2	14,450.00	5,158,714	132,164	106,152	5,397,030	767,095	(4,629,935)
3	15,990.00	6,074,337	278,240	108,860	6,461,437	1,615,942	(4,845,495)
4	18,767.00	4,890,733	450,243	109,401	5,450,377	2,612,209	(2,838,168)
5	15,117.00	1,572,361	588,730	112,109	2,273,200	3,414,712	1,141,512
6	4,747.00	-	632,363	-	632,363	3,666,712	3,034,349
7	-	-	632,363	-	632,363	3,666,712	3,034,349
8	-	-	632,363	-	632,363	3,666,712	3,034,349
9	-	-	632,363	-	632,363	3,666,712	3,034,349
10	-	-	632,363	-	632,363	3,666,712	3,034,349
11	-	-	632,363	-	632,363	3,666,712	3,034,349
12	-	-	632,363	-	632,363	3,666,712	3,034,349
13	-	-	632,363	-	632,363	3,666,712	3,034,349
14	-	-	632,363	-	632,363	3,666,712	3,034,349
15	-	-	632,363	-	632,363	3,666,712	3,034,349
16	-	-	632,363	-	632,363	3,666,712	3,034,349
17	-	-	632,363	-	632,363	3,666,712	3,034,349
18	-	-	632,363	-	632,363	3,666,712	3,034,349
19	-	-	632,363	-	632,363	3,666,712	3,034,349
20	-	-	632,363	-	632,363	3,666,712	3,034,349
21	-	-	632,363	-	632,363	3,666,712	3,034,349
22	-	-	632,363	-	632,363	3,666,712	3,034,349
23	-	-	632,363	-	632,363	3,666,712	3,034,349
24	-	-	632,363	-	632,363	3,666,712	3,034,349
25	-	-	632,363	-	632,363	3,666,712	3,034,349
-	-	-	-	-	-	EIRR	12.27%

Answer: Maximum allowable increase in rehabilitation costs is about 13.5%.

Table 19: Switching Value: Maximum Decrease in Revenues Before EIRR Falls 12%

Year	Area, ha	Investment Cost	O&M	Recurrent Cost	Incremental Costs	Incremental Benefits	Net Economic Benefits
1	-	4,112,256	-	105,068	4,217,324	-	(4,217,324)
2	14,450.00	4,545,122	116,444	106,152	4,767,718	667,372	(4,100,346)
3	15,990.00	5,351,839	245,145	108,860	5,705,844	1,405,869	(4,299,975)
4	18,767.00	4,309,016	396,690	109,401	4,815,106	2,272,622	(2,542,484)
5	15,117.00	1,385,340	518,705	112,109	2,016,154	2,970,800	954,646
6	4,747.00	-	557,148	-	557,148	3,190,040	2,632,891
7	-	-	557,148	-	557,148	3,190,040	2,632,891
8	-	-	557,148	-	557,148	3,190,040	2,632,891
9	-	-	557,148	-	557,148	3,190,040	2,632,891
10	-	-	557,148	-	557,148	3,190,040	2,632,891
11	-	-	557,148	-	557,148	3,190,040	2,632,891
12	-	-	557,148	-	557,148	3,190,040	2,632,891
13	-	-	557,148	-	557,148	3,190,040	2,632,891
14	-	-	557,148	-	557,148	3,190,040	2,632,891
15	-	-	557,148	-	557,148	3,190,040	2,632,891
16	-	-	557,148	-	557,148	3,190,040	2,632,891
17	-	-	557,148	-	557,148	3,190,040	2,632,891
18	-	-	557,148	-	557,148	3,190,040	2,632,891
19	-	-	557,148	-	557,148	3,190,040	2,632,891
20	-	-	557,148	-	557,148	3,190,040	2,632,891
21	-	-	557,148	-	557,148	3,190,040	2,632,891
22	-	-	557,148	-	557,148	3,190,040	2,632,891
23	-	-	557,148	-	557,148	3,190,040	2,632,891
24	-	-	557,148	-	557,148	3,190,040	2,632,891
25	-	-	557,148	-	557,148	3,190,040	2,632,891
						EIRR	**11.99%**

Answer: Maximum allowable decrease in revenues is about 13%.

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September 12-13, 2007

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TRAINING WORKSHOP STRATEGIC INTEGRATED PROJECT ANALYSIS: ROAD MAP OF KEY CONCEPTS AND APPLICATIONS FOR AZERBAIJAN'S AGRICULTURE SECTOR

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The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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This publication was produced for review by the United States Agency for International Development. It was prepared by Development Alternatives, Inc.

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INTEGRATED PROJECT ANALYSIS WORKSHOP
Agenda

Time	Course/ Activity	Responsible
September 12		
9:00 – 9:30	Registration of participants	Training Secretariat
9:30 – 10:00	Introduction: • Introduction of training course and team • Course objectives	DAI Training Coordinator
10:00 – 10:45	Part 1: Workshop objectives and approaches: • Workshop relevance • Importance of Investment • Preparation of Sector Strategic Development Plans • Group discussions	DAI Consultant PIP-Project
10:45 – 11:00	Coffee Break	
11:00 – 13:00	Part 2: Main concepts and princples for Integrated Project Analysis: • Public and Private Sectors Role / Partnership Framework • Project Analysis Framework • Project Cycle "Road Map" • Group discussions	DAI Consultant PIP-Project
13:00 – 14:00	Lunch	
September 13		
9:00 - 9:15	Regirstration of participants	
9:15 – 10:45	Part 3: Application of Integrated Project Analysis: Azerbaijan Agriculture Development and Credit Project II • Project Results Framework	DAI Consultant PIP-Project Representative of MOA
10:45 -11:00	Coffee Break	
11:00 -13:00	Part 4: Framework for Suggested Improved Project Procedures and Guidelines in MOA	DAI Consultant PIP-Project
13:00 – 14:00	Lunch	

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Workshop on Integrated Project Analysis, Sept. 12-13, 2007

List of Participants

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TRAINING WORKSHOP "STRATEGIC INTEGRATED INVESTMENT ANALYSIS: ROAD MAP OF KEY CONCEPTS AND APPLICATIONS FOR AZERBAIJAN'S AGRICULTURE SECTOR"

(Sept 12 & 13, 2007)

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LEARNING OBJECTIVES & APPROACH

(1) Enhanced understanding of the basic concepts and applications of "strategic integrated investment analysis", with application to Azerbaijan's agricultural sector

(2) Increased skills, motivation and commitment by MOA and other GoAZ officials to apply basic principles of integrated investment analysis during the upcoming 2009 budget/Public Investment Program cycle

The workshop approach will combine presentations of key concepts, project examples and group exercises, and participatory discussion (with emphasis to applying the most relevant key concepts to MOA's mission and investment programs/activities).

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I) CONTEXT: A) WORKSHOP RELEVANCE?

1) Implementation of Azerbaijan's on-going and updated national development strategies requires sound and sustainable investment programs (especially as oil revenues are expected to decrease after 2010)
2) MOED has issued an improved Call Circular for improving the proposals for the Public Investment Program (in 2007).
3) There are on-going efforts by MOA to complete an improved Agricultural Sector Development Strategy, and then to secure the President's approval for its effective implementation
4) MOA has recently launched a process to prepare an operational plan to support the effective implementation of its new Agricultural Sector Development Strategy
5) There are various constraints (inside and outside MOA) to carrying out effectively the above strategic activities, in order to generate sustainable impacts of the PIP. Limited capacities (by MOA and other Ministries) to formulate and implement sound integrated investment analysis is one of the key constraints to a good PIP.

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Importance of Investment

- **Total resources** = Gross Domestic Product + net imports (- net exports).
- Total resources are used for either **consumption or investment**.
- The people's **welfare and satisfaction with the Government** depends on the level of total consumption and its distribution by **income classes, social groups, and regions**.
- **Investment** is very important because it increases:
  - **Production capacity** and thus **future consumption**; and
  - **Aggregate demand** and thus **inflationary pressure** that may reduce real consumption
- Both the **quality (relevance, efficiency and effectiveness) and distribution of investment** is critical to the level, quality and distribution of future consumption, and hence the people's future welfare.

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Importance of Public Investment

- Government can decide how much of the total resources it will use and how to divide it between **public consumption** and **public investment**. This strongly affects the people's welfare.

- Public investment also influences the level, composition and productivity of future private investment, which in turn affects future consumption (welfare) of the people.

Conclusions

- Public investment policy is a **very powerful instrument** in managing social and economic development of the economy; and,
- The formulation and implementation of a sound public investment policy and programs is a skill-intensive task, and, hence, requires enhanced capacities in GoAz. (central and line ministries).

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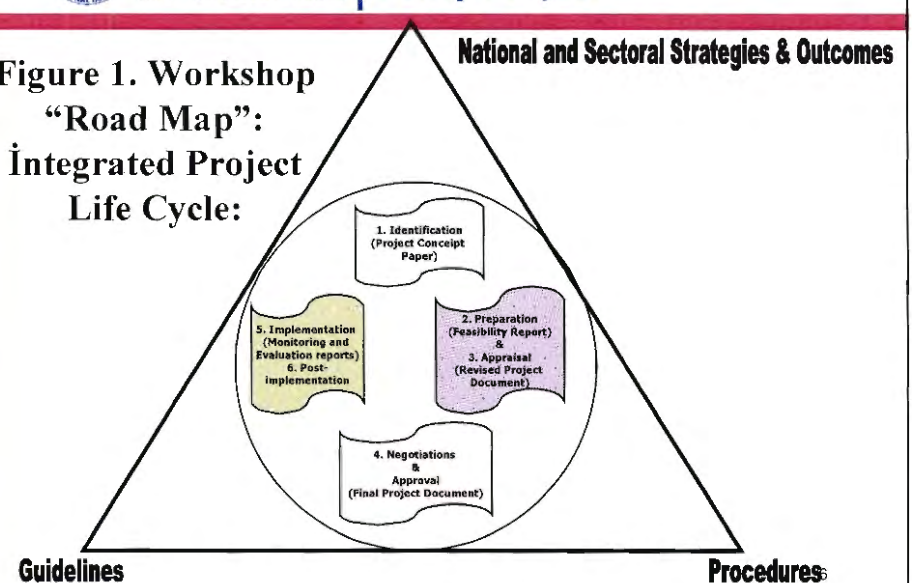
Figure 1. Workshop "Road Map": İntegrated Project Life Cycle:



B) Public Sector Investment Programming: Current Situation: Need for Improvements

- Total Public Sector investment is determined in a highly fragmented manner.
- There is no any comprehensive public investment policy formulation.
- The PIP is only a collection of some public investment projects selected on ad-hoc basis.
- The present fragmented state of public investment policy in Azerbaijan deprives the government of the opportunity to accelerate and sustain the social and economic development of the country.

Development Planning (existing procedures)

Macroeconomic Planning:

Macroeconomic goals and sector funds allocations are not explicitly considered

Sector Planning:

- Sector programs are developed from project submissions and circulated for endorsement by the Cabinet of Ministers, MOED, MOF and other designated GOAZ agencies
- No direct links between sector planning and budgetary process

Project Planning:

- Sector-specific, no macroeconomic impact consideration
- Absence of integrated project analysis (including benefit-cost analysis) for establishing resource allocation priorities

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Sector Strategic Development Planning
Current Situation

- SSDPs are **not linked** to a national development strategy framework
- No unified **Guidelines** exist for preparation of SSDPs
- SSDPs are not subject to **strategic guidelines** or reconciliation through an integrated coordination process
- SSDPs limited consideration of **inter-sector linkages**
- The **SSDP – budget relationship** is weak
- Limited **monitoring and evaluation**
- Limited **participation of stakeholders**, particularly independent experts and NGOs

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C) Framework for Improving the Public Investment Policy and Programming (under discussion by MOED)

- Clearly identify the long- and medium-term national and sectoral development objectives and strategies;
- Adopt **SMART** (**S**pecific, **M**easurable, **A**chievable, **R**esult-oriented, and **T**ime-bound) medium-term targets and the necessary policies and programs/projects to attain them;
- Assure the **consistency** of all major targets, strategies and policies with national and sectoral development objectives as well as with each other;
- Based on all these, issue early in each fiscal year the relevant coordinated Call Circulars to all government organizations to guide and instruct them for their planning and budgeting submissions to MOF and MOED;
- Make the **PIP a policy instrument** for a comprehensive review, evaluation and guidance of the government's public investment policy;
- Instruct all line ministries to prepare a **SSDP** incorporating all sub-sector programs and serving as the basis for each ministry's unified response to the call circular(s)
- This practice should be coordinated by MOED and MOF (a draft proposed PIP Regulation is currently under preparation and discussion)

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Coordinated Development Planning (proposed guidelines)

Macro Planning:

- National and sector development goals and strategies formulated
- Sector resource limitations established

Sector Planning:

- Sector strategic plans for 10 years developed per National goals
- Medium-term programs (4 years) aligned with MTEF
- Coordination, information-sharing and updating

Programs/ Project Planning:

- Investment proposals consistent with macro-planning and sector development priorities
- Investment programs bear clearly defined goals and objectives
- Projects are prepared and appraised per the methodologies of integrated project analysis and prioritized

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Conditions for Successful Sector Development Planning

- SSDPs formulate sector objectives within the established National Development Framework. Medium-term development plans need to be dynamic and maneuverable documents to correspond with the GOAZ mid-term development priorities.
- PIP should stem from SSDP's with clear delineation of capital and recurrent expenditure
- Prioritize and sequence all programs/projects
- Establish performance indicators and benchmarks for Monitoring and Evaluation
- Delineate inter-sector linkages
- Consult all stakeholders and counterparts (at all stages of the program cycle)

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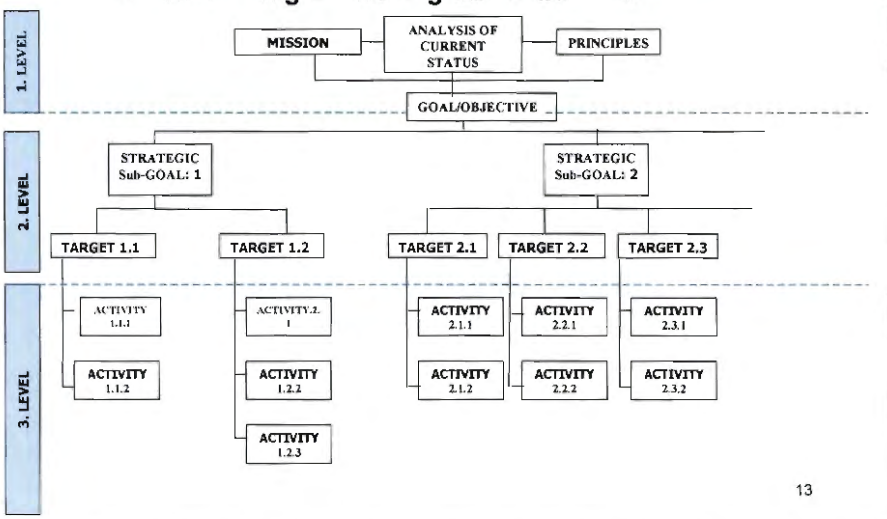
Sector Strategic Planning Structure: Overview



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Sector Development Plans – Recommendations (in process)

- Implement a more synchronized and integrated approach between planning, programming and budgeting through a new PIP Regulation
- Have sector "Goals – Strategic Targets/Outcomes – Programs/ Projects & Activities", linked to each other within a result-oriented process that will gradually lead to performance program budgeting
- Adopt a definite integrated coordination role to reconcile top-down discipline to bottom-up programming in PIPP
- Accelerate a program of Monitoring and Evaluation through a well-defined results measurement framework (for agric. sector and each major program/project).

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D) Moving from the macro-sectoral-budgetary frameworks to the project perspective in MOA/Azerbaijan

1. Importance of achieving sound and coherent macro, sectoral and budgetary frameworks

2. Project proposals should be derived from, and placed in the context of, broader developmental objectives

3. Formulation of project proposals should understand and address relevant macro and agric. sector constraints

4. The macro and sectoral context may be more important than the project itself...hence, there is a need to achieve a balance

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(D) Moving from the macro-sectoral-budgetary frameworks to the project perspective in the Azerbaijan Republic

5. The macroeconomic and sector context often result in

   differences between financial and economic prices due to various underlying factors, such as "market distortions". This context can be assessed by analyzing several factors

6. Where any of the above factors are considered to be "important", then the efficiency of project investments is likely to be reduced

7. Substantial differences between financial and economic prices can be an indicator for requiring possible policy changes

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Small Group Discussion: Guide Questions

- What are main 3 constraints in developing and implementing sound public investment policies for the agricultural sector (and especially for MOA and the subsectors being handled by your Division)
- What are 2 key actions which can be taken by central Government agencies (CoM, MOF and MOED) and 2 key actions by MOA to improve the macro-sectoral-investment program linkages?

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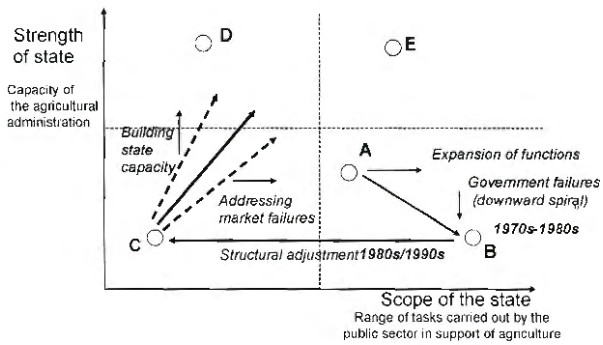
II) KEY CONCEPTS AND PRINCIPLES FOR INTEGRATED PROJECT ANALYSIS

A) Definition of "Project" and Linkage to Programs:

- Governments use public sector investments (for programs and projects) as one of their key policy and strategy instruments.
- In public investment budgeting and resource allocation decisions, a "project" is the smallest, separable investment unit which can be planned, financed and implemented independently. A project is MORE than construction of buildings
- A project may be defined as "any activity that involves the use of scarce public resources during a specific time period for the purpose of generating socio-economic return in the form of goods and services." Govt. expenditures should focus on "public goods".

B) Public & Private Sector Roles: Framework of Historical Trends in Role of State in Agric. Devt.



B) Framework for Public & Private Sector Roles and Partnerships

1. Policies/guidelines for guiding Government role in the provision of public sector investments to address "market failures" (& "partnerships" with private sector). There are 7 factors which justify public sector projects:

(a) Natural monopolies: refers to industries in which the conditions of demand and supply are such that the production by a single firm minimizes costs

(b) Externalities: Refers to situtions when activities/projects generate benefits and costs that are not reflected in the firm's benefits and costs

(c) Public Goods: Refers to goods (and services) for which charging is either impossible or undesireable

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B) Framework for Public & Private Sector Roles/Partnerships.

(d) Asymmetric Information and Incomplete Markets: Refers to situations when information is imperfect and markets are incomplete, the actions of individuals have externality-like effects that result in suboptimal production of goods and services.

(e) Poverty reduction: Public intervention to reduce poverty may be justified on ethical and political grounds

(f) Merit Goods: Refers to goods for which Government intervention is needed because individuals may not alway s act in their own best interests

(g) Distribution of costs and benefits: Refers to assessing and revising the distribution of costs and benefits among target groups in society.

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B) Framework for Public & Private Sector Roles/Partnerships.

2. Government role is to **facilitate**, rather than play a command and control role in economic development. There are 4 major roles/activities in which Government plays a facilitative role.....Providing:

(a) An appropriate institutional framework

(b) A economic environment to stimulate private investment

(c) The development and maintenance of human capital and technological capability.

(d) The provision and maintenance of economic and social infrastructure

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B) Government functions in support of the agriculture-for-development agenda: Framework of Global Good Practices

State Function	Examples
1) Functions related to public policy making	
a) Policy formulation	a) Designing agricultural devt. Strategies
b) Policy coordination and facilitation	b) Coordination across ministries & actors
c) Participation in international agreements	c) WTO
2) Areas of public policy interventions	
a) Protecting property rights	a) Land rights, intellectual property rights, farmers rights
b) Providing "core" public goods	b) Agricultural research and extension (with some partnerships), roads
c) Regulation/addressing externalities	c) Regulations for biosafety, food safety, pesticides, veterinary drugs, seed certification; communicables diseases
d) Overcoming economies of scale and market coordination problems	d) Irrigation Infrastructure; measures to stimulate market devt. (one off grants/cost sharing, based on clear criteria)
e) Reducing vulnerability and improving equity (and poverty reduction of low income rural households)	e) Safety nets; targeted investments and subsidies; redistributive land reform

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B) Framework for Public & Private Sector Roles/Partnerships.

3. Some conclusions/discussion: The optimal provision of goods and intervention by public sector is largely a matter of judgment, and depends on several factors specific to the country and sector. The agricultural sector has uniquie features and challenges in defining an evolving role of the state, while promoting an expanded role of the private sector.

   The concepts and tools presented in this workshop can help assess whether public intervention is justified, and provides a framework to determining the "best" design.

Group Discussion: What are some specific examples of the correct role of the state in Azerbaijan? What are some examples of the incorrect role of the state in Azerbaijan agriculture?

II) KEY PRINCIPLES FOR INTEGRATED PROJECT ANALYSIS:

C) Framework for Project Analysis

(1) Purpose of economic analysis in the context of the public sector "project lifecycle" is to provide GoAZ (and donors/financiers) a sound conceptual framework and improved basis for establishing investment priorities and facilitating transparent investment decisions for funding public investments with the highest economic returns

(2) Every public sector investment project is different, and therefore needs to be assessed on its own merits. "Process type" of similar "sub-projects" (e.g., construction of simiilar buildings) can follow a simplified approach.

C) Framework for Project Analysis

(3) Main Components of Project Analysis...and Key Steps

(a) Establish the scope of Financial and Economic Analysis (will depend on components & sources of costs and benefits)

(b) Work out the "Project Framework"
- a project is seen as being made up of a series of means-ends relationships, beginning with "input-output linkages", then "output-purpose linkages" and, finally, "purpose-goal linkages".
- Develop a "results framework" (see example of ADCP II)

(c) Conduct Financial Analysis: ensure adequate financial incentives to ensure participation

C) Framework for Project Analysis (cont.)

(d) Conduct Economic Analysis (adjust the financial prices, to correct for market distortions)

(e) Establish Evaluation Criteria for Key Decisions (details are provided below)

(f) Establish the Stakeholder and Distributional Impacts

(g) Fiscal Impact: Refers to impact of project on Government's budget, including its revenues (direct, indirect), expenditures (capital/replacement, and recurrent), and disaggregating it for central and local governments.

(h) Establish the Timing, Scale, and Length of "Project Life"

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C) Framework for Project Analysis

(i) Carry out the Institutional Assessment and Work out the Implementation Arrangements

(j) Enumerate the nonquantifiable effects of the project that may influence project design and the investment decision.

(k) Conduct the Risk/Sensitivity Analysis and Management (e.g., changes in crop yields, farmer adoption rates, prices)

(l) Formulate the Project Monitoring and Evaluation Design and Arrangements (use Results Framework)

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D) Project Life-Cycle: A "Road Map".

Economic analysis of public investment projects is applied throughout 6 distinct phases of the project "life-cycle" in order to:

- enhance Government's investment allocation decisions and actions
- promote sustainable results in direct support of the Government's macroeconomic and sectoral objectives.

Below are the 6 stages and the relevant corresponding outputs/documents:

(1) Identification: Project Concept Paper

(2) Preparation: Feasibility Report

(3) Appraisal: Updated Project Report (for formal review by GoAZ and donor(s))

(4) Negotiation & Approval: Updated and Negotiated/Agreed/Approved document

(5) Implementation: Implementation Manual/Plan and Periodic Progress Reports

(6) Post-implementation: Implementation Completion Report and Sustainability Plan

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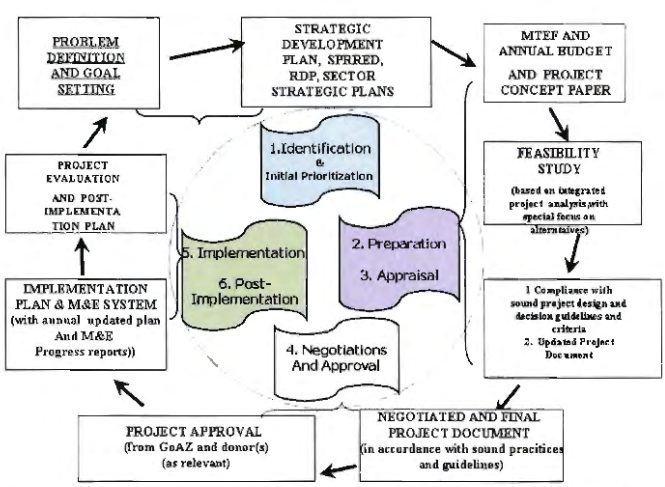
Figure 1: PROJECT LIFECYCLE: STAGES AND KEY OUTPUTS



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D) Project Life-Cycle: A "Road Map" (cont).

The 6 distinct phases of the project life-Cycle is summarized below.

(1) Identification/Project Concept: Government, in collaboration with the relevant donor(s) (if applicable):

- To identify and formulate the project concept, and ensure consistency and coherence with macro and sectoral strategies and priorities
- To outline the proposed objectives, alternative designs and approaches, likely benefits and risks, and next steps
- To prepare an initial Project Logical Framework, as a conceptual skeleton of the envisioned project
- To carryout a "pre-feasibility" study (to apply key concepts and tools), and should involve consultations with key "stakeholder" groups
- To prepare a Program/Project Concept Paper (up to 4 pages), for a "decision" meeting by GoAZ (coordinated by MoED, various options). See example.

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Project Concept Paper:Framework Table of Contents (4 pages)

A) Country and Sector Context
- Key Development/sector problems to be addressed by the project
- Performance of related programs/projects

B) Proposed Project Objectives (including key stakeholders as priority targets, and outcome indicators)

C) Preliminary Components/Key Features

D) Approximate costs and financing framework

E) Expected benefits

F) Institutional Arrangements and Roles

G) Potential Risks and Mitigation Measures

H) Key Design Issues and Options

I) Proposed schedule and arrangements for preparation

D) Project Life-Cycle: A "Road Map"

(2) Preparation: Building on the "approved" project concept, Government, in collaboration with the relevant donor agency (and often contracting a consultant and/or research institute):

- takes the lead in preparing (usually supervising) the project proposal, and supporting economic analysis (including technical, institutional, financial, economic, social, environmental, risk and sustainability analysis)
- The main output is a full "feasibility report"
- A major focus is to ascertain the best alternative method/design for achieving the stated objectives, and to solidify a "**Project Results Framework**" as a skeleton to guide the basic design and economic analysis of the project
- Costs and benefits are identified and quantified, and are valued at financial and economic prices.
- The economic validity of the chosen alternative is established.

Preparation/Feasibility Report: Framework T of C

A) Country and Sector Context
- Key Development/sector problems to be addressed by the project
- Performance of related programs/projects

B) Proposed Project Objectives (including key stakeholders as priority targets, and outcome indicators)
C) Proposed Components/Key Features
D) Approximate costs and financing framework
E) Expected benefits
F) Institutional Assessment, Arrangements, & Roles
G) Assessments: Financial/Fiscal, Economic, Social, Environmental
H) Potential Risks and Mitigation Measures
I) Framework Operational/Implementation Plan
J) Proposed schedule and arrangements for preparation
K) Annexes: Detailed supporting information/analysis

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D) Project Life-Cycle: A "Road Map".

(3) Appraisal – Government (coordinated by MoED), together with the relevant donor(s), if donor funded, in close collaboration with the Government central ministries (MOF and Cabinet of Ministers) and with the proponent line ministry, focus efforts on:

- validating and improving the feasibility report, with a focus on the project design and assessments
- making the needed revisions/improvements to project design and implementation arrangements (essentially, the "project").
- If donor funded, most often, the donor agency drives this appraisal process, without involving the central and line (or sponsoring) Ministries in a "meaningful" manner.

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D) Project Life-Cycle: A "Road Map".

(4) Negotiations and Approval –

- Based on the outcome of the appraisal process, it is assumed that there will be an agreed project document on the project's key design features (between proponent Ministry and with central Government Ministries, and with the relevant donor(s) agency(ies), if it involves external funding. This provides the basis for negotiations and eventual agreement.
- Negotiations Within GoAZ (between proponent line ministry and Central Ministries (especially Cabinet of Ministers, MoED and MOF), on key project design features, especially project scope, financing arrangements and budgetary provisions, and key strategy and policy actions (it is highly desireable to have explicit procedures and guidelines)
- Negotiations Between GoAZ and relevant donor(s), If the project is proposed to be financed by a donor, on key project design features
- The negotiated documents provide the basis for the donor agency(ies) seeking its formal approval from its Board of Directors (or equivalent decision-making body), and for GoAZ securing formal approval, in line with existing or improved approval.

D) Project Life-Cycle: A "Road Map".

(5) Implementation -

- Government line agency carries out the agreed/approved project, in line with the relevant implementation plan
- Monitoring and evaluation system play an important role to help ensure timely and effective implementation
- Often, technical assistance is provided to the client country to support effective and timely implementation, and especially to help build implementation

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D) Project Life-Cycle: A "Road Map".

(6) Post-Implementation: Sustaining the Benefits.....

- Following the project's implementation/disbursement period, the Government should take the lead to ensure key project activities are "integrated" with on-going programs and sustained.
- It is desirable for the implementing agency, with its line Ministry, to prepare and agree on a post-implementation plan (at least 1 year prior to "closing")
- Often, a donor agency, arranges a "completion" report (for example, World Bank requires an "Implementation Completion Report"), to assess the project's progress toward achieving the project objectives, outcomes, outcomes, implementation achievements and constraints, and lessons learned.
- It is important that the relevant Government line Ministry be directly involved in leading the post-implementation activities.

E) Requirements of Economic Viability

3. Economic viability depends on the sustainability of project effects. This requires...

- Ensure incremental net benefits endure
- "Internalize" environmental effects
- Ensure financial returns provide "adequate" incentives to participants
- Ensure "adequate" distribution of benefits
- Ensure adequate risk management

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F) Project Decisions and Evaluation Criteria

(i) **There are three types of project decisions for which criteria are needed (applies to both financial and economic analysis):**

- choice of the least-cost option for achieving the same benefits (e.g., standard classroom);
- choice of the best among project alternatives, and
- testing the economic viability of the best option.

(ii) There are 4 main steps in analyzing the economic viability of a project:

- Identification of the project benefits and cost
- Quantification of the costs and benefits
- Valuation of the costs and benefits (financial & economic prices)
- Comparison of the benefits with the costs

(iii) **The key concepts and criteria for assessing financial and economic viability and choosing among project options include:**

- Choosing Between Alternatives When Benefits are Not Valued (e.g., social projects);
- Choosing Between Alternatives When Benefits are Valued: there are several criteria to be used);

F) Project Decisions and Evaluation Criteria

(i) Benefit-Cost Ratio: The benefit-cost ratio compares the present value of the cost streams with the present value of the benefit streams, each discounted at the same rate.

(ii) Net Present Value: The net present value (NPV) also compares the present value of the cost streams with the present value of the benefit streams.

- *Net Present Value (NPV) is calculated through the formula*
- $\sum_{t=0}^{T} (Bt - Ct) \frac{1}{(1+i)t}$
- where B and C represent the Project's benefits and costs, respectively, in a given year (t) during a period of a number of years (T=0.....n), equal to the project's construction time plus its economic life. "i" represents the discount rate used in transforming the future benefits and costs to their present equivalent values.

F) Project Decisions and Evaluation Criteria

(iii) Internal Rate of Return: The EIRR is calculated using the net benefit stream obtained by subtracting year by year all costs from all benefits. The EIRR is the rate of discount for which the present value of the net benefit stream becomes zero.

It is calculated through the formula:

$$\sum_{t=0}^{T} \frac{Bt - Ct}{(1+r)t} = \sum_{t=0}^{T} \frac{Kt}{(1+r)t}$$

where Kt represents investments in year and r the particular rate of discount (IRR) under which the equation holds true. Cost effectiveness aims at identifying the least cost alternative among a number of projects that will all produce the same outcome.

F) Project Decisions and Evaluation Criteria

(iv) In addition, there are other criteria (less rigorous) which can be used to assess project viability, at least at an initial phase, to be complemented by more rigorous methods (e.g., payback period).

(v) The ranking of project alternatives according to the above 3 main criteria may differ. The overriding purpose of the economic analysis of projects is to increase the net output measured at economic prices in the national economy.

G) Project Monitoring and Post Evaluation

This subject is most often neglected in Integrated Project Analysis & Implementation Phase

(1) The framework for the M&E system, and relevant indicators should be summarized in the Project's "Results Framework" (see example).

(2) Once the project is approved, monitoring the progress of the project is important for managers in terms of time, cost, and performance.

(3) Post evaluation focuses on the "outcomes" and "impacts" of the project to determine if the economic and social goals of the project are achieved and what are the impacts on the stakeholders of the project after its implementation

(4) There is a broader and more strategic approach to traditional M&E, through a results-based monitoring and evaluation system

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5) Monitoring and Evaluation: Key Concepts and Tools for Getting Strategic Results

a) Importance of M&E: Program and project monitoring and evaluation increasingly is recognized by development practitioners and managers as an important component of a project's success throughout the project cycle, but in practice, M&E seems to be on the weakest links in the design and implementation of projects.

b) Recent Trends in M&E approaches: More recently, there is a shift from micro-level project M&E to "program results-based M&E systems" (embedded in national and/or sectoral systems). Azerbaijan offers the opportunity of using sector development strategies for this shift:

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5) Monitoring and Evaluation: Key Concepts and Tools for Getting Strategic Results

c) M&E: Why should we bother? There are 3 main reasons……

- To improve resource allocation—Problems are large, public resources are limited. We want existing resources to reach as many poor and vulnerable people as possible
- To enhance effectiveness—We should only pay for programs that "work"
- To strengthen accountability—programs/projects (and their managers) should be accountable for performance (and also provides a positive incentive to work towards good performance.

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5) Monitoring and Evaluation: Key Concepts and Tools for Getting Strategic Results

d) What is Monitoring? …It:

a) Provides information to project managers on whether resources are used as agreed (inputs) and whether the program is progressing as expected (outputs)
b) Usually involves both quantitative and qualitative data, focusing on final and intermediate outcomes
c) Is a continuous process throughout a project

Monitoring involves:

- An iterative process—you do it all the time, with routine periods of assessment and feedback
- Regularly producing the quantitative performance data, looking at it, determining with staff and others affected what it is telling you
- Regularly using qualitative information to
  - Help you reach the correct understanding of the quantitative data
  - Identify relevant problems, and figure out what to do to correct them

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5) Monitoring and Evaluation: Key Concepts and Tools for Getting Strategic Results

e) What is evaluation?....It:

- Determines whether the project is achieving the intended "results"
- Measures the impact on participants (impacts) as well as aspects of project implementation and delivery
- Usually involves both quantitative and qualitative data
- Is not done on every project—a project must be "worth evaluating"

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5) Monitoring and Evaluation: Key Concepts and Tools for Getting Strategic Results

f) Evaluation includes 4 types of activities:

- Evaluability assessments: Is the program ready for evaluation?
- Implementation analysis: is the project fully operational?

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5) Monitoring and Evaluation: Key Concepts and Tools for Getting Strategic Results

- Process assessments and performance monitoring: how is the project running on a daily basis?
  - Once the program is fully operational
    - Do performance monitoring to manage the programs and activities to increase success
    - Do process assessments as part of an impact evaluation to be sure you can include measures of program inputs in your impact analysis
- Impact evaluations—did the intervention achieve the desired goals?

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5) Monitoring and Evaluation: Key Concepts and Tools for Getting Strategic Results

g) What is the link between the Project Cycle (log frame) and key M&E Concepts?

Monitoring:

Inputs → Resources provided for program activity

Outputs → Goods and services generated by the program

Evaluation:

Outcomes → Access, satisfaction, and use of program goods and services

Impacts → Changes in behavior and living Standards

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Group Discussion/Exercise

1) Discuss the merits of the suggestion to require a project concept paper for projects whose costs exceed 1.0 M AzM)

2) Review the format of the Feasibility Report, and discuss possible improvements to the report format, and how MOA should improved quality Feasibility Reports.

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III) APPLICATION OF INTEGRATED INVESTMENT ANALYSIS: EXAMPLE OF THE AZ. SECOND AGRICULTURAL DEVELOPMENT AND CREDIT PROJECT (see copies)

A) Summary of Project Background
- Key sector issues being addressed
- Rationale for Project

B) Project Objectives and Results Framework

C) Group Exercises/Discussion on Key Topics: (handouts & group task assignments will be distributed), including the following:
- Results framework
- Institutional Assessment
- Financial and Economic Analysis (including sensitivity tests)
- Environmental Assessment
- M&E System Design Features
- Risk Assessment

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IV) Framework for Suggested Improved Project Procedures and Guidelines in MOA

A) Summary of current guidelines and procedures

B) Framework of Suggested Guidelines and procedures (consistent with the forthcoming PIP regulations). Focus on:
- Concept Paper
- Feasibility Report
- Appraisal Process and Report

C) Group Exercise and Discussion: Work in pairs to discuss your proposal to apply some of the key concepts of integrated project analysis to 1 new project (for the 2009 PIP cycle)

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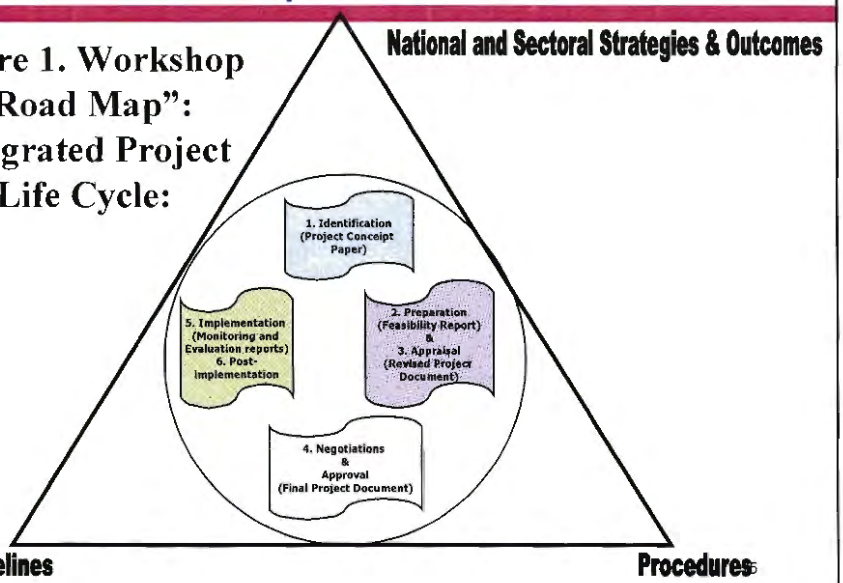
Figure 1. Workshop "Road Map": İntegrated Project Life Cycle:



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THANK YOU VERY MUCH FOR YOUR PARTICIPATION AND VALUABLE CONTRIBUTIONS!!!

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Report No: 36335-AZ

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 20.1 MILLION
(US$29.2 MILLION EQUIVALENT)

TO THE

REPUBLIC OF AZERBAIJAN

FOR A

SECOND AGRICULTURAL DEVELOPMENT AND CREDIT PROJECT
IN SUPPORT OF THE SECOND PHASE AGRICULTURAL DEVLEOPMENT
AND CREDIT PROGRAM

June 5, 2006

Environmental and Socially Sustainable Development Sector Unit
South Caucasus Country Unit
Europe and Central Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2006)

Currency Unit	=	New Azerbaijani Manat
AZN 0.91	=	US$ 1
US$ 1.4614	=	SDR 1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ACUA	Azerbaijan Credit Union Association
ADCP	Agricultural Development and Credit Project
AI	Artificial Insemination
APL	Adaptable Program Loan
AVA	Azerbaijani Veterinary Association
AZM	Azerbaijani Manat
AZN	New Azerbaijani Manat
BG	Borrowers Group
CAS	Country Assistance Strategy
CGB	Competitive Grant Board
CGS	Competitive Grant Scheme
CIA	Credit Implementing Agency
CPAR	Country Procurement Assessment Review
CPS	Country Partnership Strategy
CU	Credit Union
GOA	Government of Azerbaijan
IAC	Information and Advisory Center
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
IDA	International Development Association
IPM	Integrated Pest Management
ISDS	Integrated Safeguard Datasheet
LFI	Local Financial Intermediaries
MOA	Ministry of Agriculture
NCB	National Competitive Bidding
NFSE	National Fund for Entrepreneurship Support
NRICH	National Research Institute for Crop Husbandry and Crop Diversification
OM	Operation Manual
PA	Private Advisor
PAD	Project Appraisal Document
PDO	Project Development Objective
PFI	Participating Financial Institutions
PIC	Project Information Center
PID	Project Information Document
PMU	Project Management Unit
RAC	Regional Advisory Center
RBE	Rural Business Entities
RIHSC	Research Institute for Horticulture and Sub-tropical Crops
RVP	Regional Vice President
SA	Social Assessment
SAAC	State Agency for Agricultural Credits
SOE	Statements of Expenditure
SPPRED	State Program on Poverty Reduction and Economic Development
SPRD	State Program for Regional Development
SVS	State Veterinary Service
VFU	Veterinary Field Unit

Vice President:	Shigeo Katsu
Country Manager/Director:	Donna Dowsett-Coirolo
Sector Manager:	Juergen Voegele
Task Team Leader:	Frauke Jungbluth

AZERBAIJAN
Second Agricultural Development and Credit Project

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MAP IBRD# 33365

AZERBAIJAN

SECOND AGRICULTURAL DEVELOPMENT AND CREDIT PROJECT

PROJECT APPRAISAL DOCUMENT

EUROPE AND CENTRAL ASIA

ECSSD

Date: June 1, 2006 Country Director: D-M Dowsett-Coirolo Sector Manager/Director: Juergen Voegele	Team Leader: Frauke Jungbluth Sectors: Micro- and SME finance (55%); Agricultural extension and research (25%); Agricultural marketing and trade (20%) Themes: Rural policies and institutions (P); Small and medium enterprise support (P); Rural services and infrastructure (P)
Project ID: P090887	Environmental screening category: Financial Intermediary Assessment
Lending Instrument: Adaptable Program Loan	

Project Financing Data

[ ] Loan [X] Credit [ ] Grant [ ] Guarantee [ ] Other:

For Loans/Credits/Others:
Total Bank financing (US$m.): 29.2 (Credit A –US$ 8.7 equivalent and Credit B US$ 20.5 equivalent)
Proposed terms: IDA terms of 35 years maturity including 10 years grace and service charge of 0.75% (Credit A and B); Credit A also subject to hard-terms interest of 3% per annum 35 years maturity, including 10 years grace.

Financing Plan (US$m)

Source	Local	Foreign	Total
BORROWER/RECIPIENT	12.41	0.19	12.60
INTERNATIONAL DEVELOPMENT ASSOCIATION	25.84	3.39	29.23
JAPAN: MINISTRY OF FINANCE - PHRD GRANTS	0.25	1.36	1.61
BORROWING COUNTRY'S FIN. INTERMEDIARY/IES	4.32	0.38	4.70
LOCAL SOURCES OF BORROWING COUNTRY	9.56	0.00	9.56
Total:	52.37	5.33	57.70

Borrower:
Ministry of Agriculture
Republic of Azerbaijan
Responsible Agency:
PMU under State Agency of Agricultural Credits, Ministry of Agriculture
Republic of Azerbaijan

Estimated disbursements (Bank FY/US$m)									
FY	7	8	9	10	11				
Annual	10.45	17.98	14.42	10.87	3.98				
Cumulative	10.45	28.43	42.85	53.72	57.7				

Project implementation period: Start January 15, 2007 End: November 30, 2010
Expected effectiveness date: January 15, 2007
Expected closing date: May 31, 2011

Does the project depart from the CAS in content or other significant respects? ***Ref. PAD A.3***	[ ]Yes [X] No
Does the project require any exceptions from Bank policies? ***Ref. PAD D.7*** Have these been approved by Bank management? Is approval for any policy exception sought from the Board?	 [ ]Yes [X] No [ ]Yes [ ] No [ ]Yes [ ] No
Does the project include any critical risks rated "substantial" or "high"? ***Ref. PAD C.5***	[X]Yes [ ] No
Does the project meet the Regional criteria for readiness for implementation? ***Ref. PAD D.7***	[X]Yes [ ] No

Project development objective ***Ref. PAD B.2, Technical Annex 3***

The main objective is to further increase rural productivity and incomes by enhancing the access of farmers and small and medium rural enterprises to rural business and agricultural support services including financial, advisory and veterinary services and by stimulating market-oriented investments in rural areas.

Project description ***Ref. PAD B.3.a, Technical Annex 4***

Component I - Agricultural Business Services (US$ 42.1 million, of which US$ 0.996 million are financed from Japanese Grant)

Component Objective: The objective is to support rural businesses to improve the linkages between their production and markets. The component aims to develop efficient linkages and contractual relationships between producers and processors, and to facilitate investments in market opportunities through enhanced access to financial services and targeted business support.

Component Activities: The component would support the further development of farmers, small rural businesses and agro-processors by: (a) increasing the availability of small rural financial services by strengthening and broadening the credit union outreach; (b) expanding rural financial services such as credit for working capital requirements, long-term credit for investment purposes, and leasing programs for processing and agricultural equipment; (c) enhancing the efficiency of rural markets by introducing innovative mechanisms that encourage sustainable linkages between developing small-scale rural businesses and agro-processors with farmers, associations and groups; and (d) strengthening rural business, market information and promotion services offered through the rural advisory system.

Component II – Agricultural Support Services (US$ 14.33 million, of which US$ 0.585 million are financed from Japanese Grant)

Component Objective: The objective of the component is to enable farmers to improve their productivity and quality of production by expanding the outreach of the advisory system, strengthening the provision of private veterinary services, and improving access to adapted technologies.

Component Activities: Three main sub-components have been identified: (a) supporting the further development of an effective information and advisory system that can provide farmers and other rural entrepreneurs with appropriate knowledge and skills to improve their productivity, quality of production, management and marketing; (b) assisting livestock owners to improve animal production through enhanced access to quality-assured veterinary and husbandry services throughout the country, and by strengthening the disease surveillance and preparedness functions of the State Veterinary Service (SVS); and (c) improving the capacity of selected research institutions to provide adapted technologies and critical information to advisory staff and producers.

Component III - Project Management (US$ 1.3 million, of which US$ 0.028 million are financed from Japanese Grant)

The project will support the establishment and operation of a Project Management Unit (PMU) under the Ministry of Agriculture and will build on the structures established under ADCP-I.

Which safeguard policies are triggered, if any? ***Ref. PAD D.6, Technical Annex 10***

Involuntary Resettlement (World Bank OP 4.12): ADCP-II will not trigger OP/BP 4.12 as the project will exclude on-lending for land acquisition, relocation of population, or restrictions on access to resources.

International Waterways (World Bank OP 7.50): The project will not trigger OP 7.50 as it will not increase water abstraction from, nor waste water discharges to, transboundary waterways as defined by OP 7.50.

Pest Management (World Bank OP 4.09): The project will trigger OP 4.09 in a limited fashion as on-lending may be used by small and mid-sized sub-borrowers to finance agricultural inputs. On-lending for pesticides is subject to screening against an authorized list of pest control products approved for financing, as described in the project EMP.

Environmental Assessment (World Bank OP 4.01): The project triggers environmental operational policy 4.01 and has been assigned environmental category FI, as it involves on-lending through rural financial institutions, credit lines for agro-processing and providing grants for sub-projects under Component I - Agricultural Business Services. The anticipated sub-projects are expected to fall within World Bank categories B or C (moderate to minimal impact). The other project components have no negative environmental impact.

Significant, non-standard conditions, if any, for:
Ref. PAD C.7

Conditions of Disbursement:

- Prior to disbursement for component 1.A of the Project unless: (i) the Agency Agreement, satisfactory to the Association, has been duly executed between the Ministry of Finance and Economy of the Recipient, the State Agency for Agricultural Credit of the Recipient, the CIA and the ACUA; (ii) the CIA Business Plan, satisfactory to the Association, has been submitted to the Association; and (iii) the CIA Operational Manual and Credit Union Operational Manual have been approved.

- Prior to disbursement for component I.B of the Project unless the Rural Investment Guidelines satisfactory to the Association and the Recipient's Ministry of Finance have been prepared and submitted.

- Prior to disbursement for component I.C the Competitive Grant Committee has to be established according to terms and conditions set forth in the Operational Manual.

Board presentation:
Not applicable.

Conditions of Credit Effectiveness:

An Operational Manual, satisfactory to the Association, has been revised.

Covenants applicable to project implementation:

- By April 14. 2007 the Borrower, through the PMU has appointed an independent auditor under terms of reference acceptable to the Association.

- The Borrower shall (a) by December 1, 2006 open a Project Account in a bank on terms and conditions acceptable to the Association with an initial deposit in local currency equivalent to US$ 100,000; and (b) maintain a balance in the Project Account, until completion of the Project, with the amount adequate for the subsequent three months of Project implementation.

- The Borrower, through the PMU, shall maintain a financial management system, including records and accounts, and prepare financial statements in accordance with consistently applied accounting standards acceptable to the Association, adequate to reflect the operations, resources and expenditures related to the Project.

- The Borrower, through the PMU, shall have the project financial statements audited by independent auditors, and in accordance with consistently applied auditing standards acceptable to the association, and have the audit report furnished to the Association no later than six months after end of each year audited.

- The Borrower, through the PMU, shall prepare and furnish to the Association Interim Financial Reports, in form and substance satisfactory to the Association, no later than 45 days after end of each

quarter. The first Interim Financial Report shall cover the period from Effectiveness, including incurrence of the first expenditure under the Project through the end of such first calendar quarter.[1]

- The Borrower shall ensure that all measures necessary for the carrying out of the EMP shall be taken in a timely manner.

[1] Consistently applied standards include international accounting standards and financial statements and international standards on auditing.

A. STRATEGIC CONTEXT AND RATIONALE

1. Country and sector issues

Over the past several years, Azerbaijan has maintained a satisfactory track record of stabilization with fiscal restraint, prudent monetary policy, and modest external indebtedness. Oil and gas income is steadily increasing with significant prospects for GDP growth. The Government of Azerbaijan (GOA) recognizes that diversified development of the non-oil sector is a key for generating jobs and equity and reducing poverty. The country's development strategy and priorities are defined in its PRSP, known as the State Program on Poverty Reduction and Economic Development (SPPRED).

One of the greatest challenges of economic management in the country is to diversify the economy in the face of growing dependence on the oil sector. Therefore, development of rural areas is a priority for Azerbaijan with the agricultural sector being a key to this development. The agricultural sector is the most important source of employment in Azerbaijan. Agriculture accounted for approximately 12.3% percent of GDP in 2004 - the largest economic sector in Azerbaijan after oil. Agriculture's share of employment has increased to 40 percent in 2004 from approximately 31 percent in 1990 (the oil sector accounts for only one percent of employment). In addition, agro-industry (including textiles) represents over 50 percent of total manufacturing employment.

The agricultural sector is also very important for food security and reduction of rural poverty. Agriculture is an important source of income and stability for rural areas where the benefits of Azerbaijan's petroleum wealth are much less evident. In Azerbaijan, the reliance on agriculture as a major source of income is associated with a lower risk of poverty. Further, the share of expenditures on food by Azerbaijani households is high (75%), and even higher for the rural poor (81%). Of this, rural households produced half of the food they consumed, and for the poorest households the reliance on own consumption was even higher (65%) and grew over time.

With the privatization of farms and other reforms, small-scale agriculture has been able to lead a recovery in the agricultural sector. By 2003, overall agricultural output had increased by a total of 53% over 1995 levels (although still only 79% of the 1990 levels). The contribution of small farmers to this revival is evidenced by the substantial increase in production from household and private farms. The livestock privatization process has been smooth, and helped Azerbaijan avoid the dramatic decline in herd sizes seen in some of the Central Asian FSU countries. The total livestock numbers were twice as high in 2002 as they were in 1990 and are now mainly in the hands of smallholders.

2. Rationale for Bank Involvement

Against this background, in 1998, the Government requested a multi-phased Adaptable Program Lending support over ten years with total indicative financing of US$ 100 million to address the medium term development goals of the rural sector. The objective of the Agricultural Development and Credit Program was to return Azerbaijan's farming areas to former levels of productivity under a new system characterized by private family and group farms operating in private markets. The program aimed to support the nationwide development of: (i) an accessible, secure and unified system for registering real estate rights; (ii) a rural financial services network consisting of local financial intermediaries (LFIs) such as credit cooperatives and rural branches of commercial banks; (iii) mixed public and private advisory services for rural enterprises; and (iv) improved Government capacity to formulate appropriate policy responses to the impact of the anticipated build-up in oil revenues on the competitiveness of the rural economy.

This program was designed in three phases. ADCP-I, implemented over the last six years, focused on (i) registering private rights to rural farm land by testing mechanisms for a unified real estate registration system; (ii) piloting development of self-sustainable rural financial systems based on the creation of LFIs; (iii) establishing rural information and advisory services and strengthening applied research and veterinary services; and (iv) strengthening Government capacity to analyze and respond to the impact of the oil sector on rural Azerbaijan. Building on lessons learned in the first phase, the two subsequent phases (ADCP-II and ADCP-III) were to intensify and expand the program agenda by: (i) rolling out a model for a unified land cadastre system nationwide; (ii) expanding the coverage of rural advisory activities nationwide; (iii) implementing overall reforms of agricultural research in the country; (iv) increasing the number of local financial institutions in rural areas; and (v) engaging commercial banks as financial intermediaries in rural areas.

Building on ADCP-I's achievements, further development challenges for the agricultural sector remain: (i) the financial system still remains underdeveloped; (ii) improved agricultural marketing and information systems remain essential; (iii) market channels are still fragmented; (iv) substantial market information is lacking; (v) knowledge and skills of farmers and farmers' organizations need to continuously adjust to changed market and business requirements; and (vi) agricultural processing remains underdeveloped in a difficult business environment.

In a letter of December 24, 2004, the GOA reaffirmed its rural development priorities while seeking the Bank's assistance to enlarge access to financial services through strengthening the rural financial cooperatives system, to improve private agricultural marketing, and to further strengthen the agricultural knowledge and information systems. The Government has also recently drafted a strategy document entitled 'Policies and Strategies for Azerbaijan Agriculture' which emphasizes strengthening the private sector in agriculture, with the public sector playing regulatory, legal and catalytic roles.

3. Higher level objectives to which the project contributes

The project contributes to higher-level objectives given in the major strategic documents, including the CAS and the new Country Partnership Strategy (CPS), the PRSP document and the State Program for Regional Development.

Country Assistance Strategy (CAS): The CAS is consistent with the GOA's overall strategy and specifically recognizes the need for supporting and stimulating agriculture and rural development and for improved access to financial services, particularly in rural areas. The CAS also stresses the need to assist the government and key stakeholders in promoting non-oil trade and investments, with a special focus on small and medium-scale farmers and rural entrepreneurs. The proposed project would contribute to this objective by stimulating market-oriented investments in rural areas. It would support the efforts to generate productive employment by strengthening the development of the agricultural sector which is the most important non-oil sector. The CAS also includes a Second Phase ADCP for FY06 as a vehicle to help address Azerbaijan's key rural development issues and as a follow-up to ADCP-I. A new Country Partnership Strategy (CPS) for 2006-2009 is under preparation. One of the pillars of the new CPS will be sustainable and balanced growth of the non-oil economy through, *inter alia*, development of rural infrastructure and services and expanded access to financial services. The proposed project is consistent with the new CPS.

PRSP: The country's development strategy and priorities are defined the State Program on Poverty Reduction and Economic Development (SPPRED) which places the development of rural areas as a priority for Azerbaijan with the agricultural sector being key to this development and essential to economic diversification.

State Program for Regional Development (SPRD): The SPRD identifies the main orientation for the development of the rural economy, including agriculture as the most important source of employment in rural areas. The program was initiated in 2005. The project's activities are aligned with and fully support the Government's regional development agenda.

B. PROJECT DESCRIPTION

1. Lending instrument

Project support is being provided through a three-phased, 10 year Adaptable Program Lending, of which this is the second phase. The Project would be funded through standard IDA and hard IDA terms. Hard IDA terms will be used for the credit line in component 1.B.

2. Program objective and phases

The objective of the Agricultural Development and Credit Program was to return Azerbaijan's farming areas to former levels of productivity under a new system characterized by private family and group farms operating in private markets. The program was intended to support the nationwide development of: (i) an accessible, secure and unified system for registering all rights in real estate; (ii) a network for financial services in rural areas consisting of local financial intermediaries (LFIs), such as credit cooperatives and rural branches of commercial banks, to provide private farms and other rural enterprises with market-based financial services; (iii) mixed public and private advisory and veterinary services for rural enterprises; and (iv) Government capacity to formulate appropriate policy responses to the impact of the anticipated build-up in oil revenues on the competitiveness of the rural economy. This program was planned to be executed in three phases.

ADCP-I (US$ 30 million) became effective on December 21, 1999, and is scheduled to close on June 30, 2006. In ADCP-I: (i) some 30 Credit Unions (CUs) and 1,300 joint liability borrowers groups (BGs) were created with credit provided to around 31,000 farmers and rural businesses; (ii) rural information and advisory services were established in five regions reaching more than 270,000 rural households; (iii) a competitive grant program for agricultural research was implemented, with 52 grants and more than 11,000 participants in field demonstration activities; (iv) private veterinary activities were supported with 25 veterinary clinics established in five regions serving over 16,000 clients; (iv) a pilot unified real estate registration system was successfully piloted; and (v) an agricultural strategy unit was established. For the second phase, a unified real estate registration system was to be rolled out in five regional centers; information and advisory services were to be expanded to five additional regions; and commercial banks were to establish rural branches. For the third phase, a unified real estate system was to be expanded nationwide; and LFIs and commercial bank branches to be further expanded. At the end of the program, farming was expected to become viable with productivity of private farms increased to 1991 levels; primary producers of crop and livestock products were expected to diversify their activities and improve product quality to tap marketing opportunities; and viable and effective institutions were expected to be in place providing key services to underpin sustained agricultural development.

Based on the activities proposed for ADCP-II that are described in the following sections, the third phase would continue the process of expanding financial services for small and medium rural enterprises through CUs and commercial banks; widen the market development activities; complete the process of establishing a public/private nationwide information and advisory system with funding derived from provision of private services and from the MOA for public good activities; and further develop private veterinary practices while continue to streamline and modernize the State Veterinary Service to support public health functions. As discussed below, property registration and cadastre activities would be handled in a separate project.

Phase I triggers, relating to satisfactory performance of the pilot activities for real estate registration, rural finance such as establishment of credit unions and borrower groups as well as satisfactory delivery of lending services, and the set-up of a public/private information and advisory services, were met. Some triggers were adjusted at mid term to take into account some delays that were experienced during implementation. See Annex 15 for details.

3. Project development objective and key indicators

The main objective is to further increase rural productivity and incomes by enhancing the access of farmers and small and medium rural enterprises to rural business and agricultural support services including financial, advisory and veterinary services and by stimulating market-oriented investments in rural areas. The project will build on ADCP-I's achievements by: (i) strengthening the credit union system established under ADCP-I and stimulating commercial financial services suited for agricultural businesses; (ii) expanding the outreach of the rural advisory services established under ADCP-I; (iii) developing private veterinary services and modernizing and streamlining the State Veterinary Services; (iv) improving access to adapted technologies by one or possibly two selected agricultural research institutes; and (v) assisting producers and processors in marketing and improved product quality. The regional expansion of the immovable property registration pilot of ADCP-I would be handled under a separate proposed Real Estate and Cadastre Project. This project is being prepared in parallel with a target board date in FY07. The main project beneficiaries comprise individual farmers, farmer groups, rural micro-entrepreneurs, and the small to medium agro-processing sector.

Key Indicators:

Outcome Indicators:

The project will result in: (i) targeted farmers and rural entrepreneurs with better linkages to markets and an increased income from rural activities; (ii) targeted farmers and rural entrepreneurs with improved access to financial, technical and veterinary services; and (iii) improved control of epizootic diseases. The outcome indicators are:

- Incomes of participating farmers and rural entrepreneurs increased by 20% through improved access to services and through vertical integration;
- Production marketed for cash increased by 20% as a result of increased quantity and improved quality of production.

Output Indicators:

Output indicators are linked to the intermediate results described in the results framework and comprise:

- At least 10,000 persons accessing credit through CUs;
- Rural outstanding loan portfolio increased to 2.5% of agricultural GDP;
- Around 90 rural business innovations conducted satisfactorily, with improved practices demonstrated to at least 150 rural business entities;
- Additional 20% of persons benefited from advisory services in the existing regions targeted during ADCP-I, while around 50% of farm households reached in the new regions through training courses, demonstrations and individual advisory services;
- RACs recovered at least 20% of their operational costs in the existing regions and up to 10 % in the new regions;
- Around 75% of VFUs recovered their operational costs, and livestock owners satisfied with services received;

- A cost-effective national brucellosis control program implemented, shown by a 25% reduction in human cases;
- Around 35% of farmers satisfied with quality of locally adapted seeds and seedling varieties.

4. Project components

The project consists of two main components addressing critical support needs at the rural business and agro-processor level, and at the farm level.

Component 1 - Agricultural Business Services (US$ 42.1 million, of which US$ 0.996 million are financed from Japanese Grant)

Component Objective: The objective is to support rural businesses to improve the linkages between their production and markets. The component aims to develop efficient linkages and contractual relationships between producers and processors, and to facilitate investments in market opportunities through enhanced access to financial services and targeted business support.

Issues Addressed: In spite of positive growth in other sectors of the economy, agricultural production continues to under-perform, and food markets remain dominated by expensive imports. A large share of the agricultural production of Azerbaijan is not well-linked to more sophisticated market and processing chains. However, an increasing number of small and medium rural businesses are seeking to fill these gaps and to link processing, service provision and production activities, but their development is hampered by an insufficient range of financial and business management services and poor access to technological improvements. Demand for rural/agricultural financial services is high and is not currently being sufficiently met. Improved financial instruments are required that are better tailored to the rural clientele that is largely characterized by small farms, lack of suitable collateral, inadequate financial skills, and production and commodity market risks that are specific to agriculture.

Component Activities: The component would support the further development of farmers, small rural businesses and agro-processors by: (a) increasing the availability of small rural financial services by strengthening and broadening the credit union outreach; (b) expanding rural financial services such as credit for working capital requirements, long-term credit for investment purposes, and leasing programs for processing and agricultural equipment; (c) enhancing the efficiency of rural markets by introducing innovative mechanisms that encourage sustainable linkages between developing small-scale rural businesses and agro-processors with farmers, associations and groups; and (d) strengthening rural business, market information and promotion services offered through the rural advisory system.

Financial Services for Small Agribusiness/Credit Unions. Under ADCP-I, some 30 credit unions were created. Credit was also provided through some 1,300 borrowers' groups. Together, the credit unions and borrowers' groups served about 31,000 clients, principally farmers and small rural enterprises. Loans were primarily short term, predominantly for crop production and livestock-rearing, with a good recovery rate of over 97%. The demand for these credit services remains very high as well as a growing demand for longer maturity investment loans. Furthermore, the credit unions would like to introduce deposit-taking, starting with the stronger credit unions, which would require changes in the current legislation.

Building on the gains made under ADCP-I, ADCP-II will support the consolidation of this network through a judicious combination of more lending resources and a measured capacity building program. In particular, ADCP-II will support: (i) expanding the outreach of this network to more communities through additional lending resources; (ii) introducing product innovations, including offering longer maturities in response to client demands; (iii) strengthening liquidity and risk management skills; (iv) introducing improvements in the network's operating systems and procedures to cope with the expected growth in the

scale of its operations (larger number of clients, more diverse product menu, and greater geographical coverage); (v) strengthening of the Azerbaijan Credit Union Association and the Credit Implementing Agency (a non-bank financial institution owned by the ACUA) to refine its corporate strategy in order to ensure its long term sustainability.

Financial Services for Medium Agribusinesses/Banks and Leasing Companies. The agro-business marketing and processing sectors remain severely constrained by the lack of capital in general, but investment capital in particular. Whereas the banking sector has in recent years registered significant gains in the availability of short-term lending resources, long term resources remain limited. As the pace in agricultural production begins to grow, marketing and processing constraints will increasingly act as chokepoints in the value chain. Consequently, banks and leasing companies still need long-term funds in order to respond to investment demands from their clients. Similarly, bank and leasing company skills in appraising long term agriculture-related investment loans are also limited. Therefore, the project will provide a credit line for use by banks and leasing companies to extend investment loans/leases to agribusinesses. It will also support capacity building of participating financial institutions to improve their skills in appraising rural and agriculture-related medium and long term investments, in risk assessment and management, and in product innovation (e.g. structured finance).

Development of Efficient Rural Market Links: During ADCP-I, a Competitive Grants Scheme (CGS) was introduced that provided grants primarily for agricultural research topics. The CGS in ADCP-II will build on this experience, but will shift its focus to introducing, testing and transferring new and improved technologies emphasizing improved market accessibility, storage and small-scale processing. Grants will be available for a wide range of possible technologies in quality production, processing and marketing, business management and best business practices. Market studies to enhance the ability of rural business entities (RBEs) to identify and access markets, both within Azerbaijan and abroad, will also be eligible when associated with concrete technical actions to be taken for one or more products. Grants will be provided in response to proposals from various RBEs, and thus would be market-led and demand-driven, and would focus on real constraints of beneficiaries and possible long-term solutions in a flexible manner. The CGS will cover the whole country during the project and will not define a list of priority topics from the outset. However, as the CGS progresses, it may become necessary to prioritize or limit different types of activities depending on experience during implementation. Key elements in the selection process will include: (i) replicability of the proposed technologies and an appropriate plan for transfer of knowledge to other RBEs; (ii) suitability and affordability of proposed technologies in terms of increasing rural productivity, value-added, and market accessibility of agricultural products; and (iii) demonstrated improved linkages between producers and next level of the supply chain. The CGS will award around 90 small grants averaging about US$ 20,000 each, ranging from a minimum of US$ 10,000 to a maximum of US$ 30,000. The beneficiaries will be required to contribute an additional 30 percent of the total cost of proposed activities.

Rural Business Advisory and Market Services: To support market development in rural areas, the project will enhance the rural business advisory and market services offered through the existing structure supported during ADCP-I, which consists of the Information and Advisory Center (IAC) in Baku and the Regional Advisory Centers (RACs). The current market survey and information system will be broadened to ensure that the frequency, format, and content meet the needs of producers and clients. Market facilitation services will be enhanced by introduction of web-based information and telephone call-in systems. Training and information programs on food safety and quality will be expanded, as well as in topics related to business development such as marketing, legal and tax issues, use of credit, and book-keeping. Advisory and market promotion services will be made available to the increasing number of associations, cooperatives and rural entrepreneurs on a contract basis, including business management and market analyses as required by the client. Technical assistance and training will be provided to help

the IAC and RACs define and enhance their market support program; to improve the content, quality and availability of market information; and to develop the market promotion activities.

Component 2 – Agricultural Support Services (US$ 14.33 million, of which US$ 0.585 million are financed from Japanese Grant)

Component Objective: The objective of the component is to enable farmers to improve their productivity and quality of production by expanding the outreach of the advisory system, strengthening the provision of private veterinary services, and improving access to adapted technologies.

Issues Addressed: There continues to be substantial need to improve both the productivity and efficiency of rural producers and the quality of production in order to better serve emerging markets. ADCP-II will build and expand on the activities established under ADCP-I in the areas of advisory, veterinary and agricultural research services.

Component Activities: Three main sub-components have been identified: (a) supporting the further development of an effective information and advisory system that can provide farmers and other rural entrepreneurs with appropriate knowledge and skills to improve their productivity, quality of production, management and marketing; (b) assisting livestock owners to improve animal production through enhanced access to quality-assured veterinary and husbandry services throughout the country, and by strengthening the disease surveillance and preparedness functions of the State Veterinary Service (SVS); and (c) improving the capacity of one or possibly two selected research institutes to provide adapted technologies and critical information to advisory staff and producers.

Information and Advisory Services: The program in ADCP-II will build on the strong foundations established during ADCP-I to further develop the advisory services on a wider geographical scale using a similar approach and structure. The component will include: (a) establishment of a national network of regional advisory services, and (b) support for the Information and Advisory Center.

National Network of Advisory Services: Support will be provided for contracting local NGOs to establish RACs and to implement advisory services in 10 regions covering the whole of Azerbaijan. Village-based PAs will be contracted through the RACs to implement extension activities at the village level, including conducting training course for farmer groups, provision of individual and group advisory services, and carrying out demonstration activities on their own or in other progressive farmers' fields. The contracts will also cover costs of RAC establishment and management; maintenance of farm data bases; and collection of regional market prices. To improve outreach and access to information, additional small permanent advisory points with computer access will be located in ten districts in the existing five regions.

The expansion of the geographical coverage to incorporate the remaining regions was envisaged in the PAD description of the APL when ADCP-I was prepared and is in line with the GOA's 2004-2008 regional development strategy and the subsequent detailed regional development action plan. Additional five regions based around new RACs in Shamakhi, Barda, Salyan, Goychay and Guba/Khachmaz will be incorporated, encompassing almost 380,000 farmers in 28 districts. The program will continue to work in the five existing regions building on the existing RACs. In these regions, around 55% of the 483,000 farmers received one or more advisory services during ADCP-I, giving substantial scope for widening the coverage in these regions as well as continuing to provide valuable services to existing clients. All new and existing RACs will be based on the private sector model tested during ADCP-I. This choice is based on the overall government strategy for the sector as envisaged by the Ministry of Agriculture and detailed

in the Agricultural Development Strategy[2]. This strategy foresees that private entities would be responsible for activities such as provision of extension services, and could be contracted by government to carry out specific information and training activities that have a public good nature.

Support for the Information and Advisory Centre (IAC): The IAC will have responsibility for overall program supervision, contracting providers for training programs and multi-media information campaigns, technical support to the RACs, and monitoring and evaluation activities. The advisory system will be mainstreamed into government structures to ensure long-term support and institutional sustainability. The IAC is currently part of the MOA's State Agency for Agricultural Credits (SAAC)[3], and would eventually become a permanent body in the MOA to continue the management of the advisory program after the end of the project, while the RACs would continue as private sector advisory service providers deriving part of their income from paid services and part from contracts with the MOA to implement specific public good advisory programs. MOA budgetary support will be increased in a stepwise manner for IAC operations and for contracting service providers throughout the project.

Veterinary Services: The program will build on ADCP-I by: (a) enhancing access to quality-assured veterinary services throughout the country by expanding and strengthening the private Veterinary Field Unit (VFU) system and supporting the privatization of the State Veterinary Service (SVS) field services staff; and (b) strengthening the disease surveillance and preparedness functions of the SVS through training key staff in understanding the epidemiological basis for disease control; rehabilitating the disease surveillance, diagnosis and reporting capacities of the SVS; and implementing an agreed control program against at least two priority diseases.

Private Veterinary Practices: In ADCP-I, the delivery of curative animal health services for livestock owners was facilitated by establishing private Veterinary Field Units (VFUs) consisting of three veterinarians in 25 districts in five regions. It was demonstrated that farmers were willing to pay for these services, with increasing client numbers and livestock owners generally satisfied with the services available. By the end of ADCP-I, with the exception of Nakhchivan, the VFUs were averaging around 100 clients and almost US$ 300 in revenue per month. However, self-sustainability was not fully attempted and a minimum incentive payment was retained to the end of the project. In ADCP-II, to increase the likelihood of sustainability, additional income-earning opportunities such as artificial insemination and veterinary pharmacies will be introduced, and training will be provided to improve marketing and business management skills. A system to contract private veterinarians to carry out public good veterinary tasks will also be introduced. The geographical coverage will be extended to include 32 more districts to cover the whole country, although smaller VFUs may be established in some districts. All new VFUs will be based on a private sector approach from the outset, with separate bank accounts and their own premises. The private veterinarians would be selected based on applications submitted by SVS veterinarians wishing to establish private practices. A start-up package of equipment and remedies will be provided, based on locally available sources, including small diagnostic equipment and AI equipment. Initial training would be provided in establishing a private veterinary practice. Incentives will be provided initially, but will be reduced to zero by the end of the project as income-generating opportunities come on line. Continuing support will also be provided for the further development of the professional private Azeri Veterinary Association (AVA).

State Veterinary Service: The MOA State Veterinary Service, which has the overall responsibility for animal health, will be strengthened with a goal of establishing a well-functioning and credible disease surveillance and reporting system in Azerbaijan. The component will address the medium to long term needs of the SVS to adequately monitor, control and respond to epizootic diseases. Diagnostic

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2 Policies and Strategies for Azerbaijan Agriculture, draft prepared with support provided during ADCP-I

3 The SAAC oversees the implementation activities of agriculture and rural projects of IFAD and the Bank.

laboratories at the republican level and in six regions will be rehabilitated; key staff would be trained in modern epidemiology and risk-based disease management concepts; and technical assistance and other support would be provided to develop an overall reform strategy for the SVS, to devise and enable the Epidemiology Unit to implement control programs against one or two priority diseases, and to introduce a contract system for private veterinarians. It is anticipated that brucellosis will be one of the priority diseases, but provisions against new risks such as Avian Influenza and bovine spongiform encephalopathy (BSE) or food contamination risks (*Salmonella, E. coli*) will also be considered.

Improved Access to Adapted Technologies: The program will build on the experience gained during ADCP-I from its research-focused Competitive Grants Scheme. In ADCP-II, support would be provided to one or possibly two selected research institutes to improve their capacity to develop and demonstrate adapted technologies, focusing on variety improvement and crop management. The research strategy[4] prepared during ADCP-I included the Research Institute for Crop Husbandry and Crop Diversification, and the Research Institute for Horticulture and Sub-Tropical Crops among the institutes prioritized by the government. Support will be based on achievement of the reform proposals prepared for each institute, including the proposed organizational changes, increased stakeholder participation, a shift in research orientation and priorities, implementation of staff training programs, modernization of facilities and laboratories, and government budgetary commitments. The research institutes will link closely with the information and advisory services for field demonstrations and workshops, publication of good practices, and information and training activities.

Component 3 - Project Management (US$ 1.28 million, of which US$ 0.028 million are financed from Japanese Grant)

The project will support the establishment and operation of a Project Management Unit (PMU) under the Ministry of Agriculture and will build on the structures established under ADCP-I. The implementation arrangements are described in section C.2 and are detailed in Annex 6.

5. Lessons learned and reflected in the project design

Key lessons from ongoing Bank and donor activities in Azerbaijan and the region are that an increased availability of finance and provision of marketing assistance have strongly facilitated the development of rural businesses. These activities underline that prospects of employment generation and cash income in rural areas are closely linked to the agricultural sector in the short and medium-term. However, based on experience in ADCP-I, there is a need for wider outreach and enhanced capacity of PFIs and a greater range of financial products available for rural businesses. In addition, the weak linkages between producers and processors remain an impediment to the growth of the agricultural sector. The promotion of horticultural and fruit crops, for example, will require strong growth in the processing industry over the medium term, with both demand and supply constraints remaining for farmers and processors at the current processing scale. The introduction of information and advisory services under ADCP-I proved to have a substantial impact on farm productivity and incomes, but there is a need to develop a national network that is more operationally sustainable with an increased focus on business development, marketing, accounting and legal issues that affect production of both farmers and other rural enterprises. The veterinary services component of ADCP-I showed that farmers are willing to pay for private services, but self-sufficiency was not achieved partly because the veterinary practices were not fully separated from the State Veterinary Service (SVS) and partly because of competition from the large number of publicly-funded veterinarians. Accordingly, the program in ADCP-II would support the privatization of veterinary services by widening their income-generating opportunities, and by supporting the SVS to focus on its

[4] Strategy for Modernization of Agricultural Research System, prepared with support from ADCP-I in 2003.

core surveillance and preparedness functions against diseases that pose serious public health or economic risks. The interest in the on-farm technology assessments supported through the Competitive Grants Scheme under ADCP-I was high, but the functional linkages between the research system and the advisory system and on to producers and rural entrepreneurs need to be better defined and improved. The CGS helped the research institutions to increase their focus on development of adapted technologies of relevance to small farmers, but it became evident that deeper structural reform and streamlining of the research system is required.

6. Alternatives considered and reasons for rejection

Cadastre and Real Estate Registration: Under ADCP-I, a single agency system was successfully piloted and the scale up of the system was originally planned to be part of ADCP II. However, the Bank and the Government agreed that a standalone and larger project would be more appropriate to roll-out the pilot cadastre and registration system nationwide. This project is currently under preparation

Rural Finance: Originally, it was considered that ADCP-II should simply build and expand on the first phase rural finance activities. However, there were concerns that simply expanding the credit union network would not be sufficient to support and kick-start rural business development on a larger scale. It was therefore considered appropriate to broaden the approach taken during ADCP-II and to include a credit line for rural businesses.

Competitive Grants Scheme: The CGS in ADCP-I focused on grants for on-farm agricultural research provided primarily to research institutes. Continuation of this program was considered in parallel with support for modernization of selected research institutes. However, given the increased market emphasis requested by Government, it was decided to shift to a market-led and demand-driven program which would respond to requests from various rural business enterprises (RBEs) and thus focus on constraints identified by beneficiaries.

Advisory Services: Alternate approaches were considered for the provision of advisory services, including the MOA regional administrative offices or the MOA Agro-Science Centers, which are regional centers intended to adapt and demonstrate technologies developed by the research institutes. However, these are primarily public sector institutions without the capacity to provide the wide range of information needed in topics such as credit, marketing, legal issues, accounting and other non-technological fields. Instead, ADCP-II would continue to support the government strategy of developing private sector rural advisory services, which was successfully started during ADCP-I. Nevertheless, the linkages between the RACs and the Agro-Science Centers and the research system as a whole would be enhanced, and the liaison with the regional offices would be maintained to ensure that advisory programs respond to MOA priorities.

Veterinary Services: It was initially considered only to expand the privatized Veterinary Field Unit (VFU) system to the remaining regions along with some improvements to enhance their income-generating capacity. However, this approach mainly addresses the discretionary animal health problems of livestock owners and does not solve issues with respect to animal diseases that pose a public health or epidemic risk. Accordingly, it was considered appropriate to include activities designed to strengthen the disease surveillance and preparedness functions of the State Veterinary Service as well as to link the private veterinarians with the SVS through a contract system.

Agricultural Research: The initial emphasis was on the modernization of selected research institutes concerned with Crop Production, Livestock and Nutrition and Horticulture through support of a reform process, including staff development, renovation and equipping. However, based on an analysis of

constraints at the farm level, the focus was shifted to supporting the development of adapted, high-yielding, disease-resistant varieties of major crops, and improving linkages with the information and advisory services for field demonstrations and workshops, publication of good practices, and information and training activities.

C. IMPLEMENTATION

1. Partnership arrangements

Not applicable

2. Institutional and implementation arrangements

The project will be managed by the State Agency for Agricultural Credits (SAAC), which is the Ministry of Agriculture's Agency established to oversee international agricultural development projects, primarily through a small Project Management Unit (PMU) constituted within it. The PMU functions will include financial management, procurement, project monitoring and evaluation, and translation of project documents. The PMU Director will have responsibility for the day-to-day operations and management of ADCP-II, assisted by financial management, procurement and M&E specialists and support staff. There will also be a number of units under the management of the PMU that would be responsible for the coordination of the various components and that would take a pro-active role in ensuring timely start-up, implementation and completion of project activities. These units include the Competitive Grants Secretariat, the Information and Advisory Centre, the Veterinary team, and specialists responsible for marketing, research liaison and credit liaison. These units would also report technically to their respective units within the MOA, including the State Veterinary Service and the Agro-Science Centre responsible for agricultural research. The Information and Advisory Center, which is presently within the SAAC, is expected to become a permanent unit within the MOA after the completion of the project. For the rural finance activities, the SAAC would disburse funds to the existing Credit Implementing Agency (CIA) for on-lending to the Credit Unions or Borrowers Groups (BGs), while for the commercial bank credit line, SAAC will lend to commercial banks under subsidiary loan agreements in accordance with Investment Guidelines. Annex 6 details the implementation arrangements for each component.

3. Monitoring and evaluation of outcomes/results

The project M&E system will be based on: (a) continuous monitoring of project components; (b) a baseline survey; and (c) interim and final surveys. The design will include reporting formats for each component and sub-component, based on the annual performance targets and monitoring indicators shown in Annex 3 and on the detailed concept notes for each component and sub-component. The mid-term and final surveys will build on the baseline survey, using a similar questionnaire. Within the PMU, an M&E specialist will be responsible for coordinating the M&E tasks, organizing and updating the data base for each component, and liaising with each of the component specialists and the implementers of each activity in the collection and reporting of the required data. The M&E data will be continuously updated and consolidated quarterly for provision to the Bank task team, and will be made available to coincide with the supervision missions of the project.

In addition to the surveys to determine overall impact, each component and sub-component will have specific M&E procedures, which will be the responsibility of the respective unit in liaison with the PMU M&E specialist. For the rural finance activities, the monitoring of CUs and BGs will continue to be performed by the Credit Implementation Agency together with the Azerbaijan Credit Union Association, with quarterly and annual reports provided on the performance of the loan portfolio. Quarterly and annual reports will also be provided by the commercial banks participating in the commercial bank credit

line. The small grants will be continuously monitored by the Competitive Grants Secretariat based on milestones for each grant project that would be prepared as part of the contract, and each grant would be evaluated by contracted specialists within two months of completion, including a cost-benefit analysis of the technological innovation. For extension activities, impact and client satisfaction surveys will be carried out annually by a contracted agency, and regular monitoring of extension activities will be carried out by the IAC every six months for new RACs and every year for existing RACs. The Agency veterinary staff will monitor progress towards privatization of veterinary units using the prepared reporting formats and through regular monitoring visits, while the research program will be based on achievement of a set of milestones and goals laid out in an annual work-plan.

4. Sustainability

The project has been designed with long-term sustainability in mind. For rural finance, the project will strengthen the credit union system through legal and regulatory reform for improved supervision and possible introduction of deposit-taking services on a selective basis; update management information systems and M&E throughout the credit union system; improve credit union management skills; and build capacity of participating financial institutions to improve lending skills and promote new financial products. For the competitive grants program, the demonstration of technological innovations is likely to result in long-term benefits after the completion of the program, and cost-benefit analyses will be conducted and findings made available to banks and financial institutions as well as other potential users of the technology. Both these activities are aimed at increasing the long-term efficiency and profitability of small-scale private sector rural businesses. For the information and advisory services, a network of advisory services would be developed throughout the country, which would be mainstreamed into government structures to ensure long-term support and institutional sustainability. The system would be based on private sector service providers who would be contracted by government to carry out specific information and training activities that have a public good nature, and would also be able generate paid services from private clients. This public/private system is now used widely in European countries such as Netherlands and UK, where around 60 to 70% of the revenue of advisory services is derived from government contracts. The project will restructure one or possibly two selected research institutes to place them on a more sustainable basis, including staff training and development; streamlining the organization and management structure including staff reductions where appropriate; and focusing on adaptive research of relevance to rural producers. For veterinary services, the project will support the development of sustainable private veterinary practices while strengthening the capacity of the State Veterinary Service to monitor and control priority diseases that pose a public health risk.

5. Critical risks and possible controversial aspects

The following table shows the critical risks identified with mitigation measures. The Bank supervision missions will pay particular attention to these risks and mitigation measures.

Risks	Risk Mitigation Measures	Risk Rating with Mitigation
To project development objective		
Expansion of agricultural support services including financial, advisory and veterinary services may take place more slowly than expected, reducing the scope for more efficient use of available resources and potentials for communities, farmers and businesses.	On-going and close monitoring and supervision of the project implementation will identify the potential problems and delays at early stage of the project cycle to ensure prompt problem solution.	Modest

The market potential, especially export potential, may be over-estimated or not favorable for the agricultural businesses supported.	Market potential has partially been proven through previous projects and other donor assistance, but on a selective basis. A broader approach may require some more time for uptake. Capacity building and market information and promotion services aim to incorporate the project's broader approach.	Modest
Delay or non-availability of counterpart funding may be experienced	A detailed plan will be prepared for each implementation year, ensuring the government should put the required funds in the budget line	Modest
Project activities might not be sufficient to fully stimulate economic development in rural areas or uptake is slow.	Synergies with other programs will be sought; coordination with their programs to stimulate uptake will be built into the component operational manual.	Significant
To component results		
Credit Unions may not be sustainable in the long term due to high dependence on external funds, weak governance, and inadequate lending and financial management skills	Innovative products will be carefully created in response to demand in order to attract more clients; Azerbaijan Credit Union Association and the National Bank of Azerbaijan will work closely with the CUs and provide guidance; capacity building of the CUs will be conducted. The revolving fund will continue for up to 10 years post-project.	Modest
Legal and regulatory reform may not be completed to allow deposit-taking by CUs	Legal and policy reform is consistent with a broader effort of the liberalization policy on part of the Government. This effort is unlikely to be reversed.	Modest
Financial institutions may be reluctant to meaningfully engage in the rural sector, as well as the possible slow pace in financial product development and innovation.	PFIs will be carefully selected for interest and potential for significant engagement in the sector and to innovate, and the capacity building program will be tailored to each PFI's requirements and strengths.	Modest
Access to grant resources might undermine the credit culture in rural areas.	Grant winners would be carefully selected based on: (i) replicability of the proposed technologies to other rural business entities; (ii) suitability and affordability of proposed technologies in terms of increasing rural productivity, value added, and market accessibility; and (iii) demonstrated improved linkages between producers and next level of supply chain.	Modest
Rural business advisory and market services provided by the IAC and RACs may not be relevant, timely or in demand by the audience	Technical assistance will be provided to help IAC and RACs to define and design the program. Stakeholders will participate in the priority setting during the program design.	Modest
RACs may not be sustainable in the long term due to difficulties in recovering operational cost (target is around 20 %)	The selection of RACs will be carefully implemented based on the private sector model tested during ADCP-I. The process is also supported by the overall strategy of the government as indicated in the draft Agricultural Development Strategy.	Modest

VFUs may not be sustainable in the long run due to inability to recover operational costs.	Diverse income-earning opportunities (artificial insemination, veterinary pharmacies etc) will be introduced. Training to improve marketing and business management will be provided.	Modest
Upgrading of SVS's disease and surveillance capacities and outsourcing of tasks might be slower than expected.	Current avian influenza concerns might allow for a broader buy in of required adjustments in the SVS; project design will consider slow uptake.	Significant
Research reform may be difficult to implement.	Reform programs have already been prepared for selected institutes based on "Strategy for Modernization of Agricultural Research System".	Modest
Overall risk rating		Modest

6. Credit conditions and covenants

Condition of Effectiveness

- An Operational Manual, satisfactory to the Association, has been revised.

Dated Covenants

- By April 14. 2007 the Borrower, through the PMU has appointed an independent auditor under terms of reference acceptable to the Association.

- The Borrower shall (a) by December 1, 2006 open a Project Account in a bank on terms and conditions acceptable to the Association with an initial deposit in local currency equivalent to US$ 100,000; and (b) maintain a balance in the Project Account, until completion of the Project, with the amount adequate for the subsequent three months of Project implementation.

- The Borrower, through the PMU, shall maintain a financial management system, including records and accounts, and prepare financial statements in accordance with consistently applied accounting standards acceptable to the Association, adequate to reflect the operations, resources and expenditures related to the Project.

- The Borrower, through the PMU, shall have the project financial statements audited by independent auditors, and in accordance with consistently applied auditing standards acceptable to the association, and have the audit report furnished to the Association no later than six months after end of each year audited.

- The Borrower, through the PMU, shall prepare and furnish to the Association Interim Financial Reports, in form and substance satisfactory to the Association, no later than 45 days after end of each quarter. The first Interim Financial Report shall cover the period from Effectiveness, including incurrence of the first expenditure under the Project through the end of such first calendar quarter[5].

[5] Consistently applied standards include international accounting standards and financial statements and international standards on auditing.

- The Borrower shall ensure that all measures necessary for the carrying out of the EMP shall be taken in a timely manner.

Conditions of Disbursement:

- Prior to disbursement for component 1.A of the Project unless: (i) the Agency Agreement, satisfactory to the Association, has been duly executed between the Ministry of Finance and Economy of the Recipient, the State Agency for Agricultural Credit of the Recipient, the CIA and the ACUA; (ii) the CIA Business Plan, satisfactory to the Association, has been submitted to the Association; and (iii) the CIA Operational Manual and Credit Union Operational Manual have been approved.

- Prior to disbursement for component I.B of the Project unless the Rural Investment Guidelines satisfactory to the Association and the Recipient's Ministry of Finance have been prepared and submitted.

- Prior to disbursement for component I.C the Competitive Grant Committee has to be established according to terms and conditions set forth in the Operational Manual.

D. APPRAISAL SUMMARY

1. Economic and financial analyses

Economic Analysis: The estimated project economic rate of return (ERR) is 16.0%, and the net present value (NPV) of the project's net benefit stream, discounted at 12%, is US$ 4.1 million. Switching values show that project benefits would have to fall by 16% or costs to increase by 19% to reduce the ERR to 12%, while a one-year delay in project benefits would reduce the ERR to 12%. Annex 9 has further details of this analysis.

The quantifiable incremental benefits used in the analysis were based on: (a) strengthened and expanded advisory services and improved access to new adapted technologies; (b) strengthened and expanded veterinary services; and (c) models of likely sub-projects implemented under the Competitive Grant Scheme (CGS). For the first two benefit streams, nine activity models were prepared to represent various crops and livestock typical for the project area as well as the possible interventions that may be proposed under the project, all showing increased income per hectare or per animal head as a result of agricultural technology testing and dissemination and improved veterinary services. In calculating the overall benefits for these two streams, the adoption factors, coverage area and number of clients served were based on results from ADCP-1. The annual incremental benefits from the first two streams at full development (year 10) are estimated at around US$ 5.6 and US$ 1.8 million, respectively. For the third stream, three illustrative models were prepared representing improvements that may be undertaken as a result of the CGS activities, with estimated internal rates of return (IRRs) ranging from 25 to 37%. Models included better storage of grapes, improved processing of fruit and quality and safe slaughtering of animals. In each model, conservative assumptions regarding returns and uptake were made.

Financial Analysis: A total of 18 models were prepared to demonstrate the likely activities to be funded by the project: six credit models and the twelve models discussed above, on the basis of financial prices. The main results included: (i) a sufficient increase in gross and net returns for each of the models in the with-project situation; and (ii) adequate benefit/cost ratios demonstrating the attractiveness of the investments. The NPVs after financing for the various models ranged from US$ 29,900 to US$ 136,400, while the IRRs before financing ranged from 19 percent to more than 50 percent. Favorable cash flows from the possible project-financed investments indicated that the improvements in incomes at the farm,

entrepreneur and national levels would be sufficient to ensure uptake of the proposed activities. Business proposals would be required for each sub-project financed under the CGS and credit components.

Fiscal Impact: The government budget will finance twenty-two percent of the total project costs, comprising taxes and duties as well as a cash contribution for the information and advisory services and veterinary services, adaptive research services and project implementation and management. The annual government contribution averages around 1.5% of the agriculture sector budget for 2006, and thus would not have a significant fiscal impact. Specifically, the proposed MOA contribution for information and advisory services would rise from US$ 332,000 in year 1 to about US$ 1.27 million in year 4, the latter figure representing less than 1% of the agriculture sector budget as a whole and 2.4% percent of the MOA budget for 2006.

2. Technical

The technical approaches take into account the experience of similar components in Azerbaijan or in other countries in the region and are generally based on well-tested procedures. The approaches have been widely discussed with government and stakeholders, and are designed to meet the needs expressed at all levels.

Agricultural Business Services: The project builds on the experience during ADCP-I in the development of rural lending through BGs and CUs, which has demonstrated that substantial demand exists for small agricultural loans. However, investment needs are still substantial, and it has been estimated that agricultural lending meets less than 10% of the demand. Some financial institutions have started to fill this gap, but the outreach and product menu remain quite limited. Accordingly, the sub-component will utilize the Bank's experience in promotion of rural micro-finance, commercial bank down-scaling and introduction of innovative financial products, and will seek to increase the capacity of financial institutions in agricultural investment appraisal and to expand rural lending. The sub-component supports the government's aim of increasing the rural loan portfolio above the current low level and making financial products available to the large number of emerging small rural business entities.

The Development of Efficient Rural Market Links sub-component modifies the competitive grant approach used in ADCP-I and is now aimed primarily at innovative technologies for small rural business entities. Competitive grant schemes are used widely throughout the region in Bank projects, and this program builds on these experiences to widen the mechanism to include small-scale processing, marketing and development of business linkages. This program fills an important need for small rural businesses to introduce and test innovative technologies that may impact rural incomes and employment.

Agricultural Support Services: Good progress was made during ADCP-I in establishing a responsive, decentralized, information and advisory system that reached a large number of farmers and had a substantial impact. The project will capitalize on this experience and on the experience of other projects in the region to further develop the public-private contract model, widen the outreach, improve the operational sustainability and introduce a greater market and business focus. A national strategy for the modernization of the agricultural research system was prepared during ADCP-I, which will provide the framework for the structure and functioning of the research system, and draft reform programs have been prepared for selected institutes. Accordingly, there is momentum for reforms that would result in increased relevance of the research program for small farmers and improved linkages with the advisory system. The sub-component will also support the further development of a privatized veterinary system that is responsive to the needs of livestock owners and will improve the surveillance and preparedness functions of the State Veterinary Service in the light of increasing threats to public health from animal diseases, taking into account recent worldwide experience and best practices. Overall, this component

supports the government priority of stimulating and increasing production and export of agricultural products, and is responsive to the needs expressed by beneficiaries.

3. Fiduciary

The financial management assessment concluded that the existing systems of the PMU, which is already implementing the ongoing ADCP-I, meet IDA minimum reporting requirements. However, the PMU has decided to replace the existing in-house accounting system with an off-the-shelf 1C system/software. This software requires customization of the financial reporting module to automatically generate the required quarterly Interim Financial Reports. The system will be financed from the PHRD preparation Grant, and will be fully operational before project effectiveness. The internal control systems and procedures are documented in a Project Implementation Manual. The PMU financial management staff have experience in implementing IDA-financed projects and have received training in financial management, disbursement and auditing arrangements. However, additional training will be provided during ADCP-II implementation, and close coordination and monitoring will be critical to minimizing fiduciary risks associated with the project.

4. Social

Since ADCP-I and ADCP-II are linked, a combined Social Impact Assessment (SIA) was carried out with the following objectives: (i) to measure the impact of ADCP-I activities to determine whether the development objectives were achieved and if the welfare of the intended beneficiaries was increased; (ii) to highlight lessons learned from ADCP-I concerning the social impact of the project on the target communities; (iii) to ensure that ADCP-II is inclusive and builds ownership by using lessons learned from ADCP-I; and (iv) to ensure that investments under ADCP-II reach the intended beneficiaries and contribute to poverty alleviation. Both qualitative and quantitative methods were used as well as a desk review of background documents and data. The quantitative part consisted of a household survey and a village datasheet, while focus groups discussions and in-depth interviews comprised the qualitative part. The SIA was conducted in two phases, a preliminary phase and a more elaborate second phase.

The main findings of the preliminary SIA include:

- Farmers overall continue to find life in their villages difficult. Prices of agricultural inputs (e.g., fuel, fertilizers, machinery and chemicals) have risen whereas the prices of agricultural products have remained constant. As a result, many men of working age (around 30 to 50%) have left the village for work elsewhere, particularly to Baku and Russia.

- Close-knit social ties exist in rural communities, especially among women and the poor. Information tends to flow through personal networks, and access to information and resources is determined more by the range of personal networks than by social standing.

- Demand in the rural communities for information and advisory services remain very high as in ADCP-I. The SIA found that their information needs are particularly concentrated on marketing.

- Scarcity of machinery is a major problem faced by farmers, with access to rented equipment rather limited. Some farmers also recommended the establishment of an organization to provide them with low price mineral fertilizers. Farmers have also found it difficult to adjust to the recent fuel price rise.

- VFU staff stated that animal husbandry activities have been on the rise in their region due to increased profitability. The demand for their services remains high, and most farmers have been able to pay for their services. However, they reported that they face difficulties with transportation.

- Demand among farmers for finance is very high, mostly for inputs and equipment for farming and for working capital to establish small non-farm rural businesses. The interviews with Borrowers Groups and Credit Unions indicated that while there is generally a positive response from farmers to the programs, there are still several difficulties that preclude a wider reception amongst the farmers, such as the short repayment term.

- The SIA indicated almost universal land tenure across villages, although some land holdings may be small, of low quality, or without access to irrigation. Furthermore, some families only have household plots. Findings on land lease and sale are mixed without any significance attached to a village having been served by ADCP-I or not.

- Village infrastructure has to a large extent fallen apart after the disintegration of the collective system. In particular, the availability of electricity, gas, and potable water is limited. The educational facilities seem to be fine although not the actual infrastructure. There is a scarcity of technical and material resources. Further, there is no base for manufacturing activities.

A mid-term social review will assess whether identified social issues are addressed and will make suggestions for modifications in the project design in order to ensure that social development outcomes are achieved.

The project is not likely to trigger large-scale land acquisition or resettlement of poor farmers.

5. Environment

An Environmental Assessment and Management Plan (EMP) has been prepared to determine key actions that the project should take to safeguard negative environmental impacts. The Environmental guidelines will become an integral part of the operational manual. The overall environmental effect of the Project should be positive. Farming and agri-business loans will result in improved agricultural production and marketing, and in general, improved socioeconomic conditions of the rural population. The Project could lead to an increase in the use of farm inputs but mitigation measures, extension services and training associated with the Project should minimize the potential impacts associated with these inputs. The environmental assessment and draft EMP were discussed with local stakeholders at a workshop held in Masalli on March 31, 2006. Stakeholder input to the environmental review was solicited in the process of preparing this EMP through:

- Discussions with farmers, both small and medium sized commercial farms and with PFIs to inform them of the environmental review of the Project, and more importantly, to identify likely activities for which loans through the Project would be requested. As well, farmers were asked for opinions on important environmental issues in their communities.
- Discussions with Ministry of Agriculture officials to determine the categories of likely farm and non-farm rural enterprises for which loans would be requested.
- The ecological aspects of the Project were discussed with the officials of the Ministry of Ecology and Natural Resources.
- A workshop was held on March 31, 2006 to solicit ideas on likely farm and non-farm rural activities to be funded and the probable environmental impacts that could be expected from project

activities. A summary of EMP was posted in the Website of MENR prior to public consultation workshop held on March 31, 2006

The major environmental concerns are water pollution and soil erosion, and the consequences and secondary effects that erosion will cause. Considering the small size of most projects, it would be easy to dismiss the negative effects that each project might have on the environment. However, if by chance a large number of requests for loans originated from the same area the cumulative effect of all of the small (negligible) effects could be significant. The EMP includes a framework for assessing and mitigating potential impacts that may occur during implementation of activities financed by on-lending to small and mid-sized agricultural enterprises. For agricultural activities mitigation should not necessarily entail expensive inputs and much can be achieved towards the minimizing of residual impacts through applying efficient and safe farming techniques. The information and advisory services sub-component of the Project will advise farmers on the proper handling and application of pesticides and fertilizers, including application rates and timely application. As well, it can advise on effective cultivation techniques (including the size of tractors and the type of equipment to be engaged) that will reduce the threat of soil erosion. Irrigation schemes can be well planned in order to avoid the loss of productive land through salinization and waterlogging. Adherence to water and air quality standards will be monitored by local environmental agencies to ensure that water and air quality are protected.

6. Safeguard policies

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP/GP 4.01)	[X]	[ ]
Natural Habitats (OP/BP 4.04)	[ ]	[X]
Pest Management (OP 4.09)	[X]	[ ]
Cultural Property (OPN 11.03, being revised as OP 4.11)	[ ]	[X]
Involuntary Resettlement (OP/BP 4.12)	[ ]	[X]
Indigenous Peoples (OD 4.20, being revised as OP 4.10)	[ ]	[X]
Forests (OP/BP 4.36)	[ ]	[X]
Safety of Dams (OP/BP 4.37)	[ ]	[X]
Projects in Disputed Areas (OP/BP/GP 7.60)*	[ ]	[X]
Projects on International Waterways (OP/BP/GP 7.50)	[ ]	[X]

7. Policy Exceptions and Readiness

The project complies with all applicable Bank policies and no exceptions are required.

Procurement documents for the first year's activities will be completed within the remaining project preparation period. Detailed component concepts are currently being prepared, and will be discussed and agreed with all stakeholders. The operational manual is currently also being prepared. The procurement assessment has been finalized, with the procurement plan currently under preparation.

* *By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas*

Annex 1: Country and Sector or Program Background

AZERBAIJAN: Second Agricultural Development and Credit Project

Background. Azerbaijan is the largest of the three South Caucasus countries. The country covers an area of 86,600 km^2 and borders the Caspian Sea, where oil and gas reserves are enormous. The Nakhchivan Autonomous Republic is also a part of Azerbaijan, although geographically separated from the rest of the country. Azerbaijan's neighbors comprise Turkey, Georgia, Russia, Iran and Armenia. The country is characterized by diverse landscapes and climatic zones, as a result of variations in elevation from below sea level to more than 3,000 m above sea level. In addition to being an oil-rich country, Azerbaijan has good agricultural potential with about 4.2 million hectares of cultivated land (49% of the total land area). However, due to limited rainfall, more than three quarters of the harvested area of 1.5 million ha is under irrigation.

The population of Azerbaijan numbers 8.3 million with about 51.5% of the country's population living in urban areas and 48.5% in rural areas. The capital city, Baku, has an estimated population of 1.7 million. Due to limited employment opportunities in urban areas after 1991, labor moved into agriculture, thus converting the sector into the country's largest employer. Overall, the number of people working in agriculture increased from 32% in 1991 to 40% in 2002. Most of the agricultural land has been distributed to the rural population, thus contributing to the increase in agricultural employment.

Macro-Economic Situation. Azerbaijan's economy has grown consistently over the past years. During 2003-2004, the overall macroeconomic stability of the country strengthened and the strong economic growth rates, observed over the previous years, were maintained. GDP increased by AZM 6,819 billion from AZM 35,053 billion in 2003 to AZM 41,872 billion in 2004. The real growth in GDP per capita was 9.2% in 2004 compared with 10.3% in 2003, and reached AZM 5,114.8 thousand (US$ 1,041 per capita). Some changes have taken place in the GDP structure, including an increase in the share of the non-oil sector. Thus, 62.5% of GDP came from the production sectors (including construction), 30.2% from service sectors, 7.3% from net taxes on goods and imports in 2004. The GDP share of industry, construction, hotels, restaurants, social and informal service sectors, and net taxes on goods and imports increased in 2004, while the share of agriculture, transport and communication, and repair services of household appliances and personal belongings decreased.

After a long period of low inflation, Azerbaijan experienced an increase in the annual average rate of inflation from 2.2% in 2003 to 6.7% in 2004. The average annual exchange rate to US$ was AZM 4,910.8 in 2003 and AZM 4,913.6 in 2004. The official exchange rate of AZM to US$ was strengthened in a fluctuating-regulated regime by AZM 20, i.e. 0.41%, and was AZM 4,903 by the end of 2004. The nominal exchange rate ensured positive dynamics in the real effective exchange rate index and helped to maintain the international competitiveness of the country's economy within this period. The National Bank intervention in the currency market was purchase-oriented within the considered time period (US$ 158.7 million) and served to improve the money supply of the economy, maintain the exchange rate of the national currency at a satisfactory level and prevent "Dutch disease". At the beginning of 2006, a new currency was introduced – the New Azerbaijani Manat (AZN), with one new Manat equal to 5,000 old Manat.

Gradual liberalization of the economy, the privatization measures implemented, and the speeding up of the development of entrepreneurial activity in 2003-2004 led to an increase in the amount of investment in the economy. The volume of investment in fixed capital increased by 28% and amounted to AZM 24.2 trillion (USD 4.9 billion), 73.7% of which was foreign investments. The increase in the share of domestic

investments in total investment from 23.2% to 26.3% points to an increase in the potential of local investors and an increase in their investment opportunities.

Poverty. About half (49%) of the population was living in poverty in 2001. Poverty in urban areas was higher than in rural areas (55% vs. 42%) with the higher incidence of poverty in urban areas being caused by the loss of non-agricultural employment. In 2003, the poverty index accounted for 44.7% of the population with those living in extreme poverty accounting for 9.6%. In 2003, however, poverty was slightly higher in rural areas than in urban areas (45.3% vs. 44.1%). Rural poverty has been persistently increasing over the last years. This was caused by many factors, including: (i) failure to maintain the irrigation and drainage systems and the breakdown of rural infrastructure and power supplies; (ii) weak agricultural services; (iii) outdated technology; (iv) collapse of the Soviet-era marketing system and processing industry and the slow emergence of alternatives; (v) poor access to financial services; and (vi) lack of farm management capacity and decision making ability among new land owners. In addition, the armed conflict with Armenia resulted in a large number of refugees. Approximately one million people or 12% of the country's population are still living in temporary accommodation, with no regular employment, and are dependent on humanitarian aid from various channels.

With assistance from the international community, the Government prepared a poverty reduction strategy - the State Program on Poverty Reduction and Economic Development (SPPRED), initiated with an interim report in 2001. The SPPRED set strategies for macroeconomic stability, creating an enabling environment for increasing income-generating opportunities, improving health and education services and infrastructure, as well as social reforms. As far as the agricultural sector is concerned, the main strategies aim at ensuring secure property rights, rehabilitating irrigation systems, introducing participatory irrigation management, upgrading infrastructure, improving access to rural finance, promoting market channels and market links, providing support for processing, and developing new forms of market-oriented rural organizations. The SPPRED was published in 2003, and the first PRSP progress report was in 2004.

Agricultural Sector. Agriculture is one of the major contributors to Azerbaijan's GDP. During the past few years, the sector contributed between 11 and 16% of GDP and around 40% of employment. Before independence in 1991, Azerbaijan was a main producer of cotton, wheat, grapes, and vegetables for the Former Soviet Union (FSU) markets. Real output declined rapidly between 1991 and 1994, when the production of grains fell by 19%, cotton by 48%, grapes by 66%, and vegetables by 43%. The decline in agricultural production leveled out during the past few years. From 1996 to date, fundamental changes have been introduced, including the abolition of the state order system for agricultural products, the discontinuation of official pricing of inputs and outputs, the replacement of state input supply and farm output marketing organizations with privately owned and managed companies, and distribution of farm land to individual farm members.

Ministry of Agriculture: A major institutional change has occurred in the Ministry of Agriculture (MOA). On October 23, 2004 the President of Azerbaijan initiated a reorganization and restructuring of the agricultural sector by signing an Order on "Improving management in agrarian sector". Formerly independent bodies, such as the State Committee for Melioration and Water Industry, State Veterinary Service, State Phytosanitary Control Service have become part of the Ministry of Agriculture. The State Agency for Melioration and Water Industry has become agency of the Ministry of Agriculture. The status of the Veterinary and Phytosanitary departments have been upgraded up to State Services within the MOA and a new State Agency for Agricultural Credits has been established.

The Ministry's objectives for the agricultural sector are specified in an "Action Plan for the main areas of agrarian development in the regions of the Republic of Azerbaijan for 2004-2008". The document was prepared by the MOA in compliance with the measures stipulated in the "State Program for social and

economic development of the regions of the Republic of Azerbaijan (2004-2008)". The overall objectives of the action plan include strengthening private sector involvement, including in such activities as seed production, livestock-breeding, and artificial insemination, as well as developing small rural processing enterprises, while the MOA shifts focus to become primarily responsible for policy, legal, regulatory and catalytic roles.

Agriculture Budget: According to data on the state budget expenditures for the Republic of Azerbaijan in 2004-2006, the expenditures on the agriculture sector as a whole and the MOA budget are as follows:

	Agriculture Sector budget a/		MOA budget	
Year	AZN million	% of total budget	AZN million	% of total budget
2004	55.2	3.8%	10.3	0.7%
2005	93.4	4.3%	32.1	1.4%
2006 (forecast)	130.4	3.6%	52.4	1.4%

Source: MOA
a/ includes land improvement and irrigation, but not including fisheries and forestry;
b/ includes farm machinery (agro-leasing), phytosanitary control, seed farms, agricultural research, and veterinary services.

The figures indicate that there has been a substantial increase in agriculture and MOA expenditures in recent years, although the percentage of the total state budget remains quite small and has not changed much.

Rural Finance. Access to financial services is currently limited, especially in rural areas. The total number of bank branches operating out of Baku is 160, which is a very small number. Cash is prevalent in trade and payment transactions. Access to credit is limited and the cost of credit is high. SME lending is mostly based on foreign funding to avoid maturity mismatches. The challenges are to broaden the general access to financial services and significantly improve access to credit.

There is limited access to credit for domestic agribusinesses. Both investment capital and operating capital are lacking in the agro-processing sector, and many businesses need help understanding the nature of borrowing (business plan, repayment consequences, etc.). While some firms in the sector have been able to raise private investment capital (not often through the formal banking sector), most seem to have insufficient operating capital. Firms struggle to operate efficiently and lose earning opportunities for lack of working funds to purchase raw materials. In addition, there are some issues related specifically to agriculture. Agriculture continues to be regarded as risky, and commercial banks are less keen to lend money to the agriculture sector than to other sectors. Also, most agricultural operations are seasonal and therefore must spread fixed costs and depreciation over a relatively short period. Lines of credit are reportedly unavailable without considerable difficulty according to the firms surveyed. This was also frequently reported in two independent analyses of agro processors that were recently conducted. Because of the dependence of the sector on private investment-driven vertical coordination, the lack of access to credit is especially detrimental.

In part due to credit constraints, there is a lack of investment in collection and storage infrastructure, which is retarding the development of the sector. There is a shortage of both hardware (infrastructure) and software (knowledge) to extend the storage life of the diverse array of fruits and vegetable products, whose quality decline can be quite marked after three months. As a result, processors do not have a steady, year-round supply of inputs, and farmers are forced to sell the majority of their output at harvest time, reducing the prices they receive. For the dairy sector, one of the most striking features of existing marketing channels is the weakness of collection systems. Both of these features greatly reduce the

market opportunities for small farmers, reduce their prices they receive, and decrease the scope for vertical coordination in supply chains.

National Entrepreneurship Fund. Changes and additions have been made to the regulations governing the allocation of National Fund for Entrepreneurship Support (NFSE) resources in order to stimulate allocation of credits in rural areas. These regulations were approved by Presidential Decree in May 4, 2004. This enabled non-bank credit organizations to place NFSE resources. Availability of branch offices in the regions has been determined as one of the main criteria in the selection of agent-banks, which would finance SME development. The number of credit agencies authorized to utilize NFSE resources was increased to 25, of which 20 are banks and 5 are non-bank institutions. To ensure social and economic development of the regions and dynamic growth of entrepreneurship, the Decree of the President "On additional measures on state financial support to entrepreneurship" was signed in March 1, 2005. It aims at improving the use of NFSE resources. The Decree also envisages an increase in the maximum limit for financing the large-scale credit projects to the level of USD 1,000,000 which was earlier fixed at USD 100,000. In addition, the repayment period for large-scale credits to be extended to entrepreneurs was prolonged from 5 to 8 years. Changes made to the rules of extending large-scale credits aim at creating a more enabling environment for the entrepreneurs wishing to carry out the projects, which require more investments.

NFSE resources amounting to AZM 100 billion were provided to 1,338 entrepreneurs in 53 cities and regions through the authorized banks and credit unions in 2004. In addition, credit fairs were arranged by a number of banks during 2004 in eight regions, with more than 1,000 entrepreneurs being provided with credits of about AZM 50 billion.

Agro-Processing and Trade. Although a wide array of crops are grown and there was a significant privatization of industrial food production in Azerbaijan, processing and storage facilities are still largely outdated. The domestic processing of vegetable products is minimal and mainly concentrated on tomatoes and preserved or pickled products. In dairy, less than 10% sold on the Azerbaijan market are processed by the domestic industry and much of this processing is done by obsolete equipment. Low capacity utilization and outdated technology result in high operating costs for processors. As a consequence, the Azerbaijan processors find it difficult to compete with cheap imported products.

The market structures and institutions required for the shift to a market-based economy in the sector are still undeveloped. Market channels are fragmented and exist only in a very elementary form, and very often the informal sector plays a dominant role. This makes it difficult for farmers and processors to sell their products and receive a good price, and for processors to receive the quantity and quality of inputs they need, when they need them. Market imperfections reduce incentives for production and constrain the development of the sector.

Nevertheless, Azerbaijan firms manage to sell their products in the regional markets. Thus, Russia accounts for over 62% of Azerbaijan's exports; this share represents mainly vegetable oils and oilseeds, with fruit coming in second. Other valuable regional markets for Azerbaijan fruits and vegetables include EU countries (17% of export), Turkey (9% of export), Ukraine (3%), and other countries with total of 9% export. Export of dairy products to these markets is limited due to their own competitive domestic production.

Agricultural Extension. The agricultural extension system currently consists of five Regional Advisory Centers (RACs) and 116 village-based Private Advisors (PAs), supported by a central Information and Advisory Center (IAC) in Baku for program management and co-ordination. This system was put in place with support from ADCP-I. The RACs are responsible for the management of advisory programs in their region, including contracting the PAs; coordinating local training and demonstration activities;

overseeing and evaluating the work of the PAs; collection and distribution of local market price information; establishment of a farmer data base and local studies. Two of the RACs were based on a public sector model with funding provided directly through the project while the three other RACs were based on a private sector model using contracted NGOs. However, based on the overall government strategy for the sector, the two public sector RACs are planned to be privatized by the end of ADCP-I, which would allow them to compete more readily for contracts and to develop other programs. The PAs are responsible for implementing activities at the village level, including training and information sessions for farmer groups, group advisory services at demonstration sites on their own or in other progressive farmers' fields, and individual advisory services. The IAC is responsible for supervision and monitoring of the information and advisory program, preparation of training modules and information materials, arranging the contracting of information campaigns, coordinating a market information program, and other coordination tasks. Overall, during ADCP-I, some 264,000 farmers in 777 villages participated in training courses, group advisory services or individual advisory services, a very impressive achievement. Surveys have also indicated that there was a substantial increase in farmer knowledge, especially on technical topics, as well as increased production, revenues and family income. Over 70% of farmers participating in advisory activities indicated that their family incomes had increased since the start of the program, compared with less than a third who had not received advisory services. At this stage, however, the remaining five regions and more than 50% of farmers have not yet been reached. In addition, although services have included marketing information and support to credit groups, the major focus has been on primary producers rather than the marketing chain as a whole.

Agricultural Research. The agricultural research system under the Ministry of Agriculture comprises 14 research institutes, primarily commodity-based, which include 33 experimental stations located around the country as well as headquarters facilities. In total, the research institutes have about 6,000 ha of arable land and some 2,000 staff, of which around 800 are researchers. The research work is categorized into 196 research themes, although around 80% of the budget is used for salaries. There are also nine recently established Regional Agro-Science Centers, with about 2,500 ha of land, which are regional centers intended to adapt and demonstrate technologies developed on the research stations and institutes. The overall responsibility for planning, coordination and supervision of the research program lies with the Agro-Science Center of the MOA.

The research system was originally established to provide scientific recommendations for about 2,000 state farms and collectives. However, following land privatization, the research system has found it difficult to adopt a more responsive and farmer-oriented approach to serve the needs of some 870,000 small family farms, with extension programs and linkages perceived as inadequate. It is has also proved difficult to introduce management reforms and structural changes, including a streamlining of the number of institutes and stations. Deficiencies remain in the planning, monitoring and coordination mechanisms and in the functional relationships between the research institutes and the MOA Agro-Science Center. Staff salaries are low (an average of US$ 22 per month in 2003), and there has been only a limited intake of younger staff with the requisite computer skills and the capacity to review international scientific literature. In addition, there has been little investment in research facilities, field machinery, laboratory equipment or modern computer systems since the 1980s.

Some of these constraints were addressed through the research-focused Competitive Grants Scheme (CGS) funded during ADCP-I. Fifty-two grants of up to US$ 50,000 each (US$ 24,000 on average) were awarded for a total of US$ 1.25 million, mostly in commodity areas defined as priorities, such as wheat, fruits, vegetables, forage crops, cotton, livestock, veterinary, cotton and plant protection. The main objectives were to disseminate improved technologies from research institutes to farmers through on-farm trials and demonstrations. Some 16,000 farmers, local government officials, research staff, and MOA staff, including about 4,900 farmers and Private Advisors organized by the Regional Advisory Centers, attended field days at grant sites during the program.

The recently-established Regional Agro-Science Centers also have limited funding, and linkages with the research institutes are not fully developed. Nevertheless, joint activities with the RACs are being developed, with almost 9,000 farmers and advisors participating in demonstrations during 2004/5 and information leaflets prepared jointly and distributed through the RAC. Activities focus mostly on testing and demonstration of improved higher-yielding grain crop varieties.

Veterinary Services. The overall responsibility for animal health lies with the State Veterinary Service in the Ministry of Agriculture. The SVS was formerly the department of the MOA, but its status was upgraded up to State Service under the MOA by Presidential Decree in May 2004. A new veterinary law that envisages the further streamlining of the State Veterinary Service was promulgated in November 2005, with work ongoing on the supporting regulations. A preliminary reform strategy has been prepared, which includes privatizing the field veterinary service departments and contracting some public health veterinary measures to private veterinarians. The SVS is responsible for monitoring and control of 11 epizootic and epidemic diseases (recently reduced to 6), border controls, meat and livestock product inspection, and disease diagnosis and prognosis. It has a total staff number of around 4,290, including some 770 in district and municipality-level veterinary departments; 2,500 in field veterinary service departments; and about 560 laboratory staff in the republican, 11 zonal and 46 district-level diagnostic laboratories. The total 2005 state budget for the SVS, not including salaries, was in the order of AZM 11.6 billion (Euro 1.79 million), with most contributed by the EC Food Security Program (FSP) for measures against epizootic diseases. During ADCP-I, some equipment and training support was provided for five of the zonal laboratories to improve their diagnostic capability. A total of 15 one-ton capacity tankers were provided for use as disinfectant vehicles, but these vehicles were not used to full capacity and operated uneconomically. Overall, the SVS remains hampered by poor facilities and equipment for its field staff, inadequate laboratory equipment and conditions in many zonal and district laboratories, limited budget for activities other than those supported by the FSP, and outdated practices in many areas including disease monitoring and surveillance.

During ADCP-I, private Veterinary Field Units (VFUs) or clinics were established in 25 districts in the five project regions to deliver curative animal health services for livestock-owning clients. Each VFU consisted of three veterinarians, who were selected from a large pool of applicants. A start-up package of equipment and veterinary remedies was provided to each VFU along with start-up training. Initially, an incentive of US$ 330 was paid through the project to each VFU, a standard treatment price list was established, and many VFUs were housed in SVS facilities. The VFUs were not entitled to act as veterinary pharmacies, although the treatment price included the cost of the remedy. Payments for services were kept centrally in a common bank account at the regional SVS headquarters and the VFUs were paid from the proceeds with a 20% service charge deducted. A number of adjustments were made as the project progressed to encourage the development of private practices. The initial batch of remedies was used up, and VFUs were able to obtain quality replacements from local suppliers without difficulties. The incentives were gradually reduced to US$ 130 per VFU (about 40% of the initial amount) to encourage the development of private services based on a schedule proposed by an international consultant. The VFUs were relocated to private premises, separate bank accounts were opened for each VFU veterinarian, a tax number was allocated to each VFU, and VFUs were able to establish their own price list. Accordingly, by the end of ADCP-I, the VFUs were essentially private. It was demonstrated that farmers were willing to pay for the services, client numbers increased, and livestock owners reported that they were generally satisfied with the services available. By the end of ADCP-I, with the exception of Nakhchivan, VFUs were averaging around 100 clients and almost US$ 300 per month in revenue. However, full self-sustainability was not achieved by the end of ADCP-I. The total number of paying clients was only about half the estimated capacity of around 150 to 200 calls per month, many farmers were not able to pay or paid only partially or in kind, and competition from public veterinarians on the state payroll made it difficult to expand the client base. Accordingly, the minimum incentive payment

continued and rental costs were covered until the end of ADCP-I. To increase income-generating possibilities, artificial insemination (AI) equipment was provided to fourteen of the VFUs at the end of ADCP-I.

The professional Azerbaijani Veterinary Association and its registry of private veterinarians was reactivated during ADCP-I to carry out essential functions for representing the profession, disciplining its members and providing continuing education, with office furniture and equipment provided through the project. However, the current financial base of the association is very thin as some 200 dues-paying members pay only US$ 10 each per year. The association is providing only minimal services to its members, such as a periodic technical newsletter, but nevertheless, it remains important for the development of a private veterinarian system.

During February 2006, several outbreaks of Highly Pathogenic Avian influenza (HPAI) were confirmed in Azerbaijan. In response to the risks posed by the Avian Influenza threat, the Government has developed and begun implementation of an action plan for prevention and containment of HPAI. The plan includes the following measures: (i) banning of the import of live birds and poultry products from countries at risk (Turkey, Russia, and Iran, among others); (ii) requirements that poultry farms follow strict sanitary-epidemiological and veterinary regulations; (iii) increased monitoring of bird deaths; (iv) a public awareness campaign through the mass media to keep the population informed; (v) restriction of chicken sales to controlled shops and supermarkets; (vi) banning wild bird hunting and sale; (vii) bird shootings for research purposes in major hot spots and protected areas; (viii) vaccination of chickens against Newcastle disease, which is endemic in Azerbaijan and with symptoms similar to Avian Influenza (AI); and (ix) disinfection of vehicles passing the borders with neighboring countries. Assessment missions by WHO and FAO/OIE diagnosed the country surveillance and containment capacity as weak on both the veterinary and human health sides. The main issues identified for the animal health sector include: (i) the need to strengthen inter-ministerial coordination and to integrate initial action plans developed by the veterinary and human health authorities; (ii) critical supplies are insufficient, inadequate and unevenly distributed; (iii) HPAI diagnostic capacity is insufficient: the veterinary services recently purchased new Real Time Polymerase Chain Reaction (RT-PCR), but capacity for sampling, preparation, and interpretation of results is weak; in addition, a simultaneous outbreak of Newcastle disease, with symptoms very similar to AI, is also making diagnosis difficult; (iv) deficiencies in the infrastructure of laboratories, affecting their bio-safety; (v) lack of transparent protocols and guidelines for assessment, investigation, containment, culling, and compensation.

Annex 2: Major Related Projects Financed by the Bank and/or other Agencies

AZERBAIJAN: Second Agricultural Development and Credit Project

Project Name	Financier	Amount (million US$)	Status/Rating
Agricultural Development and Credit Project	World Bank	30.0	Closing June 30, 2006; Rated 'S'
Azerbaijan Rural Investment Project	World Bank	21.1	Ongoing; Rated 'MS'
Rehabilitation & Completion of Irrigation & Drainage Infrastructure Additional Financing Project	World Bank	5.0	Negotiated February 2006
Irrigation Distribution System & Management Improvement Project	World Bank	35.0	Ongoing Rated 'MS'
Rehabilitation & Completion of Irrigation & Drainage Infrastructure Project	World Bank	42.0	Ongoing, Closing June 30, 2007; Rated 'S'
Rural Development Program for Mountainous and Highland Areas	IFAD	9.0	Ongoing
North-East Development Project	IFAD	12.6	Ongoing
Azerbaijan Agribusiness Center	USAID		Ongoing
Azerbaijan Business Assistance and Development	USAID		Ongoing
ACDI/VOCA SME Finance Project	USAID	6.8	Ongoing
Microfinance Bank of Azerbaijan	EBRD, IFC, KFW and BSTDB	1.3	Ongoing
Unibank of Azerbaijan	EBRD	1.5	Ongoing

Azerbaijan Agricultural Development and Credit Project (ADCP-I). The project was the first stage if an Adaptable Program Loan with the primary objective to support the development of the agricultural sector. It assisted the Government to: (i) register private rights to rural farm land and test mechanisms for a unified real estate registration system encompassing urban and rural land buildings; (ii) create a self-sustaining rural financial system based on development of credit unions and village borrowers' groups; (iii) establish advisory services and privatized veterinary services in five regions and an agricultural research-focused competitive grants program; and (iv) improve Government capacity to formulate appropriate policy responses to the impact of the anticipated build-up in oil revenues on the competitiveness of the rural economy. The project's objectives were satisfactorily achieved.

Azerbaijan Rural Investment Project (AZRIP). The disintegration of the state and collective farms once responsible for operating agricultural supply, chains and maintaining infrastructure in rural areas, coupled with inadequate resource allocation, led to a rapid decline in Azerbaijan's rural services and infrastructure. This resulted in a decrease in the living standards of the 4 million people (50% percent of the population) in rural areas. To address these issues, AZRIP was designed and became effective in January 2005. It provides funding and capacity building for investments in local economic and social infrastructure. Specifically, the project targets rural communities in three economic zones, the lowlands of Shirvan, Mugan-Salyan and Nakhchivan, and its main objective is to help households in these areas complete micro-project investments to improve their living standards and increase the use of infrastructure services. The project has two main components. Component A – Infrastructure – funds grants for approximately 350-450 rural infrastructure micro-projects; and Component B – Capacity Enhancement – funds training and technical assistance for project implementation to help create the required capacity of involved local stakeholders.

Rehabilitation & Completion of Irrigation & Drainage Infrastructure Additional Financing Project (currently under preparation). The proposed objectives are: (i) to prevent the decline in supplying water to Baku City; and (ii) to eliminate further deterioration of the supply of irrigation water to approximately 86,000 ha along the Samur-Apsheron Canal.

Irrigation Distribution System & Management Improvement Project. The objective of the project is to improve the effectiveness and financial viability of irrigation water distribution and management on 56,000 ha, through provision of support to Water Users Associations (WUA) and the State Amelioration and Irrigation Committee (SAIC). The project provides funds for the development of WUA-related institutional capacity in SAIC, for training and support to WUAs to become organizations that can take charge of the operation and maintenance of irrigation and drainage systems under their management, and for selective rehabilitation of irrigation and drainage systems.

Rehabilitation & Completion of Irrigation & Drainage Infrastructure Project (RIDIP). The project's objectives are to: (i) prevent a decline in the supply of water to Baku City and the Absheron Peninsula; (ii) eliminate further deterioration of the supply of irrigation water to approximately 86,000 ha along the Samur-Apsheron Canal (SAC); and (iii) improve drainage and reduce water logging and salinity directly on approximately 36,500 ha along a section of the Main Mill-Mugan Collector (MMMC). The main component of the project relates to the rehabilitation and modernization of irrigation infrastructure in the SAC System and completion of certain drainage infrastructure in the MMMC area. The project also supports institutional strengthening of the State Amelioration and Irrigation Agency responsible for irrigation and drainage management.

Rural Development Program for Mountainous and Highland Areas (IFAD). The overall goal of the seven-year IFAD-initiated program is to help populations in the target areas improve the quality of their lives in a sustainable manner by increasing incomes and protecting the natural resource base and environment. More specifically, the program seeks to: (i) strengthen the organizational capacity of the beneficiaries so they may participate more fully in the market economy and better manage the natural resources upon which their livelihoods depend; (ii) restore economic livelihoods through improved management of the resource base and better access to financial, technical and commercial services; and (iii) strengthen public capacity to identify and respond to the needs of the mountain areas by setting up appropriate institutional mechanisms. This project is being implemented in Azerbaijan and Georgia. The target group is small private farmers operating individually or in voluntary associations. A significant proportion of the target group is women.

The North-East Development Project (IFAD). IFAD's strategy in Azerbaijan supports the government's poverty-reduction strategy for rural areas. It supports the rehabilitation of the irrigation systems and introduces appropriate arrangements for future operation and maintenance. The project also funds initiatives to overcome the acute shortage of equipment and working capital at the farm level; introduce modern, appropriate agricultural technology; promote new marketing and processing arrangements; and improve access to credit to finance heavy demand for farm and small- and medium-enterprise (SME) investments. The project is being implemented in the north-eastern region of the country and focuses on development of disadvantaged areas.

Azerbaijan Agribusiness Center (USAID). The services provided at the center are intended to facilitate the significant development of agribusinesses in Azerbaijan from the market view point. The project provides a wide range of expertise, through consultations and other assistance, to agribusiness clients in areas of (i) *production* (high value production, machinery service supply, extending market windows through innovation, improving links to processors; formalization of market linkages, and modernization of production techniques and inputs); (ii) *marketing* (market research, market surveys, plans and strategy,

market identification and introduction; competitive product identification; participation in trade shows and market events); (iii) *processing* (linkages to supply, improvement of raw materials, improvement of process efficiency and equipment, food safety & quality, packaging, competitiveness compared to imports); (iv) *logistics* (collection and distribution centers; terminal wholesale markets; catering and institutional food supply, airline and cargo company infrastructure, transport and machinery custom service, transport standards); and (iv) *finance and credit* (bankable deals, agribusiness development foundation, alliances or partnerships for development; facilitation of leasing; trade and contract finance mechanisms, machinery and facility targeted credit and investments).

Azerbaijan Business Assistance and Development (USAID). The projects assists micro and small businesses in addressing the issues that hinder business growth in rural Azerbaijan, namely the need for technical advice at the farm business level, administrative impediments to business development, deteriorating infrastructure, and lack of cooperation among rural stakeholders. The project has two components: building the productive capacity of targeted communities through training, technical assistance, business advocacy, and grants, and secondly, establishing a system, comprised of Marketing Centers and community groups for the sustainable collection, exchange, dissemination, and application of market information. The project has been operating since mid 2005.

ACDI/VOCA SME Finance Project (USAID). Through a cooperative agreement with USAID, ACDI/VOCA launched the project in September 2005. The project has five main components: (i) *ABTC* assists the Azerbaijan Bank Training Center in curriculum and course development and the pursuit of accreditation by and affiliation with North American or European institutions of higher learning as a means to enhance the skills of the industry's workforce; (ii) *AMFA* supports the development of the Azerbaijan Micro-Finance Association (AMFA) to support and advocate for its members interests and support common objectives; (iii) *Legal and Regulatory component* provides expert assistance to stakeholders on the issue of the legal and regulatory environment in which non-bank lending institutions operate; (iv) *Financial Sector Development* assists the Government of Azerbaijan and the development community on assessing constraints to the financial sector's development and coordination of efforts to abate these constraints; and (v) *Credit Guarantees component* develops a credit-enhancement facility through the Development Credit Authority to help micro-and SME-finance companies raise capital.

Microfinance Bank (EBRD, IFC, KFW, and BSTDB). To promote micro, small and medium-sized enterprises, the EBRD invested US$ 1.3 million in July 2002, along with IFC, KFW and BSTDB in the newly created Microfinance Bank of Azerbaijan and arranged technical assistance totaling EURO 1.3 million, funded by EU TACIS for the start-up of the Microfinance Bank. The bank started to operate in October 2002.

Unibank (EBRD). EBRD's activities in Azerbaijan are mainly focused on investments in the private sector and infrastructure projects. The EBRD bought 20 percent of Unibank in 2003. As a result of this transaction, Unibank improved its services to SMEs and was able to pursue its long-term aim of becoming the leading full-service bank.

EU. Between 1992 and 2004, the total assistance provided by the European Community to Azerbaijan amounted to some Euro 400 million. One of the principal EU instruments has been the Food Security Program for amount of Euro 57 million. Budget support from this program has been targeted at poverty reduction policy, land reform, the related market reform and information policy, support to the social sector, agricultural reform, including post-privatization issues, good governance in public finance and public expenditure.

Asian Development Bank. The Asian Development Bank mainly provides assistance in four strategic areas: internally displaced persons, agriculture and rural development (including flood mitigation), social

infrastructure and transport. The Microfinance Bank of Azerbaijan started to operate in 2002 with financial help from ADB and EBRD among others. The ADB is currently in the process pr preparing an additional project to support the microfinance sector of the country.

Other Donors

Japan recently became the largest bilateral donor to Azerbaijan with soft loans in excess of US$ 500 million for renovation of power plants as well as smaller grant assistance for agricultural equipment, equipment for a maternity hospital and sports equipment and vocational training.

Germany is the largest EU member state bilateral donor in Azerbaijan with over 80 million Euro in loans and grants and technical assistance principally in the fields of energy, SME/financial sector, municipal infrastructure, agriculture, legal reform and privatization. In addition, KFW is considering supporting the real estate registration and cadastre system.

Annex 3: Results Framework and Monitoring

AZERBAIJAN: Second Agricultural Development and Credit Project

Results Framework

Project Development Objective	Outcome Indicators	Use of Outcome Information
To enhance the access of farmers and rural entrepreneurs to rural business and agricultural services including financial, advisory and veterinary services and to stimulate market-oriented investment in rural areas.	Incomes of participating farmers and rural entrepreneurs increased by 20% through improved access to services and through vertical integration	End YR2: review of program approaches at MTR and adjust it accordingly
	Production marketed for cash increased by 20% as a result of increased quantity and improved quality of production	End YR4: assess impact of project components at completion and re-enforce strategic messages for development of the sector
Intermediate Results	**Results Indicators for Each Component**	**Use of Results Monitoring**
Component I:	**Component I:**	**Component I:**
Improved outreach and financial performance of CUs	At least 10,000 persons accessing credit through CUs	YR1-YR3: assess quality of the CUs' portfolio and the effectiveness of the CIA corporate strategy
Greater outreach to rural areas by PFIs (commercial banks and leasing companies), leading to increases in their rural loan portfolios	Rural outstanding loan portfolio increased to 2.5 % of Agricultural GDP	YR1 - YR3: assess the effectiveness of capacity building and the reach of PFIs in rural areas
High quality innovations linking farmers and markets introduced by rural business entities	Around 90 rural business innovations conducted satisfactorily, with improved practices demonstrated to at least 150 rural business entities	YR1: review design and conditions of CGP YR2-3: implement annual national results workshops; assess the impact and adjust the program accordingly
Component II:	**Component II:**	**Component II:**
Capacity and outreach of the information and advisory system enhanced to provide technical and business advisory and market services	Additional 20% of persons benefited from services in the old regions targeted during ADCP-I	YR1 – YR4: review satisfaction of farmers and farmer groups with the range and quality of advice, monitor the quality of the advisory services, assess the impact, and adjust the program accordingly
	Around 50% of farm households reached in the new regions through training courses, demonstrations and individual advisory services	
	RACs recovered up to 20% of their operational costs in the old regions and up to 10 % in the new regions	
Network of private veterinarians expanded and trained	Around 75% of VFUs recovered their operational costs, and livestock owners satisfied with services received	YR1 – YR4: review satisfaction of farmers and farmer groups with the range and quality of veterinary services; conduct rapid assessments for program adjustments

Improved disease surveillance & preparedness functions of SVS, including the upgrade of brucellosis program	Brucellosis controlled effectively, shown by 25% reduction in human cases	Rapid assessment surveys to review disease pressure and its changes. Program to be adjusted accordingly.
Increased availability of locally adaptable new technologies to farmers and farm business	Around 35% of farmers satisfied with quality of locally adapted seeds and seedling varieties	YR1 - YR2: conduct on-going monitoring of quality of research and review of satisfaction of farmers and farmer groups with the range and quality of advice YR1-4: Conduct on-going monitoring of milestones, assess the qualification of the institutes for the next step

Arrangements for results monitoring

	Target Values					Data Collection and Reporting		
Outcome Indicator	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
Incomes of participating farmers and rural entrepreneurs increased through improved access to services and through vertical integration	To be established by baseline survey Composite index of production (as proxy for income) per sample participating farmers of significant crops and livestock		Incomes of farmers and rural entrepreneurs to be increased by 10%		Incomes of farmers and rural entrepreneurs to be increased by 20%	At MTR and completion	Sample survey	M and E Officer to commission and supervise baseline, follow up and final survey
Production marketed for cash increased as a result of increased quantity and improved quality of production	To be established by baseline survey Composite index of production per sampled participating household marketed for cash		10% increase over base levels		20% increase over base levels	At MTR and completion	Sample survey	M and E Officer to commission and supervise sample survey
Component I: Agricultural Business Services								
Financial Services for Small Agribusiness/Credit Unions								
No. of persons accessing CUs increased	3,000 clients served		5,000 clients served		10,000 clients served	Semi-annually	CU reports	MIS officer for CU component
Financial Recovery Rate	High recovery rate – 95 %		No less than 95 %		No less than 95 %	Semi-annually	CU reports	MIS officer for CU component
Financial Services for Medium Agribusinesses/ Banks and Leasing Companies								
Rural outstanding loan portfolio as % of Agricultural GDP	(To be confirmed)		1 % increase over the base level		2.5 % increase over the base level	Semi-annually	PFI reports	M&E officer
Profitability and asset quality						Every four months and during supervision missions	Report based on information to be provided by PFIs	PFIs/PMU rural finance specialist

	Target Values					Data Collection and Reporting		
Outcome Indicator	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
Development of Efficient Rural Market Links								
No of rural business innovations conducted satisfactorily, and no. of business enterprises who are demonstrated improved ways of doing business	0 rural enterprises		30 enterprises with innovative links between farmers and markets	60 enterprises with innovative links between farmers and markets	Improved ways of doing business were demonstrated to 150 enterprises	Semi-annually	PFI reports PIU reports on CG allocation	M and E Officer to commission and supervise enterprise survey, and to monitor semi-annually
Rural Business Advisory and Market Services								
No. of persons, who benefit from the services	To be determined by a baseline survey		5% increase over base levels		10% increase over base levels	Semi-annually	PIU reports on CG allocation	M and E Officer to commission and supervise sample baseline survey, and to monitor semi-annually
Component II: Agricultural Services								
Information and Advisory Services								
Number of farmers accessing advisory services	About 277,000 farmers (around 55 % of total farmers in the five regions) received advisory services in the five existing regions in ADCP-I	Base plus 5%	Base plus 10%	Base plus 15%	Base plus 20%	Semi-annually	Advisory services reports	M and E Officer
	About 380,000 farmers reside in the new five regions To be specified further by a baseline survey		25 % of the total farmers covered		50 % of farmers of the total farmers covered			
Percentage of Operational Cost Recovery of RACs	10% of operational cost recovered in the five existing regions (to be confirmed)		15% of operational cost		20 % of operational cost	Annually	RAC reports	M&E officer
	0% in the new regions		5% of total cost		10% of total cost	Annually		
Veterinary Services								
% of VFUs who recover their operational costs	To be determined by a baseline survey		10% of VFUs	33% of VFUs	75 % of VFUs	Annually	VFU reports	M&E officer

	Target Values					Data Collection and Reporting		
Outcome Indicator	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
Few human cases of Brucellosis	To be determined by a baseline survey		12.5% drop from the base		25% drop from the base	Annually	Reports from hospitals and clinics	SVS, M&E officer
Improved Access to adapted Technologies								
Improved access of farmers to high quality and locally adapted seed and seedling varieties	To be determined by a baseline survey		10% of farmers satisfied with locally available seeds and seedling varieties		35% of farmers satisfied with locally available seeds and seedling varieties	Annually	Focus Group Interview Beneficiary Assessments	M and E Officer to commission and supervise surveys, and to monitor annually

Annex 4: Detailed Project Description

AZERBAIJAN: Second Agricultural Development and Credit Project

Project development objective and summary project description

The main objective is to further increase rural productivity and incomes by enhancing the access of farmers and small and medium rural enterprises to rural business and agricultural support services including financial, advisory and veterinary services and by stimulating market-oriented investments in rural areas. The project will build on ADCP-I's achievements by: (i) strengthening the credit union system established under ADCP-I and stimulating commercial financial services suited for agricultural businesses; (ii) expanding the outreach of the rural advisory services established under ADCP-I; (iii) developing private veterinary services and modernizing and streamlining the State Veterinary Services; (iv) improving access to adapted technologies by modernizing one or possibly two selected agricultural research institutions; and (v) assisting producers and processors in marketing and improved product quality. The regional expansion of the immovable property registration pilot of ADCP-I would be handled under a separate proposed Real Estate and Cadastre Project. This project is being prepared in parallel with a target board date in FY07. The main project beneficiaries comprise individual farmers, farmer groups, rural micro-entrepreneurs, and the small to medium agro-processing sector.

The major focus of the project is to fill the gap between rural producers and higher end markets by assisting value-added business initiatives. Although many agricultural producers are partly semi-subsistence in nature, there is evidence that farmers and processors are moving towards vertical integration down the supply chain. There is an increasing demand from individual farmers, producer associations, and small and medium enterprises for support services in agricultural production, marketing, business advice, veterinary support and finance. The project will also build on the experience from ADCP-I.

The project consists of two pillars, addressing critical support needs at the farm level and at the rural business and agro-processor level.

Component I - Agricultural Business Services (US$ 42.1 million)

Component Objective: The objective is to support rural businesses to improve the linkages between their production and markets and to enhance access to financial services by small and medium size rural enterprises (including farmers), agro-processors, and other forms of agribusinesses, through: (a) capacity building to participating financial institutions (PFIs) in order to improve their staff's lending skills and to promote new financial products; and (b) providing badly needed funds for lending to their clients. The component aims to develop efficient linkages and contractual relationships between producers and processors, and to facilitate investments in market opportunities through enhanced access to financial services and targeted business support. The key recipients of the project benefits will be the individual farmers, farmer groups, agro-processors, and other agribusiness. PFIs will also benefit through improved skills and a diverse menu of suitably adapted financial products and services.

Issues Addressed: In spite of positive growth in other sectors of the economy, agricultural production continues to under-perform, and food markets remain dominated by expensive imports. A large share of the agricultural production of Azerbaijan is not well-linked to more sophisticated market and processing chains. However, an increasing number of small and medium rural businesses are seeking to fill these gaps and to link processing, service provision and production activities, but their development is hampered by an insufficient range of financial and business management services and poor access to technological improvements. Demand for rural/agricultural financial services is high and it is currently

not being met sufficiently. Improved financial instruments are required that are better tailored to the rural clientele that is largely characterized by small farms, lack of suitable collateral, inadequate financial skills, and production and commodity market risks that are specific to agriculture

Component Activities: The component would support the further development of farmers, small rural businesses and agro-processors by: (a) increasing the availability of small-scale rural financial services by strengthening and broadening the credit union outreach; (b) expanding rural financial services such as credit for working capital requirements, long-term credit for investment purposes, and leasing programs for processing and agricultural equipment; (c) enhancing the efficiency of rural markets by introducing innovative mechanisms that encourage sustainable linkages between developing small-scale rural businesses and agro-processors with farmers, associations and groups; and (d) strengthening rural business, market information and promotion services offered through the rural advisory system.

A - Financial Services for Small Agribusiness/Credit Unions

Under ADCP-I, some 30 credit unions were created. Credit was also provided through some 1,300 borrowers' groups. Together, the credit unions and borrowers' groups served about 31,000 clients, principally farmers and small rural enterprises. Loans were primarily short term, predominantly for crop production and livestock-rearing, with a reasonably high recovery rate of over 95%. The demand for these credit services remains very high as well as a growing demand for longer maturity investment loans. Furthermore, the credit unions would like to introduce deposit-taking, starting with the stronger credit unions, which would require changes in the current legislation.

Building on the gains made under ADCP-I, the second phase would support the consolidation of this network through a judicious combination of more lending resources and a measured capacity building program. In particular, ADCP-II would support: (i) expanding the outreach of this network to more communities through additional lending resources and establishment of an additional 20-30 credit unions; (ii) introducing product innovations, including offering longer maturities in response to client demands; (iii) strengthening liquidity and risk management skills; (iv) introducing improvements in the network's operating systems and procedures to cope with the expected growth in the scale of its operations (larger number of clients, more diverse product menu, and greater geographical coverage); (v) strengthening the Azerbaijan Credit Union Association and the Credit Implementing Agency (a non-bank financial institution owned by the ACUA) in refining its corporate strategy in order to ensure its long term sustainability.

The ADCP-I revolving fund of about US$ 9.5 million will continue to be used for the purposes of the credit union financing. An additional US$ 8.7 million will be injected into the system to allow the existing credit unions to grow and expand the credit union network. Only satisfactorily performing credit unions will be eligible to participate in the project. It is expected that around 10,000 CU members can be reached at the end of the project. The network would then be further consolidated in the third phase of the APL. Lending to borrower groups will be continues in ADCP-II. However, for the medium term borrower group lending will be phased out to allow sufficient funding and growth of the credit union network, given that lending through borrower groups is not sustainable in the absence of further funding support while the credit union network could become sustainable. The credit implementing agency will, therefore, become an on-lending agency.

Capacity Building for Credit Unions. Regarding credit unions, the project will support technical assistance for: (a) legal and regulatory reform; (b) training; (c) updating their MIS; and (d) expanding the CU network.

(a) Legal and Regulatory Environment. The objective is to create a legal and regulatory environment for effective supervision of credit unions in order to progressively and selectively introduce deposit taking services. Specific project activities will include: advising on international best practice of laws and regulations pertaining to credit unions; assisting in the elaboration of criteria for evaluating CU readiness to undertake deposit taking functions; assessing existing credit unions against these criteria and proposing a preliminary list of those that might qualify to take deposits; clarifying supervisory responsibilities; providing capacity building opportunities for NBA and ACUA staff, drafting a training program and conducting the training for credit union supervision.

(b) CU Training. The objective of this activity is to create a training capacity within ACUA (to carry out training either on their own or through out-sourcing) as well as conduct training programs, particularly for the new credit unions. Specific activities aimed at creating a training capacity will consist of: identifying ACUA and non-ACUA potential trainers (e.g. the Bank Training Center) who would then be trained to become CU trainers; assisting ACUA in elaborating a training policy; reviewing the current training manual for its adequacy and carrying out the needed modifications; and conducting training, particularly basic training of new credit unions. This will be carried out alongside ACUA and non-ACUA trainers in order to impart on them the needed training skills. Training will also be conducted on new financial products, risk management, etc. Money will also be provided for study tours and external training for ACUA and CIA management and staff.

(c) Updating MIS and Monitoring and Evaluation Systems. The objective of this activity is to update the MIS systems of credit unions and the CIA in view of the expected addition of deposit taking functions to their activities, and updating the Monitoring and Evaluation systems in the whole system (CU, CIA, ACUA). Specific activities will include: designing and installing deposit modules to the MIS; updating the monitoring and evaluation systems; and designing and conducting an accompanying training program.

(d) Expanding the CU Network. Funds will be provided to facilitate the creation of 20-30 new credit unions, and expand the activities of the current ones. This will largely consist of procuring office equipment (e.g. safes) and office supplies.

B - Financial Services for Medium Agribusinesses/Banks and Leasing Companies

The agro-business marketing and processing sectors remain severely constrained by the lack of capital in general, but investment capital in particular. Whereas the banking sector has in recent years registered significant gains in the availability of short-term lending resources, long term resources remain limited. As the pace in agricultural production begins to grow, marketing and processing constraints will increasingly act as chokepoints in the value chain. Consequently, banks and leasing companies still need long-term funds in order to respond to investment demands from their clients. Similarly, bank and leasing company skills in appraising long term agricultural-related investment loans are also limited. Therefore, the project will provide a credit line for use by banks and leasing companies to extend investment loans/leases to agribusinesses. It will also support capacity building to participating financial institutions to improve their skills in appraising rural and agriculture-related medium and long term investments, in risk assessment and management, and in product innovation (e.g. structured finance).

Technical Assistance for Commercial Banks. PFIs will receive training on the specifics of lending/leasing to agribusinesses, and in particular, the appraisal of medium and long term rural investments, including their associated risks. Training will also focus on innovative financial products in order to enrich their product offering.

Line of Credit for CIA. An IDA credit line estimated at US$ 8.7 million will be made available for on-lending to credit unions and groups of jointly liable borrowers through the Credit Implementing Agency. An Agency Agreement will be signed between the State Agency for Agricultural Credits (SAAC) under the Ministry of Agriculture on the one hand, and the Credit Implementing Agency on the other, stipulating the credit line's on-lending terms and each signatory's rights and obligations. CIA lending manuals, which were recently updated under ADCP-I, are generally satisfactory. Under ADPC-I, SAAC lends the credit line proceeds in the local currency, which will also be the case in ADCP-II (see further treatment of this subject under Implementation Arrangements).

Line of Credit for Banks and Leasing Companies. A credit line, financed from 'hard' IDA resources, currently estimated at US$ 8 million plus additional co-financing of around US$ 7 million would be made available for investment activities, principally for agro-processors and other agribusinesses through qualifying PFIs as specified in the Rural *Investment Guidelines.* A PFI will be a commercial bank, a leasing company, or a credit organization selected on the basis of a set of *PFI Eligibility Criteria,* which include compliance with banking laws and prudential norms and regulations, maintenance of a healthy financial status and sound lending policies and procedures. The PFI will be responsible for identifying prospective borrowers and appraising the feasibility of the proposed investments, and will assume full lending risks. While appraising sub-loans, PFIs will, among other things, verify their conformity with *Sub-Project Eligibility Criteria.* Sub-project compliance with *Sub-Project Eligibility Criteria,* including compliance with environmental safeguards, are detailed in the Rural Investment Guidelines and will be monitored throughout project implementation.

Currently, virtually all credit lines through commercial banks in Azerbaijan are dollar-denominated. Banks have expressed preference for dollar-denominated loans, and the potential agribusiness clients have expressed indifference to currency denomination.

The refinancing rate will be US$ 6-month LIBOR + 2.0%. Currently, US$ 6-month LIBOR is around 5.1% (April 2006). Thus, the refinancing rate is expected to be in the order of 7.1%. This is within the range of interest rates offered by commercial banks on US Dollar deposits about one year. Some banks offer higher, rather speculative rates in order to attract long term deposits. As indicated earlier, the growth in deposits will be largely driven by the growing macro-economic stabilization, improved commercial bank performance, and the growing confidence in the banking industry. In any case, the credit line's US$ 15 million, which is 1% of total bank deposits, has clearly inconsequential influence on deposit taking behavior among commercial banks. Consequently, the pricing of the refinancing rate will not create disincentives for domestic deposit mobilization among recipient institutions. The rate is slightly lower than that rates charged by the more urban oriented credit lines, in order to spur interest in agribusinesses, an area that commercial banks currently find unattractive because of the special lending skills required to engage in such a sector.

PFIs will set their own interest and repayment terms to final beneficiaries and would bear the full risk of loan repayment. Only loans above 2 years will be eligible for financing under the credit line to commercial banks. Considering the scarcity of long term funding among commercial banks, PFIs will not be required to contribute to sub-project financing. On the other hand, sub-borrowers will be expected to contribute a minimum of 20% towards the cost of each sub-project.

C - Development of Efficient Rural Market Links

During ADCP-I, a Competitive Grants Scheme (CGS) was introduced that provided grants primarily for agricultural research topics. The CGS in ADCP-II would build on this experience, but would shift its focus to introducing, testing and transferring new and improved technologies emphasizing improved market accessibility, storage and small-scale processing. Grants would be available for a wide range of possible technologies in quality production, processing and marketing, business management and best business practices. Market studies to enhance the ability of rural business entities (RBEs) to identify and access markets, both within Azerbaijan and abroad, would also be eligible when associated with concrete technical actions to be taken for one or more products. Grants would be provided in response to proposals from various RBEs, and thus would be market-led and demand-driven, and would focus on real constraints of beneficiaries and possible long-term solutions in a flexible manner. The CGS would cover the whole country during the project and would not define a list of priority topics from the outset. However, as the CGS progresses, it may become necessary to prioritize or limit different types of activities depending on experience during implementation. Key elements in the selection process would include: (i) replicability of the proposed technologies and an appropriate plan for transfer of knowledge to other RBEs; (ii) suitability and affordability of proposed technologies in terms of increasing rural productivity, value-added, and market accessibility of agricultural products; and (iii) demonstrated improved linkage between producers and next level of the supply chain.

The CGS would award around 90 small grants averaging about USD 20,000 each, ranging from a minimum of USD 10,000 to a maximum of USD 30,000. The beneficiaries would be required to contribute an additional 30 percent of the total cost of proposed activities, either in cash or in-kind. At least 10 percent of the amount of each grant would be required to be used for technology demonstration and transfer activities, which may include field days, publications and media spots, while the cost of the technical assistance should not exceed 15 percent of the total grant amount. Applications would be developed and submitted by the RBE assisted by one or more service providers. The service providers would supply the business and management advice, technical assistance during implementation and demonstration of the technology, and assistance in technical and financial reporting.

The CGS would be extended over the whole of Azerbaijan during the course of the project. However, it would initially focus in the first year on two regions (Masalli and Ganja) in order to test and streamline the operational procedures in areas where: (i) there are a large number of potential market oriented RBEs; (ii) there is good potential for building on the work of previous and existing projects and programs; (iii) that are not too close to Baku, since regions further from Baku face more problems related to market linkages. In subsequent years, the CGS would expand to cover the whole country. Promotion and training activities would be carried out in each region in parallel with their incorporation into the CGS, to create a sound basis for submission of proposals. Related activities including the information and advisory services sub-component are also being implemented in these regions by the RACs as well as by other development agencies, and it will be essential to co-ordinate activities with them.

D - Rural Business Advisory and Market Services

To support market development in rural areas, the project would enhance the rural business advisory and market services offered through the existing structure supported during ADCP-I, which consists of the Information and Advisory Center (IAC) in Baku and the Regional Advisory Centers (RACs). Technical assistance and training would be provided through the project to help the IAC and RACs define and enhance their market support program; to improve the content, quality and availability of market information; and to develop the market promotion activities. Detailed activities are described as follows:

Market survey and information system: The current market survey and information system would be broadened to ensure that the frequency, format, and content meet the needs of producers and clients. The project would support market surveys and information dissemination, including volume levels of demand, quality, trends and competing imports. The current market information program consists of bi-weekly surveys of retail, wholesale and farm-gate prices at regional markets by the RACs and three Baku-area markets by the IAC, with the information collated by the IAC and made available to clients through the RACs. In ADCP-II, it is planned to include all main urban areas (Baku, Ganja, Sumgayit, Nakhchivan, Ali-Bayramli and Mingachevir cities) as well as the regional centers, with information made available through a website, newspapers and broadcasts, as well as the RAC system. Depending on the recommendations of the marketing expert, and to ensure that timely and relevant information is provided to producers and traders, seasonal production and price trends, assessments of supply and demand for specific products, and competing imports would also be included.

Market facilitation: In addition to the existing notice boards in PA training rooms and at the RACs, an electronic bulletin board for announcements on availability of products and items for sale and a telephone call-in system would be introduced. A data base on import-export organizational arrangements; information on land sale and rent; trade; and availability of agricultural machinery would also be prepared and made available on the website and through the RACs.

Training and information programs: The IAC would introduce a training and information program on food safety and quality, including agricultural grades and standards, and would expand its rural business development program. Training modules and information materials on food safety, quality and on rural business practices would be prepared, including topics such as marketing, legal and tax issues, use of credit, and book-keeping. Information campaigns are also proposed to be carried out on economic and legal mechanisms for agricultural exports; food safety and animal health issues; and tax policies and mechanisms affecting the agricultural sector. Information materials from previous campaigns on marketing and the legal and economic basis for entrepreneurship may also be reprinted. Revisions would be made to update the information in accordance with changes in legislation as required.

Market promotion services: Advisory and market promotion services would be made available to the increasing number of producer organizations, rural entrepreneurs, and professional associations. Local technical assistance would be provided as required on a contract basis in areas such as business management and market analyses as required by the client. Provision would also be made for specific market studies, which may include market analyses on behalf of associations and groups wishing to expand their market outreach, test new products, improve producer/processor linkages and introduce innovations likely to result in improving product quality and market access.

Technical assistance and training: Technical assistance and training would be provided through the project to help the IAC and RACs define and enhance their market support program; to improve the content, quality and availability of market information; and to develop the market promotion activities.

Component II – Agricultural Support Services (US$ 14.3 million)

Component Objective: The objective of the component is to enable farmers to improve their productivity and quality of production by expanding the outreach of the advisory system, strengthening the provision of private veterinary services, and modernizing one or possibly two selected agricultural research institutions.

Issues Addressed: There continues to be substantial need to improve both the productivity and efficiency of rural producers and the quality of production in order to better serve emerging markets. ADCP-II

would build and expand on the activities established under ADCP-I in the areas of advisory, veterinary and research services.

Component Activities: Three main sub-components have been identified: (a) supporting the further development of an effective information and advisory system that can provide farmers and other rural entrepreneurs with appropriate knowledge and skills to improve their productivity, quality of production, management and marketing; (b) assisting livestock owners to improve animal production through enhanced access to quality-assured veterinary and husbandry services throughout the country, and by restoring the disease surveillance and preparedness functions of the State Veterinary Service (SVS); and (c) improving the capacity of one or possibly two selected research institutes to provide adapted technologies and critical information to advisory staff and producers.

A - Information and Advisory Services

The program in ADCP-II would build on the strong foundations established during ADCP-I to further develop the advisory services on a wider geographical scale using a similar approach and structure. The component includes: (a) establishment of a national network of regional advisory services, and (b) support for the Information and Advisory Center.

(a) Establishment of a national network of regional advisory services

ADCP-II would provide support for contracting local NGOs/companies to establish RACs and to implement advisory services in 10 regions covering the whole of Azerbaijan. The contract would include costs of RAC management; contracting PAs; maintenance of farm data bases; collection of regional market prices; monitoring of PA activities; cooperative demonstration activities; local training costs; and introduction of a telephone call-in service. To improve outreach and access to information, small permanent advisory points (sub-centers) with computer access would be located in ten districts in the existing five regions.

Village-based PAs would be contracted through the RACs to implement extension activities at the village level, including conducting training course for farmer groups, provision of individual and group advisory services, and carrying out demonstration activities on their own or in other progressive farmers' fields. There would be some adjustment in the number of PAs in the existing regions, with existing PAs retained subject to a performance review and some new ones contracted. An additional 93 PAs would be contracted in the five new regions. The training topics for groups of 10 farmers and demonstration activities would be based on farmer requests, with Master Trainers (MTs) contracted by the IAC responsible for preparation of training modules. The modules may be modified by the PA based on local knowledge and conditions. Each PA would establish a training and information room with facilities, extension and demonstration materials, which may be re-located in different participating villages as the program progresses. Other RAC and PA activities include:

- definition of farmer training requirements;
- demonstrating Competitive Grant Programs within their regions;
- demonstrating research results from the MAF Regional Agro-Science Centers;
- extending the experience of progressive farmers to other farmers;
- creating joint activity groups and providing them advice on group activity, including support to borrowers groups;
- participating in exchange activities with other PAs;
- providing information services including a local bulletin board for announcements on availability of products and items for sale;
- planning and reporting.

The PAs and the RACs would also continue to develop sources of paid services based on individual advisory services, seasonal contracts and support to borrowers groups.

The expansion of the geographical coverage to incorporate the remaining regions was envisaged in the PAD when ADCP-I was prepared. It is in line with government policy as embodied in the Presidential decree of 11 February 2004 that outlines the regional development strategy for 2004-8, and the subsequent detailed Action Plan for regional development. The Plan indicates that a network of centers should be established throughout the country to provide information and advisory services, including marketing support. Accordingly, it is proposed to incorporate an additional five regions based around new RACs in Shamakhi, Barda, Salyan, Goychay and Guba/Khachmaz. These five regions would encompass almost 380,000 farmers in 28 districts, with an estimated requirement of around 93 PAs based on the number of farm households (Table 1). The required number of PAs is based on 4,500 farm households per PA in the plains areas and 4,000 in the mountainous areas.

Table 1. Geographical coverage of proposed new RACs

RAC region	Districts	Farm Households	Estimated Number of PAs	Starting Year
Khachmaz	Khachmaz, Gusar, Guba, Siyazan, Khizi, Devechi and Absheron	90,698	24	Early 2007
Barda	Tartar, Barda, Goranboy, Agdam and Yevlakh	74,610	17	Late 2007
Shamakhi	Gobustan, Shamakhi, Agsu, Ismailli and Gabala	61,272	15	Late 2007
Goycay	Goychay, Agdash, Ujar, Zardab and Kurdamir	68,746	17	Mid 2008
Salyan	Neftchala, Salyan, Hajigabul, Bilasuvar, Saatli and Sabirabad	82,923	20	Mid 2008
Total: 5	**Total: 28**	**378,567**	**93**	

Source: IAC

The program would continue to work in the five existing regions with the existing RACs. About 278,000 farmers received one or more advisory services during ADCP–I. Overall, however, there are 483,000 farm households in these regions with an average of about 3.8 land-owners per household. Accordingly, there remains substantial scope for widening the coverage in these regions as well as continuing to provide valuable services to existing clients. The number of PAs would be adjusted based on the ratio given above resulting in total of 112 in the existing regions.

For ADCP-II, it is anticipated that all new and existing RACs would be based on the private sector model tested during ADCP-I. The two existing public RACs are expected to be privatized by the end of the ADCP-I, which would allow these RACs to more readily compete for contracts and develop other programs. This choice is based on the overall government strategy for the sector as indicated by the Ministry of Agriculture and described in the draft Agricultural Development Strategy[6]. This strategy foresees that private entities would be responsible for activities such as provision of extension services, and could be contracted by government to carry out specific information and training activities that have a public good nature. This public-private system is now used widely in European countries such as Netherlands and UK. It is anticipated that the RACs and PAs would continue to develop their program of paid services under this system. However, evidence from other countries shows that 100% cost recovery is unrealistic; in the Netherlands, for example, around 62% of the revenue of advisory system is derived from government contracts.

6 Policies and Strategies for Azerbaijan Agriculture, draft prepared with support provided during ADCP-I.

(b) Support for the Information and Advisory Center(IAC)

The IAC is fundamental to the system through its coordination and supervisory role, including: organizing training of RAC staff and PAs; preparation of updated training modules; contracting of information campaigns; preparation and dissemination of training and information materials; monitoring and evaluation; and other essential support to the RACs. In addition to the full-time IAC staff, a number of Master Trainers (MTs) would also be available. The MTs would not be full-time staff, but would be contracted to provide training programs for PAs and other staff, for preparation of training modules for use by the PAs in farmer training courses, for monitoring activities, and for other tasks as required. A new round of selection would be carried out with the goal of ensuring and raising quality.

During ADCP-I, a training program was provided for MTs, including special courses in farm management, legal issues and agricultural credit. In turn, the MTs provided training for PAs and RAC staff in these and other topics. In ADCP-II, the training program would continue with a focus on management, marketing, financial issues, accounting, IT and other issues as required. Trainers for these courses would be drawn from a wide range of recognized expertise primarily from within the country. As before, the MTs would then provide training courses for PAs and RAC staff to continually upgrade their skills in these and other topics. In addition, training and methodological materials prepared during ADCP-I would be updated in accordance with new requirements and additional materials would be prepared as necessary.

To a large extent, the IAC facilities and equipment remaining from ADCP-I are adequate. However, provision would be made for minor office refurbishment, replacement computers and office supplies, and an additional vehicle for supervisory purposes.

The IAC would continue to contract local NGOs/companies to organize information campaigns, which have proved to be a very useful mechanism to deliver detailed information on specific topics. Six campaigns are proposed for ADCP-II based on similar methodology used in ADCP-I. Topics proposed and agreed with MOA are: Livestock husbandry and breeding; economic and legal mechanisms for agricultural exports; use of machinery services; pests and diseases of fruits and vegetables; food safety and animal health issues; and tax policies and mechanisms affecting the agricultural sector. However, the topics may change during implementation as priorities change. Due to the high demand, information materials may also be re-printed from previous campaigns to give a wider coverage and to include the new regions. In some cases, revisions will be made to update the information in accordance with changes in legislation, legal standards and norms, and technologies.

In addition to information campaign materials, a continuing program of preparation and broadcasting information would be carried out on economic, legal, and technological issues; development and distribution of information materials (leaflets, posters, brochures) including positive experiences obtained within the country; acquisition and disseminating international technologies obtained through the internet, media and other sources; and summarizing results of agricultural research. An information website would also be developed. It is anticipated that information would be disseminated to around 750,000 landowners, farmers, and entrepreneurs through various workshops, radio, television, and other media.

The IAC would continue its monitoring program with visits made every six months to all new RACs and PAs and annually for existing RACs to assess performance, maintain quality, identify problems as they arise, and adjust activities as necessary. In addition, impact surveys would be conducted as in ADCP-I to determine outcomes and impact as well as client satisfaction with the services provided.

The overseas study tours that were carried out during ADCP-I for two groups of 10 people to the Netherlands and Turkey were considered highly valuable for the further development of sustainable

advisory services in the future. It is proposed that similar study tours are carried out during ADCP-II to include staff of the new RACs, MOA staff at the policy level, IAC management and selected PAs identified on the basis of performance.

The advisory system would be mainstreamed into government structures to ensure long-term support and institutional sustainability. The IAC has already become part of the Ministry of Agriculture (MOA) as part of the newly formed State Agency for Agricultural Credits (SAAC). In the future, it is envisioned that the IAC would eventually become a permanent body in the MOA to continue the management of the advisory program after the end of the project, while the RACs would continue as private sector advisory service providers deriving part of their income from paid services and part from contracts with the MOA to implement specific public good advisory programs. The IAC would have responsibility for overall program supervision, contracting providers for training programs and information campaigns, technical support to the RACs, and monitoring and evaluation activities. Accordingly, MOA budgetary support is proposed for IAC operations and for contracting service providers including the RACs during ADCP-II, which is anticipated to be included in a stepwise manner.

Only limited technical assistance would be included in ADCP-II. An international marketing specialist would provide assistance and training to the IAC and the advisory system as a whole, with the goal of incorporating a greater market focus and clearly defining the activities to be carried out during the program. In addition, a national marketing specialist would be contracted by the IAC for a fixed term over the project to implement the marketing program. A further more detailed description of the proposed marketing activities is given in the previous section describing the marketing activities.

B - Veterinary Services

The program would build on ADCP-I by: (a) enhancing access to quality-assured veterinary services throughout the country by expanding and strengthening the private Veterinary Field Unit (VFU) system and supporting the privatization of the State Veterinary Service (SVS) field services staff; and (b) strengthening the disease surveillance and preparedness functions of the SVS through training key staff in understanding the epidemiological basis for disease control; rehabilitating the disease surveillance, diagnosis and reporting capacities of the SVS; and implementing an agreed control program against at least two priority diseases.

(a) Private Veterinary Practices: In ADCP-I, the delivery of curative animal health services for livestock owners was facilitated by establishing private Veterinary Field Units (VFUs) or clinics in 25 districts in five regions. Each VFU comprised three veterinarians. The program demonstrated that farmers were willing to pay for these services, client numbers increased steadily, and livestock owners were generally satisfied with the services available. By the end of ADCP-I, with the exception of Nakhchivan, the VFUs were averaging around 100 clients and almost US$ 300 in revenue per month. However, full self-sustainability was not attempted and a minimum incentive payment was retained to the end of the project. In ADCP-II, to increase the likelihood of sustainability, additional income-earning opportunities including artificial insemination and veterinary pharmacies would be introduced, and training would be provided to improve marketing and business management skills. A system whereby the private veterinarians would be contracted by the State Veterinary Service (SVS) to carry out public good veterinary tasks would also be introduced.

The geographical coverage would be extended to include 32 more districts to cover the whole country, although smaller VFUs may be established in some districts. Proposed new VFUs include:

- Region 1 - Agstafa, Gedabey, Shamkir, Tovuz, and Gazakh districts;
- Region 2 - Salyan, Bilasuvar, Neftchala, Sabirabad, and Hajigabul districts;

- Region 3 - Goychay, Kurdemir, Ujar, Zardab and Agdash districts;
- Region 4 - Ismailly, Gobustan, Shamakhi, Agsu, and Gabala districts;
- Region 5 - Khizi, Siyazan, Davechi, Guba, Gusar and Khachmaz districts;
- Region 6 - Mingachevir City, Tartar, Barda, Agdam and Yevlakh districts.

Yardimli district would also be included in the existing Lenkaran region.

All new VFUs would be based on a private sector approach from the outset, with their own premises and separate bank accounts. The private veterinarians would be selected based on applications submitted by SVS veterinarians wishing to establish private practices. In some cases, the option to improve a room in private facilities (homes) may be considered rather than renting premises. A start-up package of equipment and remedies would be provided as in ADCP-I, although based on locally available sources rather than more expensive overseas suppliers, and including small diagnostic equipment and AI equipment. Initial training would be provided in establishing a private veterinary practice. Incentives would be provided initially, but would be reduced to zero by the end of the project as income-generating opportunities come on line, with the schedule specified in the contract with the VFUs.

The existing 25 VFUs would also receive some continuing support. Some additional diagnostic and AI equipment may be provided along with refresher training focusing on business management. It is anticipated that a payment equivalent to the existing incentive would be provided initially, but would be reduced to zero by the third year of ADCP-II.

Continuing support would be provided for the further development of the Azeri Veterinary Association, including publications and workshops, based on a Memorandum of Understanding between the PMU and the AVA and an annual work-plan giving detailed costs and activities. Two bi-annual continuing education conventions would also be organized under the leadership of the AVA. Continuing education themes would be selected by the AVA membership.

(b) State Veterinary Services: The Ministry of Agriculture State Veterinary Service, which has the overall responsibility for animal health, would be strengthened with a goal of establishing a well-functioning and credible disease surveillance and reporting system in Azerbaijan. International technical assistance would be provided to assist the SVS develop a reform strategy, to devise and enable the Epidemiology Unit to implement control programs against at least two priority diseases, and develop a system for contracting private veterinarians. Diagnostic laboratories would be rehabilitated; key staff would be trained in modern epidemiology and risk-based disease management concepts; and technical assistance and other support would be provided. It is anticipated that brucellosis would be one of the priority diseases, but provisions against new risks such as avian influenza and bovine spongiform encephalopathy (BSE) or food contamination risks (*Salmonella, E. coli*) will also be considered.

The Republican Veterinary Laboratory in Baku and six zonal laboratories would be strengthened to diagnose possible exotic disease threats, with selected equipment items, glassware and disposable items. Modern equipment and training would be provided for enzyme-linked immunosorbent assay (ELISA) diagnostic technology, which is widely used for disease diagnosis but is also essential for confirmation tests for livestock with brucellosis. These laboratories would be selected on the basis of high concentration of brucellosis-infected livestock which would be determined following the nation-wide sero-prevalence survey. Structural works to laboratories may also be required. The requirements for laboratory refurbishment and equipping will be reviewed based on proposed inputs from the Avian Influenza project and other potential investments.

The SVS Epidemiology Unit would be strengthened to carry out the agreed National Brucellosis Control Program. International technical assistance would assist the SVS Epidemiology Unit to devise and agree on a control strategy for brucellosis and one or two other priority diseases; implement the agreed strategies; and monitor results. District-based disease investigation and reporting, where VFU veterinarians have a role, would be an integral part of the national surveillance system. Support for the proposed brucellosis serological survey and for a two-day National Brucellosis Control Program workshop to develop and plan the program is envisaged. Training would also be provided for SVS managers in modern management, application of modern epidemiological and risk-based management concepts. Provision has been made for attendance at veterinary technical conferences on disease surveillance, monitoring and control and for participation in relevant overseas specialized training or continuing education meetings. In addition, the component would address the medium to longer term needs to disease surveillance and monitoring, especially of avian influenza. This would include among others, the continued training of laboratory staff in the detection of the virus, the training and information of regional and local veterinary staff in the detection and response to epizootics, the development and training of guidelines and manuals for each level of responsibility and awareness building among the farming community for reportable diseases. The project would also support the upgrading of the regional and central diagnostic capacities.

C – Improved Access to Adapted Technologies

The program would build on the experience gained during ADCP-I's research-focused Competitive Grants Scheme. In ADCP-II, one or possibly two selected priority research institutes would be modernized to improve their capacity to develop and demonstrate adapted technologies for producers and processors, focusing on quality and market standards as well as productivity. In particular, the project would focus on: (a) development of high-yielding, market quality, disease-resistant and adapted varieties of major cereal, legume and horticultural crops; and (b) elaboration of various technology options in the areas of crop management, fertilization, plant protection, seed rate, crop rotation, and use of irrigation – i.e. crop husbandry research – for major cereal, legume and horticultural crops. Based on this emphasis and on the research strategy[7] prepared during ADCP-I, one or, depending on funding availability, two priority institutes suggested by the Government would likely be supported - the Research Institute for Crop Husbandry and Crop Diversification (NRICH) and the Research Institute for Horticulture and Sub-Tropical Crops (RIHSC).

Support will be based on achievement of the reform proposals prepared for each institute, including proposed organizational changes, a shift in research orientation and priorities, implementation of staff training programs, modernization of facilities and laboratories, and government budgetary commitments.

The project would support the rehabilitation and refurbishment of existing buildings, including workshops, storage facilities and laboratory facilities at the NRICH, at the Tarter Experimental Station and RIHSC. The project would support the acquisition of essential farm and plot machinery for the Absheron headquarters of the NRICH, for the Guba headquarters of the RIHSC, as well as one or two items needed on selected experimental stations including Tartar for the crop improvement and agronomy programs. Equipment for the four laboratories that would support the programs at NRICH (soil and plant analysis, grain quality, seed quality and plant protection) and the three laboratories at RIHSC (plant protection, product quality and biochemistry labs) would also be provided. The project would also support the establishment of a computer network and internet access to enable access and to share research information.

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7 Strategy for Modernization of Agricultural Research System, prepared with support from ADCP-I in 2003.

The number of staff at the research institutes would be reduced in line with the reform proposals, although younger staff would be recruited for some positions based on a human resource development plan prepared prior to implementation. Training programs would include in-country training courses in modern research technologies, computer and language skills, and overseas course for young scientists needing to complete post-graduate studies. Incentive awards would also be considered to attract young scientists.

Support would be provided for implementation of research activities on a cost-sharing basis with government funds. This support includes a proposed revolving input fund, an allocation for laboratory reagents and supplies, and costs for staff travel.

The research institutes would link closely with the information and advisory services for field demonstrations and workshops, publication of good practices, and information and training activities. Support would be provided for the establishment of demonstrations, implementation of field days and workshops, leaflets and other publications. The NRICH would focus on providing high-yielding, disease resistant varieties of major grain and legume crops and agronomic practices for different agro-ecological regions of the country. The institute would develop varieties as well as produce elite and super elite seeds at its Tartar Experimental Station, but would not be involved in commercial seed production, which would be primarily the responsibility of the private sector. The RIHSC, working with their regional stations, would provide rootstocks, seedlings and planting materials, and information on pest and disease control, organic production, and quality aspects including grading and packaging.

The Institutes would have new Boards of Advisors comprising membership from producers, processors, traders, information and advisory services, private sector, NGOs and representatives of the Ministry of Agriculture, Ministry of Finance and Ministry of Economic Development. Provision will be included for associated costs, including costs of meetings and travel of Board members.

Component III - Project Management (US$ 1.3 million)

The project would support the establishment and operation of a Project Management Unit (PMU) under the Ministry of Agriculture and would build on the structures established under ADCP-I. The implementation arrangements are described in Section C.2 and detailed in Annex 6.

Annex 5: Project Costs

AZERBAIJAN: Second Agricultural Development and Credit Project

Project Cost By Component and/or Activity	Local US $million	Foreign US $million	Total US $million
Component 1 - Agricultural Business Services			
Support to Credit Unions	18.403	0.456	18.859
Support to Agribusinesses	19.654	0.233	19.887
Development of Market Links	1.708	1.576	3.284
Total Component 1			42.030
Component 2 – Agricultural Support Services			
Information and Advisory Services	8.233	0.237	8.470
Veterinary Services	1.646	1.155	2.801
Improved Access to Adapted Technologies	1.162	1.259	2.421
Total Component 2	11.041	2.651	13.692
Component 3 – Project Management	0.988	0.232	1.220
Total Baseline Cost	51.777	5.226	57.003
Physical Contingencies	0.008	0.011	0.019
Price Contingencies	0.599	0.090	0.689
Total Project Costs[1]	52.385	5.327	57.711

[1]Identifiable taxes and duties are US$ 1.338 million, and the total project cost, net of taxes, is US$ 56.374 million. Therefore, the share of project cost net of taxes is 2.35 %.

Component Costs by Financiers (US$ '000)

	GOA: taxes		IDA		HARD IDA		Beneficiaries		PHRD Grant		Govt Budget		MOA Budget		Revolving Fund		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
A. Agricultural Business Services																		
1. Support to Credit Unions	41.7	0.2	8,785.2	46.5	-	-	-	-	505.2	2.7	-	-	-	-	9,560.0	50.6	18,808.9	32.7
2. Support to Medium Agribusinesses	0.0	-	12.6	0.1	8,696.0	43.7	3,924.0	19.7	262.2	1.3	7,000.0	35.2	-	-	-	-	19,894.7	34.5
3. Development of Efficient Rural Marketing Linkages	23.8	0.7	2,178.7	65.7	-	-	769.5	23.2	228.5	6.9	115.5	3.5	-	-	-	-	3,315.0	5.7
Subtotal Agricultural Business Services	65.5	0.2	10,976.5	26.1	8,696.0	20.7	4,693.5	11.1	996.0	2.4	7,115.5	16.9	-	-	9,560.0	22.7	42,102.6	73.0
B. Agricultural Support Services																		
1. Information and Advisory Services	679.0	7.6	4,672.7	52.3	-	-	-	-	111.6	1.2	68.7	0.8	3,402.6	38.1	-	-	8,934.6	15.5
2. Veterinary Services	191.7	6.5	2,270.6	77.1	-	-	-	-	391.9	13.3	92.6	3.1	-	-	-	-	2,946.8	5.1
3. Improved Access to New Adapted Technologies	349.5	14.3	1,946.5	79.5	-	-	-	-	81.9	3.3	71.2	2.9	-	-	-	-	2,449.0	4.2
Subtotal Agricultural Support Services	1,220.1	8.5	8,889.8	62.0	-	-	-	-	586.0	4.1	232.5	1.6	3,402.6	23.7	-	-	14,330.0	24.8
C. Project Management Unit	52.8	4.1	728.3	57.0	-	-	-	-	29.0	2.2	468.7	36.7	-	-	-	-	1,278.2	2.2
	1,338.2	2.3	20,500.0	35.7	8,696.0	15.1	4,693.5	8.1	1,611.0	2.8	7,816.6	13.5	3,402.6	5.9	9,560.0	16.6	57,711.4	100.0

Annex 6: Implementation Arrangements

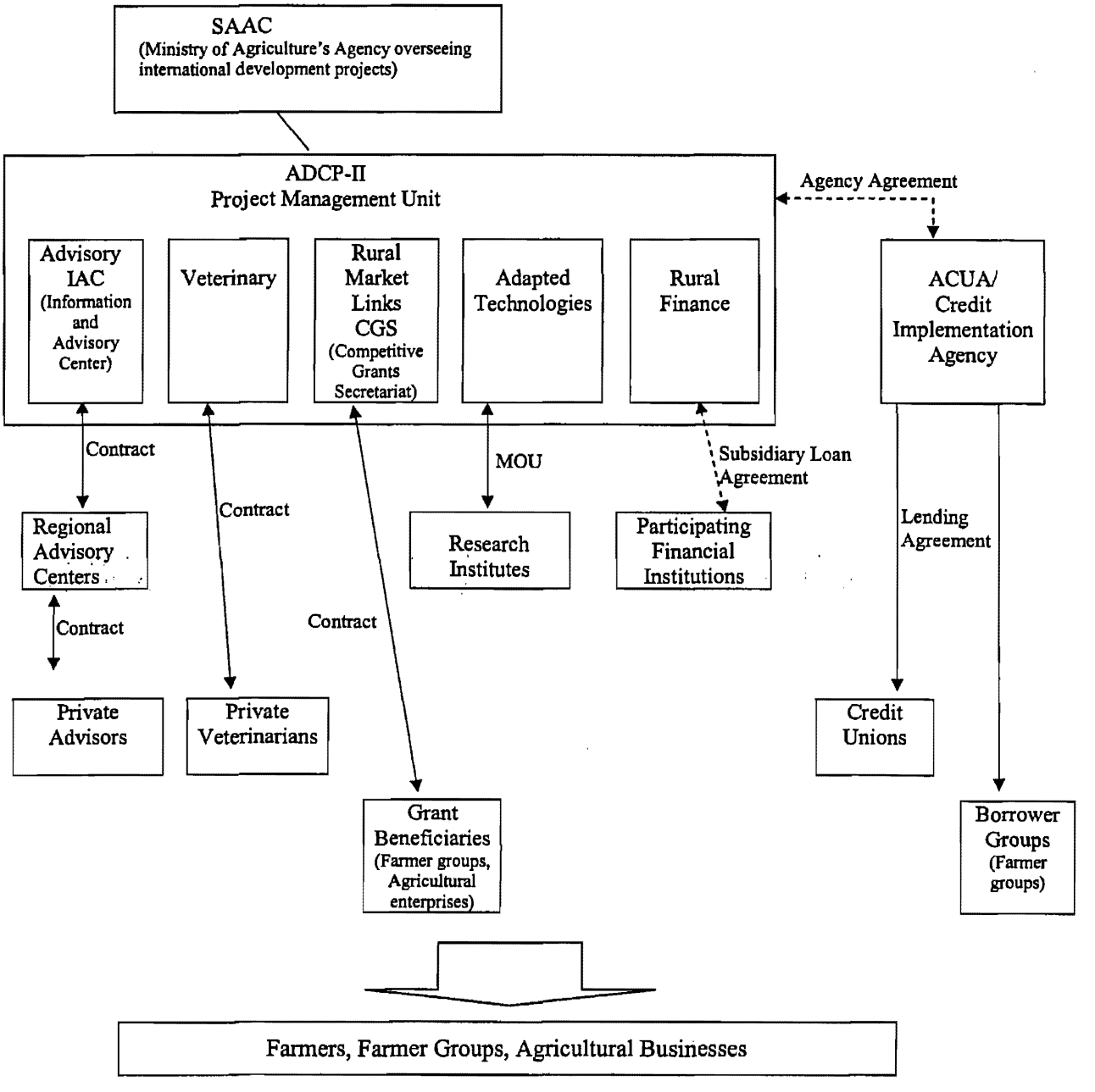
AZERBAIJAN: Second Agricultural Development and Credit Project

The project will be managed by the State Agency for Agricultural Credits (SAAC), which is the MOA's agency for overseeing international agricultural development projects, primarily through a small Project Management Unit (PMU) constituted within it. The PMU functions will include financial management, procurement, project monitoring and evaluation, and translation of project documents. The PMU Director will have responsibility for the day-to-day operations and management of ADCP-II, assisted by financial management, procurement and M&E specialists and support staff. There will also be a number of units under the management of the PMU that would be responsible for the coordination of the various components and that would take a pro-active role in ensuring timely start-up, implementation and completion of project activities. These units include the Competitive Grants Secretariat, the Information and Advisory Centre, the Veterinary team, and specialists responsible for marketing, research liaison and credit liaison. These units would also report technically to their respective units within the MOA, including the State Veterinary Service and the Agro-Science Centre responsible for agricultural research. The Information and Advisory Center, which is presently within the SAAC, is expected to become a permanent unit within the MOA after the completion of the project. For the rural finance activities, the SAAC would disburse funds to the existing Credit Implementing Agency (CIA) for on-lending to the Credit Unions or Borrowers Groups (BGs), while for the commercial bank credit line, SAAC will lend to commercial banks under subsidiary loan agreements in accordance with Investment Guidelines. The implementation arrangements are summarized in the diagram on the following page and are detailed for the different components as follows:

Financial Services for Small Agribusiness/Credit Unions. Under ADCP-I, disbursement arrangements for the rural finance component were as follows. SAAC disburses from the Special Account or from the Revolving Account (which now has some US$ 9.6 million) to the CIA. SAAC uses CIA as an agent under an Agency Agreement. CIA obtains money from SAAC at the Central Bank refinancing rate, and either wholesales it to CUs with a 3% margin, or retails it to final borrowers through a group lending methodology, in which case it applies a retail margin of 15%. CUs apply a margin of 13%. Thus, either way, final borrowers pay 25%. These are back to back loans, repaid to SAAC after every season. Under ADCP-II, the overall structure will be retained, although the pricing and lending mechanisms will be adjusted.

Financial Services for Medium Agribusiness/Banks and Leasing Companies
Regarding the credit line for commercial banks, SAAC will lend to commercial banks and leasing companies under Subsidiary Loan Agreements under terms to be defined therein, and in accordance with the Rural Investment Guidelines to be annexed thereto.

Development of Efficient Rural Market Links. The existing Competitive Grants Secretariat in the PMU would be restructured to coordinate and manage the CGS, including organization of information and training activities, publicity, proposal processing and grant administration, monitoring implementation progress, and organization of the evaluation program. The Secretariat would consist of a Chief Specialist; a Specialist primarily responsible for record-keeping and accounting and supporting the Chief Specialist in organizing training and information activities, proposal processing and monitoring; and a Specialist/Interpreter supporting the Chief Specialist with specific additional responsibility for translation of documents. The Secretariat would be provided with one vehicle and appropriate office and communications equipment to carry out the work. The Chief Specialist would report to the PMU Director. Local consultants may be contracted to provide training and conduct evaluations as required.



The selection process will include initial screening by the Secretariat to ensure compliance with the criteria, followed by a technical review by independent contracted specialists based on specified scoring procedures. An independent Competitive Grants Board (CGB) would have the responsibility for final selection of the winning proposals; for overall CGS policies and strategy; and for oversight of the CGP to ensure quality. The CGB would consist of nine members, with the majority from the private sector, and

would include members from the MOA, farmer/producer associations, NGOs, private sector rural businesses, the agriculture research and education system, and other rural development projects. This composition would involve all actors in the process and ensure that a full spectrum of experience, interest and perspectives was included. To maintain the independence of the CGB, the Chairman would be selected from the private sector members of the committee. The CGS Secretariat would act as secretary of the CGB, with minutes of each meeting fully recorded to ensure transparency. Proposals would be considered in half-yearly rounds, with at least three rounds submitted to the World Bank for their review and "no objection". Overall, the implementation of the CGS will be governed by an Operational Manual, which describes the operational procedures, regulations, eligibility and selection criteria, procurement and disbursement mechanisms, and reporting requirements.

Rural Business Advisory and Market Services. The sub-component would be implemented by the Information and Advisory Centre in Baku and the network of Regional Advisory Centers throughout the country. An international marketing expert would be provided through the project to provide assistance and training to the IAC and the advisory system as a whole, with the goal of incorporating a greater market focus and clearly defining the activities to be carried out during the program. One local marketing specialist would be appointed during the project period with specific responsibility for coordinating the marketing program, and who would report to the IAC Director. The other activities would be implemented using the contract approach, with training modules and information materials prepared by local available specialists and Master Trainers contracted on a short-term basis for specific assignments. The market survey data would also be collected by local specialists on a contract basis, and website development expertise may also be contracted as required. Market promotion activities and market studies would be provided as paid services to rural entrepreneurs, producer organizations and associations, with detailed mechanism determined during implementation based on the recommendations of the international marketing expert. The IAC would also coordinate with and inform existing programs such as the USAID-funded Rural Enterprise Competitiveness Project (RECP) and Azerbaijan Business Assistance and Development Project (ABAD).

Information and Advisory Services. The component would be implemented using the existing information and advisory structure. This structure presently consists of RACs in five regions along with contracted PAs to provide training, information and advisory services to farmers and other rural entrepreneurs, supported by the IAC in Baku for overall program supervision and management. The IAC would have responsibility for day-to-day management of the component, including preparation of TORs, although procurement and overall financial management would be the responsibility of the Project Management Unit as a whole. The IAC would be responsible for coordination and supervision of the information and advisory program including organizing training of RAC staff and PAs, preparation of updated training modules, contracting local providers to carry out information campaigns, preparation and dissemination of training and information materials, organizing the market information and market promotion activities, monitoring and evaluation, and other essential support to the RACs. The IAC would consist of Director; three Specialists responsible for contracts, information campaigns, training programs, and monitoring and evaluation; an Accountant; and support staff. A cadre of up to 20 Master Trainers would also be available for contracting to carry out training programs, prepare training modules, monitoring activities and other tasks as required. However, a new round of competitive selection of MT candidates will be carried out to ensure quality. As described above, a national marketing specialist would also be contracted by the IAC for a fixed term over the project to implement the proposed marketing activities as defined by an international marketing consultant.

For the RACs in the five new regions, local NGOs or companies would be selected through competitive tender based on TORs prepared by the IAC. The TORs would include a description of the activities required, the expected structure of the RAC, the proposed number of PAs, monitoring and reporting requirements, and would provide targets for the advisory activities such as training courses,

demonstrations and other outputs required. The selected NGO would be contracted for one year initially with an extension for second year based on satisfactory performance and achievement of the targets established.

For the RACs in the existing regions, and after the first two years for the new RACs, the NGOs would have their contracts renewed on a two-year basis subject to achievement of the targets set out in the TORs and on satisfactory performance evaluation, determined by regular monitoring by the IAC and on an impact assessment conducted before the completion of the contract. The contract amounts would be based on agreed unit costs for specific activities, and on the number of PAs in the region. The core structure of the RACs would remain the same as in ADCP-I, with about seven people including a Director; specialists responsible for contracts, information and data base development, training and evaluation; an accountant; and support staff. Each RAC would also have an Advisory Board, comprised of local stakeholders, to provide advice and direction on programs and activities.

The RACs would contract the PAs through a similar rigorous and competitive application process as in ADCP-I. The PAs would be local specialists with each responsible for several villages, and usually resident in one of the villages with their own land-holding. Following submission of applications, the most qualified would be selected to participate in a two-week training program organized by the IAC with a ratio of trainees to PA positions of 2:1. At the end of the training program, applicants would be tested for in-depth knowledge and aptitude, and the highest scorers selected. The PAs would be contracted initially on a short-term provisional basis while their performance was evaluated. As in ADCP-I, contracts would be based on implementation of specific tasks such as training courses and demonstrations, rather than on a monthly salary. The PAs and the RACs would also continue to develop sources of paid services including individual advisory services, seasonal contracts and support to borrowers groups.

Each RAC would prepare annual and monthly work-plans, to be submitted to the IAC, which would be based on a compilation of work-plans for each PA and for the RAC as a whole. Work-plans would be based on needs assessments and applications from farmers to participate in a range of possible training and demonstration activities. The RACs would submit quarterly and annual progress reports in an agreed format similar to that used in ADCP-I. The IAC would monitor RAC activities twice yearly for new RACs and annually for existing RACs to confirm that the contracted activities had been carried out to the required quality, based on monitoring criteria established during ADCP-I with the help of an international consultant. The scores derived from this monitoring exercise would be used to determine performance-related incentives provided to PAs and RAC specialists. Impact assessments would also be carried out in each region two months before the completion of each RAC contract in order to assess the value and demand for the services, to provide indicators for improvement, and to provide an input for determining whether RAC contracts should be renewed.

Veterinary Services. The sub-component would be coordinated by a Veterinary Team consisting of three national specialists contracted by the PMU, as under ADCP-I. One of these specialists would primarily be responsible for the overall coordination and monitoring of the sub-component activities; the second for institutional development of the VFUs; and the third for the support to the SVS including the disease surveillance and control program. The Veterinary Team would report on technical matters to the Chief Veterinary Officer and would report on project administrative matters to the PMU Director. The team would liaise with SVS staff at headquarters and regional levels, and would monitor VFU compliance and performance directly on a regular basis.
The private VFU veterinarians would be selected based on applications submitted by SVS veterinarians wishing to establish private practices. Selection criteria would include aspects such as technical expertise, experience in veterinary work, understanding of commercial practices and access to transport. Selected applicants would generally not be older than 45. All new VFUs would be private from the outset, with

their own bank accounts and premises, and would be provided with a start-up package of equipment and remedies. With the help of the Agency Veterinary Team, the VFUs would select the equipment and remedies from the list agreed during preparation up to the agreed value to reflect differences in disease incidence and requirements among districts. The Veterinary Team would combine the requests, and with the assistance of the PMU procurement officer, would obtain the supplies from locally available sources and distribute them to the VFUs. The Veterinary Team would also be responsible for organizing the initial, refresher training and other training for VFUs. Incentives for veterinarians to leave the SVS and establish a private practice will be provided initially, but will be reduced to zero by the end of the project as income-generating opportunities come on line. The VFUs would also be responsible for carrying out an initial disease survey to determine disease patterns and prevalence in their regions, and would also carry out tasks contracted to them by the SVS in disease surveillance and control as agreed with the SVS.

The contract between new VFUs and the PMU would be different from that used in ADCP-I, and would specify the support to be provided through the project, including the method of payment, duration and scaling down of incentive payments over the course of the project. For new VFUs, it is anticipated that incentives would be reduced to 50% in the third year of operation and to zero in the fourth year. For existing VFUs, incentives would be reduced by 20% per quarter from the second quarter of the second year of the project. The responsibilities of the VFU staff including care of equipment, keeping records and reporting would also be spelled out in the contract. The existing VFUs from ADCP-I would be required to sign the same contract for project support to continue. In the event of a VFU ceasing practice, all equipment would be returned to the project.

Support for the professional private Azerbaijani Veterinary Association (AVA) would be provided based on a Memorandum of Understanding between the PMU and the AVA and submission of an agreed annual work plan. Support would be provided only for implementation of the specified tasks, not for salaries. The AVA would have the responsibility for organizing workshops, publications and conferences for its members and representing its members in negotiation with the SVS and government.

The SVS would be responsible for implementing the disease surveillance and AI preparedness support activities in liaison with the Agency Veterinary Team. Specifically, the SVS and Agency Veterinary Team will collaborate in institutionalizing closer collaboration with the VFUs, supported by the international technical advisors. Provision has been made for contracting the private veterinarians for disease surveys and reporting, and thus piloting a mechanism for widening the contracting system. The Agency Veterinary Team and international advisor will prepare draft contracts for this purpose.

The SVS would assign a qualified veterinarian from the Epidemiology Unit to be the counterpart for the Disease Surveillance and Preparedness activities. A functioning modern disease control strategy by the SVS is a project objective. Senior management of the SVS and MOA would be responsible, in collaboration with international technical advisors, for; (a) developing and obtaining agreement for epidemiologically based disease preparedness plans; (b) implementing the agreed surveys and studies for at least two priority public health or livestock diseases, (c) implementing priority disease surveillance/control strategies through relevant government institutions; and (d) implementing avian influenza control mechanisms and assuring high capacity of the staff involved.

International technical assistance would focus on capacity-building for modern epidemiologically based surveillance and control of both endemic and exotic diseases. This technical assistance is required in order to: (a) put the skills learned into rapid practice; (b) build in-country capacity with these modern skills; (c) strengthen institutions and systems, including the Azeri Veterinary Association, SVS disease surveillance and food safety certification; (d) lead training in modern epidemiology and production-related medicine. Short-term training by international laboratory specialists, particularly for use of newer laboratory diagnostic and analytical equipment, will also be required.

Improved Access to Adapted Technologies. The sub-component would be coordinated by the Research Secretariat consisting of the Head of the Secretariat, who would also be responsible for the Competitive Grants Program, and a specialist responsible for liaison with the selected Research Institutes. The Research team would have overall responsibility for monitoring the compliance with agreed actions and performance of the Research Institutes on a regular basis. The Head of the Secretariat would report administratively to the Director of the PMU, with the PMU having responsibility for procurement, project financial management and overall monitoring and evaluation. The Head of the Secretariat would report technically to the Head of the Agro-Science Center of the MOA.

Project support would be based on an agreed annual work plan based on the reform strategy, and on achievement of a series of monitorable milestones. The milestones will be based on the implementation schedule proposed in the reform plan for each institute. The first milestone prior to implementation of the sub-component activities will be agreement on the restructuring plan for each institute and preparation and signature of a Memorandum of Understanding which will lay out the program including the implementation schedule and staffing program. Annual progress reports as well as the annual work-plans would be submitted for review to the WB.

The research institutes are under the subordination of the MOA. The institute that the project would cooperate with, would have an Advisory Board with a new composition and terms of reference with the responsibility of ensuring that a high standard of research work is maintained and the work is fully responsive to the new needs of the agrarian sector. It will set the policy standards, approve the work program and budgets of the institutes and will have a special responsibility for monitoring and evaluation of the institutes' work. The membership of the Advisory Board will include representatives' of private sector producers, agro-processors and traders; advisory services; NGOs and representatives of Agrarian Science Center, MOA, Ministry of Finance and Ministry of Economic Development. The chairperson will be an eminent person from the private sector. The membership of the Board will be approved by the Minister of Agriculture and the director of the institute will be an ex officio member of the Advisory Board. A Technical Committee will also be established at each of the institutes to assist the director with the management of the program. The Technical Committee will be chaired by the director and will include the deputy directors, leaders of the programs, heads of laboratories and research-extension coordinator. It would also include a few technical experts from outside the institute. The annual work plan and the budgets will be developed under the aegis of the Technical Committees and be passed to the Advisory Boards for approval.

The proposed staffing program, including staff reductions, will be agreed based on the proposals laid out in the reform programs for each institute. Included in the milestones will be completion of a staff assessment (skills analysis) for each institute; preparation of a human resources development plan; and a training plan for remaining and newly recruited young staff.

The research institutes would link closely with the information and advisory services for field demonstrations and workshops, publication of good practices, and information and training activities. The Research team in the PMU would be responsible for ensuring that extension activities are implemented in collaboration with the information and advisory system.

Annex 7: Financial Management and Disbursement Arrangements

AZERBAIJAN: Second Agricultural Development and Credit Project

Executive Summary and Conclusion. An assessment of the continuing adequacy of the financial management systems of the existing PMU within the State Agency for Agricultural Credits (SAAC) under the Ministry of Agriculture was carried out for the implementation of the proposed ADCP-II Project. Such systems include: accounting, financial reporting, staffing, internal controls, flow of funds for both the IDA Credit and the Government contribution, and auditing arrangements. The program support is provided through a three-phased 10-year Adaptable Program Lending Program of which ADCP-II is the second phase. The existing financial management arrangements at the PMU that is implementing the ongoing ADCP-I will continue for the implementation of the proposed ADCP-II. Conclusion derived is that the existing systems of the PMU meet Bank minimal financial reporting requirements. Although the ongoing ADCP-1 in-house accounting system is adequate for project accounting and is already generating the required quarterly financial reports, the PMU has decided to replace the existing system with an off-the-shelf 1C system/software. This software requires customization of the financial reporting module to automatically generate the required quarterly Interim Financial Reports. The system will be financed from the PHRD preparation Grant, and will be fully operational before the Project's effectiveness.

Country Issues. A Country Financial Accountability Assessment (CFAA) for Azerbaijan was carried out in 2003. The report identified weaknesses in the country's financial accountability and made recommendations to strengthen public sector budgeting; public and corporate sector accounting, auditing, governance; and institutional capacity building to sustain reforms. The Government has undertaken accounting and auditing reforms in the country, with support from the Bank and other development partners. Such reforms include: (i) development of Treasury Information System and improvement in budget preparation; (ii) enactment of new Accounting Law mandating introduction of International Financial Reporting Standards for public interest entities, including state-owned enterprises; (iii) institutional capacity building for implementation of accounting legislative reforms; and (iv) capacity building of the Chamber of Accounts (Supreme Audit Institution), and the Chamber of Auditors -the country's audit services regulator and standard-setter. The proposed Corporate and Public Sector Accountability Project will provide support to private sector development and investment, improve public financial management and accountability, and establish a sustainable training capacity in accounting and auditing. The project will be integrated into the Government's overall program of accounting and reform in the country

The Country Procurement Assessment (CPAR) carried out in 2002 reviewed the current two-stage control by the Ministry of Finance following budget allocation on contract-by-contract control whereby the prices of bids are compared to some "average market price" and rejected to the extent that the successful bid price exceeds the hypothetical market price. The CPAR recommended that this control should be abandoned as it leads to widespread inefficiencies and corruption. Another recommendation that impacts Project financial management was strengthening total budget control to ensure the value of all contracts entered into in any one budgetary year does not exceed the budget allocation for that year.

The **Country Portfolio Performance Review** of May 2005 identified some generic issues affecting Bank-financed projects. The key issues that are being monitored by the Ministry of Finance and the Bank include, amendment to the Public Procurement Law in line with international standards, enhancing capacity of the project implementing entities and government entities that implement Bank-financed projects through training in financial management and procurements. The Bank continues to provide training in these areas annually, and as need arises for the new project implementing entities.

Project Accounting and Financial Reporting. Accounting and financial reporting is centralized at the PMU. Cash basis of accounting is applied in project accounting and financial reporting using an in-house accounting software. Reports are submitted monthly to the PMU and enable the PMU to collect data for the consolidation of the Project financial statements. The existing in-house accounting and financial reporting software will be replaced with the 1C Bookkeeping that is capable of accounting and reporting in multi-currency and multi-languages (English and Russian), and which will be capable to automatically generate the required quarterly Interim Financial Reports[8]. The Interim Financial Reports will be used for project monitoring and supervision, and will include three parts: (i) **Financial Reports** which at a minimum must include statement showing cash receipts by sources and expenditures by main expenditure classifications for the period reported, cumulative and planned for the next period; (ii) **Physical Progress Reports** showing narrative information and output indicators agreed during project preparation, linking financial information with physical progress, and highlighting issues that require attention; and (iii) **Procurement Monitoring Reports** providing information on the procurement of goods, works, and selection of consultants, and on compliance with agreed procurement methods comparing procurement performance against the plan agreed at negotiations. A full set of Interim Financial Reports will be prepared quarterly throughout the life of the project, and submitted to the Bank no later than 45 days after end of each quarter. *A financial covenant on submission of the quarterly Interim Financial Reports and maintenance of adequate financial management systems is included in the legal agreement.*

Staffing and Internal Controls. The PMU has adequate number of skilled and experienced staff that have gained experience through implementation of the ongoing Bank-financed ADCP-I. Such staff includes the PMU director who reports to the SAAC, finance manager, two accountants, procurement manager, monitoring specialist, and other relevant specialists of the central PMU. The financial management team that comprises the finance manager and two accountants in the central PMU, and the accountants of the RACs have received training in financial management, disbursements and auditing requirements. Additional training will be required during the implementation of the proposed Project and the regional expansion of RACs. The duties of the financial management staff are properly segregated to ensure transparency in accounting and financial reporting. The finance manager is responsible for controllership function (planning, budgeting and financial reporting) and supervising the accountants, while posting of accounts in the accounting system, accounting for the competitive grant program, and treasury function (banking and general cash management) are assigned to the each respective accountant. Accounting and financial reporting rules, regulations, policies and procedures are documented in an existing Operational Manual.

Budgeting. Annual budget process starts in January of each year with the issuance of Decree of the Cabinet of Ministers in accordance with the Budget Law, and from directive issued by the Ministry of Finance and sent to recipients of budgetary funds. The budget is prepared and consolidated by the Finance Manager based on financing and expenditure needs from Project participating beneficiaries. The budget is reviewed by the PMU and Agency directors and forwarded to the Ministry of Finance for discussion and approval in July of each year. After discussions and negotiations between the SAAC/PMU and the Ministry of Finance, the budget is submitted to the Cabinet of Ministers by the Ministry of Finance in September of each year. Parliamentary approval of the budget takes place around November of each year. Budgetary allocations are made available to the SAAC/PMU in January or February of each year.

Funds Flow. The total project cost estimate of US$ 57.7 million will be financed with (i) IDA Credit (standard terms) of US$ 20.5 million equivalent; (ii) IDA Credit (hard term) of US$ 8 million equivalent; (iii) Government contribution of US$ 12.5 million of which around US$ 3.4 million are Ministry of Agriculture funds for the support of the information and advisory component plus US$ 9.56 million

[8] Formerly referred to as Financial Monitoring Reports (FMRs)

contribution from the LFI revolving fund; and (iv) Beneficiary contribution of US$ 4.55 million. The Borrower for the IDA Credit is the Republic of Azerbaijan, represented by the Ministry of Finance (MOF), and with the Ministry of Agriculture as the beneficiary.

The **Country Financing Parameters** for the Republic of Azerbaijan approved in December 2004 will be applied to determine the level of IDA and IBRD financing. These Parameters allow cost sharing of up to 100 percent, no country-level limit on financing of recurrent costs, and local and foreign costs may be financed in any proportions required for the project. Regarding financing of taxes, no taxes and duties are judged to be unreasonable. IDA can therefore finance all taxes and duties associated with project expenditures. In the Republic of Azerbaijan, international financial institutions' projects are exempted from paying VAT.

(a) Allocation of IDA Credit Proceeds. Funds will be disbursed against specific Project expenditures, including works, goods, consultant's services, training, grants and incremental operating costs. Procurement of these goods, works and services will be financed under IDA 'hard terms' (US$ 8 million), and IDA 'standard terms' (US$ 20.5 million). Disbursements of the Credit will be transaction-based, and will include reimbursements with full documentation, reimbursements on basis of Statements of Expenditures for small expenditures with defined thresholds, payments against Special Commitments, direct payments to third parties, and payments through the Special Account.

Designated Account. To facilitate project implementation, two Designated Accounts for standard and hard IDA term Credit funds will be opened in a commercial bank, on terms and conditions acceptable to IDA. The Designated Accounts will be replenished regularly, at least every three months, and audited in conjunction with the annual audit of the project.

The total authorized allocation to the Designated Accounts will be limited to with ceilings of US$ 1 million and US$ 2 million, respectively. Replenishment applications should be submitted at least every three months and must include reconciled bank statements as well as other appropriate supporting documents.

Statements of Expenditures (SOEs). SOEs will be used for: (a) goods contracts with estimated costs less than US$ 400,000 each; (b) works contracts less than US$ 400,000 each; (c) consultants contracts with firms less than US$ 200,000 each; (d) individual consultants less than US$ 50,000; and (e) incremental operating costs, training, and sub-loans. For all above contracts, full documentation in support of the SOEs will be retained at the PMU and made available for review by Bank missions during project supervision and by the project's auditors. Disbursements for expenditures above SOEs threshold will be made against presentation of full documentation relating to those expenditures. The SOEs documents will be retained at the PMU for at least two years after closing of the project.

Table 1A: Allocation of Credit Proceeds

Category	Amount of the Credit A Allocated (expressed in USD)	Amount of the Credit B Allocated (expressed in USD)	Percentage of Expenditures to be Financed
(1) Works and Goods		2,424,000	80%
(2) Consultant's Services, including Audits (a) for IAC and RAC under		2,685,000	70% until December 31,

Component 2 (a) of the Project (b) for others		 2,460,000	2008 and 30% thereafter 80%
(3) Training		1,294,000	100%
(4) Sub-loans under Component 1 (a) of the Project		8,650,000	100%
(5) Sub-loans under Component 1 (b) of the Project	8,700,000		55%
(6) Competitive Grants under Component 1 (c) of the Project		1,800,000	100%
(7) Incremental Operating Costs (a) for IAC and RAC under Component 2 (a) of the Project (b) for others		 212,000 975,000	 70% until December 31, 2008 and 30% thereafter 55%
TOTAL AMOUNT	8,700,000	20,500,000	

Competitive Grant Scheme. The CGS will award around 90 small grants averaging about US$ 20,000 each. The beneficiaries will be required to contribute at least 30 percent of the total cost of the proposed activities. Financing of grant activities from the IDA Credit will be made through local bank accounts opened solely for the purpose of the competitive grant program on terms and conditions satisfactory to IDA and the PMU. Replenishments to the bank accounts will be made on basis of agreed milestones and financial reports that are reviewed and approved by the CGS Secretariat, the central PMU director and finance manager before any replenishment are made. Existing accounting and administrative controls over the implementation of the Grant activities are adequate. An operational review will be carried out every two years, and as part of the project mid-term review.

Sub-Loans. Line of Credit for banks and leasing companies will be made available for investment activities for agro-processors and other agribusinesses. The Participating Financial Institutions (PFI) will sign Subsidiary Loan Agreement with the ADCP-II to make sub-loans to sub-borrowers on terms and conditions set forth in the Rural Investment Guidelines, and in accordance with Rural Investment Guidelines. The lending terms will be based on 6-month LIBOR+2%. The sub-borrowers will be required to contribute minimum 20% towards cost of sub-project financing.

(b) Government Contribution. The Government counterpart funds of US$ 12.55 million will be disbursed from budgetary allocations disbursed through the Treasury System to a Project Account opened for the SAAC/PMU. The authorized official from the PMU will be responsible for the management of the Project Account for financing eligible Project expenditures. Currently, the PMU Director is the authorized official to sign withdrawal applications (payment orders) to finance expenditures financed from the Project Account. *In order to ensure adequate counterpart funds are made available before the start of project implementation and replenished regularly, the Recipient will be required to make an initial deposit to the Project Account in the amount of (US$ 100,000) which is equivalent to three months project expenditures, to be replenished regularly.*

Auditing Arrangements. The audit of the proposed project will be conducted by independent auditors, and under terms of reference acceptable to IDA. The annual audited project financial statements will be provided to the Bank within six months of the end of each fiscal year, and also at the closing of the project. The first audit for the Project will be at the end of the first year of Project implementation. The

scope of the financial audit will be agreed with the borrower, but will include the audit of the project financial statements, the Designated Account, disbursements made on basis of Statements of Expenditure (SOEs). The contract for the audit awarded during the first year of project implementation and thereafter can be extended from year-to-year with the same auditor, subject to satisfactory performance. Such contract would be procured under Least-Cost Selection procurement method. *A financial covenant for the annual audit of the project financial statements will be included in the legal agreement.* An operational review of the Credit Unions will be carried out during the Project mid-term review. Regarding the audit of the PFIs, the Subsidiary Loan Agreement between the Ministry of Finance and the PFIs require the Participating Financial Institutions (PFIs) to have its accounts and records audited by external auditors each fiscal year. The audited financial statements will adequately reflect, in accordance with sound accounting practices, the operations, resources and expenditures in respect of the Credit Line operations under the Project.

Risks Assessment and Mitigation. Country-level financial management risks (inherent risks) and Project-level financial management risks (control risks) are summarized below, and outlined in the report available in the Project files. Inherent risks are considered high while control risks are assessed as moderate. Overall risk for the Project is rated as Moderate. The following project and entity level measures will mitigate such risks for project implementation.

Risks and Mitigation Measures

Risk	Risk Rating	Risk Mitigating Measures Incorporated into Project Design
1. Inherent Risk		
Country Level	High	The PMU has separate project financial management arrangements including dedicated staff, accounting systems and operations manual, and use of acceptable external auditors acceptable to IDA. Legal and regulatory reforms conducive to increased accountability and efficiency addressed in the ongoing PRSC-1 and in the proposed Corporate & Public Sector Accountability project.
Entity Level	Moderate	PMU experienced in implementing Bank-financed projects and grant activities. Additional training will be provided.
Project Level	Moderate	Existing accounting is adequate for project accounting. The proposed 1C system to replace the existing in-house system will be fully operational soon.
2. Control Risk		
Staffing	Low	n/a
Budgeting	Moderate	n/a
Accounting	Moderate	n/a
Internal Control	Moderate	n/a
Funds Flow	Moderate	Government to deposit an Advance to the Project Account to be replenished quarterly
Financial Reporting	Moderate	1C Accounting and Financial Reporting software to be installed and customized for the implementation of the ADCP-II Project Implementation.
Auditing	Moderate	External audit will be appointed by April 14, 2007 under terms of reference acceptable to IDA

Strengths. The existing PMU has the experience and capacity to implement the proposed ADCP-II, having implemented the first phase (ADCP-I) of the three-phased 10-year Adaptable Program Lending. The financial management staff of the PMU has received training in financial management, disbursements and auditing, and additional training will be provided during project implementation.

Weaknesses and Action Plan. There are no major weaknesses identified in the financial management systems of the PMU. However, the PMU has decided to replace the existing in-house accounting and financial reporting system with an off-the-shelf 1C software. The software is being installed and customized for financial reporting to both the Bank and the Government. The software/system will be fully operational before start of project implementation. There are no other changes in the financial management systems and arrangements for the proposed Project that are already considered adequate for the implementation of the Project.

Financial Covenants. The PMU will be required to maintain a financial management system, including records and accounts, and prepare financial statements adequate to reflect operations, resources and expenditures related to the project. The quarterly Interim Financial Reports will be submitted to the Bank no later than 45 days after end of each quarter. The project records and accounts will be audited annually by independent auditors under terms of reference acceptable to the Bank, and the audit report submitted to the Bank no later than six months after each year audited. It was agreed at negotiations that the Recipient will deposit an advance of US$100,000 to the Project Account by December 1, 2006, and maintain a balance in the account until completion of the project, with the amount adequate for the subsequent three months of Project implementation.

Supervision Plan. The Bank will conduct financial management supervision every six months to monitor progress of project implementation. The financial management supervision would pay particular attention to: (i) disbursements and financial management arrangements; (ii) review of the project's Interim Financial Reports and audited financial statements; and (iii) review of implementation of auditor's recommendations on strengthening systems and controls as outlined in the Management Letters issued by the auditors with the annual Audit Reports.

Annex 8: Procurement Arrangements

AZERBAIJAN: Second Agricultural Development and Credit Project

A. General

Procurement for the proposed project would be carried out in accordance with the World Bank's "Guidelines: Procurement Under IBRD Loans and IDA Credits" dated May 2004; and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, and the provisions stipulated in the Legal Agreement. The general description of various items under different expenditure category are described below and summarized in Table A. For each contract to be financed by the Credit, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and time frame are agreed between the Borrower and the Bank project team in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

Procurement of Works: Works procured under this project, would include: construction and rehabilitation of veterinary laboratory facilities and agricultural research institutes. The procurement will be carried out using the National SBD agreed with the Bank.

Procurement of Goods: Goods procured under the credit would include specialized equipment for agro industries. Since the majority of specialized equipment to be procured is required to have installation, therefore, majority of the Goods will be procured through Supply and Installation. Other Goods procured under this project would include: veterinary services' laboratory refurbishment, refurbishment of agricultural research institutes and other IT related equipment (Information Technology goods and ready-made software, furniture, vehicles etc.) will be procured through ICB and shopping. The procurement will be carried out using Bank's SBD for all ICB and National SBD agreed with the Bank. Shopping of goods under the specific threshold will be carried out by comparing price quotation obtained from at least three suppliers.

Procurement under Sub-Loans will follow established Private or Commercial Practices which have been found acceptable to the Association and are referred to in paragraph C.4 (d) of Section V of Schedule 2 to the financing agreement. **Procurement under Competitive Grant Scheme** will follow Community Participation procedures and are referred to in paragraph C. 4 (d) of Section V of Schedule 2 to the financing agreement. These procedures and thresholds will also be further detailed in the operational manual.

Selection of Consultants: Consultants' services would include capacity building for Credit Unions and PFIs, marketing, information and advisory services, disease surveillance and monitoring, adapted research (firms selected under QCBS and CQ procedure). Individual consultants will be selected by comparing at least three CVs.

Incremental Operating Cost: The project will finance the incremental operating costs of about US$ 2.2 million to oversee and manage the project, including: (a) PMU and other professionals travel expenses locally and abroad; and (b) communications, maintenance and operation cost for equipment and vehicles procured or used under the project.

B. Assessment of the agency capacity to implement procurement

The project activities would be implemented by the Project Management Unit, consisting of full time staff dedicated for the proposed project. It would include the Head of the ADCP-II PMU, as well as specialists in Procurement, Financial Management, Monitoring and Evaluation and IT. The PMU would be responsible for developing and updating the consolidated Project Implementation Plan, ensuring that project activities are implemented according to the PIP, reporting on project progress to the Agriculture Minister of GoA. PMU staff and GoA management and the World Bank, ensuring that procurement of goods, works and services will be carried out in a timely manner, in accordance with World Bank guidelines, managing project funds, maintaining accounts, getting the accounts audited, ensuring adequate budget provisions for the PMU in the national budget, facilitating the work consultants and working groups, reviewing consultant outputs, organizing acceptance testing required system etc. The head of the ADCP would ensure that the PMU has access to decision-makers at the appropriate level and can bring emerging implementation or coordination problems to their notice in a timely and proactive manner.

An assessment of the capacity of the Implementing Agency to implement procurement actions for the credit has been carried out by Mr. Gurcharan Singh, Sr. Procurement Specialist, on February 19, 2006. The assessment reviewed the organizational structure for implementing the project and the interaction between the project's staff responsible for procurement and the Ministry's relevant central unit for administration and finance.

The risks concerning the procurement component for implementation of the project have been identified, and include the fact that the procurement officer of the ADCP PMU has gained a good experience in procuring goods, works and services under the ADCP-I project. In ADCP-I, there were no cases of fraud or corruption identified and reported. The PMU Director and procurement officer have reasonable experience to carry out procurement according to the Bank's procedures. The overall project risk for procurement is rated **medium.**

C. Procurement Plan

The Borrower at appraisal developed a Procurement Plan for project implementation which provides the basis for the procurement methods. This plan has been agreed between the Borrower and the Project Team on May 16, 2006. It will also be available in the Project's database and in the Bank's external website, (without the estimated costs if the borrower requires it). The Procurement Plan will be updated in agreement with the Project Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. Regional Advisory Center contracts in the existing five regions of ADCP-I, might be considered potentially for direct contracting for the start-up of ADCP-II. The updated PP for each subsequent year will be submitted to the Bank for approval before the end of the previous year and will use a pre-defined standard format which will, as a minimum, list: (i) goods and services to be procured during the following calendar year, (ii) their value; (iii) the method of procurement; and (iv) the timetable for carrying out the procurement. At the time of approving the annual work program, IDA will agree on the consistency with the application of the Bank procurement guidelines to the specific procurement lots expected during the year and their methods of procurement.

D. Frequency of Procurement Supervision

In addition to the prior review supervision to be carried out from Bank offices, the capacity assessment of the Implementing Agency has recommended two supervision missions per year. The post review of procurement actions would also be carried out during the supervision mission.

For greater oversight, the Post Review will be conducted one out of five contracts in the initial stages and, as the project progresses and based on experience gained, this number shall be reviewed.

Table A: Project Costs by Procurement Arrangements
(US$ million equivalent)

Expenditure Category	Procurement Method[1] ICB	NCB	Other[2]	N.B.F.	Total Cost
1. Works	0.00	0.34	0.14	0.00	0.48
	(0.00)	(0.29)	(0.12)	(0.00)	(0.41)
2. Goods	0.89	1.17	0.50	0.00	2.56
	(0.73)	(0.94)	(0.39)	(0.00)	(2.04)
3. Consultant Services	0.00	0.00	10.58	0.00	10.58
	(0.00)	(0.00)	(5.15)	(0.00)	(5.15)
4. Operating Cost	0.00	0.00	2.19	0.00	2.19
	(0.00)	(0.00)	(1.19)	(0.00)	(1.19)
Total	0.89	1.51	13.41	0.00	15.81
	(0.73)	(1.23)	(6.85)	(0.00)	(8.79)

1/ Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.
2/ Includes civil works and goods to be procured through shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Bank Review of Procurement Decisions

(a) ICB Works Contracts estimated to cost above USD equivalent 400,000 per contract, all ICB Goods Contracts estimated to cost above USD equivalent 300,000 and all Direct contracting will be subject to prior review by the Bank.

Consultant Selection Arrangements
(USD million equivalent)

Consultant Services Expenditure Category	QCBS	SFB	LCS	CQ	Other	N.B.F.	Total Cost
A. Firms	2.57	0.00	0.00	0.75	0.00	0.00	2.04
	(0.89)	(0.00)	(0.00)	(0.75)	(0.00)	(0.00)	(1.73)
B. Individuals		0.00	0.00		1.79	0.00	1.79
		(0.00)	(0.00)		(0.18)	(0.00)	(0.18)
Total	2.57	0.00	0.00	0.75	1.79	0.00	3.83
	(0.89)	(0.00)	(0.00)	(0.75)	(0.18)	(0.00)	(1.91)

(b) Consultancy services estimated to cost above USD equivalent 200,000 (Firms) per contract or above US$ 50,000 equivalent (Individual consultants) will be subject to prior review by the Bank.

(c) NCB procedures apply to all Works Contracts < USD equivalent 400,000 with the first two NCB Works Contract subject to prior review and all Goods contracts < USD 300,000 equivalent with the first two NCB Goods Contracts being subject to prior review.

(d) Shopping procedures apply to all goods and works contracts < USD equivalent 100,000 with the first two shopping contracts being subject to prior review.

(e) **Short lists composed entirely of national consultants**: Short lists of consultants for services estimated to cost less than USD 100,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

Procurement Risks and Mitigations

The Country Procurement Assessment Review (CPAR) and the experience of other IDA- and other international funded projects indicate that project procurement could face the following challenges:

(i) The weak governance environment, weaknesses in accountability arrangements, and an overall lack of transparency in conducting procurement processes creates major risks of corruption, collusion and fraud;

(ii) The administrative system as it operates in practice creates opportunities for informal interference in the procurement process by senior officials – creating opportunities for waste, mismanagement, nepotism, corruption, collusion and fraud;

(iii) Government officials likely to be involved in project procurement through Tender Committees may not be familiar with procurement procedures; and

(iv) Suppliers and contractors, and goods and works required for the project in the current country conditions may not be available. As a result, there may be inadequate competition resulting in higher prices of goods, works and services.

The following strategy has been devised to mitigate the above risks:

- To mitigate the risks of collusion, fraud, corruption, waste and mismanagement, implementation arrangements will be geared to achieve the highest possible level of transparency in project implementation.
- In particular, the publicly accessible project website or SPA website will include all relevant information to facilitate transparency and integrity of implementation, including the following:
  - Project Appraisal Document and Financial Agreement;
  - advertisements;
  - funding proposals;
  - terms of reference for all activities;
  - contract awards;
  - progress reports from implementing entities;
  - a designated senior official with a publicly advertised phone number and postal/email address for receiving complaints;
  - a procedure for handling complaints satisfactory to the Word Bank;
  - complaints received and action taken.

- All consulting contracts costing above US$200,000, ICB and NCB contracts for goods and works will be published in the UNDB and DgMarket, in accordance with World Bank Guidelines;

- The government project team will apply a 'one-strike' policy to all contractors and consultants - any case of complicity in corruption, collusion, nepotism and/or fraud will lead to dismissal, disqualification from all further project activities and prosecution;

- A half day project launch workshop will be conducted for PMU staff, representatives of the Ministry of Agriculture and relevant staff of all other entities involved in project implementation;

- All evaluation committee members must have the requisite qualification in the specific filed for which an assignment is being assigned.

Annex 9: Economic and Financial Analysis

AZERBAIJAN: Second Agricultural Development and Credit Project

Cost benefit	NPV = US$ 4.1 million; ERR = 16%
Cost effectiveness	
Other (specify)	

Project Benefits

Project activities are expected to lead to increased incomes of farmers and rural entrepreneurs resulting from training and demonstrations provided under the extension and research components; strengthened veterinary services; as well as direct incremental benefits of sub-projects implemented under the Competitive Grant Scheme (CGS); and spread-over effects in terms of: (i) improved benefit/cost indicators, (ii) reduced losses of production and processing, (iii) improved quality of products, hence attracting higher prices on internal and external markets, (iv) improved access to markets (infrastructure and information) and related up- and down-stream linkages, consequently reducing transaction costs and increasing sales and marketing margins and raising the producers' share in sale prices, and (v) employment generation either as hired labor or as increased household labor requirements for both on-farm and off-farm activities. Principal increases in incomes would be largely dependent on farmers/rural entrepreneurs adopting improved technologies, which the project will promote directly through the extension-, veterinary-, research- and CGS-focused interventions as well as indirectly by improving the market access, supporting marketing linkages and private sector development, and generally creating a favorable economic environment that encourages farmers/rural entrepreneurs to produce more competitive products.

There are more benefits related to project activities that are difficult to quantify, thus they were not considered in the economic analysis. For example, at the national level, the improved quality and efficiency of agricultural and food production would increase the value and volume of rural domestic and export trade and contribute to an improved trade balance. In addition, the project would generate incremental tax revenues as a result of increased volume of taxable production. The amount of taxes collected would be increased gradually over a period of time. These additional financial resources would be available for sufficient funding on rural infrastructure and other social goods, and therefore make a positive contribution to economic growth and improved quality of rural life.

Economic Analysis

Introduction. The period of analysis is 15 years to account for the phasing and gestation period of the proposed interventions. The scenario presented in the economic analysis is rather conservative. The analysis that appears below is indicative and demonstrates the scope of profitability originated from conditions prevailing at the time of the preparation.

Derivation of Incremental Benefit Stream. The analysis attempts to identify quantifiable benefits that relate directly to the activities undertaken following implementation of the project's components. No credit component has been undertaken in the calculation of project benefits because the probable uptake of loans for the different income generating activities cannot be certainly known. Therefore, the calculation of this benefit stream is rather difficult and therefore has not been attempted. Nevertheless, sufficient financial benefits, presented in the following section would likely result in positive economic returns.

Price estimates for tradable commodities have been based on the World Bank's Global Commodity Price Projections, as well as on the prevailing commodity exchange prices of the countries of origin where the majority of goods comes from or delivers to. When adjusting prices of non-tradable commodities, a SCF of 1.0 has been used, as there is no foreign exchange premium according to the World Bank's assessment. The detailed derivation of economic prices is presented in Working Paper (on file). All values are given in constant 2005 prices.

For the economic analysis, family labor was valued at AZM 30,000, figures representative of the daily agricultural wage during the peak season as a good estimate of its opportunity cost and its marginal value product.

The incremental quantifiable benefit stream comprises of three main elements derived at farmers' and rural entrepreneurs' level from: (i) strengthened and expanded advisory services; (ii) strengthened and expanded veterinary services; and (iii) the sub-projects implemented under the CGS.

Regarding the first two elements, a total number of nine activity models were prepared to represent various crops and livestock typical for the project area as well as the possible interventions that may be proposed under the project: (i) wheat (both irrigated and rainfed) to represent cereals, potato to represent root crops, tomato to represent vegetables, apple to represent fruits and clover to represent fodder crops; all showing increased incomes per hectare as a result of agricultural technology testing and dissemination; (ii) improved storage of apples to represent the improved marketing activities; (iii) a sheep flock model based on 10 ewes, and 2-cows model to represent the project area's livestock patterns and the proposed activities in the field of veterinary services. It has been assumed that yields are expected to slightly increase under the without project scenario compared to present situation as agriculture may experience autonomous development initiatives especially in the emerging market economy, as well as a result of the on-going projects. The summary of these models are presented in Table 1, while the details can be found in Working Paper (on file).

Table 1: Summary of Activity Models (economic)

Item	Wheat-rainfed, 1 ha	Wheat-irrigated, 1 ha	Potato, 1 ha	Vegetables (tomato), 1 ha	Fodder (clover), 1 ha	Fruits (apple), 1ha	Apple storage, 1 ton	Sheep flock, 10 ewes	Cattle herd, 2 cows
Gross Output, AZM'000									
WOP	1290	2079	14900	11000	1250	10435	1565	1631	2958
WP	1935	2867	20440	14000	2000	15653	2609	2167	4294
Incremental	645	789	5540	3000	750	5218	1044	536	1336
Gross Output, US$									
WOP	281	452	3239	2391	272	2269	340	355	643
WP	421	623	4443	3043	435	3403	567	471	933
Incremental	140	171	1204	652	163	1134	227	117	290
Total Costs, AZM'000									
WOP	1330	1959	8406	7102	1136	4724	1,500	1507	2006
WP	1854	2398	10851	8762	1714	6923	2,300	1915	2584
Incremental	524	439	2445	1660	578	2199	800	409	578
Total Costs, US$									
WOP	289	426	1827	1544	247	1027	326	328	436
WP	403	521	2359	1905	373	1505	500	416	562
Incremental	114	95	532	361	126	478	174	89	126

Gross Margin, AZM'000									
WOP	-40	120	6494	3898	114	5711	65	125	952
WP	81	470	9589	5238	286	8730	309	252	1710
Incremental	121	350	3095	1340	172	3019	244	127	758
Gross Margin, US$									
WOP	-9	26	1412	847	25	1242	14	27	207
WP	18	102	2084	1139	62	1898	67	55	372
Incremental	26	76	673	291	37	656	53	28	165
With Project Benefit/Costs Ratio	1.0	1.2	1.9	1.6	1.2	2.3	1.1	1.1	1.7

WOP – without project, WP – with project

The analysis shows that activities in agricultural technology testing and dissemination would result in increased incomes. For example, an optimum application of inputs and improved seeds on crops are expected to increase their yield by 30%-60% resulting in incremental margins in a range from US$ 26/ha to US$ 673/ha. The promotion of improved storing of apples could bring incremental benefits of US$ 53 per ton. Improved veterinary and animal husbandry for cattle is expected to reduce mortality of adults from 4% to 2% and increase milk production in the participating farms from 5 to 8 liters per head per day or incremental benefits of almost US$ 85 per cow. Improved feeding and veterinary services for sheep would also lead to a reduced mortality of adults from 8% to 5% and to an increase in milk yield from 360 to 420 liters per head per lactation or additional margins of US$ 28 per flock of 10 ewes.

In calculating the overall benefits from the advisory and research activities, the following assumptions were made:

- Based on the results from the ACDP-1, an average coverage rate was 50%, or 50% of farmers were contacted by the end of the project in the project area, out of whom about 40% put knowledge into practice, thus resulting in a total adoption rate of 20%. This adoption rate was used for the analysis.
- Based on the cultivated area of representative crops in the project area for the last three years and applying the assumed adoption rate of 20%, the following volumes were derived for each of the adoption models, or acreages of crops where farmers would adopt advanced farm management technologies:

Adoption models	Cropping patterns, %	Adoption rates, %	Area/volume, ha/ton	Incremental margin, US$	Incremental net benefit, US$'000
Grains-irrigated	45	9	43,400	76	3,300
Grains-rainfed	30	6	19,289	26	509
Potatoes	6	1.2	700	673	471
Fodder	4	0.8	301	37	11
Vegetables	7	1.4	1,016	291	296
Fruits	8	2	1,444	656	948
Fruit storage			866	53	46
Total	**100%**	**20%**			**5,581**

- It was assumed that farmers would adopt the advanced storing technologies on 10% of fruits on which the improved crop growing techniques were applied.

Based on the above assumptions, the annual incremental benefits from the first stream at full development (year 10) are estimated at around US$ 5.6 million. These benefits would increase gradually, for example, at the end of project implementation (year 4) only 20% of the potential full-development benefits would be achieved.

In calculating the overall benefits from the veterinary activities, it was assumed that one Veterinary Field Unit (VFU) would have 300 regular clients per year based on the results of the ACDP-1 declaring that by the end of the project one VFU had on average 100 clients per month out of whom 25% were regular ones. Adoption of an improved animal husbandry practice by these 300 clients would bring about US$ 57 700 of net economic benefits at full development, or year 5th of VFU operation. Taking into account the proposed phasing of VFUs, with 21 VFUs established in the project year 1 and another 11 VFUs in the project year 2, the annual incremental benefits from the second stream at full development are estimated at about US$ 1.8 million.

As regards for the third stream, three activity models were prepared. The calculation of such benefits is challenging, as the details of future sub-projects cannot be known with any certainty. However, possible activities and investments that the project beneficiaries may choose have been identified. The specific interventions would be identified during project implementation, taking into account the demands of beneficiaries and the economic conditions at a particular location as well as services needed to deliver and support the selected investments.

For example, introduction of a slaughterhouse would reduce marketing costs by up to 10% and increase the processing capacity of meat by up to 11,000 heads, or the amount of services provided up to US$ 17,600 per year with incremental net benefits of US$ 5,885. Investments in such an innovative operation as a gas-drier would bring an additional US$ 9,661 annually due to an increased volume of higher quality products. The construction of a refrigerated warehouse would allow for storing of up to 48 tons of grapes per season that could be sold later at a higher price and with assured quality. This would increase the annual net benefit of participating association/informal groups by US$ 7,765.

The models show that the activities under the CGS have the IRRs in a range of 25% to 37%. These estimates could be confirmed by similar activities in other countries.

The illustrative models have been prepared using relatively conservative parameters for both outputs and inputs and account only for indicated income-generating activities. The summary of economic benefits of demonstrated sub-projects is presented in Table 2, while the details could be found in the next section and in Working Paper (on file). It should be also noted that each full proposal submitted would require detailed estimates of the direct and indirect benefits.

Table 2: Summary of Illustrative CGS Sub-projects (economic)

Model	Estimated Costs (US$)			Annual Net Benefits (US$)-before financing			Incremental annual net benefits per US$1 of investment (US$)	IRR-before financing (%)	NPV-before financing (US$)
	CGS	Beneficiary	Total	Without Project	With Project - Full Development	Incremental			
Slaughter House	12,500	16,795	29,295	0	5885	5,885	0.20	25%	9,698
Gas Drier	15,538	16,523	32,060	0	9616	9,616	0.30	38%	24,493
Refrigerated Warehouse	11,300	13,178	24,478	0	7765	7,765	0.32	37%	19,182
Average	*13,113*	*15,498*	*28,611*	*0*	*7,755*	*7,755*	*0.27*	*33%*	*17,791*
	46%	*54%*	*100%*						

In calculating the overall benefits from the sub-projects, the following was taken into account:

- Considering these examples as a reasonable assumption of the sub-projects likely to be implemented, estimated incremental annual net benefits per 1 US$ of investments for each type of activities could be used. In particular, an average indicator of US$ 0.27 for the incremental annual net benefits per US$ 1 of investments was applied.
- The incremental net benefits for each type of sub-projects were calculated by multiplying these indicators with the amount of estimated investments, but considering the gradual increase of such benefits over the period of 10 years.
- A 50% success rate was applied for CGS sub-projects.
- The benefits of the sub-projects are calculated for the period of ten years.
- A spread-over effect to other farmers and rural entrepreneurs is assumed by continuing the net incremental benefits of the 10th year over the next five years.
- No financing flows have been undertaken in the calculations as they either already reflected in the project costs (the project financing and beneficiary's contribution for the investment costs) or represent transfer payments (short-term loan's repayment).
- The example sub-projects for the CGS involve from 2 to 20 beneficiary households. Assuming an average direct involvement of around 10 people, the project would directly reach out 900 beneficiaries, considering that about 90 sub-projects will be implemented.

Derivation of Incremental Cost Stream. The incremental costs in economic prices have been calculated by the removal of price contingencies, taxes/duties and credit component. No residual values for capital investment items have been assumed. Replacement of vehicles and equipment (US$ 350 000 every 5 years for the advisory and veterinary services and US$ 2.2 million for the research component) and recurrent costs (US$ 2.25 million annually) beyond PY 4 have been included to support the advisory, veterinary and research services. The total economic cost of the project presented in Working Paper (on file), amounts to about US$ 21 million.

Overall Estimated Return of the Proposed Project. Given the above benefit and cost streams, the base case internal rate of return (IRR) is estimated at 16%. The base case net present value of the project's net benefit stream, discounted at 12%, is US$ 4.1 million. The summary of economic analysis is presented in Table 3.

Sensitivity Analysis. Sensitivity analysis assessed the effect of variations in benefits and costs and for various lags in the realization of benefits. The results are presented below. A fall in total project benefits by 20% and an increase in total project costs by the same proportion would reduce the base IRR to about 6%.

The switching value for total project benefits is about 21%; while for project costs it is approximately 27%. A one-year delay in project benefits reduces the project IRR to 13%.

Table 3: Economic Analysis (Constant 2005 values)

(USD thousand)	PY1	PY2	PY3	PY4	PY5	PY6	PY7	PY8	PY9	PY10	PY11	PY12	PY13-15
Project Benefits													
Incremental Returns to Extension and Research	111.6	279.1	558.1	1116.2	2232.4	3348.6	4464.8	5581.0	5581.0	5581.0	5581.0	5581.0	5581.0
Incremental Returns to CGP	0.0	10.9	49.1	120.0	218.1	316.3	403.6	463.6	490.8	490.8	490.8	490.8	490.8
Incremental Returns to VFUs Development	0.0	121.2	427.2	917.8	1350.8	1720.2	1847.2	1847.2	1847.2	1847.2	1847.2	1847.2	1847.2
Total Incremental Benefits of Financed Activities	111.6	411.2	1034.4	2154.0	3801.3	5385.2	6715.6	7891.8	7919.1	7919.1	7919.1	7919.1	7919.1
Production Net Benefits	111.6	411.2	1034.4	2154.0	3801.3	5385.2	6715.6	7891.8	7919.1	7919.1	7919.1	7919.1	7919.1
Total Project Benefits	111.6	411.2	1034.4	2154.0	3801.3	5385.2	6715.6	7891.8	7919.1	7919.1	7919.1	7919.1	7919.1
Project Costs													
Investment Costs	4544.4	5393.3	5367.7	3323.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Replacement of Vehicle and Equipment					0.0	222.7	74.8	0.0	0.0	1867.5	222.7	74.8	0.0
Recurrent Costs	558.6	608.0	598.3	577.1	1915.9	1915.9	1915.9	1915.9	1915.9	1915.9	1915.9	1915.9	1915.9
Total Project Costs	5103.0	6001.2	5966.0	3900.7	1915.9	2138.6	1990.7	1915.9	1915.9	3783.4	2138.6	1990.7	1915.9
Total Project Incremental Net Benefits	- 4991.4	- 5590.1	- 4931.7	- 1746.7	1885.4	3246.6	4724.9	5975.9	6003.2	4135.7	5780.5	5928.4	6003.2
IRR 16.1%													
NPV @12% (USD thousand) 4,113.0													

Financial Analysis

A total of 18 models were prepared to demonstrate the likely activities to be funded by the project: six credit models and 12 (9 activity and 3 CGS) models presented above, on the basis of financial prices[9]. They are built upon the information on the production systems gathered during field visits, and a review of available documents and statistics as well as the achievements of the ACDP-I.

The basis of the analysis is the interrelationships between the primary producers, processors and other entities in the supply chain. These components of the commodity chain form the basis for the analysis. The financial success of one of these partners relies on the success of others in the chain. To illustrate this relationship, models for the following commodity chains have been defined.

(a) Improved technologies and availability of credit, lead to a replanting of apple orchards to supply increasing demand of export traders;

(b) Increased demand of canneries for raw material lead to an expanded planting area of vegetables feasible thanks to improved technologies and availability of credit;

(c) Expansion of dairy herd/sheep flock due to credit and adoption of improved animal husbandry lead to greater productivity of livestock to supply milk demanded by dairy processing enterprises through milk collection points;

(d) Increased production of agricultural products due to credit availability and advanced farm management interventions, leads to a need to introduce innovative storing and processing

9 A brief description of the activity models and illustrative credit and CGS sub-projects is presented in Table 4. Further details can be found in the Working Paper (on file).

facilities like a refrigerated warehouse for grapes, a gas drier for fruits and vegetables, and a slaughter house suggested under the CGS.

Table 4: Summary of Activity Models (financial)

Item	Wheat-rainfed, 1 ha	Wheat-irrigated, 1 ha	Potato, 1 ha	Vegetables (tomato), 1 ha	Fodder (clover), 1 ha	Fruits (apple), 1ha	Apple storage, 1 ton	Sheep flock, 10 ewes	Cattle herd, 2 cows
Gross Output, AZM'000									
WOP	1395	2248	14900	11000	1250	10000	1500	1631	2958
WP	2093	3100	20440	14000	2000	15000	2500	2167	4294
Incremental	698	853	5540	3000	750	5000	1000	536	1336
Gross Output, US$									
WOP	303	489	3239	2391	272	2174	326	355	643
WP	455	674	4443	3043	435	3261	543	471	933
Incremental	152	185	1204	652	163	1087	217	117	290
Total Costs, AZM'000									
WOP	815	1141	5946	4165	813	2970	1,300	275	801
WP	1161	1519	7996	5294	1243	4465	2,000	548	1264
Incremental	346	378	2050	1129	430	1495	700	274	463
Total Costs, US$									
WOP	177	248	1293	905	177	646	283	60	174
WP	252	330	1738	1151	270	971	435	119	275
Incremental	75	82	446	245	93	325	152	59	101
Gross Margin, AZM'000									
WOP	580	1107	8954	6835	437	7030	200	1356	2157
WP	932	1581	12444	8706	757	10535	500	1619	3030
Incremental	351	474	3490	1871	320	3505	300	262	872
Gross Margin, US$									
WOP	126	241	1947	1486	95	1528	43	295	469
WP	203	344	2705	1893	165	2290	109	352	659
Incremental	76	103	759	407	70	762	65	57	190
Returns to Family Labour, AZM'000/pd									
WOP	30.5	36.9	105.3	68.4	36.4	117.2		33	53
WP	35.8	46.5	124.4	72.6	37.9	123.9		35	66
With Project Benefit/Costs Ratio	1.8	2.0	2.6	2.6	1.6	3.4	1.3	4.0	3.4

WOP-without project, WP-with project at full production

Annex 10: Safeguard Policy Issues

AZERBAIJAN: Second Agricultural Development and Credit Project

Involuntary Resettlement (World Bank OP 4.12): The ADCP-2 will not trigger OP/BP 4.12 as the project will exclude on-lending for land acquisition, relocation of population, or restrictions on access to resources.

International Waterways (World Bank OP 7.50): The project will not trigger OP 7.50 as it will not increase water abstraction from, nor waste water discharges to, transboundary waterways as defined by OP 7.50.

Pest Management (World Bank OP 4.09): The project will trigger OP 4.09 in a limited fashion as on-lending may be used by small and mid-sized sub-borrowers to finance agricultural inputs. On-lending for pesticides is subject to screening against an authorized list of pest control products approved for financing, as described in the project EMP.

Environmental Assessment (World Bank OP 4.01): The project triggers environmental operational policy 4.01 and has been assigned environmental category FI, as it involves on-lending through rural financial institutions, credit lines for agro-processing and providing grants for sub-projects under Component I - Agricultural Business Services. The anticipated sub-projects are expected to fall within World Bank categories B or C (moderate to minimal impact). The other project components have no negative environmental impact. The following measures have been or will be taken to mitigate possible problems:

(a) *The studies or assessments that have been, or are proposed to be, carried out to help identify, minimize and address safeguards-related impacts. The organizations that prepared and will prepare the studies should be listed.*

An Environmental Assessment and Management Plan (EMP) has been prepared by the ADCP-I PMU to determine key actions that the project should take to safeguard negative environmental impacts. The Environmental guidelines will become an integral part of the operational manual.

During preparation, the Social Impact Assessment of ADCP-I was combined with the Social Assessment for ADCP II. The overall objectives were: (a) to measure the impact of the activities under ADCP I to see if they have achieved their development objectives and have increased the welfare of the intended beneficiaries; (b) highlight the lessons learned through ADCP-I concerning the social impact of the project on the target communities; (c) ensure that the proposed ADCP-II is inclusive and builds ownership by using lessons learned from ADCP-I; and (c) ensure that investment under ADCP-II will reach the intended beneficiaries and contribute to poverty alleviation. The first phase of the assessment was conducted through qualitative and quantitative methods as well as desk review of background documents and data. The quantitative part was performed through a household survey and a village datasheet, while the main qualitative parts were through focus group discussions and key informant interviews. The full social and impact assessment will further explore the social issues identified.

(b) Any safeguards-related risks, perceived or substantive, and measures taken or proposed to be taken to address the risks.

The overall environmental effect of the Project should be positive. Farming and agri-business loans will result in improved agricultural production and marketing, and in general, improved socioeconomic conditions of the rural population. The Project could lead to an increase in the use of farm inputs but mitigation measures, extension services and training associated with the Project should minimize the potential impacts associated with these inputs. The following table provides a broad analysis of the

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PUBLIC INVESTMENT POLICY PROJECT

WORKSHOP ON INVESTMENT APPRAISAL AND RISK ANALYSIS

DECEMBER 3-14, 2007

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FACULTY BIOGRAPHIES

(Alphabetical Order)

Glenn P. Jenkins, is Professor of Economics at Queens University, Canada, and Director of its Program on Investment Appraisal and Risk Analysis. He is also an Institute Fellow Emeritus, of Harvard University, and is President of Cambridge Resources International. In 1985, he founded the Program on Investment Appraisal and Management at the Harvard Institute for International Development (HIID), Harvard University, and was its Director from 1985 to 2000. Dr. Jenkins specializes in the fields of public finance, investment appraisal, and economic development. He has worked extensively on the appraisal and planning of major infrastructure investments around the world.

He has published a number of books, studies, articles, research reports, and conference papers on these subject fields. Dr. Jenkins is the former Assistant Deputy Minister of Tax Policy and Legislation in the Department of Finance for the Government of Canada, and he has served as a research or economic consultant for many governments and private agencies, including the governments of the Argentina, Bolivia, Belize, Canada, Chile, Dominican Republic, Indonesia, Malaysia, Nepal, Sri Lanka, South Africa and United States, as well as for private agencies such as the Asian Development Bank, African Development Bank, Caribbean Development Bank, World Bank, the Ford Foundation, and the North-South Institute. His educational background includes a B. Comm. in Economics from Carleton University in Canada, a M.A. in Economics from the University of Western Ontario, and both a M.A. and a Ph.D. in Economics from the University of Chicago.

Mustafa Besim is an Assistant Professor of Economics in the Department of Banking and Finance at Eastern Mediterranean University. His areas of specializations are public finance, international finance and investment appraisal. He has been an Advisor in the Office of the Prime Minister of North Cyprus, where he was engaged in the development of economic policies covering the areas of public finance and trade. Dr. Besim has also been involved in the process of harmonization of the laws and practices of North Cyprus with the laws of the European Union. He has published two papers dealing with issues concerning the underground economy and a further conference paper on tax compliance. Dr. Besim holds both B.A. in Business Administration and a MSc. in Economics from Eastern Mediterranean University. His Ph.D. in Public Policy was obtained from the School of Public Policy, The University of Birmingham, UK. He is also a 2003 alumnus of the Program on Investment Appraisal and Risk Analysis, John Deutsch International, Queens University.

Andrey Klevchuk is an Economist at Cambridge Resources International, USA, where he has served as a consultant in a number of investment appraisal projects, including assignments for the African Development Bank and Government of Limpopo Province, South Africa. He has also been a consultant on public finance, tax reform and revenue forecasting for the Governments of Dominican Republic, North Cyprus, Vietnam, and the World Bank. He was a member of the faculty of the Program on Investment Appraisal and

Management, Harvard Institute for International Development, Harvard University, and the Program on Investment Appraisal and Risk Analysis, John Deutsch International, Queens University since 2000. He has served as a Lecturer with the Program on Investment Appraisal and Risk Analysis at the African Development Bank and Caribbean Development Bank. Also, Mr. Klevchuk has involved in organization and delivery of executive programs in USA, Canada, South Africa, Malaysia, Barbados, India, Cyprus, Thailand, Tunisia, and Egypt. Mr. Klevchuk holds M.Sc. in Economics from Eastern Mediterranean University. His recent consulting assignments in the field of investment appraisal included evaluation of infrastructure projects, electricity production, roads, telecommunications, smallholder agriculture, cost-effectiveness in education and health, seawater desalination, water supply and sanitation.

Kaan Kutlay is a Lecturer of the Department of Economics, Girne American University, North Cyprus. His areas of specialization are Integrated Investment Appraisal and International Economics. Mr. Kutlay holds a BBA degree in Business Administration from Eastern Mediterranean University, a MBA in International Business from Marmara University, Istanbul, Turkey and is completing his PhD in economics from Eastern Mediterranean University, North Cyprus.

Aygul Ozbafli is an Economist at Cambridge Resources International, USA. Her area of specialization is Investment Appraisal, and in particular the use of stated choice techniques to evaluate willingness to pay for reliability of electricity supply. She has served as a Lecturer with the Program on Investment Appraisal and Risk Analysis, John Deutsch International Executive Programs, Queen's University, Canada, African Development Bank, Tunis, Tunisia, Inter-American Development Bank, Washington DC, USA; Thailand Development Research Institute, Bangkok, Thailand, and the World Bank, Washington DC, USA and Bangkok, Thailand. Ms. Ozbafli graduated with a B.Sc. in electrical engineering from the University of Colorado and also graduated from a MBA from University of Colorado's School of Business. She obtained an MA in economics from Bilkent University in Ankara, Turkey. At the present time she is also completing a Ph.D. in economics at the University of Birmingham, UK.

Necati Ozkan is a Senior Lecturer of the Department of Tourism and Hospitality Management at Eastern Mediterranean University, North Cyprus. His areas of specialization are Investment Appraisal, Public Finance and Tourism Economics. His specific research interests are in the use of contingent valuation techniques for the measurement of the willingness to pay for water supply and sanitation services in tourism towns. Mr. Ozkan holds a BBA degree in Business Administration from Eastern Mediterranean University, North Cyprus, a MA in Business Analysis from Leicester University, Leicester, UK and is completing his PhD in economics from Eastern Mediterranean University, North Cyprus.

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

WEEK 1, DAY 1

MONDAY, DECEMBER 3

9:00 – 10:30 **Role and Components of an Integrated Investment Appraisal**
Introduction to Integrated Financial-Economic-Distributive-Risk Appraisal of Projects

Readings/ References:

- Jenkins, G., et.al, "Chapter 1: The Integrated Analysis," *Integrated Investment Appraisal: Concepts and Practice, 2005.*
- Jenkins, G., et.al, "Chapter 3: An Overview of the Evaluation Framework," *Integrated Investment Appraisal: Concepts and Practice, 2005.*

10:30 – 10:45 Break

10:45 – 12:30 **Alternative Investment Criteria**

Readings/ References:

- Jenkins, G., et.al, "Chapter 5: Project Evaluation Criteria," *Integrated Investment Appraisal: Concepts and Practice, 2005*, pp. 7-21.

12:30 – 13:30 ***Lunch***

13:30 – 15:00 **Discussion and Analysis of Case 1: Alternative Investment Criteria**

15:00 – 15:15 Break

15:15 – 17:00 Analysis of Case 1

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

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WEEK 1, DAY 2

TUESDAY, DECEMBER 4

09:00 – 10:30	**Development of Cash (Resource) Flow Statements**
Readings/ References:	• Jenkins, G., et.al, "Chapter 4: The Financial Analysis of a Project," *Integrated Investment Appraisal: Concepts and Practice, 2005*, pp. 4-20.
10:30 – 10:45	Break
10:45 – 12:30	**Development of Cash (Resource) Flow Statements (Cont'd)**
12:30 – 13:30	Lunch
13:30 – 15:00	**Presentation of Case 1**
15:00 – 15:15	Break
15:15 – 17:00	**Distribution and Analysis of Major Case :** "Arkati Power Company"

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WEEK 1, DAY 3

WEDNESDAY, DECEMBER 5

09:00 – 10:30 **Integration of Movements in Prices, Inflation, and Exchange Rates**

Readings/ References:

- Jenkins, G., et.al, "Chapter 4: The Financial Analysis of a Project," *Integrated Investment Appraisal: Concepts and Practice, 2005*, pp. 20-36.

10:30 – 10:45 Break

10:45 – 12:30 **Impacts of Inflation**

Readings/ References:

- Jenkins, G., et.al, "Annex 4.2, Chapter 4: The Financial Analysis of a Project," *Integrated Investment Appraisal: Concepts and Practice, 2005.*

12:30 – 13:30 Lunch

13:30 – 15:00 **Distribution of Case 2: Inflation, Exchange and Interest Rates**

15:00 – 15:15 Break

15:15 – 17:00 Analysis of Case 2 (Cont'd)

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

WEEK 1, DAY 4

THURSDAY, DECEMBER 6

9:00 – 10:30	**Determining Financial and Economic Values of Existing Assets for Cash Flow Statements**
Readings/ References:	• Jenkins, G., et.al, "Chapter 4: The Financial Analysis of a Project," *Integrated Investment Appraisal: Concepts and Practice, 2005*, pp. 6-9.
10:30 – 10:45	Break
10:45 – 12:30	**Financial Modelling from Alternative Points of View**
Readings/ References:	• Jenkins, G., et.al, "Chapter 5: Project Evaluation Criteria," *Integrated Investment Appraisal: Concepts and Practice, 2005*, pp 28-32. • Jenkins, G., et.al, "Chapter 4: The Financial Analysis of a Project," *Integrated Investment Appraisal: Concepts and Practice, 2005*, pp. 36-39. • Report on Manila Water Project • Teaching note: Manila Water Project
12:30 – 13:30	Lunch
13:30 – 15:00	**Presentation of Case 2**
15:00 – 15:15	Break
15:15 – 17:00	**Analysis of Major Case: "Arkati Power Company"**

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

WEEK 1, DAY 5

FRIDAY, DECEMBER 7	
9:00 – 10:30	**The Importance of Scale and Timing and Adjusting for length of life in Project Appraisal**
Readings/ References:	• Jenkins, et.al, "Chapter 6: Consideration in Project Evaluation of Timing, Scale, and Length of Project Life," *Integrated Investment Appraisal: Concepts and Practice, 2005.*
10:30 – 10:45	Break
10:45 – 12:30	**The Importance of Scale and Timing and Adjusting for length of life in Project Appraisal (Cont'd)**
12:30 – 13:30	Lunch
13:30 – 15:00	***Review of Course Content for week one***
15:00 – 15:15	Break
15:15 – 17:00	**Analysis of Major Case: "Arkati Power Company"**

END OF WEEK ONE

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

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WEEK 2, DAY 1

MONDAY, DECEMBER 10

9:00 – 10:30	**Cost Effectiveness Analysis**
Readings/ References:	• Jenkins, et.al, "Chapter 13: Cost Effectiveness Analysis," *Integrated Investment Appraisal: Concepts and Practice, 2005.*
10:30 – 10:45	Break
10:45 – 12:30	**Case 3: Cost-Effectiveness Analysis to reduce the incidence of Gastroenteritis by alternative health interventions**
12:30 – 13:30	Lunch
13:30 – 15:00	Analysis of Major Case: "Arkati Power Company"
15:00 – 15:15	Break
15:15 – 17:00	Analysis of Major Case: "Arkati Power Company"

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

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WEEK 2, DAY 2

TUESDAY, DECEMBER 11

9:00 – 10:30	**Economic Principles for Investment Appraisal**
Readings/ References:	• Lecture Notes
10:30 – 10:45	Break
10:45 – 12:30	**Economic Principles for Investment Appraisal**
Readings/ References:	• Teaching Note: "Senegal Water Case," Queen's University, Canada, 2006.
12:30 – 13:30	Lunch
13:30 – 15:00	**Analysis of Major Case: "Arkati Power Company"**
15:00 – 15:15	Break
15:15 – 17:00	**Analysis of Major Case: "Arkati Power Company"**

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

WEEK 2, DAY 3

WEDNESDAY, DECEMBER 12

9:00 – 10:30	**Economic Valuation of Goods and Services**
Readings/ References:	• Teaching Note: "Senegal Water Case," Queen's University, Canada, 2006.
10:30 – 10:45	Break
10:45 – 12:30	**Stakeholders Impacts of Projects**
Readings/ References:	• Harberger, A.C., Jenkins, G.P. and Kuo, C.Y, "Chapter 12: Evaluation of Stakeholder Impacts," *Cost-Benefit Analysis for Investment Decisions*, Queen's University, Canada, (September 2006).
12:30 – 13:30	Lunch
13:30 – 15:00	**Analysis of Case: "Arkati Power Company" (Economic Analysis)**
15:00 – 15:15	Break
15:15 – 17:00	**Analysis of Case: "Arkati Power Company" *(Stakeholder Analysis)***

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

WEEK 2, DAY 4

THURSDAY, DECEMBER 13

9:00 – 10:30	**Risk Analysis and Management**
Readings/ References:	• Savvides, S., "Risk Analysis in Investment Appraisal", *Project Appraisal*, Volume 9, Number 1, March 1994, pp. 3–18.
10:30 – 10:45	Break
10:45 – 12:30	*Application of Monte Carlo Risk Analysis for Arkati Power Company*
12:30 – 13:30	Lunch
13:30 – 15:00	**Course Review**
15:00 – 15:15	Break
15:15 – 17:00	**Course Review**

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

WEEK 2, DAY 5

FRIDAY, DECEMBER 14

9:00 – 10:30	**Participant Evaluation**
10:30 – 10:45	Break
10:45 – 12:30	**Completion and Preparation of Presentation of Case of "Arkati Power Company"**
12:30 – 13:30	Lunch
13:30 – 15:00	**Presentation of Case: "Arkati Power company"**
15:00 – 15:15	Break
15:15 – 17:00	**Closing Ceremony**

END OF THE PROGRAM

CAMBRIDGE RESOURCES INTERNATIONAL

FINAL REPORT

Improving Institutional Capacity of Host Government Agencies in Integrated Project Analysis Using Modern Cost-Benefit Analysis Techniques

Purchase Order No. 5844
from
Prime Contractor DAI
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December 2007

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Improving Institutional Capacity of Host Government Agencies in Integrated Project Analysis Using Modern Cost-Benefit Analysis Techniques

Overview

Preparations for the design and deliver of this course began in October 2007 and the delivery of the course took place from December 3 to 14, 2007 in Baku Azerbaijan.

The course focused on the techniques for analyzing public sector investment projects, with particular emphasis on the construction of the models for the evaluation of the financial, economic and stakeholder aspects of an integrated project appraisal. A total of 23 participants attended the course with 18 participants completing all aspects of the program, including the final examination. The participants were from a total of 11 government Ministries and Departments, with a core of 10 participants from the Ministry of Economic Development.

The arrangements, translation, and participant recruitment by the staff of the PIPE project prior to the beginning of the program was outstanding. The lecturers who delivered the course were, Glenn Jenkins, Mustafa Besim, Andrey Klevchuk, Kaan Kultay, Aygul Ozbafli, and Necati Ozkan. In additional, essential assistance was provided by the staff of the PIPE project, including Sabira SHIHALIYEVA, Nigar ISMAYLOVA, Elchin RASHIDOV, Sabina IBRAHIMOVA, Gulsabah AMIROVA, and Bagish AHMADOV. Highly skilled translation was provided by Matin AXUNDLU and Turan ALIYEV. The continuous support and guidance of Andrey PARINOV both before and during the program was greatly appreciated.

The lectures in the course were delivered in English with sequential translation in to the Azerbaijani language (Azeri). All the lecture notes and case studies were translated into the Azeri. All the lecturers, except Glenn Jenkins, could speak Turkish addition to English, and Andrey Klevchuk's mother tongue is Russian. In the laboratory when completing the case studies, the assistance was given to the participants using Turkish, although the Microsoft Excel software being used was either in Russian or in English. In terms of the language needed for communication, it was a complicated situation, but through the assistance of the local PIPE project staff, and the fact that the lecturers could communicate in Turkish, everything proceeded smoothly.

The course was conducted in the facilities of the Irshad hotel. From our point of view the facilities were, with minor exceptions, fully adequate. Given the close proximity of the training room to the restaurant, very little time was wasted due to the logistics.
The course schedule is included in this report as Appendix A, with the professional profiles of the participants and the lecturers are included as Appendix B.

Assessment of the Course

The participants of the course were evaluated on the basis of three case studies (including a major case that involved the preparation of a prefeasibility study) which they completed during the two weeks, plus a final examination. All completed case studies were graded and returned to the participants. In addition 10 percent of the final grade was determined jointly by the faculty based on the quality of the independent work done in by the participant on the case study applications. The final grades and ranking of the participants is given in Appendix C.

Overall the level of knowledge of investment appraisal, finance or economics of the participants coming into the course was not as high as is usually the situation with government officials from central government agencies in either developing or developed countries. In the main the participants were eager to learn and by the end of the program the level of knowledge of most of the participants had increased significantly. The top 50% of the class showed a strong desire to achieve a high level of professionalism in this field, and were able to achieve a significant level of competence.

The need is great in Azerbaijan for such hands-on courses where the emphasis is on transferring practical skills in cost-benefit analysis to government officials. From the detailed evaluation of the program provided by participants, Appendix D, it is clear that this type of professional education is wanted and appreciated. There was a high level of approval of all aspects of the program.

If the objective is to raise the professional level of analysis for the type of government officials we had in this program, then general lecture-only academic type courses in cost-benefit analysis are likely to be a waste of resources. Many of the participants had an engineering training as background, with some "economic development" training at an academic level. They are in the most part practical people with a significant amount of practical experience. They are able to learn fairly quickly when showed in a hands-on fashion how to evaluate public sector investment projects using cases of actual projects that they can relate to easily.

The December 2007 course was not sector specific in its focus. The main case dealt with electricity investments and the participants were briefed on cases taken from the water and health sectors. Before a high level of skills can be achieved the responsible officials will be a need to receive this type of training on a sector basis, and at a more advance level. Our recommendation would be to provide all the people who need such training with a basic two week course, similar to the one conducted in December 2007. Then fairly soon afterward, a second two week (or longer) course should be given (to those who demonstrate promise) that is focused on either a single sector or perhaps two sectors. After that the participants should be expected to start actually doing this type of analysis, or supervising consultants who are doing this work, as part of their professional duties. To be effective, the graduates of these programs will initially need to have access to experienced professionals to give them periodic guidance on how to set up the analysis, and to identify the key issues so that informed decisions can be made.

Conclusions

The training of the government officials needs to be integrated with the functions that they are going to be expected to carry out. In order to carry out these investment appraisal functions in a professional manner, guidelines and sector specific handbooks will need to be developed that can serve as the basis of the training materials for such courses. In order carry out an economic appraisal of investment projects, the basic national parameters will need to be estimated and approved for use in Azerbaijan.

Until such basic intellectual infrastructure is put in place, then the training will have to be based on the cases and guidelines developed for other countries. While the professional body of knowledge for Cost-Benefit analysis is certainly transferable from one country to another, it is not the way that the average government official in the government of Azerbaijan thinks about such decision making techniques. They are used to applying the norms and rules that have been sent to them from a central planning authority for use in Azerbaijan. Hence, it will be important for the successful implementation of cost-benefit analysis as a tool for the rational selection of public sector investments that such an institutional infrastructure of guidelines, procedures and sector specific analysis handbooks be developed for Azerbaijan.

In summary, the design and delivery of this integrated investment appraisal program has been a challenging but very enjoyable endeavor for all those from Cambridge Resources International who have been involved in it. We appreciate the opportunity to work with DAI in its planning and implementation.

Date: December 31, 2007

Glenn P. Jenkins
President

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

WEEK 1

	December 3	*December 4*	*December 5*	*December 6*	*December 7*
	MONDAY	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
09:00	Role and Components of an Integrated Investment Appraisal	Development of Cash (Resource) Flow Statements	Integration of Movements in Prices, Inflation, and Exchange Rates	Determining the Financial and Economic Values of Existing Assets	The Importance of Scale and Timing and Adjusting for length of life in Project Appraisal
10:30	*Break*	*Break*	*Break*	*Break*	***Break***
10:45	Alternative Investment Criteria	Development of Cash (Resource) Flow Statements Illustrated with Integrated Case	Impacts of Inflation	Use of Debt Service Ratios and Financial Modelling from Alternative Points of View (Manila Water Supply Project)	The Importance of Scale and Timing and Adjusting for length of life in Project Appraisal (Cont'd)
12:30	***Lunch***	***Lunch***	***Lunch***	***Lunch***	***Lunch***
13:30	Discussion and Analysis of Case 1: **Alternative Investment Criteria**	Participant Presentation of Case 1	**Distribution of Case 2: Inflation, Exchange and Interest Rates**	Presentation of Case 2	***Review of Course Content for week one***
15:00	*Break*	***Break***	***Break***	***Break***	***Break***
15:15 **17:00**	Analysis of Case 1	**Distribution and Analysis of Major Case :** "Arkati Power Company"	Analysis of Case 2 (Cont'd)	Analysis of Major Case: "Arkati Power Company"	Analysis of Major Case: "Arkati Power Company"

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

WEEK 2

	December 10	*December 11*	*December 12*	*December 13*	*December 14*
	MONDAY	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
09:00	*Cost-Effectiveness*	Economic Principles for Investment Appraisal	Economic Valuation of Goods and Services	Risk Analysis and Management	Participant Evaluation (Examination)
10:30	***Break***	***Break***	***Break***	***Break***	***Break***
10:45	Case 3: Cost-Effectiveness Analysis to reduce the incidence of Gastroenteritis by alternative health interventions	Application of Economic Analysis to Investment Appraisal	Stakeholder Analysis Transportation and Port Projects	*Application of Monte Carlo Risk Analysis for Arkati Power Company*	Completion and Preparation of Presentation of Case of "Arkati Power Company"
12:30	***Lunch***	***Lunch***	***Lunch***	***Lunch***	***Lunch***
13:30	Analysis of Major Case: "Arkati Power Company"	Analysis of Major Case: "Arkati Power Company"	Analysis of Case: "Arkati Power Company" *(Economic Analysis)*	**Course Review**	Presentation of Case: "Arkati Power company"
15:00	***Break***	***Break***	***Break***	***Break***	***Break***
15:15	Analysis of Major Case: "Arkati Power Company"	Analysis of Major Case: "Arkati Power Company"	Analysis of Case: "Arkati Power Company" *(Stakeholder Analysis)*	**Course Review**	Closing Ceremony
17:00					

Appendix B

USAID FROM THE AMERICAN PEOPLE | Public Investment Policy Project

CRI Cambridge Resources International

Public Investment Policy Project
and
Cambridge Resources International

Program on Investment Appraisal and Risk Analysis

Participant Profiles

December 3-14 2007

The USAID Public Investment Policy (PIP) Project is a technical assistance development project that will contribute to the government of Azerbaijan's (GOAz) objective of making the most efficient use of the country's financial resources. To effectively manage the GOAZ's public investment program, the PIP-Project strengthens GOAZ's institutional and technical capacity in the areas of long-term planning, capital budget formulation, and project development and management.

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Cambridge Resources International Inc. (CRI) provides advisory services, training, and support in each of the areas of investment appraisal, tax policy, and fiscal administration for both developed and developing countries. The group has also conducted training programs for professionals in each of these areas. This group has been working internationally over the past 25 years and more than 30 countries in North America, Asia, Africa, Latin America, Europe, the Caribbean and the former Soviet Union in projects sponsored by international organizations, development banks, governments, and private corporations.

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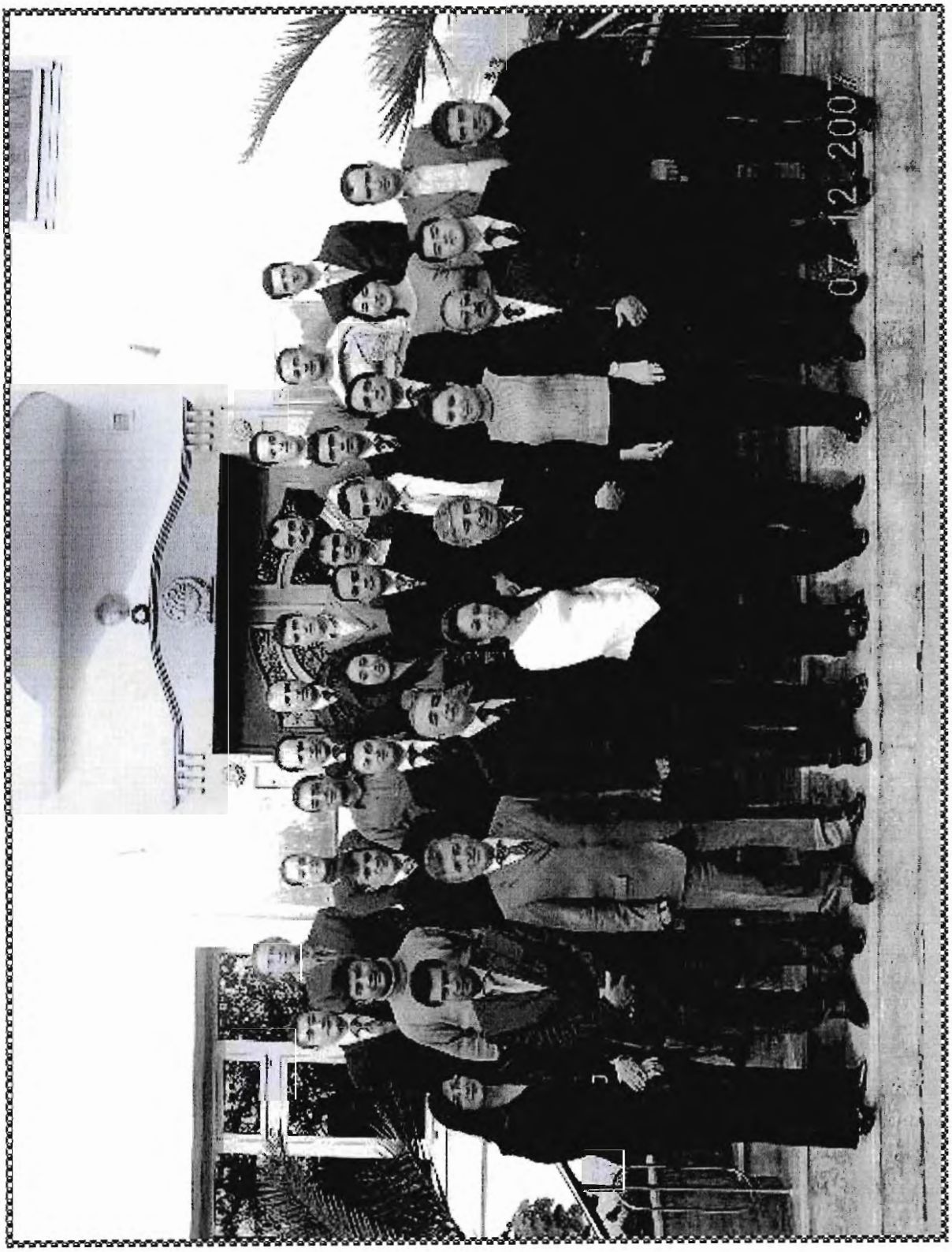
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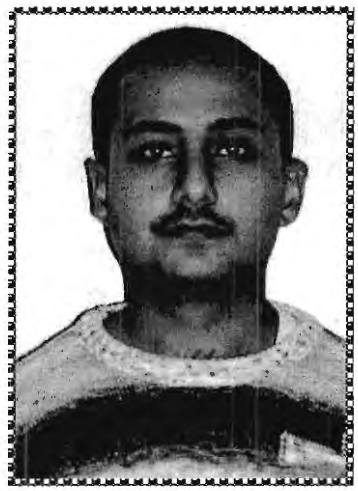

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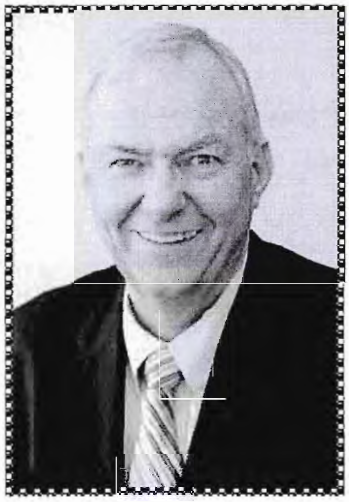

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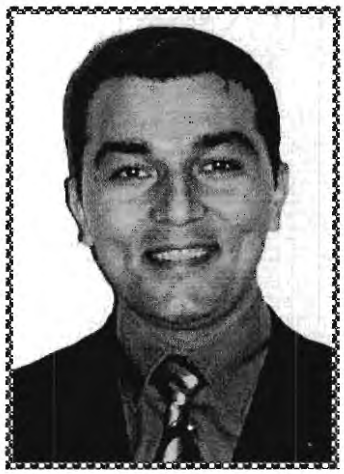

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Appendix C

Program on Investment Appraisal and Risk Analysis

Baku, Azerbaijan
December 3-14, 2007

Participants Grade

Name	Letter Grade	Rank
Nəsimi İsmayılov	A	1
Calal Bağışov	A	2
Rauf Rzayev	A	3
Maqsud Tağıyev	A	4
Bayram Rzayev	A	5
Vügar Əzizov	A	6
Ayaz Qədirov	A	7
Əsəd Məmmədov	A-	8
Bəhəddin Əliyev	A-	9
Fayaz Şükürov	A-	10
Orxan Cavadov	A-	11
Məhəmməd Bəydəmirov	B+	12
Firuddin Cabrayılov	B+	13
Arif Nəzərov	B+	14
Azad Musayev	B	15
Hamlet İsmayılov	B-	16
Şükür Hüseynov	B-	17
Vüsal Məmmədov	B-	18
Mahir Himlostov	Incomplete	
İlqar Məhərrəmov	Incomplete	
Farhad Mikayilov	Incomplete	
Əli Vəliyev	Incomplete	
Mahmud Hüseynov	incomplete	

Questions*	Participants 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Average
Financial Analysis																					
Glenn Jenkins	10	10	8	9	10	8	10	10	8	10	10	10	9	9	10	5	10	10	10	10	**9.3**
Mustafa Besim	9	7	10	10	8	10	10	10	8	10	10	10	10	9	10	5	10	10	10	10	**9.3**
Aygul Ozbafli	10	5	9	9	8	8	10	10	8	10	10	10	10	8	9	5	10	10	10	10	**9.0**
Andrey Klevchuk	10	8	10	9	8	8	10	8	9	10	10	10	9	10	9	5	10	10	10	10	**9.2**
Economic Analysis																					
Andrey Klevchuk	10	8	9	9	8	8	10	9	9	10	10	10	9	10	9	5	10	10	10	10	**9.2**
Aygul Ozbafli	10	3	9	9	8	8	10	9	9	10	10	10	9	8	10	5	10	10	10	10	**8.9**
Stakeholder Analysis				9																	
Andrey Kevchuk	10	7	9	9	9	8	10	9	9	10	10	10	9	10	10	5	10	10	10	10	**9.2**
Risk Analysis																					
Andrey Klevchuk	10	3	9	10	5	8	10	9	9	10	10	9	10	10	10	5	10	10	10	10	**8.9**
Aygul Ozbafli	10	3	9	8	5	8	10	10	9	10	10	10	9	8	10	5	10	10	10	10	**8.7**
Practical Sessions																					
Andrey Klevchuk	10	5	10	8.5	7.75	8	10	8.5	8.75	10	10	10	9.5	10	10	5	9.75	10	10	10	**9.0**
Aygul Ozbafli	10	4.25	10	9.25	7.75	8.5	10	9.5	8.75	10	10	10	9	8	10	5	10	10	10	10	**9.0**
Necati Ozkan	10	4	10	8	5.75	8.5	10	9	8.75	10	10	10	10	8	9	5	10	10	10	10	**8.8**
Kaan Kutlay	10	5	9	8.5	6	8.5	10	7	8.75	10	9	10	9	8	9	5	9	10	10	10	**8.6**
Nigar Ismaylova	10	6.25	7.75	8	7	7.5	10	10	9	10	10	5	9.75	9	7.75	5	9	10	10	10	**8.6**
Elchin Rashidov	10	5	8	8.75	7	10	10	5	9	10	10	10	9	10	8	5	9	10	10	10	**8.7**
Case Studies																					
Alternative Investment Criteria Case	10	5	8	10	5	8	10	10	9	10	10	10	9	9	8	5	10	10	10	10	**8.8**
Inflation and Exchange Rates	10	5	9	10	8	8	9	10	9	10	10	10	10	9	8	5	10	10	10	10	**9.0**
Arkati Power Project	8	8	10	9	8	8	10	10	9	10	10	10	8	9	8	5	10	10	10	10	**9.0**
Administrative Issues																					
Sabira Shihaliyeva	10	10	10	8.5	10	10	10	10	9	10	10	10	9	10	10	5	9.5	10	10	10	**9.6**
Summary																					
Training period: 1- Too Little; 5- Just Right; 10- Too Much	3.8	4.8	10	8.6	5	5.75	10	10	4.4	10	10	5	10.25	6	5	5	10	10	1.8	5	**7.0**
Course components: 1- Too Easy; 5- Just Right; 10- Too Difficult	3.5	4.8	7.7	8	7.9	5.9	10	8	4.6	5	5	10.5	8.5	5	5	5	5	10	4.6	4.6	**6.4**
General Issues**																					
Would you recommend that a colleague or staff member in your organization attend the program in the future?	1	1	1	1	1	1	1	1	1	1	1	1		1	1	2	1	1	1	1	**1.1**
Was the Training room comfortable?	2	1	2	2	1	1	1	1	1	1	1	1		4	1	2	1	1	1	1	**1.4**
Were the handouts clear and understandable?	1	1	1	2	2	1	1	1	1	1	1	1		1	2	2	1	1	1	1	**1.2**
Was the quality of the food good?	1	2	1	3	2	1	1	2	2	1	1	1		1	2	2	2	1	2	1	**1.5**

***Questions**

1 - poor (inappropriate, irrelevant, unclear, disorganized)

5 - adequate (met expectations, appropriate)

10 - excellent (surpassed expectations, thought provoking, highly relevant)

****General Issues**

1- Definitely Yes

2- Probably Yes

3- Probably No

4- Definitely No

Comments on trainers:

Glenn Jenkins

Positive :

1) Lecturing style
2) High professionalism
3) Detailed approach and explanation.
4) Very good comparisons
5) Ability to explain in an efficient and productive way
6)The subject and practical cases are explained clearly

Negative:

7) Brief explanations
8) Time for case studies was limited

Mustafa Besim

Positive:

1) Ability of being a good lecturer and attracting the audience
2) Ability to grasp questions
3) Detailed explanations

Negative:

4) Short period of participation as a trainer
5)Time for explanation should be extended to facilitate understanding of the material

Aygul Ozbafli

Positive:

1)Concrete explanation of topics
3) Lecture was concise
5) Being exact

Negative;

2) Fast manner of lecturing
3) Lecture was compact
4) There was no software presented

Andrey Klevchuk

Positive;

1)Takes advantage of breaks to explane unclear issues in informal situations
2) Good presentation of lectures

Negative;

3) The number of case studies should be less and time for explanation should be extendec
4) Limited time for comprehensive explanation of the subject
5) Repetition of Glenn Jenkins' lecture on Economic Analysis

General comments on the training:

Positive:

1) Training was very successful from the point of project analysis
2) Material was clearly delivered
3) Desirable to start training at 10 a.m
4) Desirable to prolong the training period
5) Desirable to arrange such trainings outside of Azerbaijan
6) The training was comprehensive

Negative:

7) Limited time for explanation of case studies
8) Limited number of case studies
9) Short period of the training
10) Training materials and translation needs to be improved

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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week One, Day One

(Session I: 09:00 – 10:30)

0

Questions that a Good Integrated Investment Appraisal Should Answer

1

The Role and Components of Integrated Investment Appraisal

- To stop bad projects – bad policies
- To prevent good projects from being destroyed
- To determine if components of projects are consistent
- To assess the sources and magnitudes of risks
- To determine how to reduce risks and efficiently share risks

2

Questions addressed by an Integrated Investment Appraisal

- Is the project financially or fiscally sustainable?
- Does the project contribute to the economic growth of the country? i.e. positive expected economic NPV
- What are the sources and magnitudes of risk?
- Who are beneficiaries of project and by how much?
- Who are the interest groups (stakeholders) who could distort the investment decision or affect the project's performance?
- What are the risks associated with the benefits accruing to the stakeholders? Sources of political risks?
- Are poverty alleviation goals being addressed?
- What are the fiscal impacts?
- What is the personality of the project?

3

Incrementality of Projects

- One of the important concepts when defining a project is to measure the impact of the project's cash flows and net benefits and costs on an incremental basis.
- We should carefully identify the benefits and costs that are *only* associated with the project, and not include any other benefits that would exist ***"WITHOUT"*** the project being undertaken.
- It is normal for the benefits and costs to change over time for the ***"WITHOUT"*** project case.
- The ***"WITHOUT"*** project scenario must be properly defined before using it as the base case from which to measure incremental benefits and costs produced by the ***"WITH"*** project case.
- It is an optimized "***WITHOUT***" project situation that should be compared with the "***WITH***" project situation to calculate the incremental benefits and costs.
- There is another perspective "before the project" versus "after the project" scenarios. "Before the project" is ***NOT*** the appropriate base case from which to measure incremental benefits and costs.

4

Impact of Analysis

- Quality of analysis has been shown by the World Bank to be a key determinant of the success of a project's performance.
- A proper analysis will cause the project to be redesigned so that it is less likely to fail
- World Bank experience shows that the probability of failure for poorly prepared projects within 3 years of a project's life is 7 times that of well-prepared projects
- Poorly prepared projects have 16 times as high a probability of failure within 5 years as compared to well-prepared projects

5

Role and Components of Integrated Investment Appraisal

II. Stages in Project Appraisal and Approval

Why should a project evaluation be done in stages?

A. Idea and Project Definition

B. Pre-Feasibility Study

C. Feasibility and Financing

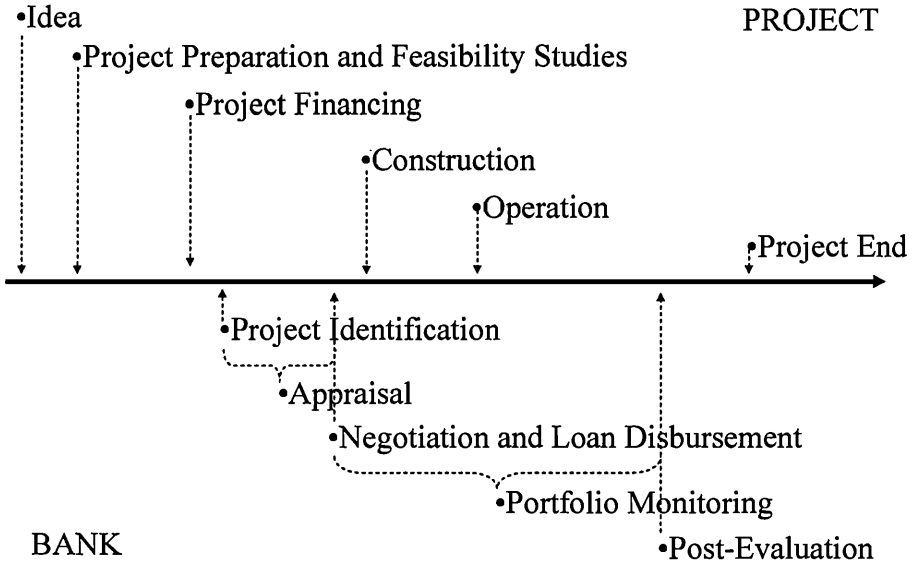
D. Detailed Design

E. Project Implementation

F. Ex-Post Evaluation

6

Project Cycle



7

Key Initial Questions of Pre-feasibility Study

a. Where is the demand?

b. Is this project consistent with the organization's expertise, current plans and strategy for the future? Can the project be implemented and operated in a reasonably efficient matter?

8

Project Definition

- Project definition is defined broadly to include the scope and specification of the objectives of the project, its output, its different stakeholders, its economic and social benefits, and the data requirements.
- Most of the project's data requirements are identified in the pre-feasibility and feasibility stages of the project where the project's variables and parameters are analyzed in detail.
- The data are generally arranged in what we refer to as "building blocks" because they constitute the foundation for the different types of analyses.

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B. Pre-Feasibility Study

- Examines overall potential of project
- Should maintain same quality of information across all variables
- Wherever possible should use secondary information
- Biased information better than mean values

Key questions:

a. Is this project financially and economically feasible throughout the project's life?

b. What are the key variables?

c. What are the sources of risk?

d. How can the risk be reduced?

10

C. Feasibility Study

- Focus is on improving accuracy of the key variables
- Alternatives for reducing risk are examined in detail
- Some primary data may be needed

Key questions:

- Is project financially attractive to all interested parties in activity?
- What is level of uncertainty of key variables?
- Can final decision for approval be taken?

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Modules of Pre-Feasibility and Feasibility Studies

- Why break study into modules?

Building Blocks

A. Demand (including environmental factors) Module
B. Technical (including environmental factors) Module
C. Environmental Assessment Module
D. Human Resources and Administrative Support Module
E. Institutional Module

Analysis Modules

F. Financial/Budget Module
G. Economic Module
H. Social Appraisal or Distributive and Basic Needs Analysis

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Building Block A: Demand Module

- Study of sources of demand, nature of market, prices and quantities
- Major distinction between domestic versus internationally traded goods and services
- For internationally traded goods, prices are given to the project by world markets
  - Secondary information most important
- For domestic market, primary research more important
  - financial and economic values are often affected by project

Output of Module

- Forecast of quantities and real prices for life of project
- Taxes, tariffs, subsidies, public regulations, technological trends
- Environmental impacts

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Building Block B: Technical or Engineering Module

A study of input requirements for investment and operations and their costs

- In this module, secondary information can be used very effectively
- Need to avoid conflict of interest between supplier of technical information and seller of investment equipment, or contractor for construction

Output of Module

- Technology and life of project
- Quantities of inputs by type needed for investment and operation
- Labor required by type and time
- Input prices and sources of supply
- Environmental impacts

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Analysis Module C: Environmental Assessment Module

- Environmental Assessment augments information for the Economic Analysis
- Identification of Environmental Impacts and Risks
- Where possible, Quantify the Environmental Impacts

- **Key questions:**

a. What are the likely environmental impacts from undertaking project ?

b. What is the cost of reducing the negative impact?

c. Evaluation of the environmental impacts and risks with and without technical measures are taken to reduce these impacts?

d. Are there alternative ways of supplying the good or service of project without incurring these environmental costs? What are the costs of these alternatives?

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Building Block D: Human Resources and Administrative Support Module

- What are managerial and labour needs of the project?
- Does organization have the ability to get the managerial skills needed?
- Is timing of project consistent with quantity and quality of management?
- What are wage rates for labor skills required?
- Manpower requirements by category are reconciled with availabilities and project timing

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Building Block E: Institutional Module

- This module deals with the adequacy of the institution responsible for managing the different stages or phases of the project.
- Insufficient attention to the institutional aspects creates serious problems during the implementation and operations phases of the project.

- **Key questions:**

a. Is the entity that is supposed to manage the project properly organized and its management adequately equipped to handle the project?
b. Are the capabilities and facilities being properly utilized?
c. Is there a need for changes in the policy and institutional set up outside this entity? What changes may be needed in policies of the local, regional and central governments?

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Analysis Module F: Financial Module

What is done:

- Integration of financial and technical variables from demand module, technical module, and management module – this is not a mechanical exercise
- Construct cash flow (resource flow) profile of project
- Identify key variables for doing economic and social analysis

Key questions:

a. What is relative certainty of financial variables?

b. What are sources and costs of financing?

c. What are minimum cash flow requirements for each of the stakeholders?

d. What can be adjusted to satisfy each of the stakeholders?

18

Analysis Module G: Economic Module

What is done:

- Examines the project using the whole country as the accounting entity
- Evaluation of externalities including environmental

Key questions:

a. What are differences between financial and economic values for a variable?

b. What causes these differences?

c. With what degrees of certainty do we know values of these differences?

d. What is the expected value of economic net benefits?

e. What is the probability of positive economic feasibility?

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Analysis Module H: Stakeholders and Basic Needs Analysis

What is done:

- Identification and quantification of extra-economic impacts of project
- Distributive Appraisal
- Income, Cost, and Fiscal Impacts on various stakeholders
- Poverty Alleviation and Political Necessities
- Basic Needs: Evaluate the impact of project on achieving basic needs objectives
  - Basic needs will vary from country to country

Key Questions:

a. In what ways does project generate beneficial and cost impacts on stakeholders?
b. What stakeholders could the project impact?
c. Who benefits and who pay the costs?
d. What are the basic needs of the society that are relevant in the country?
e. What impact will the project have on basic needs?
f. What alternative ways are there to generate desirable social impacts?
g. Is project relatively cost effective in generation of desirable social impacts?

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Integrated Projects

- Integrated projects can get very complex and need to be approached cautiously to avoid costly errors.
- It is possible for the bundled project to be financially and economically viable even though some of the components are not.
- Dropping the components that generate negative returns will maximize the project's benefits.
- Defining and understanding the objectives of the project is particularly important when analyzing integrated projects.
- Ultimately, the 'bundle' that succeeds the most in accomplishing the desired objectives should be undertaken.
- If the objective of the project is to maximize the wealth of people in Country, then the component or bundle that yields the highest economic NPV should be undertaken.

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ECONOMIC VALUE

=

FINANCIAL VALUE

+

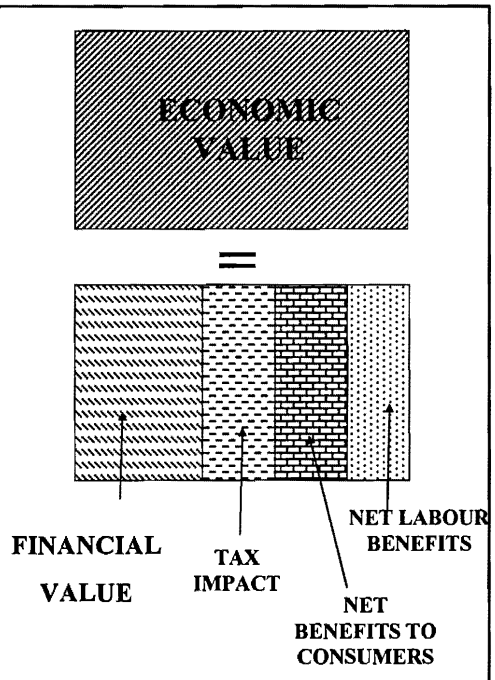
TAX IMPACT

+

NET BENEFITS TO CONSUMERS

+

NET LABOUR BENEFITS



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General Relationship

$$NPV^{ECO}_{eco.\ dr} = NPV^{FIN}_{eco.\ dr} + \sum PV^{EXT}_{eco.\ Dr}$$

- *Holds when all benefits and costs are discounted using same discount rate.*

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SUMMARY OF PROJECT DECISION CRITERIA:

1.	Financial NPV	Project Owner's View
2.	Financial IRR	
3.	Annual DSCRs	Banker's View
4.	DSCRs	
5.	Economic NPV	Country's View
6.	Economic IRR	
7.	PV of Impact on Stakeholders	Distribution Analysis
8.	Probability of unacceptable outcome for each of indicators above (risk simulation)	Risk Analysis

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Olifants-Sand Water Transfer Scheme (OSWTS) Limpopo South Africa

- Lack of water supply impedes economic and social development- shortages as early as 2004
- About one million people in region affected by OSWTS
- 79% of population have < 25 l/c/d consumption of waters

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SUPPLY OF WATER

Status Quo

- Yield of the existing Flag Boshielo dam is fully rationed
- Underground water resources are not reliable and cannot support development of the mining sector
- The only available source of water supply is development of the Olifants river resources or similar river resources

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Choice of Development Strategy, Scale and Timing using Cost-Effectiveness Analysis

Options:

- Selection of Development Strategy for Olifants River water resources:
  - raising Flag Boshielo Dam (temporary measure), or
  - construction of Rooipoort Dam, or
  - raising Flag Boshielo Dam and construction of Rooipoort Dam
- Rooipoort Dam – site location:
  - "downstream" versus "upstream" site
- Rooipoort Dam – scale (size of dam):
  - "full supply level" of dam (there are 3 proposed levels at each site location)
- Flag Boshielo and Rooipoort – "optimal" timing
  - should dams be postponed and by how long?

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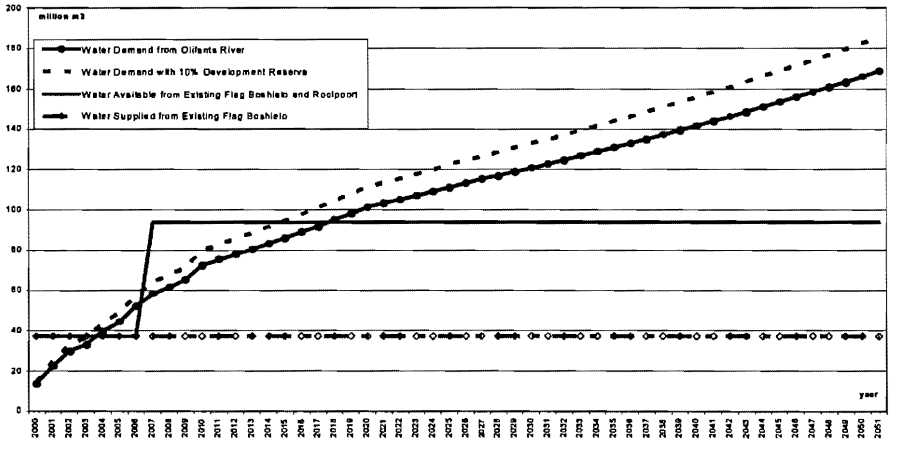
Development Strategy: Rooipoort is built (Flag Boshielo is not raised)



- Some shortages in 2004-06, before start of Rooipoort operation
- PV of water shortages vary from 15.6 to 56.4 million m^3

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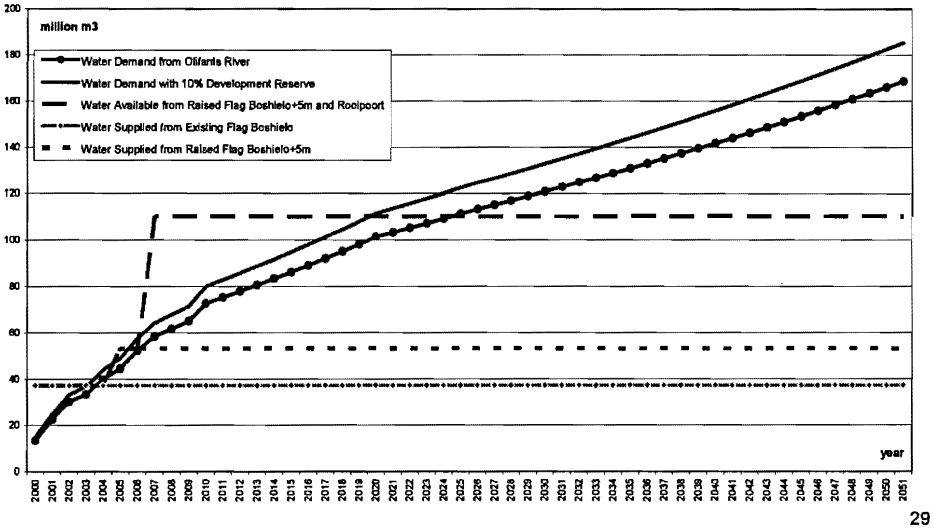
Water Demand and Supply: Flag Boshielo+5m and Rooipoort, million m^3.



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Average Economic Unit Cost of Water "Delivered to Bulk Users" with Different Economic Opportunity Cost of Water Shortage, R/m3.

Rooipoort Site:	Upstream			Downstream		
	FSL724	FSL728	FSL731	FSL720	FSL725	FSL731
Rooipoort (Flag Boshielo is not raised)	3.40	2.43	2.07	3.53	2.39	1.95
Flag Boshielo+5m and Rooipoort	2.12	1.91	1.87	2.21	1.94	1.89

- The Economic Cost-Effectiveness recommended a strategy with a cost of water of 1.87 Rand/m^3 rather than the political option that would have had a cost of 3.40 Rand/m^3.
- None of the technical or political groups had identified the Flag Boshielo plus Rooipoort at its largest scale as the most cost-effective option.

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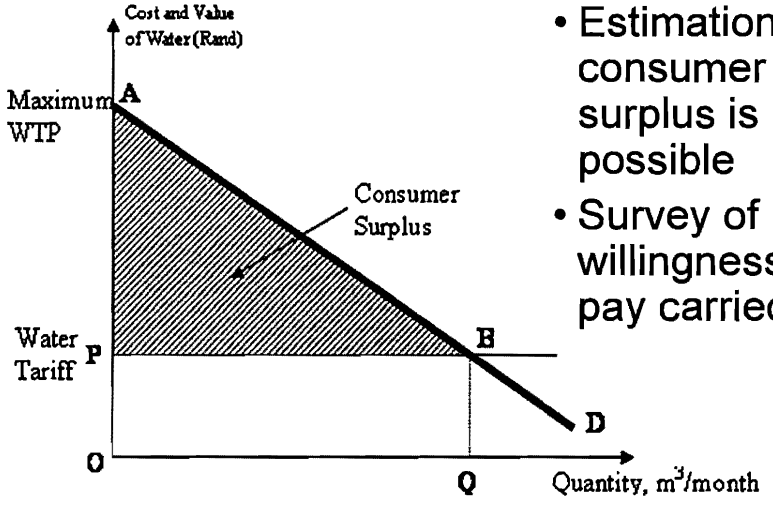
MEASURING THE IMPACT ON POVERTY

Consumer Surplus of an Individual Water Consumer.



- Estimation of consumer surplus is possible
- Survey of willingness to pay carried out

- *Rural users are the poorest of the poor in South Africa.*

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Willingness to Pay for Water

User	Average WTP (R/m^3)	Average Tariff (R/m^3)
Domestic Urban		
Potable Water	40.0	0.34
Washing Water	7.0	0.34
Commercial	8.0	6.85
Industrial	8.0	7.63
Municipal	8.0	7.88
AMPLATS Smelter	5.0	4.90
Olifants River Rural		
Potable Water	30.0	0.34
Washing Water	5.0	0.34
Lebalelo Rural		
Potable Water	30.0	0.34
Washing Water	5.0	0.34
Groothoek Hospital	8.0	5.72
Lebowakgomo		
Potable Water	40.0	0.34
Washing Water	7.0	0.34
Private	8.0	5.72
Irrigation	1.5	0.30
Lebalelo WUA	5.0	1.50

- Adopted WTP estimates are biased downwards

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Distribution of Consumer Surplus among Different Water Users, R_{2002} million.

	Flag Boshielo+5m (Rooipoort is not built)	Rooipoort (Flag Boshielo is not raised)	Flag Boshielo+5m and Rooipoort
Lebowakgomo Area	27.5	61.8	74.0
Rural Users	109.8	291.2	338.7
Mining	98.3	231.4	271.7
Polokwane	8.5	22.6	26.6
Irrigation	28.5	65.5	77.0
Total	**275.6**	**674.5**	**788.0**

- ***Rural users of Limpopo are poorest of poor in South Africa.***

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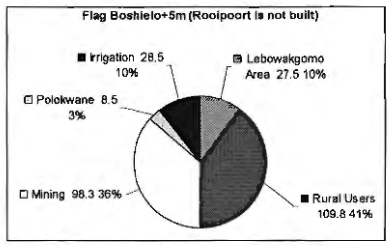

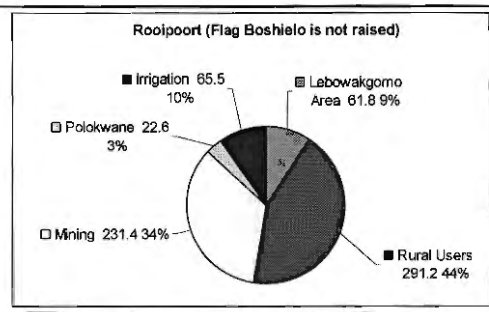

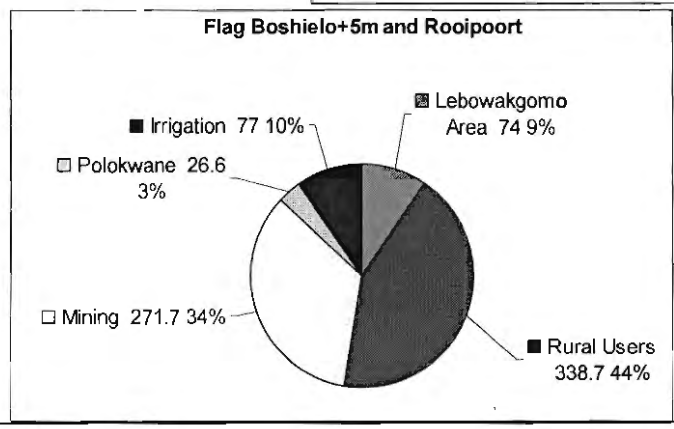

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CONCLUSION

- Recommended strategy is with Flag Boshielo raised plus Rooipoort built at size (FSL731).
- Economic analysis reveals that the true economic costs of water supplied by the OSWTS are lower than the corresponding financial estimates.
- Rural users are major net beneficiaries of scheme.
- The direct impact on their real income is over 338 million Rand.

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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week One, Day One

(Session II: 10:45 – 12:30)

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ALTERNATIVE INVESTMENT CRITERIA

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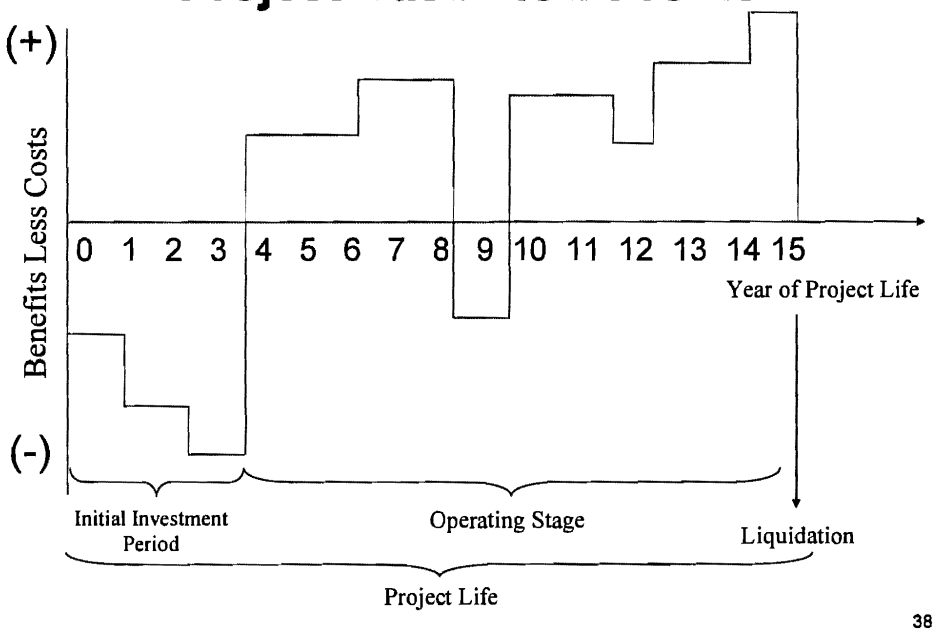
Project Cash Flow Profile



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Discounting and Alternative Investment Criteria

Basic Concepts:

A. Discounting

- Recognizes time value of money
  a. Funds when invested yield a return
  b. Future consumption worth less than present consumption

$$PVB^{o}_{r} = (B_o/(1+r)^o + (B_1/(1+r)^1 + \ldots\ldots + (B_n/(1+r)^n$$

$$PVC^{o}_{r} = (C_o/(1+r)^o + (C_1/(1+r)^1 + \ldots\ldots + (C_n/(1+r)^n$$

$$NPV^{o}_{r} = (B_o - C_o)/(1+r)^o + (B_1 - C_1)/(1+r)^1 + \ldots\ldots + (B_n - C_n)/(1+r)^n$$

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Discounting and Alternative Investment Criteria (Cont'd)

B. Cumulative Values

- The calendar year to which all projects are discounted to is important
- All mutually exclusive projects need to be compared as of same calendar year

If $NPV_r^1 = (B_o - C_o)(1+r)^1 + (B_1 - C_1) + .. + .. + (B_n - C_n)/(1+r)^{n-1}$ and

$NPV_r^3 = (B_o - C_o)(1+r)^3 + (B_1 - C_1)(1+r)^2 + (B_2 - C_2)(1+r) + (B_3 - C_3) + ... (B_n - C_n)/(1+r)^{n-3}$

Then $NPV_r^3 = (1+r)^2 NPV_r^1$

40

Example of Discounting (10% Discount Rate)

Year	0	1	2	3	4
Net Cash Flow	-1000	200	300	350	1440

$$PV_{0.1}^0 = -1000 + \frac{200}{1.1} + \frac{300}{(1.1)^2} + \frac{350}{(1.1)^3} + \frac{1440}{(1.1)^4} = 676.25$$

$$PV_{0.1}^1 = -1000(1.1) + 200 + \frac{300}{1.1} + \frac{350}{(1.1)^2} + \frac{1440}{(1.1)^3} = 743.88$$

$$PV_{0.1}^2 = -1000(1.1)^2 + 200(1.1) + 300 + \frac{350}{(1.1)^1} + \frac{1440}{(1.1)^2} = 818.26$$

Note: All of the transactions are done at the beginning of the year.

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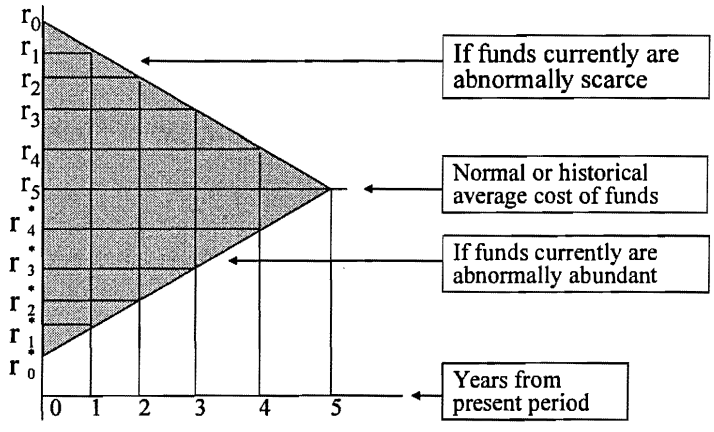
C. Variable Discount Rates

- Adjustment of Cost of Funds Through Time



•For variable discount rates r_1, r_2, & r_3 in years 1, 2, and 3, the discount factors are, respectively, as follows:

$$1/(1+r_1),\quad 1/[(1+r_1)(1+r_2)]\ \&\ 1/[(1+r_1)(1+r_2)(1+r_3)]$$

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Example of Discounting (multiple rates)

Year	0	1	2	3	4
Net Cash Flow	-1000	200	300	350	1440
r	18%	16%	14%	12%	10%

$$NPV^0 = -1000 + \frac{200}{1.18} + \frac{300}{(1.18)(1.16)} + \frac{350}{(1.18)(1.16)(1.14)} + \frac{1440}{(1.18)(1.16)(1.14)(1.12)} = 436.91$$

$$NPV^1 = -1000(1.18) + 200 + \frac{300}{1.16} + \frac{350}{(1.16)(1.14)} + \frac{1440}{(1.16)(1.14)(1.12)} = 515.55$$

$$NPV^2 = -1000(1.18)(1.16) + 200(1.16) + 300 + \frac{350}{(1.14)} + \frac{1440}{(1.14)(1.12)} = 598.04$$

Note: All of the transactions are done at the beginning of the year.

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ALTERNATIVE INVESTMENT CRITERIA

1. Net Present Value (NPV)
2. Benefit-Cost Ratio (BCR)
3. Pay-out or Pay-back Period
4. Internal Rate of Return (IRR)

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Net Present Value (NPV)

1. The NPV is the algebraic sum of the discounted values of the incremental expected positive and negative net cashflows over a project's anticipated lifetime.
2. What does net present value mean?
   - Measures the change in wealth created by the project.
   - If this sum is equal to zero, then investors can expect to recover their incremental investment and to earn a rate of return on their capital equal to the private cost of funds used to compute the present values. **In this case there is no change in wealth.**
   - Investors would be no further ahead with a zero-NPV project than they would have been if they had left the funds in the capital market.

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Alternative Investment Criteria

First Criterion: Net Present Value (NPV)

- Use as a decision criterion to answer following:
  a. When to reject projects?
  b. Select project(s) under a budget constraint?
  c. Compare mutually exclusive projects?
  d. How to choose between highly profitable mutually exclusive projects with different lengths of life?

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Net Present Value Criterion

a. When to Reject Projects?

Rule: *"Do not accept any project unless it generates a positive net present value when discounted by the opportunity cost of funds"*

Examples:

Project A: Present Value Costs $1 million, NPV + $70,000

Project B: Present Value Costs $5 million, NPV - $50,000

Project C: Present Value Costs $2 million, NPV + $100,000

Project D: Present Value Costs $3 million, NPV - $25,000

Result:

Only projects A and C are acceptable. The country is made worse off if projects B and D are undertaken.

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Net Present Value Criterion (Cont'd)

b. When You Have a Budget Constraint?

Rule: *"Within the limit of a fixed budget, choose that subset of the available projects which maximizes the net present value"*

Example:

If budget constraint is $4 million and 4 projects with positive NPV:

Project E: Costs $1 million, NPV + $60,000

Project F: Costs $3 million, NPV + $400,000

Project G: Costs $2 million, NPV + $150,000

Project H: Costs $2 million, NPV + $225,000

Result:

Combinations FG and FH are impossible, as they cost too much. EG and EH are within the budget, but are dominated by the combination EF, which has a total NPV of $460,000. GH is also possible, but its NPV of $375,000 is not as high as EF.

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Net Present Value Criterion (Cont'd)

c. When You Need to Compare Mutually Exclusive Projects?

Rule: *"In a situation where there is no budget constraint but a project must be chosen from mutually exclusive alternatives, we should always choose the alternative that generates the largest net present value"*

Example:

Assume that we must make a choice between the following three mutually exclusive projects:

Project I: PV costs $1.0 million, NPV $300,000

Project J: PV costs $4.0 million, NPV $700,000

Projects K: PV costs $1.5 million, NPV $600,000

Result:

Projects J should be chosen because it has the largest NPV.

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Alternative Investment Criteria

Benefit-Cost Ratio (R)

- As its name indicates, the benefit-cost ratio (R), or what is sometimes referred to as the profitability index, is the ratio of the PV of the net cash inflows (or economic benefits) to the PV of the net cash outflows (or economic costs):

$$R = \frac{PV\ of\ Cash\ Inflows\ (or\ Economic\ Benefits)}{PV\ of\ Cash\ Outflows\ (or\ Economic\ Costs)}$$

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Benefit-Cost Ratio (Cont'd)

Basic rule:

If benefit-cost ratio (R) >1, then the project should be undertaken.

Problems?

Sometimes it is not possible to rank projects with the Benefit-Cost Ratio

- Mutually exclusive projects of different sizes
- Mutually exclusive projects and recurrent costs subtracted out of benefits or benefits reported gross of operating costs
- Not necessarily true that $R_A > R_B$ that project "A" is better

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Benefit-Cost Ratio (Cont'd)

First Problem: The Benefit-Cost Ratio Does Not Adjust for Mutually Exclusive Projects of Different Sizes. **For example:**

Project A: → PV^0 of Costs = \$5.0 M, PV^0 of Benefits = \$7.0 M
NPV^0_A = \$2.0 M $R_A = 7/5 = 1.4$

Project B: → PV^0 of Costs = \$20.0 M, PV^0 of Benefits = \$24.0 M
NPV^0_B = \$4.0 M $R_B = 24/20 = 1.2$

According to the Benefit-Cost Ratio criterion, project A should be chosen over project B because $R_A > R_B$, but the NPV of project B is greater than the NPV of project A. So, *project B should be chosen*

Second Problem: The Benefit-Cost Ratio Does Not Adjust for Mutually Exclusive Projects and Recurrent Costs Subtracted Out of Benefits or Benefits Reported As Gross of Operating Costs. **For example:**

Project A: PV^0 Total Costs = \$5.0 M PV^0 Recurrent Costs = \$1.0 M
(i.e. Fixed Costs = \$4.0 M) PV^0 of Gross Benefits= \$7.0 M
$R_A = (7-1)/(5-1) = 6/4 = 1.5$

Project B: Total Costs = \$20.0 M Recurrent Costs = \$18.0 M
(i.e. Fixed Costs = \$2.0 M) PV^0 of Gross Benefits= \$24.0 M
$R_B = (24-18)/(20-18) = 6/2 = 3$

Hence, project B should be chosen over project A under Benefit-Cost Criterion.

Conclusion: The Benefit-Cost Ratio <u>should not</u> be used to rank projects

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Alternative Investment Criteria

Pay-out or Pay-back period

- The pay-out period measures the number of years it will take for the undiscounted net benefits (positive net cashflows) to repay the investment.
- A more sophisticated version of this rule compares the discounted benefits over a given number of years from the beginning of the project with the discounted investment costs.
- An arbitrary limit is set on the maximum number of years allowed and only those investments having enough benefits to offset all investment costs within this period will be acceptable.

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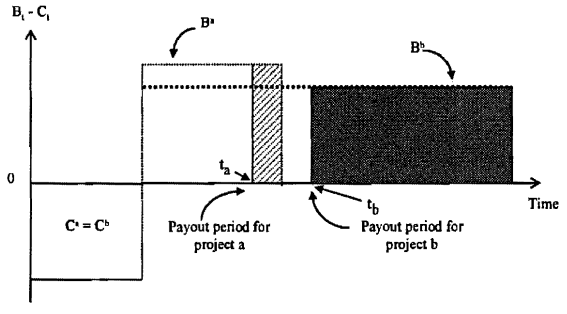
- Project with shortest payback period is preferred by this criteria

Comparison of Two Projects With Differing Lives Using Pay-Out Period



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Pay-Out or Pay-Back Period

- Assumes all benefits that are produced by in longer life project have an expected value of zero after the pay-out period.
- The criteria may be useful when the project is subject to high level of political risk.

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Alternative Investment Criteria

Internal Rate of Return (IRR)

- **IRR** is the discount rate (K) at which the present value of benefits are just equal to the present value of costs for the particular project

$$\sum_{t=0}^{n} \frac{B_t - C_t}{(1 + K)^t} = 0$$

Note: the IRR is a mathematical concept, not an economic or financial criterion

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Common uses of IRR:

(a) If the IRR is larger than the cost of funds then the project should be undertaken

(b) Often the IRR is used to rank mutually exclusive projects. The highest IRR project should be chosen

- An advantage of the IRR is that it only uses information from the project

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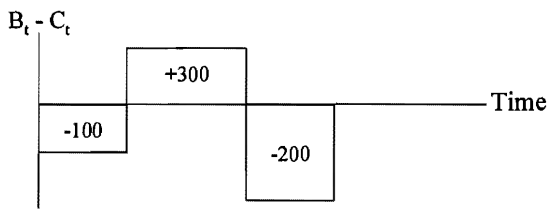
Difficulties with the Internal Rate of Return Criterion

First Difficulty: Multiple rates of return for project



Solution 1: K = 100%; NPV= -100 + 300/(1+1) + -200/(1+1)^2 = 0

Solution 2: K = 0%; NPV= -100+300/(1+0)+-200/(1+0)^2 = 0

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Difficulties with the Internal Rate of Return Criterion (Cont'd)

Second difficulty: Projects of different sizes and also mutually exclusive

Year	0	1	2	3	...	...	∞
Project A	-2,000	+600	+600	+600	+600	+600	+600
Project B	-20,000	+4,000	+4,000	+4,000	+4,000	+4,000	+4,000

NPV and IRR provide different Conclusions:

Opportunity cost of funds = 10%

NPV_A^0: 600/0.10 - 2,000 = 6,000 - 2,000 = 4,000

NPV_B^0: 4,000/0.10 - 20,000 = 40,000 - 20,000 = 20,000

Hence, $NPV_B^0 > NPV_A^0$

IRR_A : 600/K_A - 2,000 = 0 or K_A = 0.30

IRR_B : 4,000/K_B - 20,000 = 0 or K_B = 0.20

Hence, $K_A > K_B$

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Difficulties with the Internal Rate of Return Criterion (Cont'd)

Third difficulty: Projects of different lengths of life and mutually exclusive

Opportunity cost of funds = 8%
Project A: Investment costs = 1,000 in year 0
Benefits = 3,200 in year 5
Project B: Investment costs = 1,000 in year 0
Benefits = 5,200 in year 10

NPV_A^0 : $-1{,}000 + 3{,}200/(1.08)^5 = 1{,}177.86$
NPV_B^0 : $-1{,}000 + 5{,}200/(1.08)^{10} = 1{,}408.60$
Hence, $NPV_B^0 > NPV_A^0$

IRR_A : $-1{,}000 + 3{,}200/(1+K_A)^5 = 0$ which implies that $K_A = 0.262$
IRR_B : $-1{,}000 + 5{,}200/(1+K_B)^{10} = 0$ which implies that $K_B = 0.179$
Hence, $K_A > K_B$

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Difficulties with the Internal Rate of Return Criterion (Cont'd)

Fourth difficulty: Same project but started at different times

Project A: Investment costs = 1,000 in year 0
Benefits = 1,500 in year 1
Project B: Investment costs = 1,000 in year 5
Benefits = 1,600 in year 6

NPV_A^0 : $-1{,}000 + 1{,}500/(1.08) = 388.88$
NPV_B^0 : $-1{,}000/(1.08)^5 + 1{,}600/(1.08)^6 = 327.68$
Hence, $NPV_A^0 > NPV_B^0$

IRR_A : $-1{,}000 + 1{,}500/(1+K_A) = 0$ which implies that $K_A = 0.5$
IRR_B : $-1{,}000/(1+K_B)^5 + 1{,}600/(1+K_B)^6 = 0$ which implies that $K_B = 0.6$
Hence, $K_B > K_A$

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IRR FOR IRREGULAR CASHFLOWS

For Example: Look at a Private BOT Project from the perspective of the Government

Year →	0	1	2	3	4
Project A	1000	1200	800	3600	-8000
IRR A	10%				
Compares Project A and Project B ?					
Project B	1000	1200	800	3600	-6400
IRR B	-2%				
Project B is obviously better than A, yet IRR A > IRR B					
Project C	1000	1200	800	3600	-4800
IRR C	-16%				
Project C is obviously better than B, yet IRR B > IRR C					
Project D	-1000	1200	800	3600	-4800
IRR D	4%				
Project D is worse than C, yet IRR D > IRR C					
Project E	-1325	1200	800	3600	-4800
IRR E	20%				
Project E is worse than D, yet IRR E > IRR D					

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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week One, Day Two

(Session I and II: 09:00 – 12:30)

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CONSTRUCTION OF CASH (RESOURCE) FLOW STATEMENT

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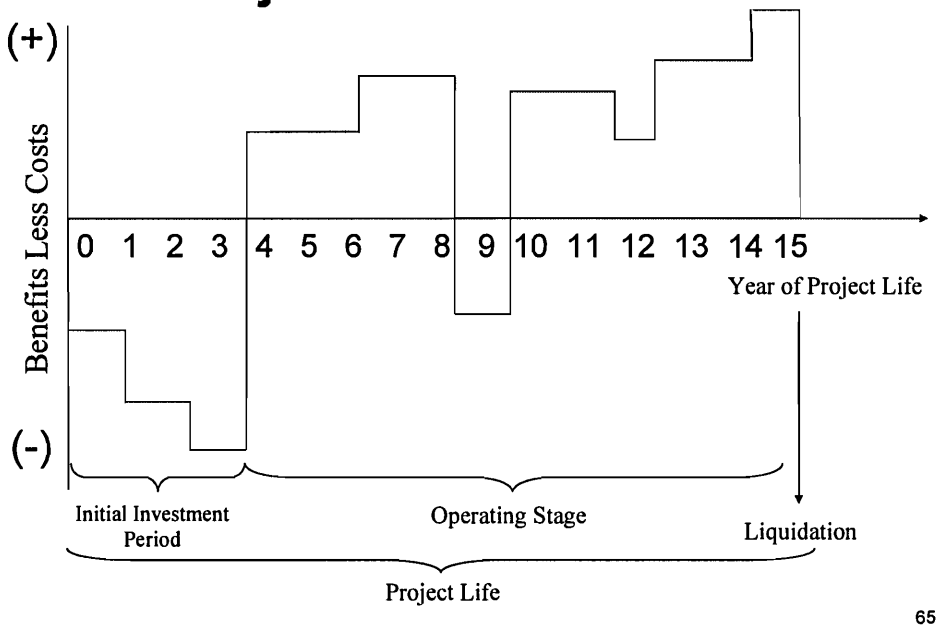
Project Cash Flow Profile



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Components of Cash Flow Analysis

a. Investment Plan

- Need to reconcile timing of technical construction plans with the financing plan, demand module, and manpower availability

b. Operating Plan

- Need to reconcile market module with manpower module and minimum cash flows for operation of project

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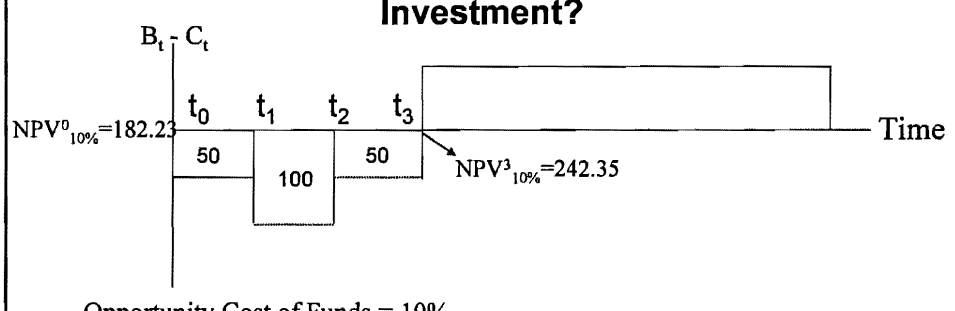
What Is the Total Cost of a Three Year Investment?



Opportunity Cost of Funds = 10%

Investment Costs:

a. Simple Sum = $200

b. At t_0 = $50 + 100/(1.1)^1 + 50/(1.1)^2$
$=50 + 90.91 + 41.32$ =$182.23

c. At t_3 = $50(1.1)^3 + 100(1.1)^2 + 50(1.1)^1$ = $242.35

Interest during construction is equal to $42.35

(Assumption that all expenditures are made at beginning of the period.)

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Interest During Construction

- Concept of opportunity cost when investment covers more than one period
- It is not the nominal interest expenses required to service debt
- Applies to the actual amount of investments made whether financed by equity or by debt.
- If measuring the total cost of the investment from the point of view of a period after the investment is made i.e. the cumulated amount of interest during construction should be included in estimates of total cost of the investment.

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c. Treatment of depreciation

- Concepts of depreciation expense used in calculating cash flow profile:
  - Tax depreciation or capital cost allowances (to estimate taxes)
  - Economic depreciation (to estimate residual values of assets)
- Why is depreciation expense not a cash flow item?

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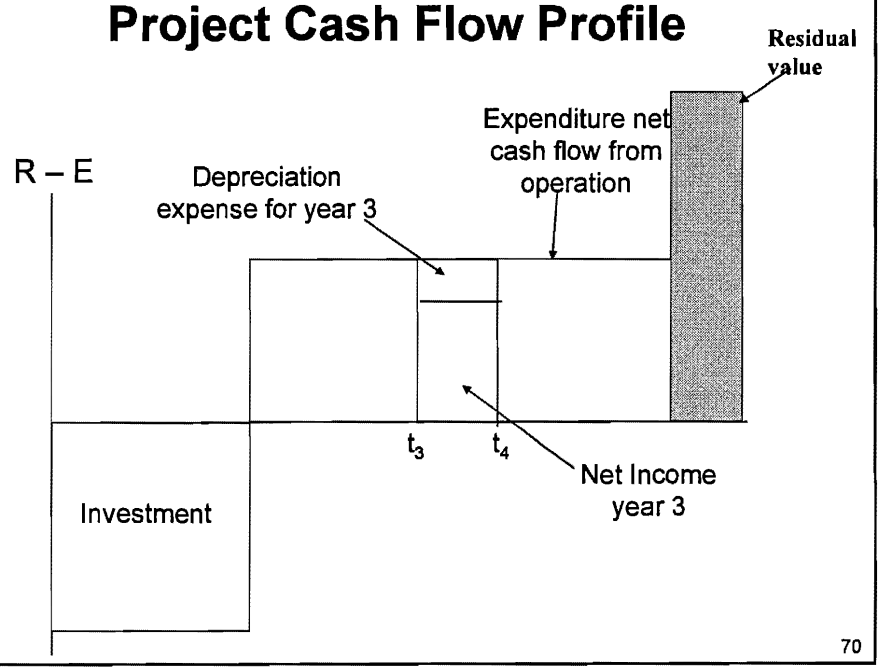
Project Cash Flow Profile



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d. Cash Receipts versus Sales

Sales for Period

+

Accounts Receivable for Beginning of Period

-

Accounts Receivable for End of Period

Cash Receipts for Period (Inflow)

For Example:

$Sales_1$ = 10,000

Accounts $Receivable_0$ = 5,000

Accounts $Receivable_1$ = 8,000

Receipts = 10,000+(5,000-8,000) = 7,000

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e. Uncollectable Receivables (Bad Debts) versus Sales

- Uncollectable receivables are calculated as a percentage of the accounts receivable at the beginning of the period.

Sales for Period

+

(Accounts Receivable for Beginning of Period -Accounts Receivable for End of Period)

-

Uncollectable Receivables

Cash Receipts for Period (Inflow)

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e. Uncollectable Receivables versus Sales (Example)

- Suppose, the accounts receivable are 20% of sales of current year and the uncollectable receivables are 10% of accounts receivable of previous year.

Years	2000	2001	2002	2003
Sales (S)	4000	5000	6000	6000
Accounts Receivable (AR)	800	1000	1200	1200
Uncollectable Receivables (UR)	-	80	100	120
Change in AR (Ar_{t-1}–AR_t–UR_t)	-	-280	-300	-120

For Example, Year 2001:

$Sales_{2001}$ = 5,000

Accounts $Receivable_{2000}$ = 800

Accounts $Receivable_{2001}$ = 1,000

Uncollectable $Receivables_{2001}$ = 80

Receipts =

5,000+(800-1,000)-80 = 4,720

For Example, Year 2002:

$Sales_{2002}$ = 6,000

Accounts $Receivable_{2001}$ = 1,000

Accounts $Receivable_{2002}$ = 1,200

Uncollectable $Receivables_{2002}$ = 100

Receipts =

6,000+(1,000-1,200)-100 = 5,700

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f. Cash Expenditures versus Purchases

Purchases for Period

+

Accounts Payable at Beginning of Period

-

Accounts Payable at End of Period

=

Cash Expenditures for Period (Outflow)

For Example:
Purchases$_1$ = 11,000
Accounts Payable$_0$ = 6,000
Accounts Payable$_1$ = 4,000
Expenditures = 11,000+(6,000-4,000) = 13,000

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g. Accounting for Working Capital

- Working Capital = Cash for Transactions
  + Accounts Receivables
  - Accounts Payables + Inventories
  + Prepaid Expenses - Accrued Liabilities

- Very important part of investment in most projects
- In Canada and USA, proportion of the Total Investment (Fixed Assets + Working Capital) that is working capital (WC) is about 30%:

$$\text{Proportion of WC in Total Investment} = \frac{WC}{FA + WC} \approx 0.30$$

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g. Accounting for Working Capital (cont'd)

- Cash held to carry out transactions is a use of cash
- Increases in cash holdings is a cash outflow
- Decreases in cash holdings is a cash inflow

For Example:

Desired stock of cash = 20% of Operating Expenses

Year	0	1	2	3	4
Operating Expenses	2000	2500	3200	5000	0
Desired Cash	400	500	640	1000	0
Impact on Net Cash Flow	-400	-100	-140	-360	+1000

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g. Accounting for Working Capital (cont'd)

If Cash Flow Profile is calculated as Receipts less Expenditures:

- No further calculation needed to determine cash flow impact of working capital except for cash
- Critical importance to properly plan for adequate financing and accounting for working capital for survival of projects
- Often need for working capital understated in project proposals

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g. Accounting for Working Capital (cont'd)

Example: Estimation of the adequate working capital for an expansion project

- Proposed Expansion Project

  Fixed Assets (FA) for Expansion Project = $ 475
  Planned Working Capital (WC) for Expansion Project = $ 25

  Proposed Total Investment for Expansion Project = $ 500

- From the balance sheet of the existing firm:

  Working capital proportion = $\frac{\text{WC}}{\text{Fixed Assets} + \text{WC}} \approx 0.24$

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g. Accounting for Working Capital (cont'd)

- Estimated Additional Working Capital:

$$\frac{\text{WC}}{\text{FA} + \text{WC}} = \frac{\text{WC}}{475 + \text{WC}} = 0.24$$

- Find: Adequate Working Capital = $ 150
  Underestimation: 150 – 25 = 125

- **Underestimated Amount of WC is $ 125**

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Moving from Financial to Economic Analysis

1. Restate financial revenues or physical outputs into their economic values – willingness to pay or economic value of resources saved.
2. Restate financial costs to economic opportunity costs.
3. Identify and quantify externalities both positive and negative of project.
4. Estimate economic values of externalities and include as them as part of resource flows of the project.
5. Identify sources and magnitudes of risks that affect economic outcomes.
6. Adjust resource flows for the costs of managing such risks.
7. Apply the economic opportunity cost of capital to determine the net economic resource flows to the Economic NPV of project.

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An Example of Construction of Cashflow

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Integrated Analysis of Misima Gold Mine in Papua New Guinea

- Analysis undertaken to determine the appropriate tax policies to apply to gold mines in Papua New Guinea
- Government did not want to repeat its previous mistakes it made in the design of tax policies for Bougainville Mine.
  - The Bougainville mine, in Papua New Guinea's North Solomons (formerly Bougainville) Province, was one of the world's largest gold and copper mines.
  - From the time mining exploration began on Bougainville, the presence of the mining company was a source of resentment amongst the local people in the Panguna area, as well as for many Bougainvilleans not directly affected by the mining operations.

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Crisis in Bougainville Mine

- Opposition to mining development was a major factor in the emergence of a secessionist movement on Bougainville.
- Melanesian people have a deep attachment to their land and, notwithstanding a complex structure of compensation payments, many Bougainvilleans feel that the development of the mine has robbed them of their land, irrevocably changed their way of life, and left them with little of the wealth they believed the mine would bring.
- As a prominent member of the Panguna landowner group said in 1989: 'Land is marriage – land is history – land is everything. If our land is ruined our life is finished' (Perpetua Serero, quoted in *Post-Courier* 1 May 1989).

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Bougainville mine in Papua New Guinea

- Since the commencement of operations in 1972 until 1988, total income generated by BCL was distributed as follows:

	K million	%
• Landowners (from compensation payments and royalty)	22	1
• Provincial Government (from royalty, and sales and other taxes)	75	5
• National Government (from income tax, dividends, dividend withholding tax, and customs duties and other taxes)	919	58
• Non-government share-holders (from dividends)	577	36
Total	**1593**	**100**

- *These tax policies were designed to get the maximum revenue for the "government". They didn't consider the allocation of revenues between the different levels of government (including tribal landowners)*

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Misima Gold and Silver Mine

- The project is located in Misima island of Papua New Guinea.
- Prospecting authority was first granted for the present site in 1977 to Placer Niugini Pvt. Ltd., which was the owner of the mine.
- The mine closed down on 26th May 2004 after operation of 15 years.
- In terms of direct contribution, the Misima Mine has contributed K21 million to the people of Milne Bay Province, as well as K285 million to the national economy over the 15 years.
- The main success story of this project is because significant contribution to the development of the country. This has been a successful partnership - a partnership between the people, the Government and the developer.

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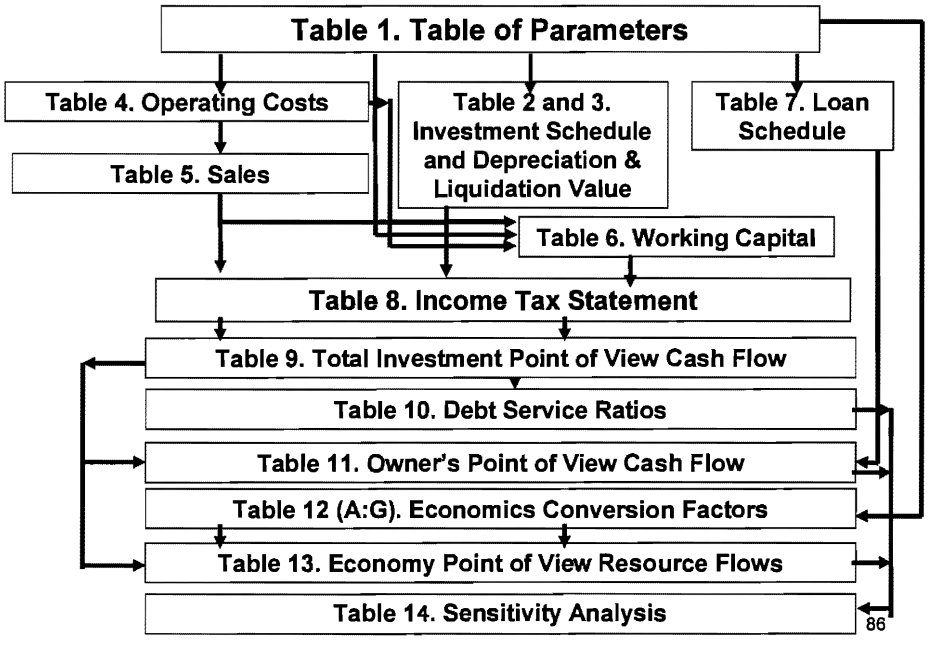
CHART OF TABLES FOR MISIMA GOLD PROJECT



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APPRAISAL OF "MISIMA GOLD MINE" PROJECT
(Illustrative Spreadsheets)

TABLE 1.PARAMETERS PANEL

Project Timing	
Start of Construction (Base Year)	2006
Start of Operation	2008
Operating Life (years)	10
Liquidation	2018

Investment (gross of taxes/tariffs) (Million Kina)	185.0	2006	2007
Infrastructure (%)	5%	4.6	4.6
Equipment (%)	85%		157.3
Installation (%)	10%		18.5
Mine Reserve Development		16.7	
Land		25.0	
Loss of Land Value (at Liquidation)		20%	
Site Restoration (2018)		6.0	
Yearly Capital Replacement (% of initial asset value)		5%	
Investment Cost Overrun Factor		0%	
Salvage Value (% of initial asset value)		10%	

Prices	US$/oz
Silver Price (2006)	6.00
Gold Price (2006)	480.0

Production	2008	2009	2010	2011-17
Ore Milled ('000 Tons)	2,000	2,500	3,000	3,500
		Recovery Rate		Grade
Gold		92%		1.6
Silver		70%		20

Working Capital	
Accounts Receivable (% Sales)	15.0%
A/C Payable (% Manufacturing Cost)	10.0%
Cash Balance (% Sales)	5.0%

Operating Cost (gross of taxes/tariffs) / K Ton Ore	
Labor	2.65
Imported Materials	2.10
Timber	1.80
Fuel	3.50
Domestic Transport & Handling	0.30
Miscellaneous	0.90

Taxes and Tariffs	
Income Tax	35.0%
Royalty	5.0%
General Sales Tax	10.0%
Tariff Rate on Fuel	25.0%
Tariff Rate on Imported Material	15.0%
Tariff on Imported Equipment	5.0%

Financing (Million Kina)		185.0
Debt	60%	111.0
Equity	40%	74.0
Return on Equity		15.0%
Interest Rate (US$ loan)		7%
Principal Installments		5
Grace Period on Principal		2
Start of Principal Repayment		2009

Economic Parameters		
Economic Opportunity Cost of Capital		13.0%
Foreign Exchange Premium		11.0%
Shadow Price of Non-tradable Outlays		0%
Exchange Rate (Kina/US$)		1.20
Domestic Transport & Handling		
Share of Tradable Content	0.60	
Unadjusted CF	0.91	

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TABLE 2. INVESTMENT SCHEDULE (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Infrastructure	4.6	4.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Machinery & Equipment		157.3	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
Installation Cost		18.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Mine Reserve Development	16.7											
TOTAL COST	**21.3**	**180.4**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**

TABLE 3. DEPRECIATION AND LIQUIDATION VALUE (Million Kina)

Initial Value of Assets	185.0
Annual Depreciation	18.5
Initial Value Machinery	138.8
Salvage Value	13.9

TABLE 4. OPERATING COSTS (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ore Milled ('000 Tons)			2,000	2,500	3,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	0
Labor			5.3	6.6	8.0	9.3	9.3	9.3	9.3	9.3	9.3	9.3	0.0
Imported Materials			4.2	5.3	6.3	7.4	7.4	7.4	7.4	7.4	7.4	7.4	0.0
Timber			3.6	4.5	5.4	6.3	6.3	6.3	6.3	6.3	6.3	6.3	0.0
Fuel			7.0	8.8	10.5	12.3	12.3	12.3	12.3	12.3	12.3	12.3	0.0
Domestic Transport & Handling			0.6	0.8	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0
Miscellaneous			1.8	2.3	2.7	3.2	3.2	3.2	3.2	3.2	3.2	3.2	0.0
TOTAL			**22.5**	**28.1**	**33.8**	**39.4**	**39.4**	**39.4**	**39.4**	**39.4**	**39.4**	**39.4**	**0.0**

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TABLE 5. SALES (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ore Milled ('000 Tons)			2,000	2,500	3,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	0
Gold Price (K/Kg)			18,506	18,506	18,506	18,506	18,506	18,506	18,506	18,506	18,506	18,506	18,506
Silver Price (K/Kg)			231	231	231	231	231	231	231	231	231	231	231
Gold Quantity (Kg)			2,944	3,680	4,416	5,152	5,152	5,152	5,152	5,152	5,152	5,152	0
Silver Quantity (Kg)			28,000	35,000	42,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000	0
Gold Sales (Million Kina)			54.5	68.1	81.7	95.3	95.3	95.3	95.3	95.3	95.3	95.3	0.0
Silver Sales (Million Kina)			6.5	8.1	9.7	11.3	11.3	11.3	11.3	11.3	11.3	11.3	0.0
Total Revenue (Million Kina)			**61.0**	**76.2**	**91.4**	**106.7**	**106.7**	**106.7**	**106.7**	**106.7**	**106.7**	**106.7**	**0.0**

TABLE 6. WORKING CAPITAL (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Accounts Receivable			9.14	11.43	13.72	16.00	16.00	16.00	16.00	16.00	16.00	16.00	0.00
Accounts Payable			1.72	2.15	2.58	3.01	3.01	3.01	3.01	3.01	3.01	3.01	0.00
Cash Balance			3.05	3.81	4.57	5.33	5.33	5.33	5.33	5.33	5.33	5.33	0.00
Change in A/R			-9.14	-2.29	-2.29	-2.29	0.00	0.00	0.00	0.00	0.00	0.00	16.00
Change in A/P			-1.72	-0.43	-0.43	-0.43	0.00	0.00	0.00	0.00	0.00	0.00	3.01
Change in C/B			3.05	0.76	0.76	0.76	0.00	0.00	0.00	0.00	0.00	0.00	-5.33

TABLE 7. LOAN SCHEDULE (Million US$)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Loan disbursement		90.2											
Outstanding debt beginning of period			90.2	90.2	72.2	54.1	36.1	18.0					
Interest accrued			6.3	6.3	5.1	3.8	2.5	1.3					
Annual repayment			6.3	24.4	23.1	21.8	20.6	19.3					
Interest paid in period			6.3	6.3	5.1	3.8	2.5	1.3					
Principal repaid				18.0	18.0	18.0	18.0	18.0					
Outstanding debt at the end of period		90.2	90.2	72.2	54.1	36.1	18.0	0.0					
Interest paid in period (Million Kina)			**7.6**	**7.6**	**6.1**	**4.5**	**3.0**	**1.5**					
Annual repayment (Million Kina)			**7.6**	**29.2**	**27.7**	**26.2**	**24.7**	**23.2**					

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TABLE 8. INCOME TAX STATEMENT (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Gold Sales			54.5	68.1	81.7	95.3	95.3	95.3	95.3	95.3	95.3	95.3	0.0
Silver Sales			6.5	8.1	9.7	11.3	11.3	11.3	11.3	11.3	11.3	11.3	0.0
Total Revenue			6.5	8.1	9.7	11.3	11.3	11.3	11.3	11.3	11.3	11.3	0.0
Operating Cost			22.5	28.1	33.8	39.4	39.4	39.4	39.4	39.4	39.4	39.4	0.0
Interest Expense			6.3	6.3	5.1	3.8	2.5	1.3	0.0	0.0	0.0	0.0	0.0
Depreciation			18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	0.0
Cost of Goods Sold			47.3	52.9	57.3	61.7	60.4	59.1	57.9	57.9	57.9	57.9	0.0
Royalty			0.3	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0
Pre-Tax Income			-41.2	-45.2	-48.1	-50.9	-49.6	-48.4	-47.1	-47.1	-47.1	-47.1	0.0
Cumulative Loses			-41.2	-86.4	-134.5	-185.4	-235.0	-283.4	-330.5	-377.6	-424.7	-471.8	-471.8
Taxable Income			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Income Tax			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Income After Tax			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 9. CASHFLOW STATEMENT: TOTAL INVESTMENT PERSPECTIVE (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
INFLOWS													
Gold Sales			54.5	68.1	81.7	95.3	95.3	95.3	95.3	95.3	95.3	95.3	0.0
Silver Sales			6.5	8.1	9.7	11.3	11.3	11.3	11.3	11.3	11.3	11.3	0.0
Change in A/R			-9.1	-2.3	-2.3	-2.3	0.0	0.0	0.0	0.0	0.0	0.0	16.0
Salvage Value													13.9
Land Grant	25.0												
TOTAL INFLOWS	25.0	0.0	51.8	73.9	89.2	104.4	106.7	106.7	106.7	106.7	106.7	106.7	29.9
OUTFLOWS													
Investment Costs													
Land	25.0												
Infrastructure	4.6	4.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0
Machinery & Equipment		157.3	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	0.0
Installation Cost		18.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.0
Mine Reserve Development	16.7												
Site Restoration													6.0
Operating Costs													
Labor			5.3	6.6	8.0	9.3	9.3	9.3	9.3	9.3	9.3	9.3	0.0
Imported Materials			4.2	5.3	6.3	7.4	7.4	7.4	7.4	7.4	7.4	7.4	0.0
Timber			3.6	4.5	5.4	6.3	6.3	6.3	6.3	6.3	6.3	6.3	0.0
Fuel			7.0	8.8	10.5	12.3	12.3	12.3	12.3	12.3	12.3	12.3	0.0
Domestic Transport & Handling			0.6	0.8	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0
Miscellaneous			1.8	2.3	2.7	3.2	3.2	3.2	3.2	3.2	3.2	3.2	0.0
Change in A/P			-1.7	-0.4	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Change in C/B			3.0	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	-5.3
Income Tax			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Royalty			0.3	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0
TOTAL OUTFLOWS	46.3	180.4	33.4	38.1	43.8	49.5	49.2	49.2	49.2	49.2	49.2	49.2	3.7
NET CASH FLOW	-21.3	-180.4	18.4	35.8	45.3	54.9	57.5	57.5	57.5	57.5	57.5	57.5	26.2

TABLE 10. DEBT SERVICE RATIOS

Net Cash Flow	-21.3	-180.4	18.4	35.8	45.3	54.9	57.5	57.5	57.5	57.5	57.5	57.5	26.2
Total Loan Repayment (Principal + Interest)			7.6	29.2	27.7	26.2	24.7	23.2					
PV Net Cash Flow			221.1	216.9	193.7	158.8	111.2	57.5					
PV Debt Repayment			96.5	96.5	77.2	57.9	38.6	19.3					
ADSCR			2.92	1.47	1.96	2.51	2.80	2.98					
DSCR			2.29	2.25	2.51	2.74	2.88	2.98					

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TABLE 11. CASHFLOW STATEMENT: OWNER'S PERSPECTIVE (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
INFLOWS													
Gold Sales	0.0	0.0	54.5	68.1	81.7	95.3	95.3	95.3	95.3	95.3	95.3	95.3	0.0
Silver Sales	0.0	0.0	6.5	8.1	9.7	11.3	11.3	11.3	11.3	11.3	11.3	11.3	0.0
Change in A/R	0.0	0.0	-9.1	-2.3	-2.3	-2.3	0.0	0.0	0.0	0.0	0.0	0.0	16.0
Salvage Value													13.9
Land Grant	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INFLOWS	**25.0**	**0.0**	**51.8**	**73.9**	**89.2**	**104.4**	**106.7**	**106.7**	**106.7**	**106.7**	**106.7**	**106.7**	**29.9**
OUTFLOWS													
Investment Costs													
Land	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Infrastructure	4.6	4.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0
Machinery & Equipment	0.0	157.3	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	0.0
Installation Cost	0.0	18.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.0
Mine Reserve Development	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Restoration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0
Operating Costs													
Labor			5.3	6.6	8.0	9.3	9.3	9.3	9.3	9.3	9.3	9.3	0.0
Imported Materials			4.2	5.3	6.3	7.4	7.4	7.4	7.4	7.4	7.4	7.4	0.0
Timber			3.6	4.5	5.4	6.3	6.3	6.3	6.3	6.3	6.3	6.3	0.0
Fuel			7.0	8.8	10.5	12.3	12.3	12.3	12.3	12.3	12.3	12.3	0.0
Domestic Transport & Handling			0.6	0.8	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0
Miscellaneous			1.8	2.3	2.7	3.2	3.2	3.2	3.2	3.2	3.2	3.2	0.0
Change in A/P			-1.7	-0.4	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Change in C/B			3.0	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	-5.3
Income Tax			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Royalty			0.3	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0
TOTAL OUTFLOWS	**46.3**	**180.4**	**33.4**	**38.1**	**43.8**	**49.5**	**49.2**	**49.2**	**49.2**	**49.2**	**49.2**	**49.2**	**3.7**
NET CASH FLOW BEFORE FINANCING	**-21.3**	**-180.4**	**18.4**	**35.8**	**45.3**	**54.9**	**57.5**	**57.5**	**57.5**	**57.5**	**57.5**	**57.5**	**26.2**
Add loan disbursement		90.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Less loan repayment		6.3	24.4	23.1	21.8	20.6	19.3	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW AFTER FINANCING	**-21.3**	**-96.5**	**-5.9**	**12.7**	**23.5**	**34.3**	**38.2**	**57.5**	**57.5**	**57.5**	**57.5**	**57.5**	**26.2**

FNPV @ ROE: 15% **33.9** **Million Kina**
FIRR: **20.0%**

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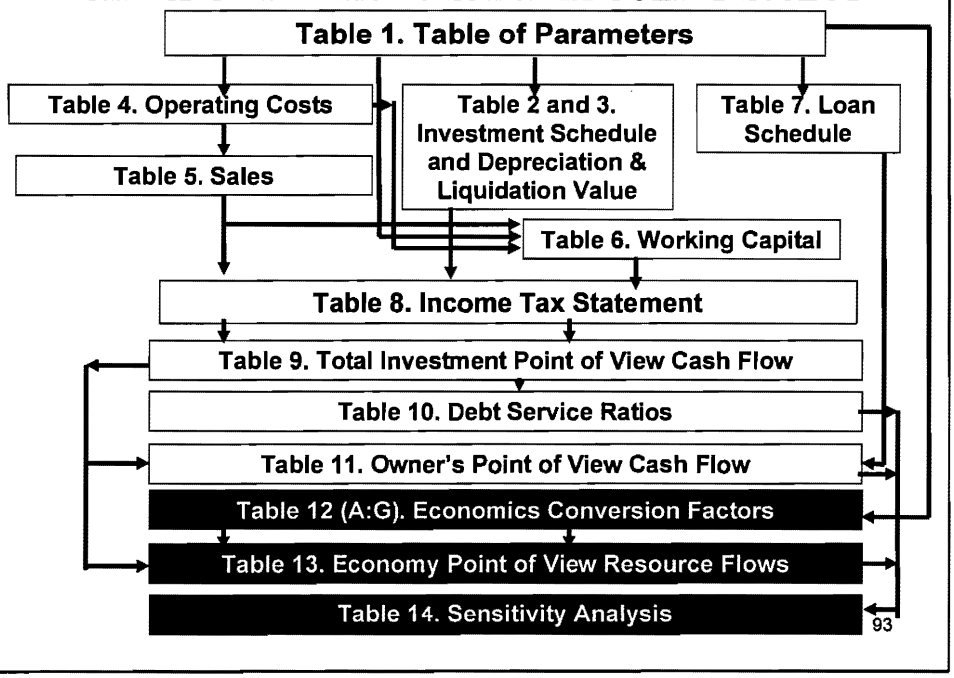
CHART OF TABLES FOR MISIMA GOLD PROJECT



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ECONOMIC ANALYSIS

TABLE 12A: ECONOMIC CONVERSION FACTOR FOR GOLD

PROJECT PRODUCES AN EXPORTABLE GOOD: GOLD

FOB = 480 US$/oz		Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradabl	FEP	Econ. Value Adj.
FOB (Kina)		576.0	1.0	576.0	1.0	63.4	639.4
(-) Domestic Transport and Handling *		0.0					0.0
Financial Price		576.0					639.4
CF = EV / FV =		1.11					

* Domestic transport and handling are already included into the expenditures of the project.

TABLE 12B: ECONOMIC CONVERSION FACTOR FOR SILVER

PROJECT PRODUCES AN EXPORTABLE GOOD: SILVER

FOB = 6 US$/oz		Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradabl	FEP	Econ. Value Adj.
FOB (Kina)		7.2	1.0	7.2	1.0	0.8	8.0
(-) Domestic Transport and Handling *		0.0					0.0
Financial Price		7.2					8.0
CF = EV / FV =		1.11					

* Domestic transport and handling are already included into the expenditures of the project.

TABLE 12C: ECONOMIC CONVERSION FACTOR FOR EQUIPMENT

PROJECT USES AN IMPORTABLE GOOD: EQUIPMENT

CIF = US$ 110.58 million		Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradabl	FEP	Econ. Value Adj.
CIF (Kina)		132.7	1.0	132.7	1.0	14.6	147.3
(+) Tariff	5.0%	6.6					
(+) General Sales Tax	10.0%	13.9					
(+) Domestic Transport and Handling	3.0%	4.0	0.9	3.6	0.6	0.3	3.9
Financial Price		157.3					151.2
CF = EV / FV =		0.96					

TABLE 12G: SUMMARY OF ECONOMIC CONVERSION FACTORS

	Economic Conversion Factor	
INFLOWS		
Gold Sales	1.11	Exported. Domestic transportation and handling already part of project expenditures.
Silver Sales	1.11	Exported. Domestic transportation and handling already part of project expenditures.
Change in A/R	1.11	Same as sales.
Salvage Value	0.96	Same as imported machinery and equipment.
Land Grant	0.00	Financial transfer, no economic value. Not shown in economic statement.
OUTFLOWS		
Investment Costs		
Land	1.00	No distortions.
Infrastructure	0.87	Non-tradable service.
Machinery & Equipment	0.96	Imported.
Installation Cost	0.90	Non-tradable service.
Mine Reserve Development	0.90	Non-tradable service.
Site Restoration	0.87	Same as infrastructure.
Operating Costs		
Labor	0.82	Estimated.
Imported Materials	0.88	Imported.
Timber	1.02	Exportable.
Fuel	0.81	Imported.
Domestic Transport & Handling	0.91	Non-tradable service.
Miscellaneous	1.00	No distortions.
Change in A/P	0.91	Average of operating costs.
Change in C/B	1.00	No distortions.
Income Tax	0.00	Financial transfer, no economic value. Not shown in economic statement.
Royalty	0.00	Financial transfer, no economic value. Not shown in economic statement.

TABLE 13. ECONOMIC RESOURCE FLOW STATEMENT (Million Kina)

	CF	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
INFLOWS														
Gold Sales	1.11	0.0	0.0	60.5	75.6	90.7	105.8	105.8	105.8	105.8	105.8	105.8	105.8	0.0
Silver Sales	1.11	0.0	0.0	7.2	9.0	10.8	12.6	12.6	12.6	12.6	12.6	12.6	12.6	0.0
Change in A/R	1.11	0.0	0.0	-10.1	-2.5	-2.5	-2.5	0.0	0.0	0.0	0.0	0.0	0.0	17.8
Salvage Value	0.96													13.3
TOTAL INFLOWS		**0.0**	**0.0**	**57.5**	**82.0**	**99.0**	**115.9**	**118.4**	**118.4**	**118.4**	**118.4**	**118.4**	**118.4**	**31.1**
OUTFLOWS														
Investment Costs														
Land	1.00	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Infrastructure	0.87	4.0	4.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.0
Machinery & Equipment	0.96	0.0	151.2	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	0.0
Installation Cost	0.90	0.0	16.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.0
Exploration & Development	0.90	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Restoration	0.87	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2
Operating Costs														
Labor	0.82	0.0	0.0	4.3	5.4	6.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	0.0
Imported Materials	0.88	0.0	0.0	3.7	4.6	5.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.0
Timber	1.02	0.0	0.0	3.7	4.6	5.5	6.4	6.4	6.4	6.4	6.4	6.4	6.4	0.0
Fuel & Power	0.81	0.0	0.0	5.7	7.1	8.5	9.9	9.9	9.9	9.9	9.9	9.9	9.9	0.0
Domestic Transport & Handling	0.91	0.0	0.0	0.5	0.7	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Miscellaneous	1.00	0.0	0.0	1.8	2.3	2.7	3.2	3.2	3.2	3.2	3.2	3.2	3.2	0.0
Change in A/P	0.91	0.0	0.0	-1.6	-0.4	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.7
Change in C/B	1.00	0.0	0.0	3.0	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	-5.3
TOTAL OUTFLOWS		**44.0**	**171.9**	**30.0**	**33.8**	**38.7**	**43.7**	**43.3**	**43.3**	**43.3**	**43.3**	**43.3**	**43.3**	**2.6**
NET CASH FLOW BEFORE FINANCING		**-44.0**	**-171.9**	**27.5**	**48.2**	**60.2**	**72.2**	**75.1**	**75.1**	**75.1**	**75.1**	**75.1**	**75.1**	**28.5**

ENPV @ EOCK: **13.0%** **104.6 Million Kina**
EIRR: **22.6%**

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SENSITIVITY ANALYSIS

TABLE 14A. SENSITIVITY TEST: INVESTMENT COST OVERRUN (%)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	33.9	**104.6**	**2.92**	**1.47**	**1.96**	**2.29**
-10%	51.0	121.7	3.25	1.64	2.19	2.55
0%	33.9	104.6	2.92	1.47	1.96	2.29
10%	16.8	87.4	2.64	1.33	1.78	2.08
20%	-0.5	70.1	2.42	1.22	1.63	1.90
30%	-17.8	52.8	2.23	1.12	1.50	1.75

TABLE 14B. SENSITIVITY TEST: SILVER PRICE (US$/oz)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	33.9	**104.6**	**2.92**	**1.47**	**1.96**	**2.29**
2.50	10.9	74.6	2.47	1.29	1.74	2.03
3.00	14.2	78.8	2.53	1.32	1.77	2.06
3.50	17.4	83.1	2.60	1.34	1.80	2.10
3.89	20.0	86.5	2.65	1.36	1.83	2.13
4.00	20.7	87.4	2.66	1.37	1.83	2.14
4.50	24.0	91.7	2.72	1.39	1.87	2.18

TABLE 14C. SENSITIVITY TEST: GOLD PRICE (US$/oz)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	33.9	**104.6**	**2.92**	**1.47**	**1.96**	**2.29**
300.00	-97.4	-37.6	0.33	0.46	0.68	0.78
350.00	-60.9	-12.6	1.05	0.74	1.04	1.20
400.00	-24.5	32.5	1.77	1.02	1.39	1.62
450.00	12.0	77.5	2.49	1.30	1.75	2.04
480.00	33.9	104.6	2.92	1.47	1.96	2.29
500.00	48.5	122.6	3.20	1.58	2.11	2.46

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Misima Mine, on Misima Island, 200km east of mainland Papua New Guinea (PNG).

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Open-pit operations at Misima.

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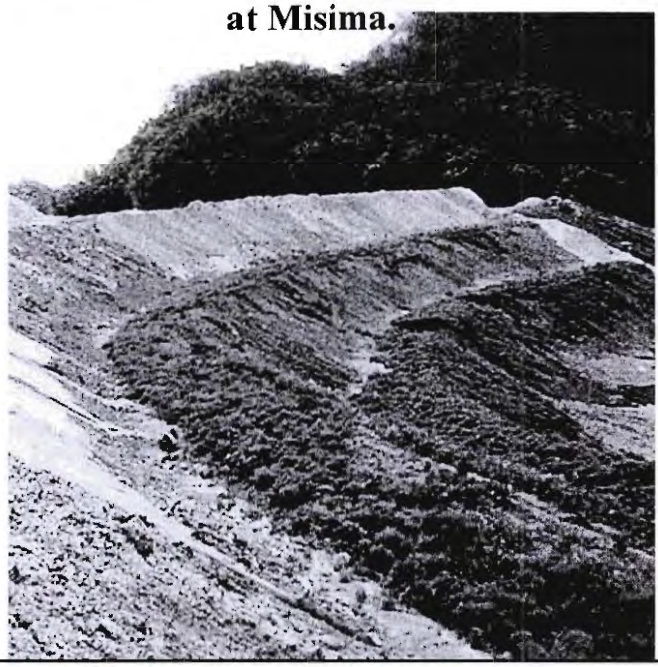
Revegetation is part of the environmental programme at Misima.



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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week One, Day Three

(Session I: 09:00 – 10:30)

101

Integration of Movements in Prices, Inflation, Exchange Rates and Interest Rates

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1. Nominal Prices (Current prices)

$P_1^t, P_2^t, P_3^t \ldots\ldots\ldots\ldots P_n^t$

2. Price Level

$P_L^t = \Sigma_i^n (P_i^t \; W_i)$

Where: i = Individual good or service included in the market basket

P_i^t = Price of the good or service (i) at a point in time (t)

W_i = Weight given to the price of a particular good or service (i);

where $\Sigma w_i = 1$

Note: it is generally useful to express the price level of a basket of goods and services at a specific point in time in terms of a price index (P_I^t)

$P_I^t = P_L^t / P_L^B$

Where P_L^t = Price level in period (t)

P_L^B = Price level for the base period (B)

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3. Changes in Price Level (Inflation)

- Measured in terms of a price index:

$$gP^e_I = ((P^t_I - P_I^{t-1})/(P_I^{t-1})) * 100$$

4. Real Prices

$$P^t_{iR} = P^t_i \ / \ P^t_I$$

Where P^t_i = nominal price of good or service (i) as of a point in time (t)

P^t_I = Price level index at time period (t)

5. Changes in Real Prices

$$\text{Change in } P^t_{iR} = \frac{P^t_{iR} - P^{t-1}_{iR}}{P^{t-1}_{iR}}$$

P^t_{iR} = Real price of good (i) as of a specific period

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Example 1: Nominal Prices and Changes in Price level

Assume Year 1 is base year

Goods	**1**	**2**	**3**
Weights	**0.2**	**0.5**	**0.3**
Nominal Prices Year 1:	P_1^1 =30	P_2^1=100	P_3^1=50
	P_L^1 =0.2(30)+0.5(100)+0.3 (50)		
	P_L^1 =71		
	P_L^B= 71		
	Price Index P_I^1 =1.00		
Nominal Prices Year 2:	P_1^2=40	P_2^2=110	P_3^2=40
	P_L^2=0.2(40)+0.5(110)+0.3(40)=		
	P_L^2 =75		
	P_L^B= 71		
	Price Index P_I^2 =1.056		

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Example 1:Nominal Prices and Changes in Price Level (cont'd)

Assume Year 1 is base year

Goods	1	2	3
Weights	0.2	0.5	0.3

Nominal Prices Year 3: $P_1^3=35$ $P_2^3=108$ $P_3^3=60$

$P_L^3 = 0.2(35)+0.5(108)+0.3(60)$

$P_L^3 = 79$

Price Index $P_I^3 = 1.113$

INFLATION RATE

- **Changes in Price Level :** Measured in terms of a price index

$gP_I^2 = ((P_I^2 - P_I^1)/(P_I^1)) * 100=((1.056-1.00)/1.00))*100=5.63\%$

$gP_I^3 = ((P_I^3 - P_I^2)/(P_I^2)) * 100=((1.113-1.056)/1.056)*100=5.33\%$

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EXAMPLE 2: Real Prices and Changes in Real Prices

Goods	1	2	3
Weights	0.2	0.5	0.3

Nominal Prices Year 1: $P_1^1=30$ $P_2^1=100$ $P_3^1=50$

Price Index $P_I^1 = 1$

Real Prices Year 1: $P_{1R}^1=30/1$ $P_{2R}^1=100/1$ $P_{3R}^1=50/1$

$P_{1R}^1=30$ $P_{2R}^1=100$ $P_{3R}^1=50$

Nominal Prices Year 2: $P_1^2=40$ $P_2^2=110$ $P_3^2=40$

Price Index $P_I^2 = 1.056$

Real Prices Year 2: $P_{1R}^2=40/1.056$ $P_{2R}^2=110/1.056$ $P_{3R}^2=40/1.056$

$P_{1R}^2=37.87$ $P_{2R}^2=104.13$ $P_{3R}^2=37.87$

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EXAMPLE 2: Real Prices and Changes in Real Prices (Cont'd)

Goods	**1**	**2**	**3**
Weights	**0.2**	**0.5**	**3**
Nominal Prices Year 3:	$P_1^3=35$	$P_2^3=108$	$P_3^3=60$
Price Index $P_I^3=1.113$			
Real Prices Year 3:	$P_{1R}^3=35/1.113$	$P_{2R}^3=108/1.113$	$P_{3R}^3=60/1.113$
	$P_{1R}^3=31.46$	$P_{2R}^3=97.06$	$P_{3R}^3=53.92$

Changes in Real Prices Year 2

Change in $P_{1R}^2 = P_{1R}^2 - P_{1R}^1 / (P_{1R}^1) =$

((37.80-30)/30)	((104.13-100)/100)	((37.80-50)/50)
=0.26	**=0.04**	**=-0.24**

Changes in Real Prices in Year 3

Change in $P_1R_3 = P_1R_3 - P_1R_2 / (P_1R_2) =$

((31.46-37.87)/37.87)	((97.06-104.13)/104.13)	((53.92-37.87)/37.87)
=- 0.17	**=- 0.07**	**=0.42**

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6. Inflation Adjusted Values

$$\hat{P}_I^{t+1} = P_i^t*(1 + gP^t_{iR})*(1 + gP^e_I)$$

$\hat{P}_I^{t+1}$ = estimated nominal price of good i in year t+1

P_i^t = nominal price of good i in year t

gP_{iR}^t = estimated growth in real price of good i

gP_I^e = assumed growth in price level index from year t to t+1

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Example: Telephone charges over time: Satellite Project

Due to changes in Technology and Deregulation real price of telephone calls are falling at 8% per year

(1) Price in year 1 for Domestic Communication =	$0.033 /minute					
(2) Real decrease in tariffs	-8.00%	-8.00%	-8.00%	-8.00%	-8.00%	-8.00%
(3) Index of real telephone charges	1.00	0.92	0.85	0.78	0.72	0.66
(4) Rate of Inflation	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
(5) General Price Index	1.00	1.03	1.06	1.09	1.13	1.16
(6) Index of inflation adjusted prices	1.00	0.95	0.90	0.85	0.81	0.76
(7) Expected real price per minute (US$) (row 1 * row 3)	$0.033	$0.030	$0.028	$0.026	$0.024	$0.022
(8) Expected nominal price per minute (US$) (row 1 * row 6)	$0.033	$0.031	$0.030	$0.028	$0.027	$0.025

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7. Constant Prices

- Fixed set of prices at a given year t_0

$$P_i^{t+n} = P_i^{to}; \quad P_k^{t+n} = P_k^{to}$$

Not a useful concept to use in project evaluation

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Integrated Financial Analysis of Investments

- The market exchange rate is the current price of foreign exchange. The market rate between the domestic currency and the foreign currency can be expressed at a point in time (t) as: $E_t^M = (\#D/F)_t$
- If the price index for the domestic currency's economy is I_t^D at the time t, and the price index for the foreign currency's country is I_t^F, then the real exchange rate (E_t^R) at that point in time can be expressed as:

$$E_t^R = (\#D/F)_t * (I_t^F / I_t^D)$$

$$E_t^R = E_t^M * (I_t^F / I_t^D) \quad \rightarrow \quad E_t^M = E_t^R * (I_t^D / I_t^F)$$

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Example

- *Initial year prices indexes in both countries assumed in project analysis to be equal to 1.0.*

$E_t^M = 8$ Rand / \$US

$I_t^D = 1.0$

$I_t^{US} = 1.0$

$$E_t^R = E^M \times \frac{I_t^{US}}{I_t^D} = 8.0 \times \frac{1.0}{1.0} = 8.0 \text{ Rand/\$}$$

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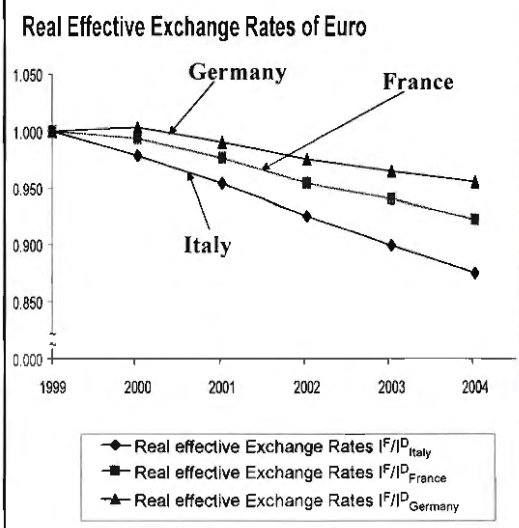

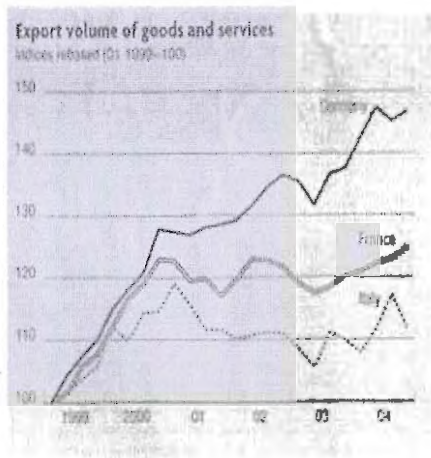

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Integrated Financial Analysis of Investments

- We can derive the market exchange rate in period t+n, E^M_{t+n}, that is required given that the projected real exchange rate as in period t+n is (E^R_{t+n}), and given the movement in the price levels of the two countries between period t and t+n. It is expressed as:

$$E^M_{t+n} = E^R_{t+n} \frac{I^D_{t+n}}{I^F_{t+n}}$$

or

$$E^M_{t+n} = E^R_{t+n}(I^D_t/I^F_t) \prod_{i=1}^{n} \frac{(1 + gP^D_{Lt+i})_i}{(1 + gP^F_{Lt+i})_i}$$

- When there is uncertainty as to the timing of changes in the real exchange rate, the market exchange rate in period t+n can be expressed as:

$$E^M_{t+n} = (1 + K) * E^R_{t+n} \frac{I^D_{t+n}}{I^F_{t+n}}$$

Where K is a random variable with a mean of zero

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What is market exchange rate going to be in 5 years time ?

Suppose that in the current year:
Domestic Price Index = 1 and Foreign Price Index = 1

Therefore, in Year 0, $E_0^M = E_0^R$. Suppose E_0^M is 8 Rand/$US and the real exchange rate is also 8 Rand/$US. The real exchange rate remains constant.

If gP^f = 2%/p.a. Foreign rate of inflation

If gP^d = 8%/p.a. Domestic rate of inflation

$I^d_{t+5} = 1\,(1.08)^5 = 1.47$

$I^f_{t+5} = 1\,(1.02)^5 = 1.10$

E^R_{t+5} = 8 Rand/$

Therefore, if $E^M_{t+5} = E^R_{t+5} \times \left(\frac{I^d_{t+5}}{I^f_{t+5}}\right)$ then:

$$E^M_{t+5} = 8.0 \times \frac{(1.47)}{(1.10)} = 10.65 \text{ Rand/\$US}$$

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Inflation and Nominal Interest Rates

- Nominal Interest Rate = (i)
- Real Interest Rate = (r)
- Risk Premium = R
- Expected Growth (inflation) in Prices = gP^e

Given the factors above, nominal interest rate is calculated as: $i = r + R + (1 + R + r)\,gP^e$

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Example

By using following information:

Inflation rate (gP^e) = 20%
Risk Premium (R) = 0
Real Interest Rate (r) = 0.05

Determination of Nominal Interest Rate

$$i = r + R + (1 + R + r)\, gP^e$$

$$i = 0.05 + 0 + (1 + 0 + 0.05)^* \, 0.20$$

$$i = 0.26$$

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Inflation and its Impact on Interest and Principal Payments

	Period 0	1	2	3	4
Price Index	1.0	1.0	1.0	1.0	1.0
1. $1000 Loan @5% Interest & No Inflation					
Loan	-1000				
Interest		50	50	50	50
Loan Payment					1000
Cash Flow in Year 0 Prices	-1000	50	50	50	1050
Net Present Value (Equilibrium Situation)	0				
Price index	1.0	1.20	1.44	1.728	2.074
2. $1000 Loan @5% Interest & 20% Inflation					
Loan	-1000				
Interest		50	50	50	50
Loan Payment					1000
Cash Flow in Current Prices	-1000	50	50	50	1050
Cash Flow in year 0 Prices	-1000	41.67	34.72	28.94	506.37
Net Present Value (Dis-Equilibrium Situation)	-487.24				
Price Index	1.0	1.2	1.44	1.728	2.074
3. $1000 Loan @ 26.0% Interest & 20% Inflation					
Loan	-1000				
Interest		260	260	260	260
Loan Payment					1000
Cash Flow in Current Prices	-1000	260	260	260	1260
Cash Flow in year 0 Prices	-1000	216.67	180.56	150.46	607.64
Net Present Value (Equilibrium Situation)	0				
4. Undiscounted Change in Cash Flow	0	-166.67	-130.56	-100.46	+442.36
=Case 1 - Case 3 in Year 0 Prices					

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Steps for Undertaking Financial Analysis

1. Estimate Real Prices, (P^i_t /P_t level) for project life
2. Make Assumptions about Future Inflation Rate (S)
3. Calculate Changes in Inflation-Adjusted Prices
4. Calculate estimated Nominal Interest Rate
5. Determine Cash Requirements (Nominal)
6. Determine Financing Requirements (Nominal)
7. Estimate Taxable Income and Income Taxes (Nominal)
8. Construct Pro-Forma Cash Flow Statement in Nominal Values
9. Calculate Nominal Net Cash Flows from Different Points of View
10. Deflate Nominal Value by General Price Index for Each Year to Obtain Real Cash Flow Statements
11. Calculate Debt Service Capacity Ratios for Total Investment (Banker's) Point of View
12. Calculate NPV and IRR for Owner's Point of View

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Impact of Expected Change in Real Exchange Rate on Real Interest Rates

- US ($) Loan
  Nominal interest rate:
  $i_{US} = r_{US} + (1+r_{US})_g P_{US}$

  Yen (Y) Loan
  $i_J = r_J + (1+r_J)_g P_J$

- Market exchange rate:
  $E_0^M = (\#\$/Y)$
  $E_0^M = E_0^R\ (I_0^{US}/I_0^J)$
  $E_1^M = E_1^R\ (I_1^{US}/I_1^J)$

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- Define the price indices in US and Japan so that

$$I_{t-1}^{US} = I_{t-1}^{J} = 1$$

$$\therefore E_{t-1}^{M} = E_{t-1}^{R}$$

$$\therefore E_{t}^{M} = E_{t}^{R} \frac{I_t^{US}}{I_t^{J}}$$

$$\therefore E_{t}^{M} = E_{t}^{R} \frac{(1+gP_t^{US})}{(1+gP_t^{J})}$$

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- In equilibrium the nominal return of giving a loan to Japan in Yen must be same as making a loan in US$ in the US.
- In order to have no profits from arbitrage the following must hold:

$$(1+i_{US}) = \frac{E_t^M}{E_{t-1}^M}(1+i_J)$$

$$1+r_{US}+(1+r_{US})gP_t^{US} = \frac{1}{E_{t-1}^R}\{1+r_J+(1+r_J)gP_t^J\}\{E_t^R \frac{(1+gP_t^{US})}{(1+gP_t^J)}\}$$

$$(1+r_{US})(1+gP_t^{US}) = (1+r_J)(1+gP_t^J)\frac{E_t^R}{E_{t-1}^R}\frac{(1+gP_t^{US})}{(1+gP_t^J)}$$

$$(1+r_{US}) = (1+r_J)\frac{E_t^R}{E_{t-1}^R}$$

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- The return in dollars from a loan you make to Japan is given by the real rate of interest you earn in Japan plus any additional (or reduction) in dollars you receive when you convert the Yen repayments into dollars.

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An Example

Assume that Yen is appreciating at an annual rate of 3%

$E_1^R = E_0^R (1.03)$

The $ is devaluing 3% a year relative to the Yen. Alternatively, the Yen is appreciating 3% a year.

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- Example $ 1,000 loan

$i_{US} = r_{US} + (1+r_{US})_g P_{US}$

Market exchange rate:

$E_0^M = 0.01$ \$/Y

$r_\$ = 0.05$

Expected rate of Inflation in US ($_gP_\$$)= 0.04/year

$i_\$ = r_\$ + (1+r_\$)_g P_\$$

$i_\$ = 0.05 + (1+0.05)\ 0.04$

$i_\$ = 0.092$

If one year loan made to US borrower:

Year	0	1
Loan	-1000	
Repayment		+1000
Interest		92
Total	-1000	+1092

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Real Interest Rate in Yen

$(1+r_\$) = \$1/\ E_0^R(1 + r_Y)\ (E_1^R)$

$(1+r_\$) = (1 + r_Y)\ (E_1^R/E_0^R)$

where E_0^R is the real exchange rate in year zero and E_1^R is real exchange rate in year 1.

Let us assume $E_1^R/E_0^R = 1.03$ i.e. the dollar is devaluing at 3 percent a year relative to the Yen.

Hence, if $r_\$ = 0.05$

$1.05 = (1 + r_Y)\ (1.03)$

$r_Y = (1.05/1.03) - 1$

$r_Y = 0.019417476$

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- Expected rate of Inflation in Japan (${}_gP_J$) is 0.01/year
- Hence, the nominal interest rate in Yen is,

  $i_Y = r_Y + (1+r_Y)_gP_J$

  $i_Y = 0.019417476 + (1+ 0.019417476)\ 0.01$

  $= 0.019417476 + 0.01019417476$

  $i_y = 0.02961165$

  Nominal interest rate is 2.961%.
- If US$ 1,000 loan made to Japan in Yen, US $ 1,000 is equal to $1{,}000/E^M$ = 1000/0.01 = 100,000 Yen

  Hence nominal interest due on 100,000 Yen loan is 2,961.165076.

  If one year loan made to US borrower:

Year	0	1
Loan	-100,000	
Repayment		+100,000
Interest		2,961
Total	-100,000	+102,961

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What will E_1^M be?

- Hence, the market exchange rate in year 1 is,

  $E_1^M = E_1^R\ (I_1^{US}/I_1^J)$

  $E_1^R = E_0^R\ (1.03)$

  $E_1^R = 0.01\ (1.03) = 0.0103$

  $E_1^M = E_1^R\ (I_1^{US}/I_1^J) = 0.0103\ (1.04/1.01)$

  $= 0.010609594$
- Repayment plus interest in US$ in year 1 of Yen loan,

  = (102,961 Y) (0.010609594) = 1,092 US$
- This is exactly the same as if loan made in US dollars at 9.2%.

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Calculation of Income Tax Deduction for Foreign Loans Borrowing from Japan

- Interest expense deduction if US company borrows Yen loan of 100,000 Y.

  Nominal interest rate in Yen = 0.02961165

  Interest expense = 2,961.17

  US $ equivalent in Year 1 = 2,961.17 (E_1^M)

  = 2,961.17 (0.01060594)

  = $31.40
- This is less than $92 interest expense that is allowed as tax deduction on an equivalent US $ loan of US $ 1,000.
- Need to consider exchange rate loss in US dollars when loan paid back.
- In order to pay back 100,000 Yen in year 1 the US borrower will need 100,000 (E_1^M) dollar or 100,000 (0.01060594) = $1060.60.
- There has been a foreign exchange capital loss of $60.60 due to exchange rate devaluation.
- Total tax deduction should be interest expense + foreign exchange loss or 31.40 + 60.60 = $92.00.

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US$ 1,000 Loan made in the USA with the Real Interest of 5%

Years	0	1	2	3	4
Inflation Rate in USA		4%	4%	4%	4%
Price Index	1.00	1.04000	1.08160	1.12486	1.16986
Real Interest Rate	0.05				
Nominal Interest Rate		**0.09200**	**0.09200**	**0.09200**	**0.09200**
Loan Schedule					
Years	0	1	2	3	4
Loan	-1000				
Interest		92	92	92	92
Repayment of Capital					1000
Interest Payment in Real US$ of Year 0		**88.46**	**85.06**	**81.79**	**78.64**
Principal Payment in Real US$ of Year 0					**854.80**
Real Value of Loan and Repayments	-1000.00	88.46	85.06	81.79	933.45
Present Value of Loan and Repayments @ 5%	0.00				

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US$ 1,000 Loan in equivalent to 100,000 Yen made to Japan

Market Exchange Rate in Year 0		0.01000 $/Yen			
Years	**0**	**1**	**2**	**3**	**4**
Real Interest Rate (USA)	5.00%				
Real exchange devaluation of US$	3.00%	3.00%	3.00%	3.00%	3.00%
Years	**0**	**1**	**2**	**3**	**4**
Inflation Rate in Japan		1.00%	1.00%	1.00%	1.00%
Price Index	1.00	1.01000	1.02010	1.03030	1.04060
Real Interest Rate in Yen	0.019417				
Nominal Interest Rate Japan		0.02961	0.02961	0.02961	0.02961
Loan Schedule in Yen					
Years	**0**	**1**	**2**	**3**	**4**
Loan	-100000				
Interest		2961	2961	2961	2961
Repayment of Capital					100000
Total Repayment of Interest+Loan (Yen)	**-100000**	**2961**	**2961**	**2961**	**102961**
Real Exchange Rate	0.0100	0.01030	0.01061	0.01093	0.01126
Nominal Exchange Rate	0.0100	0.01061	0.01125	0.01193	0.01265
Repayment of Interest rate in US $ Nominal		**31.41**	**33.31**	**35.33**	**37.47**
Repayment of Loan in US $ Nominal					1265.31
Price Index	1.00	1.04000	1.08160	1.12486	1.16986
Repayment of Interest rate in US $ Real		30.20	30.80	31.41	32.03
Repayment of Loan in US $ Real					1081.59
Real Value of Loan and Repayments	-1000.00	30.20	30.80	31.41	1113.62
Present Value of Loan and Repayments @ 5%	0.00				

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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week One, Day Three

(Session II: 10:45 – 12:30)

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IMPACTS OF INFLATION

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Impacts of Inflation

I. Direct Impacts

- **On Financing of Investments**
  - Cost Escalation Due to Inflation

    vs.
  - Over Runs of Real Expenditures
  - Planning for Cost Escalation Due to Inflation is Normal and Should be Part of Financing Plan
- On Nominal Interest Expenses Paid
- On Real Desired Cash Balances
- On Real Acts Receivable and Acts Payable

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II. Tax Impacts

- Interest Expenses Deductions
- Depreciation Expenses
- Inventories and Cost of Goods Sold

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Inflation and Its Effect on Interest and Principal Payments

	Period				
	0	1	2	3	4
Price Index	1.0	1.0	1.0	1.0	1.0
1. $1000 Loan @5% Interest & No Inflation					
Loan	-1000				
Interest					50
Loan Payment		50	50	50	1000
Cash Flow in Year 0 Prices	-1000	50	50	50	1050
Net Present Value (Equilibrium Situation)	0				
Price index	1.0	1.20	1.44	1.728	2.074
2. $1000 Loan @5% Interest & 20% Inflation					
Loan	-1000				
Interest		50	50	50	50
Loan Payment					1000
Cash Flow in Current Prices	-1000	50	50	50	1050
Cash Flow in year 0 Prices	-1000	41.67	34.72	28.94	506.37
Net Present Value (Dis-Equilibrium Situation)	-487.24				
Price Index	1.0	1.2	1.44	1.728	2.074
3. $1000 Loan @ 26.0% Interest & 20% Inflation					
Loan	-1000	260	260	260	260
Interest					1000
Loan Payment					
Cash Flow in Current Prices	-1000	260	260	260	1260
Cash Flow in year 0 Prices	-1000	216.67	180.56	150.46	607.64
Net Present Value (Equilibrium Situation)	0				
4. Undiscounted Change in Cash Flow	0	-166.67	-130.56	-100.46	+442.36
=Case 1 - Case 3 in Year 0 Prices					

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Inflation and Desired Cash Balances

Case A: (With Zero Inflation)

Assumptions

- Zero Inflation
- Desired cash = 10% of Annual Sales
- Real rate of discount = 5%

Year	0	1	2	3	4
Sales	2000	2000	2000	2000	0
Desired Cash	200	200	200	200	-
Cash Flow Impact	-200	0	0	0	+200

Real PV of Holding Cash = $-200 + 200/(1+.05)^4 = -35.46$

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Inflation and Desired Cash Balances

Case B: (With 20% inflation)

Assumptions

- 20% Inflation
- Desired cash = 10% of Sales
- Real rate of discount = 5%

Year	0	1	2	3	4
Price Index	**1**	**1.2**	**1.44**	**1.728**	**2.074**
Sales	2000	2400	2880	3456	0
Desired Cash	200	240	288	345.6	0
Cash Flow Impact	-200	-40	-48	-57.6	+346
Real Cash Flow	-200	-33	-33	-33	167

PV@ 5% = -153.66

With inflation rate of 20% the cost of cash balances have increased 4.33 times

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Impact of Inflation on Accounts Receivable and Accounts Payable

Case A: (With Zero Inflation)

Assumptions

- Zero Inflation
- Acts Receivable = 50% of Sales

Year	0	1	2	3	4
Sales	2000	2000	2000	2000	0
Acts Receivable	1000	1000	1000	1000	0
Change /AR	-1000	0	0	0	+1000
Receipts	1000	2000	2000	2000	+1000

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Impact of Inflation on Accounts Receivable and Accounts Payable

Case B: (With 20% inflation)

Assumptions

- 20% Inflation
- Acts Receivable = 50% of Sales

Year	0	1	2	3	4
Price Index	1	1.2	1.44	1.728	2.074
Sales	2000	2400	2880	3456	0
Acts Receivable	1000	1200	1440	1728	0
Change /AR	-1000	-200	-240	-288	+1728
Receipts	1000	2200	2640	3168	1728
A. Real Receipts if 20% inflation	1000	1833	1833	1833	833
B. Real Receipts if zero inflation	1000	2000	2000	2000	+1000
Difference (A-B)	0	-167	-167	-167	-167

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2) Tax Impacts of Inflation

Tax Deduction of Interest Expense

Tax shelter of interest expense because it is a deduction from taxable income

Case A: If 5% interest rate, $1000 loan, and zero inflation then

Year	0	1	2	3	4
Interest Expense		50	50	50	50
A: If tc = 40%, Tax savings		20	20	20	20

Case B: If 20% inflation, 26.0% interest, $1000 loan then:

Year	0	1	2	3	4
Nominal Interest Expense		260	260	260	260
Real Interest Expense		216.67	180.56	150.46	125.39
B: If tc = 40%, Tax Savings		86.67	72.22	60.19	50.15
Increased Tax Shelter (B-A)		66.67	52.22	40.19	30.15

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Inflation Depreciation Expense and Taxes

Investment of $1000 in year zero, depreciated over 4 years, depreciation expense is deductible from taxable income

Year	0	1	2	3	4
Depreciation		250	250	250	250
Tax Savings if tc = .40		100	100	100	100
A: If zero inflation, real value of tax savings		100	100	100	100
Price Index if 20% inflation	1	1.20	1.44	1.73	2.07
B: If 20% inflation then real value of savings		83.33	69.44	57.80	48.31
Real difference in tax savings (A-B)		16.67	30.56	42.20	51.69

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Inflation, Inventories and Cost of Good Sold

Two ways of accounting for cost of goods sold: (1) FIFO (2) LIFO

1. FIFO: If Zero Inflation

Year	0	1	2	3
A. Sales of Output	0	300	300	300
B. Purchases of Input	100	100	100	0
C. COGS		100	100	100
D. Measured Profits (A-C)		200	200	200
E. Taxes Paid if tc = .40		80	80	80
If 20% Inflation				
Price index	**1.00**	**1.2**	**1.44**	**1.728**
a. Sales	0	360	432	518.4
b. Purchases of Input	100	120	144	0
c. COGS		100	120	144
d. Measured Profits		260	312	374.4
e. Nominal Taxes Paid if tc = .40		104	124.8	149.76
f. If Real Taxes Paid		86.67	86.67	86.67
Difference f-E		6.67	6.67	6.67

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Inflation, Inventories and Cost of Good Sold

2. LIFO: If Zero Inflation

Year	0	1	2	3
A. Sales of Output	0	300	300	300
B. Purchases of Input	100	100	100	0
C. COGS		100	100	100
D. Measured Profits (A-C)		200	200	200
E. Taxes Paid if tc = .40		80	80	80
If 20% Inflation (Price index)	**1.00**	**1.2**	**1.44**	**1.728**
a. Sales	0	360	432	518.4
b. Purchases of Input	100	120	144	0
c. COGS		120	144	100
d. Measured Profits		240	288	418.4
e. Nominal Taxes Paid if tc = .40		96	115.2	167.36
f. If Real Taxes Paid		80	80	96.85
Difference f-E		0	0	16.85

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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week One, Day Four

(Session I: 09:00 – 10:30)

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Determining the Financial and Economic Values of Existing Assets for Cashflows

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FINANCIAL AND ECONOMIC VALUES OF EXISTING ASSETS

Issues

- Most projects are expansions or improvements on existing projects
- Need to determine opportunity cost of existing assets that will be employed in upgraded or expanded facility
- Need to define base case without project
- Existing facility must be first optimized before comparing with expanded project

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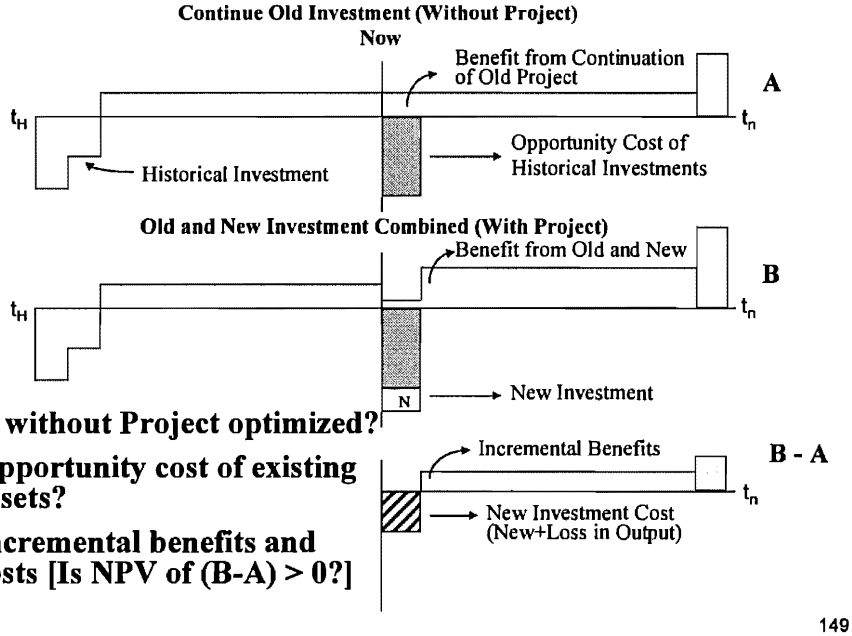
Evaluation of Project Improvements



1. **Is without Project optimized?**
2. **Opportunity cost of existing assets?**
3. **Incremental benefits and costs [Is NPV of (B-A) > 0?]**

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Non-Traditional Agriculture Exports: Pineapple Production in Ghana

Existing Production

- The existing production capacity is 40 acres per year and currently all the produce is being sold in the local market. Exporting requires producing larger amounts than these acres can sustain and higher quality of pineapples.

Expansion Program (With Project Scenario)

- The company intends to expand the farm initially by using suckers from the existing farm and those bought from other farmers. Government vendors also supply the new variety, MD II. The expansion schedule is as shown below:

Year	Year 0	Year 1	Year 2	Year 3	year4	Year 5-10
Without Project Scenario						
Production	40	40	40	40	40	40
Acres Planted	40	40	40	40	40	40
Total Land in Use	80	80	80	80	80	80
With Project Scenario						
Production	40	40	150	150	150	150
Acres Planted		150	150	150	150	150
Total Land in use	40	190	300	300	300	300

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Existing and New Investment

(a) Existing Investment (GHC '000s)		
Pineapple Farm	750000	GHC
Land		
Total Area	80	Acres
Effective use of Land	50%	
Area Under Cultivation	40	Acres
Prevailing Market Price per Acre	460	GHC /Acre
Priced Paid for Leasing 80 Acres	36,800	GHC
Lease Period	25	Years
Farm House	120,000	GHC
Pump 15Hp	6,000	GHC
Pump 25Hp	15,000	GHC
MF 327Tractor	55,000	GHC
John Deere Tractor	105,000	GHC
Total Existing Investment	1,087,800	GHC
(b) New Investment (GHC in '000's)		
	Year 0	
Incremental cultivation in Year 1 (with Project)	220	Acres
Priced Paid for Leasing 220 Acres	101200	GHC
Vehicles:		
Pick-Up 4x4 vehicle	496,000	GHC
KIA Truck	300,000	GHC
MF 327Tractor (2)	594,000	GHC
Tractor Accessories	410,400	GHC
Total Vehicles (Trucks will be renewed after year 5)	1,800,400	GHC
Equipment:		
Pump 1.5Hp (petrol)	4,500	GHC
Furniture & Equip	168,000	GHC
Communication Equip	19,000	GHC
Total Equipment	191,500	GHC
Total New Investment	1,991,900	GHC
Total Investment (Existing + New)	3,079,700	GHC
Value Added Tax (VAT)	15%	

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Owner's Prospective without Project Real ('000 GHC)

	Year 0	Year 1	Year 6	Year 10	Year 11
Domestic Inflation Index (Id)	1.50	1.68	2.98	4.68	5.22
Inflows					
Sales					
Domestic sales	1,668,480	1,668,480	1,668,480	1,668,480	-
Change in AR	(583,968)	(62,568)	(62,568)	(62,568)	521,400
Liquidation Value of Assets					-
Pineapple Farm					798,837
Land					39,068
Farm House					72,000
Pump 15Hp					-
Pump 25Hp					-
MF 327Tractor					-
John Deere Tractor					-
Total Inflow	1,084,512	1,605,912	1,605,912	1,605,912	1,429,126
Total Investments					
Pineapple Farm	500,000				
Land	24,533				
Farm House	80,000				
Pump 15Hp	4,000				
Pump 25Hp	10,000				
MF 327Tractor	36,667				
John Deere Tractor	70,000				
Total Investments Costs	725,200				
I. Direct Material Costs					
Suckers	46,200	46,200	46,200	46,200	-
Other Inputs	-	-	-	-	-
Weedicide	10,800	10,800	10,800	10,800	-
Plastics	120,000	120,000	120,000	120,000	-
Fertilizer	30,000	30,000	30,000	30,000	-
Pesticide	12,000	12,000	12,000	12,000	-
Total Input Cost	219,000	219,000	219,000	219,000	-
VAT on Inputs	32,850	32,850	32,850	32,850	-
Value of Inputs	251,850	251,850	251,850	251,850	-

Cont'd...152

Owner's Prospective without Project Real ('000 GHC) (Cont'd)

II. Salaries					
Salaries Admin & Mgmt					
Management & Admin	348,000	348,000	348,000	348,000	-
Production Staff	168,000	168,000	168,000	168,000	-
Security Staff	112,800	112,800	112,800	112,800	-
Total Salaries Admin & Mgmt	628,800	628,800	628,800	628,800	-
Social Security-Employers' Cont.	78,600	78,600	78,600	78,600	-
Direct labor					
Farm Labor	124,800	124,800	124,800	124,800	-
Labor (Supplementary Irrigation)	24,000	24,000	24,000	24,000	-
Casual Labor	124,800	124,800	124,800	124,800	-
Total labor Expense	273,600	273,600	273,600	273,600	-
Insurance (Workmen's Compensation)	4,104	4,104	4,104	4,104	-
III. Operating Expenses and Recurring Costs					
Land Preparation & Supplementary Irrigation	152,000	152,000	152,000	152,000	-
Distribution	83,424	83,424	83,424	83,424	-
Packaging Material	-	-	-	-	-
Freight	-	-	-	-	-
Research & Development	20,000	20,000	20,000	20,000	-
Utilities	12,000	12,000	12,000	12,000	-
Office Rental	12,000	12,000	12,000	12,000	-
Stationery	6,000	6,000	6,000	6,000	-
Fuel	96,000	96,000	96,000	96,000	-
Maintenance Expense	6,000	6,400	6,400	-	-
Insurance (Vehicles)	12,000	9,600	9,600	-	-
Communication	12,960	12,960	12,960	12,960	-
Total Operating Expenses & Recurring Cost	414,384	410,384	410,384	394,384	-
TOTAL COSTS	2,376,336	1,647,338	1,647,338	1,631,338	-
Change in Account Payable	(155,134)	(17,293)	(17,293)	(17,121)	145,655
Change in Cash Balances	495,401	51,679	51,679	51,364	(436,966)
Income Tax pay	-	-	-	-	-
Total Cash Outflows	2,706,606	1,681,924	1,661,924	1,665,581	(291,310)
NET CASH OUTFLOWS BEFORE FINANCING	-1,622,294	-76,012	-76,012	-59,669	1,720,436
ADD Loan Disbursements @ end of year	0	0	0	0	0
LESS Total Loan Repayments	0	0	0	0	0
NET CASH FLOW AFTER FINANCING	-1,622,294	-76,012	-76,012	-59,669	1,720,436

DR (real)	16%
NPV-fin-1	-1632564

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Owner's Prospective with Project (New + Old Investment) Real ('000 GHC)

	Year 0	Year 1	Year 6	Year 10	Year 11
Domestic Inflation Index (Id)	1.50	1.68	2.96	4.66	5.22
Inflow					
Revenue					
Nat Export Revenue	-	-	9,627,518	9,627,518	-
Domestic Revenue (at Domestic Price)	1,668,480	1,668,480	2,189,880	2,189,880	-
Change in AR	(583,868)	(62,568)	(443,152)	(443,152)	3,692,937
Liquidation Value of Assets					-
Old Equipment					-
Pineapple Farm					796,637
Land					39,068
Farm House					72,000
Pump 15Hp					-
Pump 25Hp					-
MF 327Tractor					-
John Deere Tractor					-
New Equipment					-
220 Acres Lease land					107,493
Pick-Up 4x4 vehicle					-
KIA Truck					-
MF 327Tractor (2)					-
Tractor Accessories					410,400
Pump 1.5Hp (petrol)					-
Furniture					-
Communication Equip					-
Total Inflows	1,084,612	1,605,912	11,374,246	11,374,246	5,118,555
Outflows					
Total Investment Costs					
Old Equipment					
Pineapple Farm	500,000				
Land	24,533				
Farm House	80,000				
Pump 15Hp	4,000				
Pump 25Hp	10,000				
MF 327Tractor	38,667				
John Deere Tractor	70,000				
New Equipment					
220 Acres Lease land	67,467				
Pick-Up 4x4 vehicle	330,667				
KIA Truck	200,000				
MF 327Tractor (2)	396,000				
Tractor Accessories	273,600				
Pump 1.5Hp (petrol)	3,000				
Furniture	112,000				
Communication Equip	12,667				
Total Investment Costs	2,120,600				
I. Direct Material Costs					
Suckers	46,200	46,200	173,250	173,250	-
Other Inputs					
Weedicide	10,800	10,800	40,500	40,500	-
Plastics	120,000	120,000	450,000	450,000	-
Fertilizer	30,000	30,000	112,500	112,500	-
Pesticide	12,000	12,000	45,000	45,000	-
Total Input Cost	219,000	219,000	821,250	821,250	-
VAT on Inputs	32,850	32,850	123,188	123,188	-
Value of Inputs	251,850	251,850	944,438	944,438	-

*Cont'd...*154

Owner's Prospective with Project (New + Old Investment) Real ('000 GHC) (Cont'd)

II. Salaries					
Salaries Admin & Mgmt					
Management & Admin	348,000	348,000	348,000	348,000	-
Production Staff	168,000	168,000	168,000	168,000	-
Security Staff	112,800	112,800	112,800	112,800	-
Total Salaries Admin & Mgmt	628,800	628,800	628,800	628,800	-
Social Security-Employers' Cont.	78,600	78,600	78,600	78,600	-
Direct labor					
Farm Labor	124,800	124,800	468,000	468,000	-
Labor (Supplementary Irrigation)	24,000	24,000	90,000	90,000	-
Casual Labor	124,800	124,800	468,000	468,000	-
Total labor Expense	273,600	273,600	1,026,000	1,026,000	-
Insurance (Workmen's Compensation)	4,104	4,104	15,390	15,390	-
III. Operating Expenses and Recurring Costs					
Land Preparation & Supplementary Irrigation	152,000	152,000	570,000	570,000	-
Distribution	83,424	83,424	590,870	590,870	-
Packaging Material	-	-	1,059,094	1,059,094	-
Freight	-	-	1,052,316	1,052,316	-
Research & Development	20,000	20,000	20,000	20,000	-
Utilities	12,000	12,000	12,000	12,000	-
Office Rental	12,000	12,000	12,000	12,000	-
Stationery	6,000	6,000	6,000	6,000	-
Fuel (new+old)	228,000	228,000	228,000	228,000	-
Maintenance Expense	77,500	62,000	62,000	-	-
Insurance (Vehicles)	116,250	93,000	93,000	-	-
Communication	12,960	12,960	12,960	12,960	-
Total Operating Expenses & Recurring Cost	720,134	681,384	3,718,239	3,583,239	-
TOTAL COSTS	4,077,688	1,918,338	6,411,487	6,256,487	-
Change in Account Payable	(195,709)	(17,094)	(65,234)	(63,574)	558,613
Change in Cash Balances	587,126	51,281	195,703	190,721	(1,675,839)
Income Tax pay	-	-	-	-	-
Total Cash Outflows	4,469,106	1,952,526	6,541,938	6,383,614	(1,117,226)
NET CASH OUTFLOWS BEFORE FINANCING	(3,384,594)	(346,614)	4,832,310	4,990,631	6,235,782
ADD Loan Disbursements @ end of year	-	1,893,393	-	-	-
LESS Total Loan Repayments	-	-	626,872	-	-
NET CASH FLOW AFTER FINANCING	(3,384,594)	1,546,779	4,205,438	4,990,631	6,235,782

DR (real)	16%
NPV-fin-2	14299327

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- NPV Without Project ('000) = -1,632,584
  - If you can stop the without project, the NPV of the with case is equal to at least Zero.
- NPV With Project ('000) = 14,299,327
- Difference between With and Without

  = 14,299,327 – (-1,632,584) in thousands

  = 15,931,912 in thousands

  Note: If you have the option of terminating the existing project (eliminating the negative NPV of without case), then the benefit of doing the with project case is just 14,299,327 ('000) GHC – The benefit from the real option to shut down existing facility is +1,632,584.

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COSTS ASSOCIATED WITH CONTINUING A PROJECT

- Historical Costs
  - If historical cost of asset is different from its current market value, the historical cost should not be used in the appraisal of the project
  - Need to determine opportunity costs
- Opportunity Costs
  - What is the opportunity cost of the continued use of assets of existing facility?
  - Key factor in rehabilitation of projects
  - Net Replacement Cost, In-Use Value or Liquidation Value?

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Choosing Between Liquidation, In-Use and Net Replacement Cost Values as Measures of Opportunity Cost

Net Replacement Cost (NRC): is the cost of replacing the plant as is in its present state with all equipment in its present condition.

Liquidation Value (LV): refers to the net value of the different components of the company after deducting all liquidating costs.

In-Use Value (IUV): refers to the net replacement cost plus any additional values resulting from intangible assets such as good will, brand name, etc. – *Not recommended because valuation of intangible assets very subjective.*

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Decision Criteria in deciding which value to use as opportunity cost of existing assets when considering an expansion project

1. If NPV of without case using NRC as opportunity cost > 0, then use Net Replacement Cost as opportunity cost of existing assets with case
2. If NPV using NRC as opportunity cost < 0, then estimate NPV of with or combined case using Liquidation Value (LV) as opportunity cost of existing assets.

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Estimation Techniques to Determine Liquidation Values

- **Most accurate way is to employ services of professional appraiser**

- **Short cut method:**

Liquidation Value = [(Historical cost of machinery, equipment, and structures - installation costs)* (Price $index_T$ / Price $index_H$)*(1- Proportion of asset $depreciated_T$)]

Less: Costs of liquidation of machinery, equipment, and structures

Plus: Land, Inventories, Acts Receivable - Acts Payable at current values

Less: Cost of liquidation of land and working capital

Note: Liquidation costs will vary with conditions of liquidation. Economic depreciation is the relevant concept of depreciation in this case.

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Estimation Technique to Determine Net Replacement Cost

- **Short cut method:**

Net Replacement Cost = [(Historical cost of machinery, equipment, and structures) * (Price $index_T$ /Price $index_H$)*(1- Proportion of asset $depreciated_T$)]

+ Land, Inventory, Accounts Receivable

- Accounts Payable at current values

Note: Economic depreciation is relevant concept of depreciation in this case

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Example on Liquidation Value a Case of Fastfood Project

Historic Costs (2000)		Today (2005)		
Land	1,500	Land Value	1,914	= 1,500*(1.28/1.00)
Equipment (including installation costs)	22,000	Inventory	800	
Installation Costs	1,000	Accounts Receivable	600	
Annual Depreciation Rate	15%	Accounts Payable	200	
		Liquidation Costs	1,100	
Inflation Rate	5%			
Discount Rate	10%			

Liquidation Value (LV) **13,907** **=(22,000-1,000)*(1.28/1.00)*(1-0.56)+1,914+800+600-200-1,100**
Net Replacement Cost (NRC) **15,573** **=22,000*(1.28/1.00)*(1-0.56)+1,914+800+600-200**

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Price Index	1.00	1.05	1.10	1.16	1.22	1.28	1.34	1.41	1.48	1.55
Depreciation Factor	0	0.15	0.28	0.39	0.48	0.56	0.62	0.68	0.73	0.77

Accumulated Depreciation Factor by year t = ***1 -(1 - Annual Depreciation Rate)***$^{(Number\ of\ Year(s))}$

SITUATION A

Net Revenues (Assumed)	2,029	4,300	4,636	4,987	5,157
Net Replacement Cost	-15,573				

NPV@10%: 1,466 **use NRC as opportunity cost**

SITUATION B

Net Revenues (Assumed)	2,029	3,750	4,086	4,437	4,607
Net Replacement Cost	-15,573				

NPV@10%: -278 **use LV as opportunity cost**

- **Note:** Recording the asset valuation adjustment for price change and annual depreciation amortization takes place **at the beginning of the period**, following the time interval in which these price changes and depreciation changes occur.

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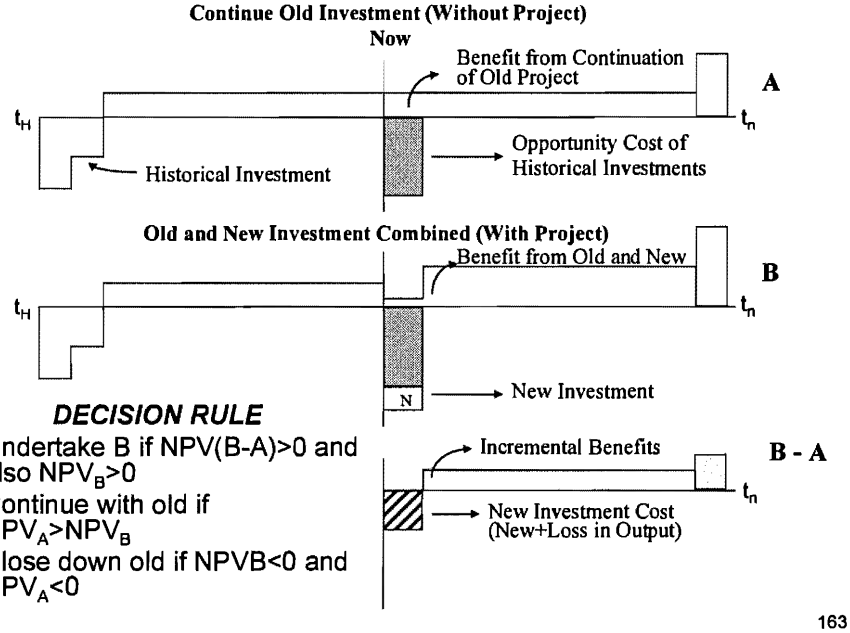
Evaluation of Project Improvements



DECISION RULE

- Undertake B if NPV(B-A)>0 and also $NPV_B>0$
- Continue with old if $NPV_A>NPV_B$
- Close down old if NPVB<0 and $NPV_A<0$

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Sunk Costs

Sunk Costs = (Net Historical Book Values) - (Greater of Liquidation or Net Replacement Cost)

- If negative, then there has been a financial capital gain.
- Sunk costs are not an economic resource cost.
- Unpaid debt backed by existing (encumbered) assets can affect investment decision.
- Such debt will affect the cash flow of an "improved" project and thus may indirectly alter the economic returns from incremental investments.
- Even if existing assets may now be sunk costs, their financial obligation cannot be ignored if the same legal entity is to be continued.

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Treatment of Land in Cost-Benefit Analysis

- Cases:

1. Financial analysis if Land purchased or rented from free market as input to project.
2. Financial analysis if land already owned by enterprise doing project.
3. Financial analysis if land can be obtained only if a specific project is undertaken.
4. Economic analysis, and the economic opportunity cost of land.

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Opportunity Cost of Land

- In all cases, land has a cost to the project. There is an opportunity cost, either annual rental value or capital cost to project for time that it uses land
- In general, there is need to separate investment in land from the investment in project

Exceptions to general rules:

- If land availability is directly tied to doing the specific project, then capital gains or losses on land is a financial benefit or cost to the project placed on land
- Direct land improvement or destruction caused by project will affect residual land values at the end of the project

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Alternative Ways of Including Cost of Land in Cash Flow of Project

A. Preferred Method: Rental Charge Approach

- Levy implicit rental charge each period as a cost. For example, if the annual rental value is 8% of current market value then:

Year	0	1	2	3	4	5
Land Rental		-8	-8	-8	-8	-8

- If anticipated real capital gains, then market rental rate (which will be lower to begin with) will increase overtime as real value of land increases.

B. Alternative Method: Capital Charge Approach:

- Assume no anticipated real capital gains and 100 is the initial purchase price of land.

Year	0	5
Land Investment	-100	+100

- Final year benefit should be different than 100 only if land physically improved or damaged.

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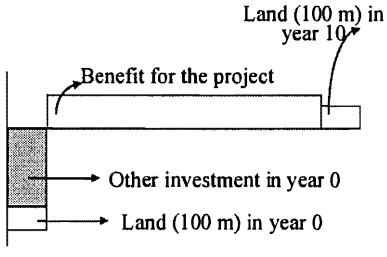
Capital gain because of other factors than Project

- Capital gains on land largely due to infrastructure investment such as roads, electricity service, subways.
- Such capital gains are not related to the actual project for which we are using the land.

- Example
  - Purchase land for 100 million in year 0 but because of new road land is worth 500 million in year 10. If we are using the land to grow vegetables then opportunity cost of land in year zero is 100 million and this real (year 0 prices) value is retrieved in year 10 as a 100 million.



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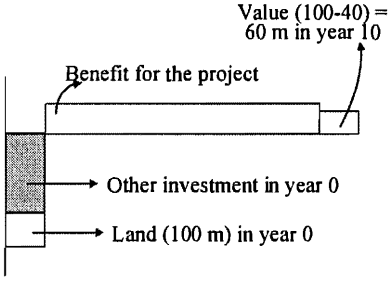
Capital loss because of Project

- If project causes land deterioration then the deterioration in land value is deducted from the initial value of land to find its residual value.

- Example
  - Farmer owns the land valued at 100 million in year 0 but because of build up of salt in the soil because of irrigation the worth of land falls to 60 million in year 10. Then the residual value of land in year 10 is a 60 million where 40 million is lost due to the salt build up in the soil.



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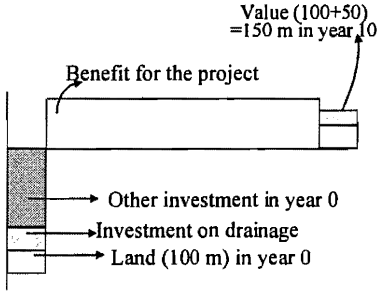
Capital gain because of Project

- If project causes land through addition investment in a drainage system to increase in value then the depreciated value of these land improvement investments should be added to the initial value of land to find its residual value.
- Farmer owns the land valued at 100 million in year 0. Because it has an opportunity cost as long as it is used to grow vegetables the land is a cost to the vegetable growing project.
- Example
  - Farmer owns the land valued at 100 million in year 0 but an investment in new drainage system has a depreciated value of 50 m in year 10. Hence, the residual value of land in year 10 is (100 + 50) 150 million.



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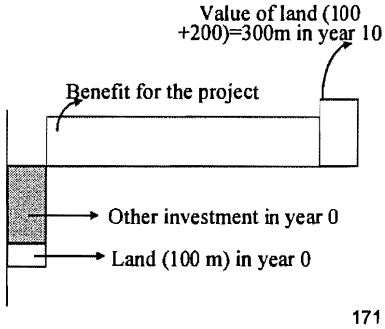
Capital Gain if Project Undertaken to Obtain Land

- If the government gives access to the purchase of land (at a price either below or equal to current market price) **ONLY** because the investors are willing to undertake a particular project. For example, the investor can obtain beach front land **ONLY** if he is willing to build a 5 star hotel, and run it for 10 years.
- In this case the private owner should consider any initial land subsidy as a financial benefit in the initial year of the project, and should include all capital gains in the residual value as a financial benefit of the project in its final year.
- Example
  - The land is valued at 100 million in year 0, but the person must build a hotel and run it for 10 years. The real value of the land is assumed to grow by (100+200)=300 million in year 10. Because the government does not allow any alternative use of the land until the project is over, from the financial perspective of owner of hotel is that the final value of land accrues to him only because he is willing to undertake the project and run it for 10 years.



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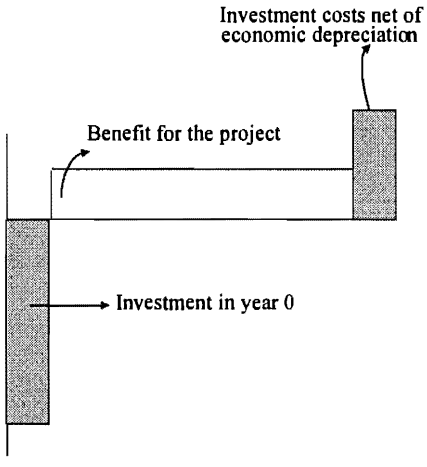
Determination of End Year Values

- Usually, the end of project does not mean end of life of business
- Often the life of the project extends beyond our ability to forecast future
- Both problems solved if we estimate values for assets in final year of analysis of cash flows
- Use same estimation procedures as for initial values of historical assets



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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week One, Day Four

(Session II: 10:45 – 12:30)

173

Estimating and Use of Debt Service Ratios

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Measuring the Debt Service Capacity of Project, Choice of Scale and Timing

- Debt Service Capacity Ratio is another criterion for evaluating the financial viability of a project
- A viable project must repay the principal and interest on the loan, as well as to bring a positive return on equity to the owners
- It is used by bankers who want to know:
  1. the **annual debt service coverage ratio** (ADSCR) of a project on a year-to-year basis
  2. a summary ratio, called **debt service capacity ratio** (DSCR) which is calculated as the present value of net cash flows over the present value of loan repayments from the current period to the end period of loan repayment
- **Debt service capacity ratio** tells the banker if there is enough cash from the project to make bridge-financing even when some years have inadequate cash flows to serve the debt.

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Calculation of Annual Debt Service Coverage Ratio:

$$ADSCR_t = \frac{\text{Annual Net Cash Flow}_t}{\text{Annual Debt Repayment}_t}$$

Calculation of Debt Service Capacity Ratio:

$$DSCR_t = \frac{PV\,(NCF_t : NCF_n)}{PV\,(\text{Debt Repayment}_t : \text{Debt Repayment}_n)}$$

Where: The Annual Net Cash Flow of the project is calculated before financing. The Annual Debt Repayment includes the interest expenses and principal repayment due in the specific year ***t*** of the loan repayment period. The last year of debt repayment is denoted as ***n***.

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Use of Debt Service Ratios

- A Project is considered for implementation:
  Total Investment Costs: 2,000,000
  Equity Funds: 1,000,000
  Proposed Loan: 1,000,000
  Start of Loan Repayment Year 1 (equal repayments)
  Required Rate of Return on Equity: 20%
- Loan of 1,000,000 is given to project for 5 years at 15%:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayment		298,316	298,316	298,316	298,316	298,316					
	ADSCR	1.07	1.07	1.21	1.47	1.27					

- Result: this project is not attractive to the banker since the ADSCR are low, meaning that the net cash flow may not be enough to meet the debt service obligations and to obtain the required Rate of Return on Equity.

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- **How to improve the Debt Service Coverage Ratios?**

  1. Decrease the interest rate on the loan
  2. Decrease the amount of borrowing
  3. Increase the duration of loan repayment

- Restructuring of the terms of the loan will make the ratios look better, and the project will become attractive to the Banker

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1. Decrease the Interest Rate on the loan

Loan of 1,000,000 is given to project for 5 years at 1%:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayment		206,040	206,040	206,040	206,040	206,040					
	ADSCR	1.55	1.55	1.75	2.14	1.84					

- Result: the ratios look better now, but it will normally require government guarantees or subsidies e.g. (IDA financing) to reduce interest rates – not easy to obtain

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2. Decrease the amount of borrowing by increasing equity to 1.4 million

Loan of 600,000 is borrowed for 5 years at 15%:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayment		178,989	178,989	178,989	178,989	178,989					
	ADSCR	1.79	1.79	2.01	2.46	2.12					

- Result: since the proportion of borrowing in the total investment decreases, the amount of annual repayment of the loan also becomes smaller, hence the ability to service the debt becomes more certain

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3. Increase the duration of loan repayment

Loan of 1,000,000 is given to project for 10 years at 15%:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayment		199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252
	ADSCR	1.61	1.61	1.81	2.21	1.91	0.50	1.00	2.41	2.71	3.21

- Result: Increasing the duration of debt repayment improves the ratios. The same amount of loan is repaid over more years
- However, in Year 6 and Year 7 the Net Cash Flows are inadequate to meet the debt repayment obligations

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What is the solution to improve cashflows at the bad year?

- If project expects difficulties in a particular future year as the net cash flows are not enough to service the debt in that period(s).
- **Questions:**
  - Should project maintain an Escrow Fund?
  - Is bridge financing a viable option?

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Should project maintain an Escrow Fund?

Definitions:

- A fund established upon the requirement of the lenders to hold cash that can be used towards debt servicing.
- This fund restricts the payment of dividends.
- Typically contains between 12 and 18 months of debt service.
- Cash can be withdrawn from the escrow fund if the project's cash flow from operations does not cover the project's debt service requirements.

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Is bridge financing a viable option?

- To find out if the bridge-financing is worth undertaking, we need to look at the cash flows and debt repayments over the remaining period of debt service.
- Debt Service Capacity Ratio (DSCR) is the appropriate criteria to use to determine if project finances for bridge-financing.
- The present values of net cash flows remaining till the end of debt repayment period, discounted at the loan interest rate, is divided by the present values of debt repayments remaining till the end of debt repayment period, also discounted at the loan interest rate. It needs to be substantially bigger than one, i.e. >1.7.

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Use of Debt Service Capacity Ratios (DSCR)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayments		199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252
ADSCR		1.61	1.61	1.81	2.21	1.91	**0.50**	**1.00**	2.41	2.71	3.21
NPV of NCF		2,052,134	1,991,954	1,922,747	1,797,159	1,560,733	1,357,843	1,446,519	1,433,497	1,096,522	640,000
NPV of Debt Repayments		1,150,000	1,093,360	1,028,224	953,318	867,176	768,112	654,189	523,178	372,515	199,252
DSCR		1.78	1.82	1.87	1.89	1.80	**1.77**	**2.21**	2.74	2.94	3.21

Results: Although the annual debt service ratios in Year 6 and Year 7 are very low, the ability of the project to generate cash in consequent years (DSCR) should be enough to obtain bridge-financing for these two critical years

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FINANCIAL MODELLING FROM DIFFERENT POINTS OF VIEW

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Alternative Points of View

- Critical in analysis to evaluate financial outcome of project from the point of view of each interested party
- Conventional analysis considers:
  a. Point of view of owner
  b. Point of view of all investors combined
     (Banker's point of view or total investment point of view)
  c. Point of view of economy

Other Perspectives

- Point of view of government budget
- Point of view of suppliers of inputs
- Point of view of downstream processors
- Point of view of competitors

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Analyses of Investment Decisions From Alternative Points of View

Type of Analysis

Viewpoint:	Financial (I)	Economic (II)	Stakeholder (III)	Basic Needs (IV)
Banker (Total Investment)	Yes	No/Yes	Yes	No
Owner	Yes	No/Yes	Yes	No
Government Budget Office	Yes	No	Yes	No
Country	No	Yes	Yes	Yes

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Analyses of Investment Decisions from Different Viewpoints

Note: Exchange premium=10%; Receipts & Equipment 100% tradable; Tradable Operating cost =100

Analysis →	Financial				Economic		Financial	
Viewpoints:	Banker's (Total Investment) (A)		Owner (B)		Country (C)		Govt. Budget (D)	
Year:	0	1	0	1	0	1	0	1
Receipts		400		400		440		40
Operating Cost		-140		-140		-150		-10
Equipment	-1000	950	-1000	950	-1100	1045	-100	95
Operating Subsidy		50		50				-50
Taxes		-100		-100				100
Loan			500	-500				
Interest				-50				
Environ. Externality						-190		
Opp. Cost of Land	-30	-30	-30	-30	-30	-30		
Net Resource Flow	-1030	1130	-530	580	-1130	1115	-100	175

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Manila South Water Distribution Project

Basic Facts:

- The Metropolitan Waterworks and Sewerage System (MWSS), the agency that operates water supply and distribution schemes in the Metropolitan Manila area, had identified south Manila as the region with the greatest need for increased access to potable piped water in Philippines.
- In the southern part of Metropolitan Manila, only about 30% of the area's population had access to piped water supply in 1990.
- The goal of the project was to bring sufficient amount of quality improved potable water to 85% of the region's households, while improving health problems caused by inadequate clean water supply and sanitation services in the region.
- The MWSS proposed to construct new clear water reservoirs and pumping stations, and expand its network of transmission mains, secondary distribution pipes and service connections.
- The primary investment was to be completed by 1995, but the project had continued making additional investments in service connections through the year 2004.

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Manila South Water Distribution Project

- The total cost of the project was estimated at 1,369.5 million 1990 Philippine Pesos.
- The Asian Development Bank and other financial institutions financed about 63 per cent of the initial investment cost while the MWSS covered the rest of the investment cost.
- The project is expected to operate for 30 years.

Project outcomes:

- Financial analysis based on the proposed structure of the water tariff rate, indicated that project was not viable from the financial point of view. The net present value was -77.76 million pesos.
- The results of the economic analysis indicated positive economic NPV of 2,117.87 million pesos.

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Figure 1: Project Parameters

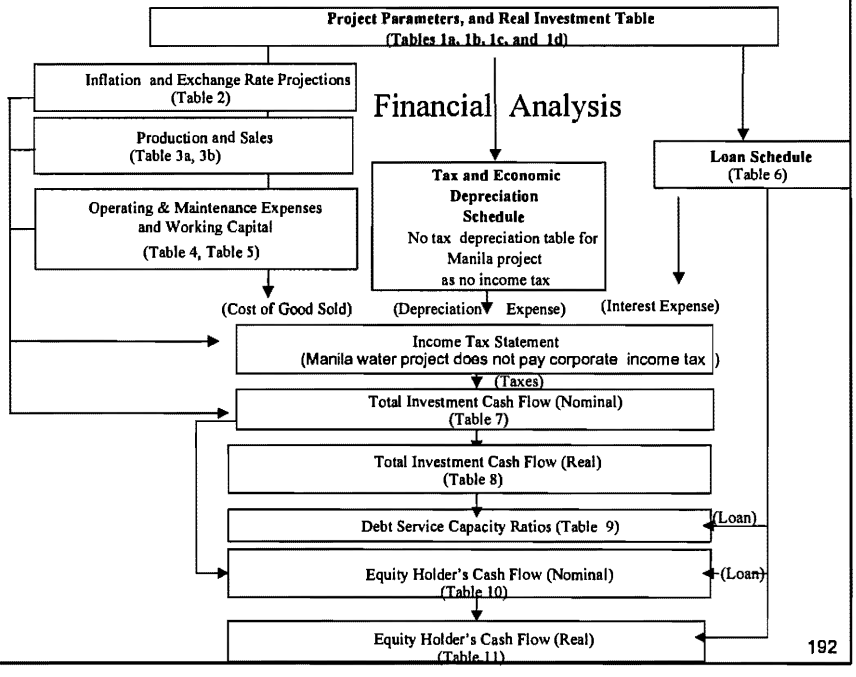

Figure 2 : Economic Analysis

Step One: **National Economic Parameters:**

a. Economic Opportunity Cost of Capital
b. Foreign Exchange Premium (provided by other study for Manila Water Project)

+

Step Two:

Economic Conversion Factors for:

a . Economic Value of water (Table 12)
b. Project Inputs, including
Investments
Operating Expenses
Labor
Working Capital
c. Summary of Conversion Factors (Table 13a-13b)

(Applied to Real Financial Cash Flow Statement)

Statement of Economic Costs and Benefits
(Table 14)

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Figure 3: Distribution Analysis

A. Economic Real Net Resource Flow
(Table 14)

- (Minus)

B. Financial Real Net Resource Flow
(Table 8)

(Yields)

C. Net Resource Flow of Externalities
(Table 15)

D. Distribution of Externalities (Present Value)
(Table 16)

E. Reconciliation of Economic and Financial Analyses:
(Table 17)

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Figure 4: Risk Analysis

A. Sensitivity Analysis
(Tables 18, 19)

B. Risk Variables
(Table 20)

C. Results
(Table 21, Figure 1 and 2)

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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week One, Day Five

(Session I and II: 09:00 – 10:30)

196

THE IMPORTANCE OF SCALE,

TIMING AND ADJUSTING FOR LENGTH OF

LIFE IN PROJECT APPRAISAL

197

The Importance of Scale and Timing in Project Appraisal

- Why is scale important?
- Too large or too small can destroy a good project

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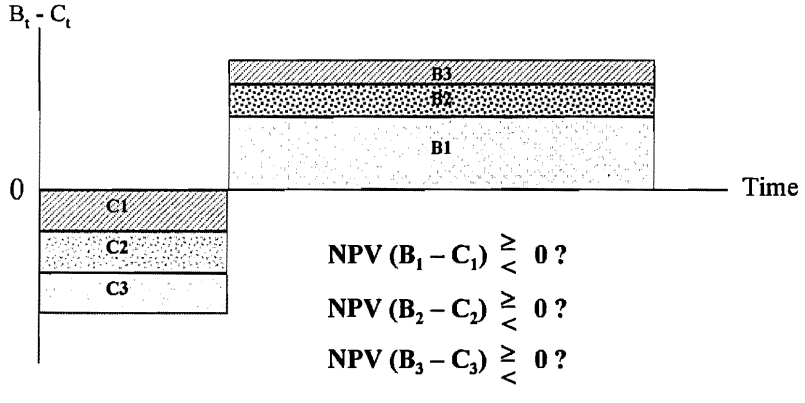
Choice of Scale

Rule: Optimal scale is when NPV = 0 for the last addition to scale and NPV > 0 for the whole project

•Net benefit profiles for alternative scales of a facility



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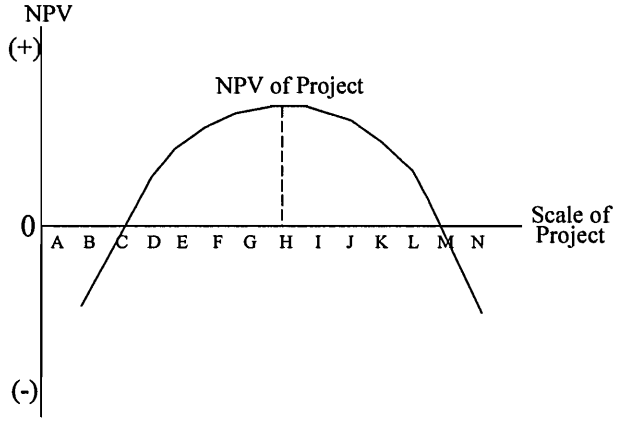
Determination of Scale of Project

- Relationship between net present value and scale



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Determination of Scale of Project for Environmental Improvement Projects that generate Benefits forever

	$000s							
Year	0	1	2	3	4	5 to ∞	$000s	
Scale	MC	MB					MNPV 10%	MIRR
S0	-3000	50	50	50	50	50	-2500	0.017
S1 - S0	-1000	75	75	75	75	75	-250	0.075
S2 - S1	-1000	275	275	275	275	275	1750	0.275
S3 - S2	-1000	400	400	400	400	400	3000	0.400
S4 - S3	-1000	200	200	200	200	200	1000	0.200
S5 - S4	-1000	101	101	101	101	101	10	0.101
S6 - S5	-1000	49	49	49	49	49	-510	0.049

Year	0	1	2	3	4	5 to ∞		
Scale	Costs	Benefits					NPV 10%	IRR
S0	-3000	50	50	50	50	50	-2500	0.017
S1	-4000	125	125	125	125	125	-2750	0.031
S2	-5000	400	400	400	400	400	-1000	0.080
S3	-6000	800	800	800	800	800	2000	0.133
S4	-7000	1000	1000	1000	1000	1000	3000	0.143
S5	-8000	1101	1101	1101	1101	1101	3010	0.138
S6	-9000	1150	1150	1150	1150	1150	2500	0.128

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Note:

1. NPV of last increment to scale 0 at scale S5. i.e. NPV of scale 5 = 10.
2. NPV of project is maximized at scale of 5, i.e. $NPV_{1-5} = 3010$.
3. IRR is maximized at scale 4.
4. When the IRR on the last increment to scale (MIRR) is equal to discount rate the NPV of project is maximized.

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Timing of Investments

Key Questions:

1. What is right time to start a project?
2. What is right time to end a project?

Four Illustrative Cases of Project Timing

Case 1. Benefits (net of operating costs) increasing continuously with calendar time. Investments costs are independent of calendar time

Case 2. Benefits (net of operating costs) increasing with calendar time. Investment costs function of calendar time

Case 3. Benefits (net of operating costs) rise and fall with calendar time. Investment costs are independent of calendar time

Case 4. Costs and benefits do not change systematically with calendar time

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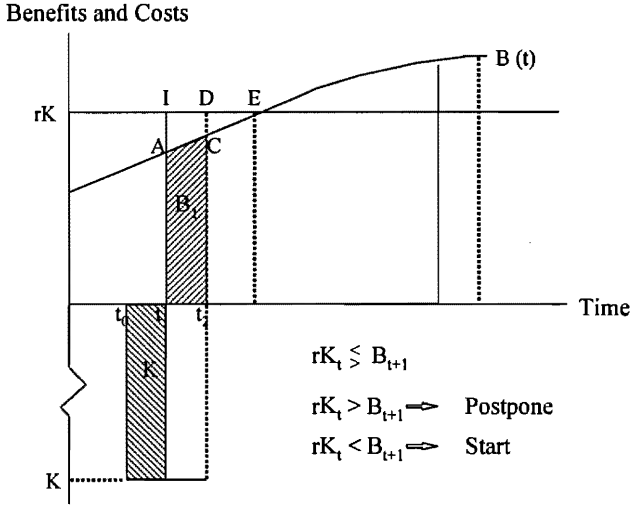
Case 1: Timing of Projects: When Potential Benefits Are a Continuously Rising Function of Calendar Time but Are Independent of Time of Starting Project



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COLONIA-BUENOS AIRES BRIDGE

NPV FOR THE BASE SCENARIO WITH DIFFERENT STARTING YEARS (thousands of 1998 US$)

Beginning Construction Year (Operation of Bridge)		Financial	Economic Argentina	Economic Uruguay
1999	(2003)	190,925	610,730	218,044
2000	(2004)	189,296	571,933	203,859
2001	(2005)	185,499	536,248	190,791
2002	(2006)	180,160	502,502	178,650

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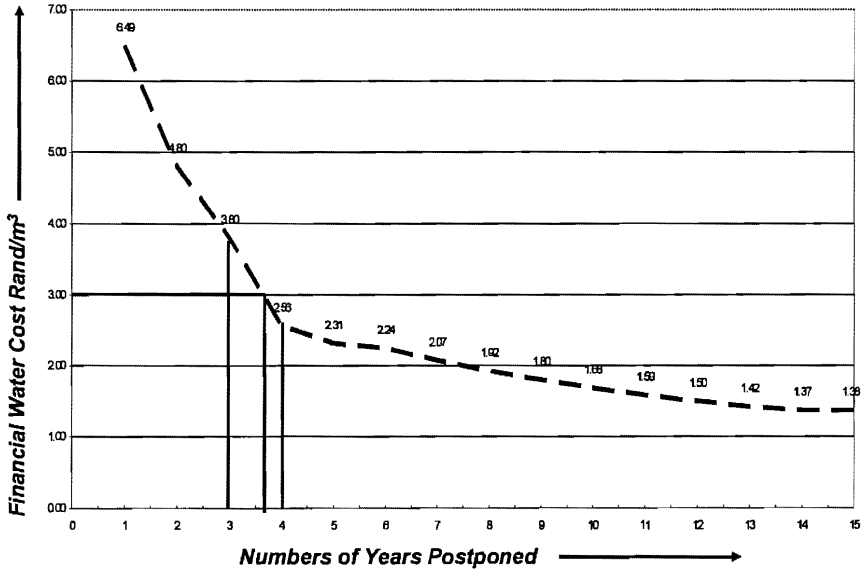
Timing for Start of Operation of Roojport Dam, South Africa, Marginal Financial Unit Water Cost



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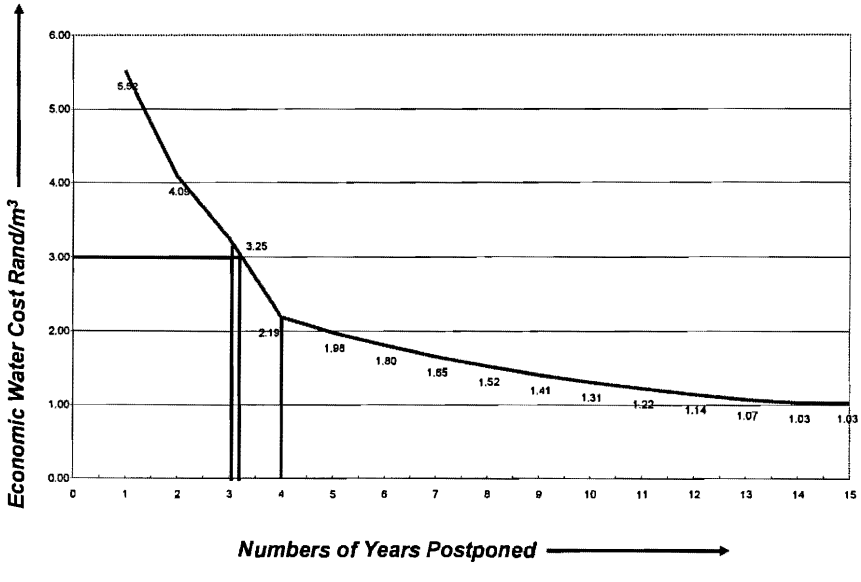
Timing for Start of Operation of Roojport Dam, South Africa, Marginal Economic Unit Water Cost



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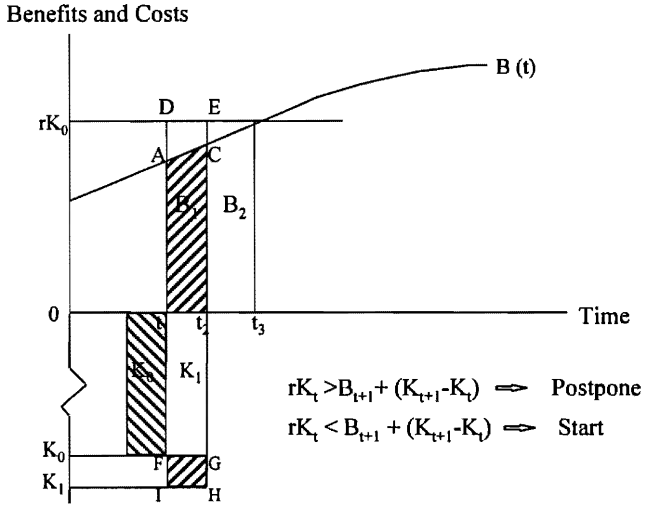
Case 2: Timing of Projects: When Both Potential Benefits and Investments Are A Function of Calendar Time



$rK_t > B_{t+1} + (K_{t+1} - K_t) \Rightarrow$ Postpone

$rK_t < B_{t+1} + (K_{t+1} - K_t) \Rightarrow$ Start

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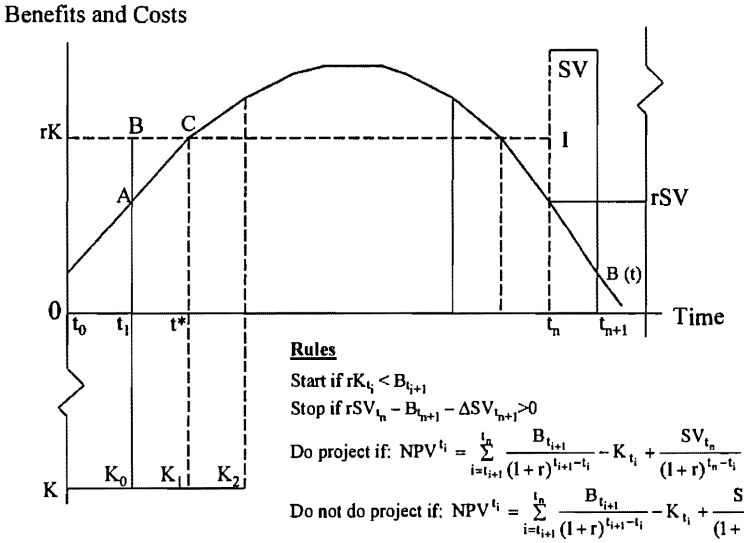
Case 3: Timing of Projects: When Potential Benefits Rise and Decline According to Calendar Time



Rules

Start if $rK_{t_i} < B_{t_{i+1}}$

Stop if $rSV_{t_n} - B_{t_{n+1}} - \Delta SV_{t_{n+1}} > 0$

Do project if: $NPV^{t_i} = \sum_{i=t_{i+1}}^{t_n} \frac{B_{t_{i+1}}}{(1+r)^{t_{i+1}-t_i}} - K_{t_i} + \frac{SV_{t_n}}{(1+r)^{t_n-t_i}} > 0$

Do not do project if: $NPV^{t_i} = \sum_{i=t_{i+1}}^{t_n} \frac{B_{t_{i+1}}}{(1+r)^{t_{i+1}-t_i}} - K_{t_i} + \frac{SV_{t_n}}{(1+r)^{t_n-t_i}} < 0$

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The Decision Rule

If $(rSV_{t_n} - B_{t_{n+1}} - \Delta SV_{t_{n+1}}) > 0 \Longrightarrow$ Stop

$< 0 \Longrightarrow$ Continue

$\Delta SV_{t_{n+1}} = SV_{t_{n+1}} - SV_{t_n}$

This rule has 5 special cases:

1. SV > 0 and ΔSV < 0, e.g. Machinery
2. SV > 0 but ΔSV > 0, e.g. Land
3. SV < 0, but ΔSV = 0, e.g. A nuclear plant
4. SV < 0, but ΔSV > 0, e.g. Severance pay for workers
5. SV < 0 and ΔSV < 0 e.g. Clean-up costs

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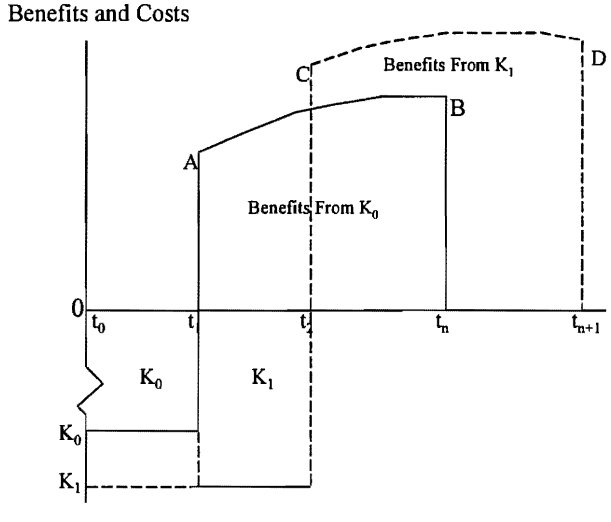
Timing of Projects:
When The Patterns of Both Potential Benefits and Costs Depend on Time of Starting Project



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CHOICE OF MUTUALLY EXCLUSIVE PROJECTS WITH DIFFERENT LENGTHS OF LIFE

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Choosing Between Highly Profitable Mutually Exclusive Projects With Different Lengths of Life

Example:

Suppose we wish to build a road where the following three types of road surfaces are to be considered:

Alternative Road Surfaces	Duration of Road
A: Gravel surfaced road	3 Years
B: Oil (tar) surfaced road	5 Years
C: Cold mix asphalt surfaced road	15 Years

Strategies that are likely to be non -viable in case of normal demand growth

Non-viable Strategies		Duration
(a) (A+A+A+A+A)	[Years 1-3, 4-6, 7-9, 10-12, 13-15]	15 Years
(b) (B+B+B)	[Years 1-5, 6-10, 11-15]	15 Years
(c) (C)	[Years 1-15]	15 Years
Viable Strategies		Duration
(d) (A+A+A+B+C)	[Years 1-3, 4-6, 7-9, 10-14, 15-29]	29 Years
(e) (A+B+B+C)	[Years 1-3, 4-8, 9-13, 14-28]	28 Years

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Viable Strategies

- To make projects comparable, a further adjustment should be made to the 29 year strategy (d) to make it comparable to the 28 year strategy (e)

  Necessary Adjustment:

- Calculate the NPV of the project in strategy (d) after dropping the benefits accruing in year 29 while at the same time reducing the present value of its costs by the fraction $PVB_{1\text{-}28}/PVB_{1\text{-}29}$
- In this way, the present value of the costs of the project are reduced by the same fraction as is the present value of its benefits. This makes the longer strategy (d) comparable to the shorter strategy (e) in terms of both costs and benefits.

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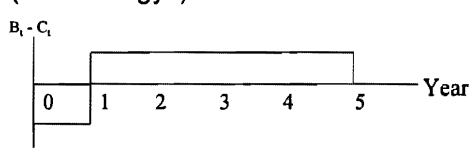
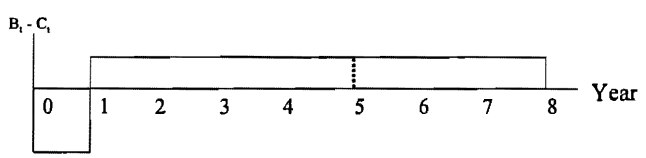
Viable Strategies: Another Example

Suppose we have the following two mutually exclusive projects representing two types of technology with different lengths of life

Project I (Technology I)



Projects II (Technology II)



Question: Whether $NPV_I > NPV_{II}$ or $NPV_I < NPV_{II}$?

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First strategy: Use adjusted NPV

Compare both projects using a common discount rate:

$PV^0C_{I,0} = 100$	$PV^0C_{II,0} = 200$
$PV^0B_{I,1\text{-}5} = 122$	$PV^0B_{II,1\text{-}8} = 225$
$NPV_I = 22$	$NPV_{II} = 25$

It appears that project II is preferred to project I, but the NPV of project II is biased upward. We need to adjust project II to make it comparable to project I.
How?

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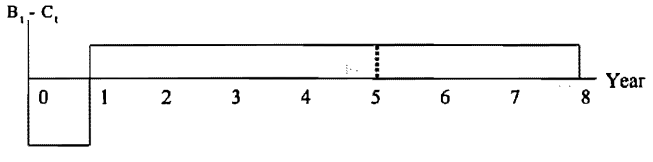
Project II (Adjusted):
Benefits for only the first 5 years are included and costs are r educed by the ratio of the present value of benefits from years 1- 5 and 1-8. We can calculate:



$PV\ {}^0C_0^{II} = 200 \qquad PV\ {}^0B_{1-8}^{II} = 225 \qquad PV\ {}^0B_{1-5}^{II} = 180$

$$NPV_I = PV\ {}^0B_{1-5}^{I} - PV\ {}^0C_0^{I} = 122 - 100 = 22$$

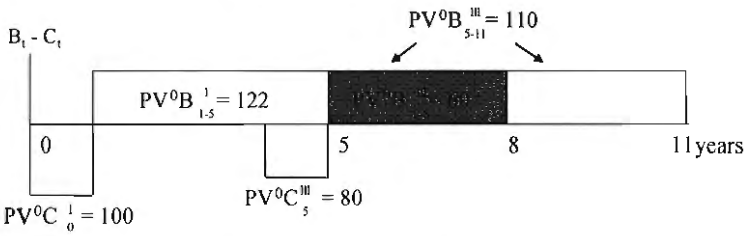
$$NPV_{II}^{A} = PV\ {}^0B_{1-5}^{II} - PV\ {}^0C_0^{II}\left(\frac{PV\ {}^0B_{1-5}^{II}}{PV\ {}^0B_{1-8}^{II}}\right) = 180 - 200\left(\frac{180}{225}\right) = 20$$

Hence, $NPV_I > NPV_{II}^{A}$

Result: **It is better to implement project I now than implement project II**

Viable Strategies (Project I followed by Project III)

- Make length of strategy to compare with project II
- Adjusted project is project I plus 3 years of project III's life



We need to calculate the NPV of project I plus project III (adjusted)

Or, NPV^{IA}_0

$$NPV^{IA}_0 = PV^0B^{I}_{1-5} - PV^0C^{I}_0 + PV^0B^{III}_{5-8} - PV^0C^{III}_5 \left(\frac{PV^0B^{III}_{5-8}}{PV^0B^{III}_{5-11}} \right)$$

$$= 122 - 100 + 60 - 80\,(60/110) = 38.36$$

$$NPV^{II}_0 = 225 - 200 = 25$$

Hence, $NPV^{II}_0 < NPV^{IA}_0$

Hence, our strategy should be to start with Project I.

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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 - 14, 2007

Case One

ALTERNATIVE INVESTMENT CRITERIA

ALTERNATIVE INVESTMENT CRITERIA

Project Selection

The following table presents the net financial cashflow profiles for five projects. These five projects are strictly mutually exclusive in that only one of the five can be implemented. Year 0 represents investment costs. The opportunity cost of public funds is 10%.

In '000 U.S. dollars

Year	0	1	2	3	4	5
Project A	-130	110	60	108	102	0
Project B	-450	46	48	50	96	290
Project C	-440	80	90	80	90	104
Project D	-90	-80	160	144	240	70
Project E	-300	50	50	50	80	70

Rank and choose the best of these five projects according to the following criteria:

A. NPV

B. Internal Rate of Return

C. Benefit/Cost ratio using two alternative definitions:

1) Net benefits/investment costs and

2) Gross benefits/total costs

The recurrent costs for each project are shown below. (These figures have already been taken into account in constructing the net cashflow of the preceding table.)

Recurrent Costs

In '000 U.S. dollars

Year	0	1	2	3	4	5
Project A	0	125	85	95	115	0
Project B	0	0	0	0	0	0
Project C	0	60	62	80	70	104
Project D	0	120	140	190	235	265
Project E	0	40	40	40	40	0

The End

ALTERNATIVE INVESTMENT CRITERIA

Project Selection

QUESTION 1: (in $000s)

Year	0	1	2	3	4	5
PROJECT A						
PROJECT B						
PROJECT C						
PROJECT D						
PROJECT E						

Discount Rate

A. NPV Criterion: Using a discount rate of

	NPV	Ranking
PROJECT A		
PROJECT B		
PROJECT C		
PROJECT D		
PROJECT E		

B. Internal Rate of Return Criterion

	IRR	Ranking
PROJECT A		
PROJECT B		
PROJECT C		
PROJECT D		
PROJECT E		

C. Benefit/Cost Ratio Criterion:

1) Net benefits/investment costs

		Years					
		0	1	2	3	4	5
PROJECT A							
Net Cash Flow							
PV Investment							
PV Benefits							
Benefit/Cost Ratio							
PROJECT B							
Net Cash Flow							
PV Investment							
PV Benefits							
Benefit/Cost Ratio							
PROJECT C							
Net Cash Flow							
PV Investment							
PV Benefits							
Benefit/Cost Ratio							
PROJECT D							
Net Cash Flow							
PV Investment							
PV Benefits							
Benefit/Cost Ratio							
PROJECT E							
Net Cash Flow							
PV Investment							
PV Benefits							
Benefit/Cost Ratio							

2) Gross Benefits/Total Costs												
	Gross Costs(G.C.) = Investment Costs + Recurrent Costs											
	Gross Benefits(G.B.) = Net Benefits + Recurrent Costs											
PROJECT A												
Gross Costs												
Net Benefits												
Gross Benefits												
PV Gross Costs												
PV Gross Benefits												
Benefit/Cost Ratio												
PROJECT B												
Gross Costs												
Net Benefits												
Gross Benefits												
PV Gross Costs												
PV Gross Benefits												
Benefit/Cost Ratio												
PROJECT C												
Gross Costs												
Net Benefits												
Gross Benefits												
PV Gross Costs												
PV Gross Benefits												
Benefit/Cost Ratio												
PROJECT D												
Gross Costs												
Net Benefits												
Gross Benefits												
PV Gross Costs												
PV Gross Benefits												
Benefit/Cost Ratio												
PROJECT E												
Gross Costs												
Net Benefits												
Gross Benefits												

PV Gross Costs											
PV Gross Benefits											
Benefit/Cost Ratio											

Ranking of Projects According To Different Criteria

PROJECT	NPV	Rank	IRR	Rank	Benefit / Cost Ratio [1]	Rank	[2]	Rank
A								
B								
C								
D								
E								

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

December 3 – 14, 2007

Case Two

INFLATION, EXCHANGE RATES AND INTEREST RATES

Case 2: INFLATION, EXCHANGE RATES AND INTEREST RATES

Assume the domestic rate of inflation in Malaysia has been 1.5 percent per year for the past three years, but the rate is expected to increase by half percentage (0.5) point each year for the next two years until it reaches 2.5 percent. Then, it is expected to remain at that level in the future. The price index for Malaysia in January 2004 was 2.5. The inflation rate in Japan has been 1% per year last year, but the rate is expected to decrease by 0.2 percentage point each year for the next three years until it reaches 0.4 percent. Then it is expected to remain at that level in the future. The price index for Japan in January 2004 is 0.9.

The currency of Malaysia is the Ringgit and that of Japan is the Yen. Assume that the market exchange rate in January 2004 is approximately 0.03 Ringgit/Yen.

The nominal one-year interest rate for Ringgit loans is 7 percent as of January 2004, with an expectation that the rate of inflation will be 2 percent the next year (2005). Assume that the real exchange rate between the two countries will remain at the same level until year 2010.

Assignment:

Prepare a table that contains the following information:

1. The projected price index for Malaysia from January 2004 to January 2010.

2. The projected price index of the Japan from January 2004 to January 2010.

3. What is the real exchange rate as of January 2004?

4. Using the assumption that the real exchange rate remains constant over the future 7 years, what are the projected nominal exchange rates between January 2005 and January 2010?

5. What is the real rate of interest as of January 2004 in Malaysia?

6. Assuming that the real rate of interest remained constant over the next 7 years, forecast the annual nominal interest rates in Malaysia that would be consistent with the real rate of interest and the projected rates of inflation?

7. Suppose the world price of a Personal Digital Assistant (PDA) that Malaysians buy from the Japan is 10,000 Yen per unit in January 2004. It is expected that the real price of PDA's will decrease by 10 percent a year, from January 2005 onward, for the following 5 years .What do you expect it to cost to Malaysian consumers in Ringgit price (nominal) in January 2009?

8. Suppose a Malaysian firm obtained a 2.5 Million Ringgit loan in January 2005, and the loan principal is to be repaid in equal installments over the following 5 years. The interest accrued over the previous year is also paid in the current year. What would be the amount of interest expense paid each year over this five year period, expressed in the prices of January 2005? Estimate the annual tax savings per year (i.e. in January 2005 prices) that will accrue to this company given that it is subject to a corporate flat tax rate of 40%. What would be the annual savings under conditions of an expected rate of inflation of zero over the entire period? Compare and comment on the differences in tax saving of the with- and without-inflation situation on the financial net present value (NPV) of the activity. The real discount rate is 7%.

9. Suppose that instead of the real exchange rate between the Ringgit and the Yen being held constant over time, it is expected that the Yen will appreciate relative to all other currencies, including the Ringgit, by 2 percentage points a year over the period from January 2005 to January 2010. What would you expect the real and nominal interest rates now to be from January 2005 until January 2010 on a Japanese Yen loan made to the same Malaysian business as described in question 8? What is the amount of real interest expense measured in Ringgit expressed in the price level of January 2005 for an equivalent Yen loan that is equivalent in value to 2.5 million Ringgit in January 2005? What is the annual value of the foreign exchange capital gain or losses associated with this loan over its repayment time?

10. Suppose, again, that this Malaysian company has the following cashflow profile and that cash balance, accounts receivable and accounts payable are respectively estimated to be at 10% of sales, 50% of sales and 10% operating costs (material purchases + direct labor costs.)

2005 Prices Real Cashflow (Ringgit)

Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
Sales revenues		3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Material purchases	500,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	
Direct labor costs		50,000	50,000	50,000	50,000	50,000	50,000

a. Using a real discount rate of 7%, and calculating the present values of the following cashflow items, evaluate their impact on the cashflow statement of this company under the condition of zero inflation and under the condition of 2.5% annual constant inflation rate:
   - Cash balances
   - Accounts payable
   - Accounts receivable

b. Using the first-in-first-out (FIFO) inventory valuation method, calculate the annual profits and taxes paid (assume annual 40% tax rate) of the company under the conditions of zero inflation and when the inflation is 2.5% every year. Compare the taxes paid under theses two scenarios.

c. Using the last-in-first-out inventory valuation method, calculate the annual profits and taxes paid (assume annual 40% tax rate) of the company under the conditions of zero inflation and when the inflation is 2.5% every year. Compare the taxes paid under theses two scenarios.

d. Suppose that the amounts of annual depreciation expense to reflect the historical cost of fixed assets allowed for deduction in the calculation of taxable income are 100,000 Ringgit per year from year 2006 to 2011 (inclusive). The rate of corporate income tax is 40 percent. How does a 2.5 percent rate of inflation as compared to a zero percent rate of inflation affect the real value of the taxes saved from the deduction for depreciation expenses? How will an increase of the rate of inflation with the current system of calculating the depreciation expense for purposes on income taxation affect the real financial NPV of the business?

Template of Case 2 on Foreign Exchange

Information about Malaysia

Inflation in Malaysia		previous year (2003)
Expected change in inflation		points until it reaches 2.5%
Price Index for Malaysia		in January 2004

Information about Japan

Inflation in Japan		previous year
Expected change inflation		points until it reaches 0.4%
Price Index for Japan		in January 2004
Exchange Rate Ringgit/Yen		Ringgit/Yen in January 2004
Nominal Interest Rate on Ringgit (i)		in January 2004

Information on Personal Digital Assistant (PDA)

World Price (January 2004)		Yen/un
%change in real price		2005-2

Information about Loan

Loan in January 2005		**Ringgi**
Principal Payment (equal installments)		**years**
Corporate tax rate		
Real discount rate		

1 **Price Index for Malaysia**

	2003	2004	2005	2006	2007	2008	2009	2010
Inflation Rate								
Price Index								

$PI_n = PI_{n-1} * (1+\text{inflation rate}_{n-1})$

2 **Price Index for Japan**

	2003	2004	2005	2006	2007	2008	2009	2010
Inflation Rate								
Price Index								

$PI_n = PI_{n-1} * (1+\text{inflation rate}_{n-1})$

Relative Price Index

PI_D/PI_F

3 **Real Exchange Rate Between Ringgit and Japanese Yen in 2004 is:**

Nominal Exchange Rate * PI^F_{04}/PI^D_{04}

4 **Nominal Exchange Rate Between Ringgit and Japanese Yen in 2004 to 2010**

	2004	2005	2006	2007	2008	2009	2010
Nominal Exchange Rate							

5 **Real Interest Rate on Ringgit Loan is:** $i = r + R + (1 + R + r)\, gPe$

i = nominal interest rate, r = real interest rate, R=risk premium, gpe = expected inflation

$7\% = r + 0 + (1 + 0 + r)\, 2\%$

Real Interest Rate on Jan. 04

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	A	B	C	D	E	F	G	H	I	J	K	L
43	6	**Nominal Interest Rate**										
44					*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	
45		Nominal Interest Rate										
46												
47	7	Price of Personal Data Access (Japanese Yen)										
48		% change in real price of PDA										
49												
50					*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	
51		Price in Japanese Yen (Real)										
52		Price in Japanese Yen (Nominal)										
53		***Price in Ringgit (Nominal)***										
54												
55												
56	8	**Information about Loan (Ringgit) Obtained by a Company in Malaysia**										
57						*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	
58		Nominal Interest Rate										
59												
60		Beginning debt										
61		Loan Disbursement										
62		Interest accured	***=beginning debt(t)*nominal interest rate(t-1)***									
63		Principal Payment										
64		Interest payment										
65		Ending Debt										
66												
67		**Price Index for Malaysia (base year 2005)**										
68		**Interest Payment (in 2005 prices) (Interest Payment/Price Index_2005)**										
69												
70						*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	
71		**Interest rate with zero inflation**										
72		Beginning debt										
73		Loan Disbursement										
74		Interest accured	***=beginning debt(t)*nominal interest rate(t-1)***									
75		Principal Payment										
76		Interest payment										
77		Ending Debt										
78												
79		**Tax savings**										
80			**Savings with inflation (Real, in 2005 prices)**									
81			**Savings with no inflation**									
82			**Increase in tax shelter**									
83			Tax savings = interest expense*corporate tax rate									
84												

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	A	B	C	D	E	F	G	H	I	J	K	L
85	9	Expected growth rate (real)			from January 2005 - 2010							
86					*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	
87		Expected growth rate (real)										
88		Real Exchange Rate Ringgit/Japanese Yen (with growth)										
89		Nominal Exchange Rate										
90												
91		**Real Interest in Japanese Yen loan**										
92		$1+r_{Ringgit} = (1+r_{Japan})*(E^R_t/E^R_{t-1})$										
93		$1+r_{Ringgit} = (1+r_{Japan})\ (1+\text{expected growth rate})$										
94		$(1+r_{Japan}) = (1+r_{Ringgit}) / (1+\text{expected growth rate})$										
95		$r_{Japan} = [(1+r_{Ringgit}) / (1+\text{expected growth rate})] - 1$										
96		r_{Japan} =										
97												
98		**Nominal Interest in Japanese Yen loan**										
99					*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	
100		Nominal Interest Rate										
101												
102		**Information about Loan (Japanese Yen) Obtained by Malaysia Company**										
103						*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	
104		Beginning debt										
105		Loan Disbursement										
106		Interest accured										
107		Equal principal payment (20% each year)										
108		**Interest payment (Japanese Yen)**										
109		Ending Debt										
110												
111		**Interest expense in Ringgit (Nominal)**										
112		**Real Interest expense (2005 Ringgit)**										
113												
114												
115		Principal Payments, Ringgit loan (Ringgit , 2005 prices)										
116												
117												
118		Principal Payments Japanese loan (Ringgit, 2005 prices)										
119												
120		**Foreign exchange capital gains/loss (Ringgit, 2005 prices)**										

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	A	B	C	D	E	F	G	H	I	J	K	L
121	**Question 10**											
122	a	***Scenario 1: Zero Inflation***										
123		***Working capital***										
124		Account receivable		of sales								
125		Accounts payable		of operating costs								
126		Cash balance		of sales								
127				***2005***	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***		
128		Sales revenues			3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000		
129		Material purchases		500,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000			
130		Direct labour costs			50,000	50,000	50,000	50,000	50,000	50,000		
131												
132				***2005***	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	
133		Account receivable										
134		Accounts payable										
135		Cash balance										
136												
137		*Change in Accounts receivable*										
138		*Change in Accounts payables*										
139		*Change in Cash Balance*										
140												
141		*Receipts*										
142		*Outflows*										
143		***A-Net Cashflow (real, zero inflation)***										
144		***PV @ 7% real discount rate***										
145												
146		***Scenario 2: 2.5% Inflation***										
147				***2005***	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	
148		Inflation rate										
149		Inflation index										
150		**Nominal**										
151		Sales revenues										
152		Material purchases										
153		Direct labour costs										
154												
155		Account receivable										
156		Accounts payable										
157		Cash balance										
158												
159		*Change in Accounts receivable*										
160		*Change in Accounts payables*										
161		*Change in Cash Balance*										
162												
163		*Receipts*										
164		*Outflows*										
165		***Cashflow (nominal, 2.5% inflation)***										
166		***B-Cashflow (real)***										
167		***PV @ 7% real discount rate***										
168												

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	A	B	C	D	E	F	G	H	I	J	K	L
169		**Difference (B - A)**										
170												
171	b	**FIFO calculaton**										
172		***Scenario 1: Zero Inflation***										
173				***2005***	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***		
174		**FIFO approach**										
175		Materials purchases										
176		Direct labour cost										
177		*COGS*										
178		**Income statement**										
179		Sales										
180		COGS										
181		**Measured profits**										
182		**A-Taxes paid (40% of profits)**										
183		***Scenario 2: 2.5% Inflation***										
184				***2005***	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***		
185		**FIFO approach**										
186		Materials purchases										
187		Direct labour cost										
188		*COGS*										
189		Income statement										
190		Sales										
191		COGS										
192		**Measured profits**										
193		**B-Taxes paid (40% of profits)**										
194		**B-Taxes paid (real)**										
195												
196		**Diference (B - A)**										

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	A	B	C	D	E	F	G	H	I	J	K	L
197												
198	c	**LIFO calculaton**										
199		***Scenario 1: Zero Inflation***										
200				*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*		
201		**LIFO approach**										
202		Materials purchases										
203		Direct labour cost										
204			*COGS*									
205		**Income statement**										
206		Sales										
207		COGS										
208		**Measured profits**										
209		**A-Taxes paid (40% of profits)**										
210		***Scenario 2: 2.5% Inflation***										
211				*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*		
212		**LIFO approach**										
213		Materials purchases										
214		Direct labour cost										
215			*COGS*									
216		Income statement										
217		Sales										
218		COGS										
219		**Measured profits**										
220		**B-Taxes paid (40% of profits)**										
221		**B-Taxes paid (real)**										
222												
223		**Diference (B - A)**										
224												
225	d											
226				*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*		
227		**Zero inflation**										
228		Depreciation Expense										
229		A-Tax saving										
230												
231		**2.5% Inflation rate**										
232		Inflation index										
233		Depreciation Expense										
234		B-Tax saving (real)										
235												
236		**Real difference in tax savings (B-A)**										

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PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Case Three

ARKATI POWER COMPANY

Arkati Power Company

A. Background

The Arkati Power Company (APC) in Nandjeletland is a joint stock company that specializes in power generation. Fifty one percent of the equity in APC is privately owned while the balance is owned by the state of Nandjeletland. The first thermal power plant of APC is a coal-fired plant with an installed capacity of 375 megawatts (MW). It was built in 1990 on 350 acres at a capital cost of Rs 6125 million in the neighborhood of the metropolitan area of Putnam. Currently, APC operates three thermal plants and one hydro plant with total installed capacity of 950 MW to supply electricity to areas in and around the city of Putnam. The annual sales of the company are about (Rupees) Rs 10.5 billion.

A.1 The demand for electricity has been growing at a faster rate than expected since 2000 in the region of Putnam. Current annual electricity demanded is about 9400 gigawatt-hours (GWh) while the supply is around 6660 GWh. This energy shortage will double if APC closes down its first coal-fired thermal plant as a result of a growing social pressure for clean environment of the community living around the plant.

A.2 To meet the power shortage in the region of Putnam, APC plans to build a new thermal plant at a new location. In 1990, the average cost of the land was about Rs 7.5 per square meter. Since then, the land price increased several fold and today, the prevailing market rate is Rs. 56.7 per square meter.

A.3 After carefully examining the options available, the board of directors approved the proposal for setting up a 750 MW thermal power plant (3 x 250 MW) and closing down the first coal-fired plant. The new plant will be located outside the city limit, where land and water are available relatively cheap. The Planning Division of APC has prepared the project report including details on the source of financing and the description of the project. The salient features of that report are summarized in the following sections:

B. Financing of the Project

B.1 The total investment cost of the new plant is US $525 million. The financing will come from the World Bank (WB), the State Bank of Nandjeletland (SBN), and from APC. The WB loan, $194 million (in nominal prices), is guaranteed by the Central Government. This loan will be drawn as follows: $85 million in year 2, $55 million in year 3 and $54 million in year 4. The real interest rate of the loan is 7%, and the principal of the loan will be repaid in 10 equal consecutive annual installments starting at the beginning of the second year of power generation (i.e., year 6). A grace period for principal repayments lasts until year 6. Interest accrued on the loan balance from previous period is paid on a continuous basis, starting from the date of signing of the loan agreement.

B.2 The loan of the State Bank of Nandjeletland (SBN) amounts to Rs 8,750 million (in nominal prices). The disbursement of this loan is as follows: Rs 2,625 million in year 2, Rs 2,975 million in year 3, and Rs 3,150 million in year 4. The loan will carry a real interest rate of 8%, and the principal will be repaid in 8 equal consecutive annual installments starting at the beginning of the second year of power generation. A grace period for principal repayments lasts until year 6. Interest accrued on the loan balance from previous period is paid on a continuous basis, starting from the date of signing of the loan agreement.

B.4 APC financing will come from its own resources and from the local financial market. By liquidating the existing coal-fired plant and selling at market rate the land used by the coal fired plant, APC will raise Rs 896.35 million. In addition, APC will issue 4.62 million shares at Rs 420 each to raise a total of Rs 1938.65 million from the local financial market. Any shortages in the cost will be covered by the internal sources of the company.

C. Capital Investment Requirement of the Project

C.1 Land: Land is freely traded in the market. APC will receive the land at no cost, from the government in Year 0 if APC is willing to undertake the project. The construction of the plant structure including switchyard, railway siding, office complex, residential colony, disposal dumps, and ash ponds requires 1000 acres (note: 1 acre = 4,047 square meters). The prevailing market rate of the land is Rs 56.7 per square meter. Because of expected future improvements in the local infrastructure outside of the project, the market price of land per square meter is estimated to increase by 300% in the liquidation year.

C.2 Preliminary & Civil Works: The total capital cost for preliminary and civil works amounts to Rs 2,031.05 million. This amount includes the construction cost of the plant building, the cost of storage facility, the cost of construction of road, railway siding, residential colony, the consultant service, and the cost of a water supply system and a host of auxiliary infrastructure. The total investment is phased at Rs 1,571.15 million in year 1, Rs 323.4 million in year 2 and Rs 136.5 million in year 3, all in year 0 prices.

C.3 Mechanical Equipment: The total capital cost for mechanical equipment amounts to Rs 12,498.5 million. This amount includes the cost of steam generators, turbo-generators, spare parts, mechanical workshop, system for plant water, air conditioning, ventilation, coal handling plant, ash handling plant, fire fighting, pollution control and monitoring. The total investment is phased at Rs 5,425 million in year 2, Rs 4,340 million in year 3 and Rs 2,733.5 million in year 4, all in year 0 prices.

C.4 Electrical Equipment: The total capital cost for electrical equipment amounts to Rs 1,344 million. This amount includes the cost of generator transformers, station transformers, auxiliary transformers, electrical system equipment, station lighting system and electrical workshop, control cables, relay panels, spares, and

switchyard. The total investment is phased at Rs 430.5 million in year 3 and Rs 913.5 million in year 4, all in year 0 prices.

C.5 Instrumentation & Control: The total capital cost for instrumentation and control amounts to Rs 470.75 million in year 0 prices. This amount includes the cost of panels, flow elements, thermocouples, switches control valves, gauges, cables, spares, analyzers and sensors, etc. The total investment occurs in year 4.

C.6 Establishment & Support Service: The total capital cost for establishment and support service amounts to Rs 1,330.7 million. The cost of establishment and support service includes the cost of consultant service, project administration and management, the cost of vehicles, special machines, and special tools. The total investment is phased at Rs 585.2 million in year 1 and Rs 248.5 million each in years 2, 3 and 4, all in year 0 prices.

C.7 Consultancy Fees: Rs 700 million, in year 0 prices, will be paid in year 4 to the engineering consultants responsible for the construction of the plant.

D. Recurrent Costs/Operating Expenses of the Project

D.1 Coal: The coal to be used in the new plant will come from a mine located 75 km from the plant. The amount of coal required to generate 1 kWh of electricity starting in year 5 is 0.78 kilogram (kg). The financial cost of pulverized coal will be Rs 910/metric ton (Mt) inclusive of Rs 122.5 in taxes and royalty in year 0. Note that an inventory of 1-month's requirement of coal will be purchased in year 4 to serve as buffer stock for succeeding years of operation. FIFO (First In First Out) method will be adopted for cost of goods sold valuation.

D.2 Furnace Oil: The furnace oil is added to pulverized coal to make the fuel-spray mixture to ease the combustion process. To generate one kWh of electricity 6.1 milliliters (ml) of furnace oil are required. At the plant gate, the financial cost of furnace oil will be Rs 4,725/kiloliter (kl) inclusive of Rs 595 in import duty and sale tax in year 0. An inventory of 1-month's requirement of furnace oil will also be purchased in year 4 to serve as buffer stock for succeeding years of operation. FIFO method method will be adopted for cost of goods sold valuation.

D.3 Annual Operation and Maintenance (O&M) will be 2% of total investment cost (excluding land).

D.4 Labour: During construction of the plant, all labor costs are already covered by the contractual packages awarded to the successful bidders. However, during the operational phase, the project will hire 250 persons skilled/semiskilled labour with the salary of Rs. 0.12 million per year (year 0 price) per person and the wage rates are expected to grow at 2 percent real in a year from year 6 onward. The project is also going to hire 60 persons unskilled labour with the salary of Rs. 0.06 million per year (year 0 price) per person and this wage rate is expected to

grow at 1 percent real a year from year 6 onward. The wage rate in the following years will be adjusted with the domestic inflation rate.

E. Pollution control

E.1 The coal, which is used to generate electricity, will release 6.93 grams (g) of nitrogen for every kWh of electricity generated. This level of nitrogen content in the coal is high by international standards compared to 2.6 g for USA, 1.73 g for Japan and 1.5 g for Australia. When released in the atmosphere, nitrogen converts into its oxides (e.g. nitrogen oxide) to generate acid pollution or corrosion in the external environment. To reduce the level of nitrogen, Selective Catalytic Reduction (SCR) process will be installed in the flue gas channel. The estimated cost of removing the nitrogen with ammonia shower is Rs 0.0875/kWh in year 0.

E.2 For every kWh of electricity, the combustion of the coal will generate 0.26 kilogram (kg) of ash. More than 80% will come as fly ash, requiring a system of electrostatic precipitation along the flue gas channel. The ash collected will be pumped into ash-ponds located 9 km away from the power plant. The slurry stacks require continuous monitoring and control to avoid ash storms, particularly during the dry season. The estimated cost for ash handling and control is Rs 0.0595 for every kWh of electricity in year 0.

F. Working Capital

F.1 Accounts receivable will be 12.5% of the sales revenue; and accounts payable will be 10% of the total operating expenses (excluding labor), and cash balances will be 7.5% of the total operating expenses.

G. Economic Life, Plant Load Factor, and Auxiliary Consumption

G.1 The economic (useful) life of plant (all investments combined) is 25 years. The plant comprises three generating sets of 250 MW each, all to start operating in year 5.

G.2 The annual plant load factor (i.e., the rate at which electricity is actually/ effectively produced) will be 80%.

G.3 The annual auxiliary electricity consumption (i.e., own consumption of the power plant) will be 4% of effective electricity generated.

G.4 Straight-line depreciation method will be used in determining the residual value of the plant (inclusive of consultancy fees), assuming no major capital replacements for the duration of the project. The project will be evaluated for an operating life of 12 years; assets will be liquidated at their book value in year 17.

H. Electricity Prices

The financial price of electricity is set at a the level of Rs 1.7/kWh for the year 0. It is assumed that the electricity price in the following years will be adjusted with the domestic inflation rate.

I. Exchange Rate

The real exchange rate of Rs 35 per USD is assumed to remain constant during the life of the project. The projected nominal exchange rates in the following years will depend on the relative inflation rates between US dollar to Rupees.

J. Inflation Rate

The inflation rate in Nandjeletland (domestic inflation rate) is 4% and in USA is 2.5%. Both inflation rates are assumed to remain constant during the life of the project.

K. Discount Rate

The required rate of return (discount rate) by equity holders is 10%.

L. Corporate Taxation

The project will be subject to the corporate income tax. The tax law allows a full deduction of the operating expenditures and interest expense. The depreciation is also tax-deductable: tax life of fixed assets (Preliminary and civil works, Mechanical equipment, Electrical equipment, Instrumentation and control) is set at 12 years; while the soft capital costs (Establishment & support services, Consultancy Fees, Interest capitalized during construction) can be amortized over 5 years. Note that, interest accrued during construction, whether paid in cash or capitalized, can be amortized over 5 years, once the project starts operation. At present, there are no provisions for losses to be carried forward/backward. The rate of corporate income tax is 25% of taxable income.

ECONOMIC ANALYSIS

M. National Parameters

The economic opportunity cost of capital for Nandjeletland is assumed to be 12% real. Suppose that there are no foreign exchange premium distortions in the market for traded goods and no shadow price of non-tradable outlays (SPNTO) distoritons for non-tradable goods.

N. Electricity Prices

The economic price is estimated to be Rs 3.00/kWh.

Economic Costs

O.1 Coal: Suppose that coal has taxes and royalty as a fixed amount of Rs 122.5 on the financial price, i.e. financial price is inclusive of these taxes.

O.2 Furnace Oil: Furnace oil contains Rs 595 as an import duty and sales tax in the financial prices.

Conversion Factors

P.1 Assume that there are no other distortions on inputs. i.e. the conversion factors for other items are 1.

P.2 Suppose that the conversion factor for accounts receivable is the same as that of Sales of Power. Conversion factor for accounts payable is equal to the average of the conversion factors for operating expenses. Change in cash balances has a conversion factor of 1.

ASSIGNMENT

Financial Analysis

1 Construct the following tables in your appraisal model:
- (a) table of parameters,
- (b) inflation, price indices and exchange rates,
- (c) schedule of investment cost,
- (d) loan schedules,
- (e) liquidation values of assets
- (f) schedule of annual depreciation "expense" (economics and tax purposes)
- (g) electricity sales and accounts receivable,
- (h) pollution control,
- (i) labour wages,
- (j) operating costs, accounts payable and cash balance,
- (k) working capital,
- (l) income tax statement
- (m) cash flow for the total investment/banker's point of view (Nominal and Real), and
- (n) cash flow for the owner's (APC) point of view (Nominal and Real)

2 In analyzing the total investment (Banker's) point of view, it is not necessary to calculate NPV. We are interested in (a) the Annual Debt Service Coverage Ratio (ADSCR) on a year-to-year basis; and (b) Debt Service Capacity Ratio (DSCR) [a summary ratio of PV Net Cash flows over PV of loan repayments during the period of the loan repayment]. See the Hint below for the estimation of the debt service ratios.

3 Calculate the NPV for the *equity point of view*.

4.a. What is cumulative debt equity ratio for the first four years of the project?

4.b. What is the relationship between project financing structure and the debt service coverage ratios?

Economics Analysis

1. Prepare the economic resource flow for the economy's point of view.
2. Calculate the NPV for the *economic point of view*.
3. Conduct a sensitivity analysis to determine the impact of a change in the following variables on the NPV of the project from the economic point of view.
   - Price of electricity from Rs/kWh 1.3 to 2.1 in increments of Rs 0.20.
   - Price of coal using a range of 728 to 1092 from the base value in increments of 91.
   - Investment cost overrun using a range of +20% to - 20% from the base value in increments of 5%.

4. Comment on the results of financial, economic and sensitivity analysis. Is the proposed project financially viable and economically feasible? What improvements do you suggest to be made in the structure of this IPP before implementation?

Stakeholder Analysis

1. Prepare a statement of economic externalities created by the project.
2. Reconcile the cashflows in the financial, economic and externality statements.
3. Identify the primary stakeholders affected by the project and carry out a distributive analysis.

   Address the following questions:

4. What is the present value of economic externalities created by this project?
5. Who are the primary stakeholders affected by the project?
6. Who gains and who loses because of the project, and what is the amount of the gain or loss for each party?

Sensitivity Analysis

1 Conduct a sensitivity analysis to determine the impact of a change in the following variables on the Financial and the Economic NPVs. Also determine the impact of the change on the Annual Debt Service Coverage Ratios in years 6 and 14 as well as the Debt Service Capacity Ratio in year 6.

- Price of electricity from Rs/kWh 1.3 to 2.1 in increments of Rs 0.20.
- Price of coal using a range of 728 to 1092 from the base value in increments of 91.
- Investment cost overrun using a range of +20% to - 20% from the base value in increments of 5%.

Hint for calculation of the Annual Debt Coverage Ratio and Debt Service Capacity Ratio:

A) Annual Debt Service Coverage Ratio (ADSCR) as follows;

$$ADSCR = [ANCF_{nominal}/(\text{Annual Debt Repayment}_{nominal})]$$

Where:

ANCF: Annual Net Cash Flow of the project before financing/
Annual Debt Repayment (It includes annual debt installments (interest + principal) during the period of the loan repayment)

B) Summary Debt Service Capacity Ratio (DSCR) for the remaining debt repayment period as follows:

$$DSCR = (PVNCF_{\text{remaining debt repayment period}}) / (PV\ \text{Annual debt repayment}_{\text{remaining debt repayment period}})$$

Notes:

1. To conduct the total investment/banker's point of view in this case, the loan financing of the investment does not enter into the net cash flow statement.
2. All the figures provided in the table of parameters are in year 0 prices which we have to adjust with the inflation for the following years.
3. The financial values of all inputs and outputs are multiplied with their respective conversion factors to get their economic values.
4. The existing and new thermal power plants are independent. The cash flow from liquidation of the existing plant is only used to finance the new plant.

CASE 3: Alternative Points of View
Arkati Power Company

Template

Table 1: Parameters

I. Technical

- Power plant capacity		megawatts -MW
- No. of generating sets		@ 250 MW each
- Plant load factor		of capacity
- Economic life of plant		years
- Project operational life		years
- Auxiliary electricity consumption		of effective electricity generated
- Megawatt to Kilowatt conversion		KW = 1 MW
- Kilowatt to Kilowatt hours a year (kWh/year)		KWh per year (1 KW capacity)

II. Electricity market

- Regional annual electricity demand		Gwh
- Regional annual supply		Gwh
- Energy shortage		Gwh
- Growth of energy shortage if APC shuts down its first coal plant		
- Financial price of electricity		Rs per kWh, in year 0 prices

These data show that there is sufficient demand for project's output.

III. Project Finance

a. Total investment cost [ ] US$ million

b. Sources of funds and Terms:

Loan disbursements in nominal prices

1. World Bank Loan — US$ Million — Year 2 3 4
   - Real Interest rate
   - Principal Repayment period [ ] installments, starting at beginning of second year of power generation (i.e year 6)

2. State Bank of Nenjeletland Loan — Rs Million — Year 2 3 4
   - Real Interest rate
   - Principal Repayment period [ ] installments, starting at beginning of second year of power generation (i.e year 6)

3. APC equity
   - From sale of existing coal plantand land
   - From share issuance

IV. Capital Investment Components — Rs million, unless otherwise stated; in year 0 prices

1. Land
   - Area [ ] acres — Note: [ ] square meters per acre
   - Price paid by APC to government [ ] Rs/square meter
   - Prevailing market price [ ] Rs/square meter
   - Future appreciation due to infrastructure outside project

	Total	Year 1	Year 2	Year 3	Year 4
2. Preliminary and civil works					
3. Mechanical equipment					
4. Electrical equipment					
5. Instrumentation and Control					
6. Establishment and Support Services					
7. Consultancy Fees					

Cost overrun factor [ ]

V. Operating Expenses (in year 0 prices)

1. Coal
   - required coal per kWh of electricity [ ] kilogram
   - financial cost of pulverized coal gross of tax [ ] Rs/metric ton
   - inventory in year 4 [ ] month of coal requirement

2. Furnace oil
   - required oil per kWh of electricity [ ] milli liter
   - financial cost of furnace oil gross of all taxes [ ] Rs/kiloliter
   - inventory in year 4 [ ] month of oil requirement

3. Operation and maintenance [ ] of total investment cost excluding land

4. Labour Wages
   - Number of Skilled Workers [ ] person
   - Wages of Skilled Workers [ ] Rs million per person/year
   - Growth rate of wage [ ] per year (from year 6)

   - Number of Unskilled Workers [ ] person
   - Wages of Unskilled Workers [ ] Rs million per person/year
   - Growth rate of wage [ ] per year (from year 6)

VI. Pollution Control (in year 0 prices)

1. Nitrogen release by coal combustion
   - Nitrogen released [ ] gram/kWh
   - Recurring cost of nitrogen removal by ammonia shower [ ] Rs/kWh
2. Ash produced by coal combustion
   - Ash produced [ ] kg/kWh
   - Cost of ash handling & control [ ] Rs/kWh

VII. Working Capital

1. Accounts receivable [ ] of sales revenues/benefits
2. Accounts payable [ ] of total operating expenses/recurring costs
3. Cash balances [ ] of total operating expenses

VIII. Inflation, Discount Rates & Exchange Rate

1. Required return by equity holders [ ]
2. Economy's discount rate [ ]
3. Exchange Rate(Real) [ ] Rs/$
   Exchange rate appr./depr. Factor (%) [ ]
4. Inflation rate (Nenjeletland) [ ]
5. Inflation rate (US) [ ]

IX. Depreciation and Corporate Tax Rate

1. Useful (economic) life of plant (all investments combined) [ ] years
2. Tax life of fixed assets [ ] years
3. Tax life of soft capital costs [ ] years

orporate income tax rate

FINANCIAL ANALYSIS

Table 2: Inflation, Price Indices and Exch. Rates	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Expected inflation rate (Nandjeletland)																		
Domestic price index																		
Expected inflation rate (US)																		
Foreign price index																		
Relative price index (R/US)																		
Expected real exchange rate (R/US$)																		
Nominal exchange rate (R/US$)																		

Table 3: Investment Cost (Nominal, million Rs)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
TOTAL																		
1. Land																		
2. Preliminary and civil works																		
3. Mechanical equipment																		
4. Electrical equipment																		
5. Instrumentation and Control																		
6. Establishment and Support Services																		
7. Consultancy Fees																		
Total Investment Cost																		

Table 4: Loan Schedule (nominal)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A. World Bank (In $Million)																
Interest Rate																
Beginning debt																
Loan Disbursements																
Interest accrued																
Principal Repayment																
Interest Paid																
Total Loan Repayment																
Ending debt																
Debt cash flow inflow																
Total Loan Repayment as an outflow																
Debt cash flow inflow in Local Currency																
Total Loan Repayment as an outflow in Local Currency																

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B. State Bank of Nandjeletland (In $Rs, nominal)																
Interest Rate																
Beginning debt																
Loan Disbursements																
Interest accrued																
Principal Repayment																
Interst Paid																
Total Loan Repayment																
Ending debt																
Debt cash flow inflow																
Total Loan Repayment as an Outflow																

Total debt repayments (Principal + Interest) (World Bank and SNB) (In Rs Million)																		
Interest paid (World Bank and SNB) (In Rs Million)																	0.0	0.0
Interest during Construction, Capitalized for Tax Purposes (World Bank and SNB) (In Rs Million)																		

Notes:
1/ In calculating interest accrued, it was assumed that interest is charged in the year after a loan amount is disbursed.
So a year 2 disbursement accrues interest in year 3; a year 3 disbursement accrues interest in year 4, etc.
2/ We know that our loan table has been set up correctly when we get a zero balance at end of the repayment period.
3/ According to Tax Law, interest accrued during construction, whether paid in cash or capitalized, can be amortized over 5 years, once the project starts operation.

Table 5: Liquidation value @ Year 17: (Real, in million Rs)	Initial Value (Real)	5	6	7	8	9	10	11	12	13	14	15	16	17
Preliminary and civil works														
Mechanical equipment														
Electrical equipment														
Instrumentation and control														
Establishment & support services														
Consultancy Fees														
Total Residual value														

Notes:
1/ The annual depreciation is obtained by dividing the total historical cost of the investments by their economic (useful) life.
Depreciation starts immediately on first year of operation (year 5) and ends on last year of operation (yr 16)
2/ Residual value is taken as the difference between the historical cost and the sum of all annual depreciation over the project's operational life of 12 years.
3/ Straight line depreciation means "charging" equal annual depreciation against the asset's historical value.

Table 6: Tax Depreciation (Nominal, in million Rs)	Initial Value (Nominal)	5	6	7	8	9	10	11	12	13	14	15	16	17
Fixed Assets														
Preliminary and civil works														
Mechanical equipment														
Electrical equipment														

Instrumentation and control																	
Soft Capital Costs																	
Establishment & support services																	
Consultancy Fees																	
Interest capitalized during construction																	
Annual Depreciation																	

Notes:

1/ The annual depreciation is obtained by dividing the total historical cost of the investments by their tax life.

2/ Tax life is shorter than the useful (economic) life.

3/ According to Tax Law, interest accrued during construction, whether paid in cash or capitalized, can be amortized over 5 years, once the project starts operation.

Table 7: Electricity Sales and Accounts Receivable (Non	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
MW to kW: = (750 MW)* (1000 kW/MW) = 750,000 kW																		
kW to kWh: = 750,000 kW * 365 days * 24 hrs/day = 6,570 million kWh																		
Effective generation: (In Million kWh) = 6,570 million kWh * 80% plant load factor																		
Less: Auxilliary consumption = 4% of Effective generation																		
Net generation = Effective generation - auxilliary consumption																		
Financial prices, Rs/kWh (nominal)																		
Electricity sales @ financial prices (nominal) = Net generation * price/kWh																		
Accounts receivable @ financial prices = 12.5% of Electricity sales																		

Notes:

1/ Project sales are usually calculated based only on the net generation of electricity. Alternatively, gross sales could be reflected as inflows but a corresponding outflow for auxilliary consumption must be made.

Table 8: Pollution Control (Nominal)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Nitrogen removal by ammonia shower																		
Ash handling & control																		

Table 9: Labour Wages	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Skilled Worker																	
Number of workers																	
Growth rate																	
Salary adjusted with growth rate (real)																	
Salary adjusted with growth rate (nominal)																	
Total wages of Skilled Workers (in million, nominal)																	
Unskilled Worker (in million otherwise stated)																	
Number of workers																	
Growth rate																	
Salary adjusted with growth rate (real)																	
Salary adjusted with growth rate (nominal)																	
Total wages of Skilled Workers (in million)																	
Total Wages (in million, nominal)																	

Table 10: Operating expenses, A/P, & Cash Balances (in	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Coal fuel: Ratio: 0.78 kg/1 kWh = C kg per 5,256 Million kWh																	
= 0 Million kg																	
= 0 Million metric tons																	
Financial price (nominal)																	
Annual coal fuel expense @ financial prices=>																	
Cost of Goods Sold (Coal Fuel)																	
2. Furnace oil: Ratio. 6.1 ml/kWh = F ml per 5,256 Million kWh																	
= 0 million ml																	
= 0.00000 million kiloliters																	
Financial price (nominal)																	
Annual furnace oil expense @ financial prices=>																	
Cost of Goods Sold (Furnace oil)																	
3. Operation and maintenance =2% of Capital Investment Components excluding land																	
4. Labour Wages																	
Total Operating Expenses in Financial																	
Financial accounts payable (A/P) = 10% of total operating expenses																	
Financial cash balances = 7.5% of total operating expenses																	

Notes:
1/ Project operating costs should be based on gross power generated.
2/ Input inventories (furnace oil and coal) in year 4 are 1/12th of the amounts required in year 5. By year 16, all inventories must be consumed so, expenses on inputs should amount only to 11/12th of the annual expense in any given year from years 5 to 15.
3/ Accounts payable and cash balance are based on all operating costs, excluding pollution control expenses.
4) COGS is calculated using FIFO accounting, hence COGS is 11/12th of current purchases plus 1/12th of previous year's purchases.

Table 11: Working Capital (nominal)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Financial Point of View																	
Accounts receivable @ financial prices																	
Accounts payable @ financial prices																	
Cash Balances @ financial prices																	
Change in Accounts Receivable																	
Change in Accounts Payable																	
Change in Cash Balances																	

Table 12: Income Tax Statement	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(in Rs Million, nominal)																		
Revenues																		
Sale of Power																		
TOTAL REVENUES																		
Expenses																		
Operating expenses																		
Cost of Goods Sold (Coal fuel)																		
Cost of Goods Sold (Furnace oil)																		
Operation and maintenance																		
Wages																		
Pollution Control																		
Nitrogen removal by ammonia shower																		
Ash handling & control																		
TOTAL OPERATING EXPENSES																		
EARNINGS BEFORE, INTEREST, TAXES, DEPRECIATION & AMORTIZATION (EBITDA)																		
Depreciation																		
EARNINGS BEFORE INTEREST AND TAXES (EBIT)																		
Interest expenses																		
PRE-TAX INCOME																		
Income tax paid																		
NET INCOME																		

Table 13: Total Investment Point of View Cash Flow	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(in Rs Million, nominal)																		
Receipts																		
Sale of Power																		
Change in A/R																		
Land subsidy																		
Residual value of assets–other than land																		
Residual value of land																		
TOTAL INFLOWS																		
Expenditures																		
Investments																		
Land																		
Preliminary & civil works																		
Mechanical equipment																		
Electrical equipment																		
Instrumentation & control																		
Establishment & support services																		
Consultancy fees																		
Operating expenses																		
Coal fuel																		
Furnace oil																		
Operation and maintenance																		
Wages																		
Pollution Control																		
Nitrogen removal by ammonia shower																		
Ash handling & control																		
Change in A/P																		0.0
Change in cash balances																		0.0
Corporate Income Tax																		0.0
TOTAL OUTFLOWS																		0.0
NET CASH FLOWS																		0.0

ANNUAL DEBT SERVICE COVERAGE RATIO (ADSCR) = Net Cash Flow/Total Debt Repayment

Interest Rate (Real) 0.00%

YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Real Annual Net Cash Flows (NCF)																		
Real Annual Debt Repayment																		
PV Annual Net Cash Flows (NCF)																		
PV Annual Debt Repayment																		

Debt Service Capacity Ratio = PV of Annual NCF/PV Annual Total Debt Repayment

Table 14: Total Investment Point of View Cash Flow	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(in Rs Million, real)																		
domestic price index	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Receipts																		
Sale of Power																		
Change in A/R																		
Land subsidy																		
Residual value of assets–other than land																		
Residual value of land																		
TOTAL INFLOWS																		
Expenditures																		
Investments																		
Land																		
Preliminary & civil works																		
Mechanical equipment																		
Electrical equipment																		
Instrumentation & control																		
Establishment & support services																		
Consultancy fees																		
Operating expenses																		
Coal fuel																		
Furnace oil																		
Operation and maintenance																		
Wages																		
Pollution Control																		
Nitrogen removal by ammonia shower																		
Ash handling & control																		
Change in A/P																		
Change in cash balances																		
Corporate Income Tax																		
TOTAL OUTFLOWS																		
NET CASH FLOWS																		

Table 15: Owners' Point of View Cash Flow	0	1	2	3	4	5	6	7	8	9	10
(In Rs Million, nominal)											
Receipts											
Sale of Power											
Change in A/R											
Land subsidy											
Liquidation value of assets											
Liquidation value of land											
TOTAL INFLOWS											
Expenditures											
Investments											
Land											
Preliminary & civil works											
Mechanical equipment											
Electrcial equipment											
Instrumentation & control											
Establishment & support services											
Consultancy fees											
Operating expenses											
Coal fuel											
Furnace oil											
Operation and maintenance											
Labour Wages											
Pollution Control											
Nitrogen removal by ammonia shower											
Ash handling & control											
Change in A/P											
Change in cash balances											
Corporate Income Tax											
TOTAL OUTFLOWS											
Project Financing											
Loan proceeds: World Bank											
State Bank of Nanjelelland											
Loan repayments											
World Bank											
State Bank of Nanjelelland											
NET CASH FLOWS											

Notes:

1/ The only difference between the total investment (banker's) and owners' cash flows are the loan items. Ideally, since the NPV of the loan is zero, the NPVs of the two cash flows should be the same.

2/ The land is reflected twice as an inflow: first in year zero since it is a resource granted to the project, which has a convertible cash value; second, in year 17 at its residual value because it can be sold for cash after the project. It is also an outflow in year 0 to reflect its opportunity cost. Alternatively, you can consider that the project has received cash as a grant and then used it to purchase the land. The outcome is the same as if we exclude the land grant and its associated expenditure.
We have included the appreciation in the land value in the residual value of the land in year 17 because it will be ours if we conduct a project.
It would have been possible for anyone to purchase the land at its market price in year 0 and do nothing and realize the appreciation in year 17.

Table 16: Owners' Point of View Cash Flow	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(In Rs Million, real)																		
domestic price index	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Receipts																		
Sale of Power																		
Change in A/R																		
Land subsidy																		
Liquidation value of assets																		
Liquidation value of land																		
TOTAL INFLOWS																		
Expenditures																		
Investments																		
Land																		
Preliminary & civil works																		
Mechanical equipment																		
Electrcial equipment																		
Instrumentation & control																		
Establishment & support services																		
Consultancy fees																		
Operating expenses																		
Coal fuel																		
Furnace oil																		
Operation and maintenance																		
Labour Wages																		
Pollution Control																		
Nitrogen removal by ammonia shower																		
Ash handling & control																		
Change in A/P																		
Change in cash balances																		
Corporate Income Tax																		
TOTAL OUTFLOWS																		
Project Financing																		
Loan proceeds: World Bank																		
State Bank of Nanjelelland																		
Loan repayments																		
World Bank																		
State Bank of Nanjelelland																		
NET CASH FLOWS																		
NPV @ 10%																		
IRR																		

Notes:

1/ The only difference between the total investment (banker's) and owners' cash flows are the loan items. Ideally, since the NPV of the loan is zero, the NPVs of the two cash flows should be the same.

2/ The land is reflected twice as an inflow: first in year zero since it is a resource granted to the project, which has a convertible cash value, second, in year 17 at its residual value because it can be sold for cash after the project. It is also an outflow in year 0 to reflect its opportunity cost. Alternatively, you can consider that the project has received cash as a grant and then used it to purchase the land. The outcome is the same as if we exclude the land grant and its associated expenditure.
We have included the appreciation in the land value in the residual value of the land in year 17 because it will be ours if we conduct a project.
It would have been possible for anyone to purchase the land at its market price in year 0 and do nothing and realize the appreciation in year 17.

ECONOMIC ANALYSIS

Table 17: Economic Parameters and Conversion Factors

Economic Parameters

Economic Value of Power	3		Economic Discount R	12%
Taxes and royalty on Coal	122.5	Rs/metric	Foreign Exchange Pr	0%
Import duty & tax on Furnace Oil	595	Rs/kilolitre	SPNTO	0%

Conversion Factors for Power

	Financial Value	Economic Value	Conversion Factor = EV/FV
Power	0.0	3.0	#DIV/0!

Conversion Factors for Coal

	FV	CF undj.	EV undj.	%T	%NT	FEP	SPNTO	EV adj.
CIF Price of Coal	-122.5	1.00	-122.5	100%	0%	0.0	0.0	-122.5
Taxes and Royalty	122.5							
FV:	0.0						EV:	-122.5
CF:	#DIV/0!							

Conversion Factors for Furnace Oil

	FV	CF undj.	EV undj.	%T	%NT	FEP	SPNTO	EV adj.
CIF Price of Furnace Oil	-595.0	1.00	-595	100%	0%	0.0	0.0	-595.0
Import Duty and Taxes	595.0							
FV:	0.0						EV:	-595.0
CF:	#DIV/0!							

Table 18: Summary of Economic Conversion Factors

	CFs
Benefit of Power	#DIV/0!
Change in A/R	#DIV/0!
Liquidation value of assets	1
Liquidation value of land	1
Land	1
Preliminary & civil works	1
Mechanical equipment	1
Electrcial equipment	1
Instrumentation & control	1
Establishment & support ser	1
Consultancy fees	1
Coal fuel	#DIV/0!
Furnace oil	#DIV/0!
Operation and maintenance	1
Labour Wages	1
Nitrogen removal by ammoni	1
Ash handling & control	1
Change in A/P	#DIV/0!
Change in cash balances	1.00
Corporate Income Tax	0

ARKATI POWER PROJECT IN NANDJELETLAND STATE

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INTRODUCTION

The Arkati Power Company (APC) in Nandjeletland is a joint stock company that specializes in power generation.

- 51% of the equity in APC is privately owned
- 49% of the equity in APC is owned by State of Nandjeletland

Currently, APC operates three thermal plants and one hydro plant with total installed capacity of 950 MW

The annual sales of the company are about Rs 10.5 billion approximately (300,000,000 USD).

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DEMAND

The demand for electricity has been growing at a faster rate than expected since 2000:

- Annual Demand 9400 GWh
- Annual Supply 6660 GWh
- Energy Shortage 2740 GWh

- There is a growing social pressure on APC to close its first coal-fired thermal plant due environmental effect on the community living around the plant.

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Demand Cont.

- If it closes it energy shortage will be doubled
- After carefully examining the options available, the board of directors approved the proposal for setting up a 750 MW thermal power plant (3 x 250 MW) and closing down the first coal-fired plant.
- Electricity tariff is Rs 1.7/kwh

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FINANCING OF THE PROJECT

- Total investment cost of the new plant is US $525 Million

World Bank Loan (WB)	US$ 194 Million Interest Rate: 7% No. of Instalments: 10
State Bank of Nandjeletland	Rs. 8,750 Million Rupees Interest Rate: 8% No. of Instalments: 8

- A grace period for principal repayment lasts until year 6.
- Interest accrued on the loan balance from previous period is paid on a continuous basis, starting from the date of signing of the loan agreement.

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CAPITAL COST COMPONENTS

1) Land: APC will receive the land at no cost, from the government in Year 0 if APC is willing to undertake the project. During liquidation year the land is expected to appreciate by 300%.
2) Preliminary & Civil Works
3) Mechanical Equipment
4) Electrical Equipment
5) Instrumentation & Control
6) Establishment & Support Service
7) Consultancy Fees

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Operating Expenses

1) Coal: The coal to be used in the new plant will come from a mine located 75 km from the plant. 1 kwh requires 0.78 kg coal. 910 Rs/ton Inventory of 1 month will be purchased in year 4 to serve as buffer stock for succeeding operation . FIFO accounting method will be adopted
2) Furnace oil: 1 kwh electricity requires 6.1 milliliter at 4725 Rs per kiloliter. Inventory of 1 month will be purchased in year 4 to serve as buffer stock for succeeding operation . FIFO accounting method will be adopted
3) Annual Operation and Maintenance (O&M) will be 2% of total investment cost (excluding land).

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Operating Expenses (Cont.)

4) Labour:
   1) 250 persons skilled/semiskilled labour with the salary of Rs. 0.12 million per year (year 0 price) per person and the wage rates are expected to grow at 2 % real in a year from year 6 onward.
   2) 60 persons unskilled labour with the salary of Rs. 0.06 million per year (year 0 price) per person and this wage rate is expected to grow at 1 % real a year from year 6 onward.

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Pollution Control

1) The coal, which is used to generate electricity, will release 6.93 grams (g) of nitrogen for every kWh of electricity generated
   - To reduce the level of nitrogen, Selective Catalytic Reduction (SCR) process will be installed. Rs 0.0875/kwh in year 0
2) For every kWh of electricity, the combustion of the coal will generate 0.26 kilogram (kg) of fly ash.
   - The ash collected will be pumped into ash-ponds located 9 km away from the power plant. Rs 0.0595 for every kWh of electricity in year 0.

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WORKING CAPITAL

1) Account receivable 12.5% of sales revenue
2) Account payable 10% of the total operating expenses (excluding labor)
3) Cash balances 7.5% of the total operating expenses

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Economic life, Plant load factor etc.

1) The annual plant load factor will be 80%.
2) The annual auxiliary electricity consumption will be 4% of effective electricity generated.
3) Straight-line depreciation method will be used in determining the residual value of the plant (inclusive of consultancy fees).
4) The project will be evaluated for an operating life of 12 years; assets will be liquidated at their book value in year 17.

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Exchange, Inflation & Discount Rates

- **Exchange Rate :** The real exchange rate of Rs 35 per USD is assumed to remain constant during the life of the project. The projected nominal exchange rates in the following years will depend on the relative inflation rates between US dollar to Rupees.
- **Inflation Rate:** The inflation rate in Nandjeletland) is 4% and in USA is 2.5%.
- **Discount Rate :** The required rate of return (discount rate) by equity holders is 10%.

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CORPORATE TAXATION

- The project will be subject to the corporate income tax.
- The tax law allows a full deduction of the operating expenditures and interest expense.
- The depreciation is also tax-deductable:
- Interest accrued during construction, whether paid in cash or capitalized, can be amortized over 5 years, once the project starts operation.
- There are no provisions for losses to be carried forward/backward.
- The rate of corporate income tax is 25% of taxable income.

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STEPS FOR EVALUATION

1. **Table of Parameters**
2. **Inflation, Price indices and Exchange Rates**
3. **Investment cost**
4. **Loan Schedule**
5. **Annual Depreciation & Liquidation Values**
6. **Tax Depreciation**
7. **Electricity Sales and Accounts Receivable**
8. **Pollution Control**
9. **Labour Wages**
10. **Operating Expenses, Accounts Payable and Cash Balances**
11. **Working Capital**
12. **Income Tax Statement**
13. **Cash Flow: Total Investment Point of View**
14. **Cash Flow: Owner's Point of View**
15. **Resource Flow: Economy's Point of View**
16. **Sensitivity Analysis**

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EVALUATION CRITERIA

- **DEBT SERVICE RATIO** FOR THE BANKER'S POINT OF VIEW NET CASH FLOW.
- **NPV** AND **IRR** FOR THE OWNER'S POINT OF VIEW NET CASH FLOW.
- **NPV** AND **IRR** FOR THE ECONOMY'S POINT OF VIEW NET RESOURCE FLOW.

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Table of Parameter

1. Technical
2. Electricity Demand
3. Project Finance
4. Capital Investment
5. Operating Expenses
6. Pollution Control
7. Working Capital
8. Inflation, Discount, and Exchange Rates
9. Depreciation and Corporate Tax Rate

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TECHNICAL COMPUTATION

⇒ DATA SHOULD BE *TYPED* INTO THE SPREADSHEET ONLY **ONCE** - IN THE TABLE OF PARAMETERS.

⇒ ALL CONSEQUENT TABLES **MUST** USE LINKS TO THE VALUES IN THE TABLE OF PARAMETERS.

	A	B	C	D	E	F
1	PLANT CAPACITY		750	MW	DAYS A YEAR	365
2	PLANT LOAD FACTOR		80.0%		HOURS A DAY	24
3	AUXILIARY CONSUMPTION		4.0%			
4	GENERATION CAPACITY			=C1*F1*F2		
5	EFFECTIVE GENERATION			=D4*C2		
6	NET GENERATION			=D5*(1-C3)		

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STEPS TO FIND "NET" ELECTRICITY GENERATION

- (a) PLANT INSTALLED CAPACITY (MW)
  (b) GENERATION CAPACITY (MWH)
  (c) EFFECTIVE GENERATION
  (d) NET GENERATION

NOTE:

⇒ 1 MWH = 1,000 KWH (kilo-Watt hour)

⇒ 1 GWH = 1,000 MWH = 1,000,000 KWH

⇒ 1 KW capacity can generate a year ➔ 8760 KWH/year
(1 KW * 24 hours * 365 days)

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QUESTIONS?

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ALTERNATIVE INVESTMENT CRITERIA

Project Selection

Suggested Solution

QUESTION 1: (in $000s)

Year	0	1	2	3	4	5
PROJECT A	-130	110	60	108	102	0
PROJECT B	-450	46	48	50	96	290
PROJECT C	-440	80	90	80	90	104
PROJECT D	-90	-80	160	144	240	70
PROJECT E	-300	50	50	50	80	70

Discount Rate 10%

A. NPV Criterion: Using a discount rate of

	NPV	Ranking
PROJECT A	170	2
PROJECT B	-85	4
PROJECT C	-107	5
PROJECT D	285	1
PROJECT E	-78	3

B. Internal Rate of Return Criterion

	IRR	Ranking
PROJECT A	62.6%	1
PROJECT B	4.2%	3
PROJECT C	0.3%	4
PROJECT D	60.4%	2
PROJECT E	0.0%	5

C. Benefit/Cost Ratio Criterion:

1) Net benefits/investment costs

	Years					
	0	1	2	3	4	5

	---	---	---	---	---	---					
Discount Factor	1.00	0.91	0.83	0.75	0.68	0.62					
PROJECT A											
Net Cash Flow	-130	110	60	108	102	0					
PV Investment	-130										
PV Benefits	300.40										
Benefit/Cost Ratio	2.31										
PROJECT B											
Net Cash Flow	-450	46	48	50	96	290					
PV Investment	-450										
PV Benefits	364.69										
Benefit/Cost Ratio	0.81										

PROJECT C							
Net Cash Flow		-440	80	90	80	90	104
PV Investment		-440					
PV Benefits		333.26					
Benefit/Cost Ratio		0.76					
PROJECT D							
Net Cash Flow		-90	-80	160	144	240	70
PV Investment		-90					
PV Benefits		375.08					
Benefit/Cost Ratio		4.17					
PROJECT E							
Net Cash Flow		-300	50	50	50	80	70
PV Investment		-300					
PV Benefits		222.448					
Benefit/Cost Ratio		0.74					
2) Gross Benefits/Total Costs							
	Gross Costs(G.C.) = Investment Costs + Recurrent Costs						
	Gross Benefits(G.B.) = Net Benefits + Recurrent Costs						
PROJECT A							
Gross Costs		130	125	85	95	115	0
Net Benefits		-130	110	60	108	102	0
Gross Benefits		0	235	145	203	217	0
PV Gross Costs		463.806					
PV Gross Benefits		634.202					
Benefit/Cost Ratio		1.37					

PROJECT B												
Gross Costs		450	0	0	0	0	0					
Net Benefits		-450	46	48	50	96	290					
Gross Benefits		0	46	48	50	96	290					
PV Gross Costs		450										
PV Gross Benefits		364.69										
Benefit/Cost Ratio		0.81										
PROJECT C												
Gross Costs		440	60	62	80	70	104					
Net Benefits		-440	80	90	80	90	104					
Gross Benefits		0	140	152	160	160	208					
PV Gross Costs		718.277										
PV Gross Benefits		611.537										
Benefit/Cost Ratio		0.85										
PROJECT D												
Gross Costs		90	120	140	190	235	265					
Net Benefits		-90	-80	160	144	240	70					
Gross Benefits		0	40	300	334	475	335					
PV Gross Costs		782.596										
PV Gross Benefits		1067.68										
Benefit/Cost Ratio		1.36										
PROJECT E												
Gross Costs		300	40	40	40	40	0					
Net Benefits		-300	50	50	50	80	70					
Gross Benefits		0	90	90	90	120	70					
PV Gross Costs		426.795										
PV Gross Benefits		349.243										
Benefit/Cost Ratio		0.82										

Ranking of Projects According To Different Criteria

PROJECT	NPV	Rank	IRR	Rank	Benefit / Cost Ratio [1]	Rank	[2]	Rank
A	170.40		62.6%	1	2.31		1.37	1
B	-85.31	4	4.2%	3	0.81	3	0.81	5
C	-106.74	5	0.3%	4	0.76	4	0.85	3
D	285.08	1	60.4%		4.17	1	1.36	2
E	-77.55	3	0.0%		0.74	5	0.82	4

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APPRAISAL OF "MISIMA GOLD MINE" PROJECT

SUGGESTED SOLUTION

TABLE 1. PARAMETERS PANEL

Project Timing	
Start of Construction (Base Year)	2006
Start of Operation	2008
Operating Life (years)	10
Liquidation	2018

Investment (gross of taxes/tariffs) (Million Kina)	160.0	2006	2007
Infrastructure (%)	5%	4.0	4.0
Equipment (%)	85%		136.0
Installation (%)	10%		16.0
Mine Reserve Development		10.0	
Land		25.0	
Loss of Land Value (at Liquidation)		20%	
Site Restoration (2018)		6.0	
Yearly Capital Replacement (% of initial asset value)		5%	
Investment Cost Overrun Factor		0%	
Salvage Value (% of initial asset value)		10%	

Prices		US$/oz
Silver Price (2006)		6.00
Gold Price (2006)		480.0
Conversion (gram / oz)	31.103	

Production	2008	2009	2010	2011-17
Ore Milled ('000 Tons)	3,000	3,500	4,000	4,000
		Recovery Rate		Grade
Gold		92%		1.6
Silver		70%		20

Working Capital	
Accounts Receivable (% Sales)	15.0%
A/C Payable (% Manufacturing Cost)	10.0%
Cash Balance (% Operating Costs)	5.0%

Operating Cost (gross of taxes/tariffs) / K Ton Ore	
Labor	2.65
Imported Materials	2.10
Timber	1.80
Fuel	3.50
Domestic Transport & Handling	0.30
Miscellaneous	0.90

Taxes and Tariffs	
Income Tax	35.0%
Royalty	5.0%
General Sales Tax	10.0%
Tariff Rate on Fuel	25.0%
Tariff Rate on Imported Material	15.0%
Tariff on Imported Equipment	5.0%

Financing (Million Kina)		185.0
Debt	60%	111.0
Equity	40%	74.0
Return on Equity		15.0%
Interest Rate (US$ loan)		7%
Principal Installments		5
Grace Period on Principal		2
Start of Principal Repayment		2009

Economic Parameters		
Economic Opportunity Cost of Capital		13.0%
Foreign Exchange Premium		11.0%
Shadow Price of Non-tradable Outlays		0%
Exchange Rate (Kina/US$)		1.20
Domestic Transport & Handling		
Share of Tradable Content	0.60	
Unadjusted CF	0.91	

FINANCIAL ANALYSIS

TABLE 2. INVESTMENT SCHEDULE (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Infrastructure	4.0	4.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Machinery & Equipment		136.0	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	
Installation Cost		16.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Mine Reserve Development	10.0												
TOTAL COST	**14.0**	**156.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**	

TABLE 3. DEPRECIATION AND LIQUIDATION VALUE (Million Kina)

Initial Value of Assets	160.0
Annual Depreciation	16.0
Initial Value Machinery	136.0
Salvage Value	13.6
Initial Value Land	25.0
Liquidation Value	20.0

TABLE 4. OPERATING COSTS (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ore Milled ('000 Tons)			3,000	3,500	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	0
Labor			8.0	9.3	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	0.0
Imported Materials			6.3	7.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0.0
Timber			5.4	6.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	0.0
Fuel			10.5	12.3	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	0.0
Domestic Transport & Handling			0.9	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
Miscellaneous			2.7	3.2	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	0.0
TOTAL			**33.8**	**39.4**	**45.0**	**45.0**	**45.0**	**45.0**	**45.0**	**45.0**	**45.0**	**45.0**	**0.0**

TABLE 5. SALES (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ore Milled ('000 Tons)			3,000	3,500	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	0
Gold Price (K/Kg)			18,519	18,519	18,519	18,519	18,519	18,519	18,519	18,519	18,519	18,519	18,519
Silver Price (K/Kg)			231	231	231	231	231	231	231	231	231	231	231
Gold Quantity (Kg)			4,416	5,152	5,888	5,888	5,888	5,888	5,888	5,888	5,888	5,888	0
Silver Quantity (Kg)			42,000	49,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	0
Gold Sales (Million Kina)			81.8	95.4	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	0.0
Silver Sales (Million Kina)			9.7	11.3	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	0.0
Total Revenue (Million Kina)			**91.5**	**106.8**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**0.0**

TABLE 6. WORKING CAPITAL (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Accounts Receivable			13.73	16.01	18.30	18.30	18.30	18.30	18.30	18.30	18.30	18.30	0.00
Accounts Payable			2.58	3.01	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	0.00
Cash Balance			1.69	1.97	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	0.00
Change in A/R			-13.73	-2.29	-2.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.30
Change in A/P			-2.58	-0.43	-0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.44
Change in C/B			1.69	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.25

TABLE 7. LOAN SCHEDULE (Million US$)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Loan disbursement		78.0											
Outstanding debt beginning of period			78.0	78.0	62.4	46.8	31.2	15.6					
Interest accrued			5.5	5.5	4.4	3.3	2.2	1.1					
Annual repayment			5.5	21.1	20.0	18.9	17.8	16.7					
Interest paid in period			5.5	5.5	4.4	3.3	2.2	1.1					
Principal repaid				15.6	15.6	15.6	15.6	15.6					
Outstanding debt at the end of period		78.0	78.0	62.4	46.8	31.2	15.6	0.0					
Interest paid in period (Million Kina)			**6.6**	**6.6**	**5.2**	**3.9**	**2.6**	**1.3**					
Annual repayment (Million Kina)			**6.6**	**25.3**	**24.0**	**22.7**	**21.3**	**20.0**					

TABLE 8. INCOME TAX STATEMENT (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Gold Sales			81.8	95.4	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	0.0
Silver Sales			9.7	11.3	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	0.0
Total Revenue			**91.5**	**106.8**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**0.0**
Operating Cost			33.8	39.4	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	0.0
Interest Expense			6.6	6.6	5.2	3.9	2.6	1.3	0.0	0.0	0.0	0.0	0.0
Depreciation			16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	0.0
Cost of Goods Sold			**56.3**	**61.9**	**66.2**	**64.9**	**63.6**	**62.3**	**61.0**	**61.0**	**61.0**	**61.0**	**0.0**
Royalty			**4.6**	**5.3**	**6.1**	**6.1**	**6.1**	**6.1**	**6.1**	**6.1**	**6.1**	**6.1**	**0.0**
Pre-Tax Income			**30.6**	**39.5**	**49.7**	**51.0**	**52.3**	**53.6**	**54.9**	**54.9**	**54.9**	**54.9**	**0.0**
Cumulative Loses			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Taxable Income			**30.6**	**39.5**	**49.7**	**51.0**	**52.3**	**53.6**	**54.9**	**54.9**	**54.9**	**54.9**	**0.0**
Income Tax			10.7	13.8	17.4	17.8	18.3	18.8	19.2	19.2	19.2	19.2	0.0
Net Income After Tax			**19.9**	**25.7**	**32.3**	**33.1**	**34.0**	**34.8**	**35.7**	**35.7**	**35.7**	**35.7**	**0.0**

TABLE 9. CASHFLOW STATEMENT: TOTAL INVESTMENT PERSPECTIVE (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
INFLOWS													
Gold Sales			81.8	95.4	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	0.0
Silver Sales			9.7	11.3	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	0.0
Change in A/R			-13.7	-2.3	-2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.3
Salvage Value													13.6
Land Grant	25.0												
TOTAL INFLOWS	**25.0**	**0.0**	**77.8**	**104.5**	**119.7**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**31.9**
OUTFLOWS													
Investment Costs													
Land	25.0												
Infrastructure	4.0	4.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.0
Machinery & Equipment		136.0	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	0.0
Installation Cost		16.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.0
Mine Reserve Development	10.0												
Site Restoration													6.0
Operating Costs													
Labor			8.0	9.3	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	0.0
Imported Materials			6.3	7.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0.0
Timber			5.4	6.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	0.0
Fuel			10.5	12.3	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	0.0
Domestic Transport & Handling			0.9	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
Miscellaneous			2.7	3.2	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	0.0
Change in A/P			-2.6	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4
Change in C/B			1.7	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.3
Income Tax			10.7	13.8	17.4	17.8	18.3	18.8	19.2	19.2	19.2	19.2	0.0
Royalty			4.6	5.3	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	0.0
TOTAL OUTFLOWS	**39.0**	**156.0**	**56.2**	**66.4**	**76.3**	**76.9**	**77.4**	**77.9**	**78.3**	**78.3**	**78.3**	**78.3**	**7.2**
NET CASH FLOW BEFORE FINANCING	**-14.0**	**-156.0**	**21.6**	**38.1**	**43.4**	**45.1**	**44.6**	**44.1**	**43.7**	**43.7**	**43.7**	**43.7**	**24.7**
PV Net Cash Flow			197.4	188.1	160.5	125.3	85.9	44.1					
PV Debt Repayment			100.2	100.2	80.1	60.1	40.1	20.0					
ADSCR			**3.30**	**1.51**	**1.81**	**1.99**	**2.09**	**2.20**					
DSCR			**1.97**	**1.88**	**2.00**	**2.09**	**2.14**	**2.20**					

TABLE 10. CASHFLOW STATEMENT: OWNER'S PERSPECTIVE (Million Kina)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
INFLOWS													
Gold Sales	0.0	0.0	81.8	95.4	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	0.0
Silver Sales	0.0	0.0	9.7	11.3	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	0.0
Change in A/R	0.0	0.0	-13.7	-2.3	-2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.3
Salvage Value													13.6
Land Grant	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INFLOWS	**25.0**	**0.0**	**77.8**	**104.5**	**119.7**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**122.0**	**31.9**
OUTFLOWS													
Investment Costs													
Land	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Infrastructure	4.0	4.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.0
Machinery & Equipment	0.0	136.0	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	0.0
Installation Cost	0.0	16.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.0
Mine Reserve Development	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Restoration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0
Operating Costs													
Labor			8.0	9.3	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	0.0
Imported Materials			6.3	7.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0.0
Timber			5.4	6.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	0.0
Fuel			10.5	12.3	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	0.0
Domestic Transport & Handling			0.9	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
Miscellaneous			2.7	3.2	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	0.0
Change in A/P			-2.6	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4
Change in C/B			1.7	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.3
Income Tax			10.7	13.8	17.4	17.8	18.3	18.8	19.2	19.2	19.2	19.2	0.0
Royalty			4.6	5.3	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	0.0
TOTAL OUTFLOWS	**39.0**	**156.0**	**56.2**	**66.4**	**76.3**	**76.9**	**77.4**	**77.9**	**78.3**	**78.3**	**78.3**	**78.3**	**7.2**
NET CASH FLOW BEFORE FINANCING	**-14.0**	**-156.0**	**21.6**	**38.1**	**43.4**	**45.1**	**44.6**	**44.1**	**43.7**	**43.7**	**43.7**	**43.7**	**24.7**
Add loan disbursement		93.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Less loan repayment		0.0	6.6	25.3	24.0	22.7	21.3	20.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW AFTER FINANCING	**-14.0**	**-62.4**	**15.1**	**12.8**	**19.4**	**22.4**	**23.3**	**24.1**	**43.7**	**43.7**	**43.7**	**43.7**	**24.7**

FNPV @ ROE: 15% **44.4** **Million Kina**
FIRR: **25.8%**

ECONOMIC ANALYSIS

TABLE 11. ECONOMIC CONVERSION FACTOR FOR GOLD

PROJECT PRODUCES AN EXPORTABLE GOOD: GOLD

FOB = 480 US$/oz	Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradable	FEP Distortions	Econ. Value Adj.
FOB (Kina)	**576.0**	1.0	576.0	1.0	63.4	**639.4**
(-) Domestic Transport and Handling *	0.0					**0.0**
Financial Price	**576.0**					**639.4**
CF = EV / FV =	**1.11**					

* Domestic transport and handling are already included into the expenditures of the project.

TABLE 12. ECONOMIC CONVERSION FACTOR FOR SILVER

PROJECT PRODUCES AN EXPORTABLE GOOD: SILVER

FOB = 6 US$/oz	Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradable	FEP Distortions	Econ. Value Adj.
FOB (Kina)	**7.2**	1.0	7.2	1.0	0.8	**8.0**
(-) Domestic Transport and Handling *	0.0					**0.0**
Financial Price	**7.2**					**8.0**
CF = EV / FV =	**1.11**					

* Domestic transport and handling are already included into the expenditures of the project.

TABLE 13. ECONOMIC CONVERSION FACTOR FOR EQUIPMENT

PROJECT USES AN IMPORTABLE GOOD: EQUIPMENT

CIF = US$ 95.64 million 95.64		Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradable	FEP Distortions	Econ. Value Adj.
CIF (Kina)		**114.8**	1.0	114.8	1.0	12.6	**127.4**
(+) Tariff	5.0%	5.7					
(+) General Sales Tax	10.0%	12.1					
(+) Domestic Transport and Handling	3.0%	3.4	0.9	3.1	0.6	0.2	**3.3**
Financial Price		**136.0**					**130.7**
CF = EV / FV =		**0.96**					

157.25

TABLE 14. ECONOMIC CONVERSION FACTOR FOR IMPORTED MATERIAL

PROJECT USES AN IMPORTABLE GOOD: IMPORTED MATERIAL

CIF = US$ 100 per unit		Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradable	FEP Distortions	Econ. Value Adj.
CIF (Kina)		**120.0**	1.0	120.0	1.0	13.2	**133.2**
(+) Tariff	15.0%	18.0					
(+) General Sales Tax	10.0%	13.8					
(+) Domestic Transport and Handling	3.0%	3.6	0.9	3.3	0.6	0.2	**3.5**
Financial Price		**155.4**					**136.7**
CF = EV / FV =		**0.88**					

TABLE 15. ECONOMIC CONVERSION FACTOR FOR FUEL

PROJECT USES AN IMPORTABLE GOOD: FUEL

CIF = US$ 90 per ton		Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradable	FEP Distortions	Econ. Value Adj.
CIF (Kina)		**108.0**	1.0	108.0	1.0	11.9	**119.9**
(+) Tariff	25.0%	27.0					
(+) General Sales Tax	10.0%	13.5					
(+) Domestic Transport and Handling	3.0%	3.2	0.9	2.9	0.6	0.2	**3.1**
Financial Price		**151.7**					**123.0**
CF = EV / FV =		**0.81**					

TABLE 16. ECONOMIC CONVERSION FACTOR FOR TIMBER

PROJECT USES AN EXPORTABLE GOOD: TIMBER

FOB = US$ 200 per m3		Fin. Value	CF Unadj.	Econ. Value Unadj.	Share Tradable	FEP Distortions	Econ. Value Adj.
FOB (Kina)		**240.0**	1.0	240.0	1.0	26.4	**266.4**
(-) Dom. Transport and Handling, source-port	5.0%	-12.0	0.9	-10.9	0.6	-0.7	**-11.6**
Supplier Price		**228.0**					**254.8**
(+) General Sales Tax	10.0%	22.8					
(+) Dom. Transport and Handling, source-project	3.0%	7.2	0.9	6.5	0.6	0.4	**7.0**
Financial Price		**258.0**					**261.7**
CF = EV / FV =		**1.01**					

TABLE 17. SUMMARY OF ECONOMIC CONVERSION FACTORS

	Economic Conversion Factor	
INFLOWS		
Gold Sales	1.11	Exported. Domestic transportation and handling already part of project expenditures.
Silver Sales	1.11	Exported. Domestic transportation and handling already part of project expenditures.
Change in A/R	1.11	Average of Gold and Silver Sales
Salvage Value	0.96	Same as imported machinery and equipment.
Land Grant	0.00	Financial transfer, no economic value. Not shown in economic statement.
Land Liquidation	1.00	No distortions.
OUTFLOWS		
Investment Costs		
Land	1.00	No distortions.
Infrastructure	0.87	Non-tradable service.
Machinery & Equipment	0.96	Imported.
Installation Cost	0.90	Non-tradable service.
Mine Reserve Development	0.90	Non-tradable service.
Site Restoration	0.87	Same as infrastructure.
Operating Costs		
Labor	0.82	Estimated.
Imported Materials	0.88	Imported.
Timber	1.01	Exportable.
Fuel	0.81	Imported.
Domestic Transport & Handling	0.91	Non-tradable service.
Miscellaneous	1.00	No distortions.
Change in A/P	0.92	Average of operating costs.
Change in C/B	1.00	No distortions.
Income Tax	0.00	Financial transfer, no economic value. Not shown in economic statement.
Royalty	0.00	Financial transfer, no economic value. Not shown in economic statement.

TABLE 18. ECONOMIC RESOURCE FLOW STATEMENT (Million Kina)

	CF	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
INFLOWS														
Gold Sales	**1.11**	0.0	0.0	90.8	105.9	121.0	121.0	121.0	121.0	121.0	121.0	121.0	121.0	0.0
Silver Sales	**1.11**	0.0	0.0	10.8	12.6	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	0.0
Change in A/R	**1.11**	0.0	0.0	-15.2	-2.5	-2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3
Salvage Value	**0.96**													13.1
Land Liquidation	**1.00**													20.0
TOTAL INFLOWS		**0.0**	**0.0**	**86.3**	**116.0**	**132.9**	**135.4**	**135.4**	**135.4**	**135.4**	**135.4**	**135.4**	**135.4**	**53.4**
OUTFLOWS														
Investment Costs														
Land	**1.00**	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Infrastructure	**0.87**	3.5	3.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0
Machinery & Equipment	**0.96**	0.0	130.7	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.0
Installation Cost	**0.90**	0.0	14.4	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.0
Exploration & Development	**0.90**	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Restoration	**0.87**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2
Operating Costs														
Labor	**0.82**	0.0	0.0	6.5	7.6	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	0.0
Imported Materials	**0.88**	0.0	0.0	5.5	6.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	0.0
Timber	**1.01**	0.0	0.0	5.5	6.4	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	0.0
Fuel & Power	**0.81**	0.0	0.0	8.5	9.9	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	0.0
Domestic Transport & Handling	**0.91**	0.0	0.0	0.8	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0
Miscellaneous	**1.00**	0.0	0.0	2.7	3.2	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	0.0
Change in A/P	**0.92**	0.0	0.0	-2.4	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2
Change in C/B	**1.00**	0.0	0.0	1.7	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.3
TOTAL OUTFLOWS		**37.5**	**148.6**	**36.5**	**42.0**	**46.9**	**47.0**	**47.0**	**47.0**	**47.0**	**47.0**	**47.0**	**47.0**	**6.1**
NET CASH FLOW BEFORE FINANCING		**-37.5**	**-148.6**	**49.9**	**74.0**	**86.0**	**88.4**	**88.4**	**88.4**	**88.4**	**88.4**	**88.4**	**88.4**	**47.2**

ENPV @ EOCK: **13.0%** **224.7** **Million Kina**
EIRR: **35.8%**

SENSITIVITY ANALYSIS

TABLE 19. SENSITIVITY TEST: INVESTMENT COST OVERRUN (%)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
-10%	57.0	239.1	3.64	1.67	2.01	2.19
0%	44.4	224.7	3.30	1.51	1.81	1.97
10%	31.8	210.3	3.03	1.37	1.65	1.79
20%	19.1	195.8	2.80	1.26	1.51	1.65
30%	6.3	181.2	2.60	1.17	1.40	1.52

TABLE 20. SENSITIVITY TEST: SILVER PRICE (US$/oz)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
2.0	23.3	182.1	2.84	1.33	1.59	1.73
3.0	28.6	192.7	2.95	1.37	1.65	1.79
4.0	33.9	203.4	3.07	1.42	1.70	1.85
5.0	39.2	214.1	3.19	1.46	1.76	1.91
6.0	44.4	224.7	3.30	1.51	1.81	1.97
7.0	49.7	235.4	3.42	1.55	1.86	2.03

TABLE 21. SENSITIVITY TEST: GOLD PRICE (US$/oz)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
300	-55.6	23.1	1.11	0.66	0.79	0.84
350	-27.8	79.1	1.72	0.90	1.07	1.15
400	0.0	135.1	2.33	1.13	1.36	1.47
450	27.8	191.1	2.94	1.37	1.64	1.78
480	44.4	224.7	3.30	1.51	1.81	1.97
500	55.6	247.1	3.54	1.60	1.92	2.10

TABLE 22. SENSITIVITY TEST: GOLD RECOVERY RATE (%)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
80%	9.6	154.6	2.54	1.21	1.46	1.58
90%	38.6	213.0	3.17	1.46	1.75	1.91
94%	50.2	236.4	3.43	1.56	1.87	2.04
100%	67.6	271.5	3.81	1.70	2.05	2.23

TABLE 23. SENSITIVITY TEST: LABOR COST (Kina / ton of ore processed)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
2.00	51.4	234.4	3.51	1.57	1.88	2.05
2.50	46.1	226.9	3.35	1.52	1.83	1.99
2.65	44.4	224.7	3.30	1.51	1.81	1.97
3.00	40.7	219.5	3.19	1.47	1.77	1.93
3.50	35.3	212.0	3.03	1.43	1.72	1.86
4.00	29.9	204.6	2.87	1.38	1.66	1.80

TABLE 24. SENSITIVITY TEST: IMPORTED MATERIALS (Kina / ton of ore processed)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
1.50	50.8	234.2	3.47	1.56	1.88	2.04
2.00	45.5	226.3	3.33	1.52	1.82	1.98
2.10	44.4	224.7	3.30	1.51	1.81	1.97
2.50	40.2	218.4	3.19	1.47	1.77	1.92
3.00	35.0	210.5	3.05	1.43	1.71	1.86
3.50	29.7	202.6	2.92	1.38	1.66	1.80

TABLE 25. SENSITIVITY TEST: FUEL (Kina / ton of ore processed)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
2.50	55.0	239.3	3.58	1.60	1.92	2.09
3.00	49.7	232.0	3.44	1.55	1.86	2.03
3.50	44.4	224.7	3.30	1.51	1.81	1.97
4.00	39.2	217.4	3.16	1.46	1.76	1.91
4.50	33.9	210.1	3.03	1.42	1.70	1.85

TABLE 26. SENSITIVITY TEST: ACCOUNTS RECEIVABLE (% of sales)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
0%	54.2	235.3	5.40	1.60	1.91	2.15
5%	51.0	231.7	4.70	1.57	1.87	2.09
10%	47.7	228.2	4.00	1.54	1.84	2.03
15%	44.4	224.7	3.30	1.51	1.81	1.97
20%	41.2	221.2	2.60	1.48	1.78	1.91

TABLE 27. SENSITIVITY TEST: ROYALTY (% of sales)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
0.0%	60.7	224.7	3.75	1.64	1.98	2.16
2.5%	52.6	224.7	3.53	1.58	1.89	2.06
5.0%	44.4	224.7	3.30	1.51	1.81	1.97
7.5%	36.3	224.7	3.07	1.44	1.73	1.88
10.0%	28.2	224.7	2.85	1.37	1.65	1.78

TABLE 28. SENSITIVITY TEST: DEBT SHARE IN INVESTMENT (%)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
0%	20.8	224.7				
20%	28.7	224.7	9.20	4.34	5.28	5.75
40%	36.6	224.7	4.78	2.21	2.68	2.92
60%	44.4	224.7	3.30	1.51	1.81	1.97
80%	52.3	224.7	2.56	1.15	1.38	1.50

TABLE 29. SENSITIVITY TEST: INTEREST RATE (%)

	FNPV Mln. K	ENPV Mln. K	ADSCR 2008	ADSCR 2009	ADSCR 2010	DSCR 2008
	44.4	**224.7**	**3.30**	**1.51**	**1.81**	**1.97**
1%	53.3	224.7	21.00	1.84	2.15	2.36
3%	50.3	224.7	7.23	1.71	2.02	2.21
5%	47.4	224.7	4.48	1.60	1.91	2.09
7%	44.4	224.7	3.30	1.51	1.81	1.97
9%	41.5	224.7	2.64	1.43	1.72	1.87

TEACHING NOTE

A SUMMARY OF THE INTEGRATED PROJECT APPRAISAL METHODOLOGY

Manila South Water Distribution Project Case

1 INTRODUCTION

This teaching note provides step by step outline of how an integrated analysis of an investment project is carried out. We illustrate the integrated approach to project appraisal by applying it to a Manila South Water Distribution Project located in the Philippines. In 1990, the southern region of metropolitan Manila had faced a water supply problem, with only 30 percent of the region's households having access to piped water. Moreover, these households often faced water shortages and cut-offs due to an inadequate water supply and distribution system. The other 70 percent of the households obtained their water demand from private water vendors and private wells. The water from both of these sources was in poor quality, while purchasing water from private sector was also very expensive. The government of Philippines established an inter-agency task force which prepared a Water Supply, Sewerage and Sanitation master plan for the Philippines for the period 1988-2000. The objective was to improve the water supply by extending the coverage of its distribution system in the southern part of Manila. The main objective of this project is to improve the water distribution service of MWSS in the South Manila area, increasing distribution coverage from the current 30% of the population to 85% by the year 2004.

This analysis was carried out prior to the privatization of the Manila Water System. It is illustration of the situation facing the utility prior to privatization. The spreadsheet tables for this case are presented in the Appendix to this note.

The analysis is expressed in domestic prices at the domestic price level. The note begins with a discussion of the presentation of the financial appraisal. This is followed by a

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systematic discussion of the economic and distributive analysis. The final section provides an overview of the risk aspects of the analysis.

2 THE INTEGRATED PROJECT APPRAISAL

The central tool of the analysis is the pro forma cash flow, net financial and economic benefit statements, which contain projections of the annual inflows and outflows over the life of the project. There are two goals of the appraisal. First, the appraisal seeks to determine if the project will be financially sustainable. In the case of a private sector project, in order for the equity holders or any other financial stakeholders to be willing to undertake a project, the net present value of project's predicted stream of annual net cash flows (NPV) should be positive. Other measures of financial performance such as the debt service coverage ratios are also important indicators of financial sustainability The pro forma net economic benefit statement constructed from financial appraisal serves as the basis for determining the project's economic feasibility.

2.1 The Financial Evaluation

This section describes the step by step construction of the financial pro forma cash flow statement, using the Manila South Water Distribution project as an example. It is important to note that some project appraisals may not require every table that is presented in this note. For example, the appraisal of a public sector project that does not pay taxes will not need to include the tax-related analysis. The Manila South Water case is a project of this type as it is not subject to income taxes. Now we present steps in financial appraisal of a typical project. The schematic organization of the initial stages in the analysis of the project is shown in Figure 1. Figure 1 shows the list of preliminary tables necessary for the development of the financial cash flow statement.

Step 1: Table of Parameters

All of the basic information about the project should be included in the table of parameters. This table should contain all the information about the project that is exogenous to the analysis. The Manila South Water Distribution Project's table of parameters (Table 1a, 1b, 1c, 1d) reveals items such as the number of existing and new connections to the water system, the price of the output (i.e. water tariff rate), working capital requirements, the cost and quantity of required inputs, relevant interest rates, grants, expected inflation rates, exchange rates, discount rates, and the investment and financing plan. The investment costs tables in the various components of the project are shown in Table 1c, and 1d. These tables will present a yearly breakdown of initial and additional investments of the project in real terms.

These are all the important variables needed to carry out a good project appraisal. Anticipated changes, such as annual real wage increases, should also be included. All parameters should be expressed in terms of clearly labeled units, with prices expressed in terms of a given year, usually "Year 0". A complete parameter table is especially important in order to take advantage of the analytical tools available in computerized spreadsheet and risk analysis programs. On the spreadsheet, all subsequent tables of the financial analysis should contain only formulas that refer to the information provided in the table of parameters.

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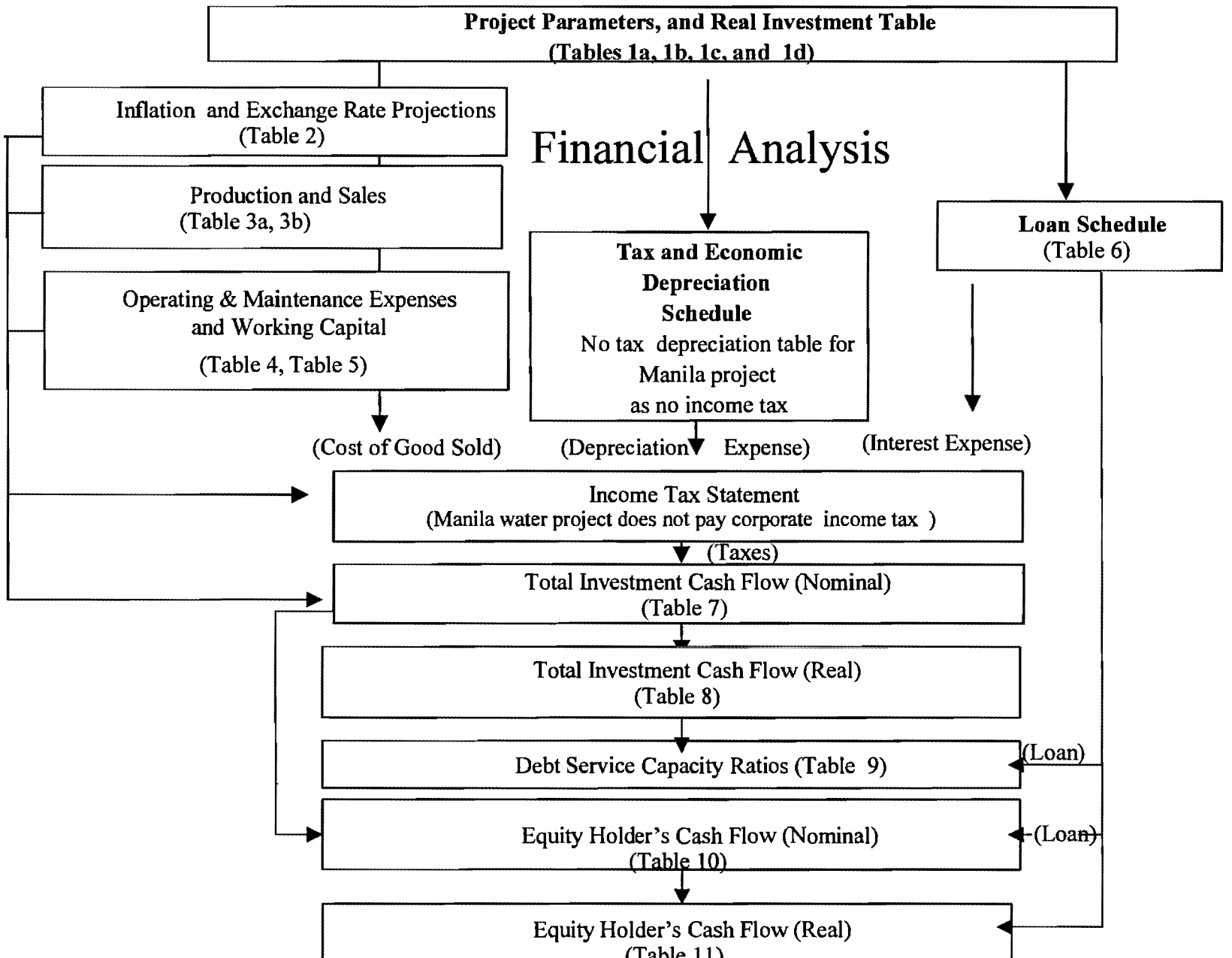
Figure 1: Project Parameters



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Step 2: Inflation and Exchange Rates Projections

Since inflation affects a project's cash flows and net economic benefits profile, through impacts on working capital and tax liabilities, nominal prices should be used throughout the financial analysis. The domestic inflation index allows us to estimate the nominal prices of items in any year, and can be easily calculated using the inflation rates provided in the table of parameters. If the project involves internationally traded goods or loans denominated in a foreign currency, we will also need to consider foreign inflation. The expected nominal exchange rate is based on the 'Year 0' real exchange rate and the relative inflation of the two. These calculations are shown in Table 2 of the Manila South Water Distribution Project.

Step 3: Production, Sales Revenue, and Costs

Table 3a of the Manila South Water Distribution project presents the water demand and supply projections over the life of the project. The nominal water tariff rate projections that are used for the calculations of costs and revenues will be adjusted annually to reflect inflation, for various political and administrative reasons it is likely that this adjustment will not be made immediately in step with inflation. In the analysis it is assumed a lag in the adjustment of the tariff, which would have the ultimate effect of lowering the effective tariff throughout the life of the project. The lag was modeled by reducing the tariff to approximately 91% of its real value for every year of the project.

Tables 3b of the project estimates the future sales revenues from the project based on the water demand and supply projections that are given in table 3a. Once we have estimated the real prices in each year, nominal price estimations can be made by simply multiplying the real price in a given year by the domestic inflation index for that year. Table 3b shows the estimates the amount of water services demanded and sales revenue generated.

In order to provide water services, operating and maintenance costs for each year are estimated in Table 4. These costs are based on the production levels estimated and costs described in the table of parameters (Table 1). The figures in table 4 present operating and maintenance costs in nominal as well as is in real terms.

Step 4: Tax and Economic Depreciation Schedule

Depreciation expenses are calculated for income tax purposes and for the estimation of the residual values for the final year of the analysis of the project and should not be mistaken for a cash outflow in the project cash flow statement. The depreciation expenses for the tax purposes is usually estimated based on nominal investment expenses, and the useful life of the project as it is specified by law for tax purposes. As tax laws vary from country to country, the precise amount of depreciation expense allowed for tax purposes can also vary. It is the rates of economic depreciation that should be used for the estimation of the residual values of the project.

Step 5: Working Capital

Working capital generally includes inventories, accounts receivable[1], accounts payable, and cash balances.[2] As indicated in the table of parameters (Table 1) accounts receivable for the Manila Water Distribution Project are assumed to be three months of revenues. Accounts payables are assumed to be three months of operating expenses except labor, while cash balances are assumed to be one month of all operating expenses. These calculations are shown in Table 5.

[1] It is the change in accounts receivable that affects the cash flow. An increase in accounts receivable indicates an increase in the amount that the patients owe the hospital. An increase in accounts receivable must be included in the cash flow statement as a negative inflow since it decreases the amount of inflows.
[2] As with accounts receivable, it is the changes in accounts payable and cash balances that must be included in the cash flow. An increase in accounts payable means that the project receives an input without paying out cash; therefore it is an inflow to the project. An increase in the cash balance on the other hand means that more cash is tied up in the day to day operations of the project, and is considered an outflow.

Step 6: Loan Schedule

The loan schedule is constructed using the information on investment costs, financing and interest rates included in the table of parameters. The purpose of this schedule is to determine the net debt cash flow (loans borrowed minus any repayments) during the life of the project. The loan schedule also provides the amount of interest paid by the project, which is included as an expense in the income statement and thus affects the project's tax liability (Table 6).

Step 7: Tax-Related Analysis

If the project under appraisal is subject to business income tax, then the tax-related analysis described on the following page must be included in the appraisal, in order to estimate the amount of income taxes that the project will pay each year. In the appraisal of projects that do not pay taxes, these tables do not have to be included, and the analysis can proceed directly to the nominal net cash flow statement.

Step 7.a: The Income Statement

The only purpose of the income statement in the financial analysis is to estimate the project's tax liability. The taxable income of any project in any given year are equal to the total revenues minus the cost of goods/services sold, administration overhead, tax depreciation expenses, assets out by the tax laws, and interest expenses. Multiplying the taxable income by corporate tax rate from the table of parameters gives us an estimate the project's tax liability in each year.

Step 8: Nominal Net Benefit Statement: Total Investment (Banker's) Point of View

The nominal cash flow, or net benefit statement, from total investment (Banker's) point of view is given in Table 7 of the Water Distribution Project. The total investment point of view, evaluates the project on its own merits, without considering the impact of any financing loans. The cash flow (or net benefit) statement, simply put, includes all benefits that create inflows into a project and costs that create outflows. And we include salvage values if they are calculated. Note that the salvage values are based on the liquidation values calculated using economic depreciation rates which are usually indicated in the table of parameters, and not on the rates of depreciation used for tax purposes. Looking at Table 7, on the inflow side is total income, plus the changes in accounts receivables. On the outflow side of Table 7 are investment costs, operation costs, changes in accounts payable, and changes in cash balances. In general, in the project's final year, all outstanding accounts (payables, and cash balance) are settled and salvage values are estimated. Cost outflows are subtracted from benefit inflows to reach the nominal net benefits in each year.

Step 9: Real Net Benefit Statement: Total Investment (Banker's) Point of View

Shown in Table 8, the real net cash flow statement from the total investment point of view is simply the nominal cash flow statement divided by the inflation index. For analysis of the operations of the project, it is preferable to deflate each line of the nominal cash flow separately, rather than deflating only the bottom line of the net cash flow. The net present value of the project can then be estimated by discounting the real net cash flow stream by the overall cost of capital noted in the table of parameters.

Step 10: Debt Service Capacity (Table 9)

The annual net cash flow from the total investment (Banker's) point of view are the basis for evaluating the capacity of the project to service the debt for the alternative financing scenarios. The calculations of Debt service capacity ratio is explained below. We calculate annual debt service capacity ratio (ADSCR) on a year to year basis and a summary ratio of PV of Net Cash flows over PV of loan repayments during the period of the loan repayment. In other words, first of all, we calculate Annual Debt service capacity Ratio (ADSCR) as follows;

Annual Debt Service Capacity Ratio (ADSCR) = $[ANCF_{real}/(\text{Annual Debt repayment}_{real})]$

Where:

ANCF: Annual Net Cash Flow of the project before financing

Annual Debt repayment: It includes annual debt installments (interest + principal) during the period of the loan repayment

Then, we calculate Debt service capacity Ratio (DSCR) as

$$DSCR = (PVNCF_{\text{end of debt}}) / (PV\ \text{Annual debt repayment}_{\text{end of debt}})$$

(Note: Discount rate: use real interest rate on loan financing)

Step 11: Nominal Net Benefit Statement: Equity Holder's Point of View

As it is shown in Table 10, the net cash flow from the equity holder's point of view is identical to that of the investment point of view, except that the equity holder also considers the impact of financing on the project.

Step 12. Real Net Benefit Statement (Equity Holder's Point of View)

Table 11 shows the equity holder's real net cash flow, which is simply the real net cash flow from the investment point of view, plus the real debt inflows (or, the equity holder's nominal cash flow deflated by the inflation index). The net present value from the equity holder's point of view can be estimated by discounting the equity holder's real net cash flow by the equity discount rate, 10 percent in the case of Manila Water Distribution

project. The government, however, is more interested in the project's impact on the overall economy, and so using the real financial net benefit statement as a base, can proceed to evaluate the economic costs and benefits of the project.

2.2 THE ECONOMIC EVALUATION OF THE PROJECTS

The economic evaluation of a project estimates the real economic value of the project's net benefits to the society as a whole. This evaluation is important for policy makers faced with a decision of whether or not to implement a particular project, or in the analysis of policies that affect the private sector's decision to undertake investments. It is also important to private decision-makers that are concerned with the effects of changes in economic policies. Such changes in policies have their primary impact on the financial performance of the project. It is the economic analysis that identifies the critical policy variables and the fundamental productivity of the project. The central tool of the economic analysis is the projects Statement of Economic Costs and Benefits. Converting the financial values of the project's financial cash flow statement into economic values generates this statement. Therefore, the stream of annual net cash flows on the financial cash flow statement is converted to a stream of annual net economic benefits. This resulting stream of net economic benefits can then be discounted by the economic cost of capital to estimate the net present value of the project to the country's economy as a whole. The schematic organization of the stages in the economic appraisal is shown in figure 2.

We describe the steps involved in estimating a project's economic NPV. Assuming that we have already constructed the real financial cash flow statement, we arrive at the economic statement in three steps: 1) the estimation of national economic parameters; 2) the estimation of economic conversion factors for each line item of the financial cash flow; and 3) the application of the national parameters and conversion factors to the financial cash flow statement. These steps are described in more detail below.

Figure 2 : Economic Analysis

Step One: **National Economic Parameters:**

a. Economic Opportunity Cost of Capital

b. Foreign Exchange Premium (provided by other study for Manila Water Project)

+

Step Two:

Economic Conversion Factors for:

a . Economic Value of water (Table 12)

b. Project Inputs, including

- Investments
- Operating Expenses
- Labor
- Working Capital

c. Summary of Conversion Factors (Table 13a-13b)

(Applied to Real Financial Cash Flow Statement)

Statement of Economic Costs and Benefits

(Table 14)

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Step 13: National Economic Parameters

Step 13.a: Economic Opportunity Cost of Capital

In the financial cash flow statements the cost of capital was valued at the equity holder's or at total investment's discount rate. However, since the project's use of capital means that this capital will not be available to the rest of the economy, we need to value these funds at a rate that reflects its true value to society. The estimation of an economy's opportunity cost of capital (EOCK) is based on a weighted average that reflects the real economic rate at which different groups of suppliers of funds (savers) value additional consumption, and the real economic rate at which different groups of demanders of funds (investors) value additional investment. Central to the estimation of the EOCK is the adjustment for any taxes or subsidies, which distort supply and demand for funds. Perhaps most importantly, consideration of the EOCK helps policy makers reject wasteful project proposals.

Step 13.b: The Foreign Exchange Premium

If a project generates or uses foreign exchange, the economic, rather than the market exchange rate of the foreign exchange rate must be included in the economic analysis. The market foreign exchange rate (E_m) frequently does not reflect the economic value of foreign exchange. The foreign exchange rate, which is the price of foreign exchange in the economy, is determined by the interaction of supply and demand for foreign exchange like all other prices in a free market system. Since taxes and tariffs affects the supply and demand of exportables and importables, which in turn affects the foreign exchange rate, the economic value of foreign exchange rates (E_e) is estimated by adjusting for these distortions. The foreign exchange premium (FEP) is simply the percentage by which the E_m must be adjusted to reach the E_e. In other words, $((E_e/E_m) - 1) = FEP$. The FEP is used in the calculation of the economic conversion factors, described below. However,

the values for EOCK and FEP for this project were taken from the study done by Jenkins, Glenn P. and El-Hifnawi, Baher.[3]

Step 14: Economic Conversion Factors

Below is a general overview of how to estimate the economic value of a good or service. Once the economic value is estimated, it is divided by the financial price to arrive at the economic conversion factor. In the case of project outputs, the relevant financial price used to calculate the conversion factor is the supply price (P_s) that the project receives. If the item is an input to a project, the relevant price is the demand price (P_d) that the project must pay. Multiplying an entire line of the financial cash flow statement by the economic conversion factor for that particular good or service will result in the stream of economic costs or benefits due to that good. Conversion factors must be estimated for every item in the financial cash flow. The commodity specific conversion factors for the Manila water distribution project are presented and economic values calculated in (Tables 13a-13d).

Step 14.a: Project Outputs

A project's output may be either a tradable or a non-tradable good. If it is a tradable good, its economic value depends on the world price for the good, plus the foreign exchange premium. In order to estimate the economic benefit of the tradable good, adjustments must be made to the financial price so that the FEP is included and any distortions created by taxes, subsidies or tariffs excluded.

If the project produces a non-tradable good, its economic value depends on the interaction of supply and demand for the good. In a free market system, the additional supply produced by the project, will lead to lower prices. Generally speaking, the economic value of the goods produced will equal the value of additional consumption, plus the

[3] Jenkins, Glenn P. and El-Hifnawi, Mostafa Baher, "Economic Parameters for the Appraisal of Investment Projects: Bangladesh, Indonesia, and the Philippines," *Report for the Economics and Development Resource Center*, Asian Development Bank, 1994.

value of resources released as original suppliers reduce production. Once again, adjustments must be made for the distorting effect of any taxes or subsidies.

For the analysis of this project, the economic value of water for drinking and washing has been calculated and used in the estimation of economic benefits of water. The economic benefits of drinking and washing water is calculated for paying and non-paying customers.

Below we discuss the methodology used in the estimation of these benefits and demand model for water that is being utilized.

Demand Model for Manila Water System

While there is shortage of water, the Metropolitan Water and Sewerage System (MWSS) was not be able to provide clean drinkable water. Many people were using alternative sources. The government decided to privatize the water system for the purpose of supplying good and clean drinkable water to its consumers. While private institutions are always willing to provide a service to earn profits, they didn't automatically have any social obligation. For those who receive an improved service, at the same or lower price will be better off but for some who were before receiving water free of charge, and will now have to pay for it after, they are likely to be worse off.

Demand for Washing Water:

Let's examine a demand and supply model of the market for water in the Manila Water and Sewerage System Project separately. We will analyze the demand of drinking and washing water. Most of the people were initially using wells water for washing and buying their drinking water from vendors.

Let's see the demand curve for washing water from the perspective of MWSS Utility when the alternative for the water users is to pump water from private wells.

Demand for Washing Water

Figure A: Demand for Water from MWSS

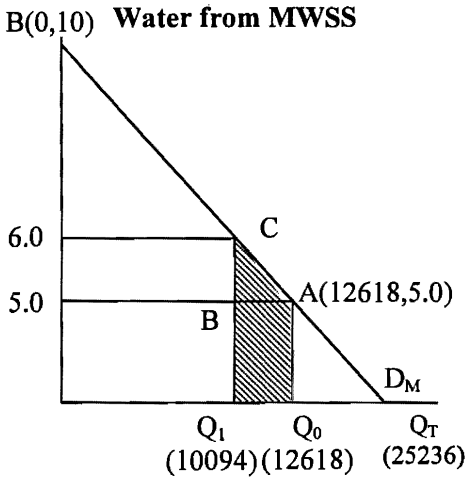
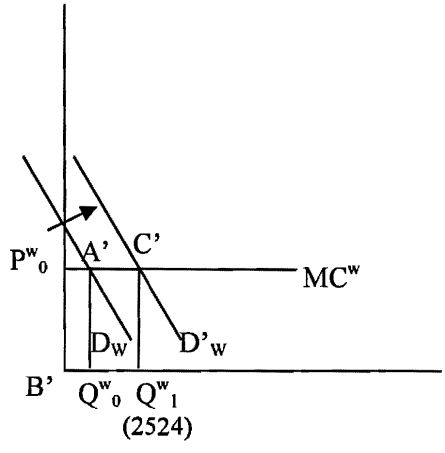


Figure B: Demand for Water from Wells



In figure A, it is assumed that the maximum real price anyone will pay for MWSS water for washing is 10 pesos/m^3. When well water is available at a cost of $P^w_0 = MC^w$. As MWSS raises price from 5 to 6 pesos per m^3 the quantity demanded for MWSS water falls from 12618 to 10094. The demand for well water shifts from Q^w_0 to Q^w_1.

The elasticity of the point A on demand curve BD_M is assumed to be equal to –1.0,

$$\text{Demand elasticity} = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

$$= \frac{0-12618}{10-5} \cdot \frac{5}{12618}$$

$$= -\frac{5}{5} = -1$$

We assume that the demand curves are all straight lines. The elasticity along a straight line demand curve is always changing as the quantity is changing; the equation for the slope for the changing quantity is equal to:

$$m\,(Q_0 - Q_1) = P_0 - P \quad \text{or,} \qquad m = \frac{P_0 - P_1}{Q_0 - Q_1}$$

Where, Q_0 is equal to the initial quantity, Q_1 is equal to the increase quantity, P_0 is equal to the initial price and P_1 is equal to the increase in price. For this demand curve when Q_0 is equal to 0, then price (P_0) is equal to 10 and while Q_1 is equal to 12618, then price (P_1) is equal to 5.

The equation for the demand curve is equal to

$$m\,(Q - Q_1) = P - P_1 \quad \text{or,} \qquad Q = \frac{1}{m}[P - P_1] + Q_1$$

Where

Q = quantity of demand water

P = price of water

Q_1 = Quantity of water while price is 5

P_1 = Price of water whatever quantity demand

When Q_1 and P_1 were given, we are able to find the equation for straight line.

The slope (m) of the line AB is equal to,

$$m\,(Q - Q_1) = P - P_1 \quad \text{or,} \quad m\,(25236 - 0) = 0 - 10$$

$$\text{or,} \quad m = -\frac{1}{2523.6}$$

The demand curve AB at the point (5, 60) is written as,

$$m\,(Q - Q_1) = P - P_1$$

Substituting values for m, Q_1 and P, we have,

$$= -\frac{1}{2523.6}\,(Q - 12618) = Y - 5 \quad \text{Or, } Q = 25236 - 2523.6P$$

Where, Q is the Quantity demanded of water and P is the price of water.

In figure A, if the price of water is increased by 20% i.e. from 5 to 6 then the quantity demanded of water will decrease by 20% i.e. means from 12618 to 10094 because the

demand elasticity of water is –1. The shaded area Q_1CAQ_0 is the decrease economic value of the water demanded because of the increase the price. When the price is equal to 5.0, people use only a small amount of well water (Q^w_0). When the price of MWSS water is increased by 20% to 6.0 pesos then 20% less of MWSS water will be consumed and more well water Q^w_1 will be demanded.

Because we assume that well water is provided in perfectly elastic supply at P^w_0 there will be no change in economic welfare from an increase in the demand for well water used for washing when MWSS increases its price from 5 to 6 pesos.

Demand for Drinking Water:

Now, the utility couldn't provide sufficient clean water for drinking and cooking consumption. People have to by water from the vendors. The price vendors currently sell is 37 pesos. The utility could provide water at a price of 5 pesos. We assume that MWSS will supply water at 5. Hence, non of the private vendors will continue supplying water because their minimum marginal cost of supply is 20 pesos. AP_2OB is the value of resources saved by eliminating the need for private vendors. Q^TBAC is the value of the additional consumption of water because of the decrease of the price. P_1P_2AC is the increase in the value of consumer surplus because of the decrease price.

Let's see in the figure for the demand curve of drinking water,

Figure C: Demand and Supply of Drinking Water from vendors with no MWSS Supply

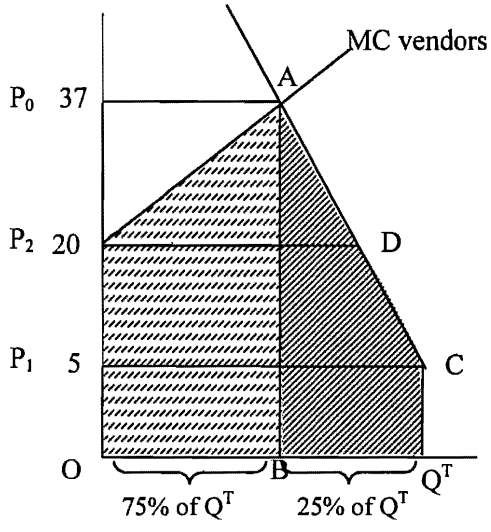
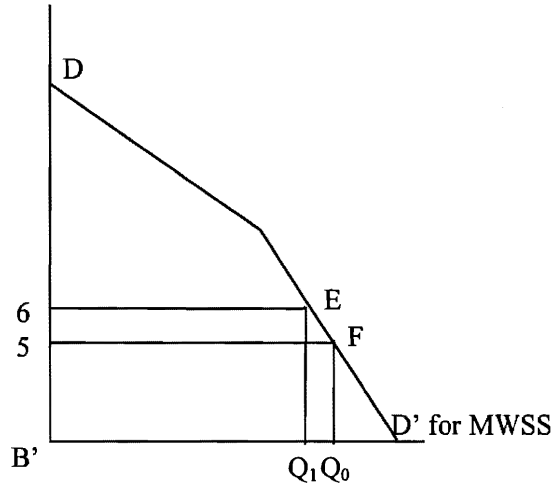


Figure D: Demand facing MWSS for Drinking Water



When the price is increased from 5 to 6 pesos, the demand from drinking water from MWSS will decrease from Q_0 to Q_1, this is shown in figure D. That means more people will use alternative water sources for drinking i.e. use well water with boiling, or use bottled water.

Figure E: Use of boiled well water for drinking

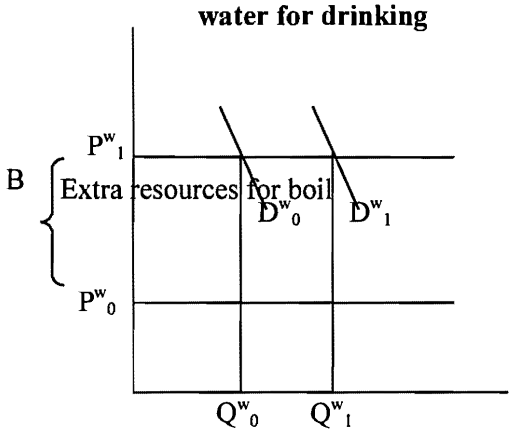
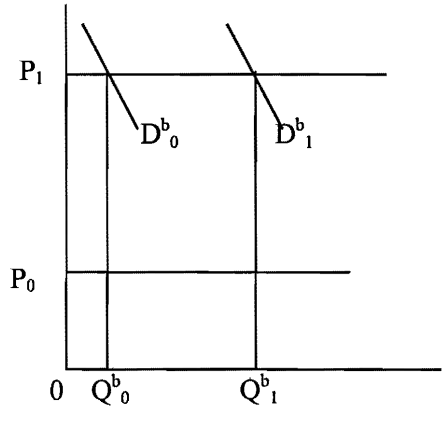


Figure F: Use of Bottle Water



In figure E, the price of well water is P^w_0 which they were using for washing water. Because of price increase of MWSS water, more people would like to use well water and then boil it for drinking and cooking. Of course, they have to use extra resources to boil the water. The cost of drinkable water will be $P^w_1 = (P^w_0 + B)$, where B is the cost of boiling water. With the higher price of tap water from MWSS, the quantity demanded of boiled water shifts from Q^w_0 to Q^w_1. The economic loss value of the water now not purchased for drinking from MWSS, is shown by the area Q_1EFQ_0 in figure D.

In figure F, we can see the demand for bottle water was Q^b_0 while price of drinking water was P_0. When the price of MWSS water becomes P_1=6 pesos the demand for bottled water will increase from Q^b_0 to Q^b_1. Because we assume that both boiled well water and bottled water are provided in perfectly elastic supply conditions, there will be no economic loss or gain from the change in demand in this market due to the increased in MWSS's price. All the change in economic welfare is measured by total demand curve for MWSS water or DD's in figure D.

Step 14.b: Projects Inputs

Project inputs, including investment costs and operating costs can be either tradables or non-tradables, and the economic cost of using the good in the project can be estimated in the same manner described above. Special mention should be made, however, of the appropriate estimation of the conversion factor for labor. Adjustments made to the financial price of labor in estimating its true economic value can vary depending on the specific context of the project and on the specific type of labor used.[4]

Step 14.c: Working Capital

The financial cash flows of most projects include Changes in Accounts Receivable, Changes in Accounts Payable, and Changes in Cash Balance. The appropriate conversion factors for Changes in Accounts Receivable and Accounts Payable are a weighted average of the components that determine the accounts.

[4] For a more complete discussion, see *Program on Investment Appraisal and Management Manual*, Glenn P. Jenkins and Arnold Harberger, Harvard Institute for International Development, Chapter 13.

Step 14.d: Taxes, Tariffs, Subsidies, and Loans

These items are considered merely transfers within the economy and, as such; do not reflect any real economic resources. The relevant conversion factor is zero.

Step 15: The Statement of Economic Costs and Benefits

Once the above two steps are completed, the construction of the Statement of Economic Costs and Benefits is very straightforward. Simply multiple each line of the real financial cash flow statement by the relevant conversion factor. Subtracting economic costs from benefits in the same way that cash outflows are subtracted from cash inflows will produce a stream of annual net economic benefits. Discounting this stream by the Economic Opportunity Cost of Capital, results in the net present value to society of the project's net economic benefits. The economic resource flow table is presented in Table 14, where net economic benefits are discounted at 10.30 % economic cost of capital, which is estimated for Philippines.

2.3 THE DISTRIBUTIVE ANALYSIS OF A PROJECT'S NET BENEFITS

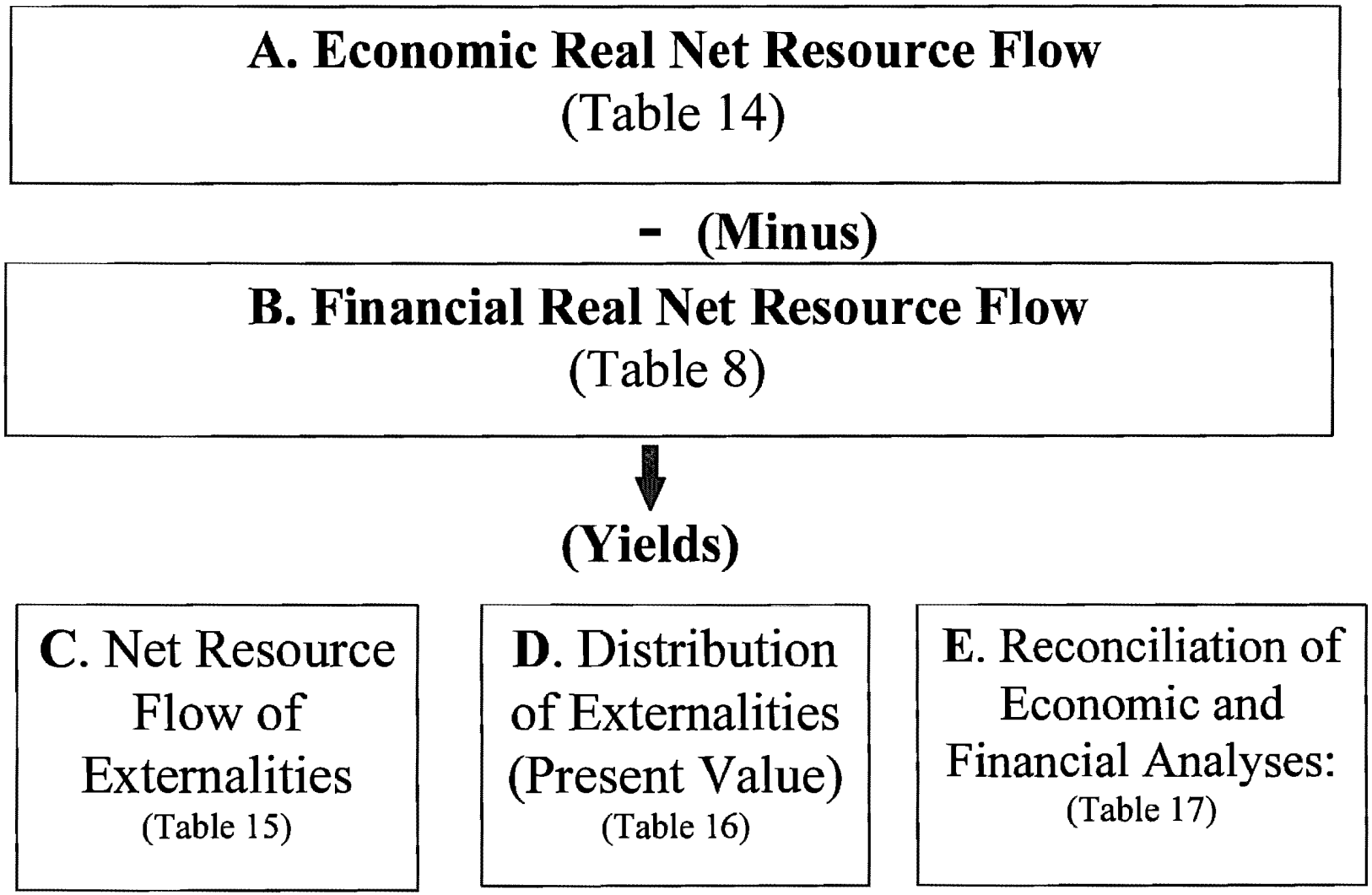
Distributive analysis seeks to allocate to the various parties involved the benefits and costs generated by a project. This analysis is important to policy makers, as it lets them estimate the impact of particular policies (often pricing policies) or projects on segments of society, and to predict which groups would reap off the greatest benefits and which groups, if any, would suffer from the project.

We illustrate how to estimate the net benefits[5] of externalities generated by different items in a project, and how to allocate these benefits to different parties. The figure 3 provides an example of the steps involved in the analysis of the distribution of a project's net benefits when project is undertaken.

[5] Net benefits may of course be negative (i.e., losses), as well as positive (gains).

All projects generate two types of net benefits. First, there are the financial net benefits, which accrue directly to the equity holder (the financial stakeholder). Second, there are externalities that may accrue to various other groups in society. The project's direct net financial benefits, allocated simply to the equity holder, are represented by the equity holder's financial NPV (discounted at the equity holder's opportunity cost of capital). The net benefits of the externalities, on the other hand, are allocated item by item to the respective party involved. Who benefits and who suffers as a consequence of a project is very much determined by the nature of the project. However, most projects will have a financial impact on one or more levels of government. The allocation of a project's externalities can be completed in three following steps.

Figure 3: Distribution Analysis



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Step 16: The Real Economic Statement minus the Real Financial Statement

A distributive analysis begins with a project's financial and economic net resource flow statements.[6] The financial net resource flow (or cash flow) statement estimates the net financial benefit of a project to the equity holder, while the economic statement predicts the project's effect on the overall economy of a country. The difference between these two net resource flows is externalities, net benefits or costs which are not captured by the equity holder. Subtracting the real financial net resource statement from the real economic statement is the first step in estimating a project's externalities. The particular stakeholder that is to be identified will be a function of the characteristics of the project. As it is shown in the Figure 3, Table 14 (the economic statement) minus Table 8 (the financial statement: Real investment point of view) results in Table 15 (the net benefits flows of externalities).

Step 17: The Present Value of the Externalities

The next step is to calculate the present value of each line item in the table of externalities (Table 16), using the economic discount rate.[7] An alternative method, which you may encounter, of estimating the present value of the externalities is to first calculate the present value of each line of both the economic and financial statement, and then subtract the financial present values from the economic ones. The disadvantage of this alternative however, is that it doesn't generate a table such as Table 16 that provides information about trends in externalities over the life of the project.

[6] See earlier notes for a discussion of these two statements.
[7] The present value is most easily calculated using a spreadsheet's NPV function.

Step 18: Allocating the Externalities (Stakeholder Analysis)

The final step is to identify the parties to whom the externalities accrue. In many projects, much of the externalities accrue to government, due to taxes, subsidies, tariffs, the foreign exchange premium, etc. In Table 16, the externalities are allocated to government, paying and non-paying users of water, water vendors, and engineering services providers. The largest share of the externalities goes to paying users of water in the form of consumer surplus. The positive externality to consumer implies that they are willingness to pay is higher than what they actually pay for the service that will provided to them.

Step 19: Summary of the Distribution of the Project's net Benefits

At the end of table 16 we present a summary of the allocation of the project's net benefits. In this example it is very simple, but in many cases it is a helpful tool. Especially if the equity holder is a government agency, or a similar entity to whom externalities may accrue, it is useful to look at the total impact of the project on the equity holder (that is, the financial NPV plus any externalities).

Step 20: Reconciliation of the Economic and Financial Statements

The reconciliation demonstrated in Table 17 serves as a check to verify that all of the externalities have been accounted for and that, indeed, the difference between the Economic and the financial statements is due solely to externalities whose origins have been identified.

Figure 4: Risk Analysis

A. Sensitivity Analysis
(Tables 18, 19)

B. Risk Variables
(Table 20)

C. Results
(Table 21 and Figure 1 & 2)

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2.4 SENSITIVITY AND RISK ANALYSIS OF THE PROJECT

Risk Analysis is important for number of reasons. First, we need to reduce the likelihood of undertaking a "bad" project while not failing to accept a "good" project. Second, one way to reduce uncertainty is to gather more data and information, to the extent feasible, about the key project variables in order to narrow their likely range and to determine precisely the appropriate probability distribution .

First of all, we need to identify the variables that are critical determinants of a project NPV. Sensitivity analysis is the first step that helps to identify the key variables. Figure 4 demonstrates the steps are taken in the Sensitivity and Risk Analysis.

Step 21: Sensitivity Analysis

A sensitivity analysis in Manila Water Supply project was conducted on the financial net present value (NPV) to help identify the variables that have a relatively large impact on the project financial returns and to assess the magnitude of these impacts. The following key variables were used in the analysis: water tariff rate, installation efficiency for connections, the percentage of non-revenue water, the number of months of accounts receivable, the real increase in the wage rate, a real investment cost overrun, and the domestic inflation rate.

A sensitivity analysis on economic net present value was conducted to see how it would change if the true economic benefit of water varied considerably from our estimated value. The key variables were tested on effect of variations in the economic benefit of water to paying users, while the second varies the benefits to non-paying users. Table 18 and 19 presents the results of the sensitivity analysis for the variables that were tested both on financial and economic NPV.

Step 22: Risk Analysis

The following variables, which were identified in the sensitivity analysis, were used to conduct a risk analysis. The assigned probability distribution and range limits of the changes in the values of the selected variables are shown in Table 20.

Table 1: Risk Variables, Probability Distributions, and Range values

Risk variable	Base value	Probability distribution	Minimum value	Maximum value
Ability of MWSS to meet Non-Revenue water targets	100%	normal	-25%	+25%
Investment Cost overrun factor	0	normal	-20%	+20%

			Range value	Probability
Installation Efficiency factor For connections	.84	step	.60 - .80 .80 - 1.00	0.30 0.70
Average accounts receivable period, months[8]	3	step	1 - 2 2 - 3 3 - 4 4 - 5	0.10 0.45 0.30 0.15

Step 23: Results of Risk Analysis

The results of risk analysis are presented in table 21 and figure 1, and 2.

3. CONCLUSION

People using this methodology may apply different levels of sophistication in their analysis as called for by the nature of the proposed investments. However the framework as summarized in this study should be followed closely.

[8]The probability distribution is based on MWSS' current record and on its program for reducing its level of accounts receivables.

A Major feature of this methodology is the complementary between the development of the computer spreadsheets and the financial-economic-distributive and risk analysis that is carried out using this tool.

If Case is not taken in the organization of the spreadsheets and the specifications of the interactions between the various analytical modules, then the quality and the nature of the output of such study will be greatly compromised. Each of these aspects of the analysis is codependent. In order for decision-makers to make the right selection of investment projects, each of the aspects of the project needs to be considered as part of the overall personality of the project.

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Appendix

POTABLE WATER SUPPLY EXPANSION

MANILA SOUTH WATER PROJECT

SPREADSHEET TABLES

Table 1a: Table of Parameters

1. Water tariff rate (1991)		5 pesos/cu m.
Adjustment to Real tariff rate due to time lag in inflation related rate increases		91.25%
2. Inflation rate		
Domestic 1990-91		12%
Domestic 1992 - 2024		8.00%
Foreign		4.00%
3. Foreign exchange rate 1991(peso/dollar)		28.00
4. Financing: ADB Loan (In $$)		
	% of Domestic Currency Cost funded by loan	33.3%
	% of Foreign Currency Cost funded by loan	100%
Real Interest Rate	(Loan and loan repayments all in US$	6.09%
Nominal Interest rate		10.33%
Number of years loan repayment		20
Grace period		5
Beginning of Payment		1997
Last date of Payment		2016
5. Accts. receivable (RISK VARIABLE)	**3**	months
6. Accts. payable	3	months of direct expenses (O&M excluding labor)
7. Cash	1	months of direct expenses
8. Income tax rate	0	
(MWSS as a government corporation is supposed to pay but has been exempt up to the time the project was being appraised)		
9. Discount Rates:		
Equity		10.0%
Economic		10.3%

10. Initial Private Connections		
No. of existing connections		38,839
No. of person/existing connection		8.4
Aver. Initial consump(liters/day)		150
11. Initial Shared Standpipes		
No. of existing standpipes		199
No. of persons/standpipe		300
Average consump (liters/day)		40
12. Initial Non-Revenue Water (NRW)		50%
a. Of NRW, percent leakage		49%
b. Of NRW, percent non-leakage		51%
13. Operating & Maint. 1990 pesos/cu m:		1.096
Wages	62.44%	0.684
Chemicals	11.92%	0.131
Power	15.19%	0.166
Maintenance	10.44%	0.114
Real Increase in Wage Rate per Year		2.00%
14. Operating Days/Year		365
15. Project Life (years)		30
16. Inv. Cost Overn Fact (RISK VARIABLE)		**0%**
17. Ability to meet NRW target Inv. (RISK VARIABLE)		**100%**

18. Elasticity for the Drinking and Washing Water

Paid Drinking Water		
Nd =	-0.22	(Elasticity of Demand for drinking water)
Fixed Rate for P_0	5.000	
Paid Washing Water		
Nd =	-1.00	(Elasticity of Demand for washing water)
Maximum Willingness to Pay for Washing Water	10.00	
If price is higher than 10, quantity of washing water	0.00	
Break-even price for water vendors	20.0	
Maximum Willingness to Pay for Drinking Water	37	
Proportion of water used for Drinking	0.05	
Proportion of water used for Washing	0.95	

Table 1b: Table of Parameters

Manila South Water Distribution Project

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
55					1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
56	17. AWSOP treated water production															
57	capacity cu. m./day(Incl. NRW)			401227												
58	18. Number of new connections proposed by MWSS each year				11229	19999	19706	19193	17493	12134	7739	8170	5717	5982	6206	6431
59	**19. New connection (Installation efficiency (RISK VARIABLE)**			**84%**												
60	20. Number of persons/connection				8	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
61	21. Average consumption/person(liters/day)				160	200	220	220	220	220	220	220	220	220	220	220
62																
63	22. Number of new standpipes each year				36	74	87	85	77	54	34	36	25	26	27	28
64	23. No. persons/standpipe			300												
65	24. Average consumption/person (liters/day)			40												
66																
67		**RISK VARIABLE--Ability of MWSS to meet NRW targets:**			100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
68		Percentage of Non Revenue water			50%	46%	42%	38%	35%	35%	35%	35%	32%	32%	32%	32%
69		Links with Ability to MWSS and % NRW			50%	46%	42%	38%	35%	35%	35%	35%	32%	32%	32%	32%
70	25. Target Percent Non-Revenue Water (NRW)															
71	a. Of NRW, percent leakage			49%												
72	b. Of NRW, percent non-leakage			51%												
73	(that is, % stolen or authorized free use)															

Table 1c: Investment Table (REAL)

Initial Investment Cost, 1991-1995

(Millions of 1990 pesos)

	A	B	C	D	E	F	G	H	I	J	K
83											
84											
85				1991			1992			1993	
86			Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
87	CIVIL WORKS										
88	a. Water reservoirs/pumping stations					13.881	5.949	19.830	33.812	14.491	48.303
89	b. Transmission mains					4.722	11.020	15.742	5.982	13.959	19.941
90	c. Secondary/Tertiary networks					29.039	9.680	38.719	67.758	22.586	90.344
91	d. Service connections					8.262	1.458	9.720	19.279	3.402	22.681
92	CIVIL WORKS TOTAL					55.904	28.107	84.011	126.831	54.438	181.269
93											
94	EQUIPMENT AND MATERIALS										
95	a. Water reservoirs/pumping stations					1.398	5.594	6.992	4.088	16.352	20.440
96	b. Transmission mains					5.848	23.393	29.241	7.406	29.632	37.038
97	c. Secondary/Tertiary networks					11.616	46.471	58.087	27.103	108.431	135.534
98	d. Service connections					1.944	7.777	9.721	4.536	18.148	22.684
99	EQUIPMENT AND MATERIALS TOTAL					20.806	83.235	104.041	43.133	172.563	215.696
100											
101	OFFICE BUILDINGS					3.670		3.670	3.670		3.670
102	CONSULTING SERVICES		1.386		1.386	1.089		1.089	0.528		0.528
103	LAND COST		25.000		25.000						
104	IN-HOUSE ENGINEERING SERVICES		32.560		32.560	16.280		16.280	16.280		16.280
105	TAXES AND DUTIES					32.160		32.160	66.670		66.670
106											
107	TOTAL INVESTMENT COST		58.946		58.946	129.909	111.342	241.251	257.112	227.001	484.113
108											
109				1994			1995			TOTAL INVESTMENTS	
110			Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
111	CIVIL WORKS										
112	a. Water reservoirs		23.009	9.860	32.869	3.099	1.319	4.418	73.801	31.619	105.42
113	b. Transmission mains		4.250	9.918	14.168	0.788	1.837	2.625	15.742	36.734	52.476
114	c. Secondary/Tertiary networks		77.438	25.812	103.250	19.360	6.454	25.814	193.595	64.532	258.127
115	d. Service connections		22.033	3.888	25.921	5.508	0.972	6.480	55.082	9.72	64.802
116	CIVIL WORKS TOTAL		126.730	49.478	176.208	28.755	10.582	39.337	338.22	142.605	480.825
117											
118	EQUIPMENT AND MATERIALS										
119	a. Water reservoirs		1.927	7.710	9.637	0.564	2.259	2.823	7.977	31.915	39.892
120	b. Transmission mains		5.262	21.054	26.316	0.975	3.898	4.873	19.491	77.977	97.468
121	c. Secondary/Tertiary networks		30.975	123.922	154.897	7.744	30.980	38.724	77.438	309.804	387.242
122	d. Service connections		5.184	20.774	25.958	1.296	5.185	6.481	12.96	51.884	64.844
123	EQUIP & MAT TOTAL		43.348	173.460	216.808	10.579	42.322	52.901	117.866	471.58	589.446
124											
125	OFFICE BUILDINGS								7.34		7.34
126	CONSULTING SERVICES		0.297		0.297				3.3		3.3
127	LAND COST								25		25
128	IN-HOUSE ENGINEERING SERVICES		12.210		12.210	4.070		4.070	81.4		81.4
129	TAXES AND DUTIES		67.000		67.000	16.350		16.350	182.18		182.18
130											
131	TOTAL INVESTMENT COST		249.585	222.938	472.523	59.754	52.904	112.658	755.306	614.185	1369.491

Table 1d: Additional Investment Table (REAL)

Between 1996-2004

Manila South Water Distribution Project

	A	B	C	D	E	F	G	H	I	J	K
148	**ADDITIONAL INVESTMENT IN TERTIARY DISTRIBUTION NETWORKS & CONNECTIONS, 1996-2004 (millions of 1990 pesos)**										
149											
150	Note that the investment cost shown above does not include connections and tertiary networks from 1996 onward.										
151	The cost for each of these items was estimated based on the average cost for the period 1992-1995. These costs										
152	were then used to estimate the costs of the additional investment in connections and terriary										
153	networks from 1996 to 2004.										
154											
155	**Cost of connections**										
156	Cumulative number of connections			50,934							
157	Cost (million)			130							
158	Cost per connection (pesos)			2,545							
159											
160	**Cost of tertiary distribution**										
161	Cumulative number of connections			50,934							
162	Cost of secondary/tertiary connections (million)			645							
163	Cost per connection (pesos)			12,671							
164	Cost of tertiary connection (10% of cost per connection)			1,267							
165	[The 10% is based on the length and diameters										
166	used in a previous study (Angat Water Supply Optimiztion Project, 1989)]										
167											
168	**Total Cost per Conn. of tertiary distr. & connections**			**3,812**							
169											
170	(Tertiary dist. and connection investments are allocated between Civil Works and										
171	Equipment using a the same civil works/ equip ratio as in the total investment above)										
172	Civil works	45%									
173	Equipment and materials	55%									
174											
175	**(Millions of Real Pesos)**		**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
176	Add. inv. on tert. distrib. & conn.		73.17	66.69	46.26	29.50	31.15	21.80	22.81	23.66	24.52
177	Civil works		32.87	29.96	20.78	13.26	13.99	9.79	10.25	10.63	11.01
178	Equipment and materials		40.30	36.73	25.48	16.25	17.15	12.00	12.56	13.03	13.50
179											
180											
181											

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Table 2: Inflation and Exchange Rate Projections

Manila South Water Distribution Project

	A	B	C	D	E	F	G	H	I	J	K	AC	AD	AE	AK
186			**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2017**	**2018**	**2019**	**2025**
187															
188	Dom. inf. rate	8.00%													
189	Dom. inflation index		1.000	1.080	1.166	1.260	1.360	1.469	1.587	1.714	1.851	7.396	7.988	8.627	13.690
190															
191	For. infl. rate	4.00%													
192	For. inflation index		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	2.772	2.883	2.999	3.794
193															
194	Relative infl. index		1.000	1.038	1.078	1.120	1.163	1.208	1.254	1.302	1.352	2.668	2.770	2.877	3.608
195															
196	NOMINAL EXCHANGE RATE		28.00	29.08	30.20	31.36	32.56	33.82	35.12	36.47	37.87	74.70	77.57	80.55	101.03
197															
198															
199															

Table 3A: Water Demand and Supply

Manila South Water Distribution Project

	A	B	C	D	E	H	K	N	P	V	AA	AF	AJ
196						TABLE 3A							
197													
198						WATER DEMAND During Connection Expansion Period (1993 to 2004)							
199													
200	New installation (connection) efficiency	(RISK VARIABLES)		0.84	0.84	0.84	0.84	0.84	0.84				
201													
202	TOTAL CONSUMPTION DEMANDED												
203													
204	1. Paid Consumption Demanded from Private Connections (Estimates for Expansion Years 1993 -2004)												
205				1992	1993	1996	1999	2002	2004	2010	2015	2020	2024
206	New Connections Realized				9,432	16,122	6,501	5,025	5,402	5402.04	5402.04	5402.04	5402.04
207	Ending (Total Connections)			38839	48,271	97,746	129,133	145,823	156,438	156,438	156,438	156,438	156,438
208	Cumulative new connections				9,432	58,907	90,294	106,984	117,599	117,599	117,599	117,599	117,599
209	No. of persons/connection			8.4	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
210	Ave. consumption/person (liters/day)			150	160	220	220	220	220	220	220	220	220
211	Total consumption (cu m./day)			48,937	61,787	161,280	213,070	240,608	258,123	258,123	258,123	258,123	258,123
212													
213	2. Paid Consumption Demanded from public standpipes (Estimates for Expansion Years 1993 -2004)												
214	New				36	85	34	26	28	28	28	28	28
215	Ending			199	235	481	646	733	788	788	788	788	788
216	No. of persons/connection			300	300	300	300	300	300	300	300	300	300
217	Ave. consumption/person (liters/day)			40	40	40	40	40	40	40	40	40	40
218	Total consumption (cu m/day)			2,388	2,820	5,772	7,752	8,796	9,456	9,456	9,456	9,456	9,456
219													
220	3. TOT. CONSUMPTION DEMANDED (1993 -2004)			1992	1993	1996	1999	2002	2004	2010	2015	2020	2024
221	4. Total Paid Consump. demanded			51,325	64,607	167,052	220,822	249,404	267,579	267578.964	267578.964	267578.96	267578.96
222	Paid Piped water consumption demanded before project (cu. m/day)			51,325	51,325	51,325	51,325	51,325	51,325	51325.14	51325.14	51325.14	51325.14
223	Tot. incremental paid consumpt. demanded from proj.(cu m/day)			0	13,282	115,727	169,497	198,079	216,254	216253.824	216253.824	216253.82	216253.82
224													
225													
226	Demand for washing water				12618	109941	161022	188175	205441	205,441	205,441	205,441	205,441
227	Slope for the Washing Water (m)				-0.000396	-0.000045	-0.000031	-0.000027	-0.000024	-0.000024	-0.000024	-0.000024	-0.000024
228	Quantity demand of washing water				12618	109941	161022	188175	205441	205441	205441	205441	205441
229	Change in Quantity demanded do the price change				0	0	0	0	0	0	0	0	0
230	Percentage Change in Quantity demanded do the price change				0%	0%	0%	0%	0%	0%	0%	0%	0%
231													
232	Demand for drinking water at 5 pesos cubic meter				664	5786	8475	9904	10813	10813	10813	10813	10813
233	Slope for the drinking water (m)				-0.19	-0.02	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
234	Total demand of drinking water				664	5786	8475	9904	10813	10813	10813	10813	10813
235	Change in Quantity demanded do the price change				0	0	0	0	0	0	0	0	0
236	Percentage Change in Quantity demanded do the price change				0.00%	0.00%	0.00%	0.00%	0.00%	0	0	0	0
237													
238	Slope for the drinking water demand from vendors (m)				0.0341	0.0039	0.0027	0.0023	0.0021	0	0	0	0
239	Quantity supplied by vendors				0	0	0	0	0	0	0	0	0
240	Supply from project				664	5786	8475	9904	10813	10813	10813	10813	10813

Table 3B: Total Sales Revenue Schedule

Manila South Water Distribution Project

	A	B	C	D	E	F	H	K	N	P	V	AA	AF	AJ
243						Table 3B								
244														
245						TOTAL DEMAND, SUPPLY, and SALES REVENUE								
246														
247	A) TOTAL CONSUMPTION DEMANDED				1993	1994	1996	1999	2002	2004	2010	2015	2020	2024
248	4. Total Paid Consump. demanded over life of project (1993 -2024)				64,607	101,314	167,052	220,822	249,404	267,579	267,579	267,579	267,579	267,579
249	Paid Piped water consumption demanded before project (cu. m/day)				51,325	51,325	51,325	51,325	51,325	51,325	51,325	51,325	51,325	51,325
250	Tot. incremental paid consumpt. demanded from proj.(cu m/day)				13,282	49,989	115,727	169,497	198,079	216,254	216,254	216,254	216,254	216,254
251														
252	Incremental Paying consumption (cu m.day)				13,282	49,989	115,727	169,497	198,079	216,254	216,254	216,254	216,254	216,254
253	Incremental water leakage (cu.m/day)				6,508	20,866	34,756	44,721	45,675	49,866	49,866	49,866	49,866	49,866
254	Incremental non-paying consumption (theft and giveaway) cu. m/day				6,774	21,717	36,174	46,546	47,539	51,901	51,901	51,901	51,901	51,901
255	Required incremental supply (incremental consumption/1-NRW) in cu.m./day				26,564	92,572	186,657	260,764	291,293	318,020	318,020	318,020	318,020	318,020
256														
257	B) TOTAL INCREMENTAL SALES REVENUES													
258			1991	1992	1993	1994	1996	1999	2002	2004	2010	2015	2020	2024
259	Incremental Sales Volume (cu m/day)				13,282	49,989	115,727	169,497	198,079	216,254	216,254	216,254	216,254	216,254
260	Real Water Tariff (pesos/cu.m)				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
261	Nominal water Tariff (pesos/cu.m)				5.32	5.75	6.70	8.44	10.64	12.41	19.69	28.93	42.50	57.83
262														
263	Nominal Revenue of Drinking water				1.29	5.24	14.16	26.12	38.45	48.96	77.70	114.17	167.75	228.22
264	Nominal Revenue of of Washing water				24.51	99.61	268.97	496.26	730.56	930.31	1476.29	2169.15	3187.20	4336.15
265	Nominal Revenues (mill. pesos)				25.80	104.85	283.13	522.38	769.01	979.28	1,553.99	2,283.32	3,354.95	4,564.37

Table 4: Operating and Maintenance Cost Schedule

Manila South Water Distribution Project

	A	D	E	F	H	K	N	V	AA	AF
269				Table 4						
270				Operating and Maintenance Expenses						
271	**Operating and Maintenance Expenses (REAL 1000s of Pesos)**									
272		**1993**	**1994**	**1995**	**1997**	**2000**	**2003**	**2011**	**2016**	**2021**
273										
274	Wages	7,042	25,029	41,893	62,195	84,906	98,365	120,400	132,931	146,766
275	Chemicals	1,267	4,414	7,244	10,336	13,297	14,516	15,165	15,165	15,165
276	Power	1,614	5,625	9,231	13,172	16,945	18,498	19,325	19,325	19,325
277	Maintenance costs	1,109	3,866	6,344	9,053	11,646	12,714	13,282	13,282	13,282
278	**Total**	**11,032**	**38,935**	**64,712**	**94,756**	**126,793**	**144,093**	**168,171**	**180,702**	**194,538**
279										
280	**Operating and Maintenance Expenses (Nominal 1000s of Pesos)**									
281		**1993**	**1994**	**1995**	**1997**	**2000**	**2003**	**2011**	**2016**	**2021**
282										
283	Wages	8,213	31,529	56,995	98,695	169,727	247,699	561,177	910,373	1,476,860
284	Chemicals	1,477	5,561	9,855	16,402	26,581	36,554	70,682	103,855	152,597
285	Power	1,883	7,086	12,558	20,902	33,872	46,582	90,072	132,346	194,459
286	Maintenance costs	1,294	4,870	8,631	14,366	23,280	32,015	61,906	90,960	133,651
287	**Total**	**12,868**	**49,047**	**88,040**	**150,366**	**253,460**	**362,850**	**783,838**	**1,237,535**	**1,957,567**

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Table 5: Working Capital Schedule

Manila South Water Distribution Project

	A	D	E	F	H	K	N	V	AA	AF	AJ
290				Table 5							
291				WORKING CAPITAL SCHEDULE							
292											
293	**(Nominal, Millions of Pesos)**	**1993**	**1994**	**1995**	**1997**	**2000**	**2003**	**2011**	**2016**	**2021**	**2025**
294											
295	**Number of months accts. rec.**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
296	Accounts receivables from drinking water	0.32	1.31	2.49	4.65	7.54	10.85	20.98	30.82	45.29	0.00
297	Changes in accounts receivable from DW	(0.32)	(0.99)	(1.18)	(1.11)	(1.01)	(1.24)	(1.55)	(2.28)	(3.35)	57.05
298	Accounts receivables from washing water	6.13	24.90	47.40	88.42	143.28	206.14	398.60	585.67	860.54	0.00
299	Changes in accounts receivable from WW	(6.13)	(18.78)	(22.50)	(21.17)	(19.22)	(23.50)	(29.53)	(43.38)	(63.74)	1,084.04
300	**Change in accounts rec.**	**(6.45)**	**(19.76)**	**(23.68)**	**(22.29)**	**(20.23)**	**(24.74)**	**(31.08)**	**(45.67)**	**(67.10)**	**1,141.09**
301											
302	Cash balance	1.07	4.09	7.34	12.53	21.12	30.24	65.32	103.13	163.13	0.00
303	Change in cash balance	(1.07)	(3.01)	(3.25)	(2.67)	(3.07)	(3.81)	(5.69)	(9.02)	(14.32)	214.99
304											
305	Accounts payable	1.16	4.38	7.76	12.92	20.93	28.79	55.67	81.79	120.18	0.00
306	Change in accts. payable	(1.16)	(3.22)	(3.38)	(2.62)	(2.81)	(3.28)	(4.12)	(6.06)	(8.90)	151.39

Table 6: Loan Schedule

Manila South Water Distribution Project

In Millions of US dollars (Nominal)

TABLE 6: LOAN SCHEDULE

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2005	2006	2007	2008	2014	2015	2016	2017
Loan Receipts	34.63																
Annual Interest Rate, Nominal --->	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Repayment installment --->	0.00	4.16	4.59	5.06	5.59	6.16	6.80	6.69	6.56	5.48	5.23	4.95	4.64	2.02	1.41	0.74	0.00
Beginning Loan		34.63	38.21	42.15	46.51	51.31	56.61	55.66	54.61	45.59	43.50	41.20	38.65	16.81	11.75	6.16	
Interest at 10.33%		3.58	3.95	4.35	4.80	5.30	5.85	5.75	5.64	4.71	4.49	4.26	3.99	1.74	1.21	0.64	
Repayment		0.00	0.00	0.00	0.00	0.00	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	
Interest		0.00	0.00	0.00	0.00	0.00	5.85	5.75	5.64	4.71							
Principal		0.00	0.00	0.00	0.00	0.00	0.95	1.05	1.16	2.09	6.80	6.80	6.80	6.80	6.80	6.80	
Ending loan	34.63	38.21	42.15	46.51	51.31	56.61	55.66	54.61	53.45	43.50	41.20	38.65	35.84	11.75	6.16	0.00	
	0.00	0.00	0.00	0.00	0.00	0.00	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	
PV loan receipts	**34.63**																
PV Loan repayments	**34.63**																

Table 7: Nominal Projected Financial Net Benefit Statement (Investment Point of View)

Manila South Water Distribution Project

	A	D	E	F	H	K	N	V	AA	AF	AJ
334			Table 7								
335			NOMINAL PROJECTED FINANCIAL NET BENEFIT STATEMENT								
336			Investment Point of View, (In million pesos)								
337		1993	1994	1995	1997	2000	2003	2011	2016	2021	2025
338											
339	**INFLOWS**										
340	**Revenue from Drinking Water**	1.29	5.24	9.98	18.61	30.16	43.40	83.92	123.30	181.17	
341	**Revenues from Washing Water**	24.51	99.61	189.61	353.67	573.13	824.56	1,594.39	2,342.69	3,442.18	
342	Revenues	25.80	104.85	199.59	372.29	603.30	867.96	1,678.31	2,465.99	3,623.34	0.00
343	Accounts receivables from drinking water	0.32	1.31	2.49	4.65	7.54	10.85	20.98	30.82	45.29	0.00
344	Changes in accounts receivable from DW	-0.32	-0.99	-1.18	-1.11	-1.01	-1.24	-1.55	-2.28	-3.35	57.05
345	Accounts receivables from washing water	6.13	24.90	47.40	88.42	143.28	206.14	398.60	585.67	860.54	0.00
346	Changes in accounts receivable from WW	-6.13	-18.78	-22.50	-21.17	-19.22	-23.50	-29.53	-43.38	-63.74	1084.04
347	Change in accts. rec.	(6.45)	(19.76)	(23.68)	(22.29)	(20.23)	(24.74)	(31.08)	(45.67)	(67.10)	1,141.09
348	**TOTAL INFLOWS**	**19.35**	**85.09**	**175.90**	**350.00**	**583.07**	**843.22**	**1,647.23**	**2,420.32**	**3,556.24**	**1,141.09**
349											
350	**OUTFLOWS**										
351	Investments										
352	Civil works	236.80	248.61	59.94	53.25	31.33	29.98	0.00	0.00	0.00	0.00
353	Equipment and materials	281.78	305.89	80.61	65.28	38.41	36.75	0.00	0.00	0.00	0.00
354	Office buildings	4.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	Consulting services	0.69	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
356	Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
357	In-house eng. services	21.27	17.23	6.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
358	Taxes and duties	87.10	94.53	24.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
359	Operating and maintenance										
360	Wages	9.20	35.31	63.83	110.54	190.09	277.42	628.52	1,019.62	1,654.08	0.00
361	Chemicals	1.65	6.23	11.04	18.37	29.77	40.94	79.16	116.32	170.91	0.00
362	Power	2.11	7.94	14.07	23.41	37.94	52.17	100.88	148.23	217.79	0.00
363	Supplies & other exp.	1.45	5.45	9.67	16.09	26.07	35.86	69.33	101.88	149.69	0.00
364	Income tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	Change in accts. payable	(1.16)	(3.22)	(3.38)	(2.62)	(2.81)	(3.28)	(4.12)	(6.06)	(8.90)	151.39
366	Change in cash balance	1.07	3.01	3.25	2.67	3.07	3.81	5.69	9.02	14.32	(214.99)
367	**TOTAL OUTFLOWS**	**646.75**	**721.40**	**270.13**	**286.99**	**353.88**	**473.65**	**879.46**	**1,389.00**	**2,197.89**	**(63.60)**
368											
369	**NET BENEFIT FLOWS**	**(627.40)**	**(636.32)**	**(94.23)**	**63.01**	**229.19**	**369.57**	**767.77**	**1,031.32**	**1,358.35**	**1,204.69**

Table 8: Real Projected Financial Net Benefit Statement:

Total Investment point of view

	A	D	E	F	H	K	N	V	AA	AF	AJ
376		1993	1994	1995	1997	2000	2003	2011	2016	2021	2025
377	**INFLOWS**										
378	**Revenue from drinking water**	1.11	4.16	7.34	11.73	15.09	17.23	18.00	18.00	18.00	
379	**Revenue from Washing Water**	21.01	79.07	139.37	222.87	286.71	327.44	342.07	342.07	342.07	
380	Revenues	22.12	83.23	146.70	234.60	301.80	344.68	360.08	360.08	360.08	
381	Accounts receivables from drinking water	0.28	1.04	1.83	2.93	3.77	4.31	4.50	4.50	4.50	0.00
382	Changes in accounts receivable from DW	(0.28)	(0.78)	(0.87)	(0.70)	(0.51)	(0.49)	(0.33)	(0.33)	(0.33)	4.17
383	Accounts receivables from washing water	5.25	19.77	34.84	55.72	71.68	81.86	85.52	85.52	85.52	0.00
384	Changes in accounts receivable from WW	(5.25)	(14.90)	(16.54)	(13.34)	(9.61)	(9.33)	(6.33)	(6.33)	(6.33)	79.18
385	Change in accts. rec.	(5.53)	(15.69)	(17.41)	(14.05)	(10.12)	(9.82)	(6.67)	(6.67)	(6.67)	83.35
386	**TOTAL INFLOWS**	**16.59**	**67.55**	**129.29**	**220.56**	**291.68**	**334.85**	**353.41**	**353.41**	**353.41**	**83.35**
387											
388	**OUTFLOWS**										
389	Investments										
390	Civil works	203.02	197.35	44.06	33.56	15.67	11.90	0.00	0.00	0.00	0.00
391	Equipment and materials	241.58	242.82	59.25	41.14	19.21	14.59	0.00	0.00	0.00	0.00
392	Office buildings	4.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
393	Consulting services	0.59	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
394	Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
395	In-house eng. services	18.23	13.68	4.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
396	Taxes and duties	74.67	75.04	18.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
397	Operating and maintenance										
398	Wages	7.89	28.03	46.92	69.66	95.09	110.17	134.85	148.88	164.38	0.00
399	Chemicals	1.42	4.94	8.11	11.58	14.89	16.26	16.98	16.98	16.98	0.00
400	Power	1.81	6.30	10.34	14.75	18.98	20.72	21.64	21.64	21.64	0.00
401	Supplies & other exp.	1.24	4.33	7.11	10.14	13.04	14.24	14.88	14.88	14.88	0.00
402	Income tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
403	Change in accts. payable	(1.00)	(2.55)	(2.49)	(1.65)	(1.40)	(1.30)	(0.88)	(0.88)	(0.88)	11.06
404	Change in cash balance	0.92	2.39	2.39	1.68	1.54	1.51	1.22	1.32	1.42	(15.70)
405	**TOTAL OUTFLOWS**	**554.48**	**572.67**	**198.56**	**180.85**	**177.03**	**188.09**	**188.69**	**202.82**	**218.42**	**(4.65)**
406											
407	**NET BENEFIT FLOWS**	**(537.90)**	**(505.13)**	**(69.26)**	**39.70**	**114.65**	**146.76**	**164.72**	**150.59**	**134.99**	**88.00**

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Table 9: Debt Service Capacity Ratios

Manila South Water Distribution Project

	A	D	E	F	H	K	N	V	AA	AF	AJ
411				Table 9:							
412				Table: Debt-Service Capacity Ratios							
413											
414		1993	1994	1995	1997	2000	2003	2011	2016	2021	2025
415	DEBT CASH FLOW (Millions of Pesos)										
416	A. Nominal										
417	Debt Cash Flow	0.00	0.00	0.00	(238.78)	(267.41)	(299.46)	(405.01)	(489.12)	0.00	0.00
418											
419	B. Real										
420	Debt Cash Flow	0.00	0.00	0.00	(150.47)	(133.77)	(118.92)	(86.89)	(71.42)	0.00	0.00
421											
422											
423	PROJECTED CASH FLOW STATEMENT, INVESTMENT POINT OF VIEW, REAL (In million pesos)										
424											
425	NET BENEFIT FLOWS	(537.90)	(505.13)	(69.26)	39.70	114.65	146.76	164.72	150.59	134.99	88.00
426											
427											
428	Annual Debt Service Coverage Ratio				0.26	0.86	1.23	1.90	2.11		
429											
430	Debt Service Capacity Ratio				1.19	1.48	1.69	1.99	2.11		
431	Real Interest Rate										
432	6%										

Table 10: Projected Financial Net Benefit Statement:

Total Equity point of view (Nominal)

	A	D	E	F	H	K	N	V	AA	AF	AJ
441		1993	1994	1995	1997	2000	2003	2011	2016	2021	2025
442	**INFLOWS**										
443	**Revenue from Drinking Water**	**1.29**	**5.24**	**9.98**	**18.61**	**30.16**	**43.40**	**83.92**	**123.30**	**181.17**	
444	**Revenues from Washing Water**	**24.51**	**99.61**	**189.61**	**353.67**	**573.13**	**824.56**	**1594.39**	**2342.69**	**3442.18**	
445	Revenues	25.80	104.85	199.59	372.29	603.30	867.96	1,678.31	2,465.99	3,623.34	0.00
446	Change in accts. rec.	(6.45)	(19.76)	(23.68)	(22.29)	(20.23)	(24.74)	(31.08)	(45.67)	(67.10)	1,141.09
447	Loans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
448	**TOTAL INFLOWS**	**19.35**	**85.09**	**175.90**	**350.00**	**583.07**	**843.22**	**1,647.23**	**2,420.32**	**3,556.24**	**1,141.09**
449											
450	**OUTFLOWS**										
451	Investments										
452	Civil works	236.80	248.61	59.94	53.25	31.33	29.98	0.00	0.00	0.00	0.00
453	Equipment and materials	281.78	305.89	80.61	65.28	38.41	36.75	0.00	0.00	0.00	0.00
454	Office buildings	4.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
455	Consulting services	0.69	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
456	Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
457	In-house eng. services	21.27	17.23	6.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
458	Taxes and duties	87.10	94.53	24.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
459	Operating and maintenance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
460	Wages	9.20	35.31	63.83	110.54	190.09	277.42	628.52	1,019.62	1,654.08	0.00
461	Chemicals	1.65	6.23	11.04	18.37	29.77	40.94	79.16	116.32	170.91	0.00
462	Power	2.11	7.94	14.07	23.41	37.94	52.17	100.88	148.23	217.79	0.00
463	Maintenace	1.45	5.45	9.67	16.09	26.07	35.86	69.33	101.88	149.69	0.00
464	Income tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
465	Change in accts. payable	(1.16)	(3.22)	(3.38)	(2.62)	(2.81)	(3.28)	(4.12)	(6.06)	(8.90)	151.39
466	Change in cash balance	1.07	3.01	3.25	2.67	3.07	3.81	5.69	9.02	14.32	(214.99)
467	Loan Repayment	0.00	0.00	0.00	238.78	267.41	299.46	405.01	489.12	0.00	0.00
468											
469	**TOTAL OUTFLOWS**	**646.75**	**721.40**	**270.13**	**525.77**	**621.28**	**773.11**	**1,284.47**	**1,878.12**	**2,197.89**	**(63.60)**
470											
471	**NET BENEFIT FLOWS**	**(627.40)**	**(636.32)**	**(94.23)**	**(175.77)**	**(38.22)**	**70.11**	**362.76**	**542.20**	**1,358.35**	**1,204.69**

Table 11: Real Projected Financial Net Benefit Statement:

Total Equity point of view

	A	B	D	E	F	H	K	N	V	AA	AF	A
48		1991	1993	1994	1995	1997	2000	2003	2011	2016	2021	2025
48	**INFLOWS**											
48	**Revenue from drinking water**	**0.00**	**1.11**	**4.16**	**7.34**	**11.73**	**15.09**	**17.23**	**18.00**	**18.00**	**18.00**	**0.00**
48	**Revenue from Washing Water**	**0.00**	**21.01**	**79.07**	**139.37**	**222.87**	**286.71**	**327.44**	**342.07**	**342.07**	**342.07**	**0.00**
48	Revenues	0.00	22.12	83.23	146.70	234.60	301.80	344.68	360.08	360.08	360.08	0.00
48	Change in accts. rec.	0.00	(5.53)	(15.69)	(17.41)	(14.05)	(10.12)	(9.82)	(6.67)	(6.67)	(6.67)	83.35
48	Loans	969.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	**TOTAL INFLOWS**	969.59	16.59	67.55	129.29	220.56	291.68	334.85	353.41	353.41	353.41	83.35
49												
49	**OUTFLOWS**											
49	Investments											
49	Civil works	0.00	203.02	197.35	44.06	33.56	15.67	11.90	0.00	0.00	0.00	0.00
49	Equipment and materials	0.00	241.58	242.82	59.25	41.14	19.21	14.59	0.00	0.00	0.00	0.00
49	Office buildings	0.00	4.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	Consulting services	1.55	0.59	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	Land	28.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	In-house eng. services	36.47	18.23	13.68	4.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	Taxes and duties	0.00	74.67	75.04	18.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	Operating and maintenance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	Wages	0.00	7.89	28.03	46.92	69.66	95.09	110.17	134.85	148.88	164.38	0.00
50	Chemicals	0.00	1.42	4.94	8.11	11.58	14.89	16.26	16.98	16.98	16.98	0.00
50	Power	0.00	1.81	6.30	10.34	14.75	18.98	20.72	21.64	21.64	21.64	0.00
50	Maintenace	0.00	1.24	4.33	7.11	10.14	13.04	14.24	14.88	14.88	14.88	0.00
50	Income tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	Change in accts. payable	0.00	(1.00)	(2.55)	(2.49)	(1.65)	(1.40)	(1.30)	(0.88)	(0.88)	(0.88)	11.06
50	Change in cash balance	0.00	0.92	2.39	2.39	1.68	1.54	1.51	1.22	1.32	1.42	(15.70)
50	Loan Repayment	0.00	0.00	0.00	0.00	150.47	133.77	118.92	86.89	71.42	0.00	0.00
50												
51	**TOTAL OUTFLOWS**	66.02	554.48	572.67	198.56	331.32	310.80	307.01	275.58	274.24	218.42	(4.65)
51												
51	**NET BENEFIT FLOWS**	903.57	(537.90)	(505.13)	(69.26)	(110.77)	(19.12)	27.84	77.83	79.17	134.99	88.00
51	NPV @ 10%	(77.76)										
51	**IRR**	**8%**										

Table 12: Economic Benefits of Water for Users

Manila South Water Distribution Project

Economic Benefits to Non-Paying Users

A. Benefits to Non- Paying Users of Water for Drinking

The ratio of drinking water from project used by non-paying consumers is assumed at 25%		166	cu. m. per day
If price become 0, the total demand		664	
The ratio of the using water from the project		0.25	
The ratio of the drinking water from vendors		0.75	
The average economic price of drinking water to non-paying users		26.00	
Average price (Pe)	Pe =	26.00	pesos/cu. m

B. Benefits to Non- Paying Users of Water for Washing

Maximum price for washing water		10.00	pesos/cu. m
Minimum price who non-paying users are paying		0	pesos/cu. m
Average price (Pe)	Pe =	5	pesos per day

c) Economic Benefits for Paying users

Year	1991	1992	1993	1994	1995	1996	1997	2001	2002	2003	2004	2005	2022	2023	2024	2025
Resources Saved from Reduced Vendor Water			5.18	19.50	34.37	45.14	54.96	73.91	77.27	80.75	84.36	84.36	84.36	84.36	84.36	0.00
Value of increased consumption			1.27	4.79	8.44	11.09	13.50	18.15	18.98	19.83	20.72	20.72	20.72	20.72	20.72	0.00
Benefits to paying users from washing water			34.54	130.00	229.13	300.96	366.42	492.76	515.13	538.34	562.40	562.40	562.40	562.40	562.40	0.00
Toal Resources saves from paying users			41.00	154.29	271.94	357.20	434.88	584.82	611.38	638.93	667.47	667.47	667.47	667.47	667.47	0.00
Accounts Receivables of paying water for economic analysis																
Accounts receivables from drinking water			1.61	6.07	10.70	14.06	17.12	23.02	24.06	25.15	26.27	26.27	26.27	26.27	26.27	0.00
Change in accounts receivables for drinking water			-1.61	-4.46	-4.63	-3.36	-3.06	-1.00	-1.05	-1.08	-1.12	0.00	0.00	0.00	0.00	26.27
Accounts receivables from washing water			8.64	32.50	57.28	75.24	91.60	123.19	128.78	134.59	140.60	140.60	140.60	140.60	140.60	0.00
Change in accounts receivables for washing water			-8.64	-23.86	-24.78	-17.96	-16.36	-5.35	-5.59	-5.80	-6.01	0.00	0.00	0.00	0.00	140.60
Total change in accounts receivable			-10.25	-28.32	-29.41	-21.31	-19.42	-6.35	-6.64	-6.89	-7.14	0.00	0.00	0.00	0.00	166.87
Economic Benefits of Non-Paying Users																
Benefits to Non-Paying users of Drinking Water			3.21	10.30	15.44	17.16	18.36	21.58	22.56	23.57	24.63	24.63	24.63	24.63	24.63	0.00
Benefits to Non-Paying users of Washing Water			11.74	37.65	56.41	62.72	67.08	78.84	82.42	86.13	89.98	89.98	89.98	89.98	89.98	0.00
Toal Resources saves from non-paying users			14.96	47.96	71.85	79.88	85.44	100.42	104.98	109.71	114.61	114.61	114.61	114.61	114.61	0.00

Table 13a: Conversion factors of inputs.

	A	B	C	D	E	F
711	1. Economic cost of foreign exchange*		0.246			
713	2. Economic cost of capital*		10.30%			
715	3. Investment Cost Items					
717	*3a. Civil works*		Conversion Factor =		0.98	
718	Civil works constitutes labor, material and equipment. To find the conomic cost of civil					
719	works, one needs to find the economic cost of each component and then find a weighted					
720	average. The weighting is based on the respective cost shares.					
722	*3b. Material and equipment*		Conversion Factor =		1.25	
723	Since tariffs and taxes have been treated separately, the only distortion affecting the economic price					
724	of this item is due to the foreign exchange premium.					
725						
726	*3c. Office buildings**		Conversion Factor =		1.02	
727	The economic cost of this item is a weighted average of the economic costs of all its components.					
728						
729	*3d. Consulting services*		Conversion Factor =		1.00	
730	As there is no reason to pay these consultants more than their market value, their economic cost is					
731	considered equal to their financial cost.					
732						
733	*3e. Land*		Conversion Factor =		1.00	
734	As there are no distortions in the land market, the economic price is considered equal to the financial price.					
735						
736	*3f. In-House engineering services*		Conversion Factor =		0.70	
737	It is assumed that 70% of the services are incremental, and would not have been performed without the project.					
738	It is also assumed that the providers of these services are paid their market value. Therefore, the conversion					
739	factor is 0.7*1.0.					
741	*3g. Taxes and duties*		Conversion Factor =		0.00	
742	These are transfers, and do not reflect any economic costs					
743						
753	4. Operating Cost Items					
755	*4a. Wages*		Conversion Factor =		1.00	
756	Workers are paid their market value.					
758	*4b. Chemicals**		Conversion Factor =		0.96	
759	The financial price has been adjusted for duties, taxes and the foreign exchange premium.					
760						
761	4c. Power*		Conversion Factor =		1.07	
762	The conversion factor of 1.07 reflects the subidized electricity prices, taxes on inputs, and					
763	the foreign exchange premium.					
765	*4d. Maintenance*		Conversion Factor =		0.96	
766	The economic cost of maintenance is the weighted average of the economic costs of the					
767	maintenance of the specific components. These are civil works, buildings, pipes and pumps. Their					
768	respective cost shares determine their weights and the economic cost and conversion factor for					
769	maintenance are determined accordingly.					
771	*4e. Changes in accounts payable*		Conversion Factor =		1.00	
772	The conversion factor for accounts payable is the weighted average of all the operating cost items					
773	(excluding labor). Ideally one should estimate a conversion factor for each year since the cost shares					
774	of the operating cost items are likely to change over time. However, as the item 'changes in accounts					
775	payable' is a small cost item and the cost shares of the components of operating costs (excluding labor)					
776	do not change much over the life of the project, an average was used. In this case, the average was 1.00.					
778	*4f. Changes in cash balance*		Conversion Factor =		1.00	
779	The economic cost of the cash held is equal to its financial cost.					
781	*4g. Changes in accounts receivable*		Conversion Factor =		10.79	
782	The conversion factor for accounts receivable is the weighted average of the conversion factor					
783	for all revenue items.					

Table 13b: Summary of Conversion factors:

	A	B	C	D	E	F
794			SUMMARY OF CONVERSION FACTORS			
795						
796	**OUTPUT**					
797	Revenue water	2.10				
798	Ch. in acc. receivable	2.10				
799	Non-Revenue water*	Undefined	Economic value		7.68	(1991 pesos per cu m)
800						
801						
802	**INPUTS**					
803	Investment Items					
804	Civil works	0.98				
805	Equipment and materials	1.25				
806	Office buildings	1.02				
807	Consulting services	1.00				
808	Land	1.00				
809	In-house eng. services	0.70				
810	Taxes and duties	0.00				
811						
812	Operating and Maintenance items					
813	Wages	1.00				
814	Chemicals	0.96				
815	Power	1.07				
816	Maintenance	0.96				
817	Ch. in acc. payable	1.00				
818	Ch. in cash balance	1.00				
819						
820						
821	*. Since the financial price for non-revenue water is zero, the conversion factor is undefined.					
822						

Table 14: Real Projected Economic Net Benefit Statement:

	CF	1991	1992	1993	1994	1995	2000	2001	2002	2003	2004	2005	2024	2025
Economic Benefits														
Resources Saved from reduced Vendors supply		0.00	0.00	5.18	19.50	34.37	70.71	73.91	77.27	80.75	84.36	84.36	84.36	0.00
Value of increased consumption		0.00	0.00	1.27	4.79	8.44	17.37	18.15	18.98	19.83	20.72	20.72	20.72	0.00
Benefits to paying users from washing water		0.00	0.00	34.54	130.00	229.13	471.37	492.76	515.13	538.34	562.40	562.40	562.40	0.00
Toal Resources saves from paying users		**0.00**	**0.00**	**41.00**	**154.29**	**271.94**	**559.44**	**584.82**	**611.38**	**638.93**	**667.47**	**667.47**	**667.47**	**0.00**
Change in account receivable from drinking water		**0.00**	**0.00**	(1.61)	(4.46)	(4.63)	(1.43)	(1.00)	(1.05)	(1.08)	(1.12)	0.00	0.00	26.27
Change in accounts receivable from washing water		**0.00**	**0.00**	(8.64)	(23.86)	(24.78)	(7.64)	(5.35)	(5.59)	(5.80)	(6.01)	0.00	0.00	140.60
Change in accounts receivable		**0.00**	**0.00**	(10.25)	(28.32)	(29.41)	(9.07)	(6.35)	(6.64)	(6.89)	(7.14)	0.00	0.00	166.87
Benefits to Non-Paying users of Drinking Water		0.00	0.00	3.21	10.30	15.44	23.62	21.58	22.56	23.57	24.63	24.63	24.63	0.00
Benefits to Non-Paying users of Washing Water		0	0	11.74	37.65	56.41	86.30	78.84	82.42	86.13	89.98	89.98	89.98	0.00
Resources saves from non-paying users		0	0	14.96	47.96	71.85	109.91	100.42	104.98	109.71	114.61	114.61	114.61	0.00
GROSS ECONOMIC BENEFITS		**0**	**0**	**45.71**	**173.92**	**314.38**	**660.28**	**678.90**	**709.72**	**741.75**	**774.95**	**782.08**	**782.08**	**166.87**
ECONOMIC COSTS														
Investments														
Civil works	0.98	0.00	92.21	198.96	193.41	43.18	15.36	10.75	11.25	11.67	12.09	0.00	0.00	0.00
Equipment and materials	1.25	0.00	145.19	301.01	302.56	73.82	23.94	16.75	17.53	18.18	18.84	0.00	0.00	0.00
Office buildings	1.02	0.00	4.19	4.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consulting services	1.00	1.55	1.22	0.59	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Land	1.00	28.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
In-house eng. services	0.70	25.53	12.76	12.76	9.57	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxes and duties	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operating and maintenance		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wages	1.00	0.00	0.00	7.89	28.03	46.92	95.09	96.92	103.35	110.17	117.39	119.74	174.44	0.00
Chemicals	0.96	0.00	0.00	1.36	4.75	7.79	14.30	14.29	14.93	15.61	16.31	16.31	16.31	0.00
Power	1.07	0.00	0.00	1.93	6.74	11.06	20.31	20.29	21.21	22.17	23.16	23.16	23.16	0.00
Supplies & other exp.	0.96	0.00	0.00	1.19	4.16	6.82	12.52	12.51	13.08	13.67	14.28	14.28	14.28	0.00
Income tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change in accts. payable	1.00	0.00	0.00	(1.00)	(2.55)	(2.49)	(1.40)	(0.77)	(1.25)	(1.30)	(1.36)	(0.88)	(0.88)	11.06
Change in cash balance	1.00	0.00	0.00	0.92	2.39	2.39	1.54	0.92	1.43	1.51	1.60	1.12	1.49	(15.70)
GROSS ECONOMIC COSTS		**55.08**	**255.58**	**529.81**	**549.39**	**192.69**	**181.65**	**171.66**	**181.53**	**191.67**	**202.31**	**173.72**	**228.79**	**(4.65)**
NET ECONOMIC BENEFITS		**(55.08)**	**(255.58)**	**(484.11)**	**(375.46)**	**121.70**	**478.63**	**507.23**	**528.18**	**550.07**	**572.64**	**608.37**	**553.29**	**171.51**
NPV economics		**2,117.87**												
EIRR		24%												

Table 15: Real Projected Flow of Externalities

	A	B	C	F	H	K	N	V	AA	AF	AJ	AK
712			1991	1994	1996	1999	2002	2010	2015	2020	2024	2025
713												
714	**BENEFITS EXTERNALITIES**											
715	Ext. for paying users from drinking water		0	20.13	46.60	68.25	79.76	87.08	87.08	87.08	87.08	0.00
716	Ext. for paying users from washing		0	50.93	117.90	172.68	201.80	220.32	220.32	220.32	220.32	0.00
717	Loss to the vendor		0	5.82	13.46	19.72	23.05	25.16	25.16	25.16	25.16	0.00
718	**Total Exter. To paying users from DW**		**0.00**	**25.94**	**60.06**	**87.97**	**102.80**	**112.23**	**112.23**	**112.23**	**112.23**	**0.00**
719	Change in accts.rec. DW		0.00	(3.67)	(2.64)	(0.88)	(0.57)	0.33	0.33	0.33	0.33	22.10
720	Change in accts.rec. WW		0.00	(8.96)	(4.45)	1.80	3.36	6.33	6.33	6.33	6.33	61.41
721	**Change in accts. rec. (DW+WW)**		**0.00**	**(12.63)**	**(7.10)**	**0.93**	**2.79**	**6.67**	**6.67**	**6.67**	**6.67**	**83.52**
722	Accts. Rec. from from Vendor (for the externalities)		0.00	1.45	3.37	4.93	5.76	6.29	6.29	6.29	6.29	0.00
723	Change in accts. rec.		0.00	(1.07)	(0.80)	(0.32)	(0.25)	0.00	0.00	0.00	0.00	6.29
724	Benefits to non-paying users		0.00	47.96	79.88	102.79	104.98	114.61	114.61	114.61	114.61	0.00
725	**TOTAL BENEFITS EXTERNALITIES**		**0.00**	**106.38**	**237.28**	**344.64**	**389.32**	**428.67**	**428.67**	**428.67**	**428.67**	**83.52**
726												
727												
728	**COSTS EXTERNALITIES**											
729	Investments											
730	Civil works		0.00	(3.95)	(0.74)	(0.30)	(0.23)	0.00	0.00	0.00	0.00	0.00
731	Equipment and materials		0.00	59.73	11.10	4.48	3.46	0.00	0.00	0.00	0.00	0.00
732	Office buildings		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
733	Consulting services		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
734	Land		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
735	In-house eng. services		(10.94)	(4.10)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
736	Taxes and duties		0.00	(75.04)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
737	Operating and maintenance		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
738	Wages		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
739	Chemicals		0.00	(0.20)	(0.40)	(0.56)	(0.62)	(0.68)	(0.68)	(0.68)	(0.68)	0.00
740	Power		0.00	0.44	0.89	1.24	1.39	1.52	1.52	1.52	1.52	0.00
741	Supplies & other exp.		0.00	(0.17)	(0.35)	(0.49)	(0.55)	(0.60)	(0.60)	(0.60)	(0.60)	0.00
742	Income tax		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
743	Change in accts. payable		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
744	Change in cash balance		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
745	**TOTAL COSTS EXTERNALITIES**		**(10.94)**	**(23.28)**	**10.51**	**4.38**	**3.45**	**0.24**	**0.24**	**0.24**	**0.24**	**0.00**
746												
747	**NET ECONOMIC EXTERNALITIES**		**10.94**	**129.66**	**226.78**	**340.27**	**385.87**	**428.43**	**428.43**	**428.43**	**428.43**	**83.52**
748												
749	**NPV (MODEL RESULT) @**	**10.30%**	**2,560.76**									

Table 16: Allocation of Externalities

Table 16
DISTRIBUTION OF EXTERNALITIES
(millions of 1991 pesos)

	A	B	C	D	E	F	G	H	I	J
775										
776										
777										
778										
779		(A)	(B)	(B-A)		DISTRIBUTION OF EXTERNALITIES				
780		PV Financial	PV Economic							
781		at Economic	at Economic	PV of						
782		Discount Rate	Discount Rate	Externalities		Government	Non-Paying Users	Paying Users*	Engineering Services	Water Vendors
783		of 10.30%	of 10.30%							
784										
785	**BENEFITS**									
786	Revenue Gener. Water	2,091.45	3,876.90	1,785.46	Drinking			651.90		(146.14)
787					Washing			1,279.69		
788	Change in accts. rec.	(83.94)	(90.51)	(6.57)	Drinking			(13.46)		3.41
789					Washing			3.48		
790	Benefits from non-revenue water (drinking)	0.00	159.07	159.07	Drinking		159.07			
791	Benefits from non-revenue water (washing)	0.00	581.21	581.21	Washing		581.21			
792	**TOTAL BENEFITS**	2,007.51	4,526.68	2,519.17						
793										
794	**COSTS**									
795	Investments									
796	Civil works	510.32	500.11	(10.21)		10.21				
797	Equipment and materials	624.87	778.59	153.72		(153.72)				
798	Office buildings	7.11	7.25	0.14		(0.14)				
799	Consulting services	3.39	3.39	0.00						
800	Land	28.00	28.00	0.00						
801	In-house eng. services	81.26	56.88	(24.38)					24.38	
802	Taxes and duties	162.32	0.00	(162.32)		162.32				
803	Operating and maintenance	0.00	0.00	0.00						
804	Wages	710.43	710.43	0.00						
805	Chemicals	102.19	98.10	(4.09)		4.09				
806	Power	130.22	139.34	9.12		(9.12)				
807	Maintenance	89.50	85.92	(3.58)		3.58				
808	Income tax	0.00	0.00	0.00						
809	Change in accts. payable	(11.54)	(11.54)	0.00						
810	Change in cash balance	12.33	12.33	0.00						
811	**TOTAL COSTS**	2,450.40	2,408.80	(41.60)						
812										
813	**NET BENEFITS**	(442.89)	2,117.87	2,560.76		17	740	1,922	24	(143)
814										
815										
816										
817										

* As these are the net benefits of the externalities, this includes the the benefits of the consumer surplus on drinking and wash water, minus the loss in well owner's producer surplus, due to the fact that the well owners are the consumers.

Table 17: Reconciliation between Economic/Financial and Distributive Analysis

	A	B	C	D	E	F	G	H	J
804					TABLE 17				
805									
806					Distributive Analysis of Net Benefits				
807									
808	**Reconciliation between Economic/Financial and Distributive Analysis:**								
809	DISCOUNT RATES								
810	Financial	10.30%							
811	Economic	10.30%							
812									
813	Econ.NPV @ 10.3%=			Fin.NPV@10.30%	+	NPV Ext. @10.30%			
814		2,117.87	=	-442.89	+	2,560.76			
815									
816			=	2,117.87					
817									
818	**Distribution of Total Net Benefits**								
819									
820		**Government**		**Non-Paying**		**Paying**		**Engineering**	**Water**
821				**Users**		**Users**		**Services**	**Vendors**
822	**NPV Exter. @ 10.3%**	17.22		740.28		1,921.61		24.38	-142.72
823									

Table 18: Sensitivity Analysis of Financial Outcome

Financial Water Tariff	NPV equity
	(77.76)
4	(345.71)
4.5	(191.92)
5	**(77.76)**
5.5	(3.24)
5.5301	(0.02)
5.7	15.47
6	31.64
6.83	2.03
7	(17.51)
7.5	(101.55)
9	(591.48)
10	(1116.29)

Accounts receivables	NPV equity
	(77.76)
1	(20.59)
2	(49.17)
3	**(77.76)**
4	(106.35)
5	(134.93)
6	(163.52)
7	(192.11)
8	(220.69)
9	(249.28)
10	(277.87)
11	(306.45)
12	(335.04)

Real increase in wa;	NPV equity
	(77.76)
1%	23.15
2%	**(77.76)**
3%	(198.22)
4%	(342.65)
5%	(516.53)
6%	(726.70)
7%	(981.70)
8%	(1292.22)
9%	(1671.62)
10%	(2136.63)

Cost -Over runs	NPV equity
	(77.76)
-7%	17.59
-6%	3.97
-5%	(9.65)
-4%	(23.27)
-3%	(36.90)
-2%	(50.52)
-1%	(64.14)
0%	**(77.76)**
5%	(145.87)
10%	(213.97)

Installation Efficiency	NPV equity
	(77.76)
0.6	-331.52
0.7	-225.79
0.8	-120.05
0.84	**-77.76**
0.9	-14.32
1	91.42

Domestic Inflation	
	(77.76)
2%	-50.66
5%	-64.60
8%	**-77.76**
11%	-90.21
14%	-102.00
17%	-113.19
20%	-123.82

Percentage of Non-Revenue W Leakage	NPV equity	NPV economics
	(77.76)	2,117.87
15%	46.37	2237.84
20%	28.12	2220.20
25%	9.86	2202.55
30%	(8.39)	2184.91
35%	(26.65)	2167.27
40%	(44.90)	2149.63
45%	(63.16)	2131.99
49%	**(77.76)**	**2117.87**
50%	(81.41)	2114.35
55%	(99.67)	2096.71
60%	(117.92)	2079.06
65%	(136.18)	2061.42
70%	(154.43)	2043.78
75%	(172.69)	2026.14
80%	(190.94)	2008.50

Percentage of Non-Revenue Water Non-Leakage	NPV equity	NPV economics
	(77.76)	2117.87
15%	53.68	1722.34
20%	35.42	1777.28
25%	17.17	1832.21
30%	(1.09)	1887.15
35%	(19.34)	1942.08
40%	(37.60)	1997.02
45%	(55.85)	2051.95
51%	**(77.76)**	**2117.87**
50%	(74.11)	2106.89
55%	(92.36)	2161.82
60%	(110.62)	2216.76
65%	(128.87)	2271.69
70%	(147.13)	2326.63
75%	(165.38)	2381.56
80%	(183.64)	2436.50

Table 19: Sensitivity Analysis of Economic Outcome

Manila South Water Distribution Project

	A	B	C	E	F	G
895		SENSITIVITY OF ECONOMIC RETRUN TO KEY VARIABLES				
896		(millions of 1991 pesos)				
897						
898						
899						
900	**Variation in Financial Tariff**			**Variation in Average Eonomic Benefit of**		
901	**of Water**			**of Washing Water to Non- Paying Users**		
902		NPV Econ			NPV Econ	
903			**2,118**		**2,118**	
904		2.50	2,511	3.00	1,885	
905		3.00	2,475	3.50	1,944	
906		3.50	2,417	4.00	2,002	
907		4.00	2,339	4.50	2,060	
908		4.50	2,239	**5.00**	**2,118**	
909		**5.00**	**2,118**	5.50	2,176	
910		5.412	2,002	6.00	2,234	
911		5.50	1,975	6.50	2,292	
912		6.00	1,812			
913		6.50	1,626			
914		7.00	1,420			
915						
916	**Variation in Average Eonomic Benefit of**			**Minimum supply of water from vendors**		
917	**of Drinking Water to Non-Paying Users**				**Externalities for Vendors**	
918		NPV Econ				
919			**2,118**		**(143)**	
920		9.0	2,014	5.0	(269)	
921		12.0	2,032	10.0	(227)	
922		15.0	2,051	15.0	(185)	
923		18.0	2,069	**20.0**	**(143)**	
924		19.0	2,075	25.0	(101)	
925		22.0	2,093	30.0	(59)	
926		**26.0**	**2,118**	35.0	(17)	
927		27.0	2,124	40.0	25	
928		28.0	2,130			

Table 20: Risk Variables, Probability Distributions, and Range values

Risk variable	Base value	Probability distribution	Minimum value	Maximum value
Ability of MWSS to meet Non-Revenue water targets	100%	normal	-25%	+25%
Investment cost overrun factor	0	normal	-20%	+20%

			Range value	Probability
Installation efficiency factor for connections	.84	step	.60 - .80	0.30
			.80 - 1.00	0.70
Average accounts receivable period, months	3	step	1 - 2	0.10
			2 - 3	0.45
			3 - 4	0.30
			4 - 5	0.15

Table 21: Risk Analysis Results

Manila South Water Distribution Project

Heading	NPV Equity	NPV Economic	Government Benefit	Non Paying Users Benefit	Paying Users Benefit	Engineering Service Benefit	Water Vendors
Expected Value	(78.70)	2121.68	17	745	1921	24	(143)
Standard Deviation	160.54	348.51	2	82	178	2	13
Minimum	(597.01)	1057.83	13	490	1443	20	(168)
Maximum	383.80	2940.02	21	1003	2241	29	(107)
Coefficient of variation	-2.04	0.16	0.10	0.11	0.09	0.09	-0.09
Probability of negative outcome	67.51%	0.0%	0.0%	0.0%	0.0%	0.0%	100.%

Figure 1: Manila Water Distribution Project:

Cumulative Distributions: Financial (Equity) and Economic NPVs

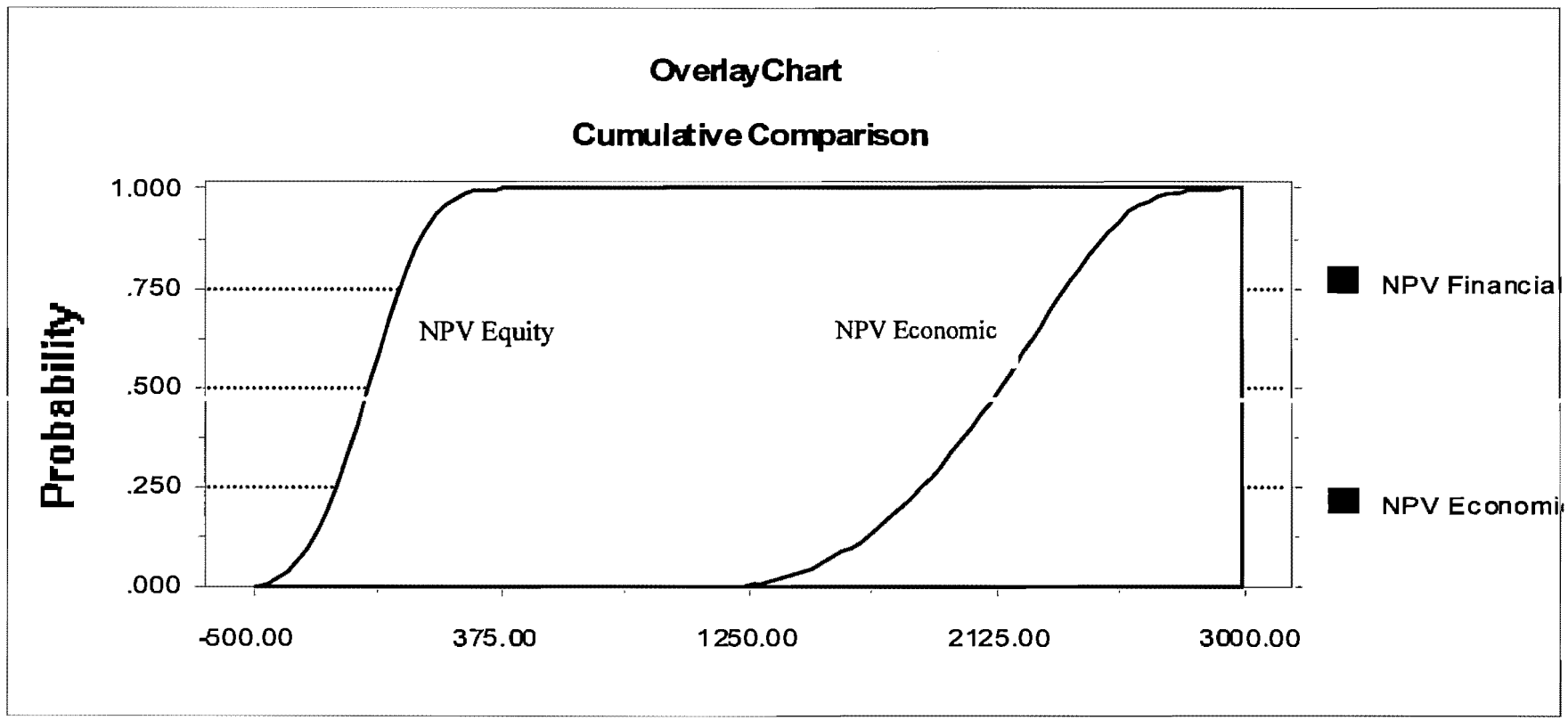
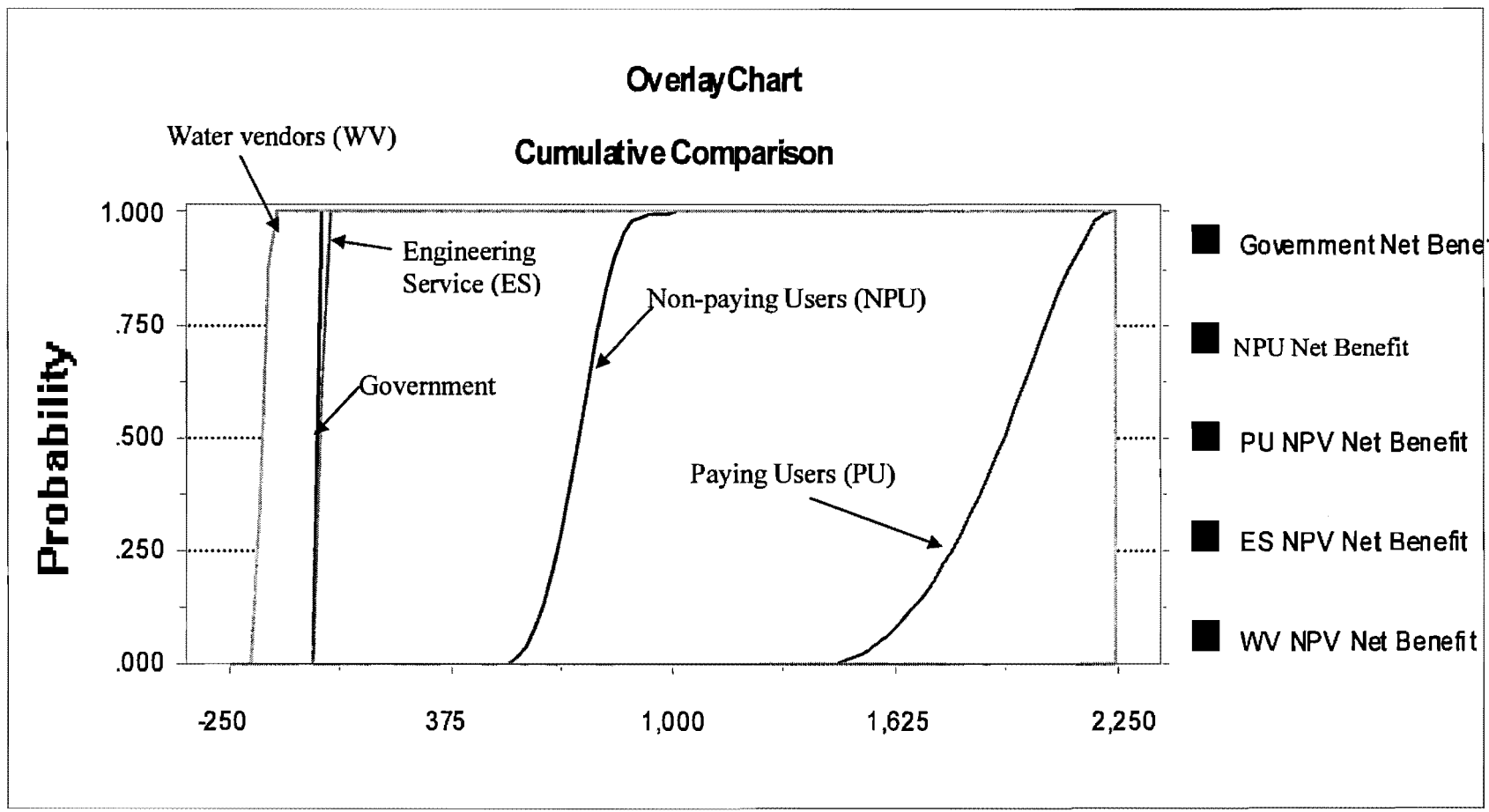


Figure 2: Water Distribution Project

Probabilities of Realization of Net Benefits



9

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week Two, Day One

(Session I: 09:00 – 10:30)

Principles of Cost Effectiveness with Applications

Cost Effectiveness Analysis

- An appraisal and program monitoring technique used to determine the least cost way of supplying a good or service. Example: what is the least cost way of supplying electricity or water to a community?
- Used heavily in social programs and projects where identification and quantification of benefits in money terms is not straightforward but, at the same time, the desirability of the activity is not in question.
- For example:
  - What is the best way to prevent heart attacks?
  - What drugs are most cost effective in the treatment of illness?
  - What is the least cost way of providing nutrition to poor children?
- The objective is to compare costs per unit of outcome of two or more programs for purposes of capital budgeting.

Cost Effectiveness Analysis (cont'd)

- This approach is very useful where aim is to choose from a set of alternative technologies and approaches that will provide the same service.
  - *Examples:*
    - Choosing from two school systems that give same education benefits
      - Centralized schools that require bus transportation and more expensive smaller schools to which students can walk,
    - Two systems of electricity generation
      - Thermal versus hydro,
    - Two park sites providing same recreational services
    - Two types of court systems
      - More court rooms at the headquarters or mobile courts.
    - Choosing amongst alternative ways of supplying potable water to communities
    - Two or more programs for AIDS prevention.

Cost Effectiveness Analysis (cont'd)

- A cost-effectiveness analysis involves a series of steps similar to those of a normal investment appraisal except that the benefits are not measured as monetary values, but as quantitative impacts.
- The focus is on evaluating the costs of the alternatives.
- Economic analysis will involve the comparison of economic costs of two or more alternatives or estimating the economic cost per unit of outcome of a program.

Discounting

- Although cost effectiveness analysis does not place a monetary value on the benefits, the project's benefits (effectiveness) has to be discounted to the same year as the discounted costs.
- Both the costs and units of effectiveness should be discounted by the same rate.

$$CE_i = \frac{\text{PV of Costs}_i}{\text{PV of Effectiveness}_i}$$

- The cost-effectiveness ratios are computed for each of the alternatives and then the analyst can rank the alternatives and take a decision.

Discounting in health care evaluation

- Currently the 3% discount rate is used by convention by health sector is far too low.
- As most health interventions need to be continued through time (eg. drugs), the discount rate is not too critical as most costs and benefits occur in the same period.
- Discounting is very important when capital expenditures are involved such as building construction: clinics, hospital, or Equipment e.g. CAT scan and MRI machines.

Cost Effectiveness Analysis Can Be Used in Two Forms:

Method 1: Constant effects

- Uses least-cost analysis to determine the lowest cost alternative for meeting the same level of benefits, including intangible benefits.
- Selection criteria is "*choose the alternative that has the lowest present value of costs (PVC).*"
  - Again the outcome may be a function of the rate of discount and may switch with change in discount rate.
- ***Example:***
  - Choosing from two types of water pipes of different diameters that yield the same quantity and quality of water per day (smaller pipe has lower investment cost but higher operating or pumping costs),
  - Selecting from two alternatives for generating the same amount of electricity (thermal and hydro generation units, the former with a lower investment and higher operating cost compared to the latter).

Case 1

Least Cost Method

Drinking Water: Alternative Delivery Systems

Alternative A:

(All figures in '000)

Years	0	1	2	3	4	5
Installation cost	3000					
Operating cost		700	700	700	700	700
Total cost	3000	700	700	700	700	700
PV of Total cost (at 6%)	**$5,949**		*PV of Total cost (at 9%)*			**$ 5,723**

Alternative B:

(All figures in '000)

Years	0	1	2	3	4	5
Installation cost	4200					
Operating cost		400	400	400	400	400
Total cost	4200	400	400	400	400	400
PV of Total cost (at 6%)	**$5,885**		*PV of Total cost (at 9%)*			**$5,756**

The results switch with change in discount rate.

Method 2: Cost-Effectiveness Ratio

- **Calculates the cost per unit of benefit. Both benefits and costs vary across alternatives.**
- ***Example:***

  Benefits are simply measured as the number of Premature Deaths Prevented.

  - Two different health programs: DPT-BCG vaccination campaign for children or AIDS treatment program for infected patients.
  - The cost per child vaccination and per patient will be computed in this case. Here the purpose is to see which program yields more value per dollar of expenditure.

Case 2
COST OF HEALTH PROJECT: IMMUNIZATION AGAINST DPT (diphtheria, pertussis and tetanus) -Bacillus of Calmette and Guérin (BCG- against tuberculosis)

(All figures in ' 000 of US$)

Year	2000	2001	2002	2003	2004	2005
Premature Deaths Prevented	-	8,000	12,000	18,000	25,000	30,000
Capital Costs						
Facilities	2,500					
Equipments	8,500					
Vehicles	5,000					
Training	2,000					
Technical Assistance	6,000					
Recurrent Costs						
Personnel		10,000	16,000	25,000	36,000	42,500
Supplies		15,000	24,000	37,500	55,000	64,000
Training		500	800	1,250	1,800	2,100
Maintenance		2,000	3,200	4,500	7,200	8,000
Others		3,300	5,500	8,200	12,000	14,500
Total Costs	**24,000**	**30,800**	**49,500**	**76,450**	**112,000**	**131,100**

Present value of Total Benefits	6.0%	**75,560**	**Present value of Total Benefits**	9.0%	68,547
Present Value of Total Costs	6.0%	**347,980**	**Present Value of Total Costs**	9.0%	317,503
Cost per unit of Premature Deaths Prevented			**4.61**		**4.63**

Case 3
COST OF HEALTH PROJECT: AIDS PROGRAM

(All figures in ' 000 of US$)

Year	2000	2001	2002	2003	2004	2005
Deaths Prevented	-	500	750	1,000	1,400	1,750
Capital Costs						
Facilities	200					
Equipments	1,000					
Vechicles	300					
Training	500					
Technical Assistance	1,500					
Recurrent Costs						
Personnel		2,000	2,500	4,000	5,000	6,000
Supplies		40,000	65,000	90,000	120,000	150,000
Training		100	100	100	100	100
Maintanance		250	300	450	600	800
Others		300	500	800	1,250	1,500
Total Costs	**3,500**	**42,650**	**68,400**	**95,350**	**126,950**	**158,400**

Present value of Total Benefits	6.0%	4,395	**Present value of Total Benefits**	9.0%	3,991
Present Value of Total Costs	6.0%	403,591	**Present Value of Total Costs**	9.0%	366,711
Cost per unit of Deaths Prevented			**91.82**		**91.88**

Types of economic evaluation in Health Sector

- **Disability-Adjusted Life Years (DALY)**
- **Quality-Adjusted Life Years (QALY)**

QALY as measure of quality of life, DALY overall measure of disease burden

Disability Adjusted Life Years

- The DALY index calculates the productive years lost from the ideal lifespan due to morbidity or premature mortality.
- Reduction of productive years due to morbidity is a function of the years lived with the disability, and an assigned weighting.
- It allows both morbidity and mortality to be considered in a single measure.

Quality Adjusted Life Year (QALY)

- QALY has been created to combine the quantity and quality of life.
- The basic idea of a QALY is straightforward. It takes one year of perfect health-life expectancy to be worth 1, but regards one year of less than perfect life expectancy as less than 1.
- An intervention which results in a patient living for four years rather than dying within one year. Hence, the treatments adds 3 years to the person's life. However, if the quality of life falls from 1 to 0.5 on the continue than the treatment generates 1.5 QALY.
- QALY' s can therefore provide an indication of the benefits gained from a variety of medical procedures in terms of quality and life and survival for the patient.

Cost-effectiveness Analysis of Strategies to Combat HIV/AIDS in Developing Countries

Annual costs in international dollars ($int),* infections averted, DALYs averted, and average cost effectiveness for various single interventions to control HIV/AIDS in Afr-E region (countries in sub-Saharan Africa with very high adult and high child mortality), compared with no intervention†

Intervention	Coverage level	Yearly costs ($int, millions)	Yearly infections averted (millions)‡	Average cost effectiveness ratio ($int/infection averted)	Yearly DALYs averted (millions)‡	Average cost effectiveness ratio ($int/DALY averted)
Mass media	100%	16	0.27	58	4.5	3
Peer education for sex workers	50%	40	0.57	70	9.2	4
	80%	61	0.89	68	14.3	4
	95%	70	1.04	68	16.7	4
Peer education and treatment of sexually transmitted infections for sex workers	50%	42	0.72	58	11.6	4
	80%	63	1.09	58	17.5	4
	95%	74	1.26	59	20.2	4
School based education	50%	58	0.01	9446	0.1	530
	80%	77	0.01	7908	0.2	444
	95%	77	0.01	6704	0.2	376
Voluntary counselling and testing	95%	406	0.31	1315	5.0	82
Prevention of mother to child transmission	ANC	161	0.19	847	4.7	34
Treatment of sexually transmitted infections	Current	43	0.14	304	2.3	19
	ANC	111	0.34	328	5.4	21
	95%	229	0.45	514	7.1	32
Antiretroviral therapy:						
No intensive monitoring, first line drugs only	ANC	1360	0.05	28 038	2.4	556
Intensive monitoring, first line drugs only	ANC	1507	0.04	34 826	2.5	596
No intensive monitoring, first and second line drugs	ANC	6434	0.04	161 099	3.2	2010
Intensive monitoring, first and second line drugs	ANC	6945	0.04	185 396	3.5	1977

*International dollars are a hypothetical unit of currency that has the same purchasing power that the US$ has in the United States at a given point in time. Details of this approach are discussed elsewhere.[12]

‡Intervention benefits are not comparable with current epidemiological estimates because results in this analysis are computed in relation to a "no intervention" comparator, which subtracts current levels of condom use, treatment of sexually transmitted infections, and antiretroviral treatment.

ANC=antenatal care coverage level.

Source: BMJ, doi:10.1136/bmj.38643.368692.68 (published 10 November 2005)

Incremental (or Marginal) Cost-Effectiveness Ratio

- The decision makers need to compute marginal cost-effectiveness ratios.
- This need arises when a new alternative is compared with the existing situation.
- The numerator now contains the difference between the cost of the new and old alternatives, and the denominator is also the difference between the effectiveness of the new and old alternatives:

$$\text{Marginal CE}_i = \frac{C_i - C_O}{E_i - E_O}$$

- This ratio can be interpreted as the incremental cost per unit of effectiveness. When there are several alternatives available, the marginal cost-effectiveness ratio can be used to rank the new measures versus the existing one.

Case 4

Marginal Cost-Effectiveness Ratios in Prevention of Traffic Fatalities

	Policy Measures	Total lives saved	Incremental Effectiveness (Deaths Prevented a Year)	Total Cost (Million $)	Incremental Cost (million $ per Year)	Marginal CE Ratios ($)	Ranking
A	Existing	500	500	20.00	20.00	40,000	
B	Existing plus Enforcement	600	100	25.50	5.50	55,000	2
C	Existing plus Road safety	1000	500	31.50	11.50	23,000	1
D	Existing plus Public Campaign	585	85	25.00	5.00	58,824	3

Cost-effectiveness Analysis of Strategies to Combat HIV/AIDS in Developing Countries

Annual costs in international dollars ($int),* DALYs averted, and incremental cost effectiveness of non-dominated† intervention combinations to control HIV/AIDS in Afr-E region

Intervention package		Yearly costs ($int, millions)	Yearly DALYs averted (millions)‡	Incremental cost effectiveness ratio ($int/DALYs averted)
No	Details			
D1	Mass media	16	4.5	3
D2	D1 + peer education and treatment of sexually transmitted infections for sex workers, 50% coverage	57	15.6	4
D3	D1 + peer education and treatment of sexually transmitted infections for sex workers, 80% coverage	79	21.3	4
D4	D1 + peer education and treatment of sexually transmitted infections for sex workers, 95% coverage	89	23.8	4
D5	D4 + prevention of mother to child transmission, antenatal care coverage level	249	27.3	46
D6	D5 + treatment of sexually transmitted infections, current coverage	290	27.9	68
D7	D5 + treatment of sexually transmitted infections, antenatal care coverage	357	28.7	80
D8	D7 + voluntary counselling and testing, 95% coverage	742	30.5	220
D9	D8 + treatment of sexually transmitted infections, expanded to 95% coverage	859	30.9	290
D10	D9 + antiretroviral therapy, no intensive monitoring, first line drugs only	2125	33.2	547
D11	D10 + school based education, 95% coverage	2202	33.3	631
D12	D11 + antiretroviral therapy, intensive monitoring, first line drugs only	2350	33.4	1144
D13	D11 + antiretroviral therapy, intensive monitoring, first and second line drugs	7483	34.4	5175

*International dollars are a hypothetical unit of currency that has the same purchasing power that the US$ has in the United States at a given point in time. Details of this approach are discussed elsewhere.[12]

†Excludes combinations that were more costly but less effective than others (dominated interventions) and those with higher incremental cost effectiveness ratios than more effective options (weakly dominated interventions).

‡Intervention benefits are not comparable with current epidemiological estimates because results in this analysis are computed in relation to a "no intervention" comparator, which subtracts current levels of condom use, treatment of sexually transmitted infections, and antiretroviral treatment.

Source: BMJ, doi:10.1136/bmj.38643.368692.68 (published 10 November 2005)

Application of Cost-Effectiveness to Water Supply Alternatives

Criteria: To minimize the present value of the average economic cost per cubic meter of water consumed

Options:

- **Two Alternative Strategies**
  - Construction of Rooipoort alone
  - Rooipoort and Raising of Existing Flag Boshielo+5m

  – Two Alternative Dam Sites and Five Different sizes of Dam
    - **Two Alternative Dam Sites**
      - » Upstream
      - » Downstream
    - **Five Different Sizes of Dam**
      - » FSL 720 FSL724
      - » FSL 725 FSL728
      - » FSL 731

Figure 1: Water Demand and Supply: Existing Flag Boshielo and Rooipoort (Flag Boshielo is not raised), million m³.

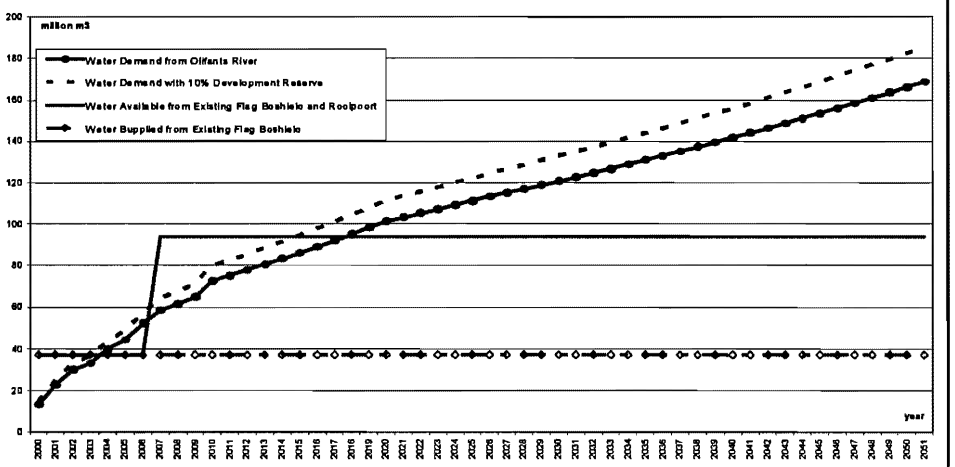


Figure 2: Water Demand and Supply: Flag Boshielo+5m and Rooipoort, million m³.

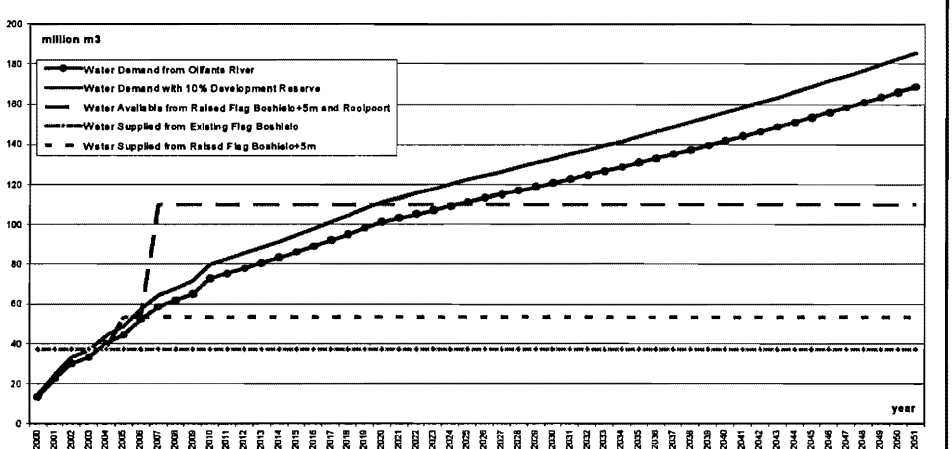


Table 1: Delivered Water to Bulk Users with Different Economic Opportunity Cost of Water Shortage, R/m³.

	Two Alternative Sites/ Five Different sizes of Dam						
Rand/m3 of Demand not met		Upstream			Downstream		
		FSL724	FSL728	FSL731	FSL720	FSL725	FSL731
3.00	Rooipoort Alone	3.40	2.43	2.07	3.53	2.39	1.95
	Rooipoort and Flag Boshielo+5m	2.16	1.94	1.87	2.25	1.97	1.89
4.00	Rooipoort Alone	3.74	2.58	2.15	3.88	2.52	2.01
	Rooipoort and Flag Boshielo+5m	2.20	1.95	1.90	2.29	1.98	1.89

Limitations of CEA

1. Does not measure willingness to Pay

- Cost-effectiveness ratios are a poor measure of consumers' willingness to pay.
- The taxpayers, most probably, would be happy to pay for additional number of deaths prevented on the roads, as a measure of effectiveness.
- What is the willingness to pay for the additional "drug addicts treated"?
- The number of addicts treated may not be the best approximation of the value of the final outcome.
- The link between the intermediate measure of effectiveness and final output, such as reduction in crime, is not explicitly stated.
- Faced with this kind of situation, the analyst must make sure that this link is properly established.

Limitations of CEA
2. Excludes some external benefits

- The concept of cost effectiveness analysis excludes most externalities on the benefits side.
- On the benefit side, the CEA looks only at a single benefit and all other benefits are essentially ignored during project selection.
- An improvement in education will not only increase life-time earnings of the students but also likely to contribute to a reduction in the rates of unemployment and crime.
- In healthcare, there are external benefits due to such treatments as the vaccination of children, i.e. other people do not catch the infection diseases.
- If a complete cost benefit analysis does not seem possible, the analyst doing the evaluation should be careful not to exclude important benefits arising from a particular project.

Limitations of CEA
3. Excludes some external costs

- While computing the cost-effectiveness ratio for a particular project, attention should be paid to the treatment of costs, which may include not only financial but also social costs.
- In the education sector, the enhancement of primary schooling is sometimes viewed in terms of the additional number of schools blocks and improvement of their physical condition. Many other costs must be included to get the desired outcome.
- Different types of projects often have some of the costs in non-monetary terms, such as waiting time, coping costs, enforcement costs, regulatory costs, compliance costs, etc.
- The economic cost effectiveness analysis carried out for such projects must account for all costs, and should also be based on the economic instead of financial prices of goods and services.

Limitations of CEA
4. Does not account for scale of project

- Scale differences may distort the choice of an "optimal" decision.
- A project with smaller size but higher efficiency level may get accepted, while another project may provide more quantity of output at a reasonable cost.
- A strict cost effectiveness analysis fails to overcome this problem.
- A complete cost benefit analysis does not have this problem because the net present value already accounts for the differences in size among alternative projects.

Scale Problem in Cost Effectiveness Analysis

Method	Effectiveness (Patients a Month)	Cost (Rand)	CE Ratio	EC Ratio	Ranking
Alternative A	200	50,000	250	0.0040	1
Alternative B	1,150	300,000	261	0.0038	2

- Let's say there are two mutually exclusive options in the choice of medical diagnostic equipment for a clinic.
- The first type of machine (A) costs R 50,000 and it can diagnose 200 patients a month.
- The second option involves more expensive equipment (B), which will cost R 300,000 but could serve up to 1,150 people a month.
- The cost effectiveness analysis results in the selection of the least costly alternative, option A, which costs R 250 per diagnosis.
- Option B allows to process almost a six-fold higher number of medical tests a month, at cost of R 261 per patient.
- Unless there is a severe budget constraint for implementation of alternative B, this alternative could be justified even if its average costs are higher than costs of alternative A. This is because the total benefits that alternative B generates are very much larger than the benefits of alternative A.

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week Two, Day Two

(Session I: 09:00 – 10:30)

MICRO-ECONOMICS FOR ECONOMIC VALUATION

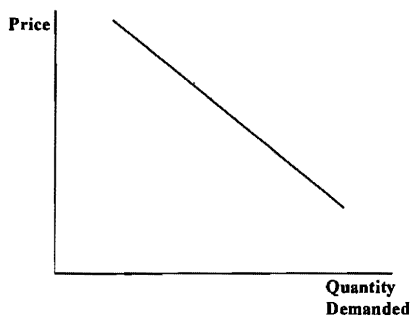
FUNDAMENTALS
OF ECONOMICS

Demand

What is a demand function (a demand curve)?

- It is a relationship between the price and the quantity of a good or service demanded by consumers or firms, holding everything else constant.

- For a demand curve, there is a negative relationship between price and quantity demanded. (Law of Demand)



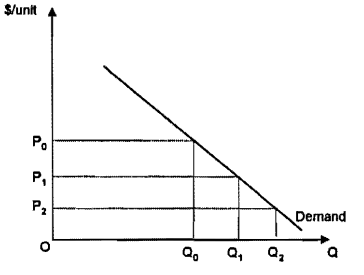
Determinants of Consumer Demand

1. Price of the good or services
2. Income
3. Tastes (Consumer preferences)
4. Prices of related goods (substitutes and complements)

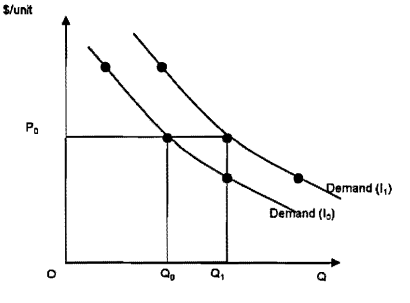
- Substitutes are goods that can serve as replacements for one another. When an increase in the price of one good causes demand for another good to increase (a positive relationship), we say that the goods are substitutes. Charcoal and Cooking Gas.

- When two goods are complements, a decrease in the price of one good results in an increase in the demanded of the other and vice versa. Car and Gasoline.

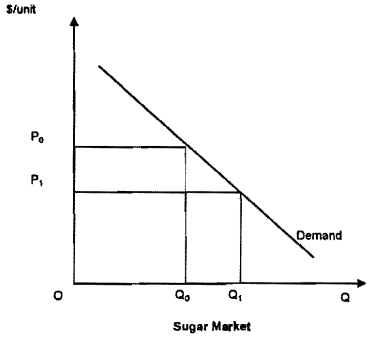
- Distinction between demand and quantity demanded
- Change in price of a good or service leads to change in quantity demanded (movement along the demand curve)

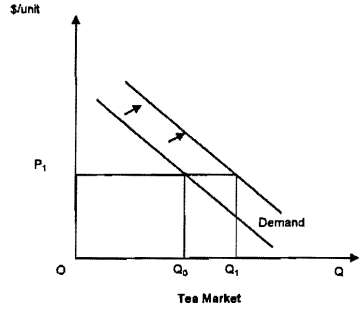


- Change in income, preferences or prices of other goods and services leads to a change in demand (shift of the demand curve)
- As income rises, more of cooking gas is demanded (movement or shift of demand curve)



Demand expands with a decrease in price of complement goods

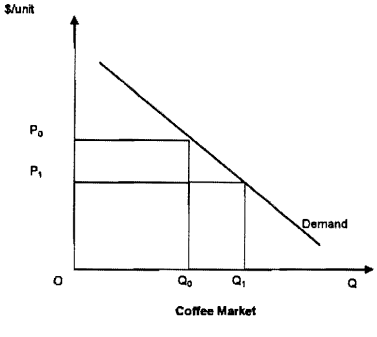


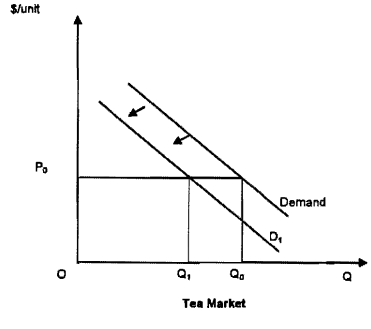


The change in sugar price increase consumption of sugar

More sugar consumption could translate into more consumption of tea at the same price level

Demand contracts with a decrease in price of substitute goods



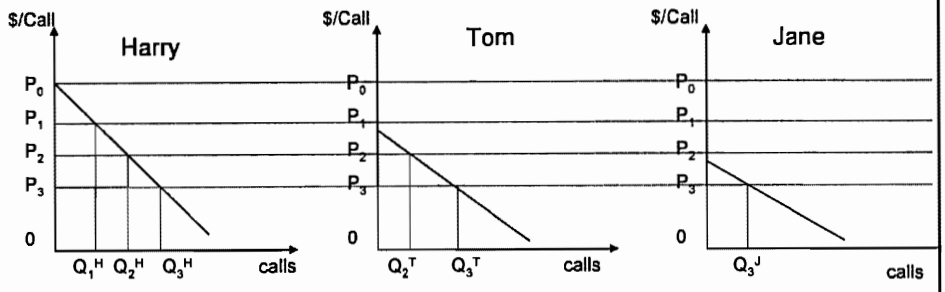


A decrease in price of coffee leads to more consumption of coffee

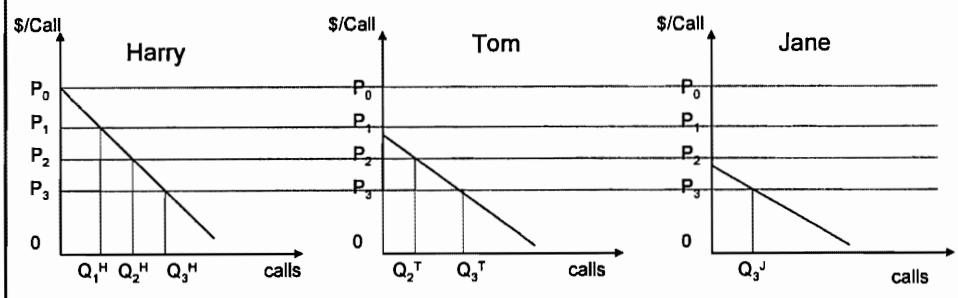
The reduction in price of coffee leads to switching of the tea consumers for coffee, hence, reduction in quantity of tea demanded

Market demand curve is the horizontal summation of individual demand curves:

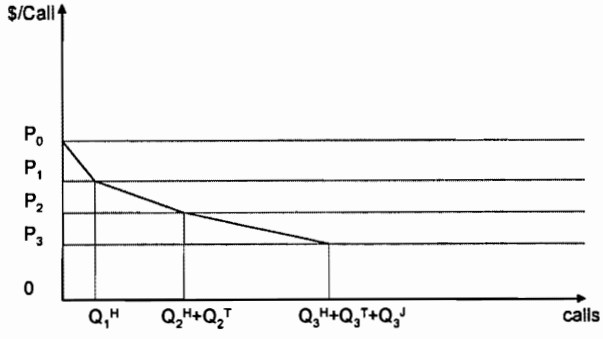
e.g. demand curve of monthly telephone calls for



	Harry	Tom	Jane	Total
At price: P_0	0	0	0	0
P_1	Q_1^H	0	0	Q_1^H
P_2	Q_2^H	Q_2^T	0	$(Q_2^H + Q_2^T)$
P_3	Q_3^H	Q_3^T	Q_3^J	$(Q_3^H + Q_3^T + Q_3^J)$



the combined demand curve of Harry, Tom and Jane is:

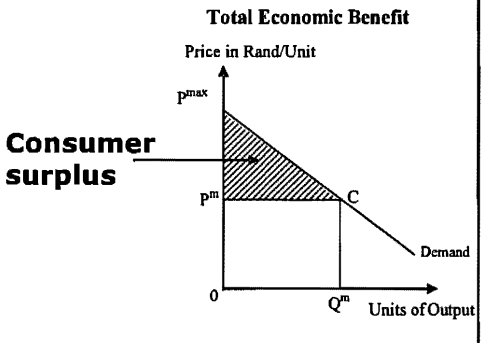


Another Look at Demand Curve

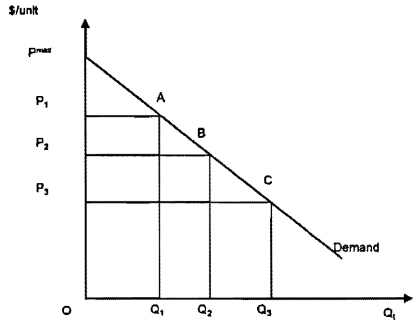
- It is a measure of the consumer's Willingness To Pay (WTP)
- Each point on the Demand curve is a measure of the consumer's assessment of the value of an additional unit of the good
- It is the marginal benefit of the additional unit
- Total benefits from the consumption of a good are measured by area under demand curve from the zero quantity to Q* being demanded

Consumer Surplus (CS)

- It is the difference between the willingness to pay and the actual amount paid to purchase a given quantity.
- Total Consumer Surplus is the area between the demand curve and the price line (price paid by the consumer)



- Gross economic benefit of consumption
- At :
- P^{max} –no consumption
- P_1: Area $0P^{max}AQ_1$
- P3: area $0P^{max}AQ_1+Q_1ABQ_2+Q_2BCQ_3$
- $=0P_3CQ_3+P_3P^{max}C$
- =financial value + consumer surplus



ELASTICITY

"Without the ability to measure and predict how much people are likely to respond to economic changes, all the economic theory in the world would be of little help to policy makers".

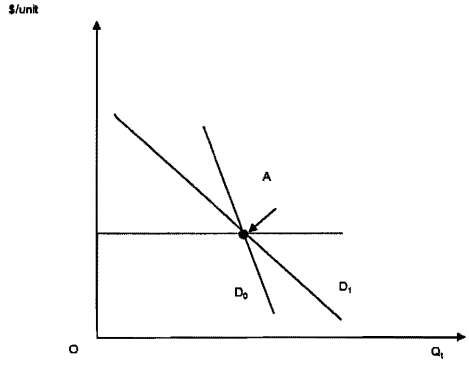
- A general concept that can be used to quantify the response in one variable when another variable changes
  - Elasticity of **demand** or **supply** with respect to **price**,
  - Elasticity of **investment** with respect to the **interest rate**,
  - Elasticity of **tax payments** with respect to **income**, etc.
- Elasticity of **A** with respect to changes in **B** is equal to the **percentage change** in **A** divided by the percentage change in **B**
- Elasticity of A with respect to B = $\frac{\%\Delta A}{\%\Delta B}$

Price Elasticity of Demand

- Price elasticity of demand measures the responsiveness of the quantity demanded to a change in price
- It equals the % change in quantity demanded divided by the % change in price

$$\eta_P^D = \frac{\text{\% change in quantity demanded}}{\text{\% change in price}} = \frac{(Q_1^D - Q_0^D) / Q_0^D}{(P_1 - P_0) / P_0}$$

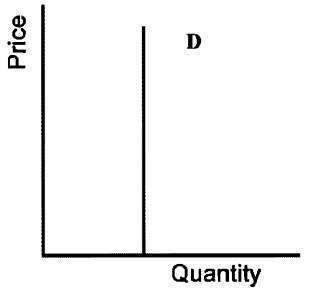
$$= \frac{\Delta Q_0^D / Q_0^D}{\Delta P / P_0} = \frac{\Delta Q_0^D * P_0}{\Delta P * Q_0^D}$$



At point A, D_0 is inelastic and D_1 is more elastic

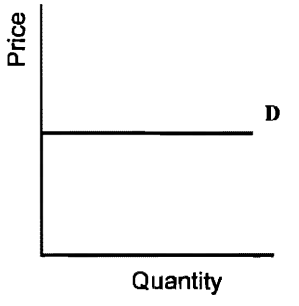
Range of Demand Elasticities

Perfectly Inelastic



elasticity of Demand = 0

Perfectly Elastic



elasticity of Demand = ∞

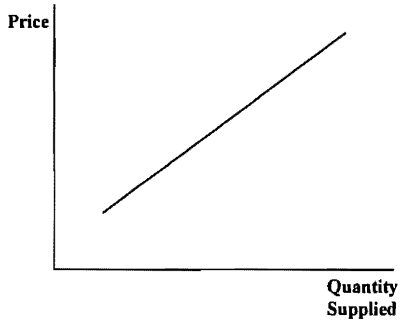
- <u>Perfectly Inelastic</u>
- Quantity demanded does not change **at all** when the price of insulin changes; the demand curve is simply vertical.

- <u>Perfectly Elastic</u>
- A small increase in the price of domestically produced oil (very close to reality) causes the quantity demanded to drop immediately to **zero** (due to internationally determined world prices); the demand curve is simply horizontal.

If $\lvert\eta_P^D\rvert = 0$	PERFECTLY INELASTIC quantity demanded is constant e.g. insulin
If $0 < \lvert\eta_P^D\rvert < 1$	INELASTIC a 1% change in price causes the quantity demanded to change by LESS than 1% quantity demanded is constant e.g. food
If $\lvert\eta_P^D\rvert = 1$	UNIT ELASTIC a 1% change in price causes the quantity demanded to change by EXACTLY 1%
If $\lvert\eta_P^D\rvert > 1$	ELASTIC a 1% change in price causes the quantity demanded to change by MORE than 1% e.g. automobiles and furniture
If $\lvert\eta_P^D\rvert = \infty$	PERFECTLY ELASTIC price is constant e.g. domestically produced oil

What is supply (a supply curve)?

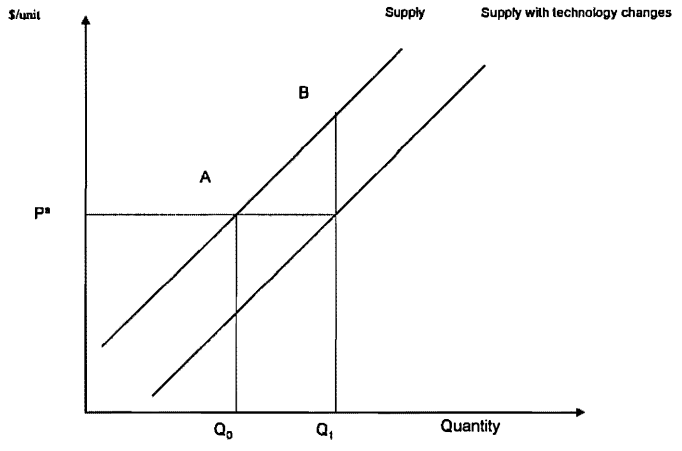
- It is a relationship between the price and the quantity supplied, holding everything else constant.
- For a supply curve, there is a positive relationship between the price and the quantity supplied. (Law of Supply)



Determinants of the Supply Curve

1. Price of inputs
2. Technology
3. Government Regulation (taxes and subsidies) that affect efficiency of production

Change in technology or improvement in technology leads to reduction of supply cost



The reduction in supply cost brings in the production/supply process that was operating in the portion of AB part of the curve even if there is no change in supply price.

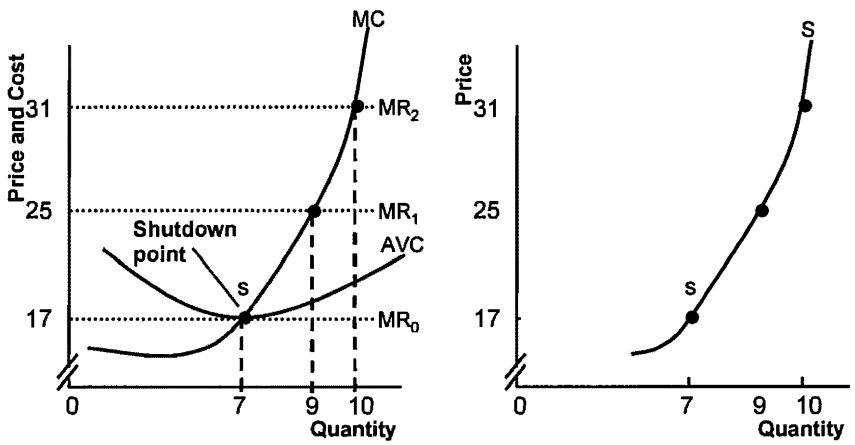
Marginal Revenue Curve

- **The MR curve shows how much revenue the firm will gain by raising output by one unit at every level of output**

Profit maximizing level of output

- **The profit maximizing firm will produce up to the point where the revenue from the last unit of output (MR) is just equal to the short-run marginal cost, that is, the level of output at which MR = MC. For a competitive firm MR = P**
- **As long as P is greater than MC, added output means added profits**
- **The short-run supply curve of a competitive firm is that portion of its marginal cost curve that lies above its average variable cost curve**

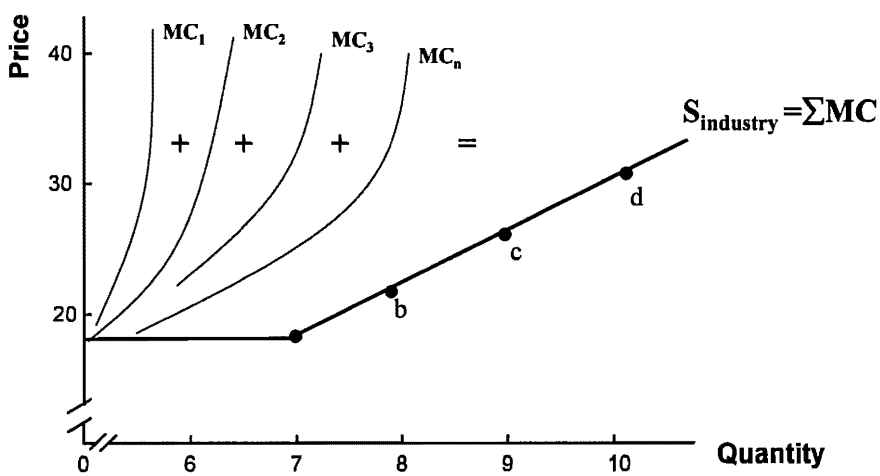
A Firm's Supply Curve



(a) Marginal cost and average variable cost

(b) Firm's supply curve

Industry Supply Curve



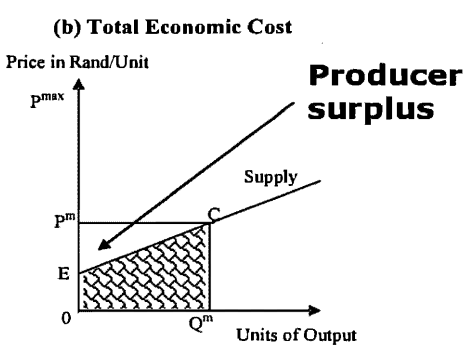
The industry supply schedule is the sum of the marginal cost curves of all individual firms

Another Look at Supply Curve

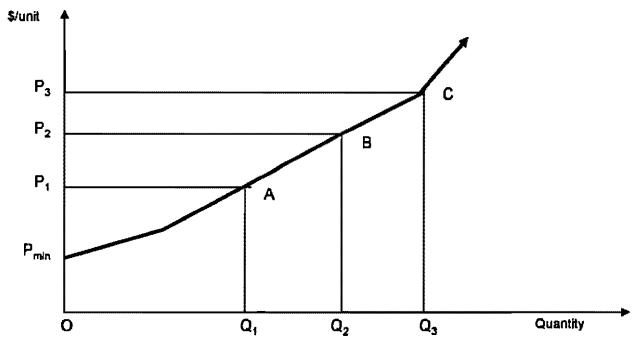
- Each point on the Supply curve is a measure of the resources used in the production of an additional unit of the output
- The total cost is measured by the area under the supply curve from the zero quantity to the quantity Q* being supplied

Producer Surplus (PS)

- Producer surplus is a measure of the net benefit received by producers from the supply of an item.
- Total Producer Surplus is the area between the price line (price received by suppliers) and the supply curve up to the quantity supplied at that price.



Measure of economic cost of supply, marginal cost of supply and opportunity cost of supply



The economic resource used to supply:

Q_1 : area $0P_{min}AQ_1$

Q2 : area $0P_{min}AQ_1 + Q_1ABQ_2$

Q3 : area $0P_{min}AQ_1 + Q_1ABQ_2 + Q_2BCQ_3$

So,

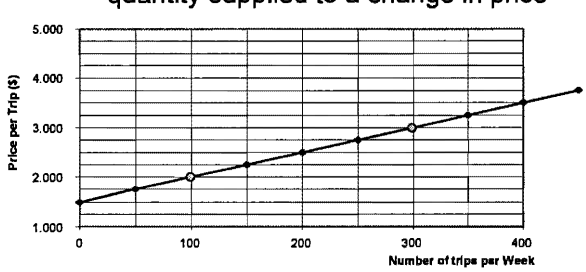
Gross economic cost = $OP_{min}CQ_3$

= $OP_3CQ_3 - P_{min}P_3C$

= financial value – producer surplus

Price Elasticity of Supply

- It equals the % change in the quantity supplied divided by the % change in price.
- Price Elasticity of Supply measures the responsiveness of the quantity supplied to a change in price



$Q_0^S = 100$

$Q_1^S = 300$

$P_0^S = 2.0$

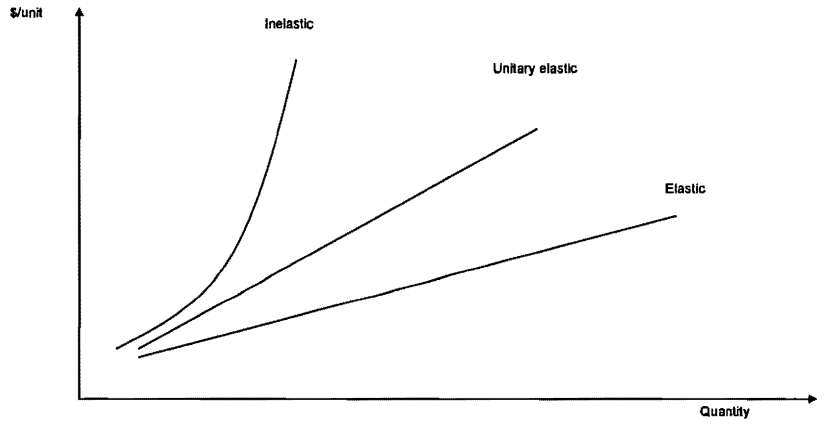
$P_1^S = 3.0$

$\Delta Q_0^S = 300 - 100 = 200$

$\Delta P = 3.0 - 2.0 = 1.0$

$$\varepsilon_P^S = \frac{\text{\% change in quantity supplied}}{\text{\% change in price}} = \frac{(Q_1^S - Q_0^S) / Q_0^S}{(P_1 - P_0) / P_0}$$

$$= \frac{\Delta Q_0^S / Q_0^S}{\Delta P / P_0} = \frac{\Delta Q_0^S * P_0}{\Delta P * Q_0^S} = \frac{200 * 2.0}{100 * 1.0} = 4$$



Market Equilibrium

Demand curve

and

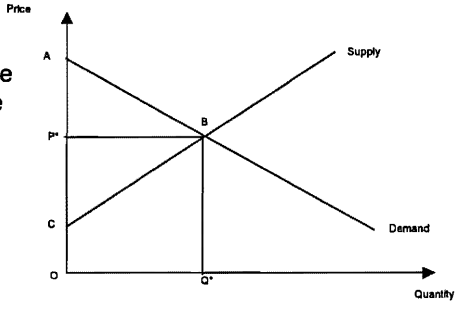
Sellers
Supply curve

→ Market → meeting place of buyers

The intersection of demand curve and supply curve determines the <u>market clearing</u> price.

At P^*, $Q^s = Q^d = Q^*$

A free, competitive market will automatically achieve an equilibrium price at which the quantity demanded equals the quantity supplied.



Excess Demand and Supply

- If the price is **below** the equilibrium price, the quantity demanded will be more than the quantity supplied
- There will be upward pressure on the price
- If the price is **above** the equilibrium price, the quantity supplied will be more than the quantity demanded
- There will be downward pressure on the price

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week Two, Day Two

(Session II: 10:45 – 12:30)

PRINCIPLES UNDERLYING THE ECONOMIC ANALYSIS OF PROJECTS

Introduction to Economic Analysis

- The financial analysis of a project focuses on its financial attractiveness to its private investors.
- The economic analysis measures the impact of the project on the entire society.
- An economic analysis of a project helps determine whether the project increases the net wealth of a country's society as a whole or not.
- A project with a negative economic net present value will serve to shrink the economy rather than grow it. For example if $1000 investment and NPV equals to $ -270. Then the project uses 1000 of resources and only produces 730 of value.

Estimation of Economic Prices

- Financial prices are market prices, which are affected by the various tariffs, taxes, and subsidies.
- Economic values may differ from financial prices because:
  1. consumers valuation of an item may be greater than financial price they pay, e.g. road usage, water.
  2. financial costs may not be the true costs e.g. Natural gas is sold to electricity utility in Egypt at a financial price that is only 1/3 of international opportunity cost.
- Calculating the economic values requires an understanding of how to integrate financial values, tariffs and taxes, handling and transportation costs, and exchange rate distortions.

Commodity Specific Conversion Factors (CSCF)

- Financial prices are market prices, which incorporate all the tariffs, taxes, and subsidies.
- We use the conversion factor to convert each of the financial cashflow into the economic cost or benefit in the economic resource statement in the economic appraisal.

$$CSCF_i = \frac{\text{EconomicValue}}{\text{FinancialPrice}}$$

- *Suppose, the project is using (purchasing) cotton yarn, the relevant financial price to the project would be the demand price, P^d, (the price paid by the project). The **financial price** to the project is R22,239 and the **economic value** is R18,794. The economic value is less than financial price because the economic value doesn't include tax.*

$$CSCF_{\text{Cotton Yarn}} = \frac{R18,794}{R22,239} = 0.85$$

Example of Financial and Economic Cashflows: the Case of Electricity Project

Table of Parameters for Financial Analysis

Price of Electricity	2.20 Rs/Kwh	Long term investment	
Production of Electricity	1,500 Gwh/year	Machinery	8000
		Equipment	1290
Gas	0.25 per Kwh	Financial Cost	
Land*(Given as subsidy)*	300	of Capital	12%
Coal	0.15 Rs/Kwh		

Cashflow: Financial Points of View (millions Rs.)

Year	2001	2002	2003	2004	2005	2006
Inflows						
Sales		3300	3300	3300	3300	
Land (Subsidy)	300					
Liquidation value of investment						0
Liquidation value of land						300
Total Inflows	**300**	**3300**	**3300**	**3300**	**3300**	**300**
Outflows						
Land	300					
Long term investment						
Machinery	8000					
Equipment	1290					
Gas		375	375	375	375	
Coal		225	225	225	225	
Labor Wages		120	120	120	120	
Total Outflows	**9,590**	**720**	**720**	**720**	**720**	**0**
Net Cashflows	**-9290**	**2580**	**2580**	**2580**	**2580**	**300**
NPV @12%	**-1283**					

Table of Parameters for Economic Analysis

Willingness to pay for electricity	3.00 Rs/Kwh
Economic Opportunity cost of Labor	80% of financial wage bill
Foreign Exchange Premium	15%
Subsidy on Gas	30% of Financial Cost
Economic Opportunity cost of capital	10%

Resource flow: Economic Points of View (millions Rs.)

Year	CF*	2001	2002	2003	2004	2005	2006
Inflows							
Sales	1.36		4500	4500	4500	4500	
Land (Subsidy)	0.00	0					
Liquidation value of land	1.00						300
Total Inflows		**0**	**4500**	**4500**	**4500**	**4500**	**300**
Outflows							
Land	1.00	300					
Long term investment							
Machinery	1.15	9200					
Equipment	1.15	1484					0.00
Gas**	1.50		560.63	560.6	560.6	560.6	
Coal	1.15		258.75	258.8	258.8	258.8	
Labor Wages	0.80		96	96	96	96	
Total Outflows		**10,984**	**915**	**915**	**915**	**915**	**0**
Net Cashflows		**-10984**	**3585**	**3585**	**3585**	**3585**	**300**
NPV @10%		**666**					

*CF = Conversion Factors

**CF for gas = [(1.3)*(1.15)]/1 = 1.5

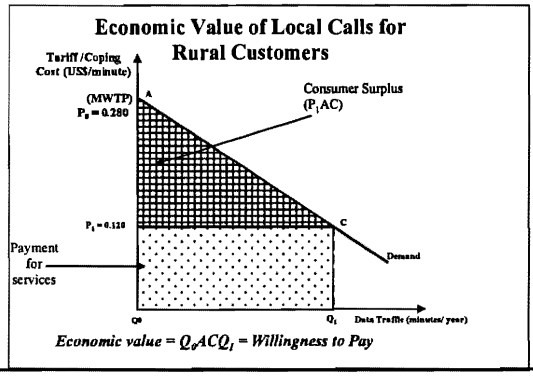
Three Postulates Underlying the Economic Evaluation Methodology

- These postulates in turn are based on a number of fundamental concepts of welfare economics.
- The competitive demand price for an incremental unit of a good or service measures its economic value to the demander and hence its economic benefit.
- The competitive supply price for an incremental unit of a good or service measures its economic resource cost.
- Costs and benefits are added up without regard to who the gainers and losers are.

What is the implication of these postulates for the economic analysis of a project?

First Postulate

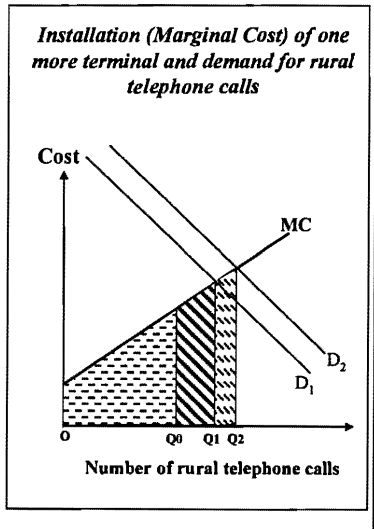
- The competitive demand price or the consumer's willingness to pay for each additional unit of consumption measures the economic benefit or the economic price of each incremental unit.
- The demand curve reflects indifference on part of the consumer between having a particular unit of a good at that price and spending the money on other goods and services.



What is the implication of these postulates for the economic analysis of a project? (Cont'd)

Second Postulate

- The competitive supply price of each incremental unit of a good measures the economic cost of the resources (inputs) that goes into the production of that unit.
- The supply (marginal cost) curve represents the minimum prices that suppliers are willing to accept for successive units of a good or service that they supply.
- In a competitive market these minimum prices represent the marginal opportunity cost of these goods.
- Suppliers will be indifferent between selling incremental units of the good at their supply prices or using the factors to produce other goods and services.



What is the implication of these postulates for the economic analysis of a project? (Cont'd)

Third Postulate

- Costs and benefits are added up without regard to who the gainers and losers are.
- Should the project be valued differently depending on whom are the beneficiaries and the losers? – Not by the economic analysis.
- This methodology measures the net economic benefit of the project by subtracting the total resource costs used to produce the project's output from the total benefits of the output.
- It adds up the currency values of the net economic benefits regardless of who are the beneficiaries or losers of the project.
- This approach attempts to separate the social aspects of project appraisal from the economic efficiency aspects.

Analyzing Economic Costs and Benefits in an Existing Market (in the absence of a new project)

Economic Costs and Benefits in an Existing Market

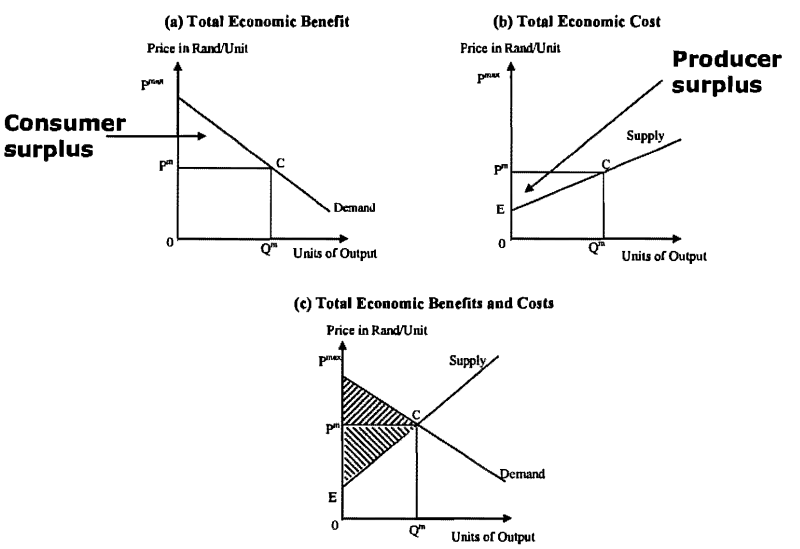
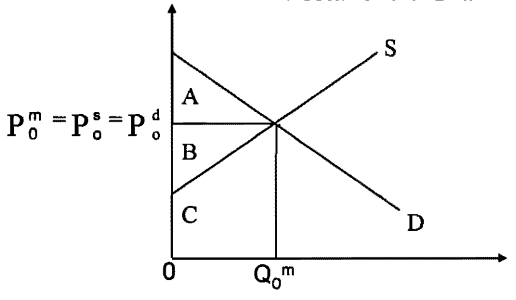


Illustration of Basic Postulates and Cost/Benefit Accounting Framework

Calculation of Net Economic Benefit Using Postulate 3: A Dollar is a Dollar



$P_0^m = P_0^s = P_0^d$

A = Consumers' Surplus
B = Producers' Surplus
C = Gross Economic Costs

Net Economic Benefit	= Total Economic Benefit	- Total Economic Cost
	= (A + B + C)	- (C)
Net Economic Benefit	= Consumers' Surplus	+ Producers' Surplus
(A + B)	= (A)	+ (B)
Consumers' Surplus	= Total Economic Benefits	- Total Revenues
A	= (A + B + C)	- (B + C)
Producers' Surplus	= Total Revenues	- Total Economic Cost
B	= (B + C)	- (C)

Analyzing Economic Costs and Benefits in an Existing Market (in the absence of a new project)

- The analysis above indicates that the gross economic benefits from the consumption of the output from this industry is greater than the financial revenues received by the suppliers due to the consumer surplus enjoyed by the consumers of the output.
- It also indicates that the economic cost of producing the output is less than the financial revenues received by the suppliers yielding a producer surplus to the owners of the supply facilities.
- The implication of these two facts is that the financial price of a unit may be different from its economic price even in the absence of distortions.

Estimation of Economic Prices

- In order to estimate the true economic value of a good or service, one needs to know:

  Tradable, Non-Tradable or Rationed

  - Is the good non-tradable (domestic)?
  - Is the good or service now being rationed?
  - Is the good internationally tradable?
  - The difference is whether the price of the good is determined by the forces of demand and supply in the domestic market or given to the country by international markets.

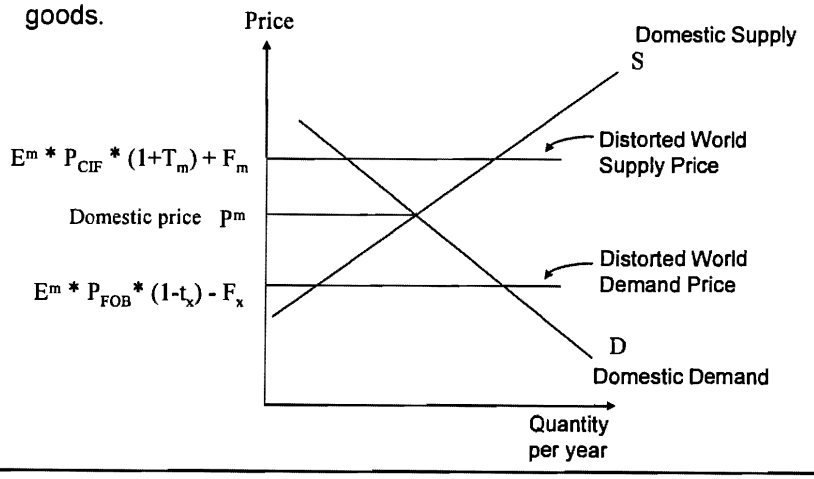
MEASUREMENT OF ECONOMIC PRICES OF NON-TRADABLE GOODS

Non-Tradable Commodities

- A good or service is considered non-tradable when its domestic price is determined by local demand and supply.
- An increase in demand (or supply) by a project could affect the amounts demanded by domestic consumers (or produced by other suppliers).

Defining a Price of Internationally Non-Traded (Domestic) Good or Service

- Goods and services whose domestic production satisfies all the domestic demand for these items and whose domestic prices are not affected by their world prices are referred to as non-traded goods.

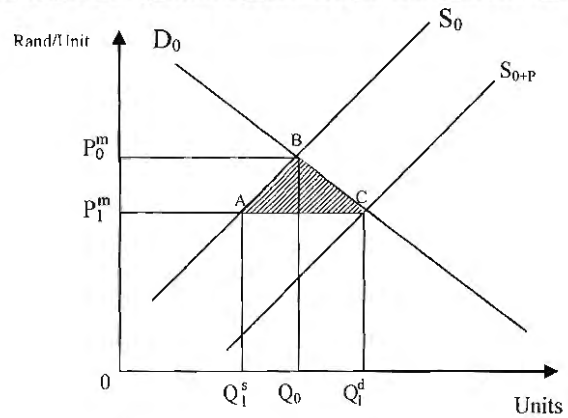


- **ECONOMIC BENEFITS are estimated based on the concept that DEMAND CURVES reflect the maximum WTP of consumers for additional unit of consumption.**
  - Output from a project affects the market equilibrium. The changes in quantity demanded, quantity supplied and price translate into cost savings due to cuts in production of inefficient producers or due to increase in consumption because of lowering of the market price.

- **ECONOMIC COSTS are estimated based on the concept that SUPPLY CURVES reflect the opportunity cost of resources used for each additional unit of production.**
  - A project requires inputs for production. Demand of inputs by the project deprives some consumers in the market because of an increase in the market price. The rise in the market price invites additional investment in input markets, depriving funds for other sectors. These costs together constitute project's gross economic costs.

Analyzing the Economic Benefits of an Non-Traded Output Produced by a Project

Economic Benefits of a New Project in an Undistorted Market



Financial Price $= Q_1^s A C Q_1^d$ Economic Value $= Q_1^s A B Q_0 + Q_0 B C Q_1^d$

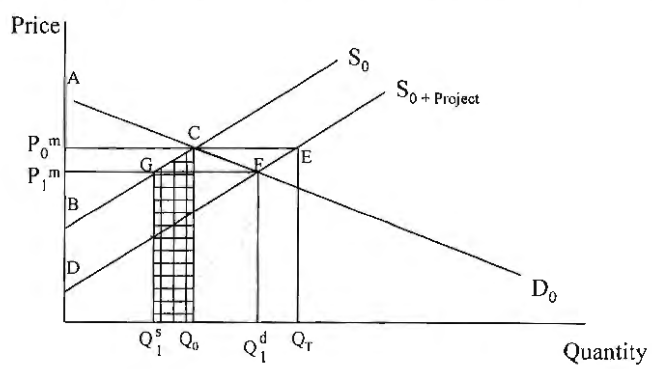
$P^e = W^s P^s + W^d P^d$

whe re, $P^s = \frac{P_0^m + P_1^m}{2}$ $P^d = \frac{P_0^m + P_1^m}{2}$

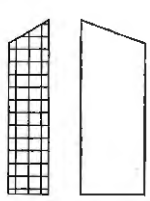
Adjusting for Distortions in the Market for Good or Service

Non-Tradable Goods

Economic Benefits of Project Output (No Distortions)



Value of Resources Saved



Value of Increased Consumption

Economic Value

$= W_s P^s + W_d P^d$

If no output market distortions, then:

$P^s = P^d = P^m$

Small versus Large Changes in Prices

- Often the quantity produced by a single project or purchases as inputs by a project, is relatively small compared to the size of the market and hence there is little or no change in the market price.
- In such a situation and given that we are operating in an undistorted market, the gross financial receipts will be equal to the gross economic benefits. The triangle ABC is very small.
- A difference arises only when the quantity produced by the project or demanded by the project is sufficiently large to have an impact on the prevailing market price in the sector.

Calculating the Economic Value of Non-Tradable Goods

Economic Value = $W_x^s P^s + W_x^d P^d$

= weighted average of supply (P^s) and demand (P^d) price

Where: $W^s + W^d = 1$

- If rationing then $W^s=0$ and $W^d=1$
- Traded: Importable $W^s = 1$ and $W^d = 0$
  Exportable $W^s = 0$ and $W^d = 1$
- Non-traded $W^s > 0$ and $W^d > 0$

Three classes of goods:

W^s	W^d
2/3	1/3
1/2	1/2
1/3	2/3

Calculating the Economic Value of Non-Tradable Goods

Weights expressed in terms of elasticities:

$$W_x^s = \frac{\text{Supply Elasticity}}{\text{Supply Elasticity - Demand Elasticity}} = \frac{\varepsilon}{\varepsilon - \eta}$$

$$W_x^d = \frac{\text{Demand Elasticity}}{\text{Supply Elasticity - Demand Elasticity}} = \frac{-\eta}{\varepsilon - \eta}$$

$$\frac{W_x^s}{W_x^d} = \frac{\varepsilon}{-\eta}$$

P^s = Supply Price

P^d = Demand Price

ε = (defined positively)own price elasticity of supply

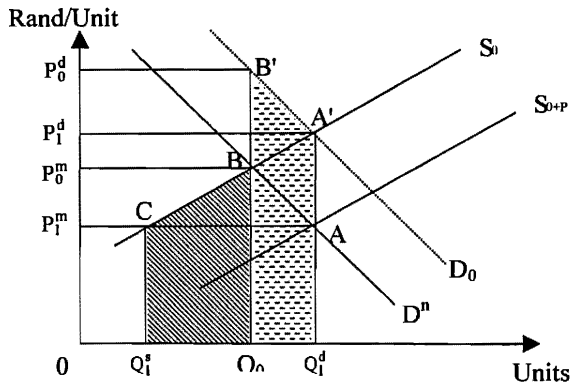
η = (defined negatively) own price elasticity of demand

Applying the Postulates to Determine Economic Evaluation of Non-Tradable Goods and Services in Distorted Markets

- Distortions are defined as market imperfections.
- The most common types of these distortions are in the form of government taxes and subsidies. Others include quantitative restrictions, price controls, and monopolies.
- We need to take the type and level of distortions as given and not changed by the project when estimating the economic costs and benefits of projects.
- The task of the project analyst or economist is to select the projects that increase the net wealth of country, given the current and expected regime of distortions in the country.

Sales Taxes Levied on Output of Project

Economic Benefit of an Output Supplied by a Project
--- when a tax is imposed on sales ---

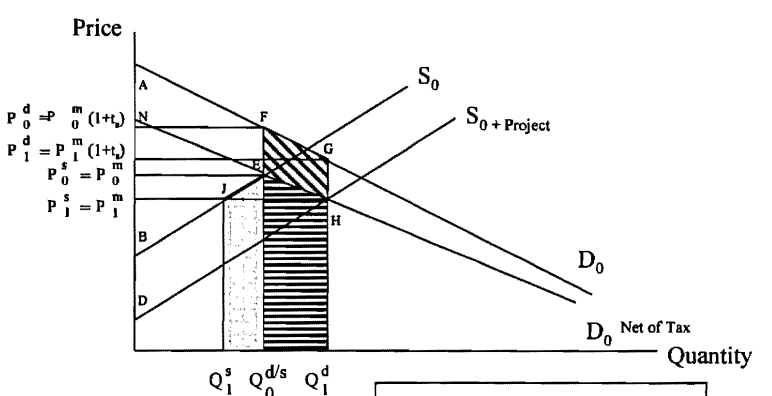


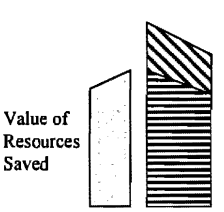
Financial benefit is P_1^m (Q_1^d-Q_1^s) **Economic benefit is $Q_1^sCBB'A'Q_1^d$**

$P^e = W^sP^s + W^dP^d$ $P^d = P^m + T$ if unit tax

$P^d = P^m(1+t)$ if ad valorem

Non-Tradable Goods
Economic Benefits of Project Output (Tax on Output)





Economic Benefits
$W_x^s P_{x0}^m + W_x^d P_{x0}^m(1+t_s)$

Example

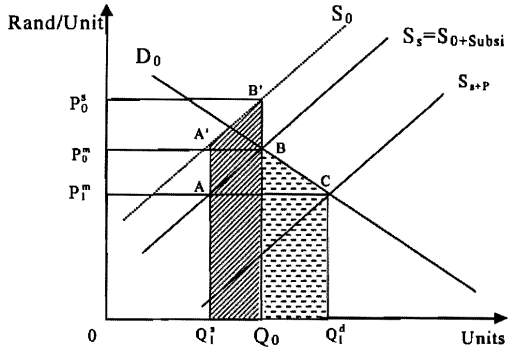
$W_x^s=1/3$, $W_x^d=2/3$ $P^m=120$, $t_s=0.15$

$P^e=1/3(120)+2/3(120)(1+0.15)=132$

$P^e=40+80(1.15)=132$

Subsidies on Production

Economic Benefits of a New Project
-- when a production subsidy is present --

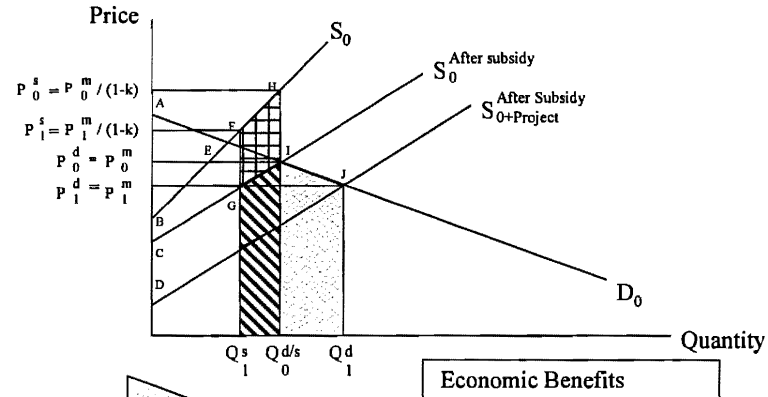


Financial benefit is P_1^m (Q_1^d-Q_1^s) **Economic benefit is $Q_1^sA'B'BCQ_1^d$**

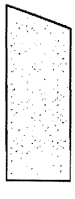
$P^e = W^s P^s + W^d P^d$ where, $P^s = P_0^m * (1+K)$

Or if subsidy is proportion of total cost, $P^s = \dfrac{P^m}{1-K}$ and $P^d = P^m$

Non-Tradable Goods
Economic Benefits of Project Output (other producers subsidized)



Value of Resources Saved



Value of Increased Consumption

Economic Benefits

$$W_x^s \frac{P_{x0}^m}{(1-k)} + W_x^d P_{x0}^m$$

Example

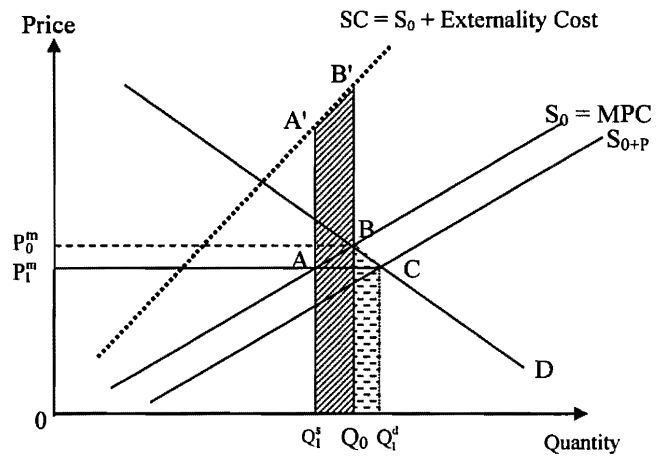
$W_x^s=1/3$, $W_x^d=2/3$ $P^m=90$, $k=0.40$

$P^e=1/3*(90/(1-0.4))+2/3*(90)$

$P^e=1/3(150)+2/3(90)=110$

Environmental Externalities

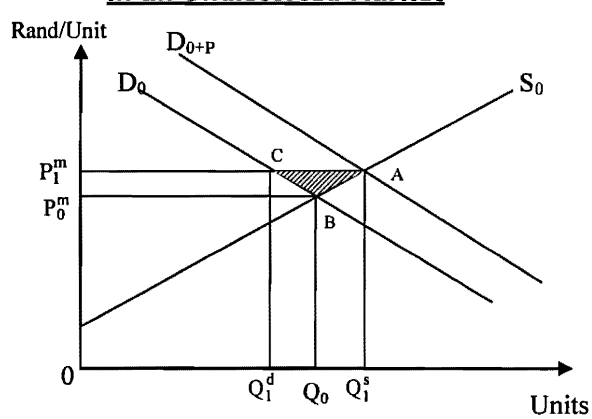
A Project with Pollution in the Lake



Financial benefit is P_1^m $(Q_1^d - Q_1^s)$ **Economic benefit is $Q_1^sA'B'BCQ_1^d$**

Analyzing the Economic Cost of an Input Demanded by a Project

Economic Cost of an Input Demanded by a Project in an Undistorted Market



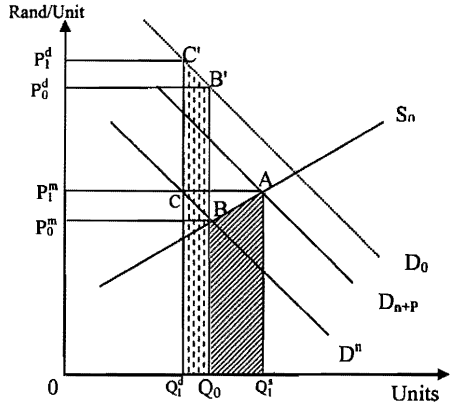
Financial Cost $= Q_1^d CAQ_1^s$ Economic Cost $= Q_0 BAQ_1^s + Q_1^d CBQ_0$

$P^e = W^s P^s + W^d P^d$

where, $P^s = \dfrac{P_0^m + P_1^m}{2}$ $P^d = \dfrac{P_0^m + P_1^m}{2}$

Sales Taxes Levied on Output of Project

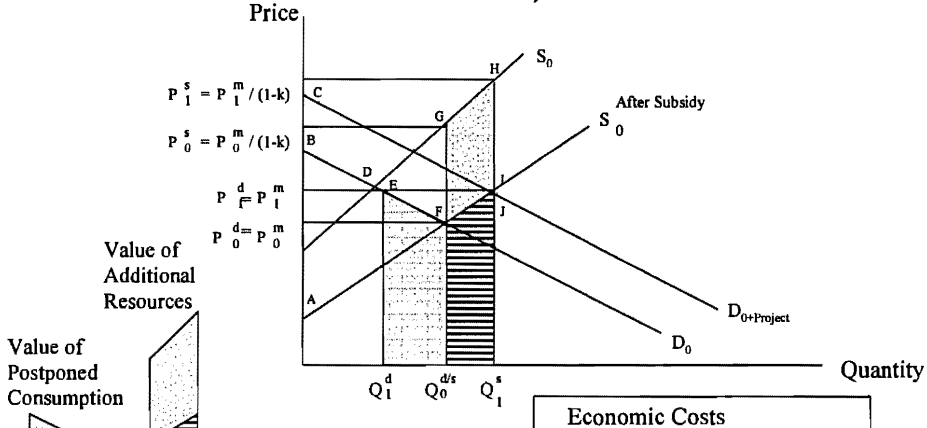
Economic Cost of an Input Demanded by a Project
--- when a tax is imposed on sales ---



Financial cost is P_1^d $(Q_1^s - Q_1^d)$ **Economic cost is $Q_1^d C'B'BAQ_1^s$**

$$P^e = W^s P^s + W^d P^d \qquad \text{where, } P^s = \frac{P_0^m + P_1^m}{2} \qquad P^d = \frac{P_0^d + P_1^d}{2}$$

Non-Tradable Goods
Economic Costs of Project Input (Input production subsidized)



Economic Costs

$$W_x^s \frac{P_{x0}^m}{(1-k)} + W_x^d P_{x0}^m$$

Example

$W_x^s = 1/3$, $W_x^d = 2/3$ $P^m = 90$, $k = 0.40$

$P^e = 1/3(90/(1-0.4)) + 2/3(90)$; $P^e = 1/3(150) + 2/3(90) = 110$

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week Two, Day Three

(Session I: 09:00 – 10:30)

ECONOMIC VALUATION OF TRADABLE GOODS & SERVICES

Applying the Postulates to Determine Economic Evaluation of Tradable Goods and services

- The framework for the estimation of economic prices was presented for the case of non-tradable goods.
- They are also applicable to the valuation of tradable goods.
- These postulates are general in nature and are also applicable to tradable goods.
- The methodology for the estimation of the economic prices of internationally tradable goods and services when there are distortions in their markets is also based on the three postulates.
- These distortions may include customs duties on imported inputs of a project or those imported items that the project output will replace or substitute.

Tradable Commodities

Classification of a Project's Inputs and Outputs

A good or service is considered tradable when an increase in demand (or supply) by a project does not affect the amount demanded by domestic consumers

- An increase in demand for an *IMPORTABLE* commodity results in an increase in demand for imports
- An increase in demand for an *EXPORTABLE* commodity results in a reduction in exports
- An increase in supply of a tradable commodity by a project will cause either a reduction in imports or an increase in exports

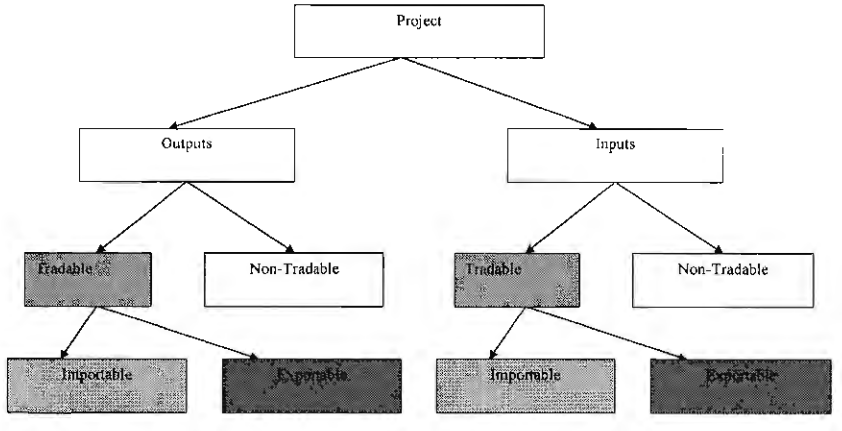
An *Importable* commodity includes imported goods and domestically produced goods that are close substitutes for imported goods

An *Exportable* commodity includes exported goods and close substitutes for exported goods

Tradable Commodities

- There are usually more internationally traded goods and services then non-traded goods and services in economy.
- Smaller countries tend to have more traded goods and services then large countries. Small countries cannot produce many goods and services efficiently.
- The public sector tends to produce non-traded goods and services but uses many traded goods and services as inputs.
- When analyzing infrastructure projects that produce domestic services then the techniques for the economic valuation of tradable goods are important for determining the economic cost of inputs to the project.

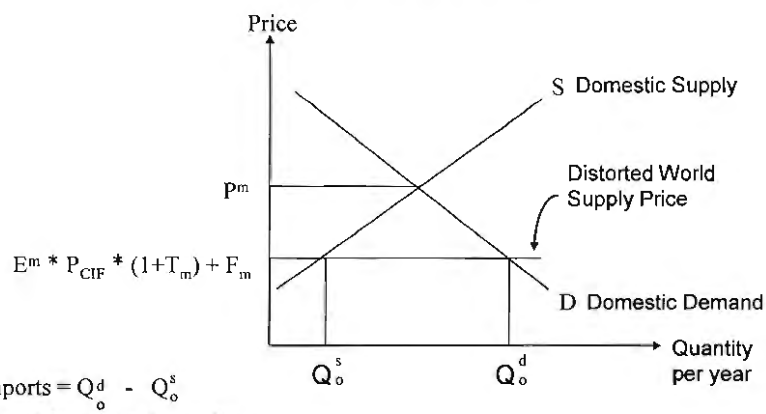
Classification of a Project's Outputs and Inputs



Measuring the Economic Values of Tradable Goods: Four Cases

1. Economic cost of importable input
2. Economic value of importable good production
3. Economic value of export production
4. Economic cost of exportable input

Importable Good



Imports = $Q_o^d - Q_o^s$

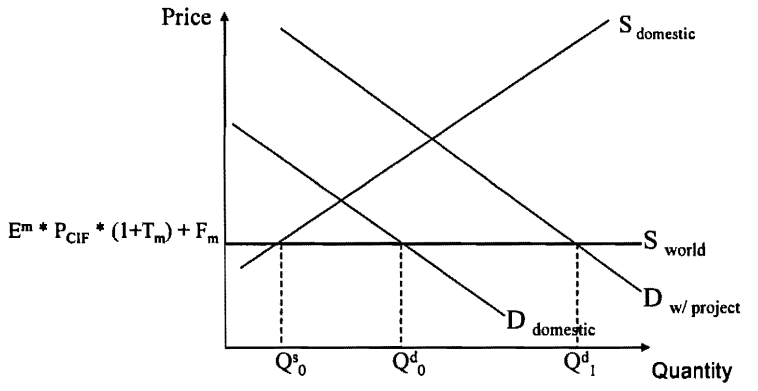
E^m = Market Exchange Rate

F_M = Domestic Freight to Market

T_m = Rate of Import Tariff

P_{CIF} = Price of imports at entry point to country, including international freight and insurance charges expressed in units of foreign currency

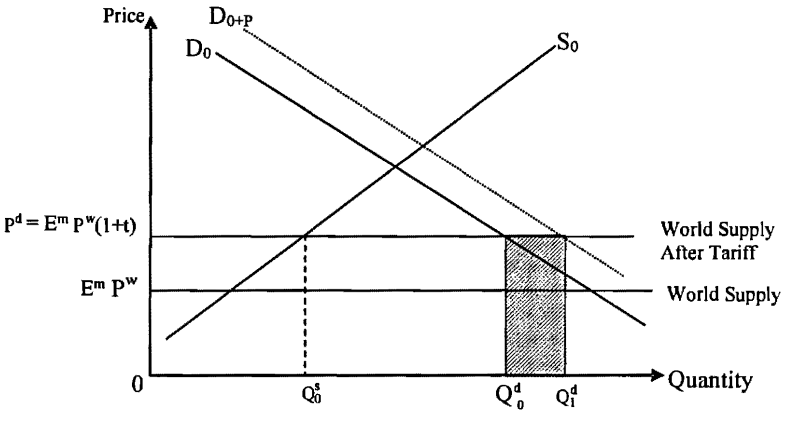
Project Demands More of an Importable Good



Project requirements will be met by additional imports (world supply). Domestic consumption is not affected.

Project Purchases Importable Inputs

Input subject to Import Tariff



Financial cost is $E^m P^w (1+t) (Q_1^d - Q_0^d)$

Economic cost is $E^m P^w (Q_1^d - Q_0^d)$ + Foreign exchange premium

Estimating The Economic Prices of Tradable Goods

1. Adjust for commodity - specific trade distortions

- Financial prices for the commodities demanded (or supplied) by a project must be adjusted for commodity-specific distortions and costs that drive a wedge between their international prices and their domestic market prices
- Taxes and Subsidies are transfers between consumers, producers, and the government. Therefore, they are not part of the real resources consumed or produced by a project.

2. Value the foreign exchange at the economic (shadow) exchange rate (E^e)

- Multiply the CIF and FOB prices at the border by the economic price of foreign exchange (E^e).
- Alternatively, add a foreign exchange premium [(E^e/E^m) - 1], or [(E^e/OER) - 1], per unit of foreign exchange demanded (or supplied) by a project.

3. Adjust for handling and transportation costs

- The economic costs of handling and transportation that are necessary to move commodities to or from the point of entry must be included.
- In the case of imported commodities, these costs should be added to the CIF price.
- In the case of exported commodities, these costs should be subtracted from the FOB price.

Foreign Exchange Externality

- The foreign exchange externality is meant to capture any indirect external welfare effects that result from a project's incremental use or production of foreign exchange.
- The source of this externality lies in the divergence that exists between the marginal value of a unit of foreign exchange and the marginal cost of earning that unit.
- This divergence is ultimately due to import tariff, export taxes, sales taxes, excise taxes and any other tax or quantitative restrictions distortions in the markets underlying the demand and supply of foreign exchange.

Visayas Communal Irrigation Project

Basic Facts

- The National Irrigation Administration (Philippine National Agency) proposes to rehabilitate 55 damaged communal irrigation systems and to build 25 new systems in Visayas.
- The project's additional components include water protection and erosion control, the strengthening of irrigation association, and the development of agricultural extension services.
- The goal of the project is to alleviate poverty, while improving environmental sustainability of the region.
- The life of project is 20 years.
- The economic benefits arise from the increased production of rice and corn, which must otherwise be imported.
- The foreign exchange premium is 24.6%.
- The project is expected to cost approximately 480.910 million pesos (US$19.78 million).
- The project will be financed with US$15.1 million loan from the International Fund for Agricultural Development, and remaining funding would be provided by the Philippine government.

Project uses an Importable Good (Pesticides)

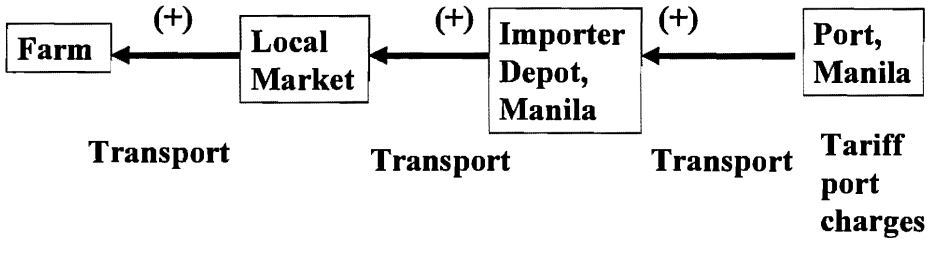


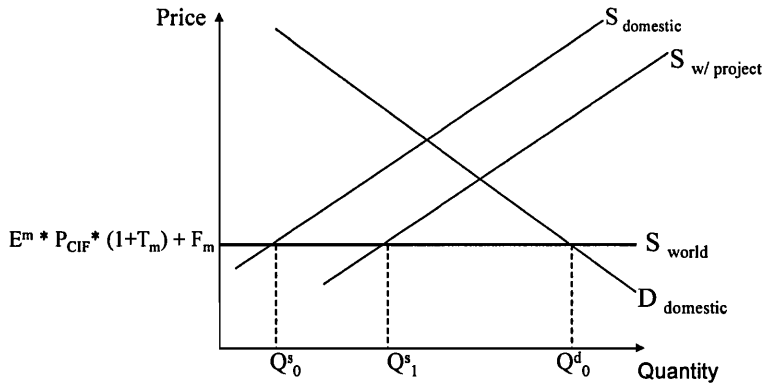
Table 1: Project Uses an Importable Good (PESTICIDES).

	Financial Price (A)	Adjustment For Taxes (B)	Adjusted Value (C= A*B)	Tradable Content (D)	Non-Tradable Content (E)	Value of Forex Premium (F=C*D*0.246)	Value of SPNTO Premium (G=C*E*0.01)	Economic Value (H=C+F+G)
CIF World (US$)	166							
CIF per 1000 liters of pesticides	4038	1	4038	100%		993.35		5031
PLUS								
Tariff	201	0	0	0%		0.00		0
Port charges, handling and transportation to Manila	155	1	155	30%	70%	11.44	1.09	168
Importer Price, Manila	4394							5199
PLUS								
Transport cost, Manila to local market	515	1	515	30%	70%	38.01	3.61	557
Dealer's margin	201	0.68	137	10%	90%	3.36	1.23	141
Price at local market	**5110**							**5897**
PLUS								
Local transport cost	120	1	120	30%	70%	8.86	0.84	130
Price at farm gate	**5230**							**6026**
Conversion Factor	**1.15**							

Measuring the Economic Values of Tradable Goods: Four Cases

1. Economic cost of importable input
2. Economic value of importable good production
3. Economic value of export production
4. Economic cost of exportable input

Project Supplies More of an Importable Good



Project reduces quantity imported. No change in domestic consumption.

Project Supplies an Importable Good (Rice)

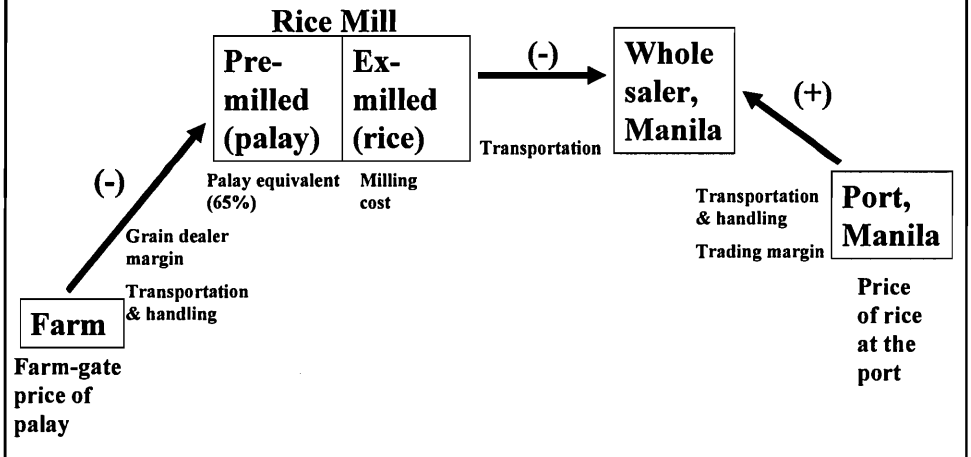


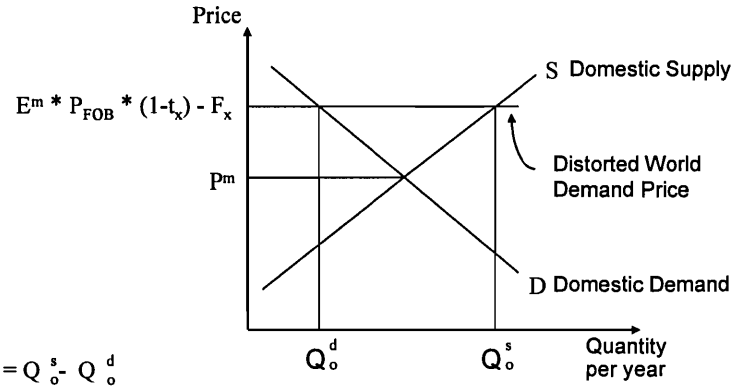
Table 2: Project Supplies an Importable Good (Rice)

	Financial Price (A)	Adjustment For Taxes (B)	Adjusted Value (C= A*B)	Tradable Content (D)	Non-Tradable Content (E)	Value of Forex Premium (F=C*D*0.246)	Value of SPNTO Premium (G=C*E*0.01)	Economic Value (H=C+F+G)
CIF World (US$)	314.8							
CIF per metric ton of rice	7659	1	7659	100%	0%	1884	0.00	9543
PLUS								
Transportation and Handling Charges	205	1	205	30%	70%	15.13	1.44	222
Trading Margin	472	0.68	321	10%	90%	7.90	2.89	332
Wholesale Price in Manila	8336		8185					10096
LESS								
Transport cost, rice mill to Manila	515	1	515	30%	70%	38	3.61	557
Ex-mill price of rice	7821							9540
LESS								
Net milling cost	346	1	346	50%	50%	43	1.73	390
Pre-milled value	7475							9150
Palay equivalent (65%)	4859							5947
LESS								
Grain dealer margin (4% margin)	194	0.68	132	10%	90%	3	1.19	137
Transport and handling cost, farm to mill	130	1	130	30%	70%	10	0.91	141
Farmgate price of palay	4534							5670
Conversion Factor	1.25							

Measuring the Economic Values of Tradable Goods: Four Cases

1. Economic cost of importable input
2. Economic value of importable good production
3. Economic value of export production
4. Economic cost of exportable input

Exportable Good



Exports = $Q^s_o - Q^d_o$

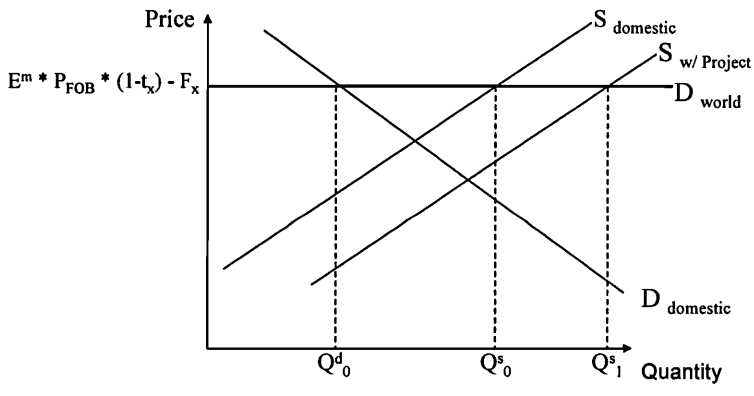
E^m = Market Exchange Rate

t_x = Export Tax

F_x = Freight and Trading Costs to Port

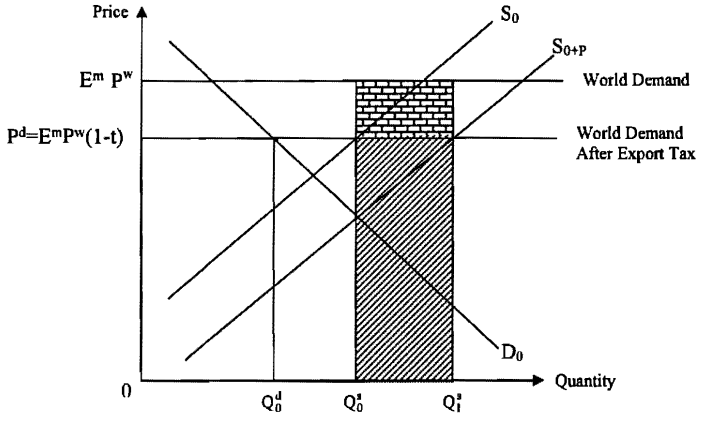
P_{FOB} = Price of exports at point of export from country in units of foreign currency

Project Supplies More of an Exportable Good



Project increases exports. Domestic consumption remains unchanged.

Project Produces Exportable Goods subject to Export Tax (No domestic transportation costs)



Financial benefit is E^mP^w (1-t) (Q_1^s-Q_0^s)

Economic benefit is $E^mP^w(Q_1^s - Q_0^s)$ + Foreign exchange premium

Economic values of exportable goods are based on the FOB values of demand for exports

IRRI Supply an Exportable Good (Seeds)

IRRI Gate $\xrightarrow{(-)}$ Port

Port charges

transportation

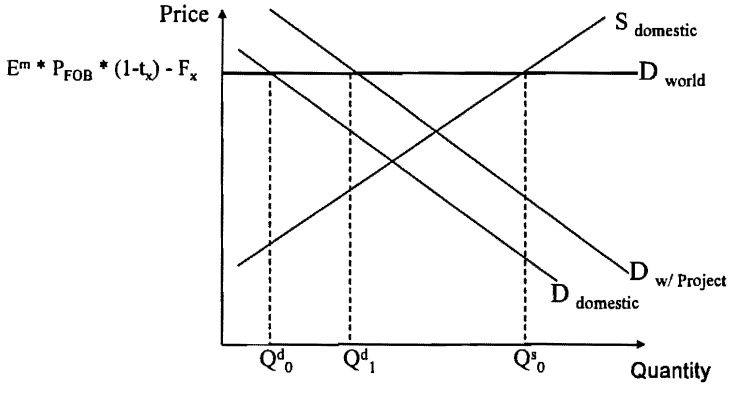
Table 3: IRRI Supply an Exportable Good (Seeds)

	Financial Price (A)	Adjustment For Taxes (B)	Adjusted Value (C= A*B)	Tradable Content (D)	Non-Tradable Content (E)	Value of Forex Premium (F=C*D*0.246)	Value of SPNTO Premium (G=C*E*0.01)	Economic Value (H=C+F+G)
FOB Port (US$)	**260**							
FOB Port (Pesos/ton)	**6326**	**1**	**6326**	**100.00%**	**0.00%**	**1556.20**	**0.00**	**7882**
LESS								
Port Charges and transportation from IRRI to Port	155	1	155	30.00%	70.00%	11.44	1.09	168
IRRI Gate Price	**6171**							**7715**
Conversion Factor (EV/PV)	**1.25**							

Measuring the Economic Values of Tradable Goods: Four Cases

1. Economic cost of importable input
2. Economic value of importable good production
3. Economic value of export production
4. Economic cost of exportable input

Project Demands More of an Exportable Good



Project requirements will reduce quantity exported.
Consumption of previous consumers remains unchanged.

Project Uses an Exportable Good (seeds)

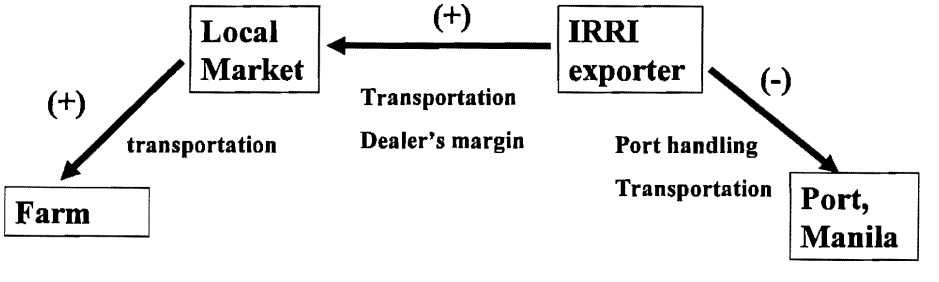


Table 4: Project Uses an Exportable Good (Seeds)

	Financial Price (A)	Adjustment For Taxes (B)	Adjusted Value (C= A*B)	Tradable Content (D)	Non-Tradable Content (E)	Value of Forex Premium (F=C*D*0.246)	Value of SPNTO Premium (G=C*E*0.01)	Economic Value (H=C+F+G)
FOB per ton of PADDY SEED (pesos/ton)	**6326**	**1**	**6326**	**100.00%**	**0.00%**	**1556.20**	**0.00**	**7882**
LESS								
Port Handling and Transportation From IRRI to port of Manila	155	1	155	30.00%	70.00%	11.44	1.09	168
IRRI Exporter Price	**6171**							**7715**
PLUS						0.00	0.00	
Transport Cost, IRRI to local market	515	1	515	30.00%	70.00%	38.01	3.61	557
Dealer's margin	235	0.68	160	10.00%	90.00%	3.93	1.44	165
Price at Local Market	**6921**							**8436**
PLUS								
Local transport cost from Market to farm (Project site)	120	1	120	30.00%	70.00%	8.86	0.84	130
Price at Farm Gate	**7041**							**8566**
Conversion Factor	**1.22**							

SUMMARY

Economic Cost of Imported Input =

CIF (adj. For Economic Exchange Rate) + Economic Cost of Freight from Port to Project

Economic Value of Importable Good Production =

CIF (adj. For Economic Exchange Rate) + Economic Cost of Local Freight from Port to Market - Economic Cost of Local Freight from Project to Market

Economic Value of Exportable Production =

FOB (adj. For Economic Exchange Rate) - Economic Cost of Local Freight from Project to Port

Economic Cost of Exportable Input =

FOB (adj. For Economic Exchange Rate) + Economic Cost of Local Freight from Export Producer to Project - Economic Cost of Local Freight from Export Producer to Port

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week Two, Day Three

(Session II: 10:45 – 12:30)

STAKEHOLDER IMPACTS OF PROJECTS

Assess Stakeholder Impacts of Projects

- A Comparison between economic and financial values tells us who wins and who loses, i.e., the Stakeholders

ECONOMIC VALUE

=

FINANCIAL VALUE

+

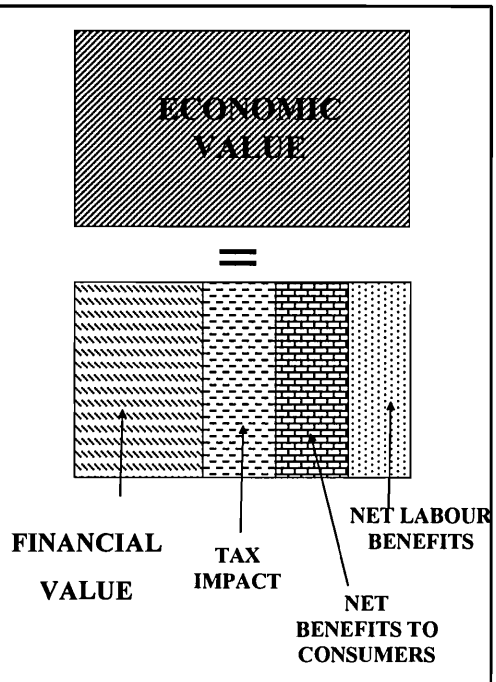
TAX IMPACT

+

NET BENEFITS TO CONSUMERS

+

NET LABOUR BENEFITS



FOR EACH INPUT AND OUTPUT VARIABLE:

- **Economic = Financial + Σ Stakeholder Impacts**
  - ***Example of a non-traded good with a sales tax:***
    - Economic Value = Financial Value +
      Change in Government Tax Revenues +
      Increase in Consumer Benefits –
      Loss in Profits to other producers

Taken over all variables and time periods of project (using a common discount rate)

- **NPV economic = NPV financial + Σ PV Stakeholder Impacts**
  - **Note: Stakeholder Impacts are often called externalities of project**

General Relationship

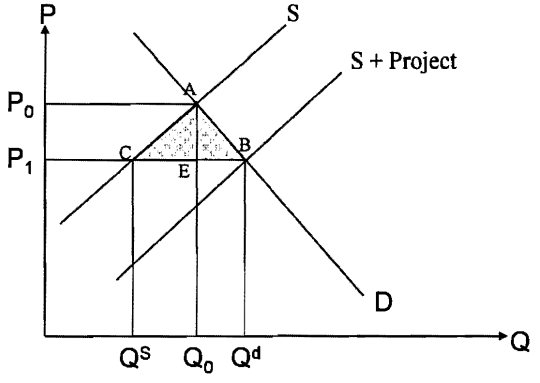
$$NPV^{ECO}_{eco} = NPV^{FIN}_{eco} + \sum PV^{EXT}_{eco}$$

Stakeholder Analysis is composed of six distinct steps:

1. Identify the externalities
2. Measure the net impact of the externalities in each market as the real economic values of resource flows less the real financial values of resource flows
3. Measure the values of the various externalities throughout the life of the project and calculate their present values by using the economic discount rate

4. Allocate the externalities across the various stakeholders of the project
5. Summarize the distribution of the project's externalities and net benefits according to the key stakeholders in society
6. Reconcile the economic and financial resource flow statements with the distributional impacts

Financial, Economic and Distributive Effects of Project to Supply Non-Tradable Goods with No Distortions



Financial Value of Output = Q^sCBQ^d or $P_1 (Q^d - Q^s)$

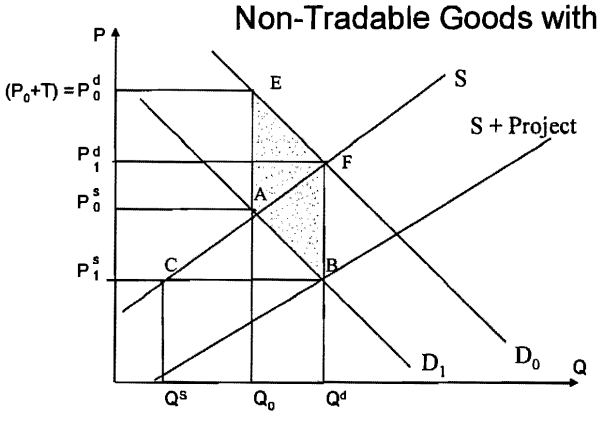
Economic Value of Output = Q^sCABQ^d

Difference (Economic - Financial) = CAB

CAB = $P_1P_0AB - P_1P_0AC$ = Gain in Consumer Surplus - Loss in Producer Surplus

Economic Value = Financial Value + Gain in Consumer Surplus - Loss in Producer Surplus
= Financial Value + Distributive Impacts

Financial, Economic and Distributive Effects of Project to Supply Non-Tradable Goods with Unit Tax



Financial Value of Output = Q^sCBQ^d

Economic Value of Output = $Q^sCAQ_0 + Q_0ABQ^d + AEFB$

Increase in Government Revenue = AEFB

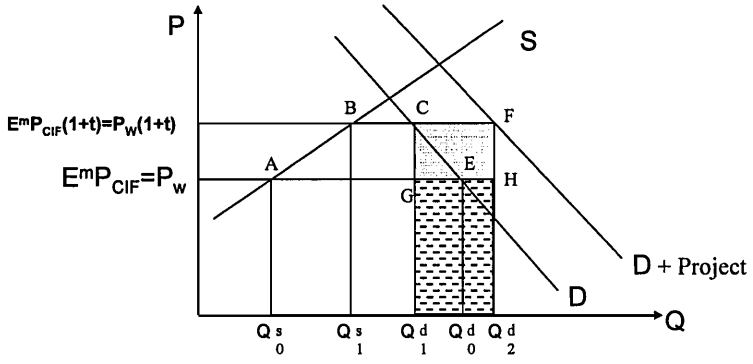
CAB = $P^S_1P^S_0AB - P^S_1P^S_0AC$

Since $P^S_1P^S_0AB = P^d_1P^d_0EF$ Therefore, CAB = $P^d_1P^d_0EF - P^S_1P^S_0AC$

= Gain in Consumer Surplus - Loss in Producer Surplus

Economic Value of Output = Financial Value of Output + Change in Gov. Tax Revenues + Increases in Consumer Surplus - Loss in Producer Surplus

Measuring Distributive Impact from Financial and Economic Values of Inputs with Tariffs



Financial Cost of Importable Goods = $Q^d_1CFQ^d_2$

Economic Cost of Importable Goods = $Q^d_1GHQ^d_2*(1+E^e / E^m - 1)$

Where $(E^e / E^m - 1)$ = Foreign Exchange Premium (FEP)

Financial Cost - Economic Cost = $GCFH^d_1 - Q^d_1GHQ^d_2*(E^e / E^m - 1)$ =

= Gain in Tariff Revenues to Government – Loss in Government Revenues from Additional Use of Foreign Exchange in Importing This Input

Examples:

- Who benefits from worker transportation?
- Why was the Makar Port built?
- Why was the Paphos hotel not built?

Workers Transportation Case

Basic Facts

- Factory currently employs 20 workers.
- Workers currently use taxis at a cost of $1.00 per day.
- Factory wants to employ 40 workers, but can not recruit any additional worker without either subsidizing transportation or paying higher wages.
- The proposal is to buy a bus for $25,000.
- Used Bus valued at $10,000 in year 5.
- The bus will operate for 250 days per year.
- It will be necessary to employ a driver to operate and maintain the bus at a wage of $10.00 per day.
- The economic opportunity cost of employing the driver is equal to approximately 80% of his wage.
- The charge per person/day on the bus will be 40 cents.

Workers Transportation Case

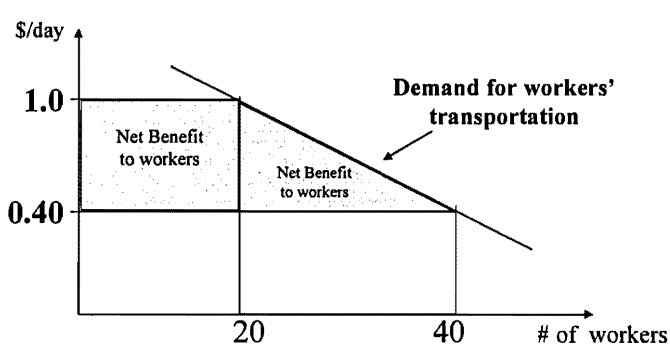
- The cost of oil and gas will be $2.00 per day. The conversion factor for oil and gas is estimated to be 0.60 because of the high taxes imposed on their purchase price.
- The spare parts bill is expected to be $100 per year. Spare parts have a tariff and taxes on them that are equal to 25 percent of their c.i.f price.Thus, the spare parts conversion factor is equal to 0.80.
- The ratio of the economic exchange rate to the market exchange rate is equal to 1.
- No income taxes are levied on the income of public enterprise.
- The financial discount rate is equal to 6%, and the economic discount rate is equal to 10%

Workers Transportation Case

TABLE 1: FINANCIAL APPRAISAL

	PV @10%	0	1	2	3	4	5
CASH INFLOWS							
Receipts	$16,679	4,000	4,000	4,000	4,000	4,000	0
Final in use values	$6,209	0	0	0	0	0	10,000
TOTAL INFLOWS		***4,000***	***4,000***	***4,000***	***4,000***	***4,000***	***10,000***
CASH OUTFLOWS							
Expenditures							
Bus purchase	20,000	20,000					
Tariff on Bus	5,000	5,000					
Operating Expenses							
Labor	10,425	2,500	2,500	2,500	2,500	2,500	0
Fuel	2,085	500	500	500	500	500	0
Spare parts	417	100	100	100	100	100	0
Total Outflow	37,927	**28,100**	**3,100**	**3,100**	**3,100**	**3,100**	**0**
Net Cash Flow	-15,038	***-24,100***	***900***	***900***	***900***	***900***	***10,000***
NPV Financial at 6%	***-13,509***						
NPV Financial at10%	***-15,038***						

Measurement of Economic Benefits



Financial Revenue/person/day = $0.40

Economic Benefits/person/day = $0.85

[(20*$1.0+20*($1+$0.40)/2]/40 = $0.85

Workers Transportation Case

TABLE 2: ECONOMIC APPRAISAL

	Conversion Factor	PV at 10%	0	1	2	3	4	5
CASH INFLOWS								
Receipts	2.125	35,444	8,500	8,500	8,500	8,500	8,500	0
Final in use values	0.8	4,967	0	0	0	0	0	8000
TOTAL INFLOWS		***40,411***	***8,500***	***8,500***	***8,500***	***8,500***	***8,500***	***8,000***
CASH OUTFLOWS								
Expenditures								
Bus purchase	1	20000	20000					
Tariff on Bus	0	0	0					
Operating Expenses								
Labor	0.8	8,340	2000	2000	2000	2000	2000	0
Fuel	0.6	1,251	300	300	300	300	300	0
Spare parts	0.8	334	80	80	80	80	80	0
TotalOutflow		***29,924***	***22,380***	***2,380***	***2,380***	***2,380***	***2,380***	-
Net Cash Flow		**10,487**	**(13,880)**	**6,120**	**6,120**	**6,120**	**6,120**	**8,000**
NPV Economic at 10%		**10,487**						

Workers Transportation Case

TABLE 3: DISTRIBUTION OF NET BENEFITS OF THE EXTERNALITIES TO STAKEHOLDERS

	PV EXTERNALITIES @10%	*Government*	*Workers*	*Driver*
Receipts	18,764		18,764	
Final in use values	(1,242)	-1,242		
TOTAL INFLOWS				
CASH OUTFLOWS				
Expenditures				
Bus purchase	0			
Tariff on Bus	(5,000)	5,000		
Operating Expenses				
Driver	(2,085)			2,085
Fuel	(834)	834		
Spare parts	(83)	83		
Total Distribution	**25,525**	**4,676**	**18,764**	**2,085**

Economic value = Financial Value + Sum of Stakeholder Externalities

RECONCILIATION OF FINANCIAL, ECONOMIC, AND DISTRIBUTIVE ANALYSIS

NPV Economics	=	NPV Financial	+	SUM of PV of externalities
at economic discount rate		at economic discount rate		at economic discount rate
10,487		-15,038		25,525

Port Rehabilitation and Expansion: The Makar Project

Basic Facts:

- Makar Port, located in General Santos City at the northern side of Sarangani Bay, a well-protected bay in Mindanao, lies along the main north-south trading axis which skirts Mindanao on its western shore.
- The objectives of the project are to increase the capacity and improve the efficiency of cargo handling facilities at the port to accommodate future flows.
- The project will cost approximately 635 million pesos[1].
- Seventy-five percent of the total project cost will be provided as a grant by the US Agency for International Development (USAID) and the other 25% will be provided from counterpart contribution by the Philippine government.

Port Rehabilitation and Expansion: The Makar Project

Project Outcome

- Deterministic case appeared good with partial financial analysis:

  NPV Financial (with Project) = 10,760,000 million pesos

- Full analysis shows project provide a negative economic performance

- Project was implemented

Port Rehabilitation and Expansion: The Makar Project

Incremental Financial-Economic Analysis

	Without Project (000s of Pesos)	With Project (000s of Pesos)	Incremental (000s of Pesos)
NPV (Total Investment Point of View)	19,453	10,760	(8,693)
NPV (Economic Point of View)	25,683	(105,576)	(131,259)

- Incorrect analysis was done initially that looked at only financial outcome with project. Should have looked at both **financial** and **economic** outcomes on an **incremental** basis.

Note: Peso is the Philippine currency and in Year 1 is equal to 0.037 US dollar (1994).

FINANCIAL ANALYSIS
Incremental Financial Cash Flow Statement (Real)
(in thousands Peso)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 15	Year 16
RECEIPTS									
Port Revenues - local	-	-	-	-	1,359	2,276	6,895	8,120	-
Port Revenues - foreign	-	-	-	-	216	243	425	452	-
Total port revenues	-	-	-	-	1,576	2,519	7,319	8,572	-
Rental income from Container Yard I	-	3,000	3,000	3,000	3,000	3,000	3,000	3,000	-
Rental income from Container Yard II	-	-	-	-	1,000	2,000	6,000	9,000	-
Other Income	69	69	69	69	69	69	69	69	-
USAID Grant and Gov. Contribution	22,148	155,088	219,215	79,719	-	-	-	-	-
Liquidation Values:	-	-	-	-	-	-	-	-	340,810
Total Cash Receipts	**22,217**	**158,157**	**222,284**	**82,788**	**5,645**	**7,588**	**16,388**	**20,641**	**340,810**
EXPENDITURES									
Investment cost-non tradable	22,631	103,995	153,285	49,006	-	-	-	-	-
Investment cost-tradable	2,758	93,124	139,002	57,285	-	-	-	-	-
Operating Cost:	-	-	-	-	9,017	9,017	9,017	9,017	-
Loss of rental income from term. shed	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	-
Change in Cash balance	-	-	-	-	79	54	64	19	(390)
Change in Accounts Receivable	-	-	-	-	158	109	128	38	(779)
Change in Accounts Payable	-	-	-	-	(1,353)	(123)	(123)	(123)	1,230
Total Expenditures	**26,489**	**198,219**	**293,386**	**107,392**	**9,001**	**10,157**	**10,186**	**10,051**	**61**
NET CASH FLOW	**(4,272)**	**(40,063)**	**(71,103)**	**(24,604)**	**(3,356)**	**(2,569)**	**6,202**	**10,589**	**340,750**
NET PRESENT VALUE (at 9%)		**(8,693)**							

Economic Benefits Makar Port Project

Financial Analysis

- Additional port revenue from expansion in traffic including foreign exchange premium.
- Additional rental income from containers yards.

Stakeholder Impacts

- Reduction in waiting time of ships.
- Reduction in animal weight loss from waiting on ship.

Economic Cost of Makar Port Project

- All investment and operating costs of port, even if subsidized.

ECONOMIC ANALYSIS
Incremental Economic Net Benefit Flow Statement
(in thousands Peso)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 15	Year 16
RECEIPTS:									
Port revenues - local	-	-	-	-	1,359	2,276	6,895	8,120	-
Port revenues - foreign	-	-	-	-	249	280	488	520	-
Total Port Revenues	-	-	-	-	1,608	2,556	7,383	8,639	-
Benefit to ship owners due to reduction in ships' waiting time	-	-	-	25,484	31,264	33,539	35,444	36,491	-
Benefit to shippers due to reduction in animal weight loss	-	-	-	-	13,331	13,906	16,204	19,715	-
Rental income from Container Yard I	-	3,000	3,000	3,000	3,000	3,000	3,000	3,000	-
Rental income from Container Yard II	-	0	0	0	1,000	2,000	6,000	9,000	-
Other Income	69	69	69	69	69	69	69	69	-
USAID Grant and Gov. Contribution	-	-	-	-	-	-	-	-	-
Liquidation Values:	-	-	-	-	-	-	-	-	316,916
Total Cash Receipts	**69**	**3,069**	**3,069**	**28,553**	**50,272**	**55,070**	**68,100**	**76,914**	**316,916**
EXPENDITURES:									
Investment cost-non tradable	21,818	96,550	141,822	45,422	-	-	-	-	-
Investment cost-tradable	2,596	87,515	130,373	54,059	-	-	-	-	-
Operating Cost:	-	-	-	-	9,044	9,044	9,044	9,044	-
Loss of rental income from term. shed	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	-
Change in Cash balance	-	-	-	-	80	55	65	20	(397)
Change in Accounts Receivable	-	-	-	-	160	111	130	39	(793)
Change in Accounts Payable	-	-	-	-	(1,329)	(121)	(121)	(121)	1,208
Total Expenditures	**25,514**	**185,165**	**273,295**	**100,581**	**9,056**	**10,190**	**10,219**	**10,082**	**19**
NET CASH FLOW	**(25,445)**	**(182,096)**	**(270,226)**	**(72,028)**	**41,216**	**44,880**	**57,881**	**66,832**	**316,898**
NET PRESENT VALUE (at 10.3%)		**(131,259)**							
INTERNAL RATE OF RETURN		5.88%							

STAKEHOLDER ANALYSIS

- Key Question:
  - Why was this BAD project implemented?

STAKEHOLDER ANALYSIS
(in thousands Peso)

ITEM	(A) PV Financial at Economic Discount Rate of 10.3%	(B) PV Economic at Economic Discount Rate of 10.3%	(C) PV of Externalities (B - A)	(D) Allocation of Externalities: Government	(E) Allocation of Externalities: Shipowners/ Shippers
RECEIPTS:					
Total Port Revenues	25,677	25,928	250	250	-
Benefit to ship owners/shippers due to reduction in ships' waiting time	-	187,684	187,684	-	187,684
Benefit to livestock shippers due to reduction in animal wt. loss	-	77,025	77,025	-	77,025
Rental income from Container Yard I	22,100	22,100	-	-	-
Rental income from Container Yard II	23,895	23,895	-	-	-
Other Income	577	577	-	-	-
USAID Grant	404,200	-	(404,200)	(404,200)	-
Liquidation Values:	81,587	75,867	(5,720)	(5,720)	-
Total Cash Receipts	***558,037***	***413,076***	***(144,961)***	***(409,670)***	***264,709***
EXPENDITURES:					
Investment cost-nontradable	280,673	260,925	(19,749)	(19,749)	-
Investment cost-tradable	245,332	230,517	(14,815)	(14,815)	-
Operating Cost:	44,000	44,135	135	135	-
Loss of rental income from term. shed	9,203	9,203	-	-	-
Change in Cash balance	223	227	4	4	-
Change in Accounts Receivable	446	454	8	8	-
Change in Accounts Payable	(1,145)	(1,126)	20	20	-
Total Expenditures	***578,732***	***544,335***	***(34,397)***	***(34,397)***	-
NET CASH FLOW	**(20,695)**	**(131,259)**	**(110,564)**	**(375,272)**	

CONCLUSION

- Philippines wasted 131,259,000 pesos in order to transfer income to a few ship-owners/shippers.

CONTRACTS CANNOT FIX SOME PROBLEMS
Example: The Paphos Holiday Complex

Basic Facts:

- The Paphos Holiday Complex was a major tourism project sponsored by the Cyprus Development Bank (CDB), which was interested in formulating and implementing an up-market tourist project that was both financially and economically viable and one that took into account environmental costs and benefits.
- The Paphos Holiday Complex targeted the upper class segment of the Western European Tourism market
- Emphasized recreational activities that made Cyprus attractive in off-season
- It would have consisted of a main hotel building of 350 room capacity and another 200 rooms in a bungalow type accommodation

Project Outcome:

- Deterministic case was good
- Riskiness was low
- Project was not undertaken

Deterministic Analysis

NPV (Equity point of view), Discount Rate = 11.4% 1.75 Million CPs

NPV (Economic point of view), Discount Rate = 9.5% 6.90 Million CPs

CP = Cypriot Pounds

Distribution Analysis: Paphos Holiday Complex
Distribution of Externalities Real Values (CP 000's)

	Total	Govt	Electr. Auth.	Other Hotels	Other Groups
From Guest Expenditure					
Outside of Hotel	1176	1176			
From Taxes	1648	1648			
From Hotel Operations	-1107	5037		-6144	
Service Charge	-197	174		-371	
In use Values:					
•Land	0				
•Buildings	-100	3			-103
•Electromechanical	26	26			
•Furnishings & Equipment	7	7			
Investments:					
•Land	0				
•Buildings	374	-12			386
•Electromechanical	-199	-199			
•Furnishings & Equipment	-75	-75			
•Preliminary 193	193				
Operating Expenses:					
•Food Cost	188	-38			226
•Beverage Cost	190	162			29
•Payroll	0				
•Departmental	-223	-223			
•Electricity	283	-67	350		
•Fuel	-156	-36			-120
•Water	-577				-577
•Repairs	-34	-34			
•Admin. & Marketing	107	107			
Corporate Taxation	3301	3301			
Staff Service Charge	0				
Working Capital:					
•Accounts Receivable	-64	-64			
•Accounts Payable	27				27
•Cash Balance	0				
•Reserve Stock	0				
Total Externalities	**4788**	**11085**	**350**	**-6515**	**-132**

Paphos Holiday Complex never built.

PROGRAM ON INVESTMENT APPRAISAL AND RISK ANALYSIS

Lecture Notes

Week Two, Day Four

(Session I: 09:00 – 10:30)

RISK ANALYSIS

What is risk?

- Risk generally describes the possible deviation from a projected outcome.
- To project any uncertain outcome into the future you need to have a "predictive model".
- A predictive model could be a simple formula or a very complex worksheet.

Decision-Making Under Uncertainty

1. **Risk analysis**
   - How to identify, analyze, and interpret the expected variability in project outcomes

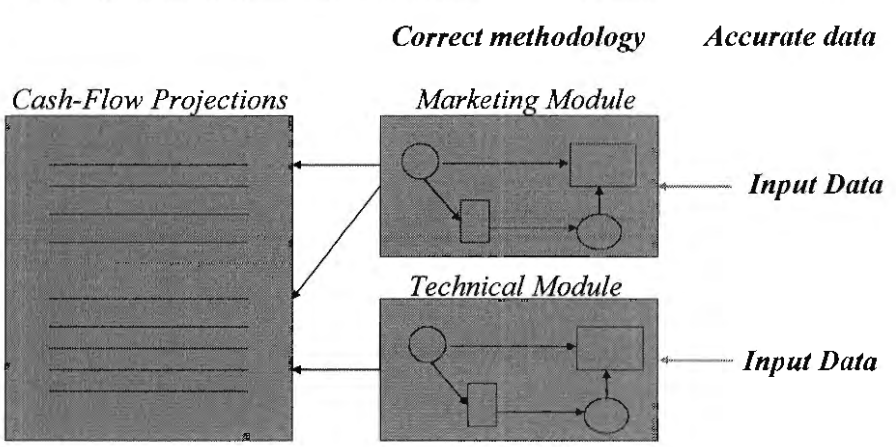
2. **Risk diversification and management**
   - How to diversify unsystematic risk
   - How to redesign and reorganize projects in order to reallocate risk

Risk Analysis

1. WHY?

- Project returns are spread over time
- Each variable affecting NPV is subject to a high level of uncertainty
- Information and data needed for more accurate forecasts are costly to acquire
- Need to reduce the likelihood of undertaking a "bad" project while not failing to accept a "good" project

A good predictive model in project appraisal depends on:



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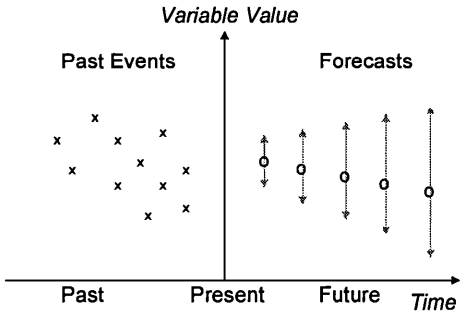
Uncertainty and Forecasting

We use the past to forecast the future



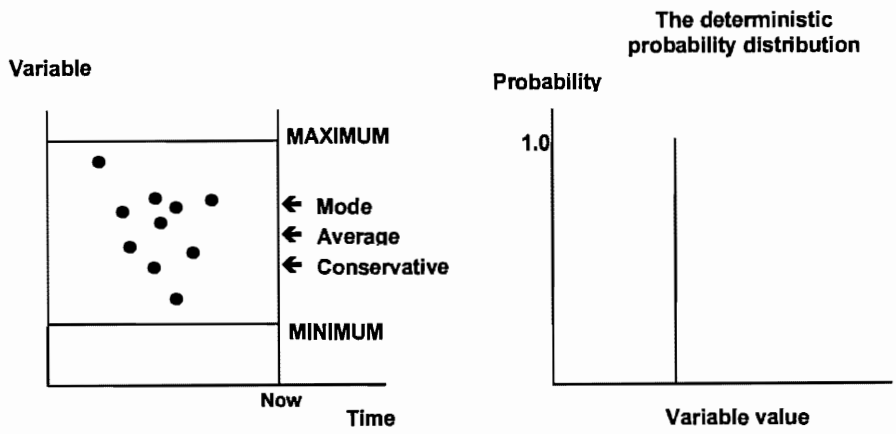
Ability to forecast accurately depends on:

- How similar past events are to the object of forecast
- How big is the sample of past events
- How recent are past events
- How consistent the outcome historically
- How far into the future is the forecast
- How dependent the outcome is on previous years (trend) and on other projected variables (correlations)

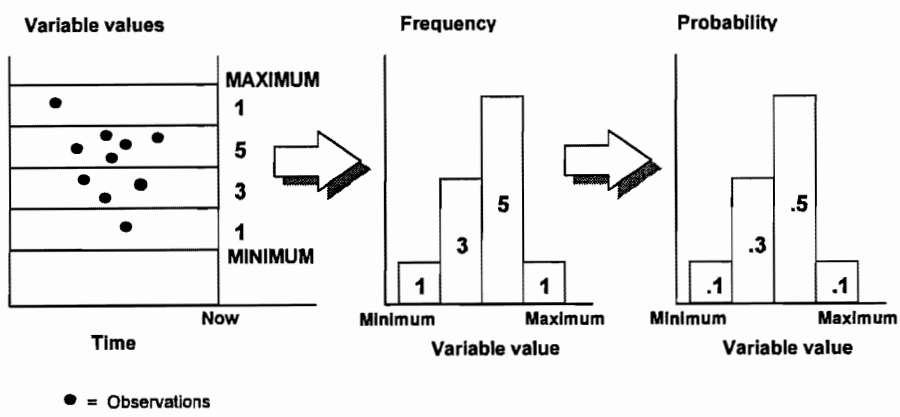
Inputs are projected as certainties (Base Case Scenario)

- When we provide inputs to a predictive model we use one particular probability distribution – the Deterministic Probability Distribution.
- By that we assign 100% probability that the single value of the input we use in the projection will actually arise.

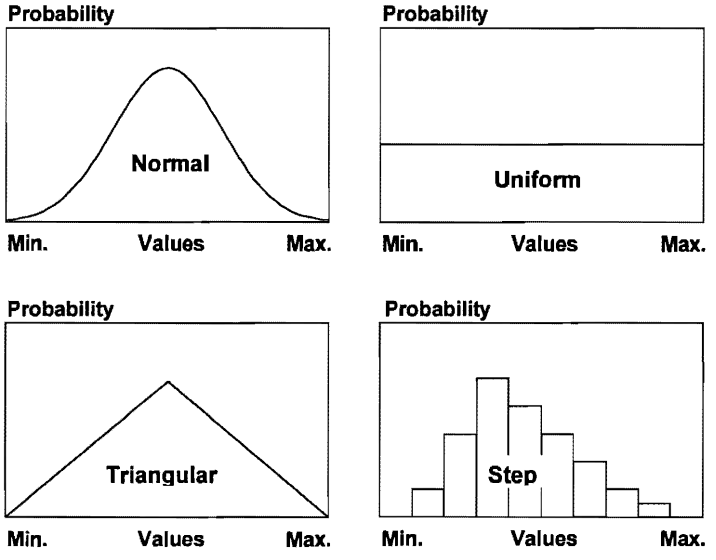
Forecasting the outcome of a future event: Single-value estimate



From a frequency to a probability distribution



Multi-value probability distributions



Multi-value probability distributions as their inputs to a predictive model.

- Any possible deviation in any of the critical input variables of a predictive model from their base case values will generate a new scenario with a different outcome (or outcomes).
- There are potentially an infinite number of combinations of input values possible, each causing a different set of results.

2. Alternative Methods of Dealing With Risk

2.1 Sensitivity Analysis

2.2 Scenario Analysis

2.3 Monte Carlo Risk Analysis (or Simulation Analysis)

2.1 Sensitivity Analysis

- Test the sensitivity of a project's outcome (NPV or the key variable) to changes in value of one parameter at a time
- "What if" analysis
- Allows you to test which variables are <u>important</u> as a source of risk
- A variable is important depending on:
  - A) Its share of total benefits or costs
  - B) Likely range of values
- Sensitivity analysis allows you to determine the <u>direction of change</u> in the NPV
- Break-even analysis allows you to determine how much a variable must change before the NPV or these key variable moves into its critical range turns negative

Another Important Use of Sensitivity Analysis

- Sensitivity analysis on the PV of each row of the spreadsheet (Banker's, Owner's and Economy's point of view) is the best way to de-bug a spreadsheet
- If results do not make sense then it is likely that there is an computation or logistical error in the spreadsheet

Sensitivity Analysis for the Mindanao Poverty Reduction Case

World T.P. Price (S.F. FOB) US$/Ton	Real NPV (Million Pesos)	Inflation Rate	Real NPV (Million Pesos)
587	-228	5%	161
637	-103	8%	147
687	22	11%	136
737	147	14%	126
787	272	17%	118
837	397	20%	111
887	522	23%	105
937	647	26%	99
987	772	29%	94
1037	897	32%	89
1087	1022	35%	84
Divergence from Original Cost Estimate	**Real NPV (Million Pesos)**	**Capacity Utilization Factor**	**Real NPV (Million Pesos)**
-10%	190	60%	-189
-5%	169	65%	-147
0%	147	70%	-105
5%	125	75%	-63
10%	103	80%	-21
15%	82	85%	21
20%	60	90%	63
25%	38	95%	105
30%	17	100%	147
35%	-5	105%	189
40%	-27	110%	231

- For Tomato Paste Plant Capacity Utilization is critical.
- What can cause Capacity Utilization to be low?
  1. Technical problems with the plant.
  2. The demand for product does not exist at the price that covers the costs
  3. The plant can not get adequate supplies of raw materials.

Factsheet:

- this plant eventually run into financial troubles
- could not attain adequate supplies of raw materials

Cautionary Notes for Sensitivity Analysis

1. Range and probability distribution of variables

- Sensitivity analysis doesn't represent the <u>possible range of values</u>
- Sensitivity analysis doesn't represent the probabilities for each range. Generally there is a <u>small</u> probability of being at the extremes.

2. Direction of effects

For most variables, the direction is obvious

A) Revenue increases → NPV increases
B) Cost increases → NPV decreases
C) Inflation → Not so obvious

Cautionary Notes for Sensitivity Analysis

3. One-at-a-Time Testing Is Not Realistic

- One-at-a-time testing is not realistic because of correlation among variables
  - A) If Q sold increases, costs will increase

    Profits = Q (P - UC)
  - B) If inflation rate changes, all prices change
  - C) If exchange rate changes, all tradable goods' prices and foreign liabilities change
- One method of dealing with these combined or correlated effects is scenario analysis

2.2 Scenario Analysis

- Scenario analysis recognizes that certain variables are interrelated. Thus a small number of variables can be altered in a consistent manner at the same time.
- **What is the set of circumstances that are likely to combine to produce different "cases" or "scenarios"?**
  - A. Worst case / Pessimistic case
  - B. Expected case / Best estimate case
  - C. Best case / Optimistic case

  Note: Scenario analysis does not take into account the Probability of cases arising
- **Interpretation is easy when results are robust:**
  - A. Accept project if NPV > 0 even in the worst case
  - B. Reject project if NPV < 0 even in the best case
  - C. If NPV is positive in some cases and negative in other cases, then results are not conclusive
- **Difficult to define what scenario's to specify without first examining the range of possible outcomes by a Monte Carlo Analysis.**
- **Scenario analysis is a good way to communicate the results of a Monte Carlo analysis.**

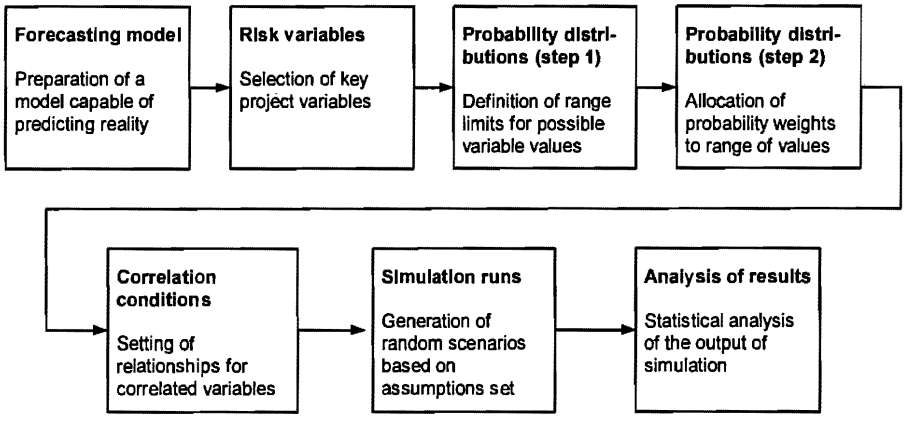
2.3 Monte Carlo Method of Risk Analysis

- A natural extension of sensitivity and scenario analysis
- Simultaneously takes into account different probability distributions and different ranges of possible values for key project variables
- Allows for correlation (covariation) between variables
- Generates a probability distribution of project outcomes (NPV) instead of just a single value estimate
- The probability distribution of project outcomes may assist decision-makers in making choices, but there can be problems of interpretation and use.

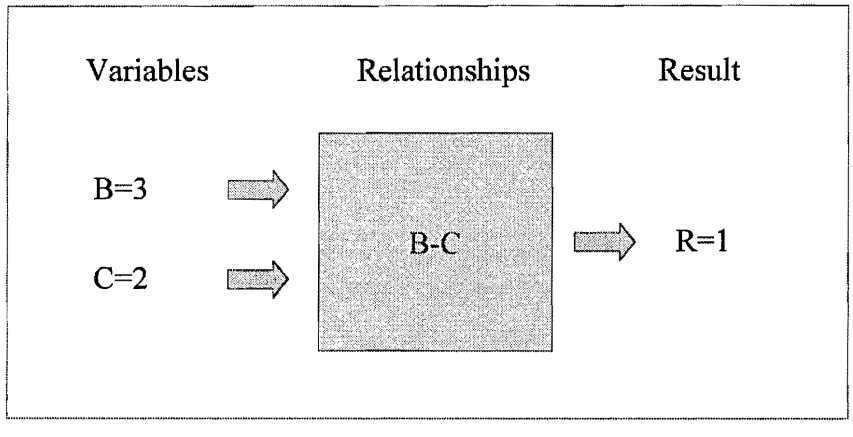
Monte-Carlo Simulation

- Monte Carlo simulation is a methodology that handles the complexity arising from projecting multi-value probability distributions as inputs to a model.
- Practically this is only possible to be applied with the use of a computer and specialised software.

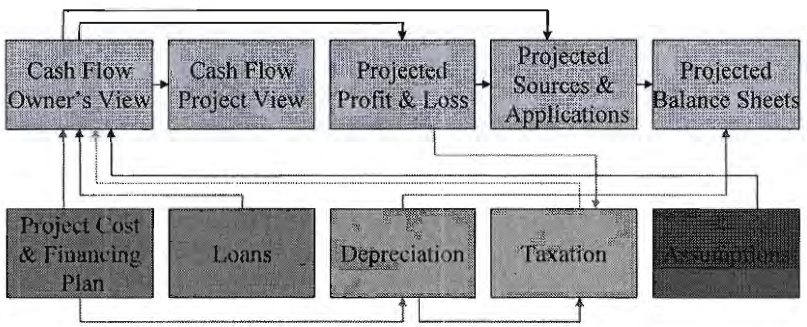
The Risk Analysis Process



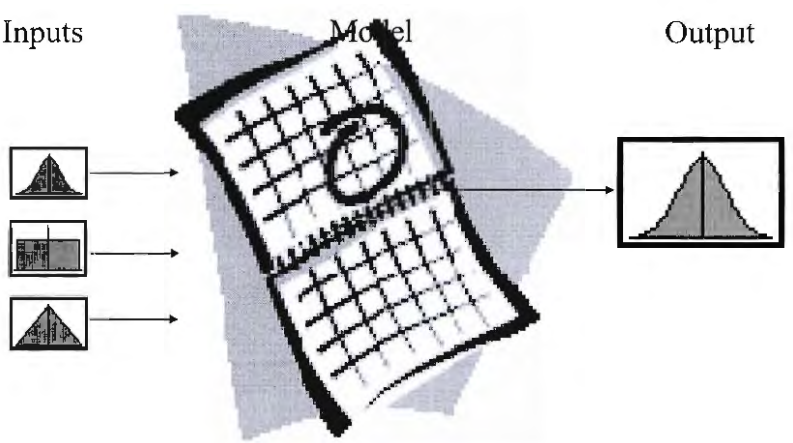
Simple Model



The Financial Model



Taking uncertainty into consideration



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The Monte-Carlo Simulation process

1. Identify the critical/most uncertain input variables in a projected model – **risk variables**.
2. Substitute single-value assumptions with **probability distributions** which tend to express the possible variability for each of the identified risk variables.

Forecasting Model

Forecasting Model

	$	Variables	Formulae
Sales price	12	V1	
Volume of sales	100	V2	
Cash inflow	1,200		F1 = V1 × V2
Materials	300		F2 = V2 × V4
Wages	400		F3 = V2 × V5
Expenses	200	V3	
Cash outflow	900		F4 = F2 + F3 + V3
Net Cash Flow	300		F5 = F1 – F4
Relevant assumptions			
Material cost per unit	3.00	V4	
Wages per unit	4.00	V5	

Set Probability Distributions

Simulation model

		$	Risk variables
Sales price	X	12	V1
Volume of sales	-0.8 Y	100	V2
Cash Inflow		1,200	
Materials		300	
Wages		400	
Expenses		200	
Cash outflow		900	
Net Cash Flow		300	
Relevant assumptions			
Material cost per unit		3.00	V4
Wages per unit		4.00	

The Monte-Carlo Simulation process

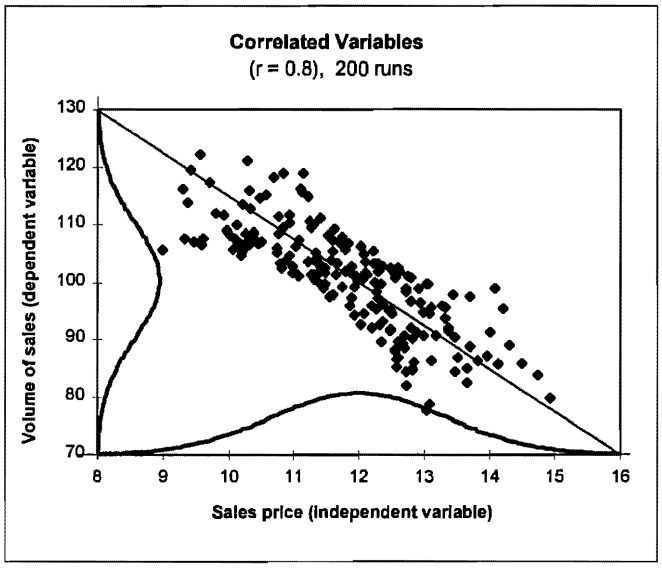
3. Set correlation conditions to limit the possibility of generating internally inconsistent scenarios during a simulation.
4. Identify the critical calculated results you wish to apply the analysis on – **model results**.

Set correlation conditions

Simulation model

		$	Risk variables
Sales price	X	12	V1
Volume of sales	-0.8 Y	100	V2
Cash inflow		1,200	
Materials		300	
Wages		400	
Expenses		200	
Cash outflow		900	
Net Cash Flow		300	
Relevant assumptions			
Material cost per unit		3.00	V4
Wages per unit		4.00	

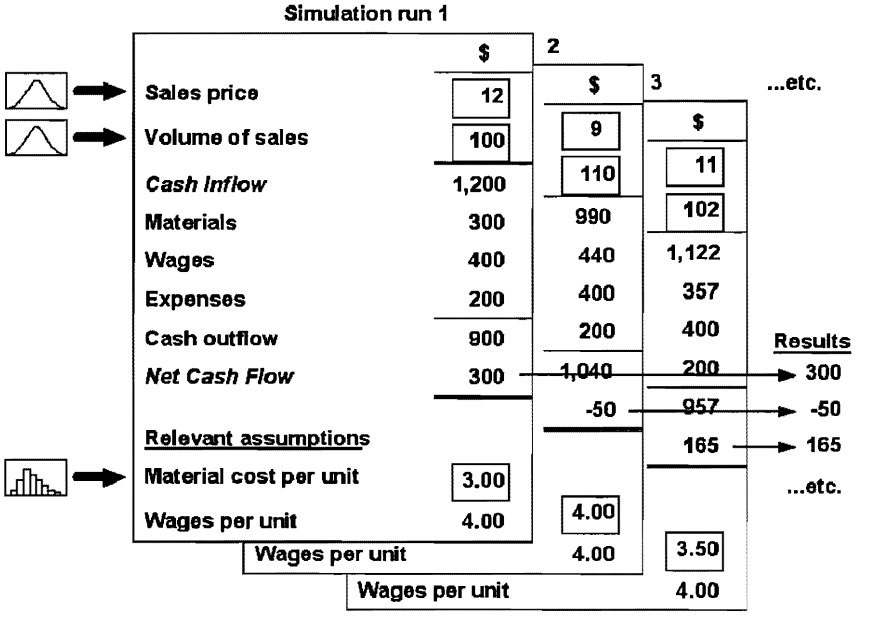
Correlated variables – Generating Relationship Data



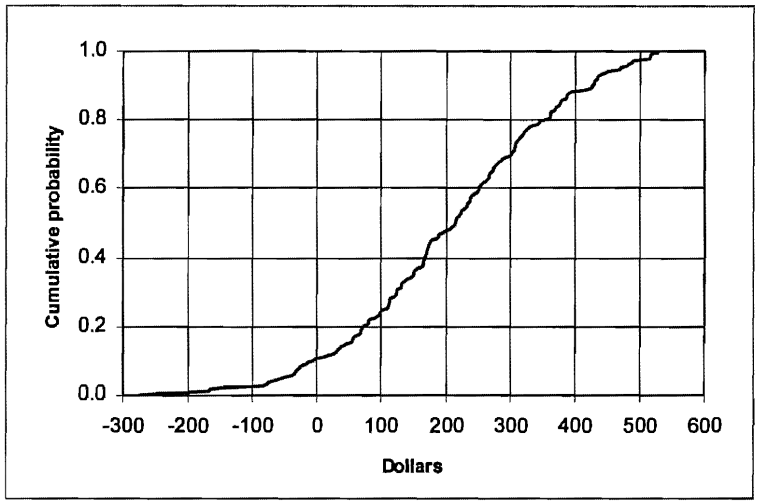
The Monte-Carlo Simulation process

5. **Run simulation** creating a sample of computer scenarios based on inputs from the probability distributions and with respect to any correlation conditions set.
6. **Analyse results** generated in the simulation run, calculating statistical measures and plotting probability distribution graphs of the results, which indicate all the potential outcomes and their likelihood of occurrence.

Simulation Runs



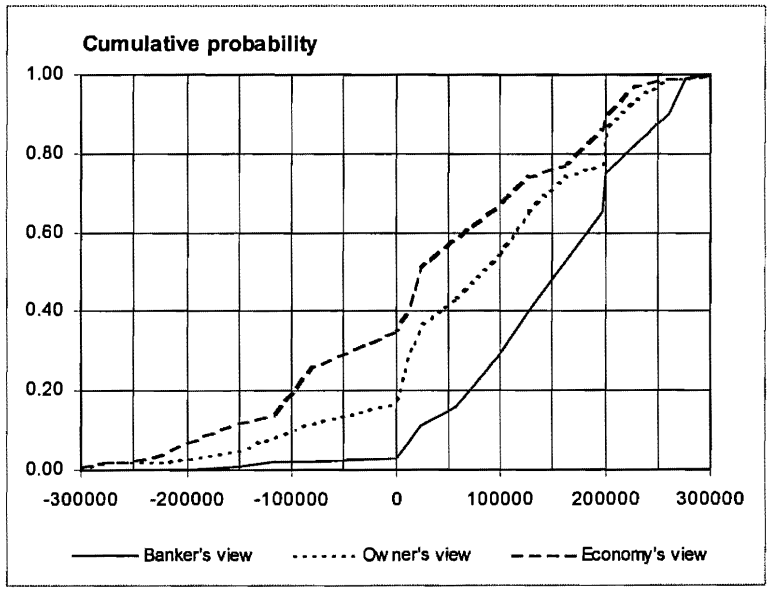
Distribution of results (net cash flow)

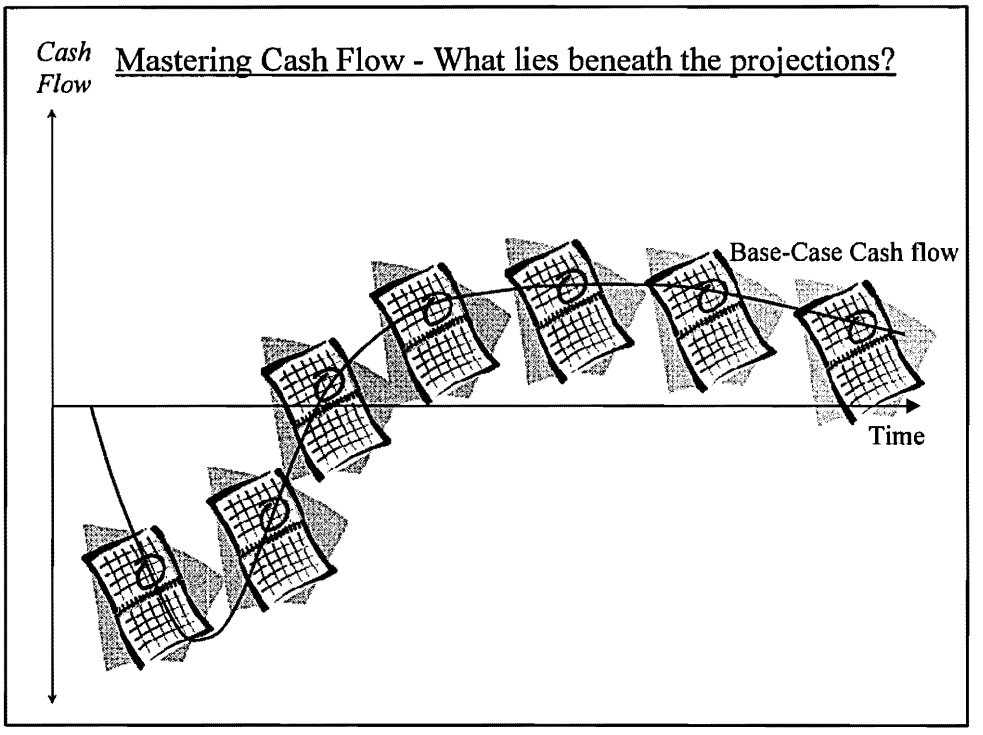


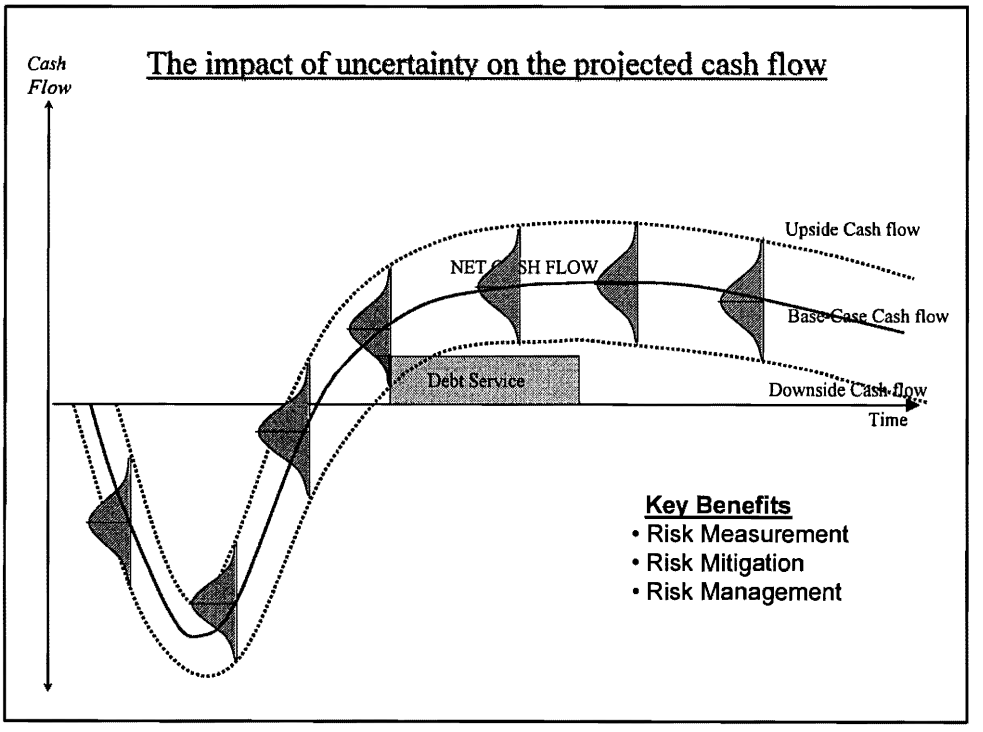
$$p = \frac{1}{n}$$

where: p = probability weight for a single run
n = sample size

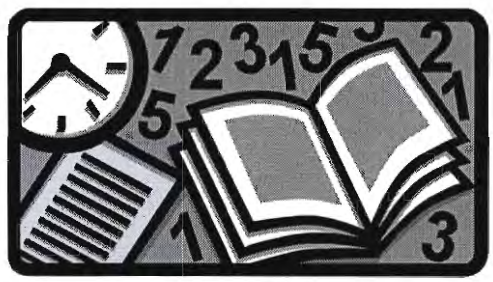
Net present value distribution (different project perspectives)

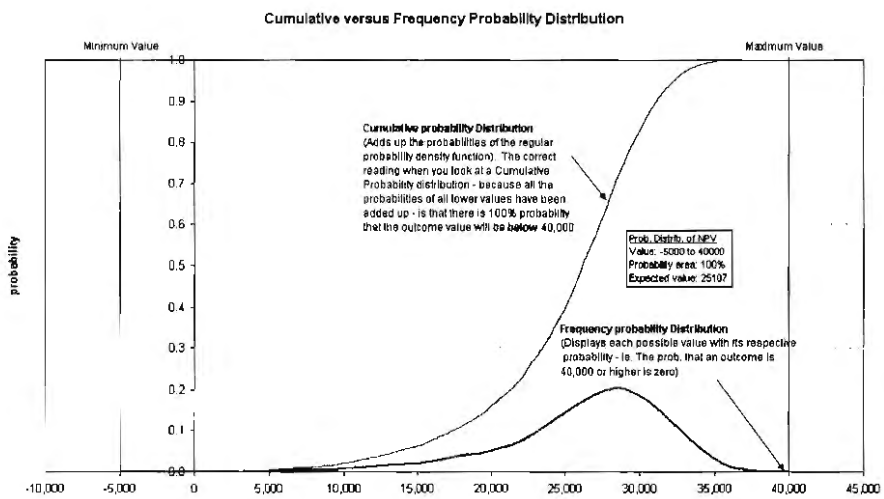



Cash Flow
Mastering Cash Flow - What lies beneath the projections?
Base-Case Cash flow
Time

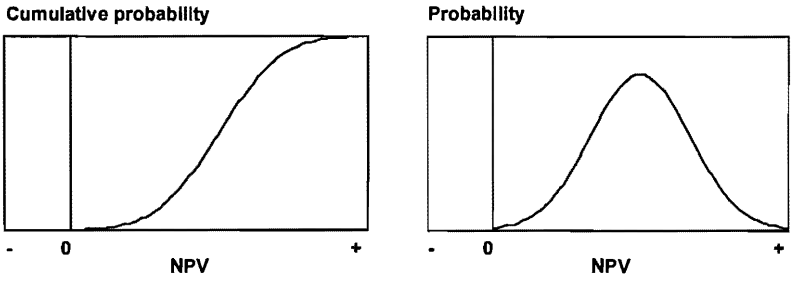

Cash Flow
The impact of uncertainty on the projected cash flow
Upside Cash flow
NET CASH FLOW
Base-Case Cash flow
Debt Service
Downside Cash flow
Time
Key Benefits
• Risk Measurement
• Risk Mitigation
• Risk Management

Interpretation of Risk Analysis Results



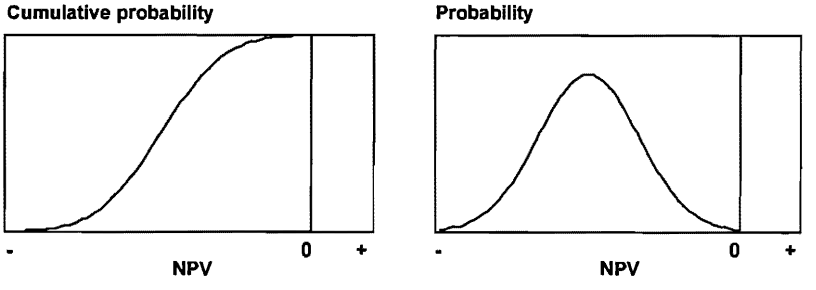


Case 1: Probability of negative NPV=0



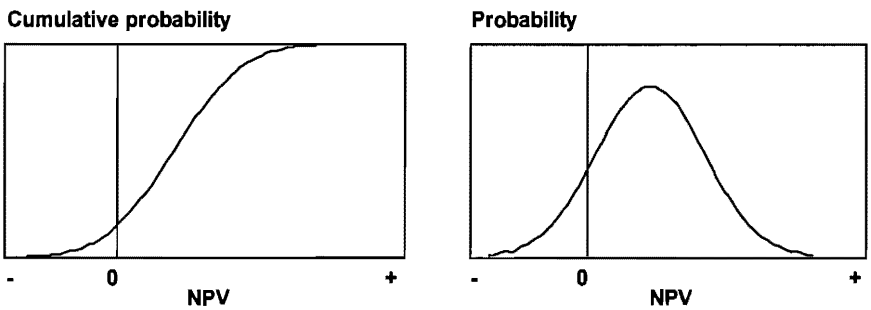
DECISION : ACCEPT

Case 2: Probability of positive NPV=0



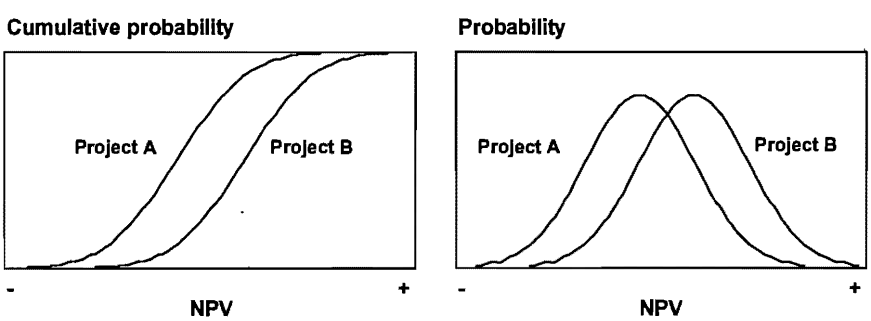
DECISION : REJECT

Case 3: Probability of zero NPV greater than 0 and less than 1



DECISION : INDETERMINATE

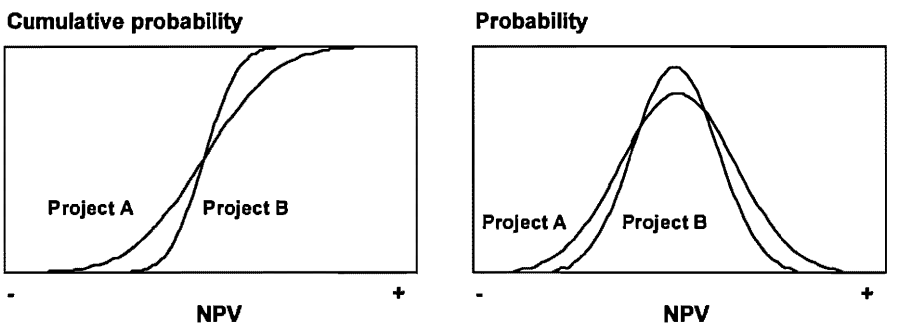
Case 4: Mutually exclusive projects (given the same probability, one project always shows a higher return)



DECISION : CHOOSE PROJECT B

Case 4: Non-intersecting cumulative probability distributions of project return for mutually exclusive projects

Case 5: Mutually exclusive projects (high return vs. low loss)



DECISION : INDETERMINATE

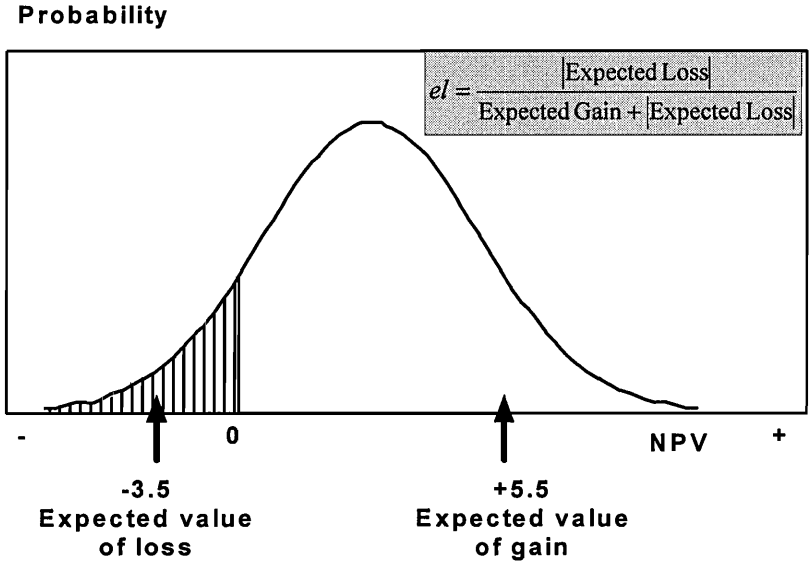
Case 5: Intersecting cumulative probability distributions of project return for mutually exclusive projects

Expected Loss Ratios:

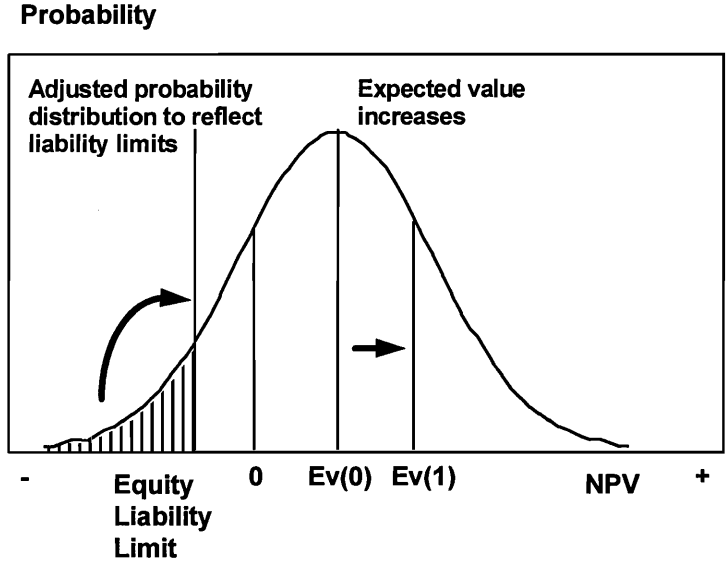
Example of project outcomes expected value of project

Return		Probability		Expected Value	
-10	x	0.2	=	-2.0	Expected value of losses
-5	x	0.3	=	-1.5	
10	x	0.4	=	4.0	Expected value of gains
15	x	0.1	=	1.5	
Total				2.0	

Expected Loss Ratios



Risk under conditions of limited liability



Advantages of risk analysis

- It enhances decision making on marginal projects.
- It screens new project ideas and aids the identification of investment opportunities.
- It highlights project areas that need further investigation and guides the collection of information.
- It aids the reformulation of projects to suit the attitudes and requirements of the investor.
- It induces the careful re-examination of the single-value estimates in the deterministic appraisal.
- It helps reduce project evaluation bias through eliminating the need to resort to conservative estimates.

Advantages of risk analysis (cont.)

- It facilitates the thorough use of experts.
- It bridges the communication gap between the analyst and the decision maker.
- It supplies a framework for evaluating project result estimates.
- It provides the necessary information base to facilitate a more efficient allocation and management of risk among various parties involved in a project.
- It makes possible the identification and measurement of explicit liquidity and repayment problems in terms of time and probability that these may occur during the life of the project.

Finally two words of caution:

- Overlooking significant inter-relationships among the projected variables can distort the results of risk analysis and lead to misleading conclusions.
- The accuracy of the results of risk analysis can only be as good as the predictive capacity of the model employed.

Program on
Integrated Investment Appraisal

DECEMBER 3 – 14, 2007

Cost-Effectiveness Analysis to reduce the incidence of Gastroenteritis by alternative health interventions

Cambridge Resources International, Inc.
Cambridge, MA, USA

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Cost-Effectiveness Analysis to reduce the incidence of Gastroenteritis[1] by alternative health interventions

The Department of Health is considering a number of alternative programs to control gastroenteritis diseases in small villages. The alternative programs under considerations are as follows:

(1) **Potable Water Supply Project**

Investment in a water supply in each village costing $500,000 in the initial investment and $5,000 each year for costs beginning one year after the initial investment is made when the project becomes operative. It is expected that this project will increase the number of man-days engaged in productive employment by 40,000 per year.

(2) **Health Clinic Project**

Investment in a health clinic, staff and medicines which has an initial investment of $30,000 but an annual cost (beginning one year later) of $20,000 per year. It is expected that this program will decrease the number of man-days lost from disease by 20,000 per year, starting the year after the clinic is built.

(3) **Rural Sanitation Project**

The third alternative is a system of improved toilets and sewers in each village which will cost $730,000 per village over a period of two years ($400,000 in the year zero and $330,000 in year one). The decrease in the number of sick days expected from this program is 45,000 from year two onward. The recurrent expenditures for this program are assumed to be negligible.

Assignment:

(1) Assume that the economic discount rate is 10 percent, the life of the investment is 28 years, the years of operation for projects (1) and (2) is 14 years and for project (3) is 13 years. All of the investment is done in year 0 (and year 1 in the case of sanitation). There will be a liquidation value at the end of the project, i.e. year 15. **Having this information which one of these alternatives would you choose to undertake first?**

[1]Gastroenteritis involves diarrhoea or vomiting, with noninflammatory infection of the upper small bowel, or inflammatory infection of the colon, both part of the gastrointestinal tract.

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(2) Suppose if project 1 is undertaken first then the incremental effectiveness of 2 is cut to 1/2 of its previous effectiveness and project 3 is cut to 2/3 of its previous effectiveness. If project 2 is undertaken first then the effectiveness of project 1 is cut to 3/4 of its previous level and project 3 will be cut to 3/5 of its effectiveness. If project 3 is undertaken first then the effectiveness of project 1 is cut to 5/8 of its previous level and project 2's effectiveness is cut to 1/10 of its previous level.

Given these interrelationships which of the remaining two projects should be undertaken second? Please explain your answer.

(3) How would your answer changes if we use a discount rate of 3 percent? Why does the different rate of discount changes the results of the analysis?

The End

Demo Case for Risk
Appraisal of SKYNET Internet Service Provider Project

Cambridge Resources International, Inc.
Cambridge, MA, USA

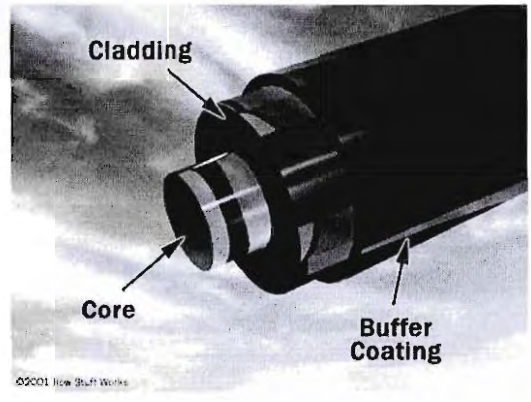
APPRAISAL OF SKYNET INTERNET SERVICE PROVIDER PROJECT

Background

Skynet Communication Systems Pvt. Ltd. (SCS) in the city of Bayar, Kimor, is a private company that specializes in communication services. The demand for internet by Bayar residents has been growing at a faster rate than expected. The city has several internet service providers (ISP) of internet services. However, the growing demand and availability of access to the high-speed regional cable have created a niche for another retailer ISP. Most of the existing ISPs have networks built based on conventional electrical cables. Skynet has realized that a business opportunity exists and has prepared a business plan and feasibility study for launching its own retail network based on fiber optics cables.[1] After examining the license application of the SCS, the city council has awarded a license to SCS to lay down its fiber optics network in the city.

What is Fiber Optics Cable?[2]

Fiber optics (optical fibers) are long, thin strands of very pure glass about the diameter of a human hair. They are arranged in bundles called **optical cables** and used to transmit light signals over long distances.



If you look closely at a single optical fiber, you will see that it has the following parts:

- **Core** - Thin glass center of the fiber where the light travels
- **Cladding** - Outer optical material surrounding the core that reflects the light back into the core
- **Buffer coating** - Plastic coating that protects the fiber from damage and moisture

Hundreds or thousands of these optical fibers are arranged in bundles in optical cables. The bundles are protected by the cable's outer covering, called a **jacket**.

Advantages of Fiber Optics[3]

Compared to conventional metal wire (copper wire), optical fibers are:

- **Less expensive** - Several miles of optical cable can be made cheaper than equivalent lengths of copper wire.
- **Thinner** - Optical fibers can be drawn to smaller diameters than copper wire.

---

1 The use of light to transmit data, video, and voice. Fiber-optic cable has a much higher bandwidth and carries signals much longer distances than wire cable. It is also lighter, easier to install, and provides better security.

2 Source: http://www.howstuffworks.com/fiber-optic.htm

3 Ibid.

- **Higher carrying capacity** - Because optical fibers are thinner than copper wires, more fibers can be bundled into a given-diameter cable than copper wires.
- **Less signal degradation** - The loss of signal in an optical fiber is less than in a copper wire.
- **Light signals** - Unlike electrical signals in copper wires, light signals from one fiber do not interfere with those of other fibers in the same cable.
- **Low power** - Because signals in optical fibers degrade less, lower-power transmitters can be used instead of the high-voltage electrical transmitters needed for copper wires.
- **Digital signals** - Optical fibers are ideally suited for carrying digital information, which is especially useful in computer networks.
- **Non-flammable** - Because no electricity is passed through optical fibers, there is no fire hazard.
- **Lightweight** - An optical cable weighs less than a comparable copper wire cable.
- **Flexible** - Because fiber optics are so flexible and can transmit and receive light, they are used in many flexible digital cameras for other purposes.

The Project

The SCS has recently realized that a number of households and small business owners are looking for affordable broadband internet access. A marketing research indicated that the existing competitors are using conventional electric cables that don't offer the maximum broadband capacity to the end user. The city of Bayar also is located en-route of a major regional fiber-optics cable that offers large trunks of onward internet capacity on an annual lease basis to smaller telecoms and ISPs like the SCS. After contacting a fiber-optics cable manufacturer, the SCS noticed that the current costs of cables and transmission equipment are the lowest than ever, and decided to go ahead with the project.

The business concept of the project was then developed. The plan is to lease onward internet capacity and sell it at a retail level to all interested household and business users. The fiber optics connection to the end user will assure the highest possible speed and reliability of the service. In order to enjoy the new broadband internet service, users will have to sign up for the service for a period of time, typically a year. A one-time connection fee is charged to the user for the extension and activation of the fiber optics cable at the household. A fixed subscription fee is then charged on a monthly basis. The subscriber is not limited by time or internet traffic usage, and there are no other fees.

Financial Analysis: Conclusion

The financial assessment of the proposed ISP project indicates that this is a financially feasible investment package. The project is expected to generate a positive financial NPV. Debt service ratios show that the project generates enough cash to pay back the loan.

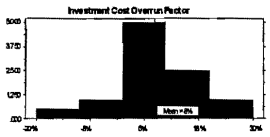
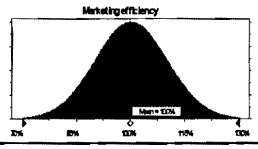
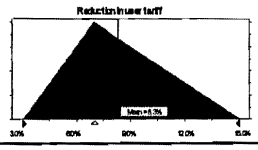
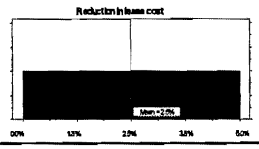
Risk Analysis

The top management of SCS has already received a ***complete financial analysis*** of the project. Before any decision is made, however, they want to know the results of a risk analysis of the project in order to better assess the variability in the returns to the investment. The management is also interested in learning about potential options that might be used to lower the variability (risk) of the proposed project.

ASSIGNMENT

1. Carry out the risk analysis of the project using the information below.

Risk Variables and Probability Distributions

Variable	Base Value	Distribution Type	Description
Construction Cost Overruns *(Cell: B9)*	0%	**Step** 	From / To / Likelihood -0.20 / -0.10 / 5% -0.10 / 0.00 / 10% 0.00 / 0.10 / 50% 0.10 / 0.20 / 25% 0.20 / 0.30 / 10%
Marketing Efficiency Factor (Cell: B27)	100%	**Normal Distribution** 	Mean 100% Standard Dev. 10%
Reduction in User Tariff (annual) (Cell range: C40:G40)	6%	**Triangular Distribution** 	Minimum 3% Likeliest 6% Maximum 15%
Reduction in Onward Capacity Lease (annual) (Cell range: C43:G43)	3%	**Uniform Distribution** 	Minimum 0% Maximum 5%

If the cost of onward capacity lease decreases, the SCS is likely to lower its end-user tariff, but not to the same degree. Include a positive correlation between the reduction in the cost of onward capacity lease and reduction in the user tariff. Use a correlation coefficient of +0.8.

Determine the impact on the following variables:

i) Financial NPV of the project ***(Cell: B194)***
ii) ADSCR in year 1 ***(Cell: C159)***
iii) ADSCR in year 2 ***(Cell: D159)***
iv) ADSCR in year 3 ***(Cell: E159)***
v) DSCR in year 1 ***(Cell: C160)***

2. Discuss the results of risk analysis:
   - What are the risk factors?
   - Is the project viable? How much risk the project carries in terms of return on equity?
   - What are the chances of timely debt service?
   - How the results of deterministic analysis compare with the outcomes of risk simulation?
   - Would you be interested in becoming a shareholder of the SCS?

APPRAISAL OF SKYNET ISP PROJECT

TABLE 1. DATA AND PARAMETERS

Project Cost (KL)	KL (year 0)
Equipment	11,800,000
Building	600,000
Land	250,000
Investment Cost Overrun Factor	0%

Debt Financing (KL)	
Loan	7,000,000
Interest rate	8%
Grace on principal	1
Principal installments	5

Operating & Maintenance Costs		
System O&M	5.0%	of Equipment
Connection cost (one-time)	100	KL
Onward capacity lease (year 0)	2,000,000	KL/year
Reduction in lease cost	3.0%	per year
Number of employees	25	people
Wage (year 0)	4,500	KL/month
Wage growth rate	2%	per year

Depreciation and Tax Parameters		
Useful life of assets	8	years
Depreciation for tax purposes	5	years
Income tax rate	35%	
Return on equity (discount rate)	15%	

Tariffs and Subscribers			
Connection fee (one-time)	250	KL	
User tariff (year 0)	120	KL/month	
Reduction in user tariff	6.0%	per year	
	Year 1	Year 2	Year 3
Target number of new subscribers	5,000	1,500	1,000
Marketing efficiency	100%		

Working Capital		
Accounts receivable (% of Subscriber fees)	40	days
Accounts payable (% of Operating costs)	30	days
Cash balance (% of Operating costs)	25	days

FINANCIAL ANALYSIS

TABLE 2. CUSTOMER BASE AND TARIFFS

Year	0	1	2	3	4	5	6
Reduction in user tariff		6.0%	6.0%	6.0%	6.0%	6.0%	
User tariff (KL/month)	**120**	**113**	**106**	**100**	**94**	**88**	
Reduction in lease cost		3.0%	3.0%	3.0%	3.0%	3.0%	
Onward capacity lease (KL/year)	**2,000,000**	**1,940,000**	**1,881,800**	**1,825,346**	**1,770,586**	**1,717,468**	
Marketing efficiency		100%	100%	100%	100%	100%	
Number of new subscribers		5,000	1,500	1,000			
Customer base	**0**	**5,000**	**6,500**	**7,500**	**7,500**	**7,500**	

TABLE 3. SALES (KL)

Year	0	1	2	3	4	5	6
Connection fees	0	1,250,000	375,000	250,000	0	0	0
Subscriber fees	0	6,768,000	8,270,496	8,970,307	8,432,089	7,926,163	0
Total Revenue	**0**	**8,018,000**	**8,645,496**	**9,220,307**	**8,432,089**	**7,926,163**	**0**

TABLE 4. OPERATING COSTS (KL)

Year	0	1	2	3	4	5	6
Wage (KL/month)	4,500	4,590	4,682	4,775	4,871	4,968	5,068
Number of employees		25	25	25	25	25	0
Labor cost (KL)	**0**	**1,377,000**	**1,404,540**	**1,432,631**	**1,461,283**	**1,490,509**	**0**
Systems O&M		590,000	590,000	590,000	590,000	590,000	
Connection cost		500,000	150,000	100,000	0	0	
Labor cost		1,377,000	1,404,540	1,432,631	1,461,283	1,490,509	
Onward capacity lease		1,940,000	1,881,800	1,825,346	1,770,586	1,717,468	
Total Operating Costs	**0**	**4,407,000**	**4,026,340**	**3,947,977**	**3,821,869**	**3,797,977**	**0**

TABLE 5. WORKING CAPITAL (KL)

Year	0	1	2	3	4	5	6
Accounts receivable	0	741,699	906,356	983,047	924,065	868,621	0
Accounts payable	0	362,219	330,932	324,491	314,126	312,163	0
Cash balance	0	301,849	275,777	270,409	261,772	260,135	0
Change in A/R		-741,699	-164,657	-76,692	58,983	55,444	868,621
Change in A/P		-362,219	31,287	6,441	10,365	1,964	312,163
Change in C/B		301,849	-26,073	-5,367	-8,638	-1,636	-260,135

TABLE 6. RESIDUAL VALUES (KL)

Year	0	1	2	3	4	5	6
Land	250,000						
Value of Assets (excluding land)	12,400,000						
Annual depreciation		1,550,000	1,550,000	1,550,000	1,550,000	1,550,000	
Residual Value of Assets							**4,900,000**

TABLE 7. DEPRECIATION FOR TAX PURPOSES (KL)

Year	0	1	2	3	4	5	6
Value of Assets (excluding land)	12,400,000						
Annual Depreciation		2,480,000	2,480,000	2,480,000	2,480,000	2,480,000	
Total Depreciation		**2,480,000**	**2,480,000**	**2,480,000**	**2,480,000**	**2,480,000**	**0**

TABLE 8. LOAN SCHEDULE (KL)

Year	0	1	2	3	4	5	6
Interest Rate	8%	8%	8%	8%	8%	8%	
Loan disbursement	7,000,000						
Outstanding debt beginning of period		7,000,000	5,600,000	4,200,000	2,800,000	1,400,000	
Interest accrued		560,000	448,000	336,000	224,000	112,000	
Annual repayment		1,960,000	1,848,000	1,736,000	1,624,000	1,512,000	
Interest paid		560,000	448,000	336,000	224,000	112,000	
Principal repaid		1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	
Outstanding debt at the end of period	7,000,000	5,600,000	4,200,000	2,800,000	1,400,000	0	

TABLE 9. INCOME TAX STATEMENT (KL)

Year	0	1	2	3	4	5	6
Connection fees		1,250,000	375,000	250,000	0	0	
Subscriber fees		6,768,000	8,270,496	8,970,307	8,432,089	7,926,163	
Operating Income		**8,018,000**	**8,645,496**	**9,220,307**	**8,432,089**	**7,926,163**	
COGS		4,407,000	4,026,340	3,947,977	3,821,869	3,797,977	
IBIDT		**4,407,000**	**4,026,340**	**3,947,977**	**3,821,869**	**3,797,977**	
Interest expense		560,000	448,000	336,000	224,000	112,000	
Depreciation expense		2,480,000	2,480,000	2,480,000	2,480,000	2,480,000	
Pre-Tax Income		**1,367,000**	**1,098,340**	**1,131,977**	**1,117,869**	**1,205,977**	
Cumulative loses		0	0	0	0	0	
Taxable Income		**1,367,000**	**1,098,340**	**1,131,977**	**1,117,869**	**1,205,977**	
Income tax		478,450	384,419	396,192	391,254	422,092	
Net Income After Tax		**888,550**	**713,921**	**735,785**	**726,615**	**783,885**	

TABLE 10. CASHFLOW STATEMENT: BANKER'S PERSPECTIVE

Year	0	1	2	3	4	5	6
INFLOWS							
Connection fees	0	1,250,000	375,000	250,000	0	0	0
Subscriber fees	0	6,768,000	8,270,496	8,970,307	8,432,089	7,926,163	0
Change in A/R	0	-741,699	-164,657	-76,692	58,983	55,444	868,621
Residual value of sssets	0	0	0	0	0	0	4,900,000
TOTAL INFLOWS	**0**	**7,276,301**	**8,480,839**	**9,143,616**	**8,491,072**	**7,981,607**	**5,768,621**
OUTFLOWS							
Investment Costs							
Equipment	11,800,000						
Building	600,000						
Land	250,000						
Operating Costs							
Systems O&M	0	590,000	590,000	590,000	590,000	590,000	0
Connection cost	0	500,000	150,000	100,000	0	0	0
Labor cost	0	1,377,000	1,404,540	1,432,631	1,461,283	1,490,509	0
Onward capacity lease	0	1,940,000	1,881,800	1,825,346	1,770,586	1,717,468	0
Change in A/P	0	-362,219	31,287	6,441	10,365	1,964	312,163
Change in C/B	0	301,849	-26,073	-5,367	-8,638	-1,636	-260,135
Income tax	0	478,450	384,419	396,192	391,254	422,092	0
TOTAL OUTFLOWS	**12,650,000**	**4,825,080**	**4,415,974**	**4,345,242**	**4,214,851**	**4,220,396**	**52,027**
NET CASH FLOW BEFORE FINANCING	**-12,650,000**	**2,451,221**	**4,064,865**	**4,798,373**	**4,276,221**	**3,761,211**	**5,716,594**
Debt Repayment		1,960,000	1,848,000	1,736,000	1,624,000	1,512,000	
PV Net Cash Flow Before Financing		16,488,022	15,159,744	11,982,469	7,758,824	3,761,211	
PV Debt Repayment		7,560,000	6,048,000	4,536,000	3,024,000	1,512,000	
ADSCR		**1.25**	**2.20**	**2.76**	**2.63**	**2.49**	
DSCR		**2.18**	**2.51**	**2.64**	**2.57**	**2.49**	

TABLE 11. CASHFLOW STATEMENT: OWNER'S PERSPECTIVE

Year	0	1	2	3	4	5	6
INFLOWS							
Connection fees	0	1,250,000	375,000	250,000	0	0	0
Subscriber fees	0	6,768,000	8,270,496	8,970,307	8,432,089	7,926,163	0
Change in A/R	0	-741,699	-164,657	-76,692	58,983	55,444	868,621
Residual value of sssets	0	0	0	0	0	0	4,900,000
TOTAL INFLOWS	**0**	**7,276,301**	**8,480,839**	**9,143,616**	**8,491,072**	**7,981,607**	**5,768,621**
OUTFLOWS							
Investment Costs							
Equipment	11,800,000						
Building	600,000						
Land	250,000						
Operating Costs							
Systems O&M	0	590,000	590,000	590,000	590,000	590,000	0
Connection cost	0	500,000	150,000	100,000	0	0	0
Labor cost	0	1,377,000	1,404,540	1,432,631	1,461,283	1,490,509	0
Onward capacity lease	0	1,940,000	1,881,800	1,825,346	1,770,586	1,717,468	0
Change in A/P	0	-362,219	31,287	6,441	10,365	1,964	312,163
Change in C/B	0	301,849	-26,073	-5,367	-8,638	-1,636	-260,135
Income tax	0	478,450	384,419	396,192	391,254	422,092	0
TOTAL OUTFLOWS	**12,650,000**	**4,825,080**	**4,415,974**	**4,345,242**	**4,214,851**	**4,220,396**	**52,027**
NET CASH FLOW BEFORE FINANCING	**-12,650,000**	**2,451,221**	**4,064,865**	**4,798,373**	**4,276,221**	**3,761,211**	**5,716,594**
Add Loan Disbursement	7,000,000						
Less Loan Repayment		-1,960,000	-1,848,000	-1,736,000	-1,624,000	-1,512,000	0
NET CASH FLOW AFTER FINANCING	**-5,650,000**	**491,221**	**2,216,865**	**3,062,373**	**2,652,221**	**2,249,211**	**5,716,594**
FNPV	**3,573,090**						
FIIR	**30.96%**						

SENSITIVITY ANALYSIS

TABLE 12. SENSITIVITY TEST: INVESTMENT COST OVERRUNS

	FNPV	FIRR	ADSCR-1	ADSCR-2	ADSCR-3	DSCR-1
	3,573,090	**30.96%**	**1.25**	**2.20**	**2.76**	**2.18**
-20%	5,602,383	53.8%	1.24	2.19	2.76	2.17
-10%	4,587,737	39.8%	1.25	2.20	2.76	2.18
0%	**3,573,090**	**31.0%**	**1.25**	**2.20**	**2.76**	**2.18**
10%	2,558,444	24.8%	1.25	2.20	2.77	2.19
20%	1,543,797	20.2%	1.26	2.21	2.77	2.19

TABLE 13. SENSITIVITY TEST: REDUCTION IN ONWARD CAPACITY LEASE COST

	FNPV	FIRR	ADSCR-1	ADSCR-2	ADSCR-3	DSCR-1
	3,573,090	**30.96%**	**1.25**	**2.20**	**2.76**	**2.18**
0.0%	2,861,200	27.9%	1.21	2.11	2.63	2.05
1.5%	3,223,685	29.5%	1.23	2.16	2.70	2.12
3.0%	**3,573,090**	**31.0%**	**1.25**	**2.20**	**2.76**	**2.18**
4.5%	3,909,833	32.4%	1.27	2.24	2.83	2.24
6.0%	4,234,321	33.7%	1.29	2.28	2.89	2.30

TABLE 14. SENSITIVITY TEST: WAGE GROWTH RATE

	FNPV	FIRR	ADSCR-1	ADSCR-2	ADSCR-3	DSCR-1
	3,573,090	**30.96%**	**1.25**	**2.20**	**2.76**	**2.18**
0%	3,913,560	32.4%	1.27	2.24	2.83	2.24
1%	3,745,395	31.7%	1.26	2.22	2.80	2.21
2%	**3,573,090**	**31.0%**	**1.25**	**2.20**	**2.76**	**2.18**
3%	3,396,558	30.2%	1.24	2.18	2.73	2.15
4%	3,215,709	29.5%	1.23	2.16	2.70	2.12

TABLE 15. SENSITIVITY TEST: REDUCTION IN USER TARIFF

	FNPV	FIRR	ADSCR-1	ADSCR-2	ADSCR-3	DSCR-1
	3,573,090	**30.96%**	**1.25**	**2.20**	**2.76**	**2.18**
2%	6,891,794	43.6%	1.38	2.56	3.42	2.76
4%	5,189,389	37.4%	1.32	2.38	3.09	2.46
6%	**3,573,090**	**31.0%**	**1.25**	**2.20**	**2.76**	**2.18**
8%	2,039,157	24.4%	1.19	2.02	2.45	1.91
10%	583,970	17.8%	1.12	1.85	2.16	1.66

TABLE 16. SENSITIVITY TEST: A/R DURATION

	FNPV	FIRR	ADSCR-1	ADSCR-2	ADSCR-3	DSCR-1
	3,573,090	**30.96%**	**1.25**	**2.20**	**2.76**	**2.18**
0	3,955,871	34.4%	1.63	2.29	2.81	2.30
20	3,764,624	32.6%	1.44	2.24	2.79	2.24
40	**3,573,090**	**31.0%**	**1.25**	**2.20**	**2.76**	**2.18**
60	3,381,556	29.4%	1.06	2.16	2.74	2.12
80	3,190,022	28.0%	0.87	2.11	2.72	2.07

TABLE 16. SENSITIVITY TEST: MARKETING EFFICIENCY

	FNPV	FIRR	ADSCR-1	ADSCR-2	ADSCR-3	DSCR-1
	3,573,090	**30.96%**	**1.25**	**2.20**	**2.76**	**2.18**
120%	8,997,666	55.4%	1.92	3.10	3.80	3.10
110%	6,285,378	43.2%	1.59	2.65	3.28	2.64
100%	**3,573,090**	**31.0%**	**1.25**	**2.20**	**2.76**	**2.18**
90%	860,802	18.8%	0.91	1.75	2.25	1.72
80%	-1,851,486	6.9%	0.58	1.30	1.73	1.27

Exam Questions

1- Which of the following is NOT a stage in Project appraisal and approval?

a) Idea and Project Definition.
b) Feasibility and Financing
c) Project Implementation
d) Ex-Post Evaluation
e) None of the above.

2- Assume you have the following cash flows.

Year	0	1	2	3
Net cash flow	-2000	200	600	2600

A) If the discount rate is 10%, what is the NPV for year 0.

a) 4631.10
b) 4210.09
c) 631.73
d) 573.73
e) None of the above.

B) If the discount rate is 20%, what is NPV for year 2.

a) 334.44
b) 126.47
c) 73.30
d) 87.96
e) None of the above.

3- If benefit – cost ratio (R) >1, then the project should be undertaken.
Sometimes it is not possible to rank projects with the Benefit-Cost Ratio.
In which of the following situations, Benefit-Cost Ratio should be used in ranking the projects.

a) Mutually exclusive projects of different sizes.
b) Mutually exclusive projects and recurrent cost subtracted out of benefits of benefits reported gross of operating costs.
c) Not necessarily true that $R_A > R_B$ that project "A" is better.
d) The benefit – cost ratio is a mathematical concept, not an economic or financial criterior.
e) Benefit-Cost ratio should never be used in ranking projects.

4- Accounting for Working Capital =

a) Cash for Transaction + Accounts Receivables – Account Payables + Inventories + Prepaid Expenses – Accrued liabilities.

b) Cash for Transaction + Accounts Receivables – Account Payables - Inventories + Prepaid Expenses – Accrued liabilities.
c) Cash for Transaction + Accounts Receivables – Account Payables + Inventories – Prepaid Expenses – Acrrued liabilities.
d) Cash for Transaction + Accounts Receivables – Account Payables + Inventories + Prepaid Expenses + Acrrued liabilities.
e) None of the above.

5- If the nominal interest rate is 19%, Risk Premium is 0 and the rate of inflation is 3%, what is the nominal interest rate?

a) 0.12
b) 0.1845
c) -0.10
d) -0.1845
e) None of the above

6- In deciding which value to use as opportunity cost of existing assets when considering an expansion project; we can use;

a) Net Replacement Cost <u>and</u> Liquidation Value
b) Net Replacement Cost <u>or</u> Liquidation Value
c) <u>Only</u> Net Replacement Cost, <u>not</u> the Liquidation Value
d) <u>Only</u> Liquidation value, <u>not</u> Net replacement cost
e) Benefit – cost ratio <u>or</u> Net Replacement cost.

7- A new hotel is built next to your farm, and brought infrastructure investments such as roads, electricity service and subways. As a result there has been a change in the value of your land. This is an example of

a) Capital gain to your land because of project.
b) Capital loss to your land because of project.
c) Capital gain because of other factors than project
d) Capital loss because of other factors than project
e) Capital gain if Project under taken to obtain land.

8- A viable project must repay the principal and the interest on the loan, as well as to bring a positive return on equity to the owners.
Which of the following is not a way of improving Debt Service Coverage Ratios?

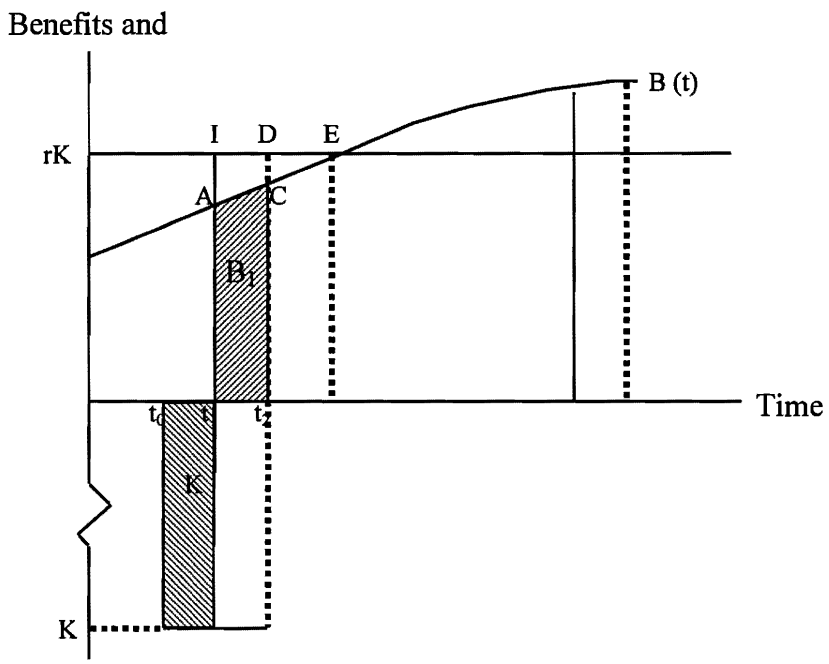
a) Increase the duration of loan repayment
b) Decrease the amount of borrowing.
c) Decrease the interest rate on loan.
d) Delaying the loan repayment start date.
e) None of the above.

9- Debt service coverage ratios are used by;

a) owners

b) bankers
c) government
d) All of the above
e) None of the above

10- When potential benefits are continuously rising function of calender time but are independent of time of starting project, we have the following figure.



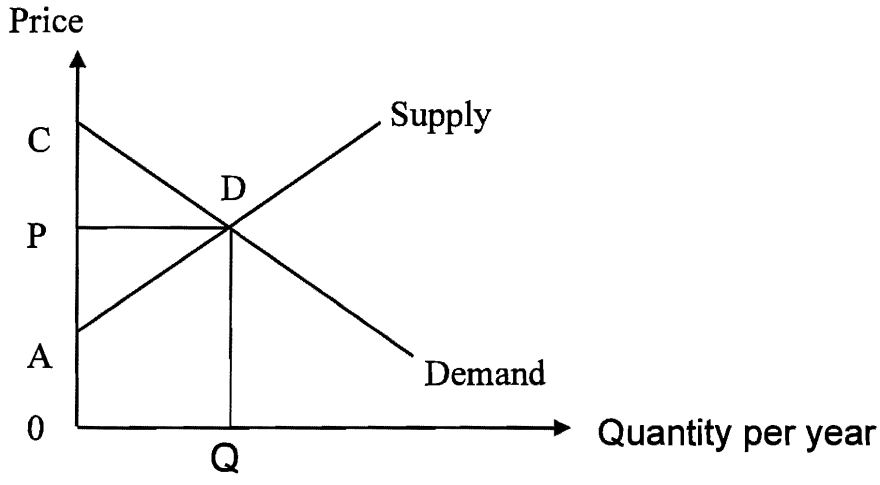
What is the right time to start a project?

a) $rK_t > B_{t+1}$
b) $rK_t < B_{t+1}$
c) $rK_t = B_{t+1}$
d) All of the above
e) None of the above

11-When we are considering Cost – Effectivenens Analyis Limitations;

a) Cost effectiveness ratios are a good measure of consumers willingness to pay.
b) Cost effectiveness analysis excludes most externalities on the benefits side
c) Cost effectiveness analysis excludes some external costs such as social costs.
d) Scale differences may distort the choice of an "optimal" decision
e) All of the above is correct.

Answer the following two questions according to the given graph



12- Which Area is the consumer surplus.

a) 0ADQ
b) PCD
c) ACD
d) APD
e) 0ACQ

13- Which Area is producers Surplus.

a) 0ADQ
b) PCD
c) ACD
d) APD
e) 0ACQ

Answer the following three questions according to the following statement "A good or service is considered tradable when an increase in demand (or supply) by a project does not effect the amount demanded by domestic consumers".

14- An increase in demand for an importable commodity resultus;

a) a decrease in demand for imports
b) an increase in demand for imports
c) a decrease in demand for exports
d) an increase in demand for exports
e) None of the above.

15- An inrease in demand for an exportable commodity results;

a) a reduction in exports
b) a increase in exports
c) a reduction in imports
d) all of the above

e) none of the above

16- An increase in the rate of infalation, working through change in accounts payable,

a) increases the Net Present Value
b) decreases the Net Present Value
c) Does not change the Net Present Value
d) None of the above

17- An increase in the rate of infalation, working through change in interest expense,
a) increases the Net Present Value
b) decreases the Net Present Value
c) Does not change the Net Present Value
d) None of the above

18- An increase in the rate of infalation, working through change in depreciation expense,
a) increases the Net Present Value
b) decreases the Net Present Value
c) Does not change the Net Present Value
d) None of the above

19- For a given rate of inflation in Turkey, in what way will a lower rate of inflation in the USA alter Turkey's equilibrium exchange rate (YTL/US$)?
a) increases
b) decreases
c) No change
d) None of the above

20- How would a lower rate of inflation in Turkey be expected to alter the nominal interest rate in Turkey?
a) increases
b) decreases
c) No change
d) None of the above

21- How does an expected increase in the real exchange rate over time affect a county's real rate of interest?
a) increases
b) decreases
c) No change
d) None of the above

22- Please indicate whether each of the variables listed below should be included in the cashflow or resource flow from each of the perspectives shown below. Use a check mark (✓) if it should be included and (X) if should not be included. If it is included in the cashflow or resource flow also indicate if the item is an inflow (+), an outflow (–) or could be both (+ or –).

	Owner	**Total invested capital**
Economic		**(Banker)**
Interest expense paid on a		

loans used to finance the investment in project	--------	-------	-------
Purchase of inputs for project from local suppliers	---------	-------	-------
A grant received from the national allotment of international assistance to purchase equipment for a project	----------	-------	---------
Loan Repayments	----------	--------	---------
Change in the desired amount of cash holdings required to make transactions	----------	--------	---------
Taxes paid by the project	----------	-------	--------
Land Rental Payments	----------	-------	--------
Public expenditures made to clean up pollution caused by project	---------	---------	--------
Owner's equity contribution	----------	----------	--------
Opportunity cost of existing assets that will be used along with new investment in an expansion project.	----------	--------	----------
Bad debt	----------	--------	----------
Opportunity cost of the time spent by the ownrer on the Project	----------	--------	----------