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PWAPK-0477*

J. Kubalak

DESIGN & EVALUATION OF AID-ASSISTED PROJECTS



Training and Development Division
Office of Personnel Management

The U.S. Agency for International Development
Washington, D.C. 20523

November 1980

FOREWORD

The Project Design and Evaluation Workshop outlines the system used by the United States Agency for International Development (AID) to formulate, and subsequently evaluate its projects for economic and social development in various developing countries.

In addition to Agency-specific administrative procedures, participants are taught generalized methodologies for project planning, such as Means-Ends Analysis, the Logical Framework, and Networking; and introduced to statistical concepts and experimental design for project evaluation. They are then given the opportunity to exercise their knowledge and practice these skills through role playing, as members of small working groups.

The objectives of the workshop are to:

1. Facilitate communication in development administration by establishing a common vocabulary for project design and evaluation.
2. Sharpen analytical skills through use of the logical Framework as the key element in AID's system of project design and evaluation.
3. Heighten awareness of AID's administrative procedures for designing and evaluating development projects.

This text is designed to serve both as a resource during the workshop, and subsequently as a ready reference when the need for actual project design or evaluation arises in the "real world".

Most of the material herein is not original, but has been selected from a variety of sources -- agency handbooks, guidelines, project papers, special studies, previous course materials, etc. -- and consolidated here for convenience. My major new contribution to this booklet is thus editorial. Due to the anonymous nature of most of the source documents, the authors are not identified with their specific contributions. Nevertheless, recognition is appropriate to Lawrence Posner and Leon Rosenberg (Practical Concepts, Inc.); Robert Hubbell and Philip Sperling (formerly of AID, currently with DIMPEX Associates); Herbert Turner (formerly of AID, currently with the UN), and Robert Berg of AID, for their substantive efforts over the past decade in developing, documenting and fostering the application of the logical framework as the cornerstone of AID's current Project Design and Evaluation System. My thanks also to Jean Stevens and Rosalie Baker who typed the finished product from my convoluted draft.

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THE FUNDAMENTALS

OF

PROJECT DESIGN & EVALUATION

IN AID

SOME SELECTED DEFINITIONS OF "PROJECT"

"The total discrete endeavor to create through the provision of personnel, equipment and/or capital funds, a finite result directly related to a discrete development problem."

AID Handbook 3

"A combination of tasks organized to achieve a particular purpose."

Training Guide for USAID
Project Operating Support Systems

"An organized effort for change."

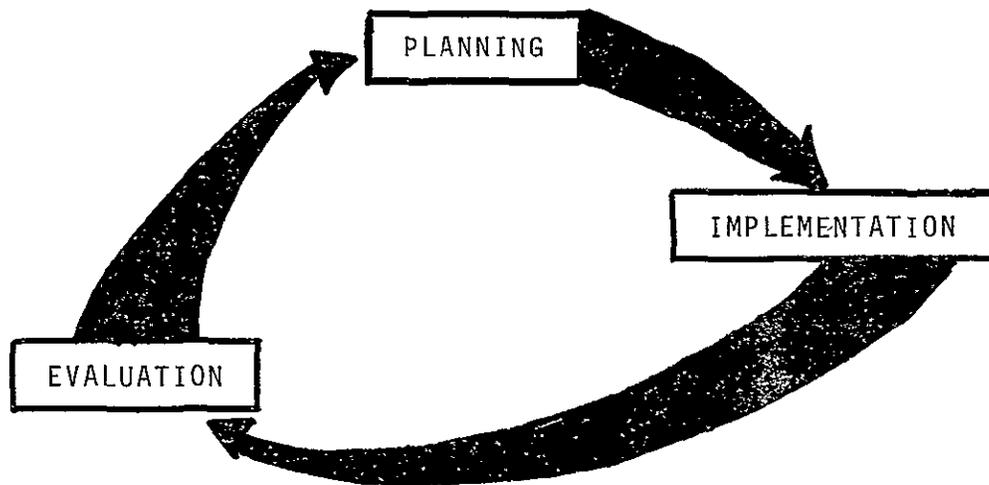
AID PD&E Course

A SYSTEMATIC APPROACH TO PROJECT MANAGEMENT

There are three general phases in a project's life cycle:

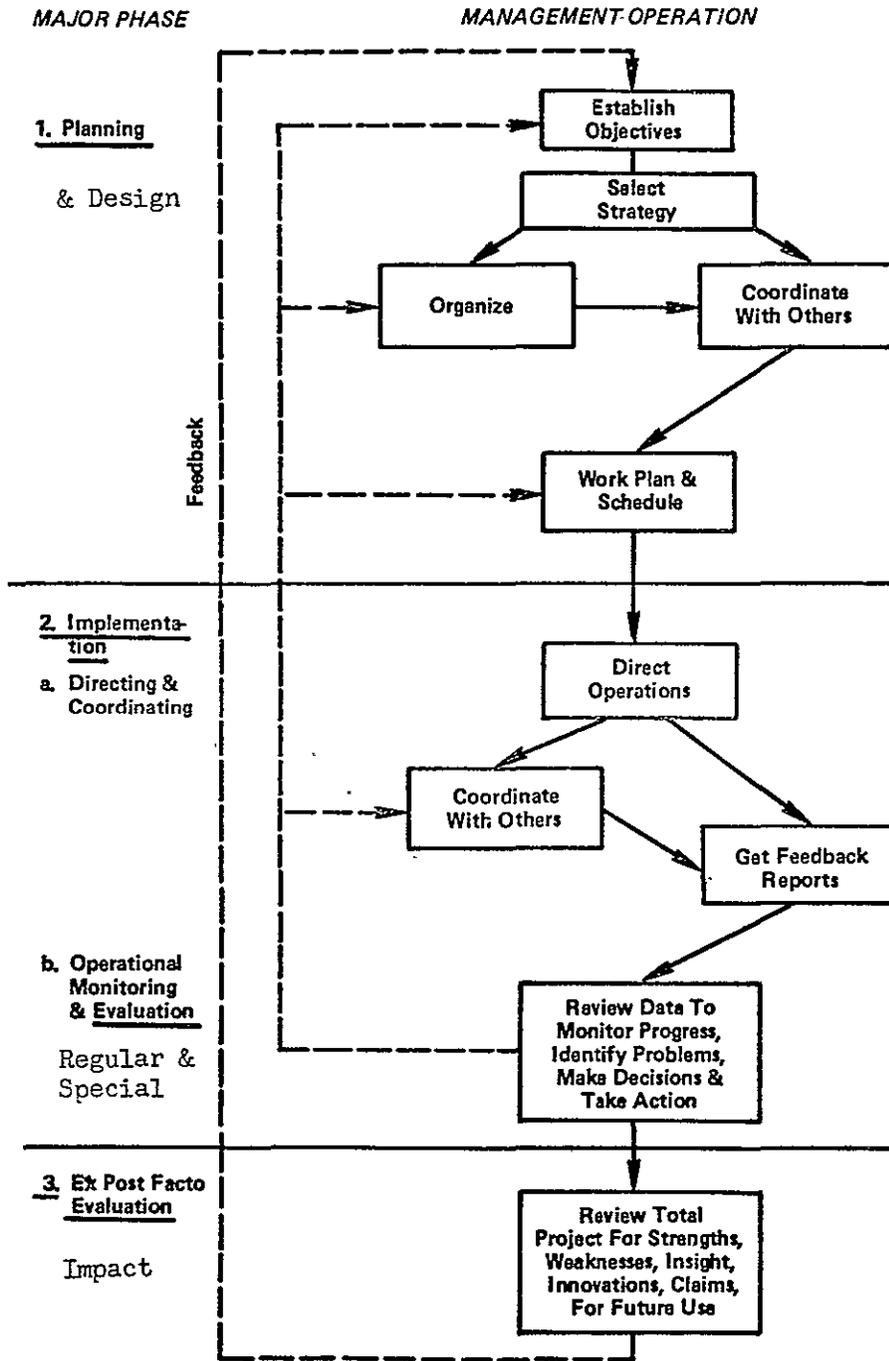
- * PLANNING (Design & Scheduling)
- * IMPLEMENTATION, and
- * EVALUATION (On-going, and Ex Post Facto)

These are interlinked in the cycle thus:



Within the framework of this overall cycle however, are a number of smaller cycles, or feedback loops which all conspire to make the project manager's life more complicated. To make things even more complex, activity may be going on in several phases, concurrently! For discussion purposes, we will examine the overall process in a little more depth.

THE MANAGEMENT PROCESS



THE MANAGEMENT PROCESS

Management operates in three general phases -- "Planning," "Implementation" (with on-going Evaluation) and "Ex Post Facto" (or after-the-fact) Evaluation. Although there is some overlap between phases, most management systems are limited to highlighting certain aspects over others.

The Planning Phase is one of trying to establish the overall Objectives of the Project in terms of its Goal and Purpose, determining the best way to achieve them, and then working with others to develop a workplan of what has to be done and a timetable for doing it.

The Implementation Phase consists primarily of directing and coordinating the work planned, then monitoring progress on a periodic basis. Periodic evaluations of the project should also be taken, apart from the regular Management Information System (MIS) data being provided to the project manager. Evaluations can be by sample surveys, spot checks and/or "brainstorming" sessions; either internally or in conjunction with outside experts, to assure that progress is as reported and also that the Project's objectives and strategy are still valid.

Immediately after the project is completed, a full-scale evaluation should be conducted to review project effectiveness in attaining its purpose; and later, after sufficient time has elapsed, a final "Impact Evaluation" to determine the contribution of the project toward overall goals. The results of these evaluations can be made available through the AID/Washington "memory bank" system to anyone who is planning a similar project.

The chart on the previous page illustrates this process. The boxes indicate the functions to be performed during each phase while the solid arrows indicate the sequence (or flow of activity) from top to bottom. The dotted arrows indicate an informational feedback flow, from certain points to earlier phases and functions. This feedback should affect the way in which the project is being carried out. For instance, after the data has been reviewed a requirement for new action to coordinate with others may be generated. In some instances a new project schedule may be required. A more serious effect of reviewing the data may be that the manner in which the project is being carried out must be changed; while a major problem may force a review and re-establishment of the project's objectives. The administrative management process keeps cycling and re-cycling in this manner until the project is completed.

In this booklet we are going to focus attention on some of the systematic techniques used by AID for project design and evaluation.

AID'S CONTEXT FOR
PROJECT DESIGN

CONTEXT FOR DESIGN

In the developing nations of the world, there are many social and economic problem situations which can be alleviated, or even resolved by appropriate levels of external monetary, technical and/or capital assistance to supplement national and local developmental efforts.

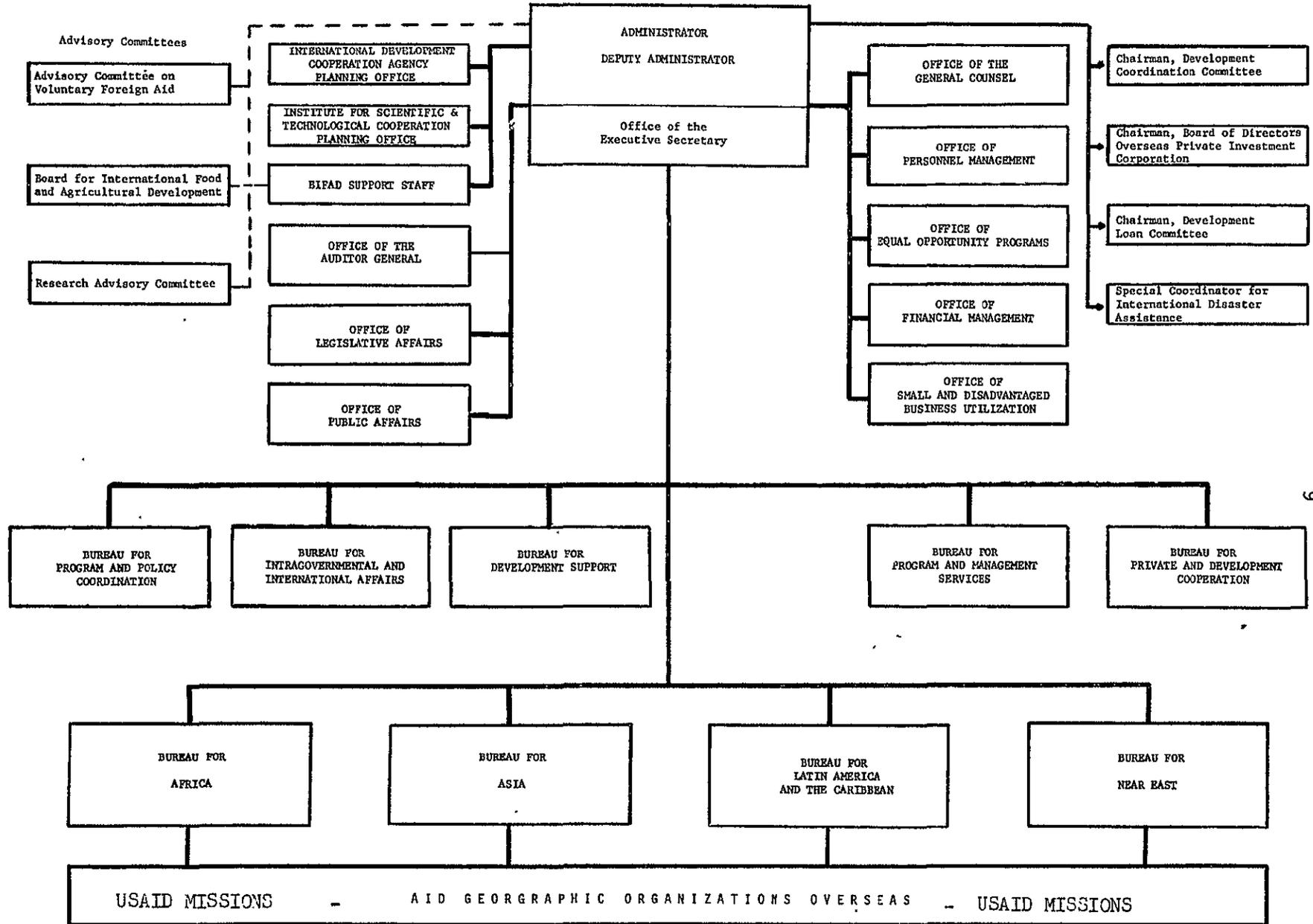
The Agency for International Development (AID) is the principal federal agency of the United States Government for carrying out the provisions of the Foreign Assistance Act of 1961, as amended and receives its funds through Congressional Appropriations. AID refers to its Foreign Assistance objectives derived from Congressional directives and guidelines as its "Congressional Mandate".

FOREIGN ASSISTANCE OBJECTIVES

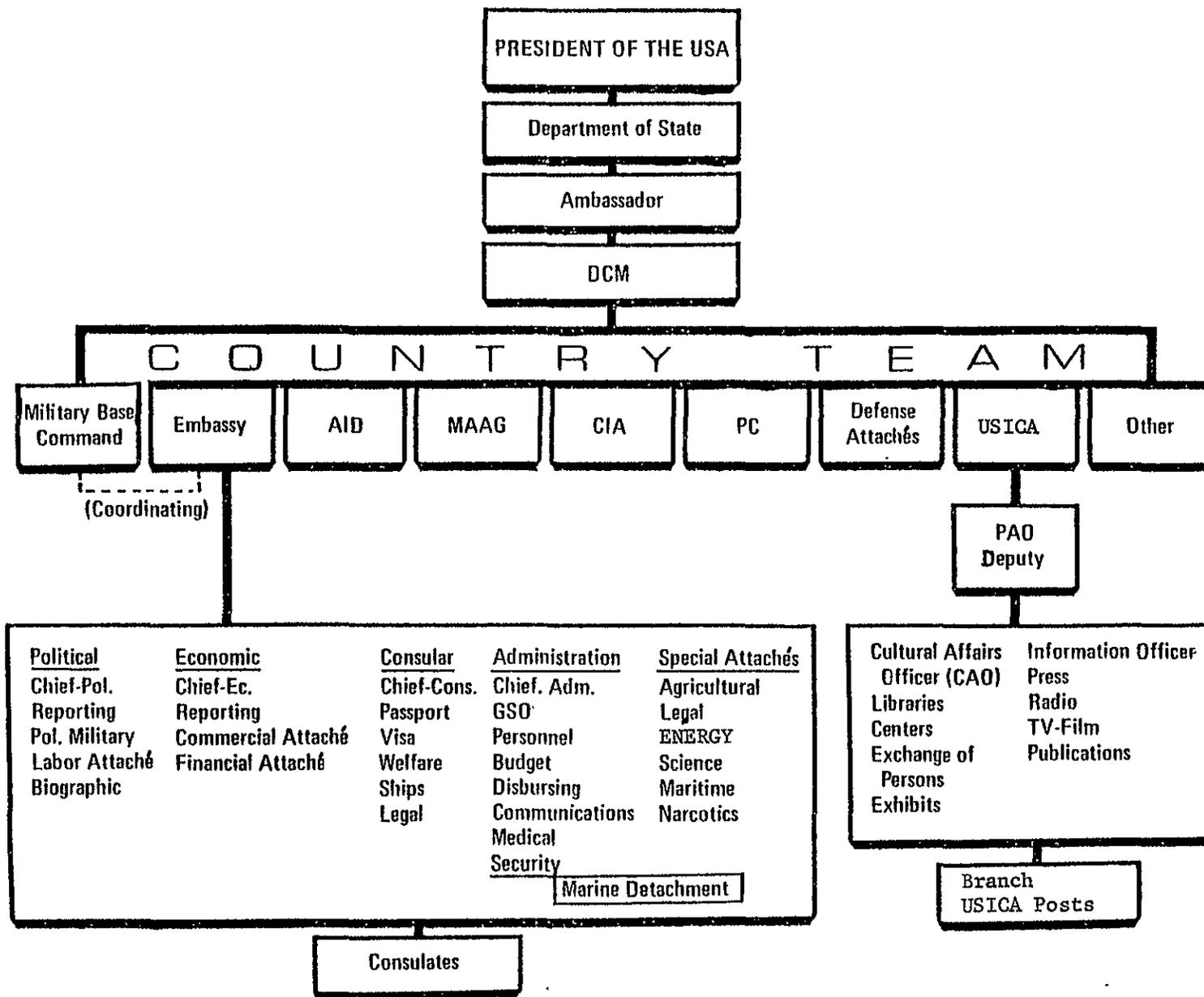
Problem-solving, people-oriented programs aimed at the poorest segments of developing nations to:

- Increase small farm productivity
- Reduce infant mortality
- Control population growth
- Promote income equality
- Reduce unemployment

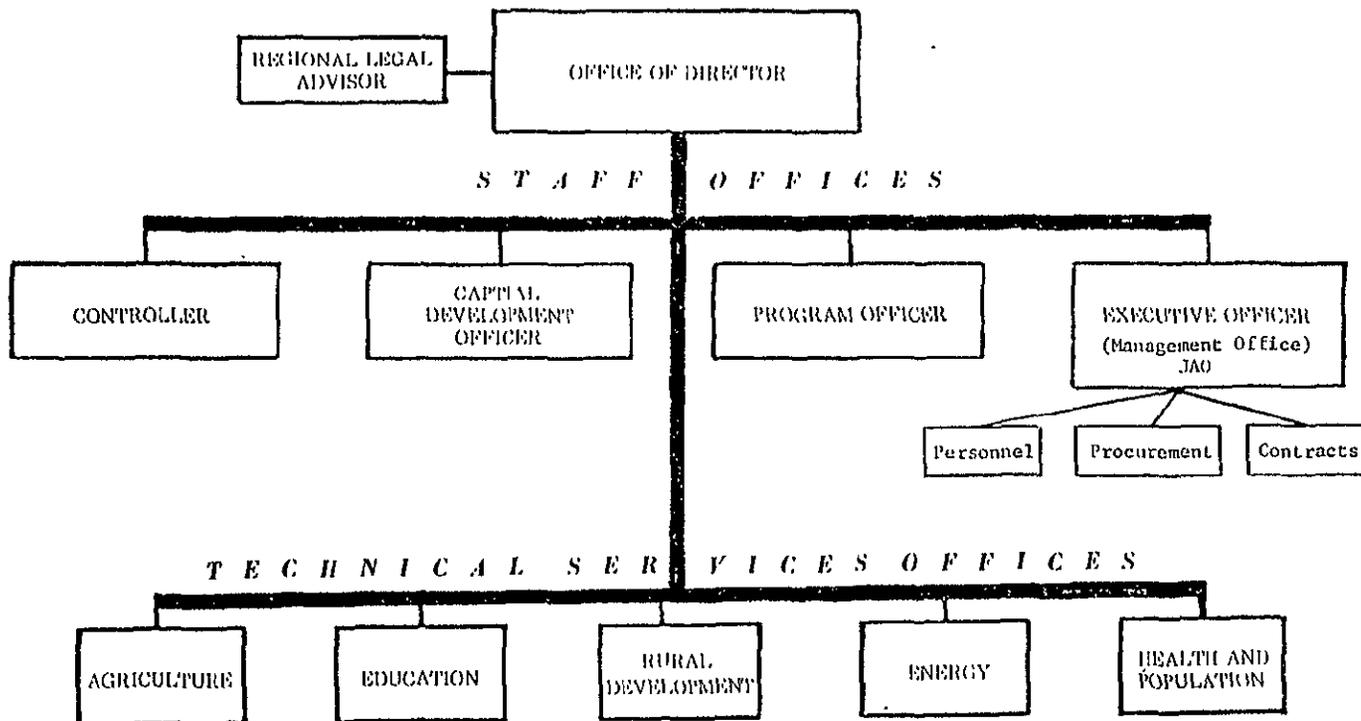
Agency for International Development



ORGANIZATION OF A MISSION



A TYPICAL ORGANIZATION OF A LARGE U.S. A.ID. MISSION

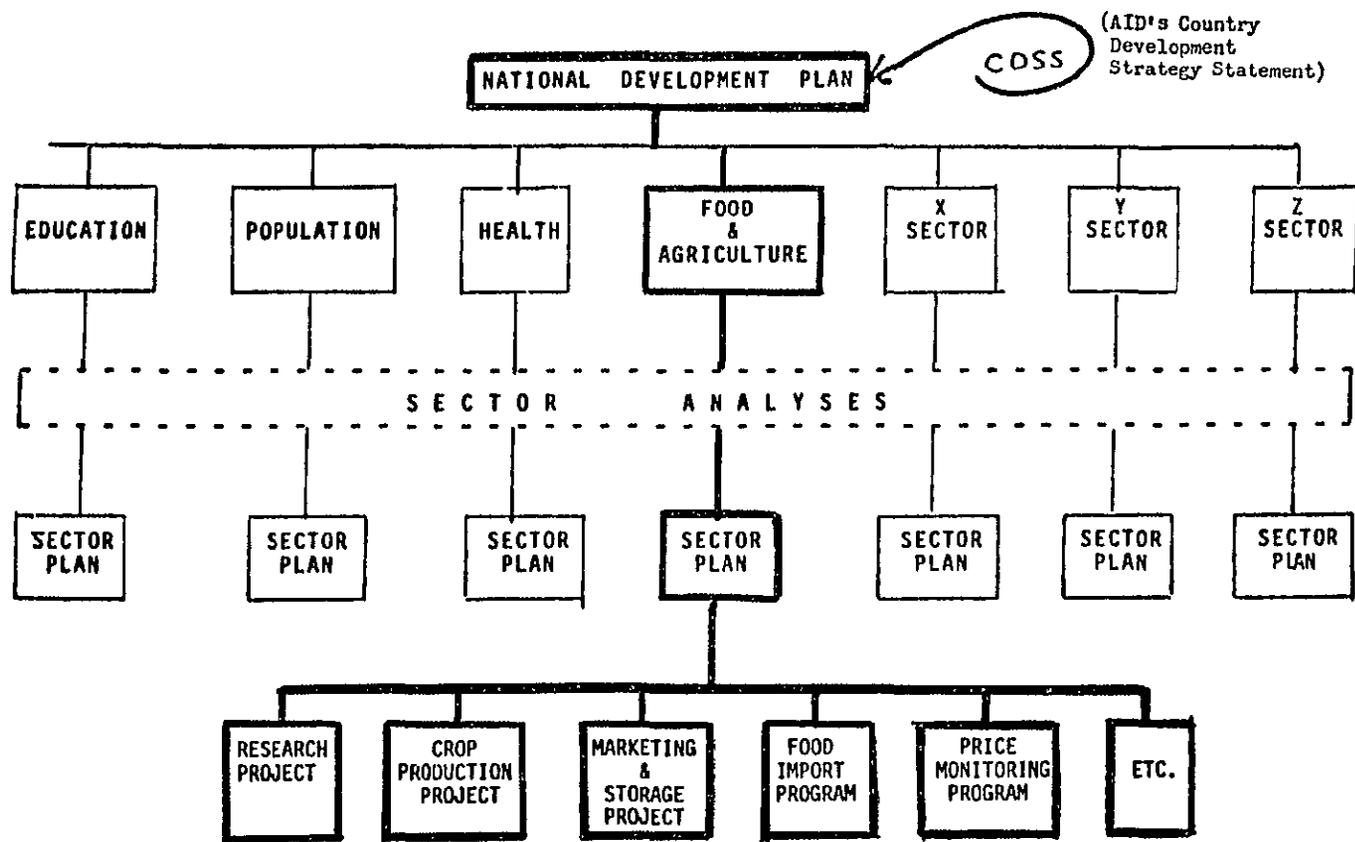


SELECTING AMONG ALTERNATIVE PROJECTS

When a project is proposed for financing, there is an implicit assumption that it represents the best alternative to the solution of a problem, and that addressing the problem represents the best alternative for fulfilling the overall development objectives of the country. The development plan of the country, and the Congressional Mandate for AID are basic policy guidelines for establishing objectives and selecting problems and projects.

Since the resources available for undertaking project assistance are insufficient to meet all the needs of the countries in which and with which we work, we have to be selective; carefully targetting our assistance to that combination of countries, sectors, programs and projects which will have the greatest impact, in terms of our government's priorities, policies and guidelines.

Selection of alternatives requires professional judgment. No mechanical process nor criterion can replace informed judgment. The factors listed on the following pages should be considered in any AID undertaking, but the weight given to each will vary from country to country, sector to sector, and project to project. A most important element in the choice must be the extent of host country commitment and priority.



SOME CRITERIA FOR SELECTING AMONG ALTERNATIVE PROJECTS

- Problem is a "critical" one
- Number of poor people affected is large
- Number of people affected is large
- Geographic area affected is large
- Project will increase income
- Project will increase employment
- Project will increase productivity
- Project will enhance general public welfare
- Women's status will be enhanced
- Project aims at institutionalization and self-support
- Project will maximize use of local institutions (vs. using outsiders)
- Cost is low in relation to benefits that will accrue
- Use of local labor is maximized; capital investment minimized
- Project falls within an overall national development plan of host government
- Host government willing and able to fund at least 25% of project cost
- Host government wants project
- Target population wants project
- Target population will actively participate in project
- Impact on ecology and/or environment is minimal
- Project will provide direct relief of people's misery

Some of these aspects are discussed more fully on the following pages .

Problem Priorities The problem to be solved must be of a type and priority which merits expenditure of AID funds. The number of apparently beneficial projects which might be undertaken in any country is huge. The task facing AID and country decision makers is to select the most critical problems for solution. While the problem may be posed or identified in the AID Country Development Strategy Statement (CDSS) and the National Development Plan, it must also be considered in the light of specific current U.S. legislative and AID policy statements, as well as its overall soundness.

Target Area - Number of Poor People Affected Projects which assist the greatest number of low income people to increase their productivity and increase their earnings are preferred. Analysis of project impact on both numbers of people and productivity will provide a guide to selecting the best alternative. Among the preferred alternatives that target the largest number of the population in lower income groups, the selection of those alternatives which focus on women should be made.

Institutional Development and Related Long-Term Self-Help Measures The alternative selected should be one which makes an optimal contribution to institutional development and self-help efforts. One of the primary concerns of any project is to leave in place a functioning capacity to manage, fund, maintain, and operate the institution and facilities developed, improved or established through assistance projects.

Use of Local Institutions A project which maximize use of local institutions will normally be preferred to one which depends more heavily on foreign institutions. The use of local institutions provides experience and earnings for local people and a means for developing local management capability and institutional cohesion. The development of local capability during project development and implementation makes the country less dependent on outside assistance after the project is completed. Collaborative and joint efforts are also given a high priority by AID.

Cost/Benefit or Cost/Effectiveness Normally, a project which plans to achieve its purpose at the minimum total cost, with the maximum participation by host country counterparts and organizations is preferred. Sometimes, a primary project purpose is economic--to achieve the maximum internal rate of return (IRR), or discounted benefit/cost ratio. In such instances, the consideration of a discounted stream of costs and benefits may help to determine the most desirable project.

Many assumptions must be made as to future cost, present and future benefits, the social and economic climate, and future developments in the international and national economies. Hence calculated internal rates of return and predicted cost-benefit ratios themselves incorporate numerous assumptions. While economic projects should not be considered below some minimum calculated internal rate of return, it does not follow that projects which exceed the minimum, or even higher internal rates of return will necessarily contribute to achieving AID development objectives. Cost/Benefit comparisons between alternative projects can provide valuable guidance in helping to select preferred alternatives, but only when the purpose served and the problem solved by the project are clearly demonstrated to contribute to overall economic and social development. One should not draw a direct cause and effect relationship between a predicted high cost-benefit ratio and the achievement of AID development assistance objectives.

In many instances, economic considerations may not be the dominant factors, while in still other situations, it may not be possible to calculate benefits. Under such circumstances, while more difficult, it may be helpful to attempt a cost/effectiveness analysis for comparative purposes where the benefits are quantified in other than monetary terms.

Labor A project which maximizes the use of local labor and minimizes the investment in capital, imported materials and equipment without a significant decrease in the quality of the project (or increase in total project cost) is preferable. Analysis of the labor intensity of the technology required for various alternatives may reveal projects which will provide greatest employment opportunities for local personnel, both during the implementation phase, and after the project is completed.

Motivation Motivation of the various sectors of society, the target population, and implementing agencies and officials has a great bearing on project success. Motivations should be identified during project analysis, and actions planned to take advantage of, or to modify them as necessary during the course of the project. The willingness of the country to undertake various projects may indicate a preferred alternative and increase the likelihood of achieving a project's objectives.

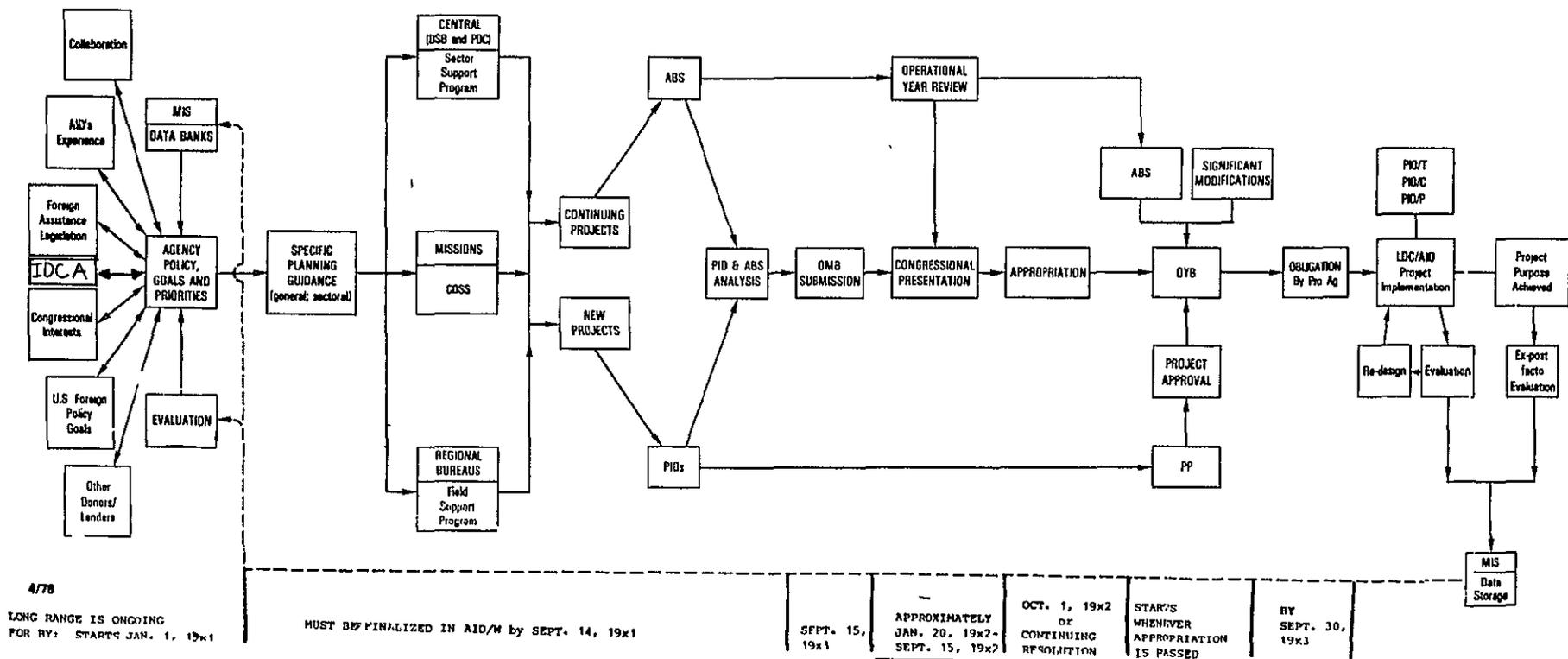
Intersectoral Relations Projects for which interaction and dependencies with other sectors are best understood normally present a preferred alternative. All projects are affected by the institutional environment within which they are implemented. Where the effect of interactions and dependencies are difficult to predict or control, the chances of project success are reduced. Careful analysis and understanding of these factors is essential to project success. Ways must be found to minimize negative cross-sectoral effects or to include within the project itself, means of modifying negative and enhancing positive intersectoral effects. A sector analysis which includes these factors will simplify selection of the preferred alternatives.

Environmental Concerns Project alternatives which minimize detrimental impacts on the ecology and physical environment are preferred. Preliminary environmental assessments of the various proposed alternatives should reveal the extent to which the environment will be degraded or improved by the various alternatives. Almost all development projects have an environmental impact which must be analyzed. The impact may be beneficial, detrimental or both in differing aspects. It cannot be assumed that small projects or a series of small projects will have an insignificant impact solely because of their size. For instance, poorly designed rural roads can result in an increase in the incidence of malaria and schistosomiasis. Alternatives in project design and implementation may be found which can mitigate these effects.

In summary, care and consideration of these factors, and various alternatives, by competent professionals is the best insurance in selecting the preferred alternative.

AID'S SYSTEM
FOR
PROJECT DESIGN

THE AID PROGRAMMING PROCESS



THE AID PROGRAMMING PROCESS, AND RELATED DOCUMENTATIONSOME KEY ACRONYMS

| | |
|---------------------|--|
| ABS | - ANNUAL BUDGET SUBMISSION |
| FY | - FISCAL YEAR (October 1 - September 30) |
| CDSS | - COUNTRY DEVELOPMENT STRATEGY STATEMENT |
| PID | - PROJECT IDENTIFICATION DOCUMENT |
| PP | - PROJECT PAPER |
| LOGFRAME | - LOGICAL FRAMEWORK -- A technique for designing & evaluating AID projects |
| PERT/CPM NETWORKING | - A technique for planning, scheduling and monitoring projects. |
| PROAG | - PROJECT AGREEMENT |
| PIL | - PROJECT IMPLEMENTATION LETTER |
| CP's | - CONDITIONS PRECEDENT (TO THE RELEASE OF FUNDS) |
| PIO | - PROJECT IMPLEMENTATION ORDER/ |
| PIO/T | /TECHNICAL SERVICES |
| PIO/P | /PARTICIPANTS |
| PIO/C | /COMMODITIES |
| PES | - PROJECT EVALUATION SUMMARY |
| TDD | - TERMINAL DISBURSEMENT DATE |

PRINCIPAL CONSIDERATIONS IN PROJECT FORMULATION:

1. Project Identification: Sectoral or Program Analysis
2. Consideration of Alternatives: Criteria to Use
3. Project Identification Document (PID)
 - a. Project Description
 - b. Project Purpose
 - c. Relation to HC and to CDSS
 - d. Priorities, Policies, and Issues
 - (1) Beneficiary
 - (2) Absorptive Capacity
 - (3) Manpower Constraints - Training Requirements
 - (4) Technical Issues
 - (5) Environmental Considerations
 - (6) Administrative Capacity - Institutional Capabilities
 - (7) Participation of the Beneficiaries
 - e. Estimated Costs (\$ & LC)
 - f. Project Preparation Strategy
 - g. Initial Environmental Examination (IEE) and Threshold Decision (re EA or EIS)

Annexes:

 - (1) PID Facesheet
 - (2) Information Retrieval Request
 - (3) Social Soundness Analysis
 - (4) Logframe
4. Project Paper (PP)
 - a. Project Data Sheet
 - b. Project Authorization
 - c. Description of Project
 - e. Financial Plan
 - f. Implementation Plan
 - g. Evaluation Arrangements
 - h. Conditions, Covenants, and Negotiating Status
 - i. Annexes:
 - Economic Analysis
 - Technical Analysis
 - Socio-Cultural Feasibility
 - Administrative Analysis
 - Financial Analysis (IRR, Viability, Budget)
 - Elements of Evaluation Plan
 - Project Implementation Plan (Network)
5. Project Authorization (PAF)
 - a. General
 - b. Fiscal, future funds, increments
 - c. Period of Obligation
 - d. Project Description
 - e. Other
6. Project Agreement (PROAG)
7. Project Implementation Letter (PIL)

THE AID PROJECT DOCUMENTATION SYSTEM

The principal documents involved in the AID project system, and the purposes of each, are as follows:

CDSS (Country Development Strategy Statement) Prepared annually by the USAID mission, this document summarizes (in about 50 pages) the Host Country's social and economic development status; progress and constraints to development; the Host Country's development plan and resources, and the USAID Mission's overall and sectoral assistance strategy, within the framework of current AID/Washington policy and guidelines. An outline of the contents of a CDSS is shown on page 22.

PID (Project Identification Document) Prepared by the USAID mission in collaboration with Host Country counterparts at any time the need becomes evident, this document outlines (in about 15 pages) the description, rationale, and estimated cost for a new project, which is consistent with the Host Country's development plan and the USAID Mission's assistance strategy, as described in the current CDSS. A sample outline of the contents of a PID is shown on page 26.

PP (Project Paper) Prepared by the USAID mission in collaboration with Host Country counterparts after approval of the PID by the AID/Washington Regional Bureau. This document presents the rationale, a thorough analysis, plan, schedule, cost estimate, and recommendation for a new project, complete with supporting documents, tables, schedules, and special studies. An outline of the contents of a PP is shown on page 28.

PAF (Project Authorization and Request for Allotment of Funds) The PAF is the document used by AID/W to approve a specific project and its budget described in the PP, specify the terms and set forth major covenants and conditions, authorize negotiation and signing of a Project Agreement, authorize funding for the project, and (normally) request allotment of funds.

PROAG (Project Agreement) Prepared by the USAID mission in negotiation with Host Country counterparts, after approval of the PP by the AID/Washington Regional Bureau. This document summarizes the essential elements of the objective and rationale for the PP, the amount and type of funding, and the responsibilities of the U.S. and the Host Country in implementing the project. An updated implementation plan is also prepared and made a part of the PROAG. The PROAG is signed jointly by representatives of the USAID Mission and the Host Country. A sample PROAG is shown on page 33.

PIL or IMP letter (Project Implementation Letter) Prepared by the USAID mission at any time during project implementation when the USAID Project Officer considers it appropriate, the PIL provides administrative, financial and/or technical guidance or clarification to the counterpart Host Country Project Manager. A sample PIL is shown on page 37.

PIO (Project Implementation Order) Prepared by the USAID Project Officer during project implementation, the PIO is the principal means for obligating project funds. There are three types of PIO's:

PIO/T - To procure specialized Technical Services

PIO/C - To procure project Commodities; equipment and supplies

PIO/P - To provide for Host Country personnel training as Participants in the U.S. or third countries.

PES (Project Evaluation Summary) Prepared by the USAID Mission Evaluation Officer and USAID Project Officer in collaboration with the Host Country Counterpart Project Officer during the life of a project, this document summarizes progress, highlights, problems, action decisions and unresolved issues. A PES format is shown on page 49.

UNCLASSIFIED

**AGENCY FOR
INTERNATIONAL
DEVELOPMENT**



**COUNTRY DEVELOPMENT
STRATEGY STATEMENT**

FY 1981

HONDURAS

**DEPARTMENT
OF
STATE**

January 1979



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Appendix 6A to HB 3 (TM 3:9)

| AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT IDENTIFICATION DOCUMENT FACESHEET <i>To Be Completed By Originating Office</i> | | 1. TRANSACTION CODE <input checked="" type="checkbox"/> C A = Add C = Change D = Delete | | PID 2. DOCUMENT CODE 1 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------|---|---|---|---------|----------------------------|---------|-----------------|---------------------|--|-------|-------------|----|--|--|----|--|-----------------|--|-------|-------------------|--|-------|-------|--|--|
| 3. COUNTRY/ENTITY THAILAND | | | 4. DOCUMENT REVISION NUMBER <input type="checkbox"/> 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 5. PROJECT NUMBER (7 digits) <input type="checkbox"/> 493-0292 <input type="checkbox"/> | | 6. BUREAU/OFFICE A. Symbol ASIA B. Code <input type="checkbox"/> 04 <input type="checkbox"/> | 7. PROJECT TITLE (maximum 40 characters) <input type="checkbox"/> Northeast Rainfed Crops Development <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | |
| 8. PROPOSED NEXT DOCUMENT A. <input type="checkbox"/> 3 2 = PRP 3 = PP B. DATE MM YY 1 1 7 8 | | | 10. ESTIMATED COSTS (\$000 or equivalent, \$1 = | | | | | | | | | | | | | | | | | | | | | | | |
| 9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION a. INITIAL FY <input type="checkbox"/> 719 b. FINAL FY <input type="checkbox"/> 719 | | | <table border="1"> <thead> <tr> <th colspan="2">FUNDING SOURCE</th> <th>Life of Project</th> </tr> </thead> <tbody> <tr> <td>a. AID Appropriated</td> <td></td> <td>4,000</td> </tr> <tr> <td>b. OTHER US</td> <td>1.</td> <td></td> </tr> <tr> <td></td> <td>2.</td> <td></td> </tr> <tr> <td>c. Host Country</td> <td></td> <td>4,542</td> </tr> <tr> <td>d. Other Donor(s)</td> <td></td> <td>8,542</td> </tr> <tr> <td colspan="2">TOTAL</td> <td></td> </tr> </tbody> </table> | | | FUNDING SOURCE | | Life of Project | a. AID Appropriated | | 4,000 | b. OTHER US | 1. | | | 2. | | c. Host Country | | 4,542 | d. Other Donor(s) | | 8,542 | TOTAL | | |
| FUNDING SOURCE | | Life of Project | | | | | | | | | | | | | | | | | | | | | | | | |
| a. AID Appropriated | | 4,000 | | | | | | | | | | | | | | | | | | | | | | | | |
| b. OTHER US | 1. | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2. | | | | | | | | | | | | | | | | | | | | | | | | | |
| c. Host Country | | 4,542 | | | | | | | | | | | | | | | | | | | | | | | | |
| d. Other Donor(s) | | 8,542 | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL | | | | | | | | | | | | | | | | | | | | | | | | | | |
| II PROPOSED BUDGET AID APPROPRIATED FUNDS (\$000) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. APPROPRIATION | B. PRIMARY PURPOSE CODE | C. PRIMARY TECH CODE | | E. FIRST FY 79 | | LIFE OF PROJECT | | | | | | | | | | | | | | | | | | | | |
| | | C. Grant | D. Loan | F. Grant | G. Loan | H. Grant | I. Loan | | | | | | | | | | | | | | | | | | | |
| (1) FN | 250B | | 230 | 100 | 4,000 | 100 | 4,000 | | | | | | | | | | | | | | | | | | | |
| (2) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (3) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (4) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL | | | | 100 | 4,000 | 100 | 4,000 | | | | | | | | | | | | | | | | | | | |
| 12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. SPECIAL CONCERNS CODES (maximum six codes of four positions each) | | | | | | 14. SECONDARY PURPOSE CODE | | | | | | | | | | | | | | | | | | | | |
| 15. PROJECT GOAL (maximum 240 characters) <input type="checkbox"/> To increase the incomes of people who live in the rural areas of Northeast Thailand and who are at the lowest end of the income scale. <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. PROJECT PURPOSE (maximum 480 characters) <input type="checkbox"/> To implement a rainfed crop and soil improvement program at 16 Project sites in the Northeast that will result in increased productivity and incomes for rural farmers. <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. PLANNING RESOURCE REQUIREMENTS (staff/funds) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agronomist | | 3 mos. | | AID Project Development Officer | | | | | | | | | | | | | | | | | | | | | | |
| Agricultural Economist | | each | | 2 months | | | | | | | | | | | | | | | | | | | | | | |
| Marketing Specialist | | | | | | \$65,000 | | | | | | | | | | | | | | | | | | | | |
| 18. ORIGINATING OFFICE CLEARANCE | | | | 19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution | | | | | | | | | | | | | | | | | | | | | | |
| Signature | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Title Charles L. Gladson Director, USAID/Thailand | | | | Date Signed MM DD YY 01 06 78 | | MM DD YY 01 26 78 | | | | | | | | | | | | | | | | | | | | |

NORTHEAST RAINFED CROPS DEVELOPMENT

Project Identification Document (PID)

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UNCLASSIFIED

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

PROJECT PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

INDONESIA - Rural Works II

AID-DLC/P-2294

UNCLASSIFIED

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

UNCLASSIFIED
AID-DLC/P-2294
May 30, 1978

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: INDONESIA - Rural Works II

Attached for your review are recommendations for authorization of a loan in the amount of Twenty-five Million United States Dollars (\$25,000,000) to Indonesia (the "Cooperating Country") and a related grant in the amount of Two Million Five Hundred Thousand United States Dollars (\$2,500,000). The purpose of the project is to assist in generating employment (short and long term) and income for the rural poor through the construction and operation of small, useful physical infrastructure subprojects.

This loan and grant is scheduled for consideration by the Development Loan Staff Committee on Friday, June 9, 1978 at 2:30 p.m. in Room 3886 New State Building. If you are a voting member, a poll sheet has been enclosed for your response.

Development Loan Committee
Office of Policy Development
and Program Review

Attachments:

Summary and Recommendations
Project Analysis
Annexes A - H

| | | | | |
|--|--|---|--|---|
| AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT PAPER FACESHEET | | 1 TRANSACTION CODE <input type="checkbox"/> A ADD <input checked="" type="checkbox"/> C CHANGE <input type="checkbox"/> D DELETE | | PP <hr/> 2 DOCUMENT CODE 3 |
| 3 COUNTRY ENTITY INDONESIA | | 4 DOCUMENT REVISION NUMBER <input type="checkbox"/> | | |
| 5. PROJECT NUMBER (7 digits) [497-0285] | | 6. BUREAU OFFICE A. SYMBOL ASIA B. CODE [04] | | 7 PROJECT TITLE (Maximum 40 characters) [RURAL WORKS II] |
| 8 ESTIMATED FY OF PROJECT COMPLETION FY [81] | | 9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY [78] B. QUARTER <input type="checkbox"/> C. FINAL FY [78] (Enter 1, 2, 3, or 4) | | |

| 10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$1 -) | | | | | | |
|--|----------|-----------|-----------|-----------------|------------|------------|
| A FUNDING SOURCE | FIRST FY | | | LIFE OF PROJECT | | |
| | B. FX | C L/C | D TOTAL | E FX | F L/C | G TOTAL |
| AID APPROPRIATED TOTAL | | | | | | |
| GRANT | (830) | () | (830) | (2,500) | () | (2,500) |
| LOAN: | () | (5,665) | (5,665) | (440) | (24,560) | (25,000) |
| OTHER | 1. | | | | | |
| U.S. | 2. | | | | | |
| -CST COUNTRY | | 13,560 | 13,560 | | 46,340 | 46,340 |
| OTHER DONOR(S) | | 2,200 | 2,200 | | 2,200 | 2,200 |
| TOTALS | 830 | 21,425 | 22,255 | 2,940 | 73,100 | 76,040 |

| 11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000) | | | | | | | | | |
|--|------------------------|--------------------|--------|--------------|--------|-----------|--------|-----------|---------|
| A. APPROPRIATION | B PRIMARY PURPOSE CODE | PRIMARY TECH. CODE | | E. 1ST FY 78 | | H. 2ND FY | | K. 3RD FY | |
| | | C. GRANT | D LOAN | F GRANT | G LOAN | I GRANT | J LOAN | L GRANT | M. LOAN |
| 1. FN | B 260 | 059 | 290 | 2,500 | 25,000 | | | | |
| 2. | | | | | | | | | |
| 3. | | | | | | | | | |
| 4. | | | | | | | | | |
| TOTALS | | | | 2,500 | 25,000 | | | | |

| A APPROPRIATION | N 4TH FY | | O 5TH FY | | LIFE OF PROJECT | | 12 IN-DEPTH EVAL. SCHEDULED |
|-----------------|----------|--------|----------|--------|-----------------|--------|-----------------------------|
| | Q GRANT | P LOAN | R GRANT | S LOAN | T. GRANT | U LOAN | |
| 1. | | | | | 2,500 | 25,000 | MM YY 08 79 |
| 2. | | | | | | | |
| 3. | | | | | | | |
| 4. | | | | | | | |
| TOTALS | | | | | 2,500 | 25,000 | |

*3. DATA CHANGE INDICATOR WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 = NO
 2 = YES

| | | | |
|---|--|--|--|
| 14 ORIGINATING OFFICE CLEARANCE | | 15. DATE DOCUMENT RECEIVED IN AID # OR FOR AID # DOCUMENTS, DATE OF DISTRIBUTION | |
| SIGNATURE THOMAS C. NIBLOCK <i>Thomas C. Niblock</i> | | DATE SIGNED MM DD YY APR 28 78 | |
| TITLE Director, USAID/Indonesia | | | |
| | | MM DD YY 05 04 78 | |

Rural Works II
Indonesia

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ADDITIONAL REFERENCE MATERIAL AVAILABLE IN AID/W

1. "42 Atau 15" - 1976 PKGB evaluation, dated November 1976.
2. "Evaluation 1977" - PKGB evaluation, dated December 1977 written by Messrs. Mitchell, Bergquist and Okada
3. "Socio-Economic Assessment" - Supplement to Evaluation 1977, dated March 1978 written by Dr. F.E. Okada.

ANNEXES

- A. Logical Framework
- B. PID approval and USAID comments
- C. Project Details
 - 1. PKGB IFY 1978/79 program
 - 2. Financial details
 - a. Research/training center costs
 - b. Technical assistance schedule
 - c. Training schedule
 - 3. PKGB project activity IFY 1974/75 - 1977/78
 - 4. PKGB project funding IFY 1974/75 - 1977/78
 - 5. PKGB infrastructure constructed IFY 1974/75 - 1977/78
 - 6. Summary description of two IFY 1976/77 PKGB subprojects
 - 7. GOI Organization Charts
 - a. DMP Jakarta
 - b. DMP Provincial Office
 - c. Kabupaten
 - d. Kecamatan
- D. GOI Application
- E. Statutory Checklist*
- F. 611(e) Determination
- G. Initial Environmental Examination
- H. Draft Authorization

* Annex not included in PP. Copies are in the official files in AID/W and the Mission.

A.I.D. LOAN NO. 497-T-056
PROJECT NO. 497-0285

PROJECT
LOAN AGREEMENT
BETWEEN
THE REPUBLIC OF INDONESIA
AND
THE UNITED STATES OF AMERICA
FOR
RURAL WORKS II

CONFIRMED COPY

Dated: April 19, 1979

RURAL WORKS II
Project Loan Agreement

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| Project Loan Standard Provisions Annex | Annex 2 |

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UNITED STATES OF AMERICA
AGENCY FOR INTERNATIONAL DEVELOPMENT
KABUL, AFGHANISTAN

هيئت الكفاء بين المللي اضلاع مسجده امريكا
كابل افغانستان

OFFICE OF THE DIRECTOR
دفتر رئيسي

OCT 18 1973

Dr. Shah Wali
Minister of Planning
Ministry of Planning
Democratic Republic of Afghanistan
Kabul, Afghanistan

Subject: AID Project No. 306-0149
Central Helmand Drainage Project - Phase II
Project Implementation Letter No. 5

Dear Dr. Shah Wali:

This letter sets forth the procedures for disbursements in conformity with Project Grant Agreement dated August 29, 1977 (Agreement). Nothing in this letter or its attachments alters the scope of the Agreement or the terms or the specific articles of the Agreement that are referred to or explained in this letter. Instructions in this letter or its attachments may be supplemented or modified by subsequent Project Implementation Letter issued from time-to-time as may be required.

A. Disbursement of Foreign Exchange Costs:

Under the Grant Agreement the Grantee may obtain disbursements of funds for the foreign exchange costs of goods and services required for the project by any of the following methods:

1. Direct Payment Procedures: The Grantee may request USAID to effect payment to a supplier or contractor for goods and services duly provided. The request for disbursement for cost of services must be accompanied by a certificate of performance executed by an authorized representative. This certificate together with other documentation required to effect payment direct to suppliers and contractor are included in Attachment A.

Dr. Shah Wali
Minister of Planning

-2-

2. Reimbursement Procedure: Under the Grant the Grantee may finance grant authorized expenditures out of it's own resources and request reimbursement from USAID. The procedures for obtaining such reimbursement together with certifications to be furnished are detailed in Attachment B.
3. Letter of Commitment Procedures: The Grantee may request AID to issue Letters of Commitment to one or more U.S. banks committing AID to reimburse such banks for payments made by them to contractors or suppliers under Letters of Credit for goods and services to be financed under the grant. The form and content of the request for a Letter of Commitment, documentation and certifications required of suppliers and contractors to obtain payment under Letters of Credit and Grantees certification of performance for services are included in Attachment C.

The DRA must make a determination as to the type of disbursement procedure preferred. Draft contracts with suppliers of goods and services submitted to AID for approval should specify the method of payment and procedures to be used in obtaining payment or reimbursement.

B. Disbursement of Local Currency Costs - Section 7.2:

Under the Grant the Grantee may obtain disbursement of funds for local currency costs of the project which are agreed to for contract construction as outlined in Section F of Annex 1 to Project Grant Agreement dated August 29, 1977. In no event will the total amount of reimbursement exceed the amount as specified in the Grant Agreement for construction costs as from time-to-time amended. The procedures to be followed by the Grantee to obtain reimbursement are as follows:

1. Prior to the initiation of any work to be reimbursed under the Project Agreement, USAID engineers will approve design criteria and standards, unit costs to be used for reimbursement, the criteria for site selection, and form of all contracts.
2. Requests to AID for disbursement shall be submitted by the Grantee in accordance with Article 5 of the approved form of agreement between HCC and HAVA. Each request for disbursement will be serially numbered and in the form appearing in Attachment D entitled "Request for Disbursement". Each request shall be dated, submitted in triplicate, identified with the AID grant number, contract number and job name. Each reimbursement for drainage construction to HCC will be based on reasonable, actual costs. Actual cost shall

Dr. Shah Wali
Minister of Planning

-3-

be defined as pre-agreed unit prices in Afghani multiplied by the actual quantities of work performed in accordance with contract drawings and specifications less the amount of 8% for taxes which has been included in each of the pre-agreed unit prices.

3. An advance equal to 25% of the total estimated value of the contract may be requested by HCC at the time work commences under the contract. The USAID portion of the advance shall be computed as follows:

$$\frac{\text{Contract Amount} \times .75 \times .25}{1.08} \text{ or } .1736 \text{ of the contract amount}$$

4. "Progress Payments" and "Final Payments" made by USAID shall be based on 75% of actual costs as defined in paragraph 2 above for the value of work actually completed. The amount of 10% shall be withheld from all progress payments and at no time will the advance plus progress payments exceed 90% of the original contract amount. Progress Payments shall be computed as follows:

$$\frac{\text{Completed work} \times .75 \times .9}{1.08} \text{ or } .625$$

Final payment will be made upon completion and acceptance of all work under each contract.

5. Disbursements made by USAID will be in the form of a U.S. dollar check payable to HCC based on 75% of actual costs at the most favorable exchange rate which is not illegal in Afghanistan as of the date of the original contract (official buying rate for U.S. dollars as established by the Da Afghanistan Bank).

C. Reimbursement for Inland Transportation Costs:

It has been agreed that within available funds the necessary and reasonable costs of (a) customs clearance services (b) temporary storage and security at Karachi, Chaman and Peshawar, Pakistan and (c) transportation costs from Karachi to Chaman or Peshawar associated with equipment purchased under the Grant Agreement may be reimbursed from Grant funds. Reimbursement shall be based on a contract between HCC and a forwarding agent previously approved by USAID. Requests for reimbursement should be submitted to USAID and accompanied by paid invoices and receiving reports. Payment will be made by a Pakistan Rupee check payable to a DRA account in a bank in Pakistan

Dr. Shah Wali
Minister of Planning

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to be identified by the Grantee.

Sincerely yours,

Owen Cylke
Acting Director

Attachments:

- A. Disbursement of Grant Funds Direct Payment Procedure
- B. Disbursement of Grant Funds Reimbursement Procedure
- C. Disbursement of Grant Funds Letters of Commitment Procedure
- D. Request for Disbursement

| | | | |
|-----------------------|--|---|---|
| AID 1350-1X (7-71) | DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT | 1. Cooperating Country DS Bureau | Page 1 of Pages |
| | | 2. PIO/T No. 931-1157-3187770 | 3. <input checked="" type="checkbox"/> Original or Amendment No. _____ |
| PIO/T | PROJECT IMPLEMENTATION ORDER/TECHNICAL SERVICES | 4. Project/Activity No. and Title Decision Support Systems for Agricultural Marketing Boards (Small Research) | |

| | | | |
|------------------------|--|---|--|
| DISTRIBUTION | 5. Appropriation Symbol 72-1181021.3 | 6.A. Allotment Symbol and Charge 843-31-099-00-20-81 | 6.B. Funds Allotted to: <input checked="" type="checkbox"/> A.I.D./W <input type="checkbox"/> Mission |
| | 7. Obligation Status <input checked="" type="checkbox"/> Administrative Reservation <input type="checkbox"/> Implementing Document | | 8. Funding Period (Mo., Day, Yr.) From 12/15/77 to 6/30/78 |
| | 9.A. Services to Start (Mo., Day, Yr.) Between 12/15/77 and 1/15/77 | | 9.B. Completion date of Services (Mo., Day, Yr.) 6/30/78 |
| | 10.A. Type of Action <input checked="" type="checkbox"/> A.I.D. Contract <input type="checkbox"/> Cooperating Country Contract <input type="checkbox"/> Participating Agency Service Agreement <input type="checkbox"/> Other | | |
| 10.B. Authorized Agent | | | |

| Estimated Financing | | (1) | (2) | (3) | (4) |
|---------------------------------------|------------------------------|----------------|-------------------|----------|---------------|
| | | Previous Total | Increase | Decrease | Total to Date |
| \$1.00= | | | | | |
| 11. Maximum A.I.D. Financing | A. Dollars | | 34,000 | | 34,000 |
| | B. U.S.-Owned Local Currency | | | | |
| 12. Cooperating Country Contributions | A. Counterpart | | FUNDS RESERVED BY | | |
| | B. Other | | POSTED 12/12/77 | | |

| | |
|------------------------|--|
| 13. Mission References | 14. Instructions to Authorized Agent SER/PM/CSD |
|------------------------|--|

The contracts office is requested to prepare a contract with Harvard University for the conduct of Phase I of a small research project described in Appendix A. The Contractor will be the Graduate School of Business of Harvard University, Boston, Mass 02163. The activity meets the requirements of an unsolicited proposal under AID PR7-4.5301 (e). The project budget is shown in Appendix A. Project approved for implementation by AA/TA on December 1, 1977. This is a small research project.

| | |
|---|---|
| 15. Clearances - Show Office Symbol, Signature and Date for all Necessary Clearances. | |
| A. The specifications in the scope of work are technically adequate DS/AGR/ESP, W. C. Merrill Date: 8/24/77 | B. Funds for the services requested are available DS/PPU, M. Mozynski Date: 12/12/77 |
| C. The scope of work lies within the purview of the initiating and approved Agency Programs DS/AGR, L. F. Hesser Date: 12/6/77 | D. ASIA/TD, C. Martin Date: 10/6/77 DS/PPU, J. Duran Date: 12/7/77 |
| E. DS/AGR/ESP, K. P. Brundage Date: 12/5/77 | F. DS/RES, M. Rechcigl Date: 12/6/77 |

| | | |
|---|--|---------------------------------|
| 16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to | 17. For the Agency, for International Development Signature: Kenneth A. Milow Title: Chief, DS/PPU, Prog. Division | 18. Date of Signature 1/9/78 |
|---|--|---------------------------------|

| | | | |
|-----------------------|-----------------------------------|--------------|-----------------|
| AID 1350-1X (1-78) | 1. Cooperating Country | 2. PIO/T No. | Page 2 of Pages |
| PIO/T | 4. Project/Activity No. and Title | | |

SCOPE OF WORK

18. THE SCOPE OF TECHNICAL SERVICES REQUIRED FOR THIS PROJECT ARE DESCRIBED IN ATTACHMENT NUMBER _____ HERETO ENTITLED "STATEMENT OF WORK".

19. SPECIAL PROVISIONS

- A. LANGUAGE REQUIREMENTS (SPECIFY) _____
(IF MARKED, TESTING MUST BE ACCOMPLISHED BY AID TO ASSURE DESIRED LEVEL OF PROFICIENCY)
- B. ACCESS TO CLASSIFIED INFORMATION WILL WILL NOT BE REQUIRED BY TECHNICIAN(S).
- C. DUTY POST(S) AND DURATION OF TECHNICIANS' SERVICES AT POST(S) (MONTHS)
- D. DEPENDENTS WILL WILL NOT BE PERMITTED TO ACCOMPANY TECHNICIAN.
- E. WAIVER(S) HAVE BEEN APPROVED TO ALLOW THE PURCHASE OF THE FOLLOWING ITEM(S) (COPY OF APPROVED WAIVER IS ATTACHED)
- F. COOPERATING COUNTRY ACCEPTANCE OF THIS PROJECT (APPLICABLE TO AID/W PROJECTS ONLY)
 HAS BEEN OBTAINED HAS NOT BEEN OBTAINED
 IS NOT APPLICABLE TO SERVICES REQUIRED BY PIO/T
- G. OTHER (SPECIFY)

20. BACKGROUND INFORMATION (ADDITIONAL INFORMATION USEFUL TO AUTHORIZED AGENT)

21. SUMMARY OF ATTACHMENTS ACCOMPANY THE PIO/T (INDICATE ATTACHMENT NUMBER IN BLANK)

- _____ DETAILED BUDGET IN SUPPORT OF INCREASED FUNDING (BLOCK 12)
- _____ EVALUATION CRITERIA FOR COMPETITIVE PROCUREMENT (BLOCK 14)
- _____ JUSTIFICATION FOR NON-COMPETITIVE PROCUREMENT (BLOCK 14)
- _____ STATEMENT OF WORK (BLOCK 18)
- _____ WAIVER(S) (BLOCK 19) (SPECIFY NUMBER)

Worksheet 43

| | | | | |
|-----------------------|-----------------------------------|--------------|-----------|-------|
| AID 1350-1X (1-78) | 1. Cooperating Country | 2. PIO/T No. | Page 3 of | Pages |
| | 4. Project/Activity No. and Title | | | |
| PIO/T | | | | |

22. Relationship of Contractor or Participating Agency to Cooperating Country and to AID

A. Relationships and Responsibilities

B. Cooperating Country Liaison Official

C. AID Liaison Officials

LOGISTIC SUPPORT

| 23. Provisions for Logistic Support | IN KIND SUPPLIED BY | | FROM LOCAL CURRENCY SUPPLIED BY | | TO BE PROVIDED OR ARRANGED BY SUPPLIER |
|---|---------------------|---------------------|---------------------------------|---------------------|--|
| | AID | COOPERATING COUNTRY | AID | COOPERATING COUNTRY | |
| A. Specific Items <i>(Insert "X" in applicable column at right. If entry needs qualification, insert asterisk and explain below in C. "Comments")</i> | | | | | |
| (1) Office Space | | | | | |
| (2) Office Equipment | | | | | |
| (3) Housing and Utilities | | | | | |
| (4) Furniture | | | | | |
| (5) Household Equipment <i>(Stoves, Refrig., etc.)</i> | | | | | |
| (6) Transportation in Cooperating Country | | | | | |
| (7) Transportation To and From Country | | | | | |
| (8) Interpreter Services/Secretarial | | | | | |
| (9) Medical Facilities | | | | | |
| (10) Vehicles (official) | | | | | |
| (11) Travel Arrangements/Tickets | | | | | |
| (OTHER SPECIFY) | | | | | |
| (12) | | | | | |
| (13) | | | | | |
| (14) | | | | | |
| (15) | | | | | |

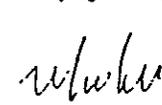
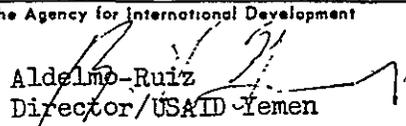
B. Additional Facilities Available From Other Sources

APO/FPO

PX

COMMISSARY

OTHER (Specify, e.g., duty free entry, tax exemption)

| | | | | |
|--|---|--|---|--|
| AID-1370-1 (8-63) | DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT | 44 | <input type="checkbox"/> Worksheet <input checked="" type="checkbox"/> Issuance | PAGE 1 OF ___ PAGES |
| PIO/C | PROJECT IMPLEMENTATION ORDER/COMMODITIES | 1. Cooperating Country Yemen Arab Republic | | 2. PIO/C No. 279-019-0-70017 |
| | | 3. Project/Activity No. and Title 289-11-130-019 Poultry Development | | |
| 4. Appropriation Symbol 72-11X1023 | | 5. a. Allotment Symbol & Charge 402-50-279-00-69-71 | | 5. b. Funds Allotted To: <input type="checkbox"/> AID/W <input checked="" type="checkbox"/> Mission |
| 6. Obligation Status <input type="checkbox"/> Administrative Reservation <input checked="" type="checkbox"/> Obligation <input type="checkbox"/> Sub-Obligation | | | 7. <input checked="" type="checkbox"/> Original or Amendment No: _____ | |
| 8. Authorized Agent USAID/Sana | | 9. Method of Financing a. <input checked="" type="checkbox"/> U.S. Government b. <input type="checkbox"/> Letter of Commitment c. <input type="checkbox"/> Reimbursement | 10. Banking Institution NA | 11. Approved Applicant NA |
| 12. Contracting Period (Mo., Day, Yr.) From: 1/1/77 To: 9/30/77 | | 13. Delivery Period (Mo., Day, Yr.) From: 1/1/77 To: 9/30/77 | | 14. Final Contribution Date (Mo., Day, Yr.) 9/30/77 |
| 15. Area of Source U.S. & Possessions (000) | | 16. Dollar Value | | |
| | | A. Previous Total | B. Increase | C. Decrease |
| | | | \$ 10,000 | D. Total to Date |
| | | | | \$ 10,000 |
| 20. Mission References ProAg 77-5 | 17. Commodity Code | 18. Item No. | 19. a. Quantity, Description, Specifications, Instructions and Special Provisions (Include Catalog Name and Number, where Appropriate) | |
| | | | A. Project Commodities: Specifications Attached B. Procurement by USAID/Sana | |
| | | (See Authority and Letter of Commitment on Reverse) | | TOTAL: |
| 21. Mission Clearances AGR: JYoung <i>MM</i> | | Date | Mission Clearances CO: RDeCruce <i>RD</i> | Date |
| PROG: KShafer <i>RKS</i> | | 2/1/77 | DD: RWagner <i>RW</i> | 2/2/77 |
| 22. Date of Original Issuance 2/17/77 | | 23. Date of this Issuance | | |
| 24. For the Cooperating Country— The terms and conditions set forth herein are hereby agreed to: <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  SIGNATURE </div> <div style="text-align: center;">  DATE </div> </div> | | 25. For the Agency for International Development <div style="text-align: center;">  Aldo Ruiz Director/USAID-Yemen </div> | | |
| | | For the Administrator | | |
| TITLE | | TITLE | | |

Project No. 289-11-130-019 Submission original Revision Date _____ Page 2 of 6 Pages

SUGGESTED SOURCE:

Burrows Equipment Co. Catalog No. 16
 1316 Sherman Avenue
 Evanston, Illinois 60204

Phone: 312-UN4-4175

— ILLUSTRATIVE —

| Page No. | Catalog No. | Item Description | Quantity | Price Each | Extension |
|----------|-------------|--|----------|------------|-----------|
| 37 | 1824 | Pocket Magnifier | 4 | 3.50 | 14.00 |
| 37 | 1821 | Hastings Triplex Magnifiers Power:10X, Lens Dia; 14MM, Focus 1" | 2 | 13 | 26.00 |
| 37 | 1798 | Hastings Tri Plex Magnifiers Power 20X Lens Dia 8 MM Focus 1/2" | 2 | 18.50 | 37.00 |
| 58 | 1180 | Fairbanks-Morse Portable Platform Scale 1,000 lb. capacity | 2 | 253 | 506.00 |

Pages 3 - 4 - 5 - 6 — Not Essential

— SAMPLE ONLY —

| | |
|-------------------|-----------------|
| Total Commodities | \$7,098.63 |
| Freight | <u>2,901.37</u> |
| Total | \$10,000.00 |

| | | | |
|---|--|---|--|
| DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT | | 1. COOPERATING COUNTRY Lesotho | 2. PDD/P NUMBER 690-048-1-70023 |
| PROJECT IMPLEMENTATION ORDER/ PARTICIPANTS (PIO/P) | | 3. PROJECT ACTIVITY NUMBER & TITLE 690-11-120-048 Land & Water Resource Development | |
| | | 4. APPROPRIATION 72-11X1023 | 5. ALLOTMENT 402-52-690-000-69-71 |
| PAGE 1 OF 3 | 7. DESIRED START DATE January 1979 | 8. TERMINAL START DATE March 1979 | 9. NUMBER OF PARTICIPANTS 1 |
| PROJECT COMPLETION DATE 12/30/81 | 11. LOCATION & DURATION OF TRAINING <input type="checkbox"/> US 12 P/M <input type="checkbox"/> THIRD COUNTRY P/M | | 10. <input checked="" type="checkbox"/> ORIGINAL AMENDMENT NO. <input type="checkbox"/> IN-COUNTRY P/M |

2 AID Financing

| AUTHORIZED AGENT | TYPE OF EXPENSE | (A) PREVIOUS TOTAL | (B) INCREASE | (C) DECREASE | (D) NEW TOTAL |
|-----------------------------------|-------------------------|--------------------|---------------------|---------------------|---------------|
| AID | A. | | | | \$13,725 |
| MISSION | B. | | | | |
| | Maint Adv | | | | 525 |
| AID/W | C. | | | | 13,200 |
| | D. | | | | |
| THIRD COUNTRY | E. | | | | |
| | F. | | | | |
| 13. COOPERATING COUNTRY FINANCING | | | | | |
| 14. U.S. TRUST ACCOUNT | A. TRUST ACCOUNT NUMBER | | C. AUTHORIZED AGENT | D. CURRENCY UNIT | E. AMOUNT |
| | B. ALLOTMENT SYMBOL | | | | |
| 15. SPECIAL PROVISIONS | | | | | |

A. REF: PI# NUMBER _____ GRANT _____ LOAN _____

B. NAME(S) OF PARTICIPANTS

MAKAE, Jeremiah

C. SUPPLEMENTARY INFORMATION

Related communications: TOAID A-576; AIDTO A-1004 DTS 220

| | | | |
|--|------|--|------|
| 16A. MISSION CLEARANCE (Training Officer/Program Officer) | DATE | 16B. MISSION CLEARANCE (Controller) | DATE |
| 17. HOST COUNTRY/BORROWER/GRANTEE SIGNATURE See ProAg 77-L-2 | | 18. AGENCY FOR INTERNATIONAL DEVELOPMENT | |
| TITLE | | FILE DATE | |

| | | |
|--|--|------------------------------------|
| DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT IMPLEMENTATION ORDER/ PARTICIPANTS TRAINING REQUEST FORM PAGE 2 OF _____ | 1. COOPERATING COUNTRY Lesotho | 2. PIO/P NUMBER 690-048-1-70023 |
| | 3. <input checked="" type="checkbox"/> ORIGINAL AMENDMENT NO. _____ | 4. DATE June 1, 1978 |

3. TRAINING REQUEST

DESCRIPTION OF TRAINING REQUESTED. (Describe clearly the training desired; summarize the project input, output, and purpose to which the training will be applied)

Training is requested for Mr. Makae at the Masters level in the field of general agriculture with a major in soil and water conservation. During training, Mr. Makae should be given an opportunity to learn preparation of plans and layouts of soil and water conservation activities and to take courses in public administration and management techniques. This should also include preparation of budgets.

Lesotho's Second Five Year Development Plan places emphasis on increasing agricultural activity. As all aspects of agriculture are dependent on a sound soil and water regime, it is necessary to have trained people who will ensure that the soil and water resources of the country are conserved. A target for this activity is to train professional conservators, able to assume technical and managerial leadership of the country's conservation program and to improve and enlarge upon conservation activities.

After training, Mr. Makae is expected to provide leadership in planning and implementation of conservation measures in Conservation Development projects and related activities.

1. ACADEMIC TRAINING ONLY: DEGREE OBJECTIVE MS

MAJOR FIELD OF STUDY Soil and water conservation

2. RELATED INFORMATION Increased demands for soil surveys, land use and conservation planning and implementation of conservation works in an effort to combat erosion requires more qualified personnel to fill professional positions in the Conservation Division.

3. PARTICULAR EMPHASIS DESIRED Agronomy, soil and range management, and livestock production.

E. SUGGESTED TRAINING FACILITIES (If known) Texas Tech University, Lubbock, Texas or equal

APPROPRIATE

6. PARTICIPANT'S FUTURE EMPLOYMENT

A. CHECK APPROXIMATE BOX (B47)

GOVERNMENT

PRIVATE

JOINT

B. OCCUPATIONAL
CATEGORY CODE
(B48-49)

3-A

| | | | |
|---|---|--|--|
| KEYPUNCH COPY FOR AID/W USE ONLY | DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT PARTICIPANT'S BIOGRAPHICAL DATA | | PAGE 3 OF 3 |
| | BATCH NUMBER (CC1-2) | 1. COOPERATING COUNTRY Lesotho | 2. PIO/P NUMBER 690-048-1-70023 |
| PARTICIPANT NUMBER (CC3-8) | 3. NAME (MR., MRS., OR MISS) CAPITALIZE OR UNDERLINE LEGAL SURNAME (B12-46) MAKAE, Jeremiah (Mr) | | |
| REGIONAL NUMBER (CC9-11) | 4. HOME/MAILING ADDRESS STREET (T12-38) Post Office Box 234 | CITY OR TOWN (T43-58) Maseru, Lesotho | |
| 5. ATTACHMENTS <input type="checkbox"/> TRANSCRIPTS <input type="checkbox"/> PHOTOS <input type="checkbox"/> DEPENDENT <input type="checkbox"/> CERTIFICATION <input type="checkbox"/> OTHER (Specify) | 6. BIRTHDATE (MO/DAY/YR) (B56-57) 12/20/40 | 7. PLACE OF BIRTH Maseru, Lesotho | |
| | 8. EMERGENCY CONTACT (COUNTRY OF TRAINING) Embassy of Lesotho Washington, D.C. | 9. SEX/ MARITAL STATUS | MALE <input type="checkbox"/> SINGLE <input checked="" type="checkbox"/> MARRIED |

space for listing how

10. LANGUAGE PROFICIENCY

A. ENGLISH LANGUAGE PROFICIENCY STATUS (Check appropriate box)

TEST GIVEN TEST WAIVED FURTHER TRAINING NECESSARY RETEST NECESSARY

B. APPROXIMATE DATE SCORES OR RATING TO BE REPORTED

C. TEST SCORES/RATINGS (Check and complete appropriate boxes)

| | | | | | | |
|---|---|-------|-------|------|------------|-----------|
| <input type="checkbox"/> TOEFL TOTAL SCORE | <input type="checkbox"/> ALIQUOT DATE GIVEN | SCORE | USAGE | ORAL | VOCAB/READ | LISTENING |
| | | FORM | | | | |

D. PROFICIENCY IN OTHER LANGUAGES

| LANGUAGES | SPEAKING | | | READING | | | WRITING | | |
|-----------|-----------|------|------|-----------|------|------|-----------|------|------|
| | Excellent | GOOD | FAIR | Excellent | GOOD | FAIR | Excellent | GOOD | FAIR |
| | | | | | | | | | |
| | | | | | | | | | |

E. FURTHER TRAINING NECESSARY HOME COUNTRY RECEIVING COUNTRY

11. IF YOU HAVE LIVED, STUDIED, OR TRAVELLED ABROAD, COMPLETE THE FOLLOWING

| COUNTRY | DATES (MO. & YR.) | | PURPOSE (E.G., TRAVEL, TRAINING, CONFERENCE, IF TRAINING, INDICATE TYPE OF PROGRAM & SPONSOR) |
|---------|-------------------|-------|---|
| | FROM | TO | |
| England | 3/75 | 05/75 | Travel |
| | | | |

12. EDUCATION

| | | |
|----------------------------------|---|---|
| A. TOTAL YEARS COMPLETED (12-15) | B. HIGHEST DEGREE OBTAINED (Check one) (M14) <input checked="" type="checkbox"/> BACH OF ARTS <input type="checkbox"/> MASTER OF SCIENCE <input type="checkbox"/> PHD <input type="checkbox"/> BACH OF SCIENCE <input type="checkbox"/> MD <input type="checkbox"/> ITGER <input type="checkbox"/> MASTER OF ARTS <input type="checkbox"/> DVM <input type="checkbox"/> NONE | C. COUNTRY WHERE DEGREE OBTAINED Lesotho |
| | | D. COUNTRY CODE (M15-17) 690 |

E. LIST BELOW IN CHRONOLOGICAL ORDER, ALL SCHOOLS ATTENDED. INCLUDE PRIMARY, MIDDLE OR SECONDARY SCHOOL UNIVERSITIES, VOCATIONAL OR TRADE SCHOOLS. (Use continuation sheet if necessary)

| NAME OF INSTITUTION | MAJOR FIELD OF STUDY | LANGUAGE OF INSTRUCTION | DATES ATTENDED | | TITLE OF DEGREE, DIPLOMA, OR CERTIFICATE | RECEIVED |
|---------------------|----------------------|-------------------------|----------------|------|--|----------|
| | | | FROM | TO | | |
| Primary School | Gen Educ | English | 1945 | 1952 | Certificate | 1952 |
| High School | Gen Educ | English | 1952 | 1957 | Certificate | 1957 |
| Univ of Lesotho | Agriculture | English | 1957 | 1961 | BS | 1961 |

13. EMPLOYMENT

| | | |
|---|---|---|
| A. BRIEF TITLE OF PRESENT POSITION/OCCUPATION (M18-43) Conservation Officer | B. DATES OF EMPLOYMENT FROM 1974 TO PRESENT | C. TOTAL YEARS (M44-45) 04 |
| D. PRESENT EMPLOYER (NAME & ADDRESS) (Q38-63) Ministry of Agriculture Maseru, Lesotho | E. NUMBER OF EMPLOYEES SUPERVISED 5 | F. SIZE (APPROX. NO. OF EMPLOYEES) 500 |

G. BRIEF DESCRIPTION OF WORK GOVERNMENT PRIVATE JOINT STUDENT

PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

| | | | | |
|--|---|--|---|---|
| 1. PROJECT TITLE | | | 2. PROJECT NUMBER | 3. MISSION/AID/W OFFICE |
| | | | 4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) _____ <input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION | |
| 5. KEY PROJECT IMPLEMENTATION DATES | | 6. ESTIMATED PROJECT FUNDING | | 7. PERIOD COVERED BY EVALUATION |
| A. First PRC-AG or Equivalent FY _____ | B. Final Obligation Expected FY _____ | C. Final Input Delivery FY _____ | A. Total \$ _____ B. U.S. \$ _____ | From (month/yr.) _____ To (month/yr.) _____ Date of Evaluation Review _____ |

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

| A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.) | B. NAME OF OFFICER RESPONSIBLE FOR ACTION | C. DATE ACTION TO BE COMPLETED |
|--|--|---------------------------------------|
| | | |

| | |
|---|---|
| 9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS <input type="checkbox"/> Project Paper <input type="checkbox"/> Implementation Plan e.g., CPI Network <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Financial Plan <input type="checkbox"/> PIO/T <input type="checkbox"/> Logical Framework <input type="checkbox"/> PIO/C <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Project Agreement <input type="checkbox"/> PIO/P | 10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT A. <input type="checkbox"/> Continue Project Without Change B. <input type="checkbox"/> Change Project Design and/or <input type="checkbox"/> Change Implementation Plan C. <input type="checkbox"/> Discontinue Project |
|---|---|

| | |
|---|--|
| 11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles) | 12. Mission/AID/W Office Director Approval Signature _____ Typed Name _____ Date _____ |
|---|--|

**INSTRUCTIONS FOR COMPLETING FORM AID 1330-15 & 15A,
PROJECT EVALUATION SUMMARY (PES)—PART I & II**

EVALUATION PROCESS - Officials of the Host Government and AID Mission should collaborate in periodic evaluation of the progress of each project. (For AID/W projects, participation of grantees is appropriate.) Timing of such regular evaluations should be linked to the key decisional requirements of the project, as listed in the Evaluation Plan included in the Project Paper and as confirmed in the Evaluation Schedule of the Annual Budget Submission; otherwise annually. A description of the evaluation process is found in Handbook 3, Part II, Chapter 8.

PURPOSES OF SUMMARY - The Project Evaluation Summary (PES) is prepared after each review to record information which is useful both to the implementors (including the Host Government and contractors) and to concerned AID/W units. It serves four purposes:

- (1) Record of decisions reached by responsible officials, so that those who participated in the evaluation process are clear about the conclusions, and so that headquarters is aware of the next steps.
- (2) Notice that a scheduled evaluation has been completed, with a brief record of the method and participation for future reference.
- (3) Summary of progress and current status for use in answering queries.
- (4) Suggestions about lessons learned for use in planning and reviewing other projects of a similar nature. The PES and other project documentation are retained in DS/DIU/DI and are available to project planners.

CONTENTS OF SUMMARY - A PES submittal has two parts, plus relevant attachments if any.

PART I REQUIRED: Form AID 1330-15 contains identifying information about the project and evaluation (Items 1-7), action decisions about the project's future (Items 8-10), and signatures (Items 11-12). Since the PES reports decisions, it is signed by the Director of the Mission or AID/W Office responsible for the project. Space is also provided for signatures of the project officer, host country and other ranking participants in the evaluation, to the extent appropriate.

PART II, OPTION 1: For regular evaluations, use continuation sheets to respond to Items 13-23 as outlined in the attached Form AID 1330-15A.

PART II, OPTION 2: For a special evaluation, the reporting unit may opt for a somewhat varied format, with a different sequence or greater detail in some areas, however, Items 13-23 should all be addressed.

ATTACHMENTS: As appropriate, reports of host governments, contractors, and others, utilized in the preparation of the evaluation summary, should be labeled A, B, C, etc., attached to the PES submittal (Missions are to submit 7 copies and AID/W Offices 7 copies) and listed under Item 23. Where it is necessary to transmit these source documents separately from the PES, Block 23 of the PES should note how this material was transmitted, when, number of copies and to whom.

SUBMITTAL PROCEDURE: Missions will submit the PES Facesheet, continuation sheets, and attachments under cover of an airgram which will be received by the Cable Room. AID/W Offices will submit the PES Facesheet, continuation sheets, and attachments to MO/PAV, Room B-930, NS under cover of a memorandum which cites any distribution instructions beyond the standard distribution. All AID/W Offices and most Missions will use the blank cut PES Facesheet and plain bond for continuation sheets, which can be reproduced on copiers. Those Missions preferring to use hecto, may order the form in hecto sets from AID/W, Distribution Branch. There will be a standard distribution made in AID/W of all field-originated PES's. Copies will be sent to the corresponding bureau's DP, DR, the country desk and Evaluation Office. Other copies will be sent to PPC, SER, PDC and DS (including DI and ARC). For AID/W-generated PES's, copies will be distributed to all bureaus.

PROJECT EVALUATION SUMMARY (PES) – PART II

The following topics are to be covered in a brief narrative statement (averaging about 200 words or half a page per item) and attached to the printed PES facesheet. Each topic should have an underlined heading. If a topic is not pertinent to a particular evaluation, list the topic and state: "Not pertinent at this time". The Summary (Item 13) should always be included, and should not exceed 200 words.

13. SUMMARY - Summarize the current project situation, mentioning progress in relation to design, prospects of achieving the purpose and goal, major problems encountered, etc.

14. EVALUATION METHODOLOGY - What was the reason for the evaluation, e.g., clarify project design, measure progress, verify program/project hypotheses, improve implementation, assess a pilot phase, prepare budget, etc? Where appropriate, refer to the Evaluation Plan in the Project Paper. Describe the methods used for this evaluation, including the study design, scope, cost, techniques of data collection, analysis and data sources. Identify agencies and key individuals (host, other donor, public, AID) participating and contributing.

15. EXTERNAL FACTORS - Identify and discuss major changes in project setting, including socio-economic conditions and host government priorities, which have an impact on the project. Examine continuing validity of assumptions.

16. INPUTS - Are there any problems with commodities, technical services, training or other inputs as to quality, quantity, timeliness, etc? Any changes needed in the type or amount of inputs to produce outputs?

17. OUTPUTS - Measure actual progress against projected output targets in current project design or implementation plan. Use tabular format if desired. Comment on significant management experiences. If outputs are not on target, discuss causes (e.g., problems with inputs, implementation assumptions). Are any changes needed in the outputs to achieve purpose?

18. PURPOSE - Quote approved project purpose. Cite progress toward each End of Project Status (EOPS) condition. When can achievement be expected? Is the set of EOPS conditions still considered a good description of what will exist when the purpose is achieved? Discuss the causes of any shortfalls in terms of the causal linkage between outputs and purpose or external factors.

19. GOAL/SUBGOAL - Quote approved goal, and subgoal, where relevant, to which the project contributes. Describe status by citing evidence available to date from specified indicators, and by mentioning the progress of other contributory projects. To what extent can progress toward goal/subgoal be attributed to purpose achievement, to other projects, to other causal factors? If progress is less than satisfactory, explore the reasons, e.g., purpose inadequate for hypothesized impact, new external factors affect purpose-subgoal/goal linkage.

20. BENEFICIARIES - Identify the direct and indirect beneficiaries of this project in terms of criteria in Sec. 102(d) of the FAA (e.g., a. increase small-farm, labor-intensive agricultural productivity; b. reduce infant mortality; c. control population growth; d. promote greater equality in income; e. reduce rates of unemployment and underemployment). Summarize data on the nature of benefits and the identity and number of those benefitting, even if some aspects were reported in preceding questions on output, purpose, or subgoal/goal. For AID/W projects, assess likelihood that results of projects will be used in LDC's.

21. UNPLANNED EFFECTS - Has the project had any unexpected results or impact, such as changes in social structure, environment, health, technical or economic situation? Are these effects advantageous or not? Do they require any change in project design or execution?

22. LESSONS LEARNED - What advice can you give a colleague about development strategy, e.g., how to tackle a similar development problem or to manage a similar project in another country? What can be suggested for follow-on in this country? Similarly, do you have any suggestions about evaluation methodology?

23. SPECIAL COMMENTS OR REMARKS - Include any significant policy or program management implications. Also list titles of attachments and number of pages.

THE "DEVELOPMENT HYPOTHESIS"

A hypothesis is a tentative statement of a relationship about which there is some uncertainty. In other words, it needs testing. The hypothesis is frequently stated as a proposition and assumed so that its logical or empirical consequences can be examined more closely according to the facts and evidence which is known or which may be established.

The hypothesis can be succinctly expressed as a statement in the form:-

If A, then B,

where there is uncertainty about the causative relationship between the existence of A, and the attainment of B.

A series of hypotheses, in the form

If A, then B,

If B, then C,

If C, then D,

is called a Linked Hypothesis.

The linked hypothesis that specific inputs can result in certain project outputs; that these outputs in turn will give rise to accomplishment of a project purpose; and that attainment of the project purpose will contribute to a program or sector goal is known as a

Development Hypothesis.

Thus,

If inputs are provided, then outputs will be produced;

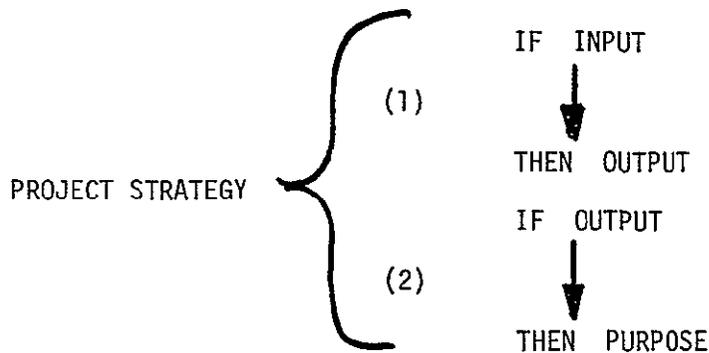
If outputs are produced, then purpose will be achieved; and

If purpose is achieved, then it will contribute to goal attainment.

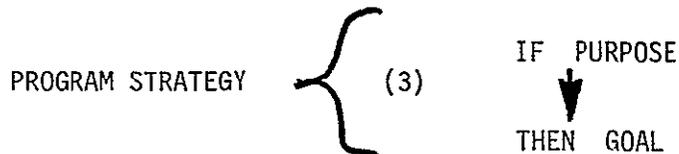
In effect, each "If" statement is the Means for attaining the End expressed by the "Then" level; which in turn becomes the means for attaining the end and the next higher level.

Thus the concept of causality is embodied in the Development Hypothesis.

The process which links Inputs to Purpose - project inputs to project outputs; and project outputs to project purpose - is called the PROJECT STRATEGY: -

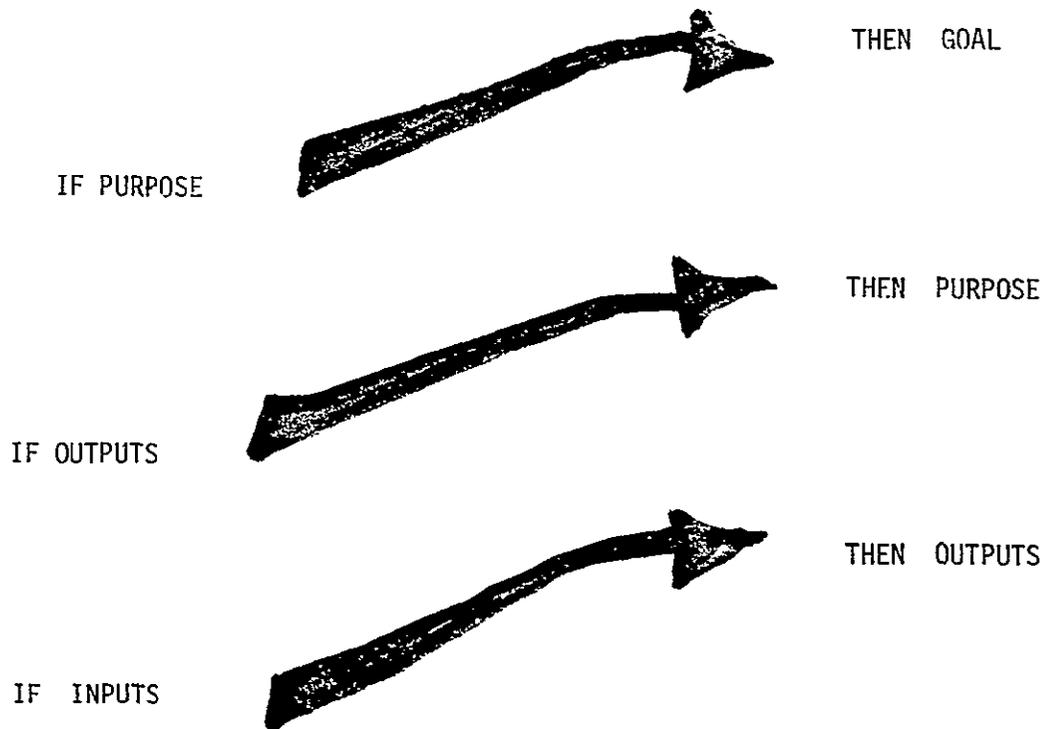


The process by which the linkage between project purpose, and the sector goal is to be realized, is referred to as the PROGRAM STRATEGY:-



For diagrammatic purposes, we reverse this process, with the INPUT at the base, leading to the higher OUTPUTS, PURPOSE and GOAL as follows:-

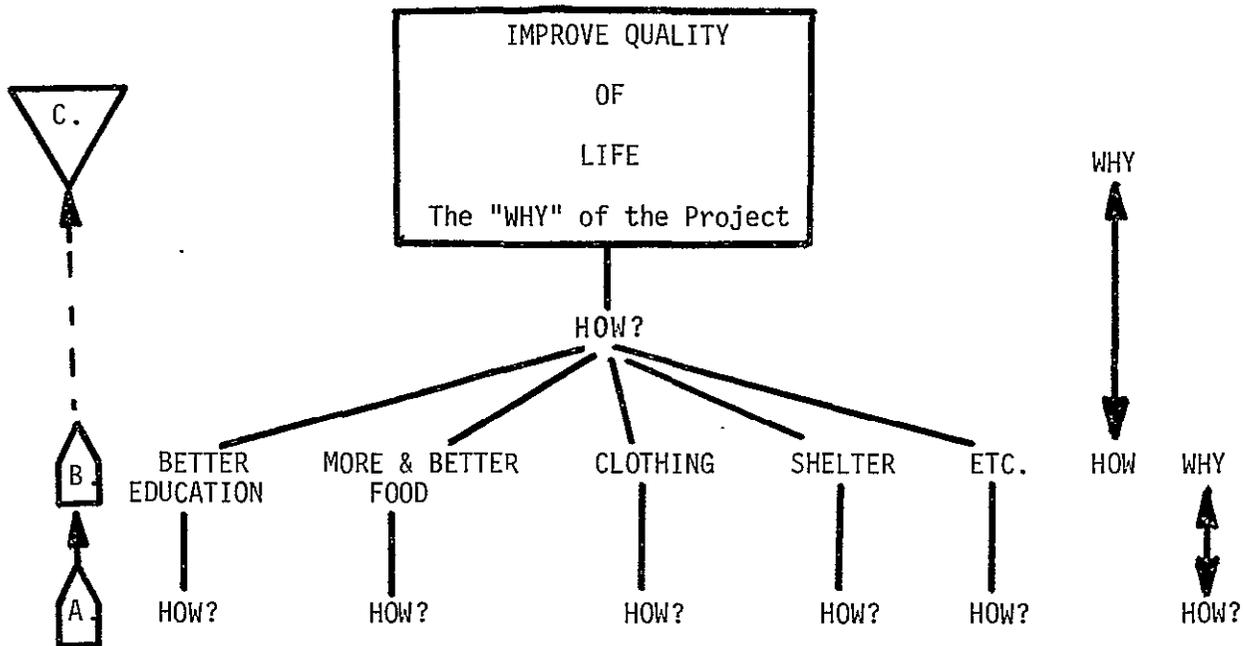
THE DEVELOPMENT PROJECT AS A SET OF LINKED HYPOTHESES
(Means-Ends Linkages)



MEANS-ENDS ANALYSIS

Means-Ends (or "How-Why?") Analysis is a methodology for identifying development problems and considering alternate courses of action to alleviate or solve them. The analysis is a graphic which shows the interrelationships of various steps and major alternatives in a problem situation, using Cause - Effect Logic to outline the elements required for successful project implementation.

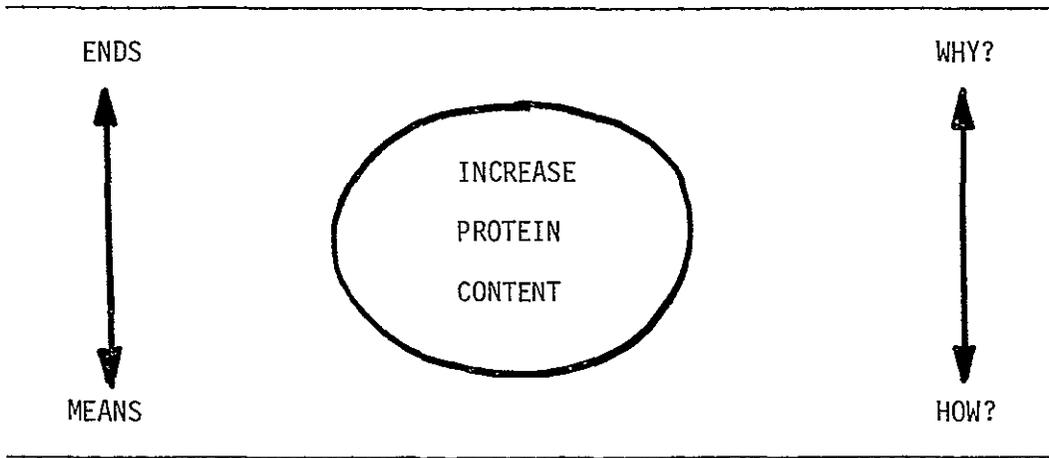
"If A, then B.
If B, then C."



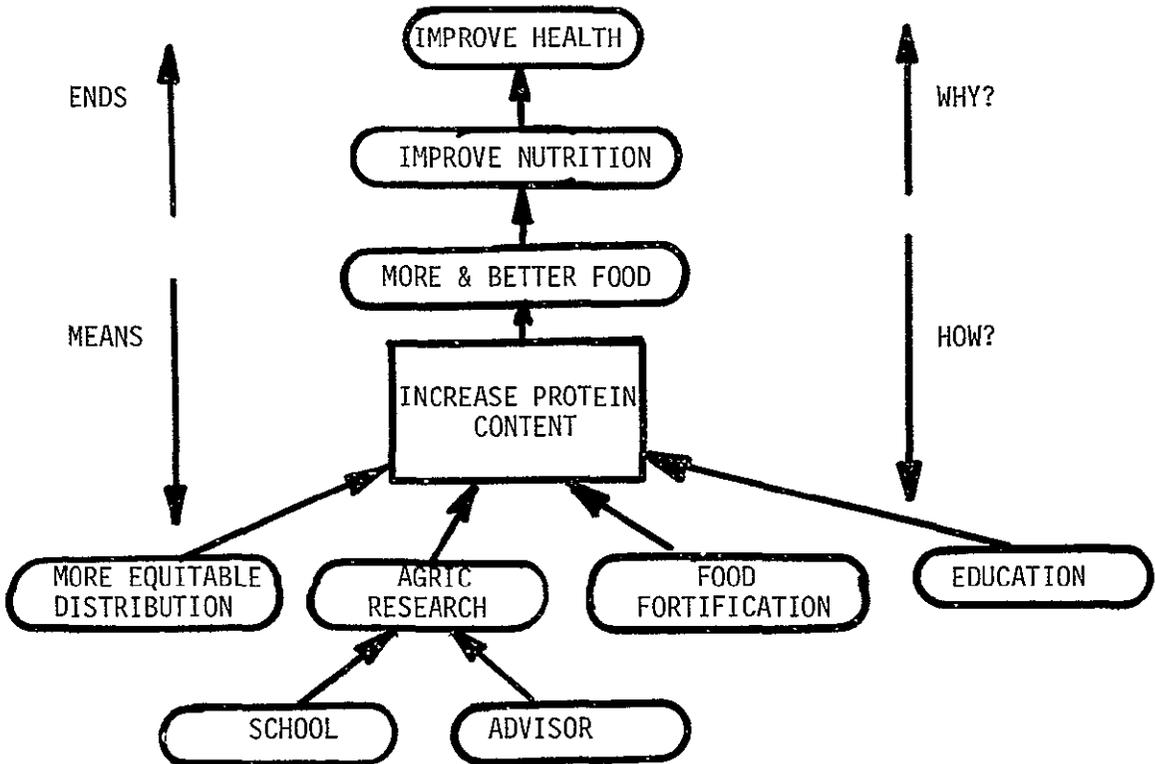
Basically, the top of the Chart represent the "End Objective" to be achieved or a problem statement which establishes why any specific action is to be undertaken. Proceeding downward alternative actions by which the "End" may be achieved, or which contribute to solution of the problem, are listed. Working down the Chart, each "How" becomes a "Why" for subordinate actions. From this analysis, one can then successively identify subordinate alternative ways in which a desired result can be achieved.

NOTE: It is not necessary to start from the ultimate "End" or "Why" level and work downward. One may begin the analysis at any level, (including a nebulous project proposal) and work both up and/or down on the Chart.

For example, under "More and Better Food", a strategy might be considered to Increase Protein Content. Thus: -



This could be developed more fully, thus: -



THREE STEP PROCEDURE FOR MEANS-ENDS ANALYSIS

- (1) Write down the key problems/impediments which affect the area in which the project is intended to operate.
- (2) Place the problem statements in a causal sequence; that is, the problem listed depends on solution of a prior problem:

Malnutrition and undernutrition

Inadequate food production

Inadequate use of fertilizer

- (3) Invert each problem and state it as a solution/objective:

Increase protein and mineral intake, expand caloric intake

Expand food production

Increase use of fertilizer

The analysis is not a mechanical process. It requires professional competence, normally in more than one discipline. Properly utilized, Means-Ends Analysis can help clarify development problem definition and feasible alternatives. Means-Ends Analysis can also provide an indication of the probability of success of a narrowly structured project, and/or indicate the interrelationship of various development assistance projects.

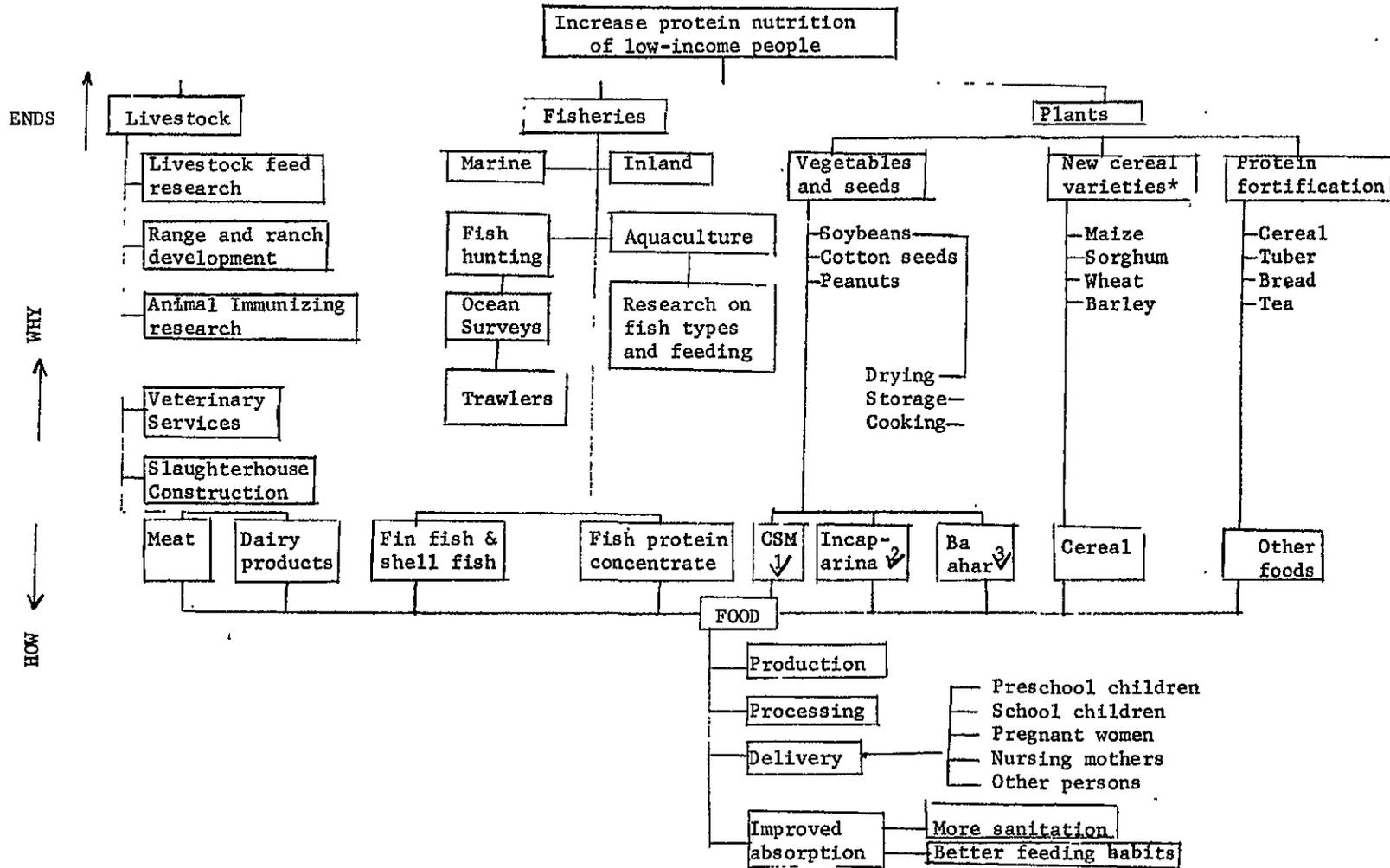
Note that some "Means" may support several "Ends", but that achieving a specific "End" usually requires employment of some "Means" which are unique. An examination of both the independent and interrelated "Means" illustrates the complexity of the development process and will assist in defining realistic project objectives. Note also that in most cases, achievement of significant "Ends" may require multiple actions involving policy, procedure, institutional development, financing, training, and construction of facilities.

Means-Ends Analysis is the first step in project design.

By presenting a range of alternatives in graphic form, Means-Ends Analysis facilitates comparison of their underlying assumptions, the actions they would require, the resources they would use, and hence the complexity and feasibility of implementation.

The following charts illustrate how Means-Ends Analysis might be applied to two kinds of development problems.

ILLUSTRATIVE MEANS-ENDS CHART
OF PROJECT ALTERNATIVES AND INTERRELATIONSHIPS



* Higher protein
 ✓ Corn, soya, and nonfat dry milk
 ✓ Corn and cottonseed
 3 Wheat, peanut, and lysine

THE LOGICAL FRAMEWORK (LOGFRAME)

Construction of a conceptual "Logical Framework" is the key element in both designing and evaluating AID Projects.

The Logical Framework (or Logframe matrix) - is a summary worksheet for presenting the project Development Hypothesis and analyzing a project design. The logframe is divided into four horizontal rows (Goal, Purpose, Outputs, and Inputs), and four columns (Narrative, Objectively Verifiable Indicators, Means of Verification, and Important Assumptions). (Modifications can be made to suit local circumstances.) Each of these aspects is discussed in more detail on the following pages.

| <u>NARRATIVE SUMMARY</u> | <u>OBJECTIVELY VERIFIABLE INDICATORS (& Targets)</u> | <u>MEANS OF VERIFICATION</u> | <u>ASSUMPTIONS</u> |
|--------------------------|--|------------------------------|--------------------|
| <u>GOAL</u> | | | |
| <u>PURPOSE</u> | | | |
| <u>OUTPUTS</u> | | | |
| <u>INPUTS</u> | | | |

This logical framework

- a. Defines project Inputs, Outputs, Purpose, and higher Goal in concise terms
- b. Outlines the project design rationale by articulating the causal linkages between the above elements
- c. Defines the indicators and targets, and source of data to permit measurement of progress of the project.

The logical framework is primarily a device for project planning. It is also used during evaluation to reexamine the original design of ongoing projects and determine whether or not the project outputs are being produced, validate whether these outputs are in fact serving to achieve the project purpose; and finally for completed projects, whether this achievement is making a significant contribution to the higher goal, as originally planned.

The Logical framework establishes the practical limits of project management responsibility. Identifying the project planning assumptions in explicit and operational terms permits a clearer separation between manageable interests and those factors which appear to be beyond the control of the project management team.

The input-to-output level should be largely, if not completely under the project manager's control. At the output-to-purpose level, however, external factors become more important, while at the purpose-to-goal level, project management has practically no ability to control events or outcomes. In evaluating project progress, it is necessary to examine the original planning assumptions about external factors, and validate or restructure the means-end linkages.

Limitations All aspects of project planning are defined by the project planners. Similarly, the degree of rigor and the level of effort required to collect and analyze data for the evaluation are determined by the person/committee conducting the evaluation. The logical framework methodology is programmatically and technically neutral. It does not assure that the project is the most effective means for achieving sector goals. It gives no guidance on equitable income distribution, employment opportunities, access to resources, popular participation in decision-making, proven strategies and techniques, cost and feasibility of replication, or effects on the environment. It is merely a systematic device for making explicit the key elements of the project, as conceived by the project's designers.

The most common form of logical framework matrix is shown on the next page. However, it should be borne in mind that this is basically a systematic method of organizing and presenting thinking. AID Missions have devised at least a half-dozen modifications of the following sample form, and variations in the format are acceptable.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY _____ to FY _____
Total U. S. Funding _____
Date Prepared: _____

Project Title & Number: _____

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|-----------------------|---|
| Program or Sector Goal: The broader objective to which this project contributes | Measures of Goal Achievement: | | Assumptions for achieving goal targets: |
| Project Purpose: | Conditions that will indicate purpose has been achieved: End of project status. | | Assumptions for achieving purpose: |
| Outputs: | Magnitude of Outputs: | | Assumptions for achieving outputs: |
| Inputs: | Implementation Target (Type and Quantity) | | Assumptions for providing inputs: |

LOGICAL FRAMEWORK ELEMENTS

LEVELS - OBJECTIVE (Goal and Purpose)

GOAL - Narrative Summary

"Goal" is a general term characterizing the programming level beyond the project purpose; -- i.e., the next higher objective to which the project is intended to contribute. The Goal is the reason for dealing with the problem, which the project is intended to solve. The Goal identifies a desired result to which an entire program may be directed. Goals are established at top program management levels. Project managers need to understand these overall programming goals, even though their contribution in formulating them may be limited.

Generally, a goal is not achieved by one project alone; but is rather established with the expectation that success in a variety of projects (as well as non-project activities) will be necessary for its achievement. In this respect, the relationship between the project Goal (the end) and the project Purpose (the means) is causal and partial. Causal relationships become more direct and complete when descending to the Output and Input levels. The establishment of a goal is thus only one final stage in a logically progressing series of hypotheses:

- * If this goal is desirable, then what project purpose will be necessary to achieve it?
- * If this project purpose will contribute to goal attainment, then what outputs will be necessary to achieve the project purpose?
- * If these outputs are to be accomplished, then what inputs will be required?

PURPOSE - Narrative Summary

The project purpose is the specific result desired of the project. A well conceived project should have an explicitly defined purpose that contributes to the goal. In turn, the combined project outputs should contribute directly to achievement of the project purpose.

In establishing project objectives, the PURPOSE is the most important level upon which to focus attention

The Objective, whether at the goal or purpose level should be as explicit as possible. For example:

POOR OBJECTIVE:- ESTABLISH AN IMPROVED CREDIT SYSTEM

GOOD OBJECTIVE:- ESTABLISH A NATIONAL SYSTEM OF SELF-SUSTAINING CREDIT UNIONS CAPABLE, BY 1985, OF PROVIDING 30% OF RUTHINIA'S SMALL FARMERS WITH THEIR PRODUCTION CREDIT NEEDS.

"PROBLEM SOLVING" METHODOLOGY TO DEVELOP PURPOSE STATEMENT

1. Describe the Problem
2. "Invert" the Problem Statement

Example:

Problem Statement:

POPULATION GROWTH WILL OUTFRAN DOMESTICALLY
PRODUCE CEREAL GRAIN SUPPLY IN A FEW YEARS.

Inversion: INCREASE DOMESTIC PRODUCTION OF CEREAL GRAINS TO
MEET NEEDS OF GROWING LOCAL POPULATION.

(Inversion helps clarify, but Project Objective needs to be Targetted)

TARGETTING: Be specific in terms of:

- Magnitude
 - Time
 - Target Area, or Audience
- and express in precise, finite and
verifiable terms

PROJECT PURPOSE STATEMENT:

INCREASE DOMESTIC PRODUCTION OF PADDY RICE
IN THE SEVEN NORTHEASTERN PROVINCES,
FROM xxx Metric Tons in Crop Year 1980
TO yyy Metric Tons in Crop Year 1985

CLARIFICATION OF MEANS - ENDS LINKAGE

COEXISTENT OBJECTIVES

In some situations, multiple objectives may be embodied in the statement of project purpose.

Multiple Objectives are acceptable where two competing objectives can coexist.

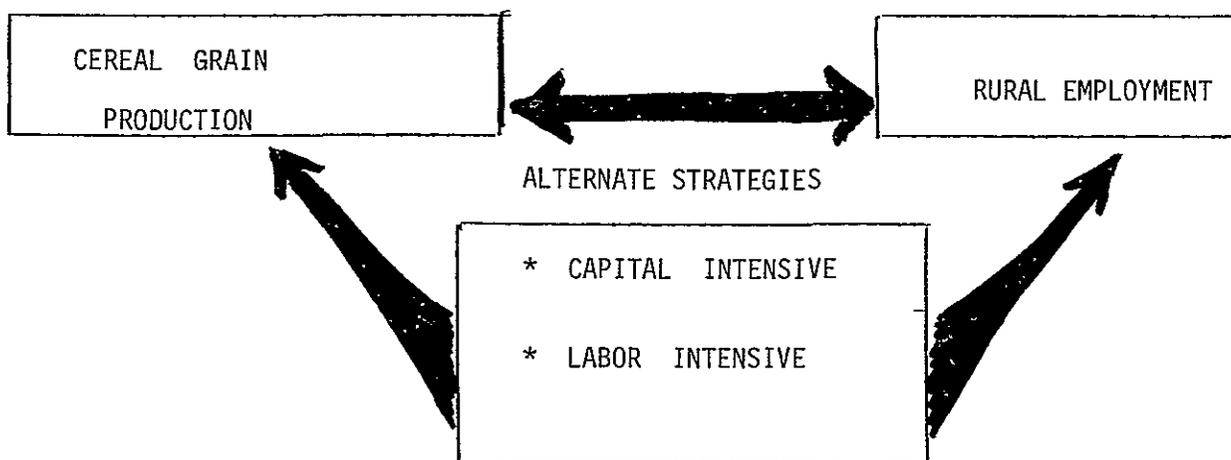
For example: "Increasing Agricultural Production" and "Expanding Rural Employment"

With a capital intensive strategy, increased production might be achieved at the expense of rural employment opportunities.

Conversely, a labor-intensive strategy would probably expand employment, but increases in production might be delayed or kept to an unacceptably low level.

The relationship between the two objectives, therefore, is a trade-off which should be anticipated and stated clearly in the project design. There is a need to identify the trade-off relationship and establish the trade-off point, devise separate progress indicators for both production, and employment, establish targets, and monitor progress towards each.

CO-EXISTENT OBJECTIVES



UNACCEPTABLE MULTIPLE OBJECTIVES

The Means-Ends linkage is often disguised as a single objective. For example:

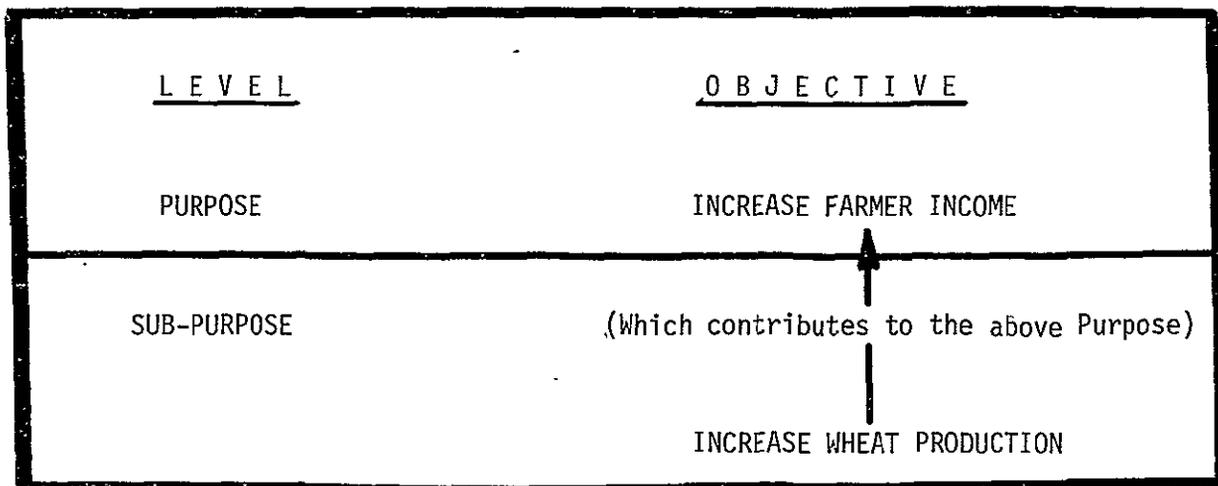
PROJECT PURPOSE: TO INCREASE WHEAT PRODUCTION IN
ORDER TO INCREASE FARMER INCOME

is not acceptable because it compresses a hierarchical Means-Ends relationship, and accomplishment of one is not synonymous with attainment of the other.

Without stable farm prices for instance, farmer income could be unaffected, or even reduced, since by increasing wheat production the price of wheat per ton could fall.

Thus, attempts to measure the above project purpose could produce confusing results.

Therefore the two objectives should be separately stated, the intended causative relationship defined, and each given its own level, with independent progress indicators. This may necessitate adding another horizontal row in the logical framework for a "Sub-Purpose" (or sub-goal) level.



When separated in this manner, the intended cause-effect relationship of the project becomes clearer, the probability of attaining the objective at any level evaluated, and alternate strategies considered in the event the objective is not achieved.

In reviewing project "Objective" statements, be alert for conjunctive phrases, such as

- ... IN ORDER TO ...
- ... BY MEANS OF ...
- ... SO AS TO ...
- ... THROUGH ...

OBJECTIVES FOR "NON-PROJECTS"

The project designer is often confronted with a general activity which does not take the classical forms of a development project; such as general Participant Training, or Food Distribution. When this situation arises, the project designer should attempt to make the expected results as explicit (and verifiable) as possible. For example, a project:-

"TO UPGRADE THE DEVELOPMENT LEADERSHIP OF RURITANIA"

could be considerably improved for both planning and evaluation purposes if it were restated as follows:

PROVIDE PARTICIPANT TRAINING (MASTERS DEGREE LEVEL)
BY SEPTEMBER 1986, FOR 35 RURITANIAN DEVELOPMENT
PLANNERS, WHO WILL HEAD AND STAFF THE PLANNING
OFFICES IN THE MINISTRIES OF AGRICULTURE, TRADE,
FINANCE AND INDUSTRY.

OUTPUTS - Narrative Summary

Project outputs are the specific results expected to be produced by managing project inputs. The outputs may be physically quantitative, such as "kilometers of rural road built"; qualitative, such as "Farmer cooperative functioning effectively"; or behavioral, such as "Increased awareness of, and receptivity to employment of paramedical personnel".

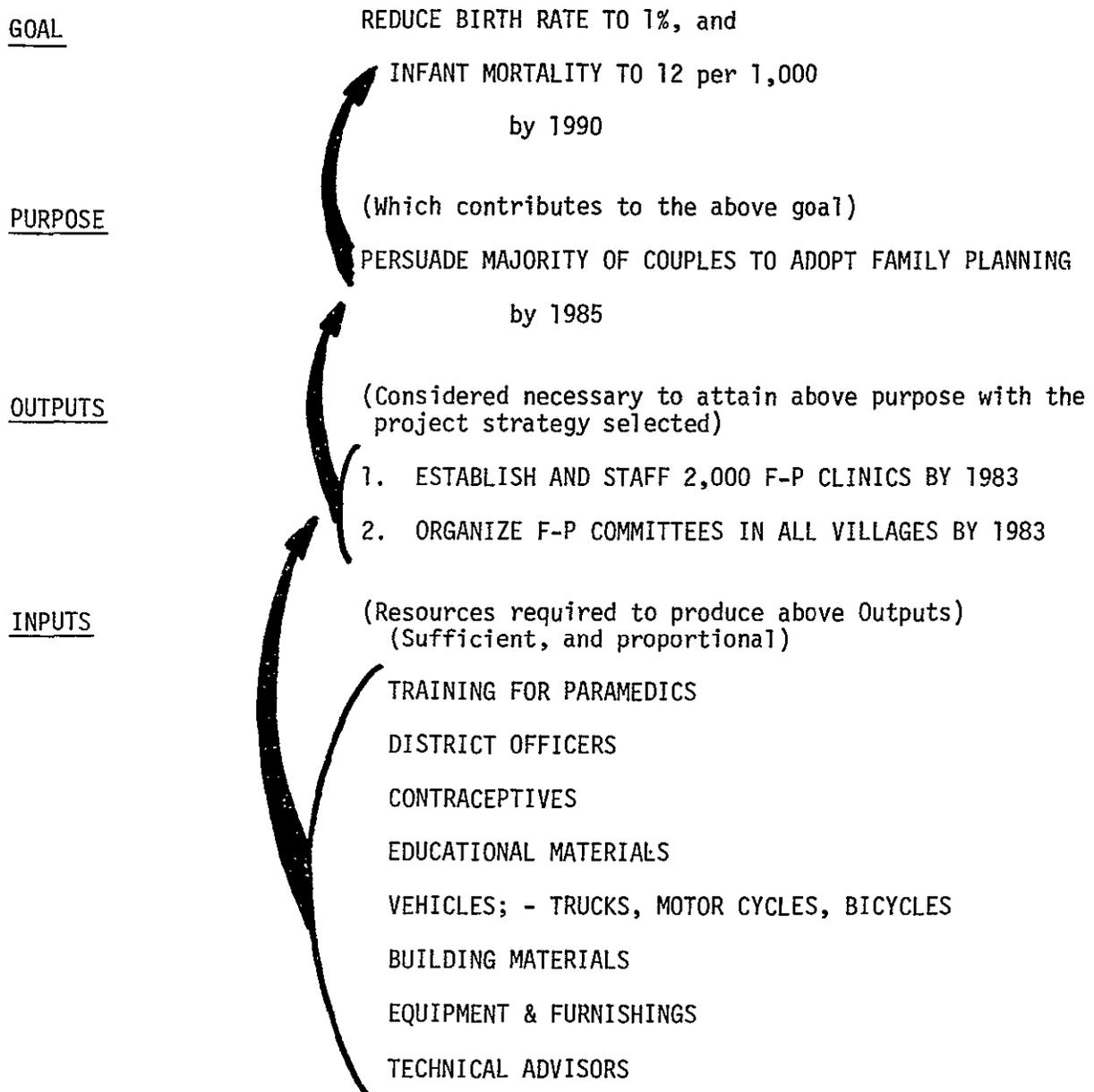
INPUTS - Narrative Summary

Inputs are those things provided by USAID, the cooperating country, and/or other donors, with the expectation of producing specific, definable outputs. The inputs are usually various combinations of personnel, supplies and equipment, training, funds, contract services, etc. These inputs may be provided directly by AID, through intermediaries such as contractors, participating agencies, or voluntary agencies; the cooperating country, and/or other donors, on either loan or grant funding. The general categories are:

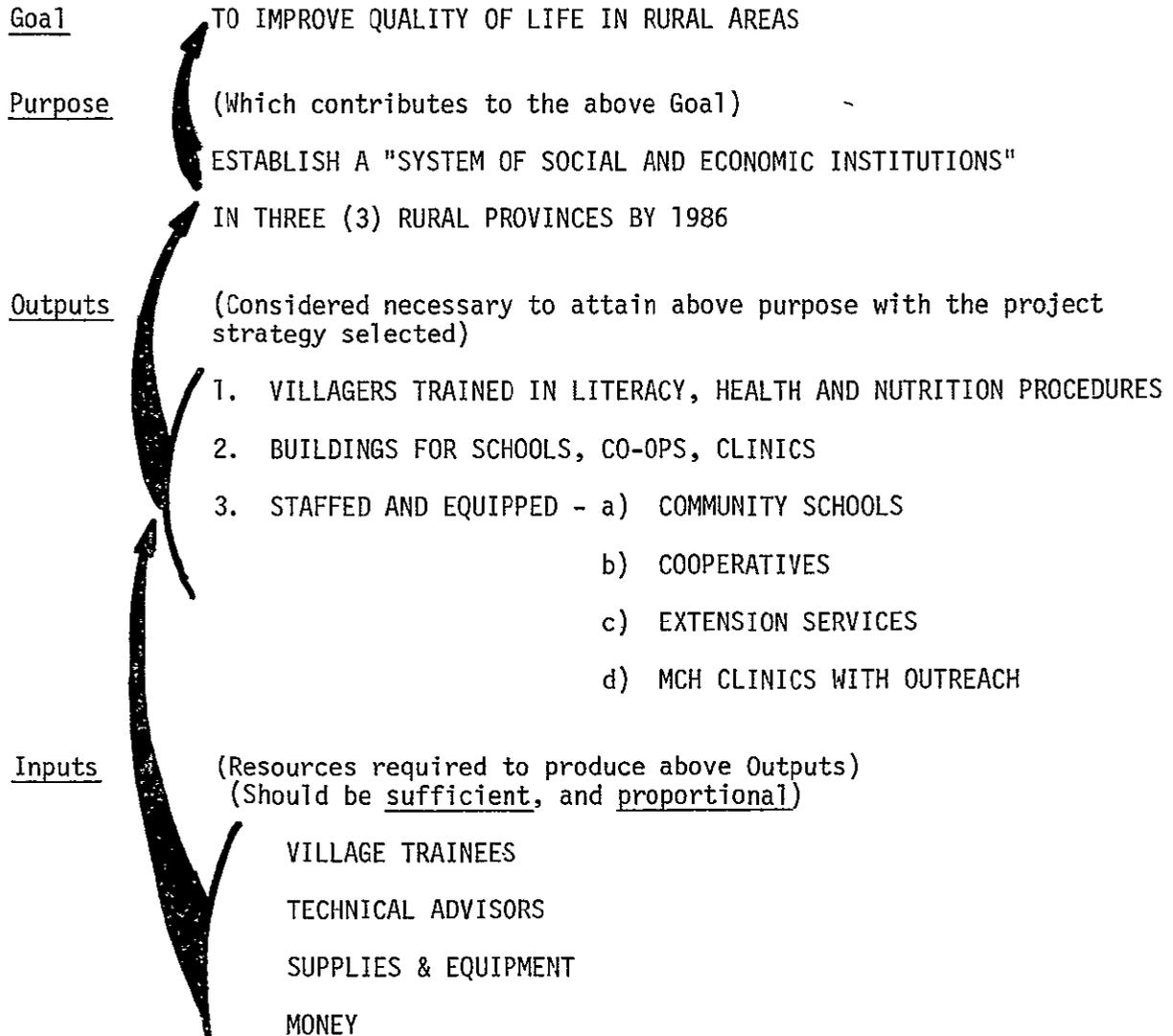
USAID INPUTS

1. Technical Assistance
 - a. Direct Hire
 - b. Consultants
2. Participants
 - a. Long Term US
 - b. Short Term US
 - c. Short Term, 3rd Countries
3. Commodities
 - a. Vehicles
 - b. Technical Equipment
 - c. Office Equipment
 - d. Supplies
4. Local Currency Support

HOST COUNTRY INPUTSOTHER DONOR INPUTS

EXAMPLE OF FAMILY PLANNING Means-Ends Hierarchy

EXAMPLE OF RURAL DEVELOPMENT MEANS-ENDS HIERARCHY



INDICATORS & TARGETS

An Indicator is a unit of measurement which facilitates concise, comprehensive and balanced judgments about a situation. It is subject to the interpretation that if its level changes in the "right" direction, things have gotten better (or people are "better off"), and if the level changes in the "wrong" direction, things are getting worse, or people are "worse off".

A target is an explicit statement of results desired for an indicator over any specified time period, at any level (Output, Purpose or Goal). It is the planned performance standard by which actual performance may be subsequently compared and measured. Targets should contain three dimensions:

- Magnitude,
- Target Area (or audience)
- Time

Good project design must include preestablishing what will be measured or observed to demonstrate progress. Preestablishing project indicators and targets helps focus discussion on evidence rather than on opinions.

| <u>OBJECTIVE</u> (LOGFRAME COLUMN 1) | <u>INDICATOR & TARGETS</u> (LOGFRAME COLUMN 2) |
|--|---|
| OBJECTIVE TO BE REACHED AT: GOAL, PURPOSE OR OUTPUT LEVEL | TO <u>MEASURE</u> WHETHER OBJECTIVE WAS REACHED |
| RAISES QUESTION: WHY? (WHEN GOING UP G P O I) | RAISES THREE QUESTIONS: * W H A T ? - RESULTS EXPECTED * H O W M U C H ? - MAGNITUDE OF RESULT |
| RAISES QUESTION: HOW? (WHEN GOING DOWN G P O I) | * W H E N ? - TIME THOSE RESULTS WILL BE REALIZED |

Indicators may be quantitative or qualitative. A quantitative indicator may be expressed as a:

Single measure -- e.g., graduates during the academic year;

Cumulative figure -- e.g., graduates since the beginning of the project;
or as a degree of change (usually percentage) increase in the number
of graduates per year between _____ and _____ academic year;
or

Ratio -- Professional medical personnel coverage per population, increased
from _____ to _____ during the life of the project.

In some cases, where quantitative measures are not possible, objective measurement of a qualitative change is possible by defining the indicator in behavioral terms; -- e.g. "working relations among cooperating-country personnel in the extension service have 'significantly improved' during the year", or

"Students are 'participating more' in unstructured classroom discussion and 'focusing less' on rote memorization and regurgitation."

In these situations, the behavior expected must be described in such a way that it can be objectively counted or observed by different people.

Where this is not possible, identification and selection of an "Objective observer", and having him/her participate in both the "pre-" and "post" - measurement for comparative purposes, is critical for the evaluation's credibility.

An alternate procedure may be for an "accredited" objective observer to compare the status of indicators within the project with conditions in areas not reached by the project.

Sometimes it is not possible to measure change directly. In such cases, indirect (or "proxy") indicators must be used: -- e.g., "6th grade graduates" as an indicator of literacy, or "purchase of 'luxury' items" as an indicator of farmer income.

A caution: - when indirect measures are used, the causal relationships that underlie them should be verified; for instance, the hypothesis that a 6th grade certificate is actually a reliable indicator of literacy in a particular country; or that farmers in a particular society actually do purchase certain luxury items as their income rises.

Indicators may - be identical to the specific objective (direct indicators),
 - Supplement the objective by describing quality or aspects
 - Substitute for the objective (indirect or proxy)

Using a single indicator cannot give a comprehensive picture of change. Multiple indicators are often needed. For example, to measure change in the development of a vocational training institution, it might be appropriate to measure several things such as:

- Number of graduates
- Staff turnover
- Salary level of graduates
- Equipment replacement budget

INDIRECT (PROXY) MEASUREMENTS

IN ORDER TO DETERMINE WHETHER THERE WERE

GATHER INDIRECT DATA AND TAKE
PROXY MEASURES OF

IMPROVEMENTS IN WATER QUALITY IN
COMMUNITY WELLS

INDEX OF WATER-BORNE INTESTINAL
DISEASES

INCREASE IN FAMILY INCOME

CHANGES IN LOCAL RETAIL SALES,
TAX, SAVINGS COLLECTIONS

INCREASES IN AGRICULTURAL PRODUCTION

CHANGES IN FREE MARKET PRICES
VOLUME SHIPMENTS
EVIDENCE OF-INCREASED STORAGE
INCREASED CONSUMPTION OF LOCALLY
GROWN PRODUCTS

EXAMPLES OF DIRECT AND INDIRECT (PROXY) INDICATORS

| PURPOSE | DIRECT INDICATORS | INDIRECT INDICATORS PROXY (OR SUBSTITUTES) |
|--|--------------------------------------|--|
| <u>To Increase</u> Per Capita Income of Small Farmers | -Crop Sales & Food Consumption | -Purchase of Typical Consumer items -Tin Roofs on Huts |
| <u>To Increase</u> Agricultural Production | -Total Metric Tons | -Free Market Price Fluctuations -Shipment of Agriculture products |
| <u>To Improve</u> Nutrition of School Children | -Amounts & Types of Food Consumed | -Height & Weight of Children -Cases of Kwashiorkor |

TARGETING is the art of defining how much of
WHAT is desired by
WHEN,
WHERE
 and
BY WHOM?

SOME EXAMPLES OF TARGETS

- Small Farmer Rice Productivity in Ilandia of 5 tons/hectare/season by 1985.
- Enabling Land Reform Legislation passed by Midonian Parliament by 1983.

Where multiple targets are stated at various levels they should be reasonably proportional.

Example of Proportionality

- 1 Extension Agent for 300 farmers
 - 1 Classroom for 40 children
 - 1 Clinic within 3 km. walking distance of market place.
- (Note: The above ratios are not definitive; merely illustrative)

Lack of Proportionality

A lack of proportionality exists when

- Input magnitudes are too small to produce Outputs
- Output magnitudes are not related to the size of the problem needing solution (i.e., Purpose to be achieved).

However, Note that the PURPOSE IS SELDOM DIRECTLY PROPORTIONAL TO THE GOAL. It is usually merely contributory to the goal

OBJECTIVELY VERIFIABLE INDICATORS

Progress should be "Objectively Verifiable" so that both a proponent of a project, and an informed skeptic could agree that progress has, or has not been as planned.

To be objectively verifiable means that one must be able to obtain the data from a reliable source. This is a very real problem in many economic development projects. It is quite easy to state a macro-economic goal "to raise the per capita income of a selected population group (for instance, the Rural Poor) by 5%".

It is entirely another matter to obtain raw data to actually measure per capita income of that group, and even more difficult to do on a frequent basis.

GOAL -- Objectively Verifiable Indicators

The indicators of goal achievement may be quantitative, qualitative, or behavioral; or a mixture. Measures of achievement should indicate a causative relationship between project purpose and goal. A single project will not usually be the total cause of goal achievement. Other projects and non-project factors usually also have a significant influence.

PURPOSE -- Objectively Verifiable Indicators

The statement of the End-of-Project-Status (EOPS) is a description of the conditions that are expected to exist when the project is successfully concluded. The objectively verifiable indicators may be either quantitative, qualitative or behavioral.

In projects which have an institutional purpose, the end-of-project status conditions should reflect the performance of the institution (such as effectiveness in producing goods and/or services, efficiency and self-sufficiency) rather than merely its physical completion and/or readiness to perform.

At least one of the indicators should be the number and type of beneficiaries the project is expected to reach.

INDICATORS AND EOPS

The Project Planner Must:

- STATE THE PROJECT PURPOSE IN FINITE, VERIFIABLE TERMS
- DEFINE THE CONDITIONS WHICH WILL EXIST WHEN THE PROJECT PURPOSE HAS BEEN ACHIEVED
- FORMULATE OBJECTIVELY VERIFIABLE INDICATORS

NOTE: We cannot measure outputs to verify whether or not purpose has been achieved. This must be independent of, and different from measuring outputs.

The overall goal can often be sub-divided into smaller, intermediate targets. For example, Prevention of Births might be expressed and subsequently measured in monthly as well as annual terms.

Difficulty may arise because project descriptions frequently lack the necessary degree of specificity. Beware of such imprecise terms as "viable", "expanded", "improved", or even a combination thereof:

Definite Terms:

Install x
 Establish y
 Build Z
 Complete A
 Reduce from x to y
 Eradicate x
 Cover cost of x
 Raise \$_____ foreign exchange

Fuzzy Terms:

| | |
|---------------|-------------|
| Improve | Promote |
| Enhance | Augment |
| Reinforce | Assist |
| Upgrade | Expand |
| Service | Develop |
| Strengthen | Coordinate |
| Raise quality | Make viable |
| | Stimulate |

Ideally both project purpose and indicators should be in definite terms. Indicators however, must be definite, and they may compensate for an imprecise project purpose statement by providing explicit targetting.

Some Examples of EOPS

PURPOSE

(To Establish) a system of social and economic institutions in three (3) rural provinces by 1986.

EOPS INDICATORS

- Adults attend school
- Number of co-op loans increasing
- New crops being grown
- Infant mortality declining
- Women active in village councils

Purpose (End of Project Status) (Often combined) Indicators and Targets

(To establish) a functioning agricultural credit system

1. Two branch offices in all districts by 1984
2. 75% of small farmers apply for loans by 1986
3. System is self-supporting by 1988
 - (a) Annual 20% reductions in government subsidies starting 1983.
 - (b) 95% loan repayment rate by 1988
 - (c) Interest covers loan losses and administrative cost.

It is also useful to include in this EOPS block, a summary of the baseline situation data for the various indicators, so that planned project progress is highlighted, thus:

| <u>INDICATOR</u> | <u>BOPS</u> | <u>EOPS</u> | <u>%CHANGE</u> |
|------------------|-------------|-------------|----------------|
| A. xxxxx | X | Y | Z |

Although improvements may always be made in development situations, and development programs such as an education system, health system, extension system may never "End", the aim of EOPS indicators is to set up definite targets which can be achieved in a reasonable period. The idea is to improve management, not to impose arbitrary termination dates on projects.

A development project is thus a phased attack on some identifiable aspect of an overall development problem.

OUTPUTS - Objectively Verifiable Indicators

Objectively Verifiable Indicators of each output are the quantities, or conditions identified in the narrative summary, with the level of attainment planned. Where ever possible, these should be identified as cumulative annual (or other appropriate time interval) numbers, percentages, ratios, qualitative assessments, or other appropriate increments. More than one indicator for each output may often be desirable. For example:

| <u>Indicator</u> | <u>Base Line</u> | <u>YR 1</u> | <u>YR 2</u> | <u>YR 3</u> | <u>YR 4</u> | <u>YR 5</u> |
|------------------|---|-------------|-------------|-------------|-------------|-------------|
| A. | 0 | 5 | 8 | 10 | 14 | 19 |
| B. | 15%* | 16% | 18% | 25% | 40% | 65% |
| C. | 6/1000 | 6/ | 5.5/ | 5/ | 4/ | 3/1000 |
| D. | UNSATIS. | UNSAT | POOR | FAIR | GOOD | EXCELLENT |
| E. | F | F | D | D | C | B |
| F. | No Data / Situation Studied / Analysed / Report Submitted | | | | | |

*NOTE: Whenever a % target is used, a base reference number should be included somewhere so that subsequent percentages can be interpreted.

Caution: The important factor in personnel assignment is the services to be performed. The fact that an advisor is at post is not a sufficient statement of the output expected from that advisor.

OUTPUTS AND PURPOSE ARE DIFFERENT IN KINDMEASURE THEM INDEPENDENTLY

| <u>PURPOSE</u> | <u>OBJECTIVELY VERIFIABLE INDICATORS</u> | <u>TARGETS</u> |
|--|--|---|
| TO INCREASE SMALL FARMER PRODUCTIVITY | CROP YIELD PER HECTARE | <u>BOPS</u> 45 ca/ha <u>EOPS</u> 80 ca/ha |
| <u>OUTPUTS</u> | - IRRIGATION NETWORK EXISTS | - 3 Pumps |
| ESTABLISH AN OPERATIONAL IRRIGATION SYSTEM | | - 4 km pipes |
| | | - All Ditches free flowing |
| | - TRAINED STAFF | - Watermaster |
| | | - 2 Assistants |
| | - UTILIZATION SCHEDULE | - Approved by User Association |
| | - USER RATE SCALE | - Economically viable @ 5¢ per 100 customers |

INPUTS - Objectively Verifiable Indicators

List the major input categories by programmed budget, in thousands (or millions) of dollars and/or level of effort, by year, for the life of the project. Separate USAID Host Country and other Donor inputs, thus: -

| <u>INPUT</u> (From Narrative Summary) | YR 1 | | YR 2 | | YR 3 | | YR 4 | | YR 5 | |
|--|----------|--------------|----------|--------------------|----------|--------------|----------|--------------|----------|--------------|
| | <u>#</u> | <u>\$000</u> | <u>#</u> | <u>\$000</u> | <u>#</u> | <u>\$000</u> | <u>#</u> | <u>\$000</u> | <u>#</u> | <u>\$000</u> |
| USAID INPUTS | | | | | | | | | | |
| Technical Assistance (Direct Hire) | | | 12 | person-months etc. | | | | | | |
| (Consultants) | | | 4 | \$100 | | | | | | |
| Participants | | | 1 | \$20 | | | | | | |
| Commodities | | | - | \$4,000 | | | | | | |
| Local Currency Support | | | - | \$1,000 | | | | | | |

"PIVTAC" - THE SIX-STEP TEST FOR INDICATORS

Indicators should be:

- ** PLAUSIBLE A believable or genuine measure of the project level? Should vary with progress achievement, but not vary significantly with changes in unrelated factors.
- ** INDEPENDENT Separate, discrete, and distinct from measures at other levels? No indicator may be used for more than one level.
- ** VERIFIABLE Objectively verifiable (as opposed to subjective). Impartial, tangible, or material? Could both a skeptic and an advocate of the project be expected to agree on the facts shown by the indicators?
- ** TARGETTED Explicit or specific including the quantity, type, the time, and if appropriate, the target audience, or place?
- ** ACCESSIBLE Are the information sources which are listed - reasonably available or accessible? Are additional special studies, or surveys required? (If so, are funds and skilled personnel available to conduct them?)
- ** COMPREHENSIVE Are all major aspects measured, so that no additional indicators are needed?

CONSIDERATIONS IN ESTABLISHING TARGETS

Is the degree of change significant? Another way of asking this is,

"How much of a difference makes a difference"

The range of progress expected should be defined in advance. Change observed can then be labeled unsatisfactory, adequate, or satisfactory. The meaning of unsatisfactory must be given in terms of a standard. (For example, an infant mortality rate of 75 per 1000 live births might be considered unsatisfactory until it reaches a more tolerable or adequate rate of less than 30 per 1000). Such a standard can be obtained by collecting the historical experience in various countries and (1) determining the current status of development by using indicators, and (2) making intra-country and inter-country comparisons of these indicators to see where on the scale of comparison a particular country lies. These measures often go beyond the evaluation of A.I.D. activities and assess a country's total development program. The rates of growth for a number of countries can also be used as standards of progress against which to describe a particular less-developed country's growth.

Advantages

If properly formulated and applied, progress indicators and performance standards can:

- Establish that change has occurred and indicate the character, direction, and rate of change;
- Permit comparison of the actual change against that which was planned;
- Permit assessment of the impact of this change on higher goals;
- Compare a project's performance with that of similar projects;
- Allow the examination of the relation of input to output and of cost to benefit.

Disadvantages

Indicators and standards have a tendency to cause apprehension and can indeed be harmful if wrongly applied because they may:

- Force the establishment of unrealistic targets, or the setting of targets more precisely than perhaps they should be set, given the uncertainties of the cooperating country situation;
- Require quantitative measurements when much of the project's concern should be with qualitative improvements in human knowledge and skill, institutional capacity, etc.;
- Subject the project to comparison with other projects and programs which are not comparable due to significant differences in cultural, economic, political, or other characteristics.

Quantitative vs. Qualitative Measures

When it is practical, quantitative measures are preferable to qualitative measure. However, the central issue in evaluation is not so much one of quantitative vs. qualitative measures, but rather that indicators of change be objectively verifiable.

MEANS OF VERIFICATION

GOAL - Means of Verification

State the kinds and sources of data needed to support the indicators cited as measures of goal achievement.

PURPOSE - Means of Verification

State the specific types of evidence which will be used to verify conditions marking the End-of-Project Status, and the source (documents, and organizations) from which they will be obtained. If no documentation exists during the design stage of the project, the necessity for obtaining base-line data and for developing a project monitoring/reporting system, or conducting special surveys should be noted. Activity to develop a reporting system or conduct surveys should be included as an additional project output to be funded under the project.

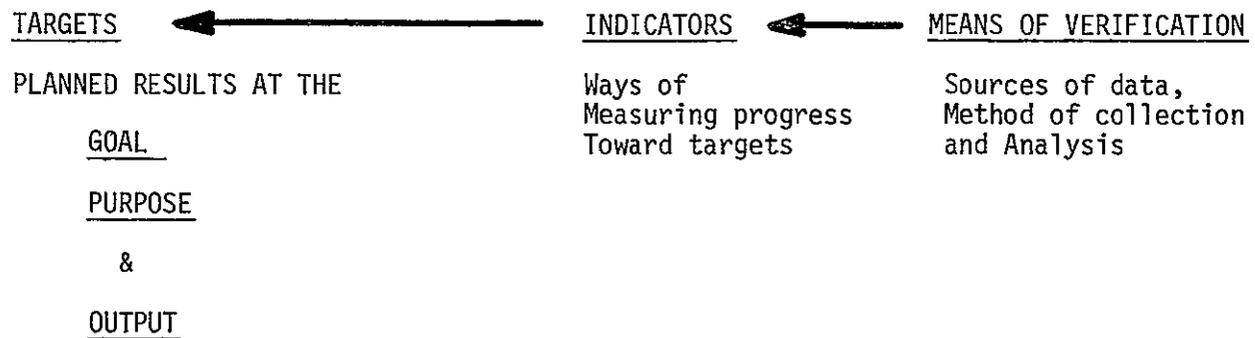
OUTPUTS - Means of Verification

State the source, and kinds of data required to verify each indicator. (This may be existing agency or ministry reports, or new reports which will be generated as a direct byproduct of the project's existence.) If no documentation exists, or is expected to be created as a normal aspect of the project's implementation, this fact should be noted and included as an additional project output to be funded under the project. Note: It is not always necessary to create regular recurring reporting systems in order to obtain project indicator data. Frequently, such data can be more effectively and efficiently obtained from periodic, studies, and/or random sample surveys. If such is the case, establishing the capability of the host country to conduct such surveys and studies might be an appropriate collateral project output. However, if during the design stage of the project specific provisions are not made for obtaining necessary data it is highly unlikely that the data will be available subsequently, for project evaluation.

INPUTS - Means of Verification

AID reports usually provide sufficient accounting and recording for AID-provided inputs. However, other inputs (such as those provided by the cooperating country, other donors, voluntary agencies, and third countries) should have confirming data sources shown.

THE RELATIONSHIP BETWEEN TARGETS, INDICATORS & MEANS OF VERIFICATION



LEVELS

DATA GATHERING & REPORTING
IMPORTANT DESIGN CONSIDERATIONS

The following is a check-list of some major factors to bear in mind when designing a data gathering and reporting system. The list is not structured in any particular order, nor is it comprehensive. However, it should serve as a good start for a design group.

Purpose
Scope
Environment
Communications
People/Machine interface
Cost
Personnel
Data processing
Processing time
Reporting Frequency
Detail desired
Authority & Chain of command
Data summarization
Verification
Project popularity
Sources
Vested interests

Each of these factors is discussed in general terms on the following pages.

Purpose: Why is information required? For the Host country Project Manager, USAID Project Manager and/or AID/Washington? What type of system is needed, who will operate, maintain and use it?

Scope: How is the project organized; what are the units from which data will be gathered? Are they technical, functional, and/or geographical? Are each of the data elements unique to a particular "organization", or are there a number of work units which can be structured to produce similar data elements? Are any of the data elements summarized through intermediate organizational levels, or are they directly analyzed only at the central level?

Environment: Is the project being implemented in a modern, sophisticated urban situation; an underdeveloped traditional rural situation; or some stage in between? What geographical distances exist between data collectors and processors?

Communications:

- a. What methods of communication are available to transmit data from the collectors to the processors? Telephone, Radio, Telegram, Bush Telegraph, Mail, Messenger, personal hand-carrying, and/or verbal reporting?
- b. What is the time lag between transmission by the collectors and receipt by the processors? Instantaneous, delays of seconds, minutes, hours, days, weeks, months? How consistent is this? Is the time lag the same all year round, or does it vary by the season or political climate?
- c. How reliable and secure is the system? Does it transmit accurately, or is there likely to be distortion (deliberate intervention or natural/technical causes) in the process? Is a written copy of the data transmitted from the collector to the processor?

People/Machine Interface: To what extent is the system people-oriented or machine-oriented? Are the indicators "instrument" readings (such as weights, measures, or temperatures), or are they judgemental factors? Are they produced automatically, or are they interpreted by people?

Cost: How much is management willing to spend to obtain the information it desires? Is the information needed whatever the cost, or are there budgetary limitations, i.e. some percentage of the project cost; or is it preferred that the cost not be explicit, but buried in the operating costs? Can the project bear the cost? If not, what are the alternatives?

Personnel:

- a. Are there sufficient personnel to collect the data for the area of coverage?
- b. Is the project staffed with experienced, skilled data collectors, or will the burden be on inexperienced, unskilled technicians who must learn on-the-job?

Data Processing: Will the system be manual, computerized, or some combination of both? Can any of the collection aspects be "Source Data Automated" or will the data be manually captured and later transcribed for machine processing?

Processing Time: How long will it take after an occurrence before the project management staff can receive an analysis of the phenomena?

Reporting Frequency: How frequently does the Project Manager (and the next higher level of management) desire to be informed of the operational situation -- continually, daily, weekly, monthly, quarterly, periodically; or infrequently "By Exception"?

Detail Desired: How much does the next higher level of management want to know -- "everything," "selected indicators", regularly "selected indicators by exception", "ad hoc" special studies?

Authority & Chain of Command:

a. Is the project manager "all powerful" to those from whom reports are required? Does he/she have direct authority over the reporters, or do they work for someone else? Do they provide data as a primary or as an additional task, or only as a courtesy?

b. How long is the Chain of Command? Can the project manager communicate directly with the data collectors, or does he/she have to go through several intermediate managerial levels?

Data Summarization: Is the data only to be summarized on the project as a whole, or will it be summarized at, and for intermediate levels?

Verification: Can the Project Manager's staff get easy access to the source of the data and the collectors to spot-check, sample and verify the validity and accuracy of the data reported?

Project Popularity: Does the project have a favorable Public Image with which people are willing to identify, or is it generally unpopular, and data collectors likely to encounter resistance, withholding or deliberate distortion of facts?

Sources:

a. Is base line data available?

b. Is any of the data already being gathered for some other purpose?

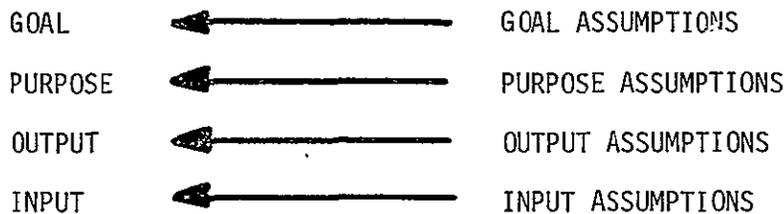
Vested Interests: Are the data collectors or the intermediate supervisors completely unbiased observers of the data they are required to collect and transmit, or do they have vested interests in understating or overstating the facts as they see them.

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ASSUMPTIONS

An "Assumption" (in AID Project Design Logframe Terminology) is an attempt to identify significant external factors or conditions over which the project manager may have no control, but which are essential to successful project implementation.

Identifying critical elements which are not part of the project design plan, "Conditions Precedent" to project implementation can be established in the Project Agreement; the plan can be modified to incorporate these elements in the project design; or another collateral project may be initiated (with a new Project Identification Document). By explicitly identifying these aspects during the design stage, the project is clarified and the probability for success can be improved. The extent of external coordination is also brought to the fore and subsequent implementation of the project can be more realistically evaluated.

Horizontal Integrity The "Assumptions" stated at each level in the AID logframe are the external conditions which are necessary in order for that level's objectives to be successfully attained.



There are normally different assumptions for each level (Goal, Purpose, Output, and Input) of the project.

TYPICAL CATEGORIES OF VARIOUS LEVEL ASSUMPTIONS

- | | |
|----------------|---|
| <u>GOAL</u> | -- Political Stability |
| | -- Inflation not too Severe |
| | -- Equitable Land Tenure System |
| <u>PURPOSE</u> | -- Incentives for Change Exist |
| | -- Related Projects Successful |
| | -- Host Government Policy Commitment |
| | -- Replication Successful |
| <u>OUTPUT</u> | -- Permanent Personnel Positions Established |
| | -- Long Term Funding Requirements Budgetted for |
| <u>INPUT</u> | -- Sufficient Qualified Personnel Pool Exists |
| | -- Required Funding will be provided on a Timely Basis. |

GOAL Important Assumptions

Achievement of the Goal is usually beyond the capability of any one project, and indeed often beyond the time-frame of the project under design. The single project is merely one building block in the overall economic development strategy of the country. Nevertheless, this does not absolve the project designers of the responsibility for articulating a coherent development hypothesis between the project's immediate Purpose and its longer range Goal.

Similarly, the critical assumptions associated with achieving that Goal may be beyond the project manager's capability to influence. Nevertheless, such assumptions should still be identified and compared with existing "reality" so that the project environment and prospects for ultimate Goal attainment can be assessed in the design stage; and subsequently evaluated by others, long after the project itself has been completed.

PURPOSE - Important Assumptions

Achievement of the Purpose also usually occurs after the project's completion and is thus in a sense beyond the immediate control of the project manager. However, the relationship and time frame between Output and Purpose is usually much closer than between Purpose and Goal, and the project manager can often exert influence (directly or indirectly) to improve the prospects for success at this level.

Successful attainment of the Purpose is usually based on two major categories of expectations:-

- that certain external conditions, or actions outside the scope of the project, will occur; and
- that the host country will continue to encourage, maintain, replicate and/or extend the Outputs provided by the project, at an acceptable level and quality, after AID's input to the project has terminated.

For example, "Increased agricultural productivity" may be a realistic (though vaguely stated) Purpose. However, achieving increases in agricultural productivity may depend upon motivating the farmers and farm labor force; establishing market regulations, distribution centers, and national price structures for agricultural commodities; all of which may be outside the design scope of any particular project.

For specific project related activities, a critical assumption with regard to essential project personnel (usually hired on a temporary basis) may be that the government will establish appropriate permanent positions and will budget funds to payroll them. For personnel who have received specialized training under the project, the assumption might be that the government will utilize them appropriately in the skill for which they were trained. For physical outputs, such as buildings, roads, equipment, etc., a critical assumption might be that the government will budget maintenance funds, or make other appropriate arrangements (such a hiring additional staff, or contracting out) to ensure that they continue to operate as intended.

OUTPUTS - Important Assumptions

Outputs are usually categories of

- New Items (roads, buildings, equipment, newly trained personnel, organizations, etc.)
- Upgraded Items (All-weather roads, modernized clinics, advanced training, etc); and/or
- Demonstrations of Improved Methods for doing things
(Use of fertilizer with high-yielding variety seeds, providing health care through use of paramedical personnel, nutritional MCH programs, etc)

Assumptions should identify the external factors related to these items which are essential if the Outputs are to be accomplished in a timely manner.

Coordination with other Agencies, civic organizations, and private sector suppliers; availability of qualified personnel, and resources -- particularly funding and commodities; enabling regulations or decrees; cooperation by local government officials and community residents are all important elements which must be considered.

INPUTS - Important Assumptions

At the Input level, the major critical assumption is that the Inputs will be available in a timely manner, in the quantities programmed. Project designers also use this Block to record "Conditions Precedent".

ASSUMPTIONS - General Considerations

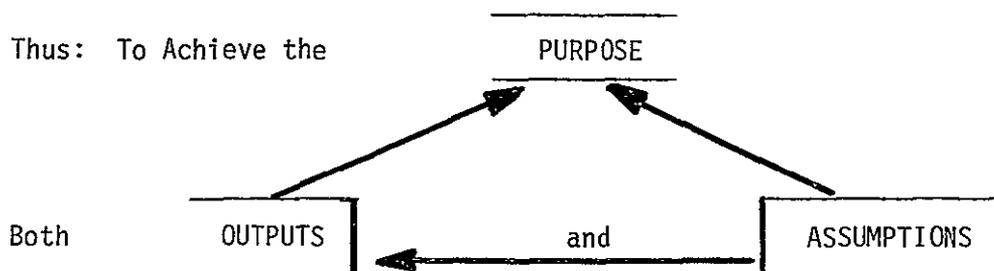
As indicated above, an assumption describes a situation (or condition) which must exist if, and when the project is to succeed, but over which the project management team may have little or no control. The degree of confidence placed on assumptions depends upon the project design team's familiarity with the cooperating country; knowledge of the sector in which the project is being developed; prior experience, and performance by the host country and other donors on similar projects.

If many critical factors are unearthed at various levels in designing the project which are beyond the project manager's control, the feasibility of successfully implementing the project may be questionable. Assumptions identified in this manner may provide the impetus for formulating other, complementary projects, or establishing "Conditions Precedent" to funding approval, or continuation of the project beyond certain stages.

A project's design is only as sound as its rationale and assumptions. As the project is implemented and these linkages are tested, confidence in the project Development Hypothesis should increase. If it does not, project management attention should be drawn to the assumptions. If the assumptions are not being met, some extraordinary measures may have to be taken before the project is permitted to continue. If the assumptions are being met, but confidence is not increasing, there may be other critical assumptions which were previously overlooked but which must now be addressed. In either event, external factors should be stated as important assumptions regarding achievement, and evaluated periodically to assure their continuing validity.

Logframe Project Design rests on the basic premise that each level in the hierarchy is not only necessary, but also sufficient (in quantity and quality) to enable the next higher level to be achieved. Since each linkage is subject to external factors beyond the control of the project's management, each link must be examined to assure that the activities at a given level (e.g., Outputs) are necessary and sufficient to achieve the next level (Purpose). If not, the additional necessary assumptions must be identified.

Thus: To Achieve the



are necessary.

Example of Different Level Assumptions

| <u>NARRATIVE (Column 1)</u> | <u>ASSUMPTIONS (Column 4)</u> |
|--|--|
| <u>GOAL:</u> National Self-Sufficiency in Rice | <ul style="list-style-type: none"> - Economic Incentives for Farmers are favorable - Per Capita Consumption will remain stable or decline |
| <u>SUBGOAL:</u> To Increase Farmers Incomes | <ul style="list-style-type: none"> - Price Stability, or Price Support System for Producers - Storage, and Transportation available - Costs of production favorable |
| <u>PURPOSE:</u> To Increase Yield per Hectare | <ul style="list-style-type: none"> - Water Supply Adequate - Fertilizer Applied Correctly |
| <u>OUTPUTS:</u> 1. Farmers Motivated to Use Fertilizer | <ul style="list-style-type: none"> - Cost of fertilizer is more than offset by sales of additional crop which results from fertilizer use |
| 2. Farmers trained in using fertilizer. | <ul style="list-style-type: none"> - Knowledgable extension workers are able to reach and train the farmers |
| 3. Farmers obtain adequate fertilizer in timely manner. | <ul style="list-style-type: none"> - Fertilizer procurement and distribution system (Govt, Private or Coop) adequate for meeting project needs |
| <u>INPUTS:</u> <u>USAID</u> Advisor (Project Officer) Contractors (Extension Specialist) | <ul style="list-style-type: none"> - Available, or will be contracted for life of project. |
| Equipment (Vehicles for extension workers) | <ul style="list-style-type: none"> - Will be available for project use within 12 months of signing Project Agreement |
| <u>Host Country</u> Project Manager Extension Technicians | <ul style="list-style-type: none"> - Available and/or can be recruited and trained |
| HYV Seed & Fertilizer | <ul style="list-style-type: none"> - Available or can be procured |

SOURCES OF UNCERTAINTY IN PROJECT DESIGN

- * FAULTY LOGIC
- * LACK OF PROPORTIONALITY
- * INEFFECTIVE MANAGEMENT
- * CONTRARY EXTERNAL FACTORS

Faulty Logic Sometimes, those most closely associated with the particular technical aspects of a project assume that this input or specialty is the critical factor which will result in the achievement of the project's goals. While there may be some substantiation for this position, usually there is more than just one missing ingredient holding back development.

Unless the intervening and/or supporting variables are also identified, such tremendous leaps in faith and logic may result in the project being inadequately designed, and/or headed in the wrong direction; tackling the symptoms of under-development rather than causes.

Some Examples of doubtful causation

| | |
|--|--|
| <u>IF</u> High Yielding Variety Seeds, | <u>THEN</u> Higher Agricultural Production |
| <u>IF</u> Contraceptives, | <u>THEN</u> Lower Birth-rates |
| <u>IF</u> Clinics, | <u>THEN</u> Better Health |
| <u>IF</u> Education, | <u>THEN</u> Higher Incomes |
| <u>IF</u> Electricity, | <u>THEN</u> Industry |
| <u>IF</u> Roads, | <u>THEN</u> Development |

Lack of Proportionality Getting the project outputs in sufficient quantity and quality, is extremely important. Many "Pilot" or "Demonstration" projects have limited success because they fail to address proportionality.

They have too much of everything at the outset when the "Model" is being developed, but insufficient (or an imbalance of) resources to replicate the model over the intended target area to achieve the Project Purpose.

Ineffective Management AID-assisted projects are amongst the most difficult to manage. Not only are the technical dimensions complex, but so are the organizational arrangements under which they must be implemented. Multiple bureaucracies, with different nationalities, cultural sensitivities, and varying levels of training and experience, must all be taken into consideration when planning a development project. AID usually undertakes projects in geographically scattered locations, in environments most lacking in support facilities, while attempting to change people's ways of living. Due care and consideration must be given to the extra managerial dimensions in such projects, and the potential for "glitches" and slippages recognized. Remember Murphy's Laws! Otherwise, unrealistic expectations will be built into the plan, which will be reflected as "Project Management Failures" during subsequent evaluations.

Contrary External Factors A project addresses only a limited number of the many factors affecting development. What may seem a positive effect in the project area by its proponents, may simultaneously be regarded as a threat by others. Exploration of the ramifications of the project impact may reveal some other factor (social, political, institutional or technical) which may require conversion or at least neutralization if the project is to succeed.

QUESTIONS IMPLICIT IN THE LOGFRAME

| <u>NARRATIVE SUMMARY</u> | <u>INDICATORS</u> | <u>MEANS OF VERIFYING</u> | <u>ASSUMPTIONS</u> |
|---|---|-------------------------------|---|
| WHY?  (NOTE: This represents one selected route of a Means-Ends Analysis)  HOW? | WHAT? HOW MUCH? WHEN? (WHERE)? | WHERE ARE DATA? | WHAT ARE OUTSIDE FACTORS? (UNCERTAINTIES)? |

DESIGN CHECKLISTGOAL LEVEL

1. The Goal statement is a single, coherent goal; it does not contain multiple objectives which are causally related.
2. The Goal is so stated that progress toward it can be verified.
3. The Goal indicators are reasonably comprehensive measures of Goal achievement.
4. Goal indicators are objectively verifiable and are targeted in terms of audience/area, quantity/quality, and time.
5. Achievement of purpose (or subgoal) together with the appropriate assumptions create the necessary and sufficient conditions to achieve the Goal.
6. Each Assumption has a strong probability of occurring.
7. Where feasible, Assumptions are stated in operational terms so that appropriate action can be taken to increase the probability of their occurring.
8. Assumptions take cognizance of other projects which immediately and directly affect the success of this project.

PURPOSE LEVEL

1. The project has a single Purpose, not a collection of sequentially linked targets clustered at the Purpose level:
or
The project has a limited number of complementary parallel Purposes whose relationships (trade-off, etc) are clearly identified.
2. The Purpose is so stated that terminal conditions for success (End of Project Status--EOPs) can be defined.
3. Purpose Indicators (EOPs) measure Purpose level achievement.
4. The EOPs Indicators are objectively verifiable, and are targeted in terms of audience/area, quantity/quality, and time.
5. The EOPs Indicators are not merely a restatement of the Outputs.
6. Given Output target dates, it is plausible that the proposed EOPs can be achieved in the targeted time span.
7. Achievement of Outputs, together with the appropriate Assumptions create the necessary and sufficient conditions to achieve the Purpose.
8. Each Assumption has a strong probability of occurring
9. Where feasible, Assumptions are stated in operational terms so that appropriate action can be taken to increase the probability of an Assumption occurring.

OUTPUT LEVEL

1. Outputs are stated functionally, as results, rather than activities.
2. All Outputs necessary for achieving the project Purpose are listed.
3. No unnecessary Outputs are listed.
4. The kind and magnitude of Outputs are so stated that progress toward them can be verified, in terms of quantity and time.
5. Provision of Inputs together with the appropriate Assumptions create the necessary and sufficient conditions to achieve the Outputs.
6. Each Assumption has a strong probability of occurring.
7. Where feasible, Assumptions are stated in operational terms so that appropriate action can be taken to increase the probability of an Assumption occurring.

INPUT LEVEL

1. Inputs are listed as activities which will produce Outputs, rather than as passive resources.
2. Input-level Indicators make clear what it will cost to achieve the Purpose (e.g. funding, staffing, equipment, other resources.)
3. The Inputs necessary for achieving project Outputs are listed.
4. It is reasonable to expect that host country managers and AID project officers transform Inputs into Outputs.
5. Input Assumptions have a strong probability of occurring.
6. Where feasible, Assumptions are stated in operational terms so that appropriate action can be taken to increase the probability of an Assumption occurring.

REQUIRED DATA

1. Baseline data has either been collected, or explicit provision has been made for its early collection in the implementation plan.
2. The Means of Verification (MOV) statements indicate where data will be found to support:
 - a. Goal level Indicators
 - b. Subgoal Indicators (if this level is used)
 - c. Purpose level Indicators
 - d. Output level Indicators
3. The MOV defines, at each level, how and from what sources hard-to-gather data or evidence will be collected.
4. The Inputs reflect the funding and for personnel requirements for any special data gathering efforts.

5. The time and cost of collecting data to support Indicators at all levels is proportionate to the nature of the project.
6. In projects which are experimental, provision has been made to collect data from a control area/group to permit comparative measurement of change in the project.

CAUSALITY AND CONSISTENCY

1. The vertical logic of the project is sound: the linkages (Input-Output, Output-Purpose, Purpose-Subgoal-Goal) are plausible both individually and cumulatively.
2. In projects concerned with institutional development, the project hierarchy differentiates between institutional capability (trained staff, budget, equipment, system, and procedures) and institutional performance (delivery of goods/services).
3. The logical framework matrix and project narrative are consistent.

REVIEWING THE LOGICAL FRAMEWORK OF A PROJECT

The key test of project design is the validity of the hypothesis

Achievement of Planned Outputs
will lead to
Achievement of Project Purpose

THIS TEST IS CONDUCTED IN FOUR STEPS:

1. TEST PROJECT PURPOSE AGAINST CONDITIONS EXPECTED

Will conditions expected at the end of the project really represent achievement of the project purpose? If these conditions are not achieved, will this be an absolute signal of project failure?

If you get a "NO" on either of these question probes, more definitive design work is required.

2. TEST OUTPUT AND PURPOSE LEVEL ASSUMPTIONS

On the basis of past experience and familiarity with local developments, are the assumptions relevant and realistic? If not, what can or should be done?

Are assumptions inclusive: i.e., do they cover the range of possible external influences which could substantially affect achievement of project purpose?

Are new inputs, or outputs needed to assure success?

3. ACHIEVEMENT OF CONDITIONS EXPECTED WITH OUTPUTS PROVIDED

Is the production of the planned outputs likely to lead to the conditions at the end of the project?

Necessary:- If any specific conditions are not going to be achieved, what (if any) changes need to be made in the project? If there an alternate strategy that could be employed? Is the alternate strategy Feasible? Desirable?

Sufficient:- Are any other actions required?

4. ATTAINMENT OF PROJECT PURPOSE

If the EOPs is attained, will the narrative statement be satisfactorily achieved? Are you convinced?

Is there an alternate strategy that could be employed

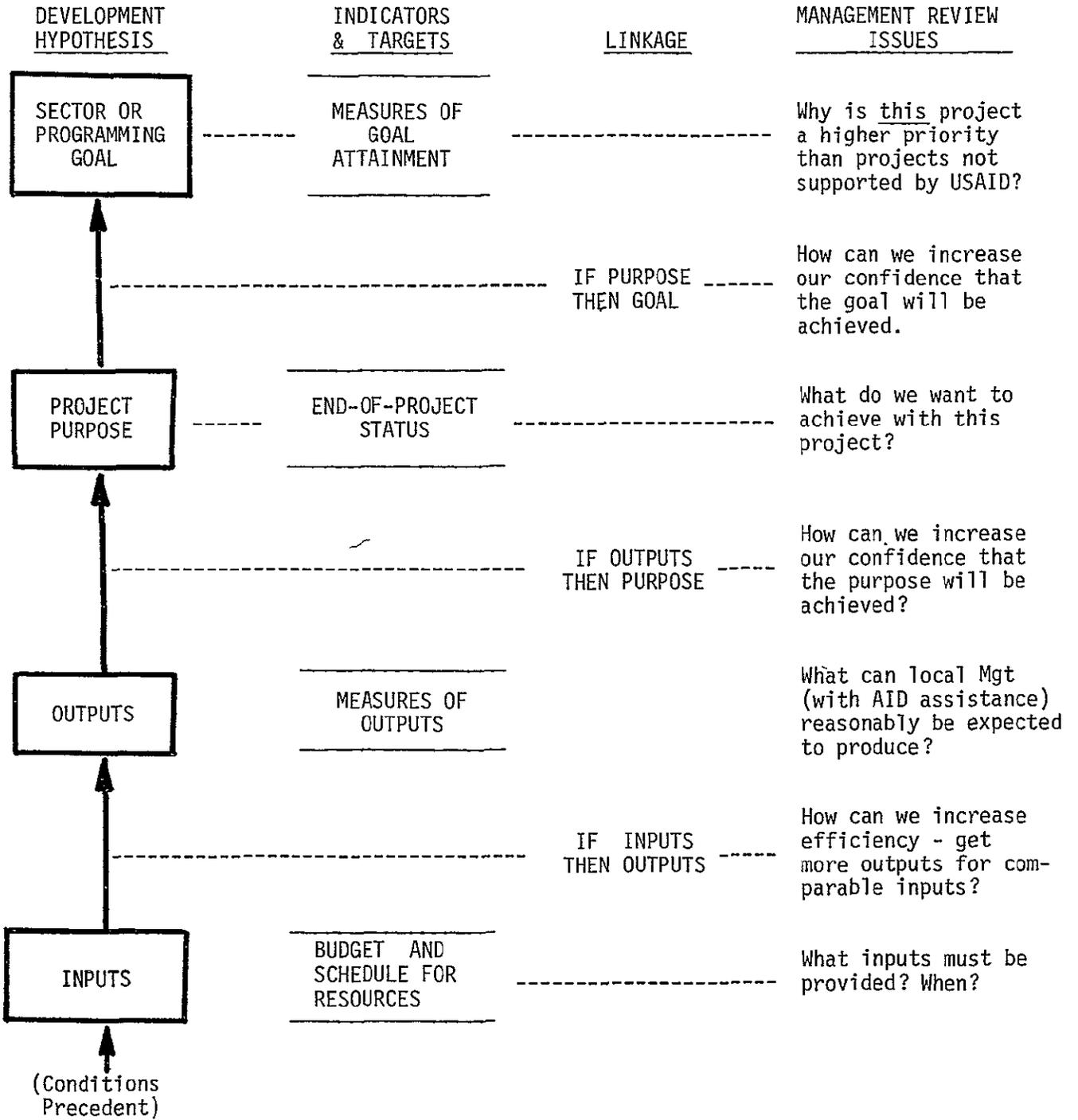
Is it feasible

Is it desirable

LOGICAL FRAMEWORK

| <u>GOAL</u> | <u>INDICATOR</u> | <u>MEANS OF VERIFICATION</u> | <u>ASSUMPTIONS</u> |
|--|---|---|--|
| <p>What is the overall reason for the project. To what national program objective will the project contribute.</p> | <p>What indicators will signal achievement of goal.</p> | <p>Specific source of data and method of obtaining it.</p> | <p>What external conditions are essential for the project to make its expected contribution to the program or sector goals?</p> |
| <u>PURPOSE</u> | <u>EOPS</u> | | |
| <p>Briefly state what the project is expected to achieve, if completed successfully and on schedule.</p> | <p>Describe the conditions or situation which will exist when the project achieves the stated purpose. Designate an identifiable point (or state) which will be the logical end of the project.</p> | <p>What are the types and sources of evidence to be used in verifying the condition marking end of project status.</p> | <p>What conditions must exist if the project is to achieve its purpose. What are the factors over which the project personnel have little or no control, but which if not present, are likely to restrict progress from Output to Purpose achievement.</p> |
| <u>OUTPUTS</u> | | | |
| <p>What are the major kinds of results that can be expected from good management of the inputs?</p> | <p>What are the specific cumulative targeted indicators for each of the planned outputs. (i.e. How much of What, for Whom, by When)</p> | <p>What are the specific sources of data for each of the indicators, and how are the data going to be obtained? If it doesn't already exist, make provision for funding it under Inputs, and require it as a condition, precedent, or as a separate output.</p> | <p>What external factors must be realized to obtain planned outputs on schedule.</p> |
| <u>INPUTS</u> | | | |
| <p>What are the key inputs by the U.S. - Other Donors - Cooperating Country</p> | <p>For each category of inputs identify the quantity and/or \$ value, by year</p> | <p>Specify source documents (records, reports, etc.)</p> | <p>Identify Conditions Precedent to Project Implementation for both AID and Host Government</p> |

REVIEWING THE LOGICAL FRAMEWORK OF
A DEVELOPMENT PROJECT



CHECKLIST FOR REVIEWING A LOGFRAME

1. PROJECT PURPOSE
 - a. Does the project deal with a major problem in the country? If not, what changes would you make?
 - b. Is the statement confined to a single objective without combining cause and effect?
2. PROGRAM GOAL
 - a. Will achievement of the Purpose contribute to an explicit aspect of the national development plan, or policy?
 - b. Will an identified group of poor people benefit?
3. HYPOTHESES
 - a. Does the series of "If-Then" hypotheses in the linkages (Input to Output, Output to Purpose, Purpose to sub-Goal, and sub-Goal to Goal) appear probable. If unlikely, make changes in the inputs, outputs, or assumptions to improve chances for success.
4. ASSUMPTIONS
 - a. Are any more assumptions necessary to assure delivery of Inputs, production of Outputs, or attainment of Purpose and Goal?
 - b. Do the assumptions adequately describe the external conditions which will affect success or failure?
 - c. Does the project look doubtful? Should some assumptions become a part of the project, as new Outputs or Inputs; or even a new Project?
5. INDICATOR TEST
 - a. Is each indicator plausible, independent, objective and targeted?
 - b. When taken together do the several indicators for a target measure all important aspects of the target? Look especially at EOPs.
6. MEANS OF VERIFICATION
 - a. Does each indicator have a source for data? Is the source reasonable?
 - b. Is there a better way to get any of the data?

MODIFICATIONS TO THE LOGICAL FRAMEWORK

This section displays several modifications to the logical framework matrix format which have grown out of operational experience. These modifications do not alter the basic logical framework concepts.

They are displayed here for two reasons:

- they may have learning value for program and project staff by clarifying one or another aspect of the logical framework concept.
- they may be useful to planners and/or evaluators as informal worksheets to be used in analyzing project design.

The modifications may be used singly or in combination; for instance, if the project planner/evaluator is concerned with the assumptions (external factors) affecting her/his project(s), he may want to combine modification #1 and modification #4. If the Mission finds that a modified logical framework is more effective than the standard matrix format for communicating with AID/W, this is acceptable.

MODIFICATION #1 - VERIFICATION OF ASSUMPTIONS

Modification #1 of the logical framework, shown below, provides an added column for clarifying and elaborating the assumptions (external factors and circumstances) which affect the causative linkages. Entries in this column can be used to:

- (a) verify the validity of the assumption
- (b) weigh the importance (or criticality) of the assumption,
- (c) assess changes in the status of the assumption,
- (d) suggest actions which could increase the probability that the assumption would be realized, and/or
- (e) specify the need for further study of the assumption.

Assumptions should be made as explicit as possible and should be stated in operational terms. This may permit the planner to take steps calculated to reduce uncertainty; increase control and, where possible, move the assumption within the scope of the project design.

Modification #1 may be usefully combined with Modification #4.

| IMPORTANT ASSUMPTIONS | MEANS OF VERIFYING ASSUMPTIONS |
|---|--------------------------------|
| Assumptions for achieving goal targets: | |

Modification #2 - Insertion of an Additional Row(s) in the Vertical Hierarchy of Objectives

Modification #2, below, is intended to accommodate one or more intermediate levels in the vertical hierarchy of objectives. Such an intermediate or sub-level might be:

Intermediate Output between Input and final Output levels,

Subsector Goal between project Purpose and sector Goal
(see example).

NOTE: that the setting of Goals (subsector, sector, program) is not normally the responsibility of project management, but rather of those to whom the project personnel report. (This applies to both the host country and the donor agency).

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS |
|---|---|
| Program or Sector Goal: The broader objective to which this project contributes: | Measures of Goal Achievement: |
| Subsector Goal: | Measures of Goal Achievement: |
| Project Purpose: | Conditions that will indicate purpose has been achieved: End of Project status. |

Modification #3 - Insertion of an Additional Column for Specific Targets

Modification #3, spells out in explicit detail, (new column 3) the actual targets measured by each Objectively Verifiable Indicator. It thus simultaneously elaborates the narrative statement of target contained in column 1 and states the final result as reflected by each Indicator.

It is important to understand and preserve the distinction between a scheduling device and a listing of interim planned targets. Scheduling of project Inputs, actions, events and Outputs is accomplished in the Project Implementation Plans (PERT network). Modification #3 permits a statement of interim planned targets and their estimated dates of completion. Modification #3 should tie in with any scheduling device used by the project management team.

The grid shown in Modification #5 can be usefully applied in Modification #3, column 3. An example of this usage is shown below.

For example:

| <u>COLUMN 1</u> | <u>COLUMN 2</u> | <u>COLUMN 3</u> | | | |
|--|---|--|-------------|-------------|------------------------------|
| Narrative Summary | Objectively Verifiable Indicators | Specific Targets | | | |
| | | <u>FY80</u> | <u>FY81</u> | <u>FY82</u> | <u>FY83</u> |
| Improve the food consumption habits and nutritional intake of low-income population. | a. Mothers enrolled in MCH program conform to nutritional requirements. | a. All women receiving food are either pregnant or lactating mothers with demonstrable nutritional need. | | | |
| | b. Percentage of children receiving food. | b. 25 | 50 | 75 | 100 |
| | c. Percentage of MCH foods produced locally. | c. 0 | 0 | 15 | 25 (to reach 60% by 1988) |
| | d. Number of farmers using production packages (in 000s) | d. | | | |
| | (1) Cuy | (1) 0 | 1 | 5 | 10 |
| | (2) Quinoa | (2) 0 | 0 | 2 | 7 |
| | (3) Legumes | (3) 0 | 0 | 0 | 5 |

Modification #4 - Relation of Assumptions to Causative Linkage

Modification #4, below, recognizes that planning Assumptions directly influence the Viability of a causative linkage rather than the target itself. The split-level arrangement of columns 3 and 4 accomodates this relationship.

Modification #4 may be usefully combined with Modification #1.

| MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|-----------------------|---|
| <u>GOAL:</u> | Assumptions About Linkage Between Project Purpose and Program-Sector Goal |
| <u>PURPOSE:</u> | |
| <u>OUTPUT:</u> | Assumptions About Linkage Between Outputs and Project Purpose |
| <u>INPUT:</u> | Assumptions About Linkage Between Inputs and Outputs |
| | |

Modification #5 -- Input-Output or Cost-Benefit Comparisons

Modification #5 facilitates the comparison of inputs/costs during any period with corresponding indicators of outputs/benefits. It also permits comparison upwards to the purpose level if such a comparison is considered meaningful and desirable. This grid can also be used in Modification #3.

EXAMPLE:

| <u>NARRATIVE</u> | <u>INDICATORS</u> | | | | |
|---|---|------|------|------|------|
| Project Purpose: | Conditions that will indicate purpose has been achieved: End of project status. | | | | |
| Create a Viable Agricultural College which can effectively contribute to agriculture development goals. | | '72* | '73 | '74 | '75 |
| | Qualified Grads/Yr | 20 | 70 | 100 | 150 |
| | Number of Farm Visits | 2000 | 3000 | 3500 | 3500 |
| | Research Reports | 20 | 25 | 30 | 35 |
| | % Operating Budget Covered | 20 | 50 | 70 | 100 |
| Outputs: | Magnitude of Outputs: | | | | |
| Professors & Research Fellows | 22 | 25 | 30 | 30 | |
| Buildings | 3 | 5 | 7 | 7 | |
| Laboratories | 1 | 4 | 8 | 8 | |
| Library Services (000 Vols.) | 10 | 12 | 16 | 17 | |
| Extension Technicians | 10 | 15 | 15 | 15 | |
| Inputs: | Implementation Target (Type & Quantity) | | | | |
| Participant Training | NO/(\$000) | 7/70 | 7/70 | 5/50 | 2/20 |
| Technical Advisors | NO/(\$000) | 2/80 | 2/80 | 1/40 | 1/40 |
| Other (Commodities, Etc.) | (\$000) | 50 | 30 | 20 | 10 |
| Total Aid | (\$000) | 200 | 180 | 110 | 70 |
| Total IDP | (\$000) | | | 500 | |
| Total Host Country | (\$000) | 450 | 500 | 500 | 500 |
| Grand Total | (\$000) | 650 | 680 | 1110 | 570 |

Modification #6 and #7 - Evaluation of Benefit Incidence

Modification #6 and #7 are designed to distinguish between the nature of the benefits created by the project (i.e., increased output of goods and services and the benefit incidence (i.e., those people who participate in the production and/or consumption of those benefits). The groups to whom the benefits are intended to accrue (target groups) should be identified by income, geographic, or other relevant socio-economic descriptors.

EXAMPLE:
Mod. #6

| Indicators of Progress/Performance (Benefit) | Indicators of Benefit Income (Beneficiaries) |
|---|--|
| Increase in wheat production of _____ metric tons/year since 1980. | B% of lower income persons (under X pesos year) able to purchase Y kilo of wheat products (bread, flour, etc) per week as compared to A% in 1980. |
| Annual increase in hospital beds of _____ since 1980. | Annual increase of hospital admissions of target low income persons of _____ since 1980. |
| Increased revenues in agricultural production sector of _____ pesos/year from 1980 to 1985. | _____ % of low income farm families in Northwest province receive no less than _____ % annual increase in real income from cash crops from 1980 to 1985. |

Two classes of benefits and beneficiencies should be considered:

- (1) Benefits generated by the construction/maintenance/operation of a facility or service, usually accruing to people employed for these purposes; and
- (2) Benefits accruing to those who obtain access to the facility or services created (school children, clinic patients, owners of land brought under irrigation or connected to market by a feeder road).

EXAMPLE:
Mod. #7

| OBJECTIVELY VERIFIABLE INDICATOR COLUMN |
|---|
| a. <u>Progress/Benefit:</u> b. <u>Benefit Incidence/Beneficiary:</u> |

Modification #8 - Logical Framework Showing Both Project Design (Original Plan)
and Evaluation (Current Status)

Modification #8 differs in that it permits the evaluator to display and measure change by recording the original objectives, indicators and planning assumptions and comparing these against the assumptions and actual status existing at the time of the evaluation.

This modification was developed for use in evaluating capital projects either during their implementation stage or after completion. It can also be used on noncapital projects.

Note - that this matrix also embodies modification #4 and #6.

EVALUATION SUMMARY - CAPITAL PROJECTS

Column 1 = Narrative.

| ORIGINAL PLAN | | | CURRENT STATUS | | |
|---|---|--|---|---|---|
| 2 Objectively Verifiable Indicators | | | 5 Actual Progress in terms of Objectively Verifiable Indicators | | |
| a Indicators of Progress Toward Planned Targets | b Indicators of Benefit Incidence, Employment, Income Distribution, Social Equity, etc. | 3. Planning Assumptions | 4. Changes in Assumptions And Circumstances | a Indicators of Progress Toward Planned Targets | b Indicators of Benefit Incidence, Employment, Income Distribution, Social Equity, etc. |
| Measures of Goal Achievement | Measures of Benefit Incidence at Goal Level | Original Assumptions Affecting Linkage between Project Purpose and Sector Program Goal | Changes Affecting the Linkage between Project Purpose and Sector Program Goal | Contribution of Project to Sector Program Goal: | Benefit Incidence at Goal Level |
| Conditions Expected at End of Project: | Indicators of Benefit Incidence Expected at End of Project | Original Assumptions Affecting Linkage between Project Outputs and Project Purpose | Changes Affecting the Linkage between Project Outputs and Project Purpose | Progress toward Project Purpose | Benefit Incidence at Project Purpose Level: |
| Magnitudes of Outputs: | Indicators of Benefit Incidence Expected at Output Level. | | | Progress Toward Output Targets: | Benefit Incidence at Output Level |

S C H E D U L I N G -

A N O V E R V I E W *

* For a fuller treatment of this topic, see the Training Guide for USAID Project Operating Support Systems, (AID, Dec 77)

IMPLEMENTATION PLANS

Although some Project Papers may contain considerable detail, they tend to deal more with general design than detailed tactics and schedules. However, specific plans of action are needed.

A draft Project Implementation Plan should be prepared in the early stages of project design, and updated in conjunction with preparation of the bilateral Project Agreement. The plan should identify the work schedule and certain output indicators, as well as such key inputs as personnel, participants, and commodity requirements. The progress of a project toward its established targets will be measured against these output indicators. Some projects, such as those of an advisory or institution-building nature, do not readily lend themselves to quantitative measures. However, even in these cases, it should be possible to provide some defined steps or sequence of events, interrelationship or forms of behavior which can be monitored and objectively verified as evidence of achievement.

The documentation for implementation of loans is usually more complex than for grant projects. In part, this difference reflects the fact that the cooperating government is more directly responsible for implementation, and a loan may involve various conditions precedent and periodic guidance through implementation Letters each with its own specified reports. A loan may also depend heavily on technical implementation plans prepared by engineering or management consultant firms.

Whatever the formats and whoever the authors, the totality of the implementation plans should make the interim and final objectives clear so that progress and completion can be observed and evaluated.

SCHEDULING FOR PLANNING & CONTROL

Once specific objectives are established, all project managers should:

- o Identify all major activities required to meet the end objectives.
- o Pinpoint complex organizational and technical interrelationships (or constraints) among these activities.
- o Predict the outcome (in time and cost) of executing all activities with reasonable degree of certainty.
- o Allocate limited resources in the best possible manner.
- o Establish the ability to monitor and update project status information during implementation.
- o Identify opportunities for trade offs among costs, lead time, risk, etc.

There are several graphic techniques for assisting the project management staff in performing the above functions.

The two most commonly used are "Bar Charts" and "Networks". They can be used in a complementary manner since each has inherent weaknesses which are offset by the other's strengths.

THE BAR CHART

The Bar Chart (also known as a Gantt Chart) is probably the simplest, most familiar and most widely used technique for planning and scheduling. It comes in a variety of forms and degrees of complexity; and can be built up into quite a formidable graphic presentation of a project, depicting inputs of time, money and other resources.

Advantages

- * Looks simple
- * Neat appearance
- * Easy to draft
- * Schedule is time-scaled
- * Progress can be estimated by percentages
- * Can be reduced in size
- * Familiar to most people

Disadvantages

- * Oversimplified
- * Percentages often meaningless
- * Activities often vague/ambiguous
- * "Critical" events not shown
- * Interrelationships not shown
- * Difficult to check accuracy
- * Difficult to update



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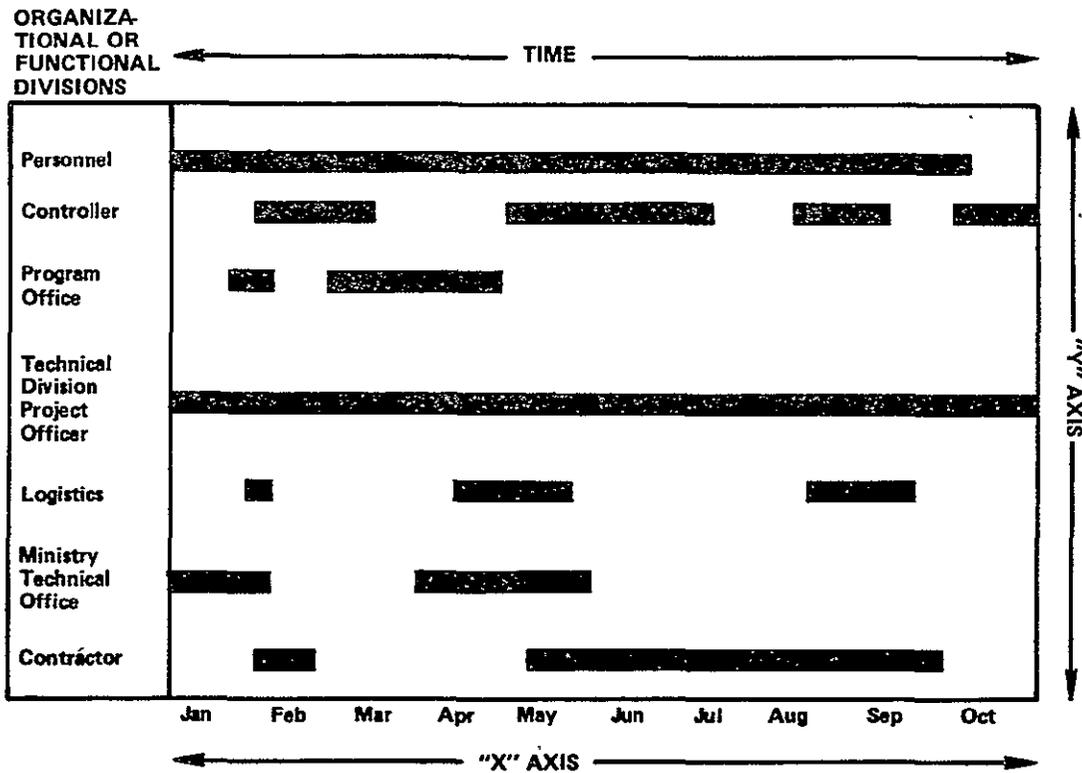
Preparation

Generally, the major functional or organizational divisions of a project are identified on the left hand "stub" (or "Y" Axis) of the chart, while the "X" Axis is a time scale for the anticipated life of the project. (It is also useful to add a few extra time units to allow for delays during the project implementation, and subsequent rescheduling).

The required time to perform various activities in each area of work is estimated; the interrelationships with other areas of work discussed and "coordinated"; then each activity is scheduled by being drawn to scale on the chart, as a bar.

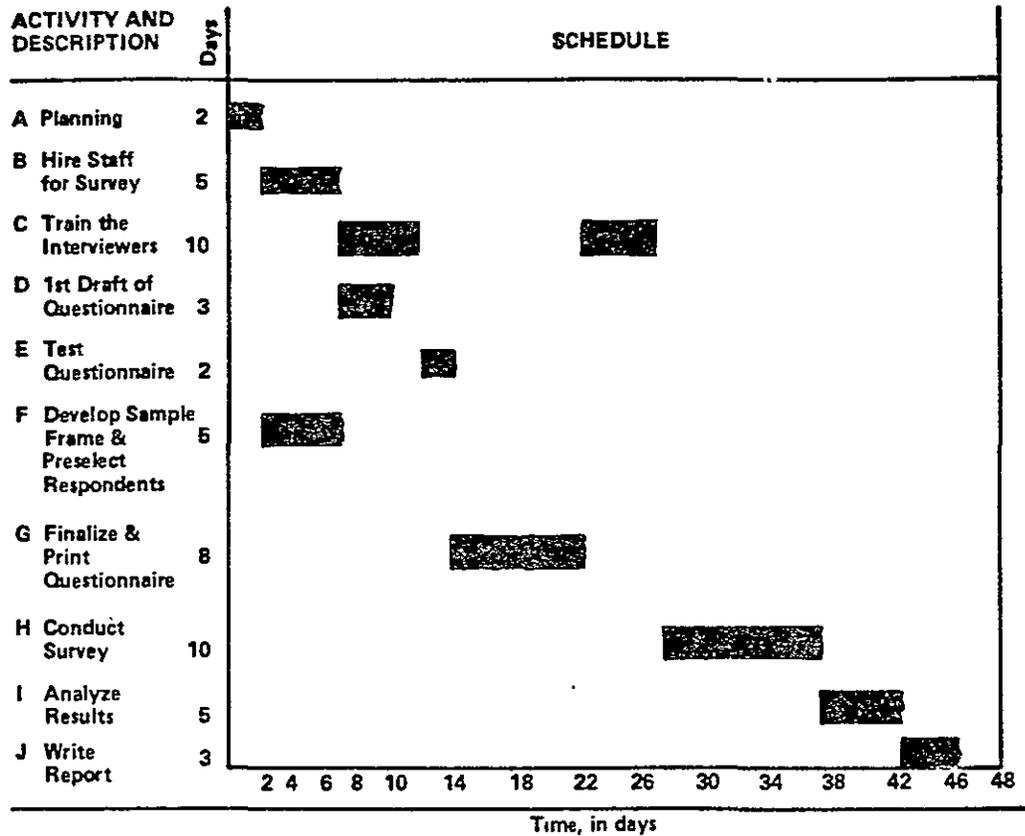
Such a chart can be prepared fairly rapidly, looks impressive, and can be extremely useful as a visual aid in discussions and briefings. Sometimes, upon closer analysis, however, the chart reveals very little substantive project information, as the detailed tasks are not identified -- but merely the time periods when different divisions have agreed to be working on various elements of the project. Although often submitted as part of project documentation, this particular chart below is practically useless for anyone trying to get an understanding of the project's substance.

BAR CHART



A much more useful type of Gantt Chart is shown below, outlining the major steps in a project; in this instance planning and conducting a survey.

BAR CHART FOR CONDUCTING A SURVEY



Although the bar chart looks simple in its finished format, this is deceptive. Its preparation is the result of a complex, coordinating process, and may take several revisions before you arrive at a satisfactory final product.

THE MILESTONE CHART

The "Milestone" Chart is an incremental improvement upon the Bar Chart. Its unique characteristic is the Milestone -- a specific, significant checkpoint in the project which can be used for progress reporting. Some of these may concern only the project manager, while others may be classed as "Critical" events of interest also to the Program Office, Mission Director and AID/W.

Advantages

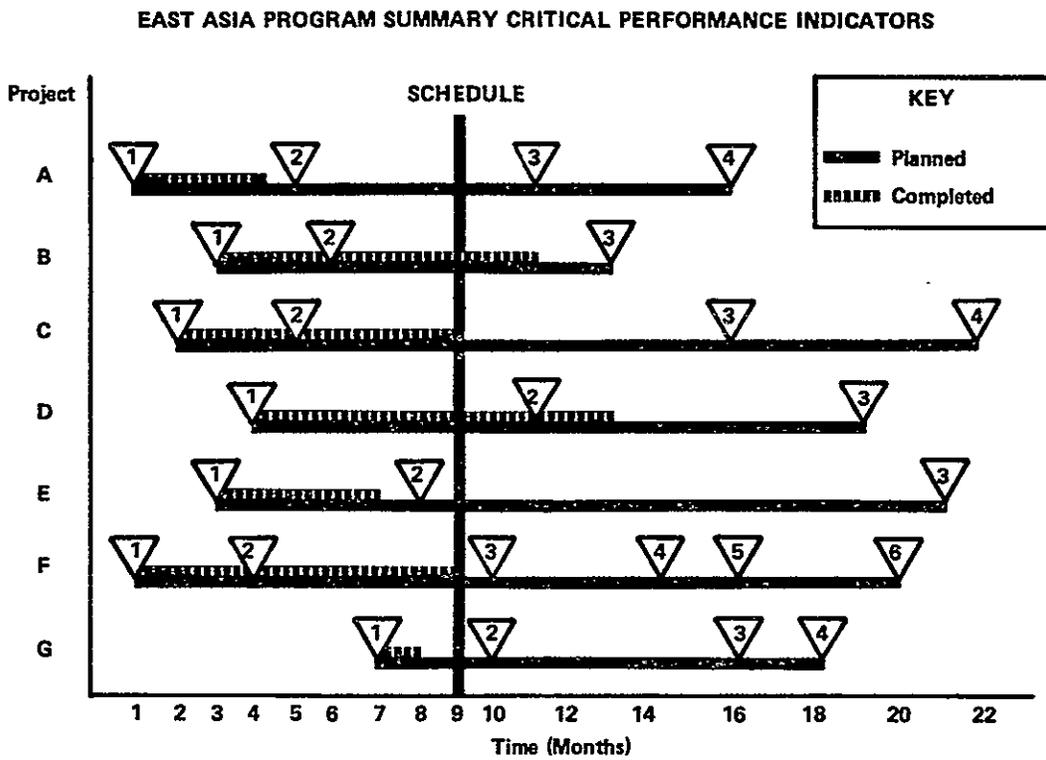
- * Looks simple
- * Neat appearance
- * Easy to draft
- * Schedule is time-scaled
- * Identifies "Critical" events
- * Progress can be estimated by percentages
- * Can be reduced in size
- * Familiar to many people
- * Easy to understand
- * Provides a structured reporting system for management during implementation

Disadvantages

- * Oversimplified
- * Percentages often meaningless
- * Activities often vague/ambiguous
- * Interrelationships not shown
- * Difficult to check accuracy
- * Difficult to update

THE MILESTONE CHART

Milestone Charts can be used for monitoring complex single projects; or for several projects simultaneously by reducing each project to a single bar with the milestones, as illustrated below.



NETWORKING

A giant leap forward in the art of project planning and scheduling techniques was made in the late 1950's with the development of the Program Evaluation and Review Technique; or PERT Networking as it is more generally known. Building upon the milestone charts, four major innovations were introduced which are significant to us.

1. Elimination of the Matrix format of the Bar and Milestone Charts. Replaced by a free-form NETWORK which can be (but is not necessarily) time-scaled.
2. Addition of a dotted line - - - connecting the "Complete" milestone of an activity to the "Start" milestone of subsequent activities; and between "Interface" milestones.
3. Description of the activities directly on the bars instead of on the left hand "Stub".
4. A formal methodology for calculating activity times, analyzing project schedules, bottlenecks, and relative priorities for management attention.

These features will be discussed more fully on the following pages.

Advantages

- * Simplifies scheduling of complex projects
- * Interrelationships shown
- * Encourages collaboration in design
- * Clarifies individual and joint project responsibilities
- * "Critical Indicators" shown
- * Permits rapid overall program analysis
- * Impact of activity changes can be rapidly assessed
- * Points up potential schedule slippages before the fact
- * Indicates the significance of current slippages on future events
- * Time-scaling unnecessary for analysis
- * Provides a structured reporting system for management during implementation
- * Easy to update
- * Percentage of completion can be calculated

Disadvantages

- * Looks complicated & mathematically oriented
- * Unfamiliar to many
- * Technical "language" barrier
- * Short-course formal training required
- * Untidy appearance
- * Chart reduction difficult (unless coded)

Definitions

Along with the preceding innovations, PERT introduced a new "language". Some of the terms are merely different words for familiar ones. Others, however, are used to define new concepts.

* NETWORK

A network is the project plan in graphic form. It is entirely different from the standard matrix bar/milestone chart, and consists of two symbols, Circles and Arrows, called respectively, "Events" and "Activities".

* EVENTS

Events are merely another name for "milestones" or "Critical Indicators", and are thus check points in the project where things can be identified specifically as having occurred. Events consume neither time nor resources. They are usually identified as "Start", "Complete", or "Transfer Responsibility" points. Although most often drawn as circles, they can also be shown as squares, rectangles, triangles, etc., to distinguish between different organizational responsibilities.

* ACTIVITIES

Another already familiar term -- activities are time-consuming tasks in the project. A slight change from the Gantt & Milestone Charts -- instead of bars, PERT uses arrows. The tail of the arrow represents the start of the activity, and the head its completion. A major change -- usually activities are not time-scaled. Thus, the length of the arrow has no meaning.

* DUMMY ACTIVITIES

This is a new concept. A dummy activity is the dotted arrow between two events (milestones). It represents the logical relationship (dependency or constraint) between the events that was assumed in the milestone chart, but never recorded. Dummies are not used to represent actual work activities or periods of elapsed time. They merely show linkages between one event and another.

* LEAD TIME ACTIVITY

A familiar concept, but diagrammed for the first time, it is indicated by a "Hairpin" curve arrow. A lead time arrow can be used where a period of time must be blocked off for scheduling purposes, even though no project activity is taking place (such as waiting 30 days for contractor bids, project stand-down during the rainy season, etc.). It can also be used for an activity which requires a fixed period of time to complete. For example, standardized procurement and programming lead-times, budget review cycles, or participant training. Again, the arrow is not usually time-scaled.

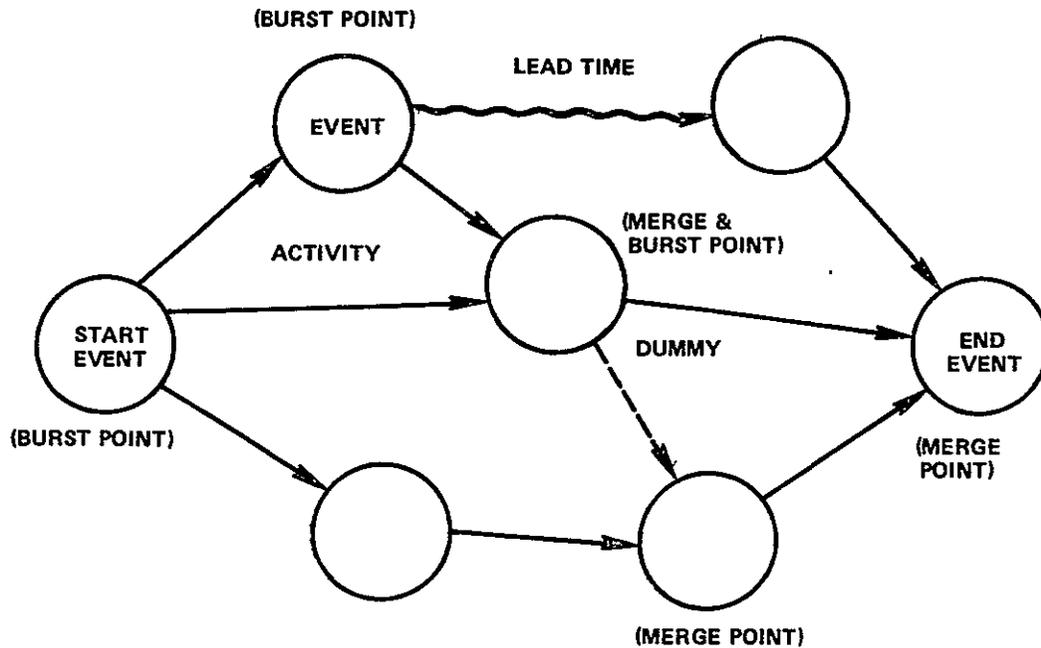
* MERGE POINT

A new concept -- where more than one activity terminates in an event.

* BURST POINT -- A new concept -- where more than one activity originates from an event

* CODING - A lettering system so that each event is uniquely identified.

SAMPLE PERT NETWORK

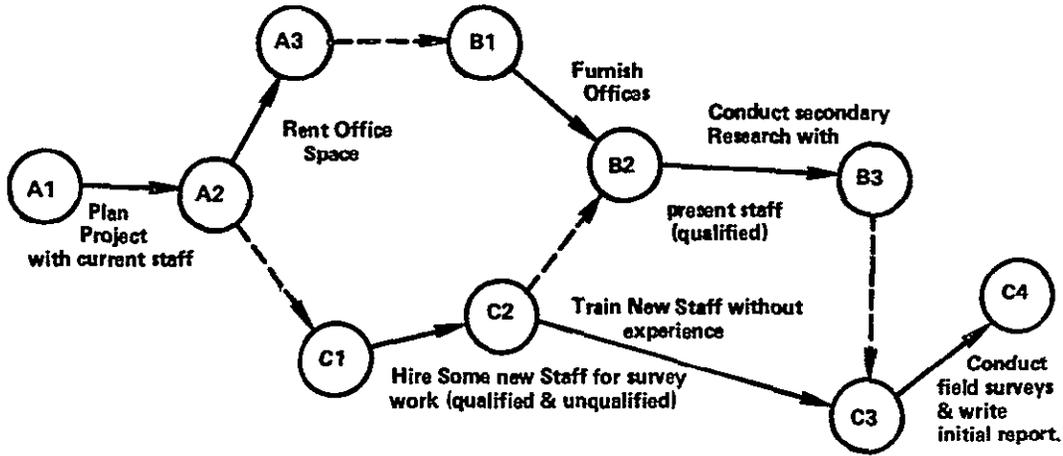
Points to Note

The network above illustrates the four principal symbols used in a PERT network. It should be particularly noted that:

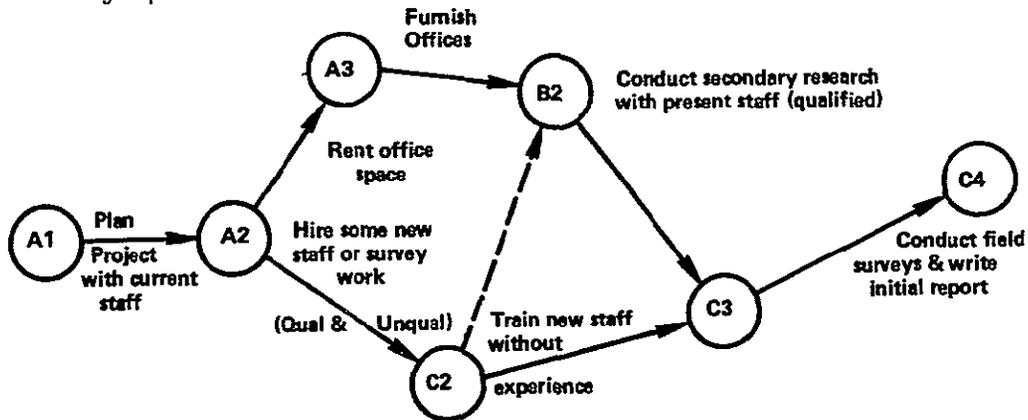
- * A Network originates from a single event
- * A Network terminates in a single event
- * Flow of activity is from left to right
- * There are no "loops" or backward passes
- * The length of the arrow has no meaning

The example used earlier in the milestone chart is presented in a network format on the following page:

MILESTONE CHART TO PERT NETWORK
 Networking eliminating "Stub" and
 Time Scale, and describing activities

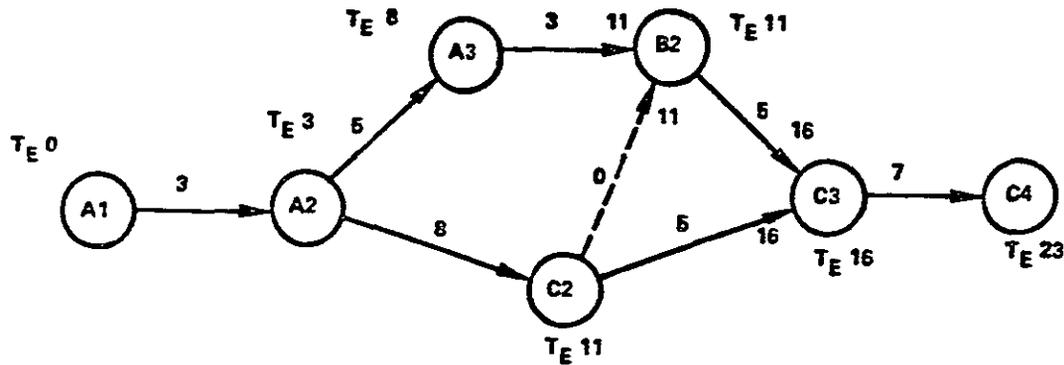


Here, the "stub" activity classification has been abolished, and also the time scale. The network is developed "free-form", but maintain the sequencing flow from left to right. Note: Since there is no relationship between Events B-1 and C-1, it should not be implied that C-1 occurs before B-1 merely because it is plotted to the left of B-1. The flow of arrows is the only determinant of sequence. Thus C-2 must occur before B-2. Furthermore, the activities themselves are described in more detail, because the events only represent "Start", "Complete" or "Transfer Responsibility" points.



Since the activity "Furnish Offices" cannot start until the office space has been rented, the event B-1 "Start" to furnish offices is unnecessary detail which can be implied from the preceding event A-3 "Complete" renting office space. Similarly, C-3 is the "Start" of field survey work, to be done by the entire staff. Therefore B-3 can be implied by the head of the arrow from B-2 to C-3 without any loss of comprehension. Occasionally additional events and dummies are inserted for more precision and clarity -- especially when activities are being done by different groups of people, to insure that the transfer of responsibility points are clearly identified.

MILESTONE CHART TO PERT NETWORK

Estimating Time for Scheduling
Activities

In Networking, activity time estimates are developed after sequencing; separately from the scheduling process. (Since we used a prescheduled milestone chart as the base of this network, there is no difference in the activity times). Because the network is not time-scaled, the Earliest Time it is feasible to complete an Event (T_E) is calculated and recorded near the circle.

This represents the complete transition from Milestone Chart to Network.

Summary

You may wonder why networks are considered preferable to the milestone charts they replaced. They certainly look more complicated, and less orderly. The answer is that they are much easier to prepare, especially on complex projects; and once prepared, a lot more information can be derived from them.

Admittedly, networks take some getting used to. They are untidy and confusing for reports and presentations -- especially if your boss doesn't understand the language and is puzzled because on the chart the "7 week" activity arrow is drawn shorter than the "5 week" one! Nevertheless, to an analytical manager, the network is unexcelled for developing a meaningful picture of a project and keeping track of it as changes occur during implementation.

NETWORK CALCULATIONS AND ANALYSIS

This network illustrates the principal calculations made with a network, and the information which is available to management for analysis and possible rescheduling.

The t_e is the estimated elapsed time for a specific activity (task)

T_E is the earliest time an Event (circle, milestone, checkpoint) can be completed. It is obtained by cumulative addition of t_e 's in a sequential "path". Note: at a "Merge Event" ("E" for example) the T_E is the highest cumulative t_e of the paths leading to the event, as shown on the arrow heads.

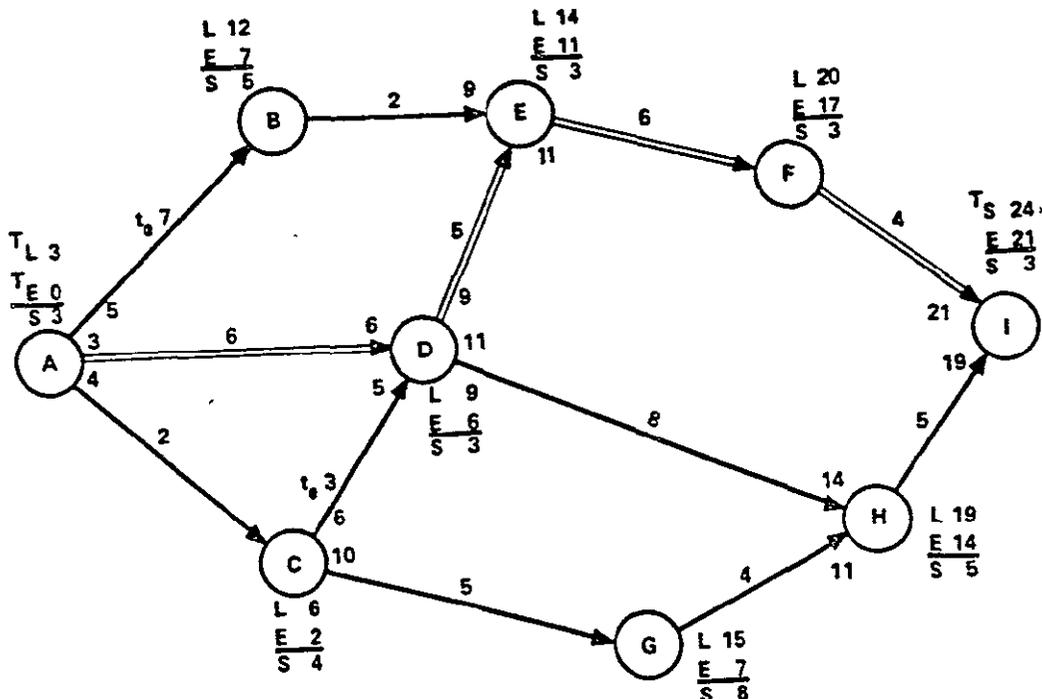
T_L is the latest time an event can be completed, and still meet the overall target date for project completion.

It is calculated by starting at the last event in the network with the T_S (Project Completion Target Date). Working backwards along each sequential path, subtract the t_e from the T_S to obtain the T_L for the event at the beginning of the arrow. For events other than the last one in the network, subtract from the T_E . Note: at a "Burst Event" (such as "D" in the illustration below) the T_L for the event is the smallest of the paths leading from the event, as shown on the arrow tails.

T_S is the overall project Scheduled Time, or target date for completion of the project. This is not usually calculated, but is more often assigned to the project manager by a higher level of management.

S is "Event Slack"-- the spare time available to complete an activity, and the event which marks its termination. It is calculated by subtracting the T_E from the T_L .

The Critical Path (shown by the double line) is the series of activities in the Network which is the longest sequence in the network. This is the shortest time in which the overall project can be completed.



NETWORK TIME-SCALING

Although time-scaling is not necessary in PERT-ing, many managers prefer to have a time-scaled network -- at least to start the project. However, do not attempt to prepare a time-scaled network of a project until you have developed a non-scalar network. The logic of the network and the time estimates for the activities should be done as two separate tasks.

Networks can be plotted based on their event T_E 's or T_L 's. The T_E plot will show the earliest time that each activity can be completed, and any spare activity time - known as Free Float. The T_L plot will show the latest time that each activity can start, and each event completed, in order to complete the project on schedule.

The T_E network is usually preferred by a project manager who is closely involved and trying to expedite day-to-day operations. The T_L network is usually preferred by a "rear echelon" manager who is more concerned with monitoring overall deadlines and project status.

Advantages

- * Easier to understand than non-scalar network
- * Free float shown graphically on T_E network
- * Useful for scheduling, estimating resource requirements and highlighting key events

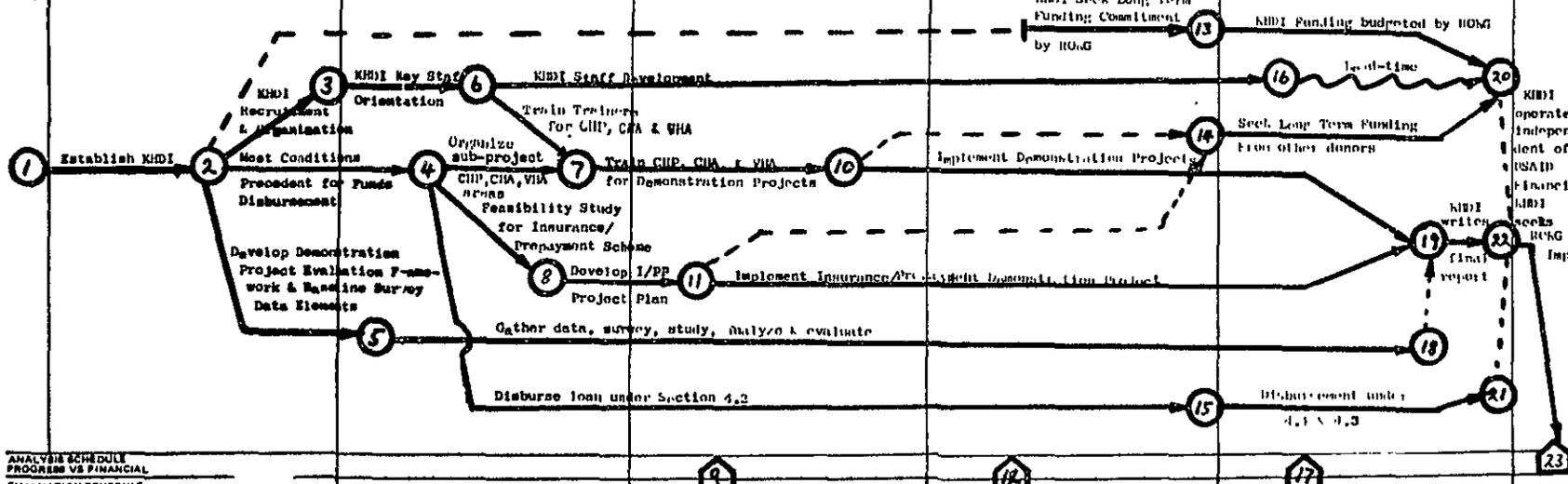
Disadvantages

- * Time consuming initial plotting and drafting effort
- * Updating cumbersome -- network must be redrafted each time actual activities/events differ from plan
- * T_L 's not shown on T_E network
- * T_E 's not shown on T_L network

LOAN # 481-4-072
 COUNTRY: KOREA PROJECT NO: 481-22-50-710 PROJECT TITLE: KOREA HEALTH DEMONSTRATION Loan Project DATE: JAN 77 ORIGINAL REVISION # 1 APPROVED: KENNETH A. SMITH, ASST. G.D.O. MANAGEMENT SYSTEMS ADVISOR USAID/KORR

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 MONTH: 0 7 12 14 16 18 21 22 24 27 28 33 36 40 48 51 52 57 60 72

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 PHASE II: SUCCESSFUL DEMONSTRATION ORGANIZATION RESEARCH, DEVELOPMENT, TEST & EVALUATION DEMONSTRATION (SUCCESSFUL) DISSEMINATION



ANALYSIS SCHEDULE
 PROGRESS VS FINANCIAL
 EVALUATION SCHEDULE

CRITICAL PERFORMANCE INDICATOR (CPI) NETWORK

AID 1828-36 (2-76)

ACTIVITY PRECEDENCE DIAGRAMMING (APD)

Advantages

- * Easy to develop
- * Interrelationships shown
- * Impact of activity changes can be rapidly assessed
- * Time-scaling unnecessary for analysis
- * Easy to update

Disadvantages

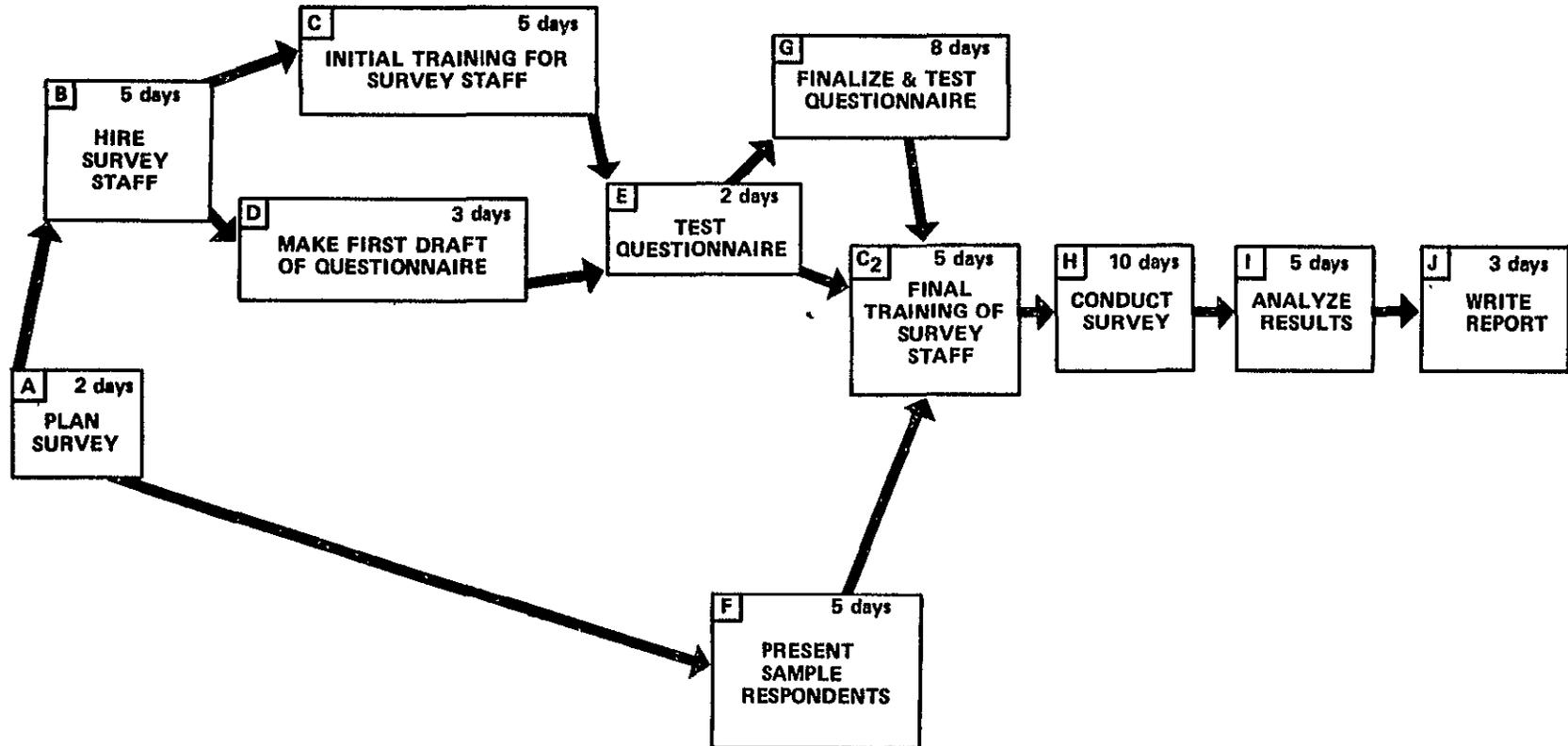
- * Critical Performance Indicators, milestones/events not shown
- * Time-scaling cumbersome (unless coded)
- * Untidy appearance
- * Looks complicated

The Activity Precedence Diagram (APD) is another "Networking" technique for project management use. The major difference between APD and PERT is that with APD the "Activities" are the blocks instead of the arrow. This minor change in technique considerably simplifies the process of developing a project network.¹ However, as with the Gantt Chart, specific Critical Performance Indicators, Milestones/Events are not depicted, but have to be inferred, which complicates reporting to the Program Office and AID/W.

To develop the Precedence Diagram, many people use a 3" x 5" card for each activity. By spreading these out on a large sheet of paper on a conference table the activities can be rearranged until a satisfactory sequence and layout is obtained. The interdependencies can then be sketched in. This approach saves a lot of drafting and redrafting time and effort, and also encourages active participation by others in the planning and design process.

1 NOTE: The proponents of APD often claim that their version of networking is simpler than PERT-ing because the "dummy activities" have been eliminated, but this is incorrect. The APD network is undoubtedly simpler. However, what has been eliminated are Events and the necessity to explain the meaning of "dummy" because its symbol has been changed. Actually all the arrows in a Precedence Diagram are dummy activities. This simplification carries with it both advantages (particularly in learning) and drawbacks (in reporting).

ACTIVITY PRECEDENCE DIAGRAM FOR CONDUCTING A SURVEY
INITIAL LAYOUT (NON-SCALAR)



THE A I D E V A L U A T I O N
P R O C E S S

E V A L U A T I O N -
THE RETROSPECTIVE MEASUREMENT AND ANALYSIS
OF THE RESULTS OF A DEVELOPMENT PROJECT

AID'S EVALUATION MANDATE

It is AID policy to utilize evaluation as a fully integrated instrument of program policy and management. All forms of development assistance are required to be evaluated, and the evaluation findings utilized to improve the quality, effectiveness and impact of that assistance.

Section 125 of the Foreign Assistance Act directs the AID Administrator to improve the assessment of AID programs and projects, and Section 621A requires that

"A management system be established that includes: the definition of objectives and programs for United States foreign assistance; the development of quantitative indicators or progress toward these objectives; the orderly consideration of alternative means for accomplishing such objectives; and the adoption of methods for comparing actual results of programs and projects with those anticipated when they were undertaken. The system should provide information to the Agency and to Congress that relates Agency resources, expenditures, and budget projections to such objectives and results in order to assist in the evaluation of program performance, the review of budgetary requests, and the setting of program priorities."

Section 634 requires an annual report to Congress so that:

"The Congress and the American people may be better and more currently informed regarding U.S. development policy, including the amounts and effectiveness provided by the U.S. Government to developing countries. The report is to include, inter alia, a comprehensive and coordinated review of all United States policies and programs having a major impact on the well-being of the poor majority in developing countries."

Within the executive branch, the Office of Management and Budget (OMB) has articulated evaluation policy in Circular-117, which states:

"All agencies of the Executive Branch of the Federal Government will assess the effectiveness of their programs and efficiency with which they are conducted, and seek improvements on a continuing basis so that Federal management will reflect the most progressive practices and business management, and result in improved service to the public."

AN AGENCY OVERVIEW OF EVALUATION

AID policy is to build a body of substantive knowledge and theory of social and economic development from empirical evidence, which will serve as a basis for formulating policies and strategies, allocating resources, and designing programs and projects.

The Agency is accountable to Congress, the President, and Director, International Development Cooperation Agency for the effective use of its resources. Since evaluation is a key element in that accountability, all aspects of Agency operations (including all forms of program and project assistance) are to be evaluated to assure their relevance and utility, and to measure their effectiveness and impact.

Evaluation is an integral element of the Agency's policy and program management processes. Responsibility for evaluation is decentralized and should be as close as possible to the user of the evaluation findings, to facilitate prompt and effective utilization.

It is Agency policy that the host country should play a leading role in evaluation, as well as in program and project design and implementation. Where the host country does not have adequate capacity for evaluation, the USAID should offer evaluative studies, maximum use should be made of indigenous host country skills and resources, such as local universities and consulting firms.

Agency leadership, both in AID/W and in the field, is critical to the effective use of evaluation as an instrument of policy and program design. Agency policy in this regard was articulated by the Administrator in the following statement:

"Much of our New Directions effort must necessarily be experimental and high-risk. But we need not act as if no past experience is relevant to our decisions. Many of the past activities in LDCs, often activities assisted by AID, are highly relevant to finding out what will and what will not work in the future."

"I believe it fundamental that policy and program management decisions be based as much as possible on organized and broadly based analysis of relevant prior experience wherever it may be found. Stated more simply, executive decisions should be preceded by systematic efforts to exploit evaluation findings. This applies both to regional bureaus in their formulation of policy, program and technical guidance..."

At the Project Level, AID policy requires that:

- Designers of new project proposals review evaluations and lessons learned from prior experiences in other, similar projects and settings.
- Evaluative elements be incorporated in project design.
- Senior AID, and host country management participate in project evaluation.
- Periodic evaluations of on-going projects be scheduled periodically to support key program decisions.

- Evaluation efforts be commensurate with size, importance, complexity and duration of project.
- High standards of objectivity and candor be maintained.
- Evaluation reports of findings and decisions be prepared and useful information provided to similar activities, planned elsewhere.

AID imposes these requirements on itself. However, when a host country government, a private voluntary organization, or an intermediary, conducting research and development activities accepts AID support, it must also accept responsibility for meeting AID standards and requirements for project design and evaluation.

LINKAGE BETWEEN DESIGN & EVALUATION

The project design (as reflected in the Project Paper, Project Agreement, Logical Framework and Project Implementation Plan) is the starting point for subsequent evaluation. The Project Design established the Intent, the Plan, the Means for measuring progress, and the external conditions (Assumptions) that would affect the project. During Project Evaluation each of these design elements is reconsidered and an attempt made to assess progress.

Basically, the designers intend the project will result in certain desired changes in host-country development. Because of host-country socio-economic uncertainties, and because there is no proven development theory on which predictions can be based, the designer must regard the design as a set of hypotheses, with reasonable probability factors based upon feasibility analyses. The evaluator, in turn, attempts to validate or disprove these hypotheses. Objective evaluative data either reinforces confidence that the hypotheses were correct, or provides an opportunity to revise them.

The linkage between design and evaluation is a special application of the scientific method. Existing knowledge is drawn upon to hypothesize an explanation of a phenomena, answer a question, or solve a problem. An experiment is then conducted and the results observed. If the results are as anticipated, the experiment is replicated to validate the hypothesis. If the results are not as anticipated, then the hypothesis must be reformulated and another, different, experiment conducted. Development projects have tremendous economic, political and sociological implications. Once there is sufficient evidence that a particular project approach is unproductive (or even counter-productive) and a different tack seems more likely to produce beneficial results, the impetus for change is usually overwhelming. Thus, AID-assisted development projects are formative, and changes in direction during implementation can be expected, rather than the "experiment" running to its conclusion as in a more formal "scientific" approach.

Nevertheless, Design and Evaluation should both be thorough and rigorous. It may seem wasteful to devote a great amount of effort to project design, only to modify and remodify the project later on the basis of evaluative findings. One may question the need for careful design at the outset if we are so willing to redesign. The reason is that resources for development are scarce, both in the host country and AID. Therefore, initially, we should be as careful as possible in laying the groundwork for a successful project. However, since we cannot perfectly diagnose the present nor predict the future, we must learn as we go. Empirical knowledge, derived from careful evaluation during the course of the project is invaluable in conserving resources and avoiding problems.

Careful definition of the project Goal, Purpose, and Output Levels can permit advance judgment about the probability of achieving Objectives with the resources and methods available. Unless the preconditions for evaluation (Indicators, Targets and Means of Verification) were established in the planning and design stage, it may be extremely costly and difficult (if not impossible) to evaluate the results of a project.

Evaluation is the analysis of experience either during or after the project to determine what happened, and why? In any project, reviewing what actually occurred compared to what was intended, is an important aspect of the project management cycle of "Planning, Implementation and Evaluation."

The primary purpose of evaluating a project during implementation is to assist managers in host governments or participating institutions and AID, to make decisions about the future of the project. Should it continue without change? Is some re-scheduling necessary? Should the mix of inputs be altered? Can tactics or processes be improved? Are more or different outputs needed to improve chances of achieving the purpose? Is it likely that this achievement will have the desired development impact and that the benefits will justify the cost? Or should the project be terminated because it is no longer needed or now looks like a poor risk?

Evaluation enables us to highlight both the strong and weak points and reach conclusions about whether the project achieved its purpose. This is necessary to determine whether further activity is desirable, and if so, of what sort. If successful, the project may be used as a model for replication elsewhere, while the experiences gained can provide the basis for action guidelines. Even when the project is unsuccessful, evaluation can help by identifying the hazards likely to be encountered and the pitfalls to be avoided or overcome if the project (or something similar) is to be attempted again. Such awareness in the form of "Lessons Learned" is an invaluable component of any institutional "memory".

Evaluation after the project has terminated, when all the available facts, figures, experiences and opinions can be assembled, shared and assimilated is useful. However, utility can be enhanced by going beyond the confines of the "Post Mortem" stage and conducting earlier, interim "Check-up's" on the project's operational well-being.

An outside objective viewpoint is particularly useful in complex projects for social change and economic development where multiple variables are involved, and dynamic development may occur through interaction with other projects and sectors as the project unfolds. Although the participants actually involved in the project are undoubtedly the most knowledgeable about the situation and its problems, often (with the daily struggle of give-and-take) the objective may be lost sight of in the effort to stay on schedule. Furthermore, conditions of society sometimes change so that the original objective which everyone is so industriously striving to attain may no longer be appropriate. Under these circumstances, an external evaluation of "How Goes It?" conducted by outsiders isolated from the daily turmoil (even with only partial data and fleeting impressions) can be extremely useful. Such a periodic check can be conducted in a relatively short time by a team of professionals who have experience in similar activities elsewhere, drawing upon project staff for guidance and/or assistance. Their fresh viewpoint and timely diagnosis may help avoid premature project failure, and assure that the young and still growing project attains full growth and maturity as most appropriate, obviating a possible "Unsuccessful" postmortem finding. Outside reviews are also more credible than internal evaluations (no matter how objective and professionally the internal studies are performed) especially in situations where controversial issues or findings may be aired.

Due to competing demands on their time, many of the key individuals external to the immediate project (but with overall coordinative responsibility and/or authority) tend to lose touch with what is actually happening during implementation, and their

initial support and commitment may dwindle. By holding an intensive interim evaluation, and focussing upon the project's objectives and its continuing needs (both technical and administrative), this interest may be rekindled.

As a result of analyzing and discussing an on-going project, communications can be facilitated; Host country (or participating) institutions, other donors, and AID policy officials align their objectives more closely; Technicians and contractors learn more precisely what is expected of them; and supervisors acquire a better understanding of the problems encountered by staff members. Formal evaluation can serve as the means for generating and incorporating new initiatives which may be required because of events which were unforeseen at the time the project was formulated, but for which no provision has been made under the existing project guidelines. The review can provide reassurance to the project staff and others on those aspects where things are going well and need little if any change; give recognition to those involved for their efforts; while highlighting other aspects where timely changes or corrective action may be appropriate to the project's long run goal.

Scheduled evaluations are critical events in the life of a project. The imminence of a deadline often provides the critical stimulus to address elements known to be behind schedule or of poor quality. In short, we evaluate to:

DETERMINE EFFECTIVENESS;

Did the project achieve its planned purpose?

DETERMINE SIGNIFICANCE;

Did the project make a substantial contribution to development?

MEASURE EFFICIENCY;

Did we achieve a satisfactory cost/benefit ratio; could we have accomplished our purpose at lower cost?

LEARN LESSONS

Which can be applied to similar activities elsewhere.

AID EVALUATIONS

AID conducts three different types of project evaluations:-

- * REGULAR
- * SPECIAL, and
- * IMPACT

Regular Evaluations are done routinely while projects are underway; are conducted largely by personnel directly concerned with implementing the project, and use economic, physical, management and financial information which has been routinely collected, or is readily available to assess progress against planned targets. Regular Evaluations are conducted on each project by AID mission and host country personnel on a schedule set in the Evaluation Plan for each project, based on Mission and AID/W management needs. Such evaluations need not be annual but their timing should be related to project phases. Regular Evaluations are not in response to any special need or problem, nor are they expected to produce any extraordinary, unanticipated findings. The scope and depth of a regular evaluation varies, depending on the type of project, its phase, or the importance of decisions to be made.

Special Evaluations are in addition to, and different from, regular evaluations. They are called for by Mission or AID/W management whenever it appears appropriate, for example when:

- Management wants answers to difficult questions, or unexpected problems.
- A follow-on project is contemplated
- A contract team with special expertise will be needed.
- Unanticipated changes in host country policy may have affected key design assumptions.
- An in-depth analysis is required

Special evaluations are usually conducted by outside consultant teams, sometimes in conjunction with Mission and host country management staff.

Impact Evaluations are conducted, usually at the conclusion of a project or sometime thereafter, to assess whether the project had the intended result on the targetted population at the Purpose and Sector Goal levels. Impact Evaluations are usually undertaken by an AID/W team.

The essential intent of evaluation in AID is to determine what happened, how, and why.

Evaluating an ongoing project to improve its design and implementation calls for different resources, methodology and skills than evaluating the relevance and effectiveness of a program policy or strategy. Yet each is an attempt to assess prior experience in order to improve future performance.

AID's use of the term "evaluation" is concerned with results. It differs from the usage in some other development agencies and organizations which apply the term to pre-approval decisions about project feasibility and the studies upon which these decisions are based. (In AID that process is called pre-project "appraisal").

The following is a brief summary of evaluation "models" and a short statement about the purpose/anticipated benefits of each.

Formative evaluation a process wherein evaluation is used progressively to guide the design and implementation of a project. Used when the problem being addressed is not fully understood, when the project purpose is not yet readily definable in precise and explicit terms, and when there is uncertainty about the appropriateness of the strategy for achieving the purpose. Formative evaluation is conducted periodically to explore trial and error experience to gain a better understanding of the problem, sharpen the definition of the purpose and formulate viable strategy for achieving it. Formative evaluation is a learning process and is the appropriate approach to any situation with a high degree of uncertainty.

Goal Attainment Evaluation. The goal attainment model measures program or project progress toward a single predominant objective. This model is widely used by AID in evaluating on-going projects. It is relatively low-cost and imposes only modest skill requirements.

Summative evaluation is when the problem is well understood, the purpose clearly defined, and there is a high level of confidence in the chosen strategy. Summative evaluation merely attempts to measure progress towards the stated purpose. Summative evaluation is used interchangeably with such terms as ex-post or post-hoc evaluation; where it is no longer possible to induce changes in the program/project design.

Monitoring Implementation monitoring is a continuous function. The monitor is intimately engaged in day-to-day operations and is usually emotionally and intellectually involved in the project. The monitor is concerned with:

- ... the procurement, delivery and installation of resource inputs;
- ... adherence to implementation plans;
- ... compliance with required standards and procedures;
- ... achievement of planned targets.

By contrast, evaluation is a discontinuous function. The evaluator is disengaged from day-to-day operations, and, hopefully, detached emotionally and intellectually from the project.

In projects evaluated by the project management team, the monitor and evaluator may be the same, requiring a shift in perspective, attitude and behavior during the evaluation.

The two functions are interdependent and necessarily somewhat overlapping. The monitor generates and collects progress data needed by the evaluator, and may call for an evaluation when difficulties arise. The evaluator's findings are translated into replanning actions, and implemented under the monitor's supervision.

IMPLEMENTATION MONITORING

Keep track of daily activities

Accepts policies, rules

Works toward targets

Stresses conversion of inputs to outputs

Concentrates on planned project elements

Reports progress

Audit

These two functions differ in several fundamental ways, share a few similar concerns and methods, and interact on occasion.

The Agency's audit function is independent of the managerial structure, whereas the evaluation function is integrated into it. (Although the Agency often uses the services of non-AID persons for evaluation activities, the evaluation process is not an independent function.)

The auditor examines financial transactions, compliance with standards and procedures, efficiency, economy and effectiveness of operations, integrity and performance of management, consistency of programs with legislation and policy, and program results. Evaluation is concerned with the developmental impact of programs and projects, the effectiveness of policy and strategies, and the factors associated with developmental change.

The auditor draws heavily on secondary data (such as administrative and financial records) supplementing these with site visits and interviews. The evaluator

PROJECT EVALUATION

Take the long range view

Questions pertinence of policies, and procedures

Measures progress and asks whether targets are adequate

Emphasizes achievement of purpose

Assesses planned elements and

* Looks for unplanned change

* Searches for causes

* Challenges assumptions

Records Lessons Learned

may use such data but also collects social and economic data generated by program/project operations, often directly from target areas or groups. Although independent of the Agency line management, the auditor scrutinizes its internal functioning. Conversely the evaluator whose work is integrated into the line management function, measures socio-economic change which occurs outside the Agency.

Research and Evaluation

Evaluation is a form of research which stresses the retrospective dimension and which is applied rather than theoretical. Indeed, those types of evaluation activity which utilize the rigorous tools of experimental methodology (treatment and control groups, random selection) are termed evaluative research.

Relation to Budgeting

For projects which are funded on a year-to-year incremental basis, evaluation of past progress provides a basis for judging future needs.

For projects initially funded for the life of the project, cost estimates beyond three years should be suspect. Therefore, periodic evaluations should provide a basis for more accurate cost estimates for the remaining life of the project.

EVALUATION PLANNING

Project planning lays the groundwork for evaluation. The Logical Framework establishes the general project objectives -- Indicators, Specific Targets, Sources of Data and overall timing. The Project Implementation Network details the key steps and sequence for carrying out the plan.

The evaluation plan should identify the timing, purpose, scope, depth and other characteristics of the evaluations to be conducted during the life of the project.

These evaluations should be keyed to important phases during the project, so that evaluation findings will be available prior to making important decisions.

The resources needed for evaluations, (including expert outside participants) documentation, budget support etc. should be identified in the plan. The evaluation plan should provide for a control area/group, and collection of data to permit comparative measurement of change between the project and the control. Arrangements should be spelled out for collecting and recording baseline and progress data to support project progress indicators, as well as monitor design assumptions. Generally, the first evaluation of a project focusses attention on the provision of inputs -- quantity, quality, timing -- to accomplish the Outputs. Subsequent evaluations are more concerned with accomplishment of Outputs, and a reexamination of the project hypothesis to see if it is still valid, while the final evaluation during the life of the project is examining the probability of attaining the project Purpose, or reasons for variance. Sometime after the project has been completed, another evaluation should be scheduled so that the longer term impact of the project (after AID withdrawal) can also be assessed.

The evaluation plan should consider:

1. How many evaluations will be required?
2. When should the evaluations be scheduled?
3. What hypotheses should be tested at each evaluation?
4. What methods should be used to obtain the data required?
5. Who will evaluate?
6. How much will the evaluations cost, and who will fund?

HOW MANY EVALUATIONS

Relate to: Project events
 Management needs
 Availability of people
 Cost

WHEN

Relate to: Decision-making needs
 Major project phases

WHAT HYPOTHESES

(For example)

| | |
|-------------------------|--|
| Early evaluation | Is design O.K. Are inputs adequate |
| Intermediate Evaluation | Are inputs on schedule; What unforeseen circumstances have arisen Is the EOPS probable |
| Later Evaluation | Is the output to purpose level being achieved Are the poor people benefitting |

What Method Should Be Used to Obtain Data

Record Search

Interviews

Inspections

Surveys

Who will evaluate

Insiders?

Outsiders?

Collaborative Style?

WHO SHOULD EVALUATEIn-house personnelAdvantages

- * Familiar with programs, staff operations
- * Consistency (assumed) with Agency management's values
- * Avoids time-consuming procurement negotiations
- * Avoids additional expense

Disadvantages

- * Objectivity and candor may be questioned
- * Possibility of organizational role conflict
- * Difficulty in releasing from daily assignment

Outside Experts

- * Greater objectivity
- * Free of organizational bias
- * Easy access to decision-makers
- * Time available
- * Familiar with recent advances in technology

- * May be perceived as "policeman" and arouse anxiety among in-house
- * Requires time for contract negotiations, orientation, monitoring
- * Additional expense

Collaborative

- * Advantages of both in-house (AID and Host country) and outside experts; plus greater cultural sensitivities

- * National protocol, practices and priorities may constrain study.
- * Host country participation may inhibit candid discussion of nationally sensitive issues.

EVALUATION METHODOLOGY

Evaluation measures induced change and compares that change to:

- Planned targets/objectives
- Initial/baseline conditions
- Change in a similar but untreated area/group
- A similar project(s) elsewhere
- Some external, absolute standard

The particular methodology used determines to a large extent the quality of the evaluation. The choice of an evaluation methodology will define the types of information to be collected, the information sources, and the means of collection and analysis.

The essential elements for evaluation should be incorporated into the Project Paper at the earliest practical stage, so that (1) measurement of progress toward planned targets and (2) determination of why the project is or is not achieving its planned targets can be facilitated.

There are three broad classes of evaluation methodology:

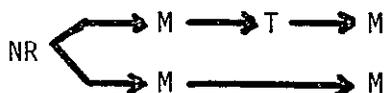
- EXPERIMENTAL DESIGN WITH RANDOM SELECTION:
- QUASI-EXPERIMENTAL DESIGN WITH NON-RANDOM SELECTION: AND
- NON-EXPERIMENTAL DESIGN/CROSS-SECTIONAL ANALYSIS

Each accommodates a variety of practices ranging from the most sophisticated and rigorous to the simple and informal. The major analytical methodologies used in evaluation are:

I. EXPERIMENTAL DESIGN

I. Experimental Design with Random Selection

Where circumstances permit this is the "ideal" methodology. The project designer randomly selects a sample from a population and divides it into two groups with similar initial socio-economic conditions/status. One group becomes the project experimental (or treatment) group, and the other is a Control group. Both groups are carefully measured for various indicators (Baseline). An "intervention" is made in the project group only, after which both groups are measured again (for the same indicators) to identify changes. Evaluators base their conclusions on the comparative examination of the indicators measurements in the two groups; with the differences attributed to the project intervention. This is diagrammed as follows:



One of two groups, formed through random assignment of individuals, is exposed to treatment. The performance of both groups is measured before and after treatment

Where M = Measurement
 NR = Non Random Selection
 R = Random Selection
 T = Treatment

Typically, experimental design measures outcome variables before treatment and at least once afterward. This method requires that indicators of the expected effects of the treatment be identified before the project starts. Predicting outcome variables in this manner infers the existence of a Hypothesis about the relationship between independent, intervening and dependent variables.

Baseline-Data. We measure dynamics by measuring and comparing the change between two statics. These data provide information about the status of things at the start of the project (beginning-of-Project Status or BOPs). These data become the "fix", zero point, anchor point, or benchmark against which later measures will be taken. Thus: -

| | Beginning (BOPS) | End (EOPS) |
|----------------------------|------------------|------------|
| Project experimental group | A - - - - - | A' |
| Control group | B - - - - - | B' |

Project results (i.e., the Change attributable to the Project) can be simply stated as the difference between differences; or schematically

$$\text{Change} = \left[(A' - A) - (B' - B) \right]$$

Note: Caution should be exercised when making this comparison. Under many circumstances (particularly where the baseline is not stable) it is the magnitude of change that should be measured, not just the absolute difference. When such is the case, the formula (as a percentage) is: -

$$\text{Change} = \left[\frac{(A' - A) \times 100}{A} - \frac{(B' - B) \times 100}{B} \right]$$

| | | | | | |
|--------------|-------|-------------|-----|-------------|--|
| For Example: | Given | <u>BOPS</u> | And | <u>EOPS</u> | |
| | A | = 14 | A' | = 28 | |
| | B | = 15 | B' | = 18 | |

Note: The Magnitude of Change (expressed as a percentage) is: -

$$\left[\frac{(28 - 14) \times 100\%}{14} - \frac{(18 - 15) \times 100\%}{15} \right]$$

$$\text{Magnitude of Change} = 100\% - 20\% = \underline{80\%}$$

Rather than the numerical change

$$\begin{aligned} & (28 - 14) - (18 - 15) \\ & = 14 - 3 = \underline{11} \end{aligned}$$

Baseline: Every project plan should contain (or reference another document which contains) baseline data. This is a statement of pertinent conditions at the time the project begins or as soon thereafter as practical. Two different kinds of baseline data are required.

Project Specific Baseline: The level of activity (or condition) which the project is intended directly and immediately to change; e.g. in a livestock production project, the project specific baseline indicators might be the number, size, quality, and health of livestock presently produced. In an education sector loan, they could be the size, quality, productivity, and other identifying features of the education establishment and pertinent data which reflect utilization of its outputs (i.e. students and research).

Socio-Economic Baseline: The status of socio-economic activity in the area where the project will operate; e.g. in a livestock project, the socio-economic baseline indicators would include the income, savings, consumption, land availability and ownership, and other socio-economic factors in the immediate area of population affected by the project.

Corroboration. A limited amount of redundancy in indicators can serve to corroborate the measurement of change. Redundancy is also insurance against the effects of unforeseen variables and misleading signals in the measurement process.

Note: It is important that the Baseline situation is Stable -- that is, that it reflects a steady condition or state, before the project treatment. Otherwise, any changes noted after the project may be due to a pre-existing trend, rather than the project treatment itself.

Thus, it is frequently desirable to obtain a series of measurements (time-series) on the population over a period of time before the project starts to assure that a stable condition exists.

The selection of baseline data and indicators is of course governed by the changes that are sought or anticipated in planning for evaluation. The project planner (and evaluator) must answer the following questions:

- What changes are anticipated?
- What should the end-results of these changes be?
- How are these end-results to be indicated in the future?
- What data are available at present which resemble the indicators? (which can increase, improve, grow or change into the future indicator?)

Indicators at
Output Level

→ leading to →

Objective of
Purpose Level

House sprayed
Skill training provided
Business loans made
Family planning clinics established
Textbooks printed
Examiners trained
Fertilizer distributed

Malaria reduced
Employment obtained
Exports increased
Birthrate reduced
Education improved
Increased taxes collected
Crops increased

Validity: The technical soundness of a study is known as Internal Validity. An experiment is internally valid when all the potential factors that might influence the data are controlled except the one under study.

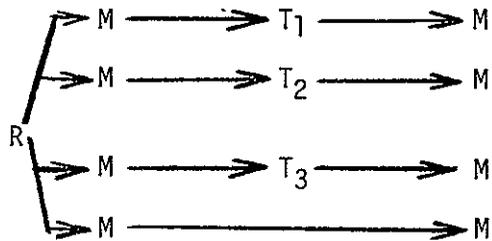
The applicability of results from a particular experiment to other situations is known as External Validity. If a study is externally valid, then the results are generalizable.

Validity is generally very high for "Experimental" design. Cautions are:

Internal Validity: Valid comparisons can generally be made between experimental and control groups because of randomization. However, because of the requirement for a baseline test both groups are alerted to the forthcoming experiment. Where data is subjective, experimental group members may bias information in order to please, or obtain further benefits; while control group members may feel they have been arbitrarily excluded from participation, and be resistant to post-test measurement.

External Validity: High validity, where the same conditions as the experimental situation prevail.

EXPERIMENTAL DESIGN WITH RANDOM SELECTION - MULTIPLE GROUPS



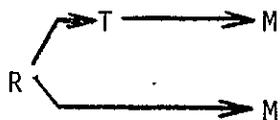
Multiple groups are selected by random assignment. Several are exposed to differing treatments (experimental) and one is not (control). The performance of all groups is measured prior to the treatment period and following the treatment period.

With Experimental Design you can have several comparison groups which receive different kinds or amounts of treatment and one which receives no treatment. This permits comparisons among the kinds/amounts of treatment as well as comparison of each treated group against the control group. Random selection from a relatively homogenous body of individuals or groups assures a common baseline of social, economic and other characteristics. Selected individuals/groups are alike in all respects except the treatment variables to be measured. Randomized selection eliminates bias in all variables except those contained in the treatment. Non-treatment variables are called confounding variables.

Internal Validity: This design permits independent, unbiased measurement of the effects of the treatment. Of all the designs described it has the least likelihood of invalid inferences.

External Validity: There is no way of determining the impact. Just being involved in an experiment has an effect on the participant, but results can be generalized only to identical situations as the experiment. To permit generalization, evaluation activities should be as unobtrusive to participants as possible.

EXPERIMENTAL DESIGN WITH RANDOM SELECTION --POST TEST ONLY. This is a variant of the experimental design which measures the treatment and control groups after treatment only. It avoids the potential statistical biases of pretreatment measurement, as well as the costs and effort, but the opportunity for measuring the amount, kind and direction of change from initial baseline conditions is lost. It should be used only when the situation for the control group is judged to be very static.



One of two groups, formed by random assignment, is exposed to treatment. The performance of both groups is measured after the treatment only, and the difference attributed to the treatment.

Internal Validity: High.

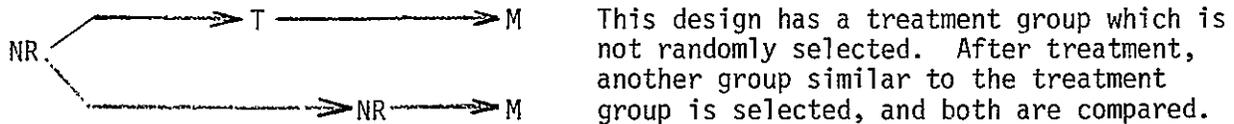
External Validity: This design avoids the bias which may result from pretesting, simply by dispensing with it. Generalization requires that members of both groups be drawn at random from the target population.

Where basic Experimental Design approaches are not possible, other, less rigorous, approaches should be considered:

QUASI-EXPERIMENTAL DESIGN

QUASI-EXPERIMENTAL DESIGN WITH NON-RANDOM SELECTION. This design compares treatment and control groups, but the groups are purposefully (not randomly) selected. Control group selection is sometimes made after the treatment rather than before.

Purposeful selection permits the evaluator to hold selected variables constant in both treatment and control groups in testing a specific hypothesis.



This design has the advantage of focussing the measurement on the specific question. The disadvantage is that other confounding factors, not isolated by the design, may have had an important (but unmeasured) influence on the outcome. Another obvious disadvantage is that it is not usually possible to establish the extent to which the treatment and control groups/areas were homogenous prior to treatment.

Evaluators tend to apply quasi-experimental design after the treatment, usually because pretreatment measurements were not taken in the treatment and control groups.

For example consider an agricultural production project with three key factor inputs: irrigation water, fertilizer, and high yielding seed. In order to compare the effect of increased water supply on crop production the evaluator may want to hold the seed and fertilizer variables constant by selecting the treatment and control areas only from among those areas where the seed and fertilizer uses were thought to be similar.

Internal Validity: There is no control for other factors which might cause differences between pretreatment and post treatment status, and no assurance of homogeneity between treatment and control groups.

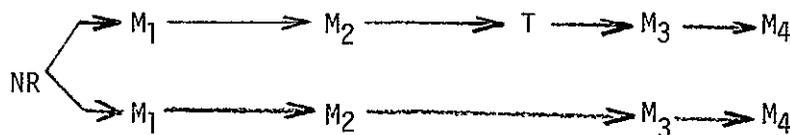
External Validity: This design avoids the bias which could result from pretesting. Generalization requires that the population be the same as that purposefully selected.

THE INTERRUPTED TIME SERIES. This is a longitudinal methodology which falls within the quasi-experimental category. Sometimes called "before and after" studies, the Interrupted Time Series calls for several measurements of the same variable over a period of time. The method can be used when a treatment (a tax reform, an export licensing regulation) is to be applied to an entire population and Universal coverage precludes establishing a control group within the population. Major types are:-

QUASI-EXPERIMENTAL DESIGN -- NON-RANDOM SELECTION - TWO GROUP INTERRUPTED TIME SERIES

The most rigorous of interrupted time series models consists of periodic measurement of the treatment population and simultaneous measurement of another untreated population. Differences in the longitudinal data series before and after the intervention are compared, as well as the differences between the two populations.

The first comparison (before and after) measures the inferred effect of the intervention as well as any reinforcing or countervailing trends over time. The second comparison (between populations) allows the evaluator to infer attribution of the change to the intervention. However, attribution can be considered only if there are no plausible alternative explanations for the change. Key questions which strongly influence the credibility of the inference are (a) the similarity of the characteristics of the two populations and (b) whether they were subjected to the same physical, economic and social influences during the measurement period. Thus the evaluative inference is conditioned by (a) expert knowledge of local conditions in the two populations and (b) the statistical differences between the two time series.



This design has a treatment group and a control group which is similar to the treatment group but is not randomly selected. Measurements are made at several intervals before, during and after treatments to form a longitudinal time series.

Internal Validity: There is no control for other factors which might cause differences between pretreatment and post treatment status. There is some control over maturation (the tendency for measured performance to improve or degrade over time regardless of any intervention) to the extent that maturation trends are similar for the two groups. This method permits identification of pretreatment and post treatment trends in the two groups which could otherwise be mistaken as treatment effects.

External Validity: The act of evaluation could affect measurements. Generalizations are appropriate only to a population exposed to a series of similar measures.

QUASI-EXPERIMENTAL DESIGN -- NON-RANDOM SELECTION -- ONE GROUP
INTERRUPTED TIME SERIES



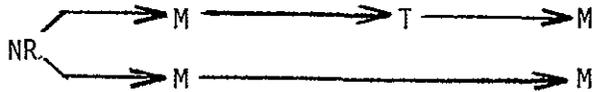
This design provides for a series of comparable measurements both before and after treatment.

Internal Validity: This design does not control for other factors which might influence differences between pretest and post test values. This approach has some claim to internal validity in that:

- If evaluative measurement has an influence on performance of the treatment group, it should show up as a cumulative effect in the pretreatment measurement series, and not be a one-time effect which appears in the immediate pretreatment and post treatment measurements.
- If the total measurement period is greater than the treatment period, effects from growing maturity of the participants can be separated from treatment effects.

External Validity: This design may cause interaction between the evaluation measurement and the project treatment. Sensitivity to the measurement process; to treatment; or reinforcement of effects which occurs after treatment; can be cumulative.

QUASI-EXPERIMENTAL DESIGN -- NON-RANDOM SELECTION PRETEST/POST TEST
COMPARISON GROUP



This design compares an experimental group and a comparison group measured immediately before and after treatment. Selection is not random.

The Pretest/Post Test Comparison Group Design - is a commonly used approach which, on the surface, appears to be rigorous. In actual practice it suffers important deficiencies in dealing with social change processes.

The method calls for an experimental (treatment) group to be tested immediately before and after the treatment. A control group, believed to be similar to the treatment group (but not randomly selected) also is pre-and post-tested. The before and after measurements of the two groups are compared; the differences are attributed to the treatment.

There are two major deficiencies in this approach.

- Non-random selection of a supposedly similar group might permit important (but unnoticed) dissimilarities.
- Limiting the time series to measurements made immediately before and after the treatment may obscure important longer term trends already underway.

These two deficiencies can be ameliorated by exercising great care in control group selection; and by extending the time series both before and after the treatment.

Internal Validity: Despite its popularity, this quasi-experimental design is prone to internal validity problems. The more similar the experimental and control groups (and their baseline measurements), the more effective this design becomes.

However, even when the experimental and control groups are similar, this design requires that except for the treatment the history of the two groups should be equivalent for the period between measures.

Two threats to internal validity with non-random groups

- Errors in matching groups may be accentuated by regression effects. This occurs when an individual is misclassified in a group which is not typical of normal behavior. During the experiment the individual will tend to "regress" towards average performance, offsetting the influence of the experimental variable.
- If the two groups are different in maturity or motivation, they may develop differently regardless of the effects of the treatment.

External Validity: Reaction of groups to measurement is possible. Generalizations are justified only to groups exposed to similar pretreatment measurement. Statistical analysis techniques to adjust for pretreatment differences between groups must rely on assumptions which frequently cannot be justified.

QUASI-EXPERIMENTAL DESIGN -- NON-RANDOM SELECTION
ONE-GROUP PRETEST/POST TEST STUDY

NR → M → T → M

A single group is tested immediately before and after, the treatment.

In this variant, a treatment group is measured immediately before and after treatment. There is no comparison group. The time series is limited to the treatment period.

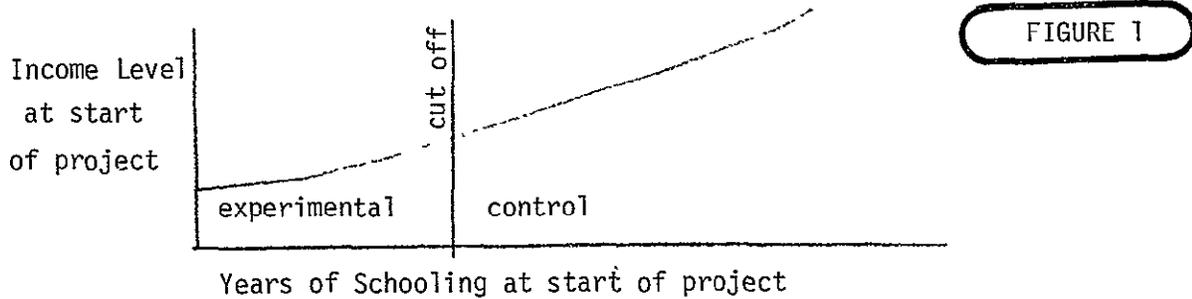
This method is adequate as a gross measure of whether change has or has not occurred. However, it has very little credibility since the method does not systematically permit the evaluator to analyze longer term trends or the influence of factors other than the treatment. Confidence that the change was a result of the treatment requires (1) that the difference in before-and after data is statistically significant; (2) the change coincided with the intervention; and (3) other possible causal explanations can be rejected.

Internal Validity: The design does not control for other factors which might cause differences in the measures. It would not rule out the possibility that particular characteristics of the group, or other events during the treatment period, may have caused the differences. There is no control for the influence which exposure to the initial measurement processes might have on post-test performance.

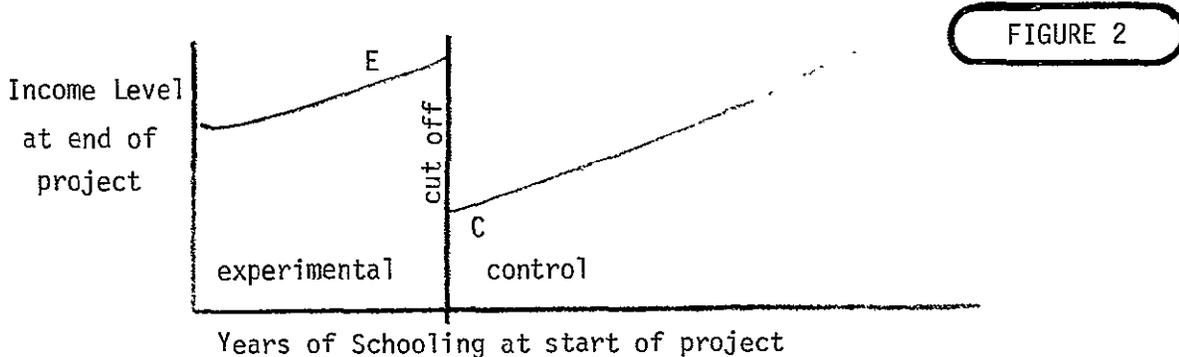
External Validity: Generalization must be limited to situations where similar pretesting occurs. The inherent limitations on external validity are usually minor compared to the threat to internal validity.

REGRESSION-DISCONTINUITY DESIGN. This is another evaluation methodology which falls within the quasi-experimental category. This method can be used where eligibility of individuals for treatment is determined by their position on some graduated scale of social or economic qualification or need (income, size of farm, years of schooling). Those on one side of the eligibility cut off line receive the treatment, those on the other side would not, but would become the control group. Each group would be shown as a set of points distributed over a graduated scale.

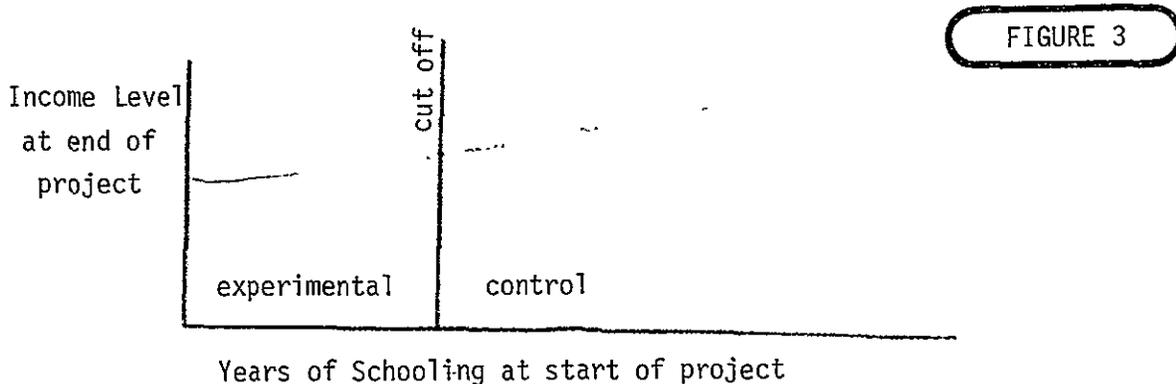
For example, if the criterion for eligibility were "x years of schooling or less", and the treatment was "vocational training" to improve income, then the pre-treatment situation might look like figure 1.



If the post treatment situation looked like figure 2, then one could conclude that the program treatment had induced a change as shown by the discontinuity.



Whereas if the post treatment situation looked like figure 3, one would conclude that the program treatment had induced no change at all.



NON-EXPERIMENTAL DESIGN--CROSS SECTIONAL ANALYSIS: This methodology is characterized by

- (a) absence of random selection of treatment and control groups;
- (b) a causal model for statistical analysis;
- (c) focus on one-time analysis rather than longitudinal trends.

The first step is to develop a causal model which defines an assumed set of relationships among three kinds of variables:

- Independent or treatment variables, usually the resources input and strategies which are intended to induce the desired change;
- Intervening or non-treatment variables such as the characteristics of the target group, host country socio-economic factors, etc., and
- Dependent or outcome variables which include planned and actual results.

The value of the subsequent analysis depends on whether or not the model includes all of the significant causal variables.

The second step is to analyze the relation between the variables, using empirical data. The evaluator does not compare treatment and control groups, or intervene in the allocation of program/project resources. Instead, statistical analytical techniques (such as covariance analysis or multiple regression analysis) are employed. The analyst attempts to compare pairs of variables, while other explanatory variables are held constant by statistical techniques.

For instance, in studying the effects on farmer income of fertilizer use, the analyst would attempt to compare the incomes of farmers who use varying amounts and kinds of fertilizers, while holding constant other factor inputs, e.g. seed varieties, methods of cultivation, market prices, and access to irrigation water. The characteristics and constraints of this approach are:

- the causal model must include all of the possibly significant causal factors;
- the assumptions and causative linkages must be carefully developed and based upon substantial experience;
- the empirical data must be accurate, valid and reliable;
- tests of statistical significance are of paramount importance

THE CASE STUDY This is often used, but is the least rigorous method. Here a project situation is studied and described from many aspects, using whatever data the analyst can obtain, and seems appropriate. There is often no statistical baseline or control group with which to measure or compare progress. Comparisons are made between the project and any other non-project situations on particular aspects, but in a non-systematic and non-controlled manner. Heavy reliance is placed on observation; descriptive analogies; anecdotal material; expert opinion; "common sense"; deductive, and inductive reasoning.

The findings, although perhaps logically reasoned, are highly subjective and qualitative rather than quantitative, and the conclusions are usually unverifiable.

Subjectivity can be reduced by recognizing the possibility of bias, and by stating as explicitly as possible what the value premises are.

There are a number of tools at the disposal of the evaluator to minimize subjectivity. These include:

- Statistical data to replace conjectures and opinions held by the evaluator;
- Judgments of individuals and groups not directly involved in carrying out the project, such as
 - (1) The local academic community, graduate students, etc.
 - (2) Persons directly affected by the measures,
 - (3) Consultants,
 - (4) Other A.I.D. offices not directly involved in the project;
- Joint evaluations with the cooperating country government;
- Comparisons with
 - (1) Control groups,
 - (2) Inter-country and intra-country standards.

Nevertheless, both internal and external validity are suspect, and open to challenge by others.

CONCLUSION

In summary, Evaluation seeks to answer three basic questions which should be asked of all kinds of assistance at all levels -- project, sector, and country program:

- Effectiveness - Are the planned project targets being achieved?
What are the reasons for success or failure?
- Significance - Will the achievement of the targets contribute to economic development or other higher goals beyond the project? To what extent? What are the project's advantages over possible alternatives? What about side effects?
- Efficiency - Do the benefits justify the cost? Are there more efficient means of achieving the same target?

There are several different approaches which can be employed for evaluating projects. Unfortunately in the economic and social development environment in which we work, the most rigorous methods are usually not feasible. However, this is not sufficient cause to throw up our hands, and abstain from evaluation. We should be aware of the limitations of our tools, use the most appropriate ones for the particular situation, and strive to improve our understanding of the development hypotheses.

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DEVELOPING A SCOPE OF WORK FOR AN EVALUATION

Before an evaluation can take place, a detailed Scope of Work must be developed, to identify what is to be done; why; how; who; where; when; and the approximate cost.

Although there are many things about a project which could be evaluated, it is usually desirable to focus on different aspects at different times. Indeed, given the normal constraints of available funding, personnel and timing, some aspects may not be reviewed at all by the evaluation teams.

The following are major considerations in developing the scope of work:

- WHAT - Describe the Project; Current situation; issues and problems
What major hypotheses are to be tested, and what indicators will be used to measure progress at each level?
What other factors (outside the logframe) may be important?
- WHY - Identify the reason for the evaluation, Is it to check the project design, inputs, implementation process and/or assumptions for validity?
Is it to get feedback for use in Redesign, Implementation or some other purpose?
Is it to measure progress for rescheduling implementation activities; reporting to AID/W, or planning a follow-on project.
Is it to measure attainment of outputs, purpose, sub-goal or goal?
Is it to measure economic efficiency (i.e., cost-benefits)?
Is it to resolve a specific issue?
Is it for some other reason?
What use will be made of the evaluation after it is completed?
- HOW - Outline how the evaluation is to be conducted?
Search records, review files, conduct interviews; workshop conference discussion; site visits; observations and inspections; sample surveys; statistical analysis, etc.
- WHO - Who will do the evaluation?
How many and what types of people?
- WHERE - From where will the evaluators come; where will they conduct the evaluation field work; prepare the analysis and written report?
Where will they make the presentation?
- WHEN - Develop a draft schedule for conducting the evaluation.
- HOW MUCH - Estimate the cost of the evaluation for the following aspects:
- personnel salaries
 - international travel
 - in-country travel
 - per-diem
 - materials
 - rental of equipment and facilities
 - hiring of interpreters, translators
 - overhead (if external contractor used)
- What will be the source of funding for the evaluation?

Sources of Evaluators

In-house evaluators can be drawn from many sources: - the office responsible for the project, another Mission, or AID/W; Participating Agency personnel; U.S. university or contract personnel in the area; or a task force of experts formed from a combination of the above groups. AID/W geographic bureaus can assist in recruiting outside evaluators. Potential sources include the group of consulting firms under contract with the AID/W Program Evaluation Office, other past and present A.I.D. consultants and contractors, professional organizations, international organizations, U.S. Government agencies, roster of retired U.S. Government employees, U.S. university personnel independently in the area, third-country experts, etc.

When teams are used, the role of the Mission is to help define the scope of work, to collect data and records in advance of the team arrival, to suggest and arrange appointments and field trips, to react to tentative conclusions, and to follow-up on recommendations.

Consultants

Consultants in specific functional fields may have a strong technical bias. However, they should be able to offer greater objectivity than an "insider" in the evaluation of a specific project.

Generalists often make valuable contributions by challenging basic assumptions, and bringing a new perspective to highly technical projects.

In most cases, the consultant will be handicapped by lack of familiarity with the project or program and the country or Mission perspective. Unless familiar with prevailing local conditions and customs, the consultant-evaluator is likely to encounter many difficulties and unexpected delays in designing and conducting the evaluation study.

- The consultant should be able to apply specialized knowledge, and familiarity with techniques and fresh viewpoints which may not be available to the project manager.
- Consultants should be able to assemble a staff of varied and cross-disciplinary expertise which usually cannot be matched within.
- Recommendations by a recognized non-U.S. Government source are usually better received than those coming from U.S. Government sources. A consultant may be able to prepare and present a more frank and candid report than an agency of the U.S. Government.

Basis for Selection

Problems likely to be encountered and basic qualifications expected from the evaluator(s) (such as language, knowledge of local conditions, technical expertise) should be detailed. With this information, an intelligent selection can be made by the contracting officer between possible groups of evaluators, and individuals within the group. In addition, this information will help provide potential candidates with an understanding of what is expected.

When an outside consultant is retained, a detailed briefing should be provided of:

- Project background and history;
- Sector goals and Project goal;
- Operating strategy of the project to date and anticipated strategy; including the assumptions about conditions or action of other interested parties;
- Project operations;
- Reasons for making an evaluation;
- Scope of evaluation;
- Extent of cooperating government participation and contracts.

In addition to this briefing, the consultant should also be given a document outlining the logistic support that can be provided and the facilities available. (e.g. housing, transportation, PX and commissary privileges, etc.).

- Finally, special care should be taken to acquaint consultants with the concept and methodology of A.I.D.'s evaluation process. While the consultants specific assignment may not cover all aspects of the project, this knowledge will help them to formulate recommendations, so they can be integrated into the AID system.

Mission Liaison with Consultants

The Mission should designate a counterpart (ie, the project manager) as liaison officer for the consultant to assure that all relevant data are made available. Periodic review sessions should be held between the consultant and appropriate A.I.D. personnel to check progress.

After the consultant's departure, the liaison officer should follow through on proposed changes.

Timing and Submission of the Evaluation Report

The consultant should be held to a mutually agreed-upon, realistic schedule. Except when clearly not possible (data analysis by computer at the consultant's home institution), the consultant should be required to submit a report (or at least a draft) prior to departure from the Mission.

PRE-EVALUATION
THE DESIGN CLARIFICATION PROCESS

Before an evaluation is undertaken, a "Pre-Evaluation" review should be held to:

- | | |
|--|--------------------------------------|
| 1. Assess changes in Host Country circumstances, policies & priorities | Is Project still relevant/necessary? |
| 2. Reexamine basic design elements | Are they still valid? |
| 3. Reconsider evaluation plan | Is it still appropriate? |

STEP 1.

Obvious changes since the last evaluation should be identified and weighed to see if they significantly affect the on-going project. These include such changes as:

- Host country (or U.S.) development policies and priorities
- The nature and magnitude of the problems addressed.
- Physical and environmental conditions.
- Demand, competitiveness, cost (e.g., oil prices).
- Attitudes and other social variables.
- Institutional capacity to implement project.

The project's continuing conformance to AID policy, host country and statutory provisions and priorities should be reviewed to determine whether some adjustment is needed to make it coincide with current policies and priorities.

The most important evaluation recommendation - whether to discontinue or re-direct the project - may be made here without having to spend the time and effort to evaluate progress to date.

STEP 2.

Since project personnel have gained experience during implementation, the project design should be re-checked. Ask people who participated in the original design to step back and take a fresh look. (The presence of some new people in the evaluation working group is often helpful, also.)

Start with the project purpose. Is it a concise statement of an achievable solution to a concrete problem, without compression of means and ends into a single statement? Does the list of End-of-Project Status (EOPS) conditions/indicators meet the four tests of all good indicators (plausibility, independence, verifiability, and targetting) for the project amount and duration? Note: EOPS may not occur until some time after project assistance has terminated.

Does the list of assumptions still cover the external factors which are critical for successful transition from output production to purpose achievement? Can the data needed to verify each indicator be found in a usable form and at reasonable cost?

Similar questions for inputs, outputs and goal level targets should be asked to assure that all design elements are stated in terms which are sufficiently precise and verifiable to permit meaningful evaluation. It may be possible to sharpen statements of targets and assumptions and devise more practical indicators, thus simplifying the evaluation. Where output targets and EOPS are stated in progressive, phased levels of accomplishment, assessment of progress is relatively easy. When both indicators and targets are formulated only in terms of the final desired result, evaluators have to use both extrapolation and judgement to assess progress/accomplishment at any given time. Improvements in target explicitness should not change the nature of the project. The evaluation team must decide whether their recommended clarification changes in project design are major or minor. If minor, the evaluation of progress can proceed. If major, it may be appropriate to postpone the evaluation.

Criteria built in at the design state to evaluate the project should be of three types:

- Responsiveness of the project to the development needs of the target group and the host country's priorities.
- Conformance with AID statutory and policy provisions, such as equitable sharing of the benefits of economic growth.
- Specific project targets at output, purpose and goal levels.

Data Collection.

The project evaluation plan should spell out the details of data collection:
 - whether routine reporting or special surveys by project staff or, where appropriate, by trained data collectors. Provide for collecting and analyzing three kinds of data:

- Any additional baseline data (beyond that collected when the original situation was analyzed). Such information should be gathered as early in the implementation stage as practical, since later efforts to reconstruct the baseline situation will be difficult, costly, and produce less reliable data.
- Progress/performance data generated during implementation. (This should be the output and purpose level indicators in the logical framework.)
- Progress data on social and economic impact, (i.e., the goal level).

The success of most evaluations depends on effective data collection. If data are to be analyzed by statistical techniques which involve use of a computer, a statistician or ADP systems expert should be consulted early in the evaluation. They may want data to be collected or to be expressed in a particular form; and can frequently suggest shortcuts in data collection.

It may be necessary to describe in detail the methods by which the data were collected and the procedures used in obtaining the sample. The statistician should be aware of what happened in the data collection stage so that if errors are present, they will not be compounded during the analysis.

THE EVALUATION PROCESS

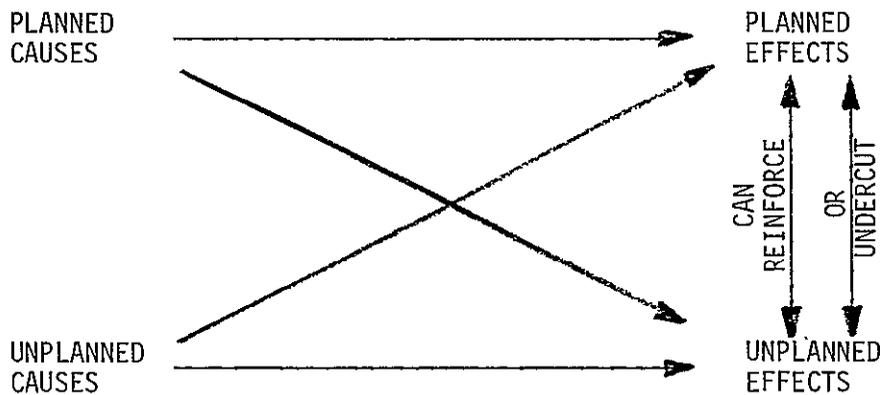
- ** MEASURE PROGRESS
- ** ASSESS UNPLANNED CHANGE
- ** SEARCH FOR CAUSAL FACTORS
- ** DRAW CONCLUSIONS AND INFERENCES FOR REPLANNING

Progress assessment is relatively straightforward. Information on the availability and installation of inputs and the production of outputs may simply need to be summarized, and compared to planned target levels. Analysis of the suitability and timeliness of inputs will also be needed.

Judging whether the purpose is being, or will be achieved, is often difficult until the later stages of project implementation, and in many cases, even after AID disbursement has been terminated. Nevertheless, evaluators should search for evidence whether the development hypotheses linkages still appear valid and whether inputs and outputs are suitable and adequate to permit achievement of the project purpose.

- Analyze data for
 - (1) amount of change
 - (2) direction of change
 - (3) rates of change
 - (4) nature of change
- Interpret the data
 - (1) Was the planned purpose (or intermediate target) accomplished?
 - (2) Did it make a significant impact on broader development goals?
 - (3) Was it worth the cost and effort?
 - (4) What lessons are there to be learned?
 - (5) What were the critical factors that determined the outcome?
- Note changes not in logframe
- Consider their causes
- Decide whether they help or hurt project

Unexpected effects are an important topic of an evaluation. Project design hypothesizes planned causes and effects. But causes, (especially in the uncertain socio-economic environment of a less-developed country) may also result in some unexplained effects. Furthermore, unplanned causes may contribute to planned effects, while causes and effects can also interact with each other in a complex manner.



The impact of unplanned causes and effects may be beneficial, detrimental, or both. For example, cooperation among farmers on an irrigation ditch may lead to cooperation for marketing. Much of the unexpected impact may be ecological. In any event, the effects should be appraised. Periodic evaluations during the life of a project provide an opportunity to identify unexpected factors and take them into account before a project or its environment becomes seriously distorted.

Even where progress toward established targets is proceeding as planned, the evaluators should attempt to determine the extent to which such progress is attributable to the project or to other factors. This often requires comparison of the project area with an untreated or "control" area. For example, if agricultural production increased in an area with an agriculture production project, did it also increase elsewhere in the country/region where conditions are similar but where there was no project? If the project area obtained greater production than the untreated area, then we can probably conclude that the difference was, to some extent, attributable to the project. If the difference in production of the two areas was slight (i.e., statistically insignificant) then the evaluators must seek alternative explanations. For example, to what extent was the change due to weather or prices, rather than to the project?

If it can be established that the contribution of the project to date is not statistically significant and the likelihood of it doing so is low, then the evaluator should recommend that the project be modified or discontinued, and its resources allocated elsewhere.

If progress assessment indicates unsatisfactory progress toward planned output targets, the evaluators must search for an explanation. For instance:

- Resource inputs not available when or where needed; not appropriate; or not adequate in amount and/or quality.
- Over optimistic implementation plan in scheduling commodity/equipment deliveries, construction, training or some other implementation action.
- Inadequate performance of one, or more of the implementing agents (suppliers, trainers, contractor/PASA, AID/W back-stoppers, the host country, other donors).

If scheduled progress toward project Purpose is not occurring, it may be that the project design was unrealistic (i.e., expectation levels too high, inappropriate project strategy). Contributing and/or causal factors often are:

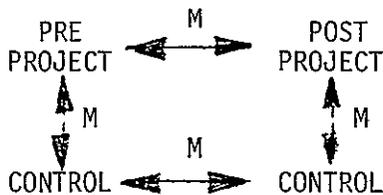
- Host Country: enthusiasm and support;
capability to finance project requirements
managerial capacity;
will and motivation to tackle institutional,
social and legal obstacles.
- Performance of collateral projects, programs and policies
contributing to the same sector goal.
- Effectiveness of incentive systems and motivational
techniques.
- Behavior of market forces, changes in effective demand,
absorptive capacity.

During the later stages of implementation, it is often possible to detect early signs of the project impact on the target group and contribution to the subsector or sector goal. If this is not beginning to occur, the contributing and/or causal factors might be:

- Level and nature of economic activity, e.g., demand, price
and employment levels.
- Policy, legislation and institutional factors impinging on
the project.
- Political climate stability.

Search for Causal Factors

If a "Control" exists, the differences between it and the project should be carefully noted at the outset and followed up afterwards. The difference can then be attributed to the project.



If no control exists, search for a plausible alternate explanation. Could something other than our project have caused the change?

If there is a persuasive alternate explanation or a number of plausible alternate explanations then the probability that our project caused the change will be lessened.

The following aspects should be closely examined:

| <u>INTERNAL</u> | <u>EXTERNAL</u> |
|-----------------|--------------------------------|
| Performance | Level of economic activity |
| Design | Response to incentives |
| Strategy | Response to innovation |
| Technology | Shift in government priorities |
| Inputs | Change in price structure |
| | Decrease in effective demand |

ANALYSIS OF LOGICAL FRAMEWORK LINKAGES

INPUTS

Are the inputs being provided on schedule?

Is there a reasonable expectation that the schedule will be maintained? What changes are necessary?

If the inputs have not been provided on schedule, is there any evidence that this has adversely affected attainment of the project outputs? What changes are necessary?

TRANSFORMATION OF INPUTS TO OUTPUTS

Is the project technically sound?

Does it meet FAA Section 611 & 201(b)?

Is it administratively sound, i.e., is it based on a viable organization which has sufficiently trained manpower, management and budget to operate and maintain the facilities planned for?

If not, improvements in these aspects should precede other implementation efforts.

If the inputs are provided on schedule, is it reasonable to expect that the outputs can be produced on schedule? If not, what changes are necessary? If you are uncertain, three primary factors should be examined:

- Does the type, quantity or timing of the inputs need revision?
- Are the project output expectations realistic?
- Are the assumptions realistic?

As a result of this review, changes may be required in the assumptions, input requirements and/or output expectations.

Reflect in the logical framework those changes that can be made by the participants in the logical framework design/evaluation.

Note changes which are required, but should have the concurrence and/or coordination with top management.

TRANSFORMATION OF OUTPUTS TO PURPOSE

Is the project socially sound?

Is the project economically sound?

Are any adverse effects of the project outputs evident?

Are there any unplanned effects evident? Are they positive?
neutral?
negative?

Is it reasonable to contemplate that the conditions expected at the end of the project really will represent achievement of the project purpose?

TRANSFORMATION OF PURPOSE TO PROGRAM, SECTOR OR SUBSECTOR GOAL

This link takes us beyond the activities which project personnel can normally control. Here we must expect, and look for the "spread effect" to appear as influencing other program, subsector, or sector activities.

Are you satisfied that the achievement of the project purpose will make a meaningful contribution -- either directly or indirectly -- towards the achievement of the program or sector goal, taking into consideration the extent of the problem and the magnitude of the inputs?

Are the indicators of project impact reasonably related to the goal?

Are there any indications of the project influencing other programs or project activities?

REPLICATION

If the project was a pilot, or demonstration project, did it demonstrate that it was worthwhile in its target area?

Can the input/output ratios be replicated on a larger, or national scale?

Are major modifications required before replication is undertaken?

Is it replicable in whole or part?

Does the government have the personnel and budgetary resources available to carry out the replication?

Is additional AID supporting assistance required? If so, what kind?

Some Methodological Problems in Evaluating Projects

Evaluation raises several methodological issues which are noted below:

Aggregate Indicators: Some of the usual aggregate indicators of economic progress (such as GNP) may show overall improvement without any benefit being realized by the poor. Averages may conceal the actual effect within target groups. Therefore, specific indicators need to be differentiated by beneficiary groups and expressed in terms of ranges or variances among participants. In a production project, for example, the question is not simply whether more wheat was produced, but whether the increased production is attributable to small farmers, and to what extent the incomes of the small farmers were affected by the increased production.

Proxy Measures: One of the indicators of well-being frequently listed for Project Goal levels is per capita income. This is almost impossible to measure directly, because people may not recall the amount of cash earned, nor know the value of income in kind. Even if they do know, they are not likely to reveal the information. There are two practical ways of ascertaining change in per capita income. One way is to use several proxy indicators. These may be items which people in that particular country buy when they have some marginal increase in income, savings in cooperatives or banks, sales by local merchants, or government revenue collections. Rises in such proxies will indicate that income is rising even if they do not tell accurately how large the rise is. Several proxies will give a more complete and reliable basis for judgment than one proxy. The other way is income accounting. Data is collected on quantities sold, bought and consumed. Then the researcher puts prices on these quantities. By subtracting purchases of inputs (costs) from sales and consumption, an estimate of income is derived.

Apparent Increase in Problem: In many projects, there is often an apparent rise or increase in the problem situations being treated, due to the improved collection of data about the problem. For example, in an area where no health records are maintained on a particular disease, the project which initiates treatment for the disease and simultaneously keeps records on detection of new cases, may discover many more cases than were previously thought to exist. Spurious analysis of baseline and post-project data might draw the inference that there is a high correlation between treatment and incidence.

Institutional Effectiveness

One of the factors to be considered during evaluation of an institution-building project is whether the institution is mature enough to operate satisfactorily without outside help. This cannot be easily evaluated while advisors are still present. Management may have to gamble that local staff will rise to the challenge when the responsibility is entirely theirs, or that they will learn from their mistakes before much harm is done. One useful device may be to arrange for one or two return visits by former advisors. The progress of the institution in its first stages of independent operation can then be assessed, with suggestions for future activities.

Institutional Effectiveness (Continued)

Indicators for Institution Building projects should explicitly identify the type of internal changes expected. However, achievement of these changes is not the final test of effectiveness. Institutions are built to provide services, or products, for target groups. Thus effectiveness should be measured by its impact on beneficiaries.

Lack of Data

Occasionally evaluators discover that predictions about availability, or applicability, of data to measure project progress were incorrect and/or means to obtain the required data do not exist. Arrangements should be made promptly to collect the minimum data necessary for the future. For the past, it may be possible to reconstruct some of the necessary information by files search, or by special survey. Such activities often require additional financial support.

PROGRESS MONITORING - CONTRACTOR PERFORMANCE

The AID Project Manager is required to monitor contractor performance and to periodically make an evaluative report. If performance is below par, do not rate it "acceptable" or "as planned". This will only defeat the primary purpose of the process: -- initiate remedial action. Furthermore, the project manager may eventually be placed in the embarrassing position of having the project clearly in trouble, while according to all previous records, most if not all performance factors had been rated "as planned".

Actual impact compares performance with plan.

Importance indicates the extent to which that aspect is critical to project success.

Any factor rated important which is also rated either Negative or not applicable presumably demands management attention. However, remedial action may be difficult, if not impossible in some circumstances.

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CHECKLIST FOR AN EVALUATION STUDY

- Objectives
- (1) What is the evaluation study (not the project) objective?
 - (2) Does the study have a potential for providing new (and needed) information? A new method? Technique? Procedure? Policy?
 - (3) Will the final results be important or significant for the project or program? Might they change some policy or way of doing things? Would confirmation of validity of earlier expectations warrant the cost of the study?

- Methods
- (1) Are the techniques, instruments, or modes of inquiry appropriate to the study design in the foreign context?
 - (2) Will the methods require adaptation to a local condition? Will this adaptation do violence to the design?
 - (3) Are there sampling problems?
 - (4) If interviewing or opinion-survey techniques are to be used, have the questions been reviewed for meaningfulness in the local language and culture? Good taste? Political sensitivity? Religious connotation? Language problems?
 - (5) Will the methods gather more data than required? Less?

- Data Processing
- (1) Are the procedures for the statistical manipulation of the data stated clearly? Is there a clearly conceived plan for the analysis that will be done once the data have been collected?
 - (2) Have statisticians or ADP systems experts been consulted regarding the program to be used?
 - (3) Are the analytical procedures likely to produce meaningful statements?

- Analysis and Interpretation
- (1) Have a wide variety of potential findings been considered?
 - (2) Does the logic or design of the study permit clearly stated generalizations?

- Costs
- (1) Are the dollar costs for the evaluation study reasonable for the various categories (personnel, travel, supplies, overhead, etc.)?
 - (2) Are local currencies being used to the maximum extent possible?
 - (3) Are there luxury or unnecessary items in the budget?
 - (4) Has the budget estimate omitted consideration of some item (services by foreign personnel, differences in living costs from one place to another, etc.)?
 - (5) Are the total costs proportional to the scope or importance of the study? Is the study worth the cost?

- General
- (1) Will the study answer the questions it set out to answer?
 - (2) Will it produce explicit and usable results?
 - (3) If it is not completed, will there be salvage value?
 - (4) If the study is completed -- THEN WHAT?

COLLECTION AND
STATISTICAL ANALYSIS
OF DATA

DATA COLLECTION

Even in less-developed countries, where statistical services are not very well developed, there are likely to be substantial sources and amounts of data. Such data must be approached with caution however. The major problem is that data which is routinely collected by others (particularly self-reporting of progress) may not be very reliable because of built-in biases of the collectors or the manner in which collected. Furthermore, the scope of coverage of data already on hand may differ from the requirements for a specific project.

There are three basic methods for obtaining data about a project:

- Direct Measurement
- Observation, and
- Interrogation

Direct Measurement is the most accurate, when it can be done. Devices, such as scales, yardsticks, surveying equipment, etc., are usually used and measurements recorded in standard units. Thus, relatively little judgment is involved. Accuracy depends upon the recorder's familiarity with the measuring device, its appropriateness for the particular situation, and the care with which the results are recorded. One limitation is that people under study are usually very conscious that measurements are being taken about them, their property or productivity, and often react in some manner which tend to bias the results, positively or negatively.

Observation relies much more heavily upon the ability of the observer to perceive facts, patterns and relationships. It can be done in either a participatory or non-participatory manner, and is a reasonably unobtrusive method for collecting data. It tends to be more subjective than direct measurement..

Interrogation can be done in many different ways to gather a wide variety of information. It relies heavily upon the willingness of the respondent to cooperate, as well as the skill of the questioner in asking and interpreting the responses.

Other problems exist which hamper the collection of data. For instance, the invasion of family privacy may be resented, and different languages or dialects in the same country compound interviewing problems. It is often difficult to find trained interviewers; travel may be difficult because of terrain, poor roads, lack of vehicles and lodging facilities. Often there are travel restrictions.

For a fuller treatment of this topic in connection with AID-supported projects, see the Manager's Guide to Data Collection, November 1979; prepared by Practical Concepts Incorporated, and printed and distributed by the Office of Evaluation, Bureau for Program and Policy Coordination, Agency for International Development, Washington, D.C. 20523.

Characteristics and Attributes of Measurement

Measurement: is the act or process of ascertaining the dimensions, capacity amount or direction of some variable, on a qualitative or quantitative scale, e.g., establishing the rate and amount of growth of agricultural yield. A measure is a unit or standard of measurement, e.g., tons of grain per hectare.

An indicator measures or demonstrates the kind, quantity, quality, direction, location, time and other explicit dimensions of change occurring in a variable; e.g., an annual rate of increase of yield of 'x' tons of high quality bulgar wheat/per hectare in the South East Province river valley; from 'y' tons in 1980 to 'z' tons in 1981.

There are four principal kinds of measurement:

- Nominal or categorical measurement, which establishes classes based upon characteristics, e.g., 3,000 children are in age group A, 2,500 are in age group B. This kind of measurement uses cardinal numbers; 1, 2, 3, etc.
- Ordinal measurement, which places an item in some position on a numerical scale or sequence, (e.g., x is 34th in a group of 100). When there are only two levels or choices on the scale, the ordinal measurement is called dichotomous. When there are more than two, the term continuous is used.
- Interval measurement, which is concerned with the distance between the levels on an ordinal scale. The interval may be constant, or variable.
- Ratio measurement, which permits the formulation of ratios based upon ordinal values, e.g., hectares per year, children per teacher, calories per person.

Validity refers to the degree with which a measure or indicator does what it purports to do. Several of its dimensions are noted here.

- Relevance is a significant, substantial and demonstrable congruence with the variable being measured.
- Bias is a measure of accuracy, and is concerned with the extent to which the measurement is representative of the population being measured.
- Sensitivity is the ability of the measurement to detect and record individual units which possess a trait which is to be measured but which may not be obvious or easily discerned, e.g., small farmer lack of confidence in a new extension agent.
- Specificity is the ability of the measurement to exclude individual units which do not possess a trait to be measured but which may not be obvious.
- Comprehensiveness occurs when the measurement addresses all significant aspects of the variable being evaluated.

Reliability is the extent to which a measurement produces stable, consistent results when repeated by different observers or under different conditions. Factors contributing to unreliability include:

- the nature of the variable being measured. Measuring the length of a road should produce reliable data; the attitude of a target population will be a less reliable measurement.
- measuring instruments (e.g., interview schedules) which have not been adequately field tested or standardized; and data collectors who have not been properly trained.
- inadequate sample selection Too small a sample, or a sampling of unrepresentative elements from the total population could distort the conclusions drawn from the data.

Measurement Error

Error in measurement is unavoidable. Errors of a random nature (overestimation some times, underestimation at others) can be reduced by careful application of tested data collection instruments. Errors of a systematic nature (e.g., consistent overestimation) can be discovered by repeated measurement of the same variable using different instruments, evaluators, times, etc.

SAMPLING

Scientific Sampling is the use of efficient and effective systematic methods for collecting, interpreting and presenting data in a quantitative manner to facilitate understanding. Scientific sampling is not infallible, but bias can be eliminated to a great extent, and the probability of being correct ascertained.

The prime purpose of scientific sample surveying is to assist program management and policy decision making. If sufficient secondary data¹ relevant to the problem is already available, it may be used as the basis for decision-making. If secondary data is unavailable, or insufficient for the purpose, primary data² should be collected. Thus the need for a survey is created.

COMPARISON OF SCIENTIFIC WITH NON-SCIENTIFIC (OR JUDGEMENT) SAMPLING

| <u>Principal reasons for Scientific Sampling</u> | <u>Disadvantages of "judgement" Sampling</u> |
|--|---|
| 1. Bias and subjectivity in selecting sample units can be minimized | 1. Although seemingly logical, personal biases can severely limit the data collected; the findings may be invalid; and subsequent utilization can lead to gross errors in policy and program management. |
| 2. Precise quantitative statements can be made regarding how representative the sample is of the population from which it is drawn. | 2. The validity of "judgement" data cannot be estimated. |
| 3. The probability of being correct (or incorrect) can be estimated. | 3. The degree of accuracy of "judgement" data cannot be quantified. |
| 4. Scientific sampling is efficient, effective and economical, since the smallest sample size necessary to meet management's specifications can be calculated. | 4. The sample drawn by a "judgement" may be much larger than necessary to do the job (and consequently wasteful of resources); or too small to reflect the situation accurately, which in addition to wasting resources will also fail to provide management with an adequate assessment. |

In short, the validity of a "judgement" sample is generally limited to the sample itself, and cannot be applied to a larger population with any degree of confidence.

Furthermore, because there are many different sources of errors in mass data, sampling is generally more accurate than 100% enumeration and much more practical. For example, varying interpretations by many people of a common guideline, incomplete responses, errors in processing the data, delays in processing because of the volume. Such errors are not easily controlled; hence the smaller the sample, the less opportunity for mistakes to enter. Thus, a carefully controlled sample, even though small, is an invaluable aid in project management, and policy making.

-
1. Data originally gathered by someone else for another purpose.
 2. New and original data.

DETERMINING SAMPLE SIZE

As a general rule of thumb, statistical techniques can usually be effectively applied when at least 30 measurements are obtained at random. This is usually insufficient however to present findings with any quantifiable degree of confidence.

Time, money and effort can be wasted if the sample is either larger or smaller than required to meet the specified needs of management. More samples than required waste resources, while fewer samples than necessary give results with less than the required reliability.

Two popular, but erroneous misconceptions should be reviewed; that:

- (1) a sample should be some percentage (say 5% or 10%) of a population under study.
- (2) a large sample should be taken from a large population, and a small sample from a small population.

Neither of these is correct.

In determining the size of a sample the actual numerical size is usually far more important in determining the reliability of the results than the percentage size.

Furthermore, the size of the population is a minor factor in determining the size of the sample.

The results of a survey are applicable to the total population from which the sample was drawn. Therefore it is economical to sample from as large a population as possible, given the limitations of homogeneity.

The most important criteria for determining the size of a sample are:

1. VARIABILITY in the population under study.
2. ERROR that will be tolerated in the findings.
3. CONFIDENCE desired when presenting the findings, that the data is accurate.
4. RESOURCES available to obtain the data, conduct the survey and process the findings.

The first three of these criteria can be used directly in a formula to determine sample size. The fourth is a factor at management's discretion to modify its specifications of "2" and "3".

In order to determine the appropriate size of a sample, you must first establish the type of situation to be studied. One of two formulas can be used, depending upon whether you are seeking your answer in terms of an average or a percentage.

CRITERIA FOR DETERMINING SAMPLE SIZE

VARIABILITY. This is the "Standard Deviation" of the population under study calculated from the formula below. For practical purposes it is based on the first thirty samples drawn.

$$S = \sqrt{\frac{\sum d^2}{N}}$$

Where

S = Standard Deviation

$\sum d^2$ = Sum of squared differences from the mean

N = Number of items in the group

A more expedient (but less accurate) method for assessing Variability is to use one-sixth of the estimated range, based on historical data, experience in similar situations, or local "expert" opinion. In general, the greater the variability in the population, the larger the sample must be.

TOLERABLE ERROR. Any findings developed from a sample survey will only be approximations, no matter how scientifically they were obtained. Management must specify how precise it wants the answer to be -- within 1, 5, 10 or more units (or percentage points). In general, the greater the desire for accuracy, the larger the sample must be.

CONFIDENCE Desired. When presenting the findings, how sure do you want to be that the answer is within a particular range? It is never possible to be 100% sure, when dealing with samples. Generally, to increase the Confidence in an estimate, a larger sample must be taken.

OPTIMUM SAMPLE SIZE FOR ESTIMATING A MEAN

$$S = \frac{D^2}{\left(\frac{E}{K}\right)^2}$$

Where

S = Optimum Sample Size

D = Standard Deviation of data in the population

E = Size of the mean error that management will tolerate

K = Confidence with which you wish to present the findings

Selected Values of

| <u>K</u> (Standard Error) | Confidence as a Percentage (%) | Numerical "odds" |
|------------------------------|-----------------------------------|------------------|
| 1 | 68.26 | 2:1 |
| 2 | 95.44 | 20:1 |
| 3 | 99.74 | 369:1 |

OPTIMUM SAMPLE SIZE FOR ESTIMATING A PERCENTAGE

$$S = \frac{(100 - P) \times P}{\left(\frac{E}{K}\right)^2}$$

Where

- S = Optimum Sample Size
- 100 = Constant (100) in all equations
- P = Preliminary estimated percentage
- E = Size of the percentage error that management will tolerate
- K = Confidence with which you wish to present the findings

Preliminary Estimated Percentage. Similar to the need to determine the variability of the population ("D") in the previous formula, in this situation you must select a percentage between 1 and 99. (0 and 100 do not compute!) you should be aware of the following general trends.

| | | | | | | | |
|------------------------|-----|----|-----|------|------|------|------|
| Where "P" = | 0 | 1 | 10 | 20 | 30 | 40 | 50 |
| or | 100 | 99 | 90 | 80 | 70 | 60 | |
| Then "(100 - P) x P" = | 0 | 99 | 900 | 1600 | 2100 | 2400 | 2500 |

Thus, if you have no "feel" for the situation, and can get no expert opinion, you can play safe by using 50%, as this gives the largest possible result.

Practically, you should increase the actual sample size over the optimum size to protect against possible error in estimating the standard deviation, to allow for some non-response during data gathering, errors in compiling data, and other loss because of inaccessibility, etc. Additional samples will increase the reliability of the estimate, while fewer samples than specified will lessen its reliability and perhaps fail to meet management's requirements.

SCIENTIFIC SAMPLING METHODS

Once you have established "How Many" samples to draw from a population, the next important problem to be resolved is "Which ones?" Random sampling is selection of items from a given population in a manner which assures that each item has an equal chance of being selected.

There are several methods for drawing samples, each of which has certain advantages depending upon the circumstances. If each item in the population is considered to have equal importance, you can take either a "SIMPLE" or a "SYSTEMATIC" RANDOM SAMPLE. If on the other hand you know that the characteristics of the items in the population differ markedly and it is possible to classify them, you might want to select samples from each of these groupings in order to improve the validity of the survey: This more sophisticated approach is known as "STRATIFIED RANDOM SAMPLING."

Finally, because of the difficulties in field travel in some situations, and/or in order to reduce travel time and costs, "CLUSTER" sampling may be the only practical means for conducting the survey.

SIMPLE RANDOM SAMPLING

Table of Random Digits

A good "scientific" method in simple random sampling is to use a table of random digits, such as the one on the following page. These tables are carefully constructed to utilize the digits 0-9 in a completely unstructured, unsystematic, random manner, with each digit occurring with about the same frequency.

The process is as follows:-

- FIRST, Obtain a count of the total population under study.
- SECOND, Use the total size of the population to determine the grouping of random digits in the table that will be used. (For example, if the population is between 10 and 99, use groupings of two digits; between 100 and 999, use groupings of three digits and so forth).
- THIRD, Assign sequence numbers to the population under study. (Select any point in the table to start, grouping as explained above.)
- FINALLY Proceed in any systematic manner, (i.e., down, across, etc.) selecting and recording those numbers that fall within the population range (disregarding numbers outside the range) until the total designated sample size has been selected.

An important aspect of using a random digit table is that by recording your working method and including the particular table used with the survey results, any charge of bias can be disapproved. Hence the objectivity, relative validity and reliability of the survey is assured. This is especially important in highly controversial or crucial policy situations.

¹ *Population* is used in statistics to signify the total number of things from which you are going to draw samples.

SELECTING SAMPLES WITH A DECK OF CARDS

A practical field method for drawing random samples from a population is to use an ordinary deck of playing cards. Here you have a systematic 2,4,13 or 52-base selection pool, using the whole deck¹, or any intermediate size population, by eliminating some cards or disregarding and reselecting, if drawn. The deck of numbers is easily "randomized" by shuffling, cutting and drawing. As in using random digit tables, sequence numbers must be assigned to the population.

For populations larger than 52, you must employ a "multi-stage" method. To do this, initially sub-divide the group, and make a few preliminary eliminations before sequence numbering and selecting actual samples from each final group and/or sub-group.

This procedure introduces some problems. Unless you are careful it may not be as objective as a random digit table.² Nevertheless, it has certain practical advantages. It is a readily available and employable method under most field conditions, particularly where random digit tables are difficult to apply or cannot be employed because of the laborious (and often impossible) task of sequence numbering every item in a vaguely defined population. With cards you can work quite flexibly and rapidly, where the total population is not masterlisted or well defined.

Psychologically, the attempt to eliminate subjectivity and the concept of chance can be more appreciated by the people you are surveying. After you have chosen their area to be surveyed by a previous sub-grouping, it is a useful "ice-breaker" to have the field management staff "participate" in the selection of farmers to be interviewed by cutting and selecting cards for you.

For example, although you may know in gross numbers how many farmers are enrolled in a program by province, you will not usually know their names.³ Thus it would not be possible to select which farmers to visit. However, by a preliminary drawing you may select several provinces to survey. Upon arrival at each province, you may further select several municipalities to visit, and upon contact with the municipal management team, several villages and ultimately several farmers can be selected from the farm management technician's master-list.

1 2- Red/Black; 4 - Heart, Club, Diamond, Spade; 13 - Ace through King regardless of color or suite; 52 - Hearts 1-13, Clubs 14-26, Diamonds 27-39, and Spades 40-52.

2 If the groupings, and divisions into sub-groupings are not equal and symmetrical, the individual items in the population will not have an equal chance of selection.

3 Nor should you. Generally it is not necessary nor desirable to accumulate masses of detailed data at higher management levels.

SYSTEMATIC RANDOM SAMPLING

This method purposely selects items from all parts of the population in a systematic manner, without bias, rather than attempting to pick items at random.

To use this method:-

1. Assign one sequence number to each item in the population.
2. Determine the "skip interval". Divide the number of units in the population by the sample size.

$$i = \frac{P}{S}$$

Where

i = skip interval
 P = Population Size
 S = Sample Size

3. Select a random starting point from the population (Use a random digit table)
4. Include that item in the sample, and every "i"th item thereafter, until the total sample has been selected.

Caution: Sometimes, items in a population are arranged in a particular order or pattern which may be repetitive or cyclical. If this is so, and the skip interval is on the same cycle, your sample items may not be representative of the total population but instead may all have the same characteristic.

For instance, you might decide to survey work activity in field offices using particular times of the day for sample observations. If you should happen to select a 2 hour skip interval, and start at 8 a.m. -- with a sampling of activity at 8 a.m. 10 a.m. 12 noon 2 p.m. 4 p.m. and 6 p.m. you might draw the conclusion that there is very little work going on since at most times people were arriving, on break, or leaving the office to go home!! This is an obvious case of using the skip interval inappropriately, but many other situations may be less obvious.

STRATIFIED RANDOM SAMPLING

If it is known ahead of time that the characteristics of some items in the population differ markedly; that these differences are significant to the problem being surveyed; and it is possible to classify these items on the basis of their characteristics; you can get a more accurate picture of the total population by selecting a random sample from each group.

For example, if we were studying the yields of rice farms in a province, it might be useful to stratify the farms by "irrigated", "rainfed" and "upland" since these characteristics are already known, can be classified, and are significant factors in determining yields. The result would be much more meaningful than merely selecting farms at random without regard to stratification.

Whenever possible, the sample size drawn from these stratifications should be proportionate to the size of the group, as this reduces the analytical problems in evaluating the results. For instance, if we wanted to take a sample of 200 hectares from a province stratified as indicated below, the sample size for each category should also be based on the same percentage. Thus:-

| <u>Stratification</u> | <u>Hectares</u> | <u>Percentage</u> | <u>Sample Size</u> |
|-----------------------|-----------------|-------------------|--------------------|
| Irrigated | 35,000 | 46.5% | 93 |
| Rainfed | 31,228 | 42.2% | 84.4 |
| Upland | <u>8,500</u> | <u>11.3%</u> | <u>22.6</u> |
| TOTAL | 75,228 | 100% | 200 |

Sampling within each stratum can then be done by any of the other methods discussed.

CLUSTER SAMPLING

Where time limitations and/or difficult field travel conditions make it impossible to obtain data any other way, cluster sampling is often resorted to as the only practical means to gather data. For example, it may take two or more days for an interviewer to obtain responses from ten farmers by simple random sampling if they are scattered all over the province, as this may mean extensive travel from one remote village to another.

With cluster sampling, instead of selecting data from many different geographical locations, more respondents are queried at fewer locations. Whenever possible, the total appropriate population (for instance all rice farmers in a selected village) should be interviewed. Thus by randomly selecting two villages, and interviewing as many farmers as possible within those villages, many more farmers may be contacted in a much shorter time period.

Because the samples will be drawn from a more limited cross section of the total population, it is desirable to go beyond the minimum sample size specifications. Furthermore, as many clusters should be selected as can be accommodated by the time/budget limitations. Clusters should be approximately the same in size.

It is important to remember that the clusters themselves should still be selected on a scientific rather than a judgement basis. Furthermore, if sampling is desired within the cluster (rather than the entire group), it too should be done randomly.

THE QUESTIONNAIRE

There is no such thing as an "ideal" questionnaire. Nevertheless there are certain useful ground rules that can facilitate their construction.

QUESTIONS

- a. Single Purpose:- Whenever possible, limit the survey to a "single purpose". A poor, but frequent, practice is to try to accommodate the needs of several different management groups in one survey, rationalizing that "it doesn't take much longer to ask another question while you are there" and "it is cheaper than running a separate survey" etc. Unfortunately, a "multi-purpose shopping expedition" usually results in a cumbersome census-type document that may never be completely analyzed, but which will effectively hinder the gathering and processing of data for the primary intended purpose. Furthermore a sample survey that is properly structured to meet a specific need is generally not a suitable vehicle for answering multi-purpose questions from the same sample base. Consequently, even if analyzed, the additional data may be invalid.
- b. Plan Ahead. Work backwards, by planning the questionnaire in terms of the final report. Analyze whether the right questions have been included to provide the answer requested.
- c. Limit the Number. Each question takes time (and costs money) to ask, process and analyze. Therefore be selective. Screen each proposed question carefully and decide whether the respondent is the appropriate source, or whether such answer can be more readily obtained elsewhere. If a questionnaire becomes too long, attention and accuracy of both interviewers and respondents decreases.
- d. Avoid "Leading" Questions. Many people respond to please the questioner, or to avoid embarrassment they tell what they think he/she wants to hear. Others deliberately distort their answers depending how they perceive the answer may be used. You cannot eliminate all problems in this area, but you can improve the survey considerably by being careful to phrase your questions as objectively as possible to avoid hinting at the "desirable" answer.
- e. Avoid "Memory" Questions. Questions which rely on an individual's recall and cannot be verified in any meaningful way are likely to have a high degree of inaccuracy.
- f. Cross-Check Questions. If there is likely to be a strong element of doubt or distortion in the answer, provide for some "probing" or objectively verifiable cross-check questions, if possible. (Note: it is not usually necessary to record the responses to probing questions.)
- g. Clarity. Even though the question is clear to you, and you know precisely what you mean by it, make sure that others will interpret it in the same way. Otherwise, each interviewer will interpret it in the field in his/her own terms, and you may end up with confusing and/or useless results. If necessary, rephrase the question, and/or provide additional guidance on what it means, definitions, etc.
- h. Pre-test your questions on others before deciding on the exact wording to be used in the questionnaire. This is absolutely essential. Questions which appear clear and straight-forward to the survey designer may prove to be confusing to the respondent and elicit answers which are not relevant, because of cultural problems.

QUESTIONNAIRE FORMAT

The following guidelines are provided to facilitate both the gathering and tabulation of the data.

a. Identification. Each question and possible response should be uniquely identified with either a number, letter, or both; so that in the processing and analytical stage they may be readily referred to without repetition or reference to the subject matter itself.

1. Question a. _____ Yes
 ? b. _____ No

b. Multiple Choice Structure the format so that as many questions as possible can be answered with a check mark. Spell out categories in which responses are expected.

2. Question a. _____ Always
 ? b. _____ Sometimes
 c. _____ Never

c. Numbers When numbers are required for an answer, indicate the unit that is required. Leave space for raw data to be recorded in other units. (Often in the field, responses are not in terms of the units desired, and recalculation must be done prior to tabulation.) If no space is available, the raw data may be inserted where the standardized unit response should go, which leads to gross errors.

3. Question a. _____ Metric tons
 ?

d. Spacing Leave plenty of "white space" around each response. The answer is going to be filled in under field conditions, not small typing. Also make allowances for comments by the interviewer.

e. Block Answers Standardize the manner for recording answers. Usually, a left hand or right hand column is easier for processing than responses scattered throughout the form, or on a single line. For multiple responses of varying length. It is easier to both record and tabulate the answers when the blank space precedes, rather than follows the item. For example:-

4. a. _____ Yes Question:
 b. _____ No ?
 c. _____ Don't know ?
 d. _____ Haven't made up my mind yet

Instead of:-

4. Question:
 ? a. Yes _____ b. No _____ c. Don't know _____
 d. _____ Haven't made up my mind yet

or:-

4. Question: a. Yes _____
 b. No _____
 ? c. Don't know _____
 d. Haven't made up my mind yet _____

CONDUCTING THE SURVEY

Some general guidelines which should be observed are as follows:

- a. Brief the Interviewers. Ensure that all the interviewers have a common understanding of the purpose of the survey, definition of terms, the meaning of the questions to be asked, and a uniform way to record answers. Provide guidance on procedures to follow when they encounter difficulties. If possible, provide for a "dry run" interview session to supplement the orientation process.
- b. Interviewing Procedures. Differences in interviewers personalities and questioning techniques will affect the responses they obtain. The effect of this can never be eliminated, but it can be minimized. The following are general points that should be kept in mind by the interviewers.

Introduction - Introduce yourself.

Verify who you are speaking to.

Put the individual being interviewed at ease.

Tell the reason for the survey and the use to which it will be put.

Tell the individual how he/she was selected to be interviewed.

Assure him/her of confidentiality or anonymity of results.

Tell him/her how long the interview is likely to take.

Ask if the time is convenient for an interview now.

See whether there is a suitable place to conduct the interview. (Privacy is often desirable, especially when asking personal questions. However, in many field situations, this may be impossible to obtain as you may become the focal point of the village's "live entertainment".)

Conducting the Interview - Use your judgment whether to follow a structured "questionnaire format" reading off each item; or an unstructured interview style using the questionnaire as a check list, but employing a lot of additional extemporaneous "probing" questions. The structured style may get a response to every answer, but you may scare or inhibit the response, especially if you record the answers in the presence of the person being interviewed. (On the other hand, some people feel more important when they see you writing down what they say, and often think if you don't write it down, you may forget it, and/or fail to pass on their comments.) Unstructured interviewing generally leads to a much more wide-ranging discussion, takes longer and may gather much supplementary data which may also be useful. However, it is not generally possible to statistically analyze such additional data. Sometimes it is critical that every respondent be given only the precisely formatted question, so that responses are standardized. Extemporaneous questioning often introduces interviewer bias.

- c. Field Computations. Use local or familiar measures, and minimize computations by the respondent. Get raw data which can be converted to percentages, etc., later. Most people perform poorly in mental arithmetic, therefore record information in the terms which it is given to you. Note the conversion factor for later use in obtaining the desired unit measures.

CAUTIONS TO OBSERVE IN CONDUCTING SURVEYS

Avoid leading questions, and verify responses for accuracy by cross checking and/or back-track repetition. Often individuals misunderstand what you are asking, or only tell you what they think you want to hear. They may be trying to impress you, gain your sympathy, or avoid discussing the topic at all for lack of knowledge or fear of embarrassment.

For instance, the farmer may understate his yield if he thinks he may be penalized (by taxes or rents) or overstate it if he is trying to compete for "farmer of the year" in the Green Revolution competition! Therefore, you may have to repeat your questions several different ways to ensure that they are understood and the person being interviewed is responding accurately to the best of his knowledge.

Remember - Do not promise anything (except to pass on information) unless you have authority to take corrective action. You are usually only interviewing in the village as an observer and gatherer of facts. On the other hand the individual being interviewed may regard you as a representative of the government who can and should do something about the situation. Idle promises will only result in a lack of confidence and lessen cooperation the next time around.

ANALYZING THE DATA

After the data has been gathered and recorded on the survey forms, it must be edited, weighted, calculated and interpreted.

EDITING. Prior to use, raw data on survey forms, gathered by different enumerators, must be screened by a staff using consistent guidelines. The principal purposes of this are to review for Clarity, Internal Consistency, Correction and Mark-Up for further processing.

Clarity. Data recorded by enumerators under field conditions is sometimes almost illegible and/or unintelligible to a staff editor. Numbers may be illegible, and many cryptic comments may have been added to the standardized responses which might qualify the answers recorded from "Yes" to "Yes , but... "

Whenever possible, questionable items should be reviewed with the individual making the survey. However, this is not always possible, and even then it does not always produce success. The individual cannot always read his/her own writing, and/or does not recall the context in which the comments were made, even though they may have seemed meaningful at the time.

If multiple choice responses have not been used, the editing staff has an extremely difficult task of developing a standardized scheme to classify "open-ended" comments received. In fact it is often impossible at this late stage, since it is highly unlikely that all respondents would comment (or that different enumerators would solicit unstructured comments) in any systematic manner. This emphasizes the need to carefully plan and structure the survey before gathering the data, not afterwards.

It may also develop that some things which were overlooked, or thought not to be important when designing the questionnaire, actually have great significance. Thus some preliminary modification (or even elimination) of questions and responses may be necessary.

Internal Consistency. 1) Check marks may have been placed in more than one option of multiple choice questions even though it was originally specified that only "one of the above" was to be checked. There may be clarifying comments in the "white space" as to why, or there may be no explanation at all. 2) With number responses, editing is frequently required to recalculate the recorded values into the standardized units requested. Sometimes the conversion factor is provided, sometimes it has been overlooked.

Correction. Decisions have to be made on how to treat questionable data. Should the data be rejected outright as erroneous; counted at face value regardless of its apparent error; or retained but reduced in value, with an attempt to figure the "intent" of the editorial task.

Mark-up. Finally, to simplify the data processing task which follows, it may be necessary to transform the check marks in the standardized responses into "Base numbers". For example, if a series of questions were asked about rice farming which are to be analyzed in terms of hectares, the hectarage of a particular respondent's farm will be the base number to substitute for the check marks on his survey form.

To illustrate the problems of editing, a series of questions and responses on a farmer's farming practices are shown "before" and "after".

Before

| 1. | <u>2.3</u> has | Area Farmed | | |
|----|------------------|-----------------|--|---|
| | a. <u>Yes</u> | b. <u>No</u> | <u>DID YOU:-</u> | <u>Comments</u> |
| 2. | <u>x</u> | <u>x</u> | use certified HYV seed? | Only for 1.5 hectares. |
| 3. | <u> </u> | <u>x</u> | use recommended amount of fertilizers? | Not enough urea available. |
| 4. | <u>x</u> | <u> </u> | use herbicides? | |
| 5. | <u>x</u> | <u>x</u> | receive credit from the bank? | Credit received too late for land preparation and transplanting. |
| 6. | <u>x</u> | <u>x</u> | receive assistance from the government technician? | Technician helped prepare farm plan and budget. Did not see him after that. |
| 7. | <u> </u> | <u>ca/ha</u> | What yield did you obtain? (44 kilos/ca) | 135 sacks (at 40 kilos/sack) |
| 8. | <u> </u> | <u>pesos/ca</u> | What selling price did you get? (50 kilos/ca) | Sold 80 of the above sacks for a total of 2,500 pesos. |

AFTER

| 1. | a. <u>Yes</u> | b. <u>No</u> | <u>DID YOU:-</u> | |
|----|------------------|-----------------|--|--|
| 2. | <u>1.5</u> | <u>.8</u> | use certified HYV seed? | |
| 3. | <u> </u> | <u>2.3</u> | use recommended amounts of fertilizers? | |
| 4. | <u>2.3</u> | <u> </u> | use herbicides? | |
| 5. | <u> </u> | <u>2.3</u> | receive credit from the bank? | |
| 6. | <u> </u> | <u>2.3</u> | receive assistance from the government technician? | |
| 7. | <u>53.4</u> | <u>ca/ha</u> | What yield did you obtain? (44 kilos/ca) | $\frac{135 \times 40}{44} = 122.73$ $\frac{122.73}{2.3} = 53.4$ |
| 8. | <u>39</u> | <u>pesos/ca</u> | What selling price did you get? | $\frac{2,500}{80 \times 40} = 78c \text{ per kilo}$ $.78 \times 50 = 39$ |

NOTE: Question 5 & 6 could be edited in several ways. It is important therefore that a decision be reached by the "editor" and held to consistently throughout all subsequent form editings.

WEIGHTING

Whenever a survey is conducted on a Stratified sample basis, it is the raw data responses that must be "weighted" after the data has been collected. This is done to avoid distortion during evaluation when the number of responses from each stratification differs from the original sampling scheme.

For example, we might have planned a survey of rehabilitation efforts in a particular area, stratified according to the reported flood damage; with a sample size of 3600. Because of time and distance limitations, it may not have been possible to contact as many of the farmers (and hectares) as originally intended in some areas; while in other areas more hectares might have been covered. To "normalize" the data, a weighting factor is developed - by dividing the original area designated to be surveyed in each instance by that actually surveyed. Thus:-

$$\text{Weight} = \frac{\text{Original stratification size}}{\text{Actual survey sample size}}$$

For example,

| A Province | B Ha Damaged | C % | D Stratification (Ha to be Surveyed) | E Ha Actually Surveyed | F Weight (D/E) |
|---------------|-----------------|--------|--|------------------------------|-------------------|
| Bataan | 2,000 | 4.348 | 160 | 250 | .64 |
| Bulacan | 9,000 | 19.565 | 700 | 400 | 1.75 |
| N. Ecija | 9,000 | 19.565 | 700 | 1060 | .66 |
| Pampanga | 15,000 | 32.609 | 1170 | 980 | 1.19 |
| Pangasinan | 3,500 | 7.609 | 270 | 270 | 1.00 |
| Tarlac | 7,000 | 15.217 | 550 | 690 | .80 |
| Zambales | 500 | 1.087 | 40 | 100 | .40 |
| TOTAL | 46,000 | 100% | (3590)* 3600 | 3750 | |

Thus an adjustment must be made to any raw numbers in each tabulation to reflect the normalizing effect appropriate for that province. If this were not done some areas would be overrepresented and others underrepresented in the final result.

* Due to rounding off

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GROUPING DATA

After the survey has been completed, and the forms edited, you have a mass of "ungrouped data". The next task is to organize this data into meaningful groupings. Each question to be analyzed must be extracted from the individual survey forms, and all responses tabulated separately.

For example if we were attempting to determine the average palay yield in ca/ha from a sample of 50 rainfed farmers, after weighting we might have the following responses.

68,97,15,45,66, 81,99,105,26,60,78,47,55,72,78,130,85,74,57,86,77,102,47,52,73
69,57,88,73,69,45,101,93,54,65,92,77,85,60,65,58,72,64,73,79,36,83,96,96,67

About all we can readily tell from this ungrouped data is that the yields vary. With a little searching we might also be able to identify the range. These data should be re-grouped from high to low (or low to high) as follows:

| | | | | | | | | | |
|-----|----|----|----|----|----|----|----|----|----|
| 130 | 97 | 88 | 81 | 77 | 72 | 67 | 60 | 55 | 45 |
| 105 | 96 | 86 | 79 | 74 | 72 | 66 | 60 | 54 | 45 |
| 102 | 96 | 85 | 78 | 73 | 69 | 65 | 58 | 52 | 36 |
| 101 | 93 | 85 | 78 | 73 | 69 | 65 | 57 | 47 | 26 |
| 99 | 92 | 83 | 77 | 73 | 68 | 64 | 57 | 47 | 15 |

Now a pattern is beginning to emerge. The range is readily identifiable - span of 115, from 15 to 130 - and it looks as though the "mean" will be in low 70's.

We can either proceed with calculations at this stage, or reduce the number of items to be manipulated by summarizing them into groups. For very large collections of data, grouping into "frequency distributions" is extremely helpful to avoid a lot of tedious arithmetic. Concentration also highlights the essential pattern of the total collection.

Number of Groups. "How many groups" a collection of data should be condensed is largely a judgment factor. Generally, the fewer the number of items, the fewer the number of groupings. A good rule of thumb is around 15 groupings, with a range from 8 groupings (for about 100 items) to 25 groupings (for about 1000 items). Since the objective is to reduce the amount of arithmetical manipulation, and reveal any meaningful pattern in the data; convenience, rather than mathematical precision is the dominant consideration.

A frequency distribution table for our example with 10 groupings, mid-points and frequency, is as follows:-

| <u>Lower and Upper Limit</u> | <u>Mid-point</u> | <u>Frequency</u> |
|------------------------------|------------------|------------------|
| 14 -- 25.9 | 20 | 1 |
| 26 -- 37.9 | 32 | 2 |
| 38 -- 49.9 | 44 | 4 |
| 50 -- 61.9 | 56 | 8 |
| 62 -- 73.9 | 68 | 13 |
| 74 -- 85.9 | 80 | 10 |
| 86 -- 97.9 | 92 | 7 |
| 98 -- 109.9 | 104 | 4 |
| 110 -- 121.9 | 116 | 0 |
| 122 -- 133.9 | 128 | 1 |

With a continuous distribution from 14 to 133.9, subdivided into 10 groups, (class intervals) with even numbers for mid-points, and assurance that none of our data will overlap the limits of the class interval, we are now ready for data analysis.

PERCENTAGE FREQUENCY DISTRIBUTIONS

Frequency distributions converted to percentages, are extremely useful for comparing two or more sets of data.

For example, in examining the production of rice farmers under an agricultural credit project, comparing the yield of a sampling of farmers who received credit with those who did not; the raw data is not directly comparable until it is converted to a percentage frequency distribution. To do this, the total number of farmers in each category (181 for borrowers, 129 for non-borrowers) is used as the base. The raw data, and percentage frequency distribution derived from it are shown below:-

| YIELD Ca/Ha | NUMBERS OF | | PERCENTAGE OF | |
|----------------|------------|---------------|---------------|---------------|
| | Borrowers | Non-Borrowers | Borrowers | Non-Borrowers |
| 0 - 10 | 13 | 8 | 7 | 6 |
| 11 - 20 | 7 | 7 | 4 | 5 |
| 21 - 30 | 9 | 12 | 5 | 9 |
| 31 - 40 | 16 | 11 | 9 | 9 |
| 41 - 50 | 16 | 4 | 9 | 3 |
| 51 - 60 | 20 | 13 | 11 | 10 |
| 61 - 70 | 26 | 18 | 14 | 14 |
| 71 - 80 | 13 | 19 | 7 | 15 |
| 81 - 90 | 18 | 13 | 10 | 10 |
| 91 -100 | 18 | 6 | 10 | 5 |
| 101 -110 | 11 | 11 | 6 | 9 |
| 111 -120 | 13 | 4 | 7 | 3 |
| 121 -130 | 1 | 3 | 1 | 2 |
| TOTAL | 181 | 129 | 100% | 100% |

When converting raw data to percentages, as above, some loss of precision will occur if the values are "rounded off". For instance, in the first category where yields are 0 - 10 cavans/hectare,

$$\frac{13 \times 100}{181} = 7.1823204\%$$

Whereas

$$\frac{8 \times 100}{129} = 6.2015503\%$$

This generally should not be cause for concern. Of course in some situations, fine measurements are essential, and slight variations in data values can be very significant. Often however the purpose of data reduction is to facilitate analysis and highlight gross differences. In such circumstances, no useful purpose is served by greater precision, and, in fact, visibility is often hindered by the additional "data clutter", and much extra preparation time is also required.

THE STANDARD DEVIATION

Various averages (mean, median and mode), are "measures of central tendency".

Averages, such as average rate of seeding per hectare, average rates of fertilization; average yields, average price per bushel, average loan, average repayment rate, etc. are all familiar and useful measures in formulating recommendations for agricultural programs, and in their management. However, no two specific situations are exactly alike. For instance, even if both farmer Cruz and farmer Rodriguez were to follow the same guidelines to produce a rice crop, because of the many differences in their personal situations and attitudes, the natural factors which exist, and the chance occurrences which may affect either, they are both likely to obtain differing yields.

A major limitation, of an average is that the variation around that average is often ignored, which could lead to distorted impressions of the true situation. For program analysis and management purposes, the extent of the differences is extremely significant. Therefore, in addition to averages, another measurement which provides a quantitative "measure of dispersion" is necessary. This is the "Standard Deviation", and is derived from both the mean and the frequency distribution itself.

The formula for calculating the Standard Deviation from Simple-Random Samples for ungrouped data is as follows:-

$$S = \sqrt{\frac{\sum d^2}{N}}$$

Where

S = Standard Deviation

d^2 = Sum of the Squared differences from the mean

N = number of items in the group

EXAMPLE: To find the Standard Deviation of these five numbers: 10, 20, 25, 40, 80. By addition, the sum of the numbers is 175; and the mean is

$$\frac{175}{5} = 35$$

The difference of each value from the mean is shown in the table below. To eliminate the influence of the + signs to obtain the sum, the difference is squared, and later the square root is taken. Thus:-

| A | B | C | D |
|---------|------------|--------------------------|------------------------------|
| Item | Item Value | Difference from Mean (d) | Difference Squared (d^2) |
| 1 | 10 | - 25 | 625 |
| 2 | 20 | - 15 | 225 |
| 3 | 25 | - 10 | 100 |
| 4 | 40 | + 5 | 25 |
| 5 | 80 | + 45 | 2025 |
| $N = 5$ | $= 175$ | $d^2 =$ | <u>3000</u> |

By substituting in the formula, the standard deviation is calculated

$$\sqrt{\frac{3000}{5}} = \sqrt{600} = 24.495 \text{ or } 24.5 \text{ rounded off}$$

Since the mean of the distribution was 35, one standard deviation less than the mean (35 - 24.5) is 10.5, and one standard deviation greater than the mean (35 + 24.5) is 59.5. We use such measurements later to analyze frequency distributions.

CALCULATING THE STANDARD DEVIATION FROM GROUPED DATA

When the data has already been grouped by uniform class intervals an adjustment must be made to the formula to allow for the "compaction" of varying data into clusters.

Where

$$S = i \sqrt{\frac{\sum f(d)^2}{n} - \left(\frac{\sum fd}{n}\right)^2}$$

S = Standard Deviation
 i = size of the class interval
 f = frequency of occurrence of data in the class interval
 d = difference of the class interval from the "origin"; - an arbitrary selected class interval.
 n = number of items in the distribution

Any of the class intervals can be selected as the "origin" and the difference from this point can be measured in class intervals. Then columns E, F, and G are calculated.

| A CLASS INTERVAL Lower Limit Upper Limit | | B MIDPOINT | C FREQUENCY (f) | D DIFFERENCE FROM "ORIGIN" (d) | E (= CxD) FREQUENCY x DIFFERENCE (fd) | F DIFFERENCE SQUARED (d ²) | G (= CxF) FREQUENCY x DIFFERENCE SQUARED (f(d) ²) |
|---|--|---------------|-----------------------|---|--|---|---|
| 14 — 25.9 | | 20 | 1 | - 4 | - 4 | 16 | 16 |
| 26 — 37.9 | | 32 | 2 | - 3 | - 6 | 9 | 18 |
| 38 — 49.9 | | 44 | 4 | - 2 | - 8 | 4 | 16 |
| 50 — 61.9 | | 56 | 8 | - 1 | - 8 | 1 | 8 |
| 62 — 73.9 | | 68 | 13 | 0 | 0 | 0 | 0 |
| 74 — 85.9 | | 80 | 10 | + 1 | +10 | 1 | 10 |
| 86 — 97.9 | | 92 | 7 | + 2 | +14 | 4 | 28 |
| 98 — 109.9 | | 104 | 4 | + 3 | +12 | 9 | 36 |
| 110 — 121.9 | | 116 | 0 | + 4 | 0 | 16 | 0 |
| 122 — 133.9 | | 128 | 1 | + 5 | + 5 | 25 | 25 |
| | | | <u>N = 50</u> | | <u>Σ fd = + 15</u> | | <u>Σ f(d)² = 157</u> |

Note from the above table that $\sum f(d)^2$ and $(\sum fd)^2$ are not the same!

$$f(d)^2 = 157 \text{ whereas } (\sum fd)^2 \text{ is } 15^2 = 225$$

Thus:

$$\begin{aligned} S &= 12 \times \sqrt{\frac{157}{50} - \left(\frac{15}{50}\right)^2} \\ &= 12 \times \sqrt{\frac{157}{50} - \frac{225}{2500}} \\ &= 12 \times \sqrt{3.14 - 0.09} \\ &= 12 \times \sqrt{3.05} \\ &= 12 \times 1.7464 \\ &= 20.957 \text{ or } 21 \text{ rounded off.} \end{aligned}$$

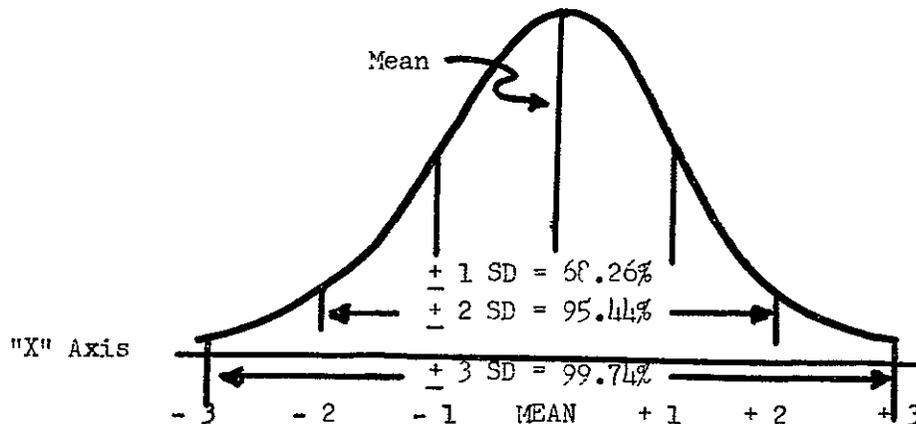
THE "NORMAL DISTRIBUTION CURVE"

No two situations are ever exactly alike. Nevertheless, statisticians have discovered that the frequency distributions of processes that are repeated many times under similar condition tend to form a general symmetrical "bell-shaped" distribution. This pattern is known as the "Normal Distribution Curve". Each occurrence can be affected in minor ways by natural common factors and/or change. It is inappropriate to attempt to explain the statistical basis for the normal distribution in this booklet. Suffice it to state that many frequency distributions developed in analyzing project situations are symmetrical and unimodal, approximating the normal curve. It is thus a useful statistical concept whose properties we can employ.

Probability of Deviation from the Mean

A major feature of the normal curve is in determining the extent to which any data value in the array differs from the mean. This is done by measuring the area under the curve, from the mean to the value of the data items in question.

The normal curve has certain properties. The distance from the mean to any point can be measured in terms of the Standard Deviation. Because of its shape, the proportions under the curve in terms of standard deviations are constant, regardless of the actual data values. For example 1 SD \pm mean covers an area of 68.26% of the total area under the curve. Similarly, the areas under the curve at ± 2 and 3 standard deviations are standardized percentages as indicated below. A more complete range of values is indicated in Table 2.



Note that the shape of the normal curve is such that it approaches, but never touches the "x" axis, but for practical purposes, it is not necessary to go beyond 3 standard deviations in either direction.

Applying the normal curve to an earlier problem situation where the mean of the distribution is 71.6 ca/ha and given that one standard deviation is 21 ca/ha it is probable that

- 1 SD. 68.26% of the farmers should obtain a harvest between
 $71.6 \pm 21 = 50.6$ and 92.6 ca/ha
- 2 SD. 95.44% of the farmers should obtain a harvest between
 $71.6 \pm 42 = 29.6$ and 113.6 ca/ha and
- 3 SD. 99.74% of the farmers should obtain a harvest between
 $71.6 \pm 62 = 9.6$ and 133.6 ca/ha

Although the probabilities have been shown for + 1, 2, & 3 standard deviations, by use of table 2, the range for any desired probability can be determined; or by using table 3, the probability for any range.

Example 1. Given a mean of 71.6 and a standard deviation of 21, using table 2, the range for 39% probability is $\pm .51$ SDeviations.

Since 21 ca/ha = 1SD, $21 \times .51 = .51$ S. Deviations, which is 10.71ca/ha

Therefore, the appropriate range for 39% of farmers is

$$71.6 \pm 10.71 = 60.89 \text{ to } 82.31 \text{ ca/ha.}$$

This is an extremely useful feature in analyzing sample data.

Example 2. Given the above mean of 71.6 and a standard deviation of 21, what is the probability that farmers will get or what percentage of farmers are likely to get between 70 and 80 ca/ha.

Since 70 is 1.6 below the mean, or $\frac{-1.6}{21} = -.08$ SD units

Similarly 80 is 8.4 above the mean, or $\frac{8.4}{21} = +.4$ SD units

from table 3, .08 SD units = 3.19%
 and .4 SD units = 15.54%

Thus the specified range encompasses an 18.73% probability.

STANDARD ERROR OF THE MEAN

Because we have been working with sample data, rather than the actual total population, the mean that we have derived is only a mean of the sample, rather than the true mean. It is important that this difference be taken into consideration. Otherwise our findings will be limited to only the sample population itself and we will have derived no benefit from sampling. Normal distribution theory can be used to estimate the likelihood that the true mean lies within a given range of the sample mean. By use of the following formula, we calculate the Standard Error of the Mean:-

Where

$$SEM = \sqrt{\frac{S^2}{n}}$$

SEM = Standard Error of the Mean
 S = Standard Deviation of the Sample
 n = Size of the Sample

In effect, the standard error is a standard deviation which measures the extent to which values estimated from samples differ from the true population value.

Thus in the foregoing situation, where the sample mean was 71.6; the sample size 50; and the sample standard deviation 21, the Standard Error of the Mean is:-

$$\begin{aligned} SEM &= \sqrt{\frac{21^2}{50}} \\ &= \sqrt{\frac{441}{50}} \\ &= \sqrt{8.82} \\ &= 2.97 \end{aligned}$$

The Magnitude of the Maximum Possible Error can be expressed by dividing the Standard Error of the Mean by the Mean itself, and describing it as a percentage, thus:-

$$\text{Magnitude} = \frac{SEM}{M} \times 100$$

Where

M = mean

which in this case is $\frac{2.97}{71.6} \times 100 = 4.15$ or about 4 percent

CONFIDENCE INTERVAL AND STANDARD ERROR OF THE MEAN

The significance of calculating the Standard Deviation and the Standard Error is we can now apply the findings from the sample survey data to the total population and be confident (within specified limitations) that it is an accurate representation of the true situation.

Since the Standard Error is a special case standard deviation, its probabilities are determined from the normal curve in the same manner as the standard deviation previously described. Thus ± 1 standard error represents a probability (or confidence) of 68.26% that the true mean lies within this range of the sample mean. In our example where the sample mean is 71.6 and the standard error of the mean 2.97, therefore we can state with a confidence of 68.26% that the true mean of the population lies between

$$71.6 \pm 2.97, \text{ or } 68.63 \text{ and } 74.57 \text{ ca/ha}$$

To Obtain the Range

Depending upon the confidence with which we wish to express our findings, the number of standard errors of the mean to utilize can also be determined from the "Normal Curve and Related Probability Table" Table 2.

For example, if we wish to have a confidence of 99.5%, from table 2, a range of 2.81 standard errors of the mean would be necessary.

In the example, since 1 standard error of the mean = 2.97 ca/ha
2.81 standard errors of the mean would be $2.97 \times 2.81 = \pm 8.35$ ca/ha
from the sample mean of 71.6, or between 63.25 and 79.95 ca/ha

To Obtain the Confidence Level

Alternately, if management specifies the range within which it wishes the data presented, we can indicate the confidence that we have in that range by calculating as follows:

$$\frac{\text{Management tolerated error}}{1 \text{ standard error}} = \text{number of standard errors of the mean utilized}$$

For example, in the above situation, if management wanted the answer within 1 ca/ha, our confidence would be calculated as follows:

$$\frac{1}{2.97} = .337 \text{ or rounded off } .34 \text{ standard errors of the mean which}$$

from the table gives us a probability of 26.62%.

STANDARD ERROR OF A PERCENTAGE

The concepts of probability are equally applicable to other measures besides the mean. Another measure of general interest is the percentage. For instance, management might wish to know the extent to which low productivity was a problem in rain-fed paddy areas.

If we make an assumption that 60 + ca/ha is the satisfactory cut-off point, and we observe that 13 from sample of 50 (13/50, or 26 percent) fall in the problem area; from this sample information, what inference can then be drawn about the population?

First, we must determine the probable sampling error in the estimated percentage. The formula for this is as follows:-

Where

Standard Error of
a percentage

$$= \sqrt{\frac{(100 - P) \times P}{N}}$$

SEP = Standard Error of a Percentage

100 = Constant (100)

P = Sample Percentage

N = Sample Size

Thus, substituting our data in the above

$$= \sqrt{\frac{(100 - 26) \times 26}{50}}$$

$$= \sqrt{\frac{74 \times 26}{50}}$$

$$= \sqrt{\frac{1924}{50}}$$

$$= \sqrt{38.48}$$

$$= 6.2$$

To get the Magnitude of the Possible Error, divide the Standard Error of the Percentage by the Sample Percentage; and express it as a percentage as follows:

$$\text{Magnitude} = \frac{\text{SEP}}{P} \times 100$$

Thus the error in this case could be as much as $\frac{6.2}{26} \times 100 = 23.85$, or almost 24%

CONFIDENCE INTERVAL AND STANDARD ERROR OF A PERCENTAGE

The confidence associated with the sample percentage can be calculated and applied to the true percentage.

For example, where the sample percentage is 26% and the standard error of the percentage 6.2%, we can state with a confidence of 68.26% (1 standard deviation) that the true percentage lies between

$$26 \pm 6.2, \text{ or between } 19.8 \text{ and } 32.2 \text{ percent}$$

By reference to table 2 the number of standard errors of the percentage to utilize can be determined for any desired confidence.

For example, to determine the minimum percentage with a confidence of 99.5%, from table 2, 2.81 standard errors of the percentage would have to be subtracted from the sample percentage.

$$\begin{aligned} \text{Since 1 standard error of a percentage} &= 6.2 \text{ percent} \\ 2.81 \text{ SEP} &= 6.2 \times 2.81 = 17.42 \text{ or a} \\ \text{minimum of } 26 - 17.42 &= 8.58 \text{ percent.} \end{aligned}$$

By the same token, it could be as much as $26 + 17.42 = 43.42$ percent.

Alternately, if management wanted the answer with a range of only 5 percent, we could provide that answer, with the reservation that our confidence was not very high. Thus

$$\frac{\text{Management tolerated error}}{\text{Standard error of percentage}} = \frac{\text{number of standard errors of the percentage}}{\text{utilized}}$$

For example a range of 5 percent represents 2.5 percent on each side of the sample percentage; thus

$$\frac{2.5}{6.2} = 0.4 \text{ standard errors of the percentage}$$

From table 2, this converts directly to a confidence level of 31.08%.

These concepts were used earlier to determine the appropriate size sample to be taken, using best guesses for the mean and the standard deviation with specified tolerances. Once the sample has been taken, we merely reverse the process, using the actual sample to determine that which we had previously only guessed.

CORRELATION

In program management, recommendations are often made to adopt certain practices in order to improve results. For example, credit is often seen as a major factor which could increase farmers yields.

Whenever possible, recommendations are made on the basis of carefully evaluated experiments, particularly technical recommendations such as appropriate amounts of fertilizer per hectare. Sometimes, however when we want to change policies, we often have nothing better to go on than intuition and common sense. At other times, the need to do something is so great that there is no chance for pre-testing.

In these circumstances, it is appropriate that the impact of the recommended changes be evaluated as soon as practicable to determine whether the change was in fact beneficial, and thus should be continued, or whether it was insignificant, or even detrimental; in which case management would want to rescind it.

For example, Pairs of data might be obtained for a) amount of credit and b) yield from a sample number of farmers.

1. In effect, from these paired sets of data values, a Coefficient of Correlation "r" is calculated. This is then compared against a scale ranging from - 1.0 to + 1.0, interpreted as follows:-

| <u>COEFFICIENT OF CORRELATION</u> | <u>INTERPRETATION</u> |
|-----------------------------------|--|
| - 1.0 | Perfect "Negative Correlation" (i.e. As "X" increases, "Y" decreases). |
| 0 | No correlation discernable. |
| + 1.0 | Perfect "Positive Correlation" (i.e. As "X" increases, "Y" increases also) |

2. By squaring the coefficient of correlation, the amount of variation attributable to the independent variable can be calculated. Thus Percentage of

$$\frac{\text{Variation of Y}}{\text{Attributable to X}} = 100 r^2$$

3. Alternately, the percentage of unexplainable variation can also be identified

$$\frac{\text{Percentage of Variation of Y Which is not attributable to X}}{= 100 (1 - r^2)}$$

The magnitude of these measurements provide management an indication whether further investigation is called for.

This is quite a complex area for analysis, and generally beyond the scope of this limited text. However, just to whet the appetite, an example is provided of the simplest of these correlation analysis techniques - linear relationship between two variables.

LINEAR RANK ORDER CORRELATION OF TWO VARIABLES

A simplified approach is to rank order each data pair and then compare the rank orders using the following formula (known as the Spearman Rank Order Correlation).

$$r = 1 - \left(\frac{6 \sum d^2}{n(n^2 - 1)} \right)$$

Where

r = coefficient of correlation

1 = constant 1

6 = constant 6

$\sum d^2$ = Sum of the squared differences between X & Y

n = number of pairs

For example

Management wanted to know whether the availability of credit has any impact upon yields. Sample data revealed the following:

| Variable X Loans (Pesos) | Rank Order X | Variable Y Yields (ca/ha) | Rank Order Y | Difference Between Rank Orders X & Y | Difference Squared |
|--------------------------------|-----------------|---------------------------------|-----------------|--|-----------------------|
| 110 | 9 | 25 | 8 | 1 | 1 |
| 210 | 8 | 14 | 9 | 1 | 1 |
| 370 | 7 | 34 | 7 | 0 | 0 |
| 420 | 6 | 59 | 5 | 1 | 1 |
| 560 | 5 | 60 | 4 | 1 | 1 |
| 640 | 4 | 43 | 6 | 2 | 4 |
| 770 | 3 | 81 | 2 | 1 | 1 |
| 850 | 2 | 79 | 3 | 1 | 1 |
| 900 | 1 | 99 | 1 | 0 | 0 |

$\sum d^2 = 10$

Substituting

$$r = 1 - \left(\frac{6 \times 10}{9(9^2 - 1)} \right) = 1 - \left(\frac{60}{9(81 - 1)} \right)$$

$$= 1 - \left(\frac{60}{729 - 9} \right) = 1 - \frac{60}{720} = 1 - .083 = \underline{\underline{.917}}$$

Rank ordering considerably simplifies computation but it also is less accurate than using the actual data. It is a useful technique therefore when "probing" to determine whether a correlation might exist.

A caution when doing correlation analysis -- very often a high correlation may exist between two variables, but this does not necessarily mean that there is a "cause - effect" relationship between them. The correlation may be coincidental, or "spurious". High correlation does tend to reinforce intuition, and common sense; but a healthy measure of skepticism must be used also. Consider whether there are any other plausible factors which might have produced the result.

REGRESSION ANALYSIS

Frequently, management desires to make forecasts to establish realistic targets, and/or make predictions for policy analysis, based upon current trend information. This can be done by a technique known as regression analysis, which develops the "line of least squares" in the available data.

For example, continuing the previous illustration where the correlation between yields and loans was made, assuming a cause - effect relation is plausible, management might want to determine the appropriate loan size to achieve a particular level of production; assuming a linear relationship.

Essentially, the line of least squares is obtained by solving for two simultaneous equations with the data developed for the correlation analysis; then substituting the values in the formula for a straight line.

$$Y = a + bX$$

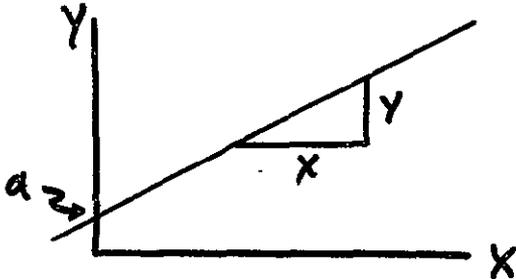
Where

Y = value of the Y axis data

X = value of the X axis data

a = the point where the line intercepts the Y axis, and the value of x is 0

b = the slope of the line, determined quantitatively as $\frac{Y \text{ value}}{X \text{ value}}$



The line of least squares is found by solving for the following two equations.

where

$$(1) \sum Y = na + b\sum X$$

$$(2) \sum XY = a\sum X + b\sum X^2$$

$\sum Y$ = sum of Y value

$\sum X$ = sum of X value

$\sum XY$ = sum of XY values

n = number of pairs of data

$\sum X^2$ = sum of X^2 values

EXAMPLE OF REGRESSION ANALYSIS

From the survey data, the following table is developed to determine the value of the various elements in the formula:

| Independent Variable | Dependent Variable | | |
|----------------------|--------------------|----------------------|------------------------|
| X | Y | XY | X ² |
| 110 | 25 | 2750 | 12100 |
| 210 | 14 | 2940 | 44100 |
| 370 | 34 | 12580 | 136900 |
| 420 | 59 | 24780 | 176400 |
| 560 | 60 | 33600 | 313600 |
| 640 | 43 | 27520 | 409600 |
| 770 | 81 | 62370 | 592900 |
| 850 | 79 | 67150 | 722500 |
| 900 | 99 | 89100 | 810000 |
| $\Sigma X = 4830$ | $\Sigma Y = 494$ | $\Sigma XY = 322790$ | $\Sigma X^2 = 3218100$ |

N = Number of Pairs = 9

$$(1) \quad 494 = 9a + 4830b$$

$$(2) \quad 322790 = 4830a + 3218100b$$

$$\Sigma X = 4830$$

$$\Sigma Y = 494$$

$$\Sigma XY = 322790$$

$$\Sigma X^2 = 3218100$$

First we can simplify equation(2) by dividing it through by 10, thus

$$(3) \quad 32279 = 483a + 321810b$$

Next we must eliminate one of the unknowns (either "a" or "b") from both equations, (1) and (3). This we can do by testing for a multiplier that will set 9a equal to 483a; by dividing 483 by 9 thus:-

$$\frac{483}{9} = 53.66666$$

We now multiply equation (1) by the multiplier to obtain equation (4), and round off, thus

$$(4) \quad 26511 = 483a + 259210b$$

Subtract equation (4) from equation (3)

$$\begin{array}{r} 32279 = 483a + 321810b \\ - 26511 = 483a + 259210b \\ \hline 5768 = 0 + 62600b \end{array}$$

Therefore $b = \frac{5768}{62600} = .092$

Substitute this value of "b" in equation (1)

$$494 = 9a + (4830 \times .092) = 9a + 444.36$$

transposing $9a = 494 - 444.36, \text{ or } 49.64$

therefore $a = \frac{49.64}{9} = 5.52$

These two values for "a" and "b" can then be substituted in the straight line equation $Y = a + bX$

$$Y = 5.52 + .092X$$

Graphically, a line of least squares can be plotted from any two data values in the table. For example,

$$\text{Where } X = 110 \quad Y = 5.52 + (.092 \times 110) = 5.52 + 10.12 = 15.64$$

$$\text{and where } X = 900 \quad Y = 5.52 + (.092 \times 900) = 5.52 + 82.8 = 88.32$$

By extrapolation and inspection, the values of either X or Y can be estimated for a given value of Y or X. These values can also be obtained by calculation, using either formula $Y = a + bX$ or

$$X = \frac{Y - a}{b}$$

For example, to determine the appropriate loan size in order to obtain a harvest of 100 ca/ha, from the preceding data and assuming a linear relationship.

$$X = \frac{100 - 5.52}{.092} = \frac{94.48}{.092} = 1026.96$$

or approximately 1027 pesos rounded off.

SIGNIFICANCE

Sample surveys are often requested by management because they want information about an area of interest on which, for one reason or another, little or no data exists. For example, to assess the impact of a typhoon on rice plantings and/or harvestings which are underway. Other times new data may be required for an important program or policy decision -- such as whether to change the rate of fertilization for a particular seed variety during the dry season. Sometimes sampling is the most efficient method of gathering regular series of data - such as the Bureau of Agricultural Economics Quarterly Survey on Rice Production.

Often however, sample surveys are conducted to assist the program manager in identifying strong and weak areas, and to monitor the degree to which the program is living up to expectations. When regular program reports are received on key indicators from "interested" practitioners, periodic sampling of data in the field by "objective" evaluators can give indications as to the quality of those reports. For instance, does the sample survey indicate the same level of production as is being reported, or does it differ? If there is a difference, is it worth worrying about? i.e., is it "within the ballpark"? We can improve upon this subjective question by asking "is the variation statistically significant?"

The size of the Standard Deviation is a useful indicator of the quality of program implementation. Since the sample data should have been gathered in a random fashion from a relatively homogeneous population, the actual spread of the data should not vary much in absolute amount if all aspects of the process are well managed. A small standard deviation represents a narrow range and a relatively tightly managed program. A large standard deviation represents a wide data range and consequently much wider tolerances, pointing the need for follow-up and improvement. Of course, "Small" and "Large" are relative terms depending upon the subject under study. In agriculture, carefully controlled experimental plots may produce consistently good yields; but many individuals with different mental attitudes, farming under varying physical conditions can produce widely varying results. Nevertheless, the distribution should follow a normal pattern under most circumstances.

When results occur which are unlikely to have happened by chance, they are labelled "Statistically Significant". The statistical significance is based upon probability. When statistically significant data are identified in program analysis, this is an indication to management that something unusual is happening that warrants attention. If we are trying to make something unusual happen, the significant difference may be good news. If we are not, it indicates that something is wrong; Either there is an anomaly in program implementation which requires remedial action, or the data reported is in error. In any event, we should make management aware that something unusual is happening.

Before raising alarms however, the initial assumption of a homogeneous population grouping (and thus the expectation of a normal distribution pattern) should be verified. For added confidence in searching for false/erroneous data reports, the data should be checked as to whether it is below the minimum expectations for a "non-normal distribution".

There are several tests which can be applied to data to determine their significance, depending upon the situation. One of them will be discussed on the following pages.

THE "Z" TESTSIGNIFICANCE TESTING FOR A MEAN

Periodically, management should evaluate the quality of its regular progress reports from the field, particularly where the field workers report on their own performance. Even when no vested interests are involved, census-type reporting is rarely 100% accurate, and sampling cannot give absolute certainty either. However sampling results can be expressed in terms of probabilities, and by using the "Z" test, the accuracy of the reported data can be judged.

The procedure for "Z" Significance testing is as follows:-

1. Assume that there is no "statistically significant difference" between the sample mean and the reported mean. This is known as the "Null" hypothesis. In other words, even though the "reported" and "sample" means are not exactly the same, management is willing to accept them as "close enough" if both the "reported" and "sample" data could have been drawn from the same population at least "X" times out of 100.
2. Determine management's minimum criteria for significance. Generally, the null hypothesis is rejected if the probability (due to sampling variability) of a result occurring is five times or less out of a hundred. The 5% (5/100) can also be written as 0.05 and is usually described as the .05 Level of Significance. Higher or lower levels of significance can be established by management for particular situations.

A Higher level of significance means that if the result occurs, it is more significant. A result is more significant if it has a lower probability of occurring. Thus a .03 level of significance (i.e. probability of occurring only 3 times out of 100) is of a higher level of significance than a .05 level.

3. Test the hypothesis.

- a. Calculate "Z" from the formula:

$$Z = \frac{\text{Sample Mean} - \text{Reported Mean}}{\text{Standard Error of the Sample Mean}}$$
- b. Look up the value for "Z" in Table 4

The "Z" value indicates the probability (percentage of occurrence, i.e. 80%; or 80 chances out of 100) that the sample mean and the reported mean could have come from the same population.

NOTE: If the reported mean could reasonably have been expected to be either higher or lower than the sample mean, MULTIPLY THE "Z" VALUE BY 2. If the reported mean could reasonably have been expected to be only higher (or lower) than the sample mean, USE THE "Z" VALUE DIRECTLY.

c. IF THE "Z" VALUE IS EQUAL TO OR GREATER than management's minimum criteria, THE HYPOTHESIS IS ACCEPTED, and we conclude that there is NO SIGNIFICANT DIFFERENCE.

IF THE "Z" VALUE IS LOWER than management's minimum criteria, THE HYPOTHESIS IS REJECTED, and we conclude that there IS A SIGNIFICANT DIFFERENCE.

NOTE: We cannot absolutely prove, or disprove a hypothesis, statistically. We can only indicate the probability of it being as stated; the higher the probability, the more likely the hypothesis is correct.

An Example should clarify this: A province reports that the average palay yield is 85 ca/ha, but it is suspected that this report is somewhat inflated. A sample survey is conducted in that province, which indicates that the average yield is only 78 ca/ha. The Standard Error of the Sample Mean (derived from the sample data) is calculated at 3.8 ca/ha.

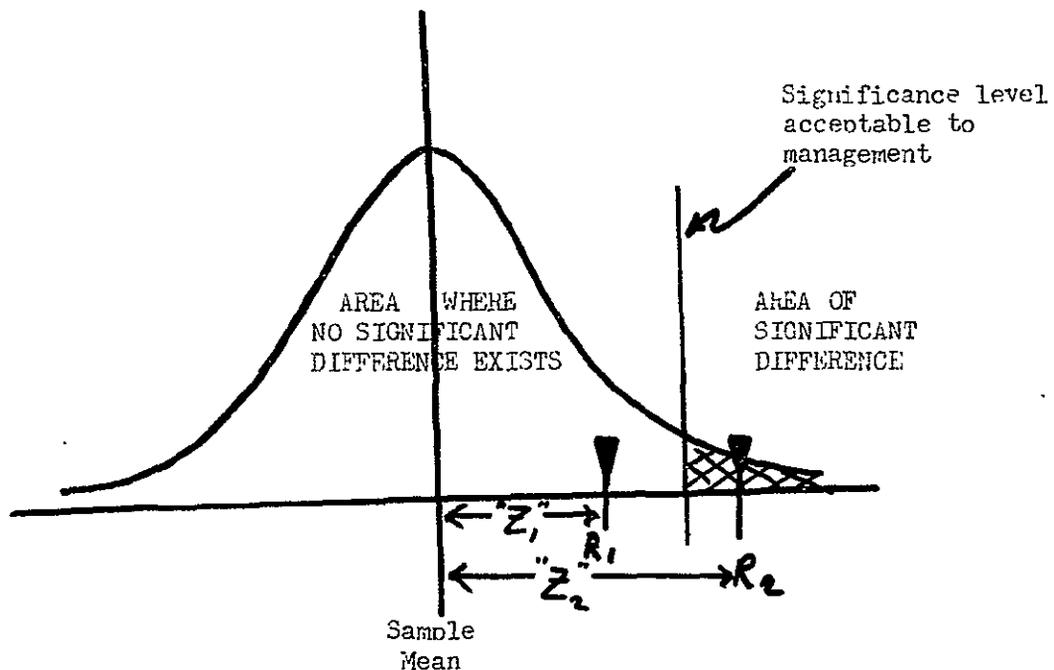
Management establishes the null hypothesis that statistically there is no significant difference between 78 and 85 ca/ha, and is willing to accept a significance level of 5%.

$$Z = \frac{78 - 85}{3.8} = \frac{-7}{3.8} = \underline{\underline{-1.84}}$$

From Table 4, a "Z" value of 1.84 indicates a probability of 3.29%.

In other words, only in less than 4 out of 100 cases could the reported and sample means be from the same population. Since 3.29% is lower than the 5% management was willing to accept, the hypothesis is rejected, and we conclude that there IS a statistically significant difference between the two.

Study the sketch below to make sure you understand this concept.



TYPE I AND TYPE II ERRORS

Because we don't have perfect information, by relying upon significance tests management runs the risk of making errors in judgment. These can be of two kinds and are known as Type I and Type II errors. For instance: Given a Management Minimum of 5% and "Z" value of 4%.

| <u>TEST INFERENCE AND ACTION</u> | <u>ACTUAL SITUATION</u> | <u>NET EFFECT</u> |
|--|--|--|
| There is a <u>significant difference</u> . The <u>Hypothesis is rejected</u> . | 1. There IS a significant difference. | Correct Inference |
| | 2. There really is NO significant difference | Incorrect Inference TYPE I ERROR MADE |

Management is too "uptight".

The risk management takes by running a "tight ship" is to criticize the reporters unjustly, and/or look for problems where none exist. The chances of making such an error can be reduced by raising the level of significance (i.e. lowering the minimum acceptable probability). For instance, in the above example there is no significant difference at the 3% level.

If no significant difference is indicated, and the hypothesis is acceptable management faces another risk, known as a TYPE II error. For instance: Given management minimum of 5%, and a "Z" value of 6%

| <u>TEST INFERENCE AND ACTION</u> | <u>ACTUAL SITUATION</u> | <u>NET EFFECT</u> |
|---|---|---|
| There is <u>NO significant difference</u> . The <u>Hypothesis is accepted</u> . | 1. There is <u>NO</u> significant difference. | Correct Inference |
| | 2. There <u>IS</u> a significant difference. | Incorrect Inference TYPE II ERROR MADE |

Management is "too lax".

The risk management takes by being lenient is to overlook poor reporting, and fail to take corrective action where it is needed. The chances of making such an error can be reduced by lowering the level of significance (i.e. raising the minimum probability acceptable). For instance if management's minimum acceptable probability had been 8% in the above example, a significant difference would have been observed. Thus management should consider whether it is more important to avoid Type I errors, or Type II errors, or whether both are equally as critical.

SIGNIFICANCE TESTING FOR A PERCENTAGE

Significance testing for a percentage employs the Z-test in much the same way as for a mean. There are two principal differences however.

1. The Z-test only gives accurate results when the percentage and/or the number of samples is relatively large. The rule of thumb is to utilize the Z test when a combination of

$$\text{number of samples} \times \text{reported percentage}^* = 500, \text{ or more}$$

$$\text{For example } 30 \text{ samples} \times 20 \text{ percent} = 600$$

Otherwise the distortions are too great and a more exact method must be used.

2. In calculating the Standard Error of Percentage the "reported percentage" is used instead of the "sample percentage".

The formula is:

$$Z = \frac{\text{Sample Percentage} - \text{Reported Percentage}}{\text{Standard Error of Percentage}}$$

For Example, a province reports that 85% of its supervised farmers are being visited by the extension technician during the month. However, a sample survey of 25 farmers indicates that only 60% were visited.

STEPS:

1. Test whether the Z test is appropriate. Either (25×85) or $25 \times (100 - 85)$ should equal at least 500. $25 \times 85 = 2125$, $25 \times (100 - 85) = 375$. Therefore the Z test is appropriate.
2. Establish the null hypothesis that there is no statistically significant difference between the sample percentage and the reported percentage.
3. Management establishes the minimum acceptable significance level at 5%.
4. Calculate Standard Error of Percentage using "reported percentage".

Where

$$P = \text{Reported Percent} = 85$$

$$N = \text{Sample Size} = 25$$

$$\begin{aligned} SEP &= \sqrt{\frac{(100-P) \times P}{N}} \\ &= \sqrt{\frac{(100-85) \times 85}{25}} = \sqrt{\frac{15 \times 85}{25}} \\ &= \sqrt{\frac{1275}{25}} = \sqrt{51} = \underline{\underline{7.14}} \end{aligned}$$

* or (100 - reported percentage)

5. Calculate Z

$$\begin{aligned} \text{a. } Z &= \frac{60-85}{7.14} = \frac{-25}{7.14} \\ &= \underline{\underline{-3.5}} \end{aligned}$$

b. From Table 4, a Z of - 3.5 is less than .14 percent.

How much less, we cannot determine, since it is off the Table.

Even allowing for the possibility that the reported percentage could have been higher or lower than the sample, the percentage of occurrence (ie the probability) would not be more than .28%.

Since this probability is lower than management's minimum acceptable level of 5.0% the likelihood of 60% and 85% being in the same general "ballpark" is very remote, and the hypothesis is rejected.

We conclude that there IS a significant difference.

It is important to recognize that it is not possible conclusively to prove a hypothesis on the basis of logic. It is possible only to increase the degree of confidence in a hypothesis.

However, it is possible to disprove a hypothesis on the basis of logic by creating a null hypothesis (the negative complement of the original hypothesis) and then disprove or discredit that; thus increasing confidence in the original hypothesis. For example if our hypothesis is that the production of high protein wheat by small farmers will result in improvements in their children's health. Our null hypothesis would be that there is no causal relationship between production and health. If it can be disproven or discredited, the original hypothesis gains in credibility.

Discrediting the null hypothesis is only one means for increasing confidence in the original hypothesis. It is necessary also to eliminate or reduce the credibility of other possible explanations. For instance preventive health services dispensed by mobile health clinics might have caused the children's health to improve. Or it might have been due to hygiene and sanitation instruction in school.

Several aspects of the hypothesis testing process which require special note are:

- The analytical study design must be carefully disciplined and systematic with appropriate provisions for cross checking and verification.
- The hypothesis must be narrowly and specifically drawn to disengage or eliminate a variety of related social, economic, cultural and other factors.
- The testing must recognize the possibility of unanticipated causes and effects.
- The testing must be concerned not only with the independent (causal) variables and dependent (effects) variables, but also with the nature of the treatment, its characteristics and components.

Because of errors in measurement, and because the variable factors themselves may not be stable, the evaluator needs assurance that apparent effects (outcomes) are real. Statistical significance assumes great importance. Statistical significance is a measure which compares the observed magnitude of an effect to the amount of random variability/error inherent in the data. Thus statistical significance estimates the likelihood that an observed effect is not due to chance.

MAJOR POINTS IN WRITING SURVEY REPORTS

- Avoid "technical jargon" unless you are sure that your intended reader is completely familiar with it.
- Round off numbers wherever possible, it won't usually distort a thing. Even though you may have been gathering data in hectares, or even tenths of hectares, when the final report is written you will probably be dealing in thousands, tens of thousands, even hundreds of thousands; so avoid data clutter and round off.
- Use graphs instead of tables wherever possible -- usually it is the trend of the data that is important rather than the precise numbers. Therefore identify the point you are trying to make, then make it, simply.
- Where you do use tables - whenever possible get all the data on one page. There is nothing that will distract a reader from gleaning the message from your table more than having to flip pages.
- Tables should be organized so that a single message is highlighted. Comprehensive matrixes of basic data are only useful for researchers to analyze -- they do not communicate to management until they are interpreted. If you need the comprehensive table - the appendix is the place for it. Extract from it the point you wish to make, and then prepare a condensed version in the text at the appropriate point.
- After using a table, summarize in the narrative what the reader is supposed to learn from studying it. Some people have a mental block against numbers and only read the text -- skipping over tables.
- If you need to go into detail on a point, and it would clutter up the text, use a footnote. Remember however that a footnote is best seen at the foot of the page on which the point is raised. "Footnotes" relegated to the back of the text rarely, (if ever) get read in relation to the points they are clarifying.
- Single space the narrative. This flies in the face of most research oriented training where double spaced text is required, but unless it is a draft where extensive rewrite is to be expected, no useful purpose is served by double spacing. It makes the report twice as bulky as it need be, it wastes paper, and it usually inhibits readability because the "concept density" -- the number of thoughts per page -- is halved.

A I D E V A L U A T I O N

R E S P O N S I B I L I T I E S & P R O C E D U R E S

A. I. D. EVALUATION PROCESS

Only action units can effectively make changes indicated by evaluation findings. Therefore, A.I.D. assigns primary responsibility for program evaluation to the action units of the Agency. Missions and appropriate AID/W offices are expected to consider the validity of targets and appraise progress towards them. This requires a regular evaluation process with systematic collection and analysis of objective data; periodically bringing variety of viewpoints to bear on activities and problems, and relating evaluation findings to action decisions. This process goes far beyond the preparation of reports, although its conclusions may be recorded in evaluation reports.

A.I.D. Evaluation Organization and Responsibilities

Evaluation activities are the responsibility of individual Missions and those AID/W offices charged with direct supervision of specific programs. Coordination and supporting functions are provided by the Director of Program Evaluation in cooperation with AID/W offices and the Regional Bureaus. Internal coordination among these offices is facilitated by their membership on the Program Evaluation Committee (PEC)* which meets regularly to discuss procedures and to exchange information.

The Office of Evaluation PPC/AID/W - Located in the Bureau for Program and Policy Coordination, the Office of Evaluation PPC/E develops evaluation methodology and coordinates the evaluation activities of the various bureaus and staff offices. This office arranges for the exchange of information pertaining to techniques and results of evaluation within A.I.D. and with other donors; provides general guidance in evaluation; and conducts or supports evaluation studies of Agency-wide policy and program issues and problems. PPC/E carries out these functions in cooperation with the members of the Program Evaluation Committee, which PPC/E chairs.

Regional Bureau Evaluation Officers - Regional Bureau evaluation officers backstop the overseas evaluation activities in their respective geographic areas; serve as advisor on evaluation matters within the Bureau; and represent the Bureau on the A.I.D. Program Evaluation Committee.

Although their specific tasks differ somewhat from region to region, Regional Bureau evaluation officers are generally responsible for:

- facilitating AID/W review and use of annual evaluation plans; Project Evaluation Summaries and special evaluations; and for coordinating ensuing comments and support to the Missions.
- serving as the focal point in the Bureau for collecting and disseminating evaluation experience, methodology, and findings;
- participating in the selection and training of Mission evaluation officers, and special evaluation teams.
- assisting in the introduction and supervision of regional evaluation activities, as well as participating in them as the need arises.

* PEC members include representatives of each of the Regional Bureaus, the staff bureaus, and of the Office of Food for Peace, and the Auditor General.

The Evaluation Officer

The primary responsibility for assuring adequate program evaluation rests with each Mission Director and AID/W Office Director. Their attitude towards evaluation shapes that of their organization, and they should specifically decide how to organize for this purpose. Each Mission and AID/W office responsible for project activities designates an evaluation officer responsible for the staff functions needed to make the evaluation system work effectively.

Since project evaluation is a group process pooling the information and ideas of host country, participating institutions and AID managers, the Mission/Bureau Evaluation Officer is an evaluation system manager, not the evaluator. This officer should:

- Help Project Officers plan their Project Design and Evaluation Plan.
- Draft and manage the Mission Annual Evaluation Schedule.
- Meet periodically with Project Officers to help them review the project design; prepare for the scheduled evaluation; and assemble and analyze data on progress.
- Together with the Project Officers, prepare an agenda of issues for the Project Evaluation Review; schedule the review with appropriate decision-makers; arrange for participation of interested persons; prepare the Project Evaluation Summary after the Evaluation Review; and maintain a record of follow-on actions.

Regular Evaluation of Projects

Missions and AID/W offices responsible for the administration of projects are required to evaluate them on a systematic basis in accordance with a schedule established in the Evaluation Plan submitted as part of the Project Paper and modified in the Annual Evaluation Schedule for all projects in the mission or office. The self-evaluation approach should enlist the judgments and suggestions of all knowledgeable personnel, including members of contract and PASA/RASA teams, and (insofar as practical) of the cooperating country and other donors

Mission and AID/W offices submit an Annual Evaluation Schedule, in conjunction with the Annual Budget Submission (ABS) exercise, showing which projects will be evaluated that year. The Schedule takes into account the availability of key AID, host country, grantee or contractor personnel, possibilities for grouping evaluations of related projects, and adjusts for alterations in the critical dates of various projects. The Annual Evaluation Schedule is keyed to the ABS exercise to link evaluation to the programming and budget process.

Monitoring of Schedules

Bureaus review the annual evaluation schedules for any apparent problem (such as conflicts with other Missions or Offices in the use of outside personnel; need of AID/W for a report on a particular project earlier than the scheduled evaluation; reasonableness of proposals to forego evaluation of particular projects, etc.) then approve or suggest modifications. Bureaus consolidate approved schedules and (after adding any Bureau-initiated items) publish them as Bureau Evaluation Schedules. PPC/E consolidates Bureau schedules as part of the overall Agency evaluation plan. Bureaus monitor the receipt of evaluation reports.

THE MISSION EVALUATION REVIEW

Participants in the Evaluation Review and their Functions

The key to a successful evaluation is a structured Evaluation Review at which various viewpoints, kinds of experience, and skills are brought to bear on the project. A broad-based review panel will usually facilitate

1. the inclusion of a wide range of organizational considerations in the review of project status;
2. understanding of the project by key personnel, and
3. the implementation of action decisions.

In addition, participating in the review process offers a valuable educational experience which benefits both project technicians and management.

Some weeks prior to the scheduled Evaluation Review the AID Evaluation Officer and Project Officer should meet with the Host Country Project Manager to discuss the purpose, scope, and nature of the evaluation and decide who should participate in the process: host country staff officials; key U.S. project personnel (whether or not direct-hire); and possibly representatives of respective planning and finance offices.

Other interested or knowledgeable officers from both AID and the host country should be invited to attend and participate in the Review. These may include the Program Officer, Controller, donors of related projects, visiting experts and consultants, etc. For AID/W projects, panels may include representatives from other Agency bureaus and from field Missions, outside experts, visiting foreign officials, etc. In this way different points of view are brought to bear in the interpretation of data and the recommendation of actions.

Before beginning work the Evaluation Officer should discuss the AID on-going project evaluation subsystem with the group which has been selected. If all are familiar with the subsystem, a minimum reminder will suffice; if not, a thorough discussion of concepts and procedures will save time in the long run.

Project staff organizes the resources and information. The relationship between the Evaluation Officer (or whoever guides the process) and the other participants should be based on mutual cooperation to achieve a common aim of improving the design and execution of the project. It should not be permitted to become an adversary process.

Prepare an Agenda for Evaluation Review

The evaluation team should reach agreement on the problem, issues recommendations and alternative courses of action to be considered at the Evaluation Review session.

Both senior AID and host government officials should be briefed on the evaluation findings and given a chance to study documents (such as a revised logical framework matrix or a progress summary) in advance of the Review. This will give top officials an opportunity to raise questions or make suggestions on issues other than those

selected by the staff. The extent of advance briefing accorded participants in the Evaluation Review differs from organization to organization. All participants should be provided a copy of the logical framework matrix, a brief narrative summary of the project, findings, and recommendations which have resulted from preparation of the background documentation, outlining the key problems which have surfaced in the course of the preparation of the logical framework. The Director may receive an oral briefing prior to the Evaluation Review.

Another approach is to give the Evaluation Review members a completed draft Project Evaluation Summary (PES). The first page, reflecting action proposed or requested, may be left blank and then completed after the meeting of the group.

Alternatively, this page may be used to list issues for the Review, or the page may be completed, outlining the recommended actions which are then reviewed, and--as appropriate--changed during the course of the Evaluation Review.

The Mission Evaluation Officer should organize and guide the review process. Procedures vary from Mission to Mission and even project to project, on how this will be conducted. However, the objectives are the same, to:

- Present the findings to interested parties
- Encourage interaction between the parties
- Facilitate any required replanning.

The Review

The scenario for the Evaluation Review will depend in large part on the nature of the project and the personalities of the Evaluation Review panel members.

Initially, the two key actors will presumably be the Evaluation Officer and the Project Officer -- or one of the other parties on the Project Staff.

In many circumstances the Evaluation Officer (EO) serves as the moderator and/or commentator and reporter. The EO is not an evaluator, but is managing a process to benefit others. As such, a relatively passive style usually provides the best results. If the Mission Director, the Deputy or a cooperating-country official chairs the Review, they should be thoroughly familiar with the preparatory work which preceded the Review meeting (i.e., the findings developed in the course of the preparation of the logical framework and progress reports).

The specific roles which individual panel members play in the Evaluation Review differ with the size and organization of the review, the personality of the participants, etc. However, there are specific responsibilities which should generally be undertaken by the participants as follows:

1. The Evaluation Officer should insure that all participants derive the maximum benefits from the Evaluation Review. Usually the Evaluation Officer will:-
 - (a) Schedule the Evaluation Review.
 - (b) Select the participants, based upon consultation with concerned Mission staff.
 - (c) Act as a second to the Director (or Deputy) chairing the Review; or upon request, lead the discussion

- (d) Assure that decisions and recommendations are recorded.
 - (e) Assume responsibility for submission of the agreed-upon Project Evaluation Summary (PES).
2. The Mission Director (or Deputy) and Cooperating-Country Counterpart must insist that the evaluation process provide a realistic assessment of expectations under the current plan; and of alternatives which might improve the activity or increase its impact. They are ultimately responsible for making the evaluation process a questing and vigorous one by encouraging the kind of inquiry which can result in a better plan; a better project; and a better program; and by utilizing the findings in making their resources allocation decisions.
 3. The Cooperating-Country Representative can help improve a project by providing candid feedback to both the Mission and the host government. The objective should be to provide constructive criticism to resolve any critical planning and implementation problems. Missions have also emphasized that the cooperating-country representative at the Evaluation Review should be from a level of responsibility that action decisions concerning the project can be made.
 4. a. Project Staff (either the Mission Project Officer, cooperating-country representative, or the intermediary) should provide the panel with a brief description of the project. (There are usually some Review participants or observers who are not fully conversant with the project.) The general project design should be presented, and performance during the period under review, reported. The Project Staff may present a brief analysis of alternatives (if any) which have evolved in preparing the background documentation. Finally, plans for the next period should be spelled out, realistic targets outlined, and actions recommended which might or should be taken - by the Mission, AID/W the intermediary, or the cooperating country. These facts and recommendations may also come in response to the questions from review participants.
 - b. The Program Officer (PO) should raise issues significant to Mission and cooperating-country policy and programming, and establish the linkages between the project purpose and programming goals. The PO should derive (or convey) the following:
 - (a) A clearer understanding of the project's projected contribution to the overall development program.
 - (b) The impact of the project on related projects and on broad policy objectives, such as Title IX.
 - (c) Discuss changes in major assumptions, and their implications for the general program.
 - (d) Provide guidance if major Project revision, or a new PID will be required.
 - c. The Consultant should bring to the Evaluation Review both evidence and outside (uninvolved) expert judgment. This different perspective can be both an asset and a potential liability. On the one hand an outsider may see hidden assumptions and identify new alternatives that have previously escaped the Project Staff. On the other hand there is the potential liability that an outsider will only have a superficial understanding of the "real" local

situation. An Evaluation Review is thus a good forum for the outsider to share fresh viewpoints, evidence, and any new interpretations of the alternatives available.

5. Other Participants and observers may make key contributions or derive important benefits from the Review meetings. For example, Financial Officers may comment on proposed initiatives and become informed of planned changes. People involved in related activities may become better acquainted with the project under review.

Where the Host Country does not lead the review, it is often useful for the AID Mission Evaluation Officer to serve as the moderator of the meeting. He/she will be familiar with the agenda and can allot appropriate time for each issue.

A brief explanation about procedures should be given to any new participants. The climate of the review will influence the utility of the result. A reminder may be useful that the review is to assist management to make decisions about the future of the project. A collaborative atmosphere seeking answers to the questions "How far have we progressed and how can we do better in the future?" will create more constructive cooperation and evoke more ideas than a judicial inquiry which seeks to place blame. Credit should be given, if complex problems are sorted out because of the review. Objectivity should be encouraged and rewarded. The Project Officer can then present evaluation team findings and recommendations while the Senior AID, host country, and participating institution managers are free to ask questions and reach conclusions.

The session should conclude with a summary of decisions reached, together with assignments of responsibility for particular actions and target dates for completion of actions. For some issues, the decisions may consist of an assignment to explore the problem further (perhaps by a special evaluation) or a statement by a policy official that he would like to consider the matter for a while.

Summary: If the steps preceding the Project Evaluation Summary (PES) preparation have been carried out in a collaborative way between the Mission and the cooperating country, then the PES can be used as a joint report of findings and submitted not only to A.I.D./W but, if desired, to the cooperating-country government as well. If the Mission and the cooperating country elect to prepare a joint evaluation report, and decide to use some format other than the PES, the Mission should submit the joint evaluation report to AID/W under cover of page 1 of the PES with the appropriate project identification data (title, number, etc) entered on page 1. This report will fulfill the Mission's obligation for submission of the PES.

It is strongly recommended that the Evaluation Officer, or whoever chairs the review, orally summarize and record the decisions reached by the Panel. In this fashion, any objections or qualifications can be voiced and resolved immediately. If this is done, (assuming that all concerned key project personnel are invited to participate in the Review) it should be possible to prepare the PES immediately upon the completion of the Review, and submit it to AID/W without the need for further clearances other than those of the Project Officer and the Mission Director.

Project Evaluation Summary (PES) for Terminating Projects

A final evaluation can be invaluable in confirming that end-of-project conditions have been created, and for recording lessons learned and facilitating the lateral transfer of this information. However, the PES format is not ideally suited either for tying up loose ends or for transfer of experience. Except under unusual circumstances, there will be few, if any new actions proposed or requested as a result of a final evaluation unless there is to be some followup activity.

It is recommended that a notation be made on page 1 of the PES that the project has been completed and any further action proposed or recommended, as a cover sheet for a more formal project evaluation report.

Here the Mission should note (prior to the disbanding of the project team) any lessons learned which might be applicable to other projects, either active or contemplated. This sort of information is especially important if another project along similar lines might be undertaken at a later date, by which time the original staff members may no longer be present.

Under some circumstances, the PES may be developed in-house jointly by the Project Staff, the Evaluation Officer, and the Program office. In other situations, it may be desirable to have an outside consultant study team contractor's report.

Timing of PES Submissions

The Mission schedules PES submissions in its Annual Program Evaluation Plan. Projects usually should be evaluated at critical points or phases - perhaps a period of several months for some projects and many months for others.

AID/W has no rules on when a PES is to be submitted during the year. Missions can schedule it in relation to their own or cooperating-country budget or program reviews. For example, some Missions complete key PES in the winter and spring as preparation for strategy for the annual program submission.

One very important factor in scheduling project evaluations is the availability of key project personnel. Every effort should be made to coordinate evaluation schedules with home leave or transfer of the Project Officer, the Technical Division Chief, Team Chief, or other personnel expected to make a major contribution to the evaluation process.

Evaluation Reporting

The project evaluation system focuses on management decisions to modify aspects of a project plan. Evaluation reports are intended to be by-products of this process. Information needed for the report should be readily available from the Evaluation Review, so that report preparation is simply a matter of selection and recording. The Project Evaluation Summary (PES) serves four purposes:

- Record of decisions for the convenience of the participants to the evaluation, to assure clarity of understanding and communication and remind participants of conclusions reached and actions to be taken. For decisions involving AID/W, the report is an advance notice that a formal action request will be coming.
- Notice to the Bureau that an evaluation has occurred, as required, with some indication of methods and participation for future reference.
- Summary of progress and status for use by AID/W and/or headquarters of participating agencies, voluntary agencies and contractors in answering queries.
- Lessons learned which may help others with similar problems. Transfer of experience can occur during program reviews of similar projects in AID/W, through secondary analysis and synthesis of project evaluation data, and through the Development Information System.

Content and Format of Project Evaluation Summary

AID provides a printed Project Evaluation Summary (PES) for both regular and special evaluations. Part I of the PES identifies the project and records decisions about follow-on actions. Part II provides for a brief summary of project status, a report on evaluation methodology, and key participants in the evaluation. It also includes brief narrative statements about evaluation findings on various aspects of progress. Finally, it notes any lessons learned about development strategy and project operations.

Candor and Objectivity

Candor means forthrightness with the additional sense of freedom from bias, prejudice, or malice. Objectivity means to operate independently and be capable of making observation or verification.

AID's current program evaluation system is somewhat biased in that project managers may play an active role in evaluating the projects that they themselves are managing. The important issue therefore is to minimize the subjective element. The project must be given as honest an appraisal as possible. Stating facts, with all the "warts and pimples" can be a tremendous advantage.

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PROJECT EVALUATION SUMMARY (PES) -- PART I

Report Symbol U-447

| | | | | |
|--|------------------------------------|-------------------------------|--|---|
| 1. PROJECT TITLE CREDIT UNIONS (Including Grant 0101, Loan 526-T-027, and OPF 5/78) | | | 2. PROJECT NUMBER 526-0101 | 3. MISSION/AID/W OFFICE USAID/Paraguay |
| 5. KEY PROJECT IMPLEMENTATION DATES | | | 4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 79-6 | |
| A. First PRO-AG or Equivalent FY 79 | B. Final Obligation Expected FY 80 | C. Final Input Delivery FY 81 | <input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION | |
| 6. ESTIMATED PROJECT FUNDING | | | 7. PERIOD COVERED BY EVALUATION | |
| A. Total \$ 7,743,900 | | | From (month/yr) Dec. 1977 | |
| B. U.S. \$ 5,209,300 | | | To (month/yr.) June 1979 | |
| | | | Date of Evaluation Review | |

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

| A. List decisions and/or unresolved issues, cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.) | B. NAME OF OFFICER RESPONSIBLE FOR ACTION | C. DATE ACTION TO BE COMPLETED |
|--|---|--------------------------------|
| 1. CREDICOOP should prepare a global long term financial projection (cash flow). | Richard Leigh Juan Peralta | Dec. 1979 |
| 2. By March 80, CREDICOOP should utilize the subobligated funds available under Grant 101 to either install the two steel silos donated per Mission Director's letter dated July 8, 1977 or utilize these materials along with the previous mentioned funds to construct a warehouse on the premises recently acquired by CREDICOOP. | Richard Leigh Juan Peralta | Dec. 1979 |
| 3. AID supports CREDICOOP placing the maximum emphasis in the development of the <u>Comités por Compañía</u> and using these Comités as a means to reduce loan delinquency both in education analysis prior to loan disbursement and as a follow-up form of social pressure. | David Alverson | Continuing |
| 4. CREDICOOP should study the possibility of including the <u>Comités por Compañía</u> as part of the Monetary Incentive Program. | Juan Peralta | Dec. 1979 |
| 5. Examine the <u>ayudantes de campo</u> program with a view toward redesign or take whatever action is necessary to improve the working relationship between the member and his cooperative. | David Alverson Juan Peralta | March 1980 |
| 6. The Mission should investigate data available to ascertain how EOPS No. 3b is being met. | David Alverson | March 1980 |

| | |
|---|--|
| 9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS | 10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT |
| <input type="checkbox"/> Project Paper <input type="checkbox"/> Implementation Plan e.g., CPI Network <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Financial Plan <input type="checkbox"/> PIO/T <input type="checkbox"/> Logical Framework <input type="checkbox"/> PIO/C <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Project Agreement <input type="checkbox"/> PIO/P | A. <input checked="" type="checkbox"/> Continue Project Without Change B. <input type="checkbox"/> Change Project Design and/or <input type="checkbox"/> Change Implementation Plan C. <input type="checkbox"/> Discontinue Project |

| | |
|--|---|
| 11. PROJECT OFFICER AND HOST COUNTRY OR OTHER BANKING PARTICIPANTS AS APPROPRIATE (Names and Titles) | 12. Mission/AID/W Office Director Approval |
| David Alverson USAID/P Project Manager Dr. Roberto Pielto CREDICOOP Treasurer | Signature: Paul A. Montavon Typed Name: Paul A. Montavon Date: 10/11/79 |

UNCLASSIFIED

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PROJECT EVALUATION SUMMARY (PES) - PART I

(Page 2)

Report Symbol U-447

| | | | | |
|---|--|---|---|---|
| 1. PROJECT TITLE CREDIT UNIONS (Including Grant 0101, Loan 526-T-027, and OPG 5/78) | | | 2. PROJECT NUMBER 526-0101 | 3. MISSION/AID/W OFFICE USAID/Paraguay |
| 5. KEY PROJECT IMPLEMENTATION DATES | | | 4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) <u>79-5</u> | |
| A. First PRO-AG or Equivalent FY <u>69</u> | B. Final Obligation Expected FY <u>80</u> | C. Final Input Delivery FY <u>81</u> | 6. ESTIMATED PROJECT FUNDING A. Total \$ <u>7,743,900</u> B. U.S. \$ <u>5,209,300</u> | |
| 7. PERIOD COVERED BY EVALUATION From (month/yr.) <u>Dec. 1977</u> To (month/yr.) <u>June 1979</u> Date of Evaluation Review | | | <input checked="" type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION | |
| 8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR | | | | |
| A. List decisions and/or unresolved issues, cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., program, SPAR, PIO, which will present detailed request.) | | | B. NAME OF OFFICER RESPONSIBLE FOR ACTION | C. DATE ACTION TO BE COMPLETED |
| 7. Perform an in-depth review of the credit collection procedures followed by the nine cooperatives served by the stabilization program (OPG). | | | Juan Peralta Ernesto Sosa | March 1980 |
| 9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS | | | 10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT | |
| <input type="checkbox"/> Project Paper <input type="checkbox"/> Implementation Plan e.g., CPI Network <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Financial Plan <input type="checkbox"/> PIO/T <input type="checkbox"/> Logical Framework <input type="checkbox"/> PIO/C <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Project Agreement <input type="checkbox"/> PIO/P | | | A. <input checked="" type="checkbox"/> Continue Project Without Change B. <input type="checkbox"/> Change Project Design and/or <input type="checkbox"/> Change Implementation Plan C. <input type="checkbox"/> Discontinue Project | |
| 11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles) | | | 12. Mission/AID/W Office Director Approval | |
| | | | Signature | |
| | | | Typed Name | |
| | | | Date | |

13. SUMMARY

No significant problems were identified in the delivery of Project inputs, and the analysis of progress towards planned outputs showed that the Project is about on target for most indicators. Likewise, the Project has made substantial progress towards most end-of-project conditions. The most impressive achievement has been the building of a foundation for an effective savings and credit system addressing the most critical constraints to small farmers' income. The Project is on schedule in terms of the number of rural credit cooperatives formed, the financial strength of the Central Organization--CREDICOOP, cooperatives' savings in the central, and volume and quality of marketing services provided to the members. Impressive progress was made in the mobilization of share capital at the primary cooperative level, which already surpassed the 1981 estimates. On the other hand, the Project fell short in achieving the planned membership and loan volume. In addition, high delinquency rates experienced by a minority of cooperatives constitute a threat to maintaining the satisfactory recuperation rate at CREDICOOP.

Although no hard data were available to measure the impact on the goal, available evidence suggests that as a direct result of the Project, farmer members are obtaining monetary benefits enabling them to increase their farm assets and/or their shares in their cooperatives.

14. EVALUATION METHOD

This review is the annual regular evaluation of the Project carried out as called for in the Mission's Annual Evaluation Schedule. It encompassed an overall measurement of Project progress towards the objectives and targets spelled out in the PP prepared in October 1977, Amendment No. 1 of the Loan Agreement dated December 7, 1976, and the OPG Agreement for the Credit Union Financial Stabilization Fund dated August 31, 1978.

The review was carried out in conjunction with CREDICOOP's internal semi-annual evaluation of progress towards the targets set forth in the CREDICOOP's Annual Plan of Activities for 1979. In this, each CREDICOOP Division prepares an assessment of its own activities, which is presented for discussion in plenary sessions including the entire CREDICOOP's staff and representatives from GOP and donor agencies. Problems are prioritized and the management team amends the annual plans and takes appropriate corrective actions.

Progress data on the development of the whole credit cooperative system were obtained from the monthly reports submitted by the cooperatives to CREDICOOP, as well as from information collected by CREDICOOP's

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cooperative promoters who, in preparation for the evaluation, visited each of the cooperatives in their respective areas to either update numerical data or gather additional qualitative data, all of which was also presented for the review of the plenary evaluation review group.

At the end of these sessions the AID Evaluation Specialist made a list of the most important issues resulting from these reviews, including those which might deserve AID's attention. These issues were discussed at the Mission in a final Evaluation Review Meeting with the Mission Director held on September 21, 1979.

Block B of this PES includes only those action decisions of major importance agreed upon in the final Evaluation Review Meeting. In addition, CREDICOOP has issued a comprehensive report on the outcome of its internal in-depth review with a number of decisions or recommendations, the implementation and monitoring of which will be CREDICOOP's responsibility.

15. EXTERNAL FACTORS

In general, external factors have not strongly influenced the Project. It is important to note, however, that while the price of cotton (the small farmer's most important cash crop) has been quite favorable during the past few years, some farmers' cotton production fell in 1978/79 due to bad weather. This may account for some loan delinquencies dating from that time. Also in 1978/79 a national gasoline shortage delayed cotton marketing.

16. PROJECT INPUTS

Project inputs include: (a) \$1,928,300 provided through AID Grant 0101 for technical assistance, commodities, and administrative costs; (b) \$3 million through AID Loan 027 to CREDICOOP for agricultural credit; and (c) \$281,300 through OFG 5/78 for support of a stabilization program within CREDICOOP. The Government of Paraguay provides technical assistance through the Ministry of Agriculture and the National Development Bank; tax exemptions to the cooperatives; and a small annual budget support to CREDICOOP. The U.S. Peace Corps provides volunteers used primarily in the accounting and auditing areas.

This evaluation has not identified significant problems in the delivery of Project inputs. The AID grant-financed technical services provided by CUNA, Inc. were instrumental in achieving project success, and the work of the two resident advisors was rated superior. All other AID inputs were provided as planned with the exception of the funds made available for the purchase of marketing facilities and equipment (\$89,000 of Grant 0101).

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The GOP continues to provide strong support to the Project. The technical assistance committed by the MAG and BNF has been provided on a consistent and effective basis through well qualified personnel. The MAG's support to CREDICOOP's budget has been received as planned and the Directorate of Cooperatives from MAG continues to cooperate fully in the chartering of new cooperatives and in providing specialized technical assistance when necessary.

17. PROJECT OUTPUTS

The planning documents include only the total output production level for June, 1981 and do not contain intermediate annual targets for Project outputs. Therefore, progress was measured by studying the tendency towards achieving the specific end-of-project targets. The results were as follows:

| <u>Planned Outputs</u> <u>June, 1981</u> | <u>Actual Progress as of</u> <u>June, 1979</u> |
|--|--|
| <u>1. Trained Staff and Leadership</u> | |
| a. CREDICOOP with 28 staff members with a minimum of two years of on-the-job training. | a. CREDICOOP has on board a total of 23 specialized and supporting staff members with over two years of service within the Institution. There are four other employees who have worked for periods of less than two years. All CREDICOOP employees have participated in training courses abroad or locally (or both), and have been exposed to continuous on-the-job training by the CUNA advisors. It is felt that CREDICOOP has already developed a staff capability commensurate to the type and size of its actual operations. |
| b. 30 rural coops with managers with at least 50 hrs. each of specialized training. | b. This output target has been achieved. There are 15 managers in 30 rural coops with more than 200 hrs. of specialized training each, and 10 others with between 50 and 200 hrs. of training. The remaining five are either managers of cooperatives of recent creation or new managers in older cooperatives. CREDICOOP considers that with few exceptions the present educational level of cooperative managers is generally adequate. Future |

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educational activities will focus on more advanced training, i.e. training in subjects such as basic economics, financial analysis, financial mathematics, etc.

The weakest area in the rural cooperatives' operations is agricultural technical assistance. The original concept of the ayudante de campo, an extension worker selected among the farmer members and to whom the cooperative pays a relative small compensation, proved not to be viable. There has always been a high turnover rate and to date only 24 of the rural cooperatives have that position filled. Of this total about 10 ayudantes are performing well. The others are not capable of adequately carrying out their duties.

c. 100 cooperatives board members with at least 20 hrs. of training in cooperative promotion and management.

c. The training of cooperative board members has been emphasized by CREDICOOP since its inception. During 1978, 349 hrs. were divided among 907 participants, even though CREDICOOP was not able to carry out all its 1978 educational plan for board members and had to cancel 14 regional courses mostly due to board members' lack of time and interest. To overcome this problem, CREDICOOP provided courses at the individual cooperatives where more acceptance was found.

d. A continuing training capability in place.

d. This target has been achieved. CREDICOOP has an Education Division staffed by 2 employees which successfully implements an adequate training program. In addition to the functions of this division, CREDICOOP employs four promoters and an accounting advisor who are all heavily engaged in field education activities.

2. Standardized Procedures in Accounting, Capitalization and Credit

a. 30 rural coops using the standard accounting system recommended by CREDICOOP.

b. All rural cooperatives complying with requirements that they purchase minimum share in CREDICOOP of 5% on marketing loans, and that cooperative members make share purchases of 10% in their cooperatives for each production loan.

c. 30 rural cooperatives using written credit procedures based on CREDICOOP model.

a. There are 28 rural cooperatives using the accounting system designed and recommended by CREDICOOP. The system is simple, adequate, and there seem to be no technical problems with its implementation; but progressive assistance is required in proportion to the complexity of the cooperative operations. There are 18 cooperatives that have already implemented a fairly good administrative and accounting system and that employ capable full or part time accountants. Another group of cooperatives still requires assistance, especially in the area of training of administrative personnel.

b. The capitalization requirements have been duly enforced by CREDICOOP and this target has been accomplished. In addition to the targeted requirements, CREDICOOP requires the cooperatives to buy shares worth an equivalent of 2-1/2% of the integrated capital of the cooperative per year.

c. CREDICOOP has developed adequate model loan policies and procedures for credit unions (patterned after CREDICOOP's own model) which were distributed to all affiliated cooperatives. The CREDICOOP promoters implement this model with the cooperatives' personnel. Additionally, CREDICOOP has developed forms and implementing manuals covering the whole credit process. These include a record system and procedures for credit analysis. The major problem with the credit policies and procedures is their implementation at the cooperative level. The CREDICOOP/AID review of compliance with the most critical elements revealed that at least 10 rural cooperatives are not following all of the practices necessary for sound credit

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administration. The CREDICOOP promoters are working directly with these cooperatives to eliminate these deficiencies.

3. Marketing Operations

a. CREDICOOP marketing department staffed by at least four employees.

a. Marketing operations constitute an important part of CREDICOOP's operations. The department is staffed by four trained members capable of handling present requirements.

b. CREDICOOP with two storage facilities with dryers and with adequate vehicles and equipment to provide marketing services to 38 rural cooperatives at projected volume.

b. This target was not properly defined in the planning documents. Under the present scheme CREDICOOP acts as a marketing agent for its affiliates and does not physically handle the bulk of the agricultural products marketed. Therefore, the real need for marketing facilities and equipment was difficult to estimate. As a result, most of the funds obligated for the purchase have not yet been used by CREDICOOP.

4. Credit Operations

CREDICOOP generating enough income from lending operations to cover its costs while still providing adequate support to achieve projected lending levels and delinquency objectives.

CREDICOOP has not achieved the lending level projected in the PP and in its own annual global investment plans. This was mainly due to (a) CREDICOOP's and the National Development Bank's cut-off of credit to 14 cooperatives with high internal delinquency rates; and (b) the success of the Project in achieving capitalization targets, thereby reducing the cooperatives' need for external credit. Another factor that contributed to the shortfall was lower than anticipated loan demand, as the Project has not achieved the planned number of farmer members in the rural cooperatives. (See EOPS No. 2). The annual amount of interest earnings from loans as of June 30, 1979 is \$32,100 short of the \$125,782 projected in the financial plans. The net income however, does not

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fall far short of the original estimates due to the fact that operating expenses were less than projected and because interest income from monies deposited in interest bearing accounts was more than projected.

Through Implementation Letter No. 8 of October 3, 1977, the Mission authorized CREDICOOP to utilize up to \$300,000 of AID Loan T-027 to finance the purchase of agricultural land by members of CREDICOOP affiliated rural cooperatives. AID and CREDICOOP agreed that during the period the first \$100,000 was disbursed CREDICOOP was to develop a plan for evaluating the land financing activities. Implementation of the evaluation plan was to start during the period the second \$100,000 was disbursed.

CREDICOOP has proceeded cautiously in implementing this program. As of the date of this evaluation, land financing loans totalling \$118,054 had been made to five cooperatives. An evaluation plan was prepared by CREDICOOP and reviewed by AID on September 11, 1978 with the recommendation that it be analyzed by a social scientist. This was done and CREDICOOP is now planning to carry out the field work in preparation for the evaluation.

5. Plans for future operations to benefit small farmers. At least one feasibility study by outside consultants to determine the advisability, profitability and best location for a cotton gin and/or other agricultural investments.

5. Feasibility studies for a cotton gin and an oil extraction plant were completed by outside consultants. CREDICOOP is now evaluating these studies and discussing them with its membership.

18. PROJECT PURPOSE

The purpose of the Project is to enable CREDICOOP to generate income in excess of costs while providing the full range of services required by its member cooperatives.

This evaluation disclosed that CREDICOOP has met most of the EOPS targets as of June 30, 1979 and that if the present trend continues, it is likely that the purpose of the Project will be fully achieved by June 1981. Progress towards individual EOPS indicators is as follows:

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EOPS No. 1 - Financial Strength

a. CREDICOOP shows a net profit of \$26,000. The financial projections prepared in 1977 estimate that CREDICOOP will achieve its breakeven point between 1980 and 1981. The net loss projected in 1977 as of June 30, 1979 is \$57,818.

A Balance Sheet and Income Statement as of 6/30/79 prepared for the purpose of this evaluation showed a loss in operations of \$19,398. When AID's contribution plus a small cash contribution from the Ministry of Agriculture are added to this amount, the total operational loss increases to the equivalent of \$79,200. This loss, however, is in line with the financial projection contained in the PP, as CREDICOOP has adopted the policy of increasing its reserve for bad debts to 1.5% of the highest annual balance of loans receivable instead of the 1.0% agreed to in Project documents.

b. Rural cooperatives have share capital of \$1,619,000. The June 1979 target for share capital mobilized by the rural cooperatives is \$990,000.

The share capital in rural cooperatives as of June 30, 1979 was the equivalent of \$1,750,000, which not only far exceeds the 1979 target but also surpasses the 1981 end-of-project estimate. This successful outcome has been largely due to the forced capitalization requirement whereby members must buy cooperative shares worth a fixed percentage of the loan received. Another factor that has contributed to the growth in share capital is the direct relationship between the amount of the share capital owned by a member and the amount of credit he may obtain. This policy provides an incentive for members to increase their share ownership.

c. Cooperatives' savings in CREDICOOP reach \$500,000, with \$185,000 by June 30, 1979

As part of its program for the mobilization of capital funds, CREDICOOP requires affiliated cooperatives to maintain as share capital in CREDICOOP an amount equivalent to 2.5% of their own share capital. In addition, CREDICOOP requires minimum share purchases by these coops based on percentages on loans made by CREDICOOP to its member coops.

As of June 30, 1979 cooperatives' savings in CREDICOOP amounted to the equivalent of \$258,968, thus exceeding the planned target by 40%. This amount includes the share purchases made by 14 urban cooperatives affiliated to CREDICOOP.

EOPS No. 2 - Membership: 38 rural cooperatives with 15,000 farmer members

A total of 30 cooperatives and 9,000 farmers was planned as of June 30, 1979.

To date, 29 rural cooperatives affiliated to CREDICOOP have been formed. In addition, there are 13 urban cooperatives which, although not included in Project plans, constitute a key element of the CREDICOOP system as they provide capital and leadership. The project is falling short, however, in achieving the targeted amount of farmer members: By June 19, 1979 there were only 5,242, i.e. 3,758 fewer farmers than the originally projected figure of 9,000. The less than planned membership growth is due to the conservative policy adopted by CREDICOOP through which cooperatives are encouraged to exercise great selectivity in admitting new members. This policy was adopted as a result of high delinquency experienced in rural cooperatives in the early years when the rural cooperatives had no membership strategy for member selection and thus had to deal with undesirables.

CREDICOOP is, however, aware of the fact that membership growth is crucial to its financial self-sufficiency, and is presently trying to combine the two conflicting goals of low delinquency and membership growth by adopting a new and formalized policy of "growth with selectivity."

This policy emphasizes development of comités por compañía within cooperatives before they launch membership campaigns. Such comités, informal groups of farmers residing in the same area and belonging to the same coop, coordinate technical assistance and marketing services provided coop members. They may also assist with collection of delinquent loans and may recruit and recommend other farmers for membership.

EOPS No. 3 - Agricultural Credit

- a. Annual cooperative loan volume reaches \$7,000,000 by June 1981
The total projected for June 1979 is \$3,000,000.

The annual volume of all loans made by rural cooperatives as of June, 1979 amounted to \$2,422,396. This shortfall resulted from the less than planned membership in the cooperatives and the cut-off of external credits (from CREDICOOP and BNF) to the cooperatives experiencing high delinquency rates.

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- b. There are 1,020 borrowers with fewer than five ha., 6,120 with five to 20. and 1,000 with over 20. A total of 4,100 ha. are financed

We were not able during this evaluation to verify the progress towards this target due to the lack of hard data, as the information available at CREDICOOP on number of farmers and amount of hectares financed only includes those farmer borrowers listed in the annual agricultural plans submitted by the cooperatives to CREDICOOP in support of their requests for loans. The total number of farmers and hectares included in these plans amount to only 1,408 and 4,723 respectively. These data, however, are not comparable with the planned figures as they do not include the financing of agricultural credit by the cooperatives with their own capital and external sources other than CREDICOOP. Likewise, we were not able to obtain detailed data by land ownership, as the annual agricultural plans only include the number of hectares cultivated and not the total land the farmer has access to.

- c. CREDICOOP charge-offs do not exceed 1% of loans made from 1976 through 1980

To date CREDICOOP has not yet charged off any bad debt. An analysis of CREDICOOP's portfolio made during this evaluation showed that of total loans of \$3,410,593, only \$35,789 was delinquent as of June 30, 1979, representing a recuperation rate of 97%. An analysis of the delinquent accounts showed that the amount includes a total of \$28,391 consisting of the unpaid balance on a large loan to one cooperative which fell due in December, 1977. The rest is composed of minor balances with due dates between July, 1978 and June, 1979.

However, it is important to note that while the recuperation rate as of June 30, 1979 appears satisfactory, a more accurate picture of the situation could only be obtained through the behaviour of the portfolio during subsequent months, as most of the agricultural loans to cooperatives fall due on July 1, 1979. For instance, as of August 3, 1979, delinquent loans amounted to the equivalent of \$363,000, which decreased the recuperation rate to 86%.

The overall level of delinquency in turn has its origin in the delinquency within the individual cooperatives. An effort was made by CREDICOOP and AID during this evaluation to identify the causes and define the necessary corrective action that CREDICOOP could take in each case. The most frequent causes are bad harvests, ineffective boards and/or managers, failure to follow sound credit rules and procedures, lack of supervision of credit use and inadequate follow-up on delinquent loans.

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The cooperatives reported that as of June 30, 1979, ₡48.9 million (\$388,000) out of a portfolio of ₡456.3 million (\$3,621,420) was delinquent. This figure, however, does not present fairly the magnitude of the delinquency problem as a significant portion of the loans fall due in July-August. Moreover, the cooperatives do not apply uniform criteria in reporting their delinquency. Some consider only the installments overdue as delinquent, while others consider as such the whole outstanding balance once an installment has not been paid by the due date.

On August 31, 1978 and again on March 20, 1979 the Mission entered into OPG agreements with CREDICOOP to establish a self-sustaining stabilization program designed to initially benefit nine cooperatives facing bankruptcy. Through these agreements AID provided \$230,000 for loans and \$51,300 for an incentive program for managers and employees in the nine affected cooperatives whereby employees would be rewarded upon attainment of certain targets, mainly for loan collection. CREDICOOP provided \$17,100 for technical assistance and \$16,200 for the stabilization fund. The National Development Bank waived interest and fines totalling \$68,300, and CUNA loaned \$35,000 to the fund.

In December, 1978 CREDICOOP loaned ₡37,314,000 (\$296,142) from the Stabilization Fund to nine cooperatives to refinance their existing debt to the National Development Bank. At the same time CREDICOOP resumed routine lending to the nine cooperatives in accordance with certain targets for loan collection, share capital and administration.

In the OPG agreement it was assumed that 50% of the old loans (₡17.5 million) would be recovered over a seven year period. A detailed recuperation plan was made for the first year which estimated that a total of ₡8.9 million would have been collected by the cooperatives by the end of the crop year (July/August).

In the evaluation we found that by July 31, 1979 the cooperatives had met 56% of the target, recovering ₡4.9 million of the delinquent loans.^{1/} Repayments to CREDICOOP, however amounted to only ₡1.9 million as of August 31, 1979, as opposed to ₡7.7 million planned. The less than satisfactory recuperation by CREDICOOP is due mainly to the fact that the cooperatives are placing priority in repaying the new short term loans granted by CREDICOOP in late 1978, as these bear a higher interest rate than those falling under the Stabilization Program.

^{1/} It is worth pointing out that the 56% recuperation by the cooperatives has been achieved despite bad harvests in some areas and notwithstanding the less than satisfactory credit management practices followed by the cooperatives.

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So far, only four of the nine cooperatives have adopted marketing and loan recuperation policies. Only one of the nine cooperatives issues notices of payment due before the loan due date. The others issue these notices after the due date. None of the nine coops issues notices to all delinquent members. It is therefore recommended that an in-depth review be made as soon as possible regarding the credit collection procedures followed by the cooperatives with the objective of outlining actions necessary to improve the situation.

CREDDICOP has adequately complied with the special covenants set forth in the OPG agreements, and all project inputs were delivered as planned.

EOPS No. 4 - Marketing

The annual volume of crops marketed reaches \$7,000,000, with a total of \$2,300,000 for the year ending 6/30/79.

The total volume of crops marketed as of 6/30/79 from the crop year 1978/79 amounted to \$2,150,000, with about \$412,000 more to be marketed in the next three months. Cotton accounts for 94%. Other crops marketed include soybeans, tobacco, corn, fish and a little wheat. The main reasons for the dominant role of cotton are the continuing attractive world market price and the fact that cotton is the traditional cash crop of small farmers in Paraguay.

In addition to providing additional benefits to the farmer derived from better prices, marketing operations constitute an important element in the recuperation of loans. CREDDICOP estimates that 95% of all loan recuperations at the cooperatives were ensured through CREDDICOP's marketing of loan recipients' products.

Marketing services also constitute an important source of income for CREDDICOP. During the last crop year marketing operations earned CREDDICOP a total of \$3,751,822 (\$29,776), approximately 12% of its net operational income. Cumulative net proceeds as of June 30, 1980 were projected in 1978 at \$169,400 and are to be used together with an AID contribution of \$35,000 and an estimated cash contribution of \$25,000 from the participating cooperatives as counterpart to a revolving fund for the improvement of marketing facilities of rural cooperatives.

To date, seven rural cooperatives have benefitted with loans to improve their warehouses. CREDDICOP and the cooperatives have provided their counterpart shares as planned, and total investments, including AID contribution of \$45,992, amount to \$104,796.

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The Project has been slow, however, in implementing the marketing facilities plans for CREDICOOP itself. No decision has been made yet on the type of equipment to be bought, and consequently a total of \$89,007 still remains unsubobligated under Grant 0101. A decision in regard to the use of these funds should take into account the new AID Minifundia Crop Intensification Project.

19. PROJECT GOAL

The goal of this Project is to increase by 50% the net income of participating small farm families over a five year period with a statistically significant increase over nonparticipating families. Another measure of goal achievement planned in the PP is an average capitalization of rural members of \$85. Progress data were to be obtained from cooperative loan request records, the ongoing Small Farmer Survey, and a follow-up survey in 1980 or 1981.

The USAID has repeatedly gathered baseline data on cooperative members vs. non-cooperative farmers. However, once data were gathered, both in 1972-73 and 1975-76, they were not fully analyzed due to computer processing failures in Paraguay and due to the experimental nature of the survey instruments used. Data gathering was carried out as planned but the analysis never reached the point where economic differences between cooperative members and nonmembers could be confidently established from the baseline data. Furthermore, the analysis of cooperative vs. non-cooperative farmers was only informally added to the workloads of the surveyors collecting baseline data and was not included in the original scope of work of the Mission's Agricultural Sector Assessment.

Despite these oversights, the July 1978 update of the Agricultural Assessment included an excellent section (pages 140-164) demonstrating that non-cooperative farmers perceived many economic advantages to belonging to cooperatives. CREDICOOP members and nonmember farmers in CREDICOOP regions were interviewed in the 1978 Sector Assessment. Both interviewed groups reflected positive attitudes towards the cooperative movement in general, and especially towards CREDICOOP. While these data are not of the type originally projected, they are extremely useful in evaluating differences between cooperative members and non-cooperative farmers.

There are proxy indicators which suggest that the Project is making a significant contribution towards the goal of increasing participants' farm income. For example, the capitalization of rural members as of December 31, 1978 has reached an average of \$146 versus \$85 planned for the end of project in June 19, 1981. It is safe to assume that most of the savings originated through sales of the increased production achieved with the help of agricultural loans. Moreover, almost all farmer members are currently marketing through CREDICOOP, which provides them additional monetary benefits through better prices (estimated at 9% higher for cotton, 16% for soybeans, and 22% for corn) and the fair weight and grading offered by CREDICOOP's marketing system.

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20. BENEFICIARIES

Prior to the preparation of the PP for Grant Project 0101 in late 1977, USAID undertook three studies of cooperatives to determine whether their clientele met the target group selection criteria contained in Sec 102(d) of the FAA. The conclusion of these studies was that the Project was reaching the rural poor majority target group.

Data on farm income are not systematically recorded and therefore no information is available to determine eligibility based on income. Nevertheless, it has been demonstrated that CREDICOOP is directing most of its lending to farmers with small land holdings (1 to 20 ha.), including a significant number without full ownership of the land they farm. These farmers typically devote 1.5 or two hectares to consumption crops (cassava, corn, beans) and cultivate a few additional hectares of traditional cash crops (cotton, tobacco and occasionally soybeans). Their income is generally low due to several constraints (identified in the Mission's Agricultural Sector Assessment).

This Project plays an important role in alleviating one of the most basic constraints to small farm income, which is the lack of adequate credit services. At the same time it helps reduce other problems such as an inefficient marketing system, lack of adequate technologies, and poor farmer organization.

Follow-up on Actions to be Taken

The Mission, host country, and implementing agent should maintain close coordination to assure that decisions taken are implemented. Management should follow the usual procedures of the organization for keeping track of assignments, rather than making the Evaluation Officer responsible for such supervision.

A full evaluation file (including raw data and information on how it was developed) should be maintained by the project officers as an integral part of the project files. Such an evaluation file will be useful for the next periodic evaluation. It may also be useful in case the project is included as part of a special impact evaluation conducted by AID/W for program policy purposes.

No standardized procedure is applicable under all circumstances. However, a good general rule is that the Evaluation Officer not be charged with supervising the followup on actions decided upon by the Evaluation Review. This task should be left to the Project Officer although the Evaluation Officer should maintain a record of all Review decisions and note the actions taken.

Distribution and Monitoring of Reports

Either the printed form, or a narrative with cover sheet, should be submitted to SER/MO/PAV to duplicate and distribute copies.

Bureaus should check the receipt of reports and query Missions or AID/W offices in case of delay from the established schedule.

Use of Reports by the Office of Development Information & Utilization (DIU)

Copies of evaluation reports, as well as other major project documents, are available in the Office of Development Information and Utilization (DIU) for use by development officers and others interested in deriving lessons from experience, for use in future activities.

SPECIAL EVALUATIONS

A regular evaluation often results in a decision to make a special study of the project. Some of the possible reasons for a special evaluation noted earlier were:

- Management wants answers to difficult, unexpected questions.
- A follow-on project is contemplated.
- A contract team with special expertise will be needed.
- An in-depth analysis of a particular aspect is required.
- Anticipated changes in host country policy may have affected key design assumptions.

In addition, evaluations may also be undertaken at the instigation of program managers in AID/W or the field to provide clues for dealing with broader issues such as formulation of strategies, goal setting, and resource allocation. The requesters of special evaluations take the lead in identifying the questions which concern them and formulating hypotheses which they would like to have tested. Special evaluations initiated by AID/W may be confined to a single country or may be comparative studies of experience in several countries.

Study Design, Methodology, Resources and Arrangements

The nature of the special evaluation (scope, study design, methodology, etc.) is determined largely by its purpose.

If the purpose is to measure project progress more accurately than could be done in a regular evaluation, and to identify and assess the socioeconomic factors associated with that progress, then the study design will include, but probably go well beyond, the basic steps described earlier.

If the purpose of the special evaluation is to explore critical issues or problems, then the study design will probably call for the formulation of several hypotheses to explain each of the issues/problems. The study design should specify the kinds of evidence needed to test or validate the hypotheses and how to collect and apply that evidence.

If the purpose is to establish the effectiveness of a project strategy, the study design may require a comparative examination of the project experience against other projects with different strategies.

Special evaluations may require sophisticated statistical methodologies, design and analysis. The choice of evaluation methodology warrants careful consideration since the methodology will control the extent to which the findings are valid, and therefore credible. Also the methodology will determine what kinds of data are needed and how it will be collected and analyzed; thus establishing the cost, and feasibility of the evaluation.

Frequently, it is necessary to call upon an outside contractor or consultants for Special Evaluations. The evaluation staffs in PPC and the AID/W bureaus can help locate evaluators, either from its roster of contractors or from other sources. However the Mission must specify what it wants, what support it will supply, and what it expects the consultants to do. In this regard, it is commonly thought that an expert in, say, cereal crop production is also an expert in evaluation of cereal crop production projects. Experience shows that sectoral/technical experts are not necessarily skilled or experienced in design or evaluation of projects in their field. Bureau and Mission Evaluation Officers should therefore assure that outside evaluation teams have qualified personnel in both the technical and evaluation areas. All evaluation teams must have a working familiarity with AID's design and evaluation methodology and practices. Bureau Evaluation Officers should brief field teams on the AID Evaluation system prior to departure from AID/W.

Consultants may have more time, expertise and objectivity than project personnel, but usually lack familiarity with local conditions. Hence, a mixed team of host and AID personnel working with consultants is often effective. It is important to note here that AID cannot delegate its official responsibility for evaluation to a contractor or consultant. The role of a contractor or consultant is to collect and analyze data and draw tentative conclusions and inferences from the analysis for presentation to AID. Final evaluative judgments and decisions are made by AID.

CONDUCTING THE STUDY

- o Collect Evidence
- o Analyze data
- o Make Judgmental issues explicit
- o Draft recommendations and conclusions
- o Clear draft with host and donor officials
- o Prepare final report

The evaluation team should be required to submit a draft report or detailed outline several days prior to departure from the Mission (or AID/W Office for AID/W projects) so that reactions can be obtained from users of the final report.

Reports

To facilitate comparative analysis and to help the Office of Development Information and Utilization (DIU) abstract findings for transmission to others with similar problems, special evaluation reports must follow the outline specified for the Project Evaluation Summary (PES).

In addition to regular distribution, project personnel and consultants should plan appropriate distribution to other Missions or donors with similar projects, to concerned universities and research institutions, etc.

SUGGESTED OUTLINE: SUMMARY OF SPECIAL EVALUATION REPORTS

(Use 250-300 words altogether)

A. Introduction:

1. Describe in one or two brief sentences the project's intended purpose and outputs, and the reason for the special evaluation.
2. Describe in one sentence the inputs used to carry out the project.
3. Describe briefly the period covered by the evaluation.

B. Method:

1. Describe briefly the method(s) used to conduct the study.

C. Results:

1. State your conclusions regarding the project's performance and the degree of achievement reached at the output and purpose levels.
2. Where the project has succeeded, state the reasons why; where the project has failed, state the reasons why.
3. Identify the effects of external and/or internal factors on the performance of project activities.

D. Recommendations:

1. Provide a one-sentence assessment of the project's status.
2. Based on successes or failures, outline your recommendations for continuance, modification, or cessation of project activities.

E. Financial Summary and Analysis.

IMPACT EVALUATIONS

The Foreign Assistance Act requires that AID development assistance projects help to improve the well-being of poor people. To meet this mandate, evaluators need to pay special attention to the actual effects of projects on specific target groups or individuals. Impact evaluation attempts to assess the consequences of development assistance, at the project, program or policy level. At any of these levels, impact evaluations are expected to:

- (a) determine whether social and/or economic changes occurred; and
- (b) ascertain whether such changes are attributable to the specific development assistance policy, program or project under examination.

Impact evaluation focuses on results, whether desirable or undesirable, transient or permanent, immediate or delayed, intermediate or final, planned or unplanned. It is also concerned with other causal factors (other programs, projects, policies, strategies, institutional and structural influences, market conditions, etc.) which may have been instrumental in stimulating the observed changes. Impact evaluation often deals with complex interactions where important consequences may be latent and obscure, rather than readily observable.

The approaches, methods and techniques used in impact evaluations are often complex. They must be adequate to detect change. In addition, they must be precise enough to yield information on the degree to which the changes that are observed are attributable to specific causes. There are few simple approaches.

Impact evaluation is the Agency tool for addressing questions of particular importance with regard to the project hypotheses, strategies and process, on a selective basis. Impact evaluation will be applied in situations where:

- Understanding the consequences and causal relationships in a specific project is deemed important.
- Evaluating one or two projects that articulate a common set of development hypotheses may clarify understanding of a functional cluster of Agency projects (e.g., a specific type of agricultural production intervention).
- Evaluating several projects directed at the same socio-economic consequence, but employing different approaches, could provide a measure of relative effectiveness of the approaches.
- Evaluating one or more projects offers the possibility that AID could increase its understanding of important process issues, such as participation strategies, etc.

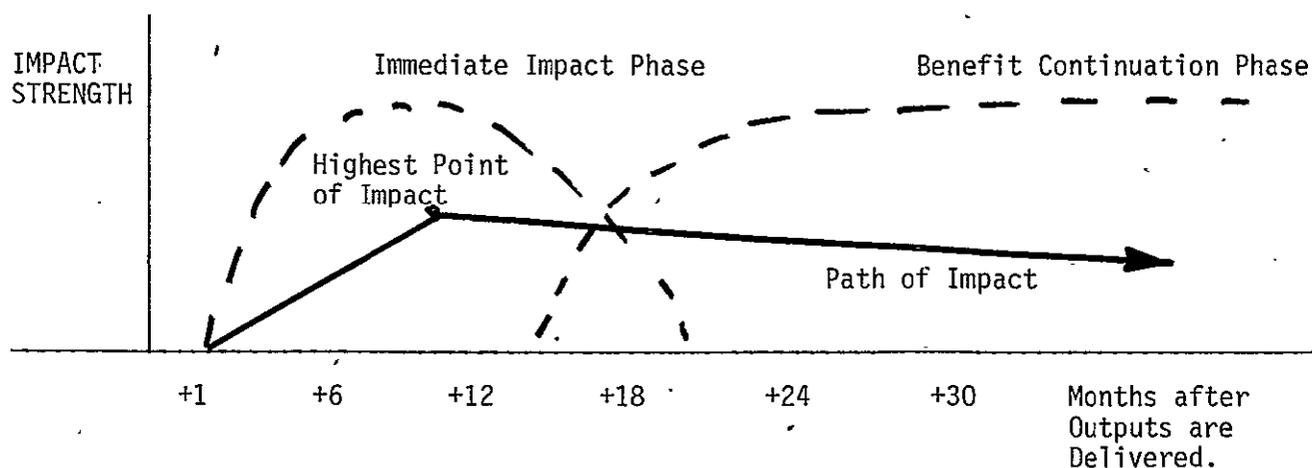
Selecting Projects for Impact Evaluation

PPC/E coordinates impact evaluation selections. Missions and Bureaus should inform PPC/E concerning their plans for impact evaluation, and the particular projects they have selected for examination. PPC/E will maintain a roster of planned and completed impact evaluations, serve as liaison between interested offices and attempt to ensure that the evaluation agendas of all are met through a coordinated, cost-effective effort.

Timing of Impact Evaluations

The impact of a project has two phases. In the first phase (usually soon after project completion), the immediate consequences of a project will be observable. During this phase, project impact may well be at its height. However, it is only later, after additional time has intervened, that the permanent consequences of a project and its second-generation effects can be detected. In this later period, the initial impact may continue, disappear or be enhanced, to the degree that other projects, programs or policies reinforce the direction of change stimulated by the project.

The duration of these phases when immediate impact and long term impact (benefit continuation) are apparent, will differ by type of project. In some agricultural projects, for instance, the immediate social and economic consequences may be observable within months of Output delivery, - after one crop season. The consequences of education and institution building projects, on the other hand, may not be observable for several years. Similarly, the second phase of impact in time, where it should be possible to both look backward and evaluate immediate impact, at its height, and simultaneously gather evidence concerning the early stages of benefit continuation -- the long term trend of socio-economic consequences established by the project..



As a guideline, immediate impact from projects should be observable sometime in the period from one to eighteen months after a project's Outputs are delivered. Long term impact will probably be observable within twelve to twenty-four months after Outputs are delivered. These preliminary expectations lack field verification. They do, however, suggest a way to define when an impact evaluation could capture information on both immediate and continuing project effects.

1st Generation/2nd Generation Effects

"First generation" effects are effects caused by the project action. "Second generation" effects are effects for which the project's first generation effects are the cause. From the point of view of evaluation, second generation effects cannot be observed until after the primary effects have occurred. Some second generation effects may be observable very early, others could lag and not be observable until well after the last of a project's first generation effects are felt, e.g., some time in the second or third year after the project's Outputs are provided.

If second generation effects from a project are unplanned, or if they could have been anticipated but were not, evaluators will have to undertake a two step process in order to assess them: (a) identify a project's second generation effects, and (b) measure them. The process of identifying effects that were not articulated by the project adds a layer of complexity to the evaluation task.

Project effects that could not have been anticipated must be "discovered" in the course of an evaluation. The evaluator must take three steps in assessing unanticipated effects.

- * Identify aspects of the project situation that are not on the list.
- * Discern whether these aspects changed during the project period.
- * Define a plausible connection between project action and the unanticipated changes that have been observed.

Inclusion of unplanned effects in a scope of work for project impact evaluations may increase the total time and the level of effort required. More sophisticated fieldworkers will be required than if only planned change is measured, and more staff, overall, may be required to complete the tasks within the evaluation scope.

Primary and Secondary Effects

"Planned" and "Primary" effects often mean the same thing in a project design: Secondary effects include changes that affect the target groups/areas in dimensions that differ from what was planned (e.g., negative side effects) and/or changes that affect other populations/areas (e.g., spontaneous adoption of a project approach by a different group of people).

Secondary effects may occur well after primary effects are observable, thus extending the time frame for evaluation. Some secondary effects may be unplanned requiring that a process be instituted to identify them before measurement can begin. Finally, where secondary effects occur in other populations/areas, the number of sites visited during an evaluation may have to be increased, with a greater level of effort.

Positive and Negative Effects

Positive and negative are terms that convey our value judgments. They take on meaning only in a context, and not everyone will value a given effect in the same way. Thus, evaluators may find situations in which the Mission and the host government, or the central ministries and the villages, do not agree on how an effect is to be valued. From an evaluation perspective, the prudent approach is to document effects, then indicate how they are valued by key groups in the project situation. The labels "positive" and "negative" might safely be applied where all key parties agreed on the value judgment for a given effect. Where no consensus is found, evaluators should point this out, rather than trying to apply a label to which some parties do not subscribe.

A cursory review of AID project documents suggests that the effects identified tend to be effects that AID values positively. In impact evaluations, two issues need to be addressed:

- (1) the degree to which the effects which AID views positively, are also positively valued by others, and
- (2) Methodology to identify and measure negative effects (or costs).

Value judgments should be sought from those involved in the project or the geographic area; the Ministry with which AID is working; individuals involved in project implementation at the site; local political representatives; people working in sectors that are indirectly affected by project action; etc. Take care not to exclude groups that are expected to differ from AID in their view. One obvious problem is bias: people tend to tell AID representatives what they think we want to hear, rather than be embarrassed by indicating they do not appreciate something AID worked hard to produce. Additional complexity is added when AID must "discover" the effects it wants valued.

Spread Effects

Spread effect refers to two types of multiplier effects: planned replication; and the spontaneous adoption of a process. For example, spread effects from a cooperative marketing project could involve:

- (a) the planned development of marketing cooperatives beyond the initial target area/group.
- (b) the spontaneous development of marketing cooperatives in other, unplanned areas; and
- (c) the use of the cooperative mode to serve other purposes (such as savings & loan).

Some of the "ripple" effects of projects tend to be secondary in nature. While spread effects that involve the adoption of both a process and the specific content from a project are likely to be recognized quite easily, instances in which only a process is reapplied may be somewhat more difficult to identify.

Including "spread effects" in an impact evaluation scope may increase the number of personnel and their skill levels and the evaluation will likely cover a more extensive area/population that would be the case if "spread effects" were not included.

The Additional Lessons Element

In the course of most project impact evaluations, evaluators acquire useful information that does not readily fall into the specific information categories identified by a scope of work. Five types of information of this sort can readily be identified; while these areas should not be subjects of formal study during an impact evaluation, in developing a final report, space should be allocated to report such information.

- a) Management Information Often evaluators learn a lot about how a project was managed when they attempt to examine its progress. While impact evaluations will reveal less of this type of information than a good mid-project evaluation, observations about project management which have some bearing either on the continued operation of the project or on the management of similar/future projects should be recorded.
- b) Methodological Observations This includes what worked, what didn't work, what proved difficult about the design for the evaluation, the instruments, the data collection approach, the analysis, etc.
- c) External Validity The issue of external validity is an important one for AID. A set of project hypotheses have internal validity if they "work" in the project situation in which we said they would. These hypotheses have external validity if they can be applied to other situations. In planning to replicate a project design elsewhere AID must be concerned both with whether the design worked, and whether the hypotheses have external validity. A single project evaluation is not usually able to make a definitive statement on this topic; evaluations that assess several projects of the same type provide better information. Nevertheless, evaluation of an individual project often surfaces information pertaining to external validity. What project assumptions appeared to be critical; what assumptions proved to be important that the project failed to note; what political/cultural factors appear to have had bearing on the success/failure of the projects, etc. To the degree that evaluations record this type of information, it increases the probability that replication attempts can be successful.
- d) Partial Information/Hunches Evaluators pick up much diverse information during the course of an evaluation. While often partial, and usually not very rigorous, sometimes this information suggests conclusions, or the type of facts that might have been surfaced if additional study questions had been defined early on. In a formal study (e.g., a sample survey) there often seems to be nowhere to record such "soft" data. Having a specific scope item for recording this type of data has two effects: In many cases it leads to recording partial information/hunches that would otherwise be excluded because evidence is not adequate to justify recording the data as a finding. Secondly, it encourages evaluators, who co-mingle their partial data with data based on solid research, to separate the two.
- e) Inferences/Deductions that Go Beyond the Project Framework Sometimes, in the course of examining a project, evaluators will find that the exposure to a great deal of factual information, conversations in the area, etc., trigger a new idea about how development works, or is affected by factors that go well beyond the project they are evaluating. Such thoughts and hypotheses may be tangentially related to the specific project (e.g., cross-sector interactions that have not been identified previously). At other times, the relationship to the specific project will be quite remote, concerning instead the effects of some AID or host policy, or cultural patterns.

Preparation of the Final Report

When an impact study is completed, a report telling what was done, how it was done, and containing conclusions and recommendations should be written. A useful technique is to draft a preliminary outline before the study begins. This will help clarify thinking as to what should be done, how it should be done, and the kinds of problems involved. When the study has been completed, the final report should state clearly and succinctly basic identification data on the project (including country, project title, project number, project financing) such as:

- Why the study was undertaken.
- What the problem was.
- Who performed the study.
- How the problem was studied. What procedures were used. What information was collected. How were the data analyzed. How were the data interpreted.
- Where the study was carried out.
- When the study was carried out.
- Whether the project currently exists.. Whether it was physically completed and if it still physically exists and functions. Whether it produces usable outputs. Whether it enjoys supports of both the target group and the host-country government.
- Whether the project was effective. Whether it is functioning and viable. Whether the institutional component of the project is delivering goods and services effectively and at reasonable cost. Whether it is self-sufficient in terms of budgetary resources, qualified personnel and equipment and plant. Whether it is innovative, productive and held in esteem by both client and peer institutions. Identify the cumulative accomplishments of the project.
- What the development impact is -- intended or unintended -- directly attributable to, or clearly associated with the project.
- What economic changes have occurred as a direct consequence of the project in terms of
 - Employment, production/productivity;
 - Income, savings, consumption, investment;
 - Access to economic resources and benefits;
 - Mobility, access to markets and which socio-economic groups were affected.

- What social changes have occurred as a direct consequences of the project:
 - Access to social resources, services and opportunities
 - Changes in ownership, tenure, location and social mobility;
 - Changes in political power and participation;
 - Changes in disadvantaged groups such as minorities, the landless, women, etc.;
 - Changes in personal security and sense of community;
- How the project has affected political decisions, host-country policy and structural and administrative areas which over time affect the economic and social welfare of the target group.
- What ways the project has contributed to environmental enhancement or degradation.
- In what ways, and to what extent, the results of the project have been sustained over time, spread over a larger area, replicated and/or multiplied. At what levels beyond the project purpose level this spread effect has occurred: subsectoral, sectoral, area or macro.
- Identification and assessment of the effects of factors which caused -- or were associated with -- the observed changes/results.

The final question to be answered in the report is, "SO WHAT?" State the conclusions clearly and concisely, and recommend the next steps to be taken.

Identify Lessons learned

- Substantive findings and conclusions of value to A.I.D. and host-country program managers and project designers.
- Then make recommendations for changes in A.I.D. institutional procedures and behavior.
- On the qualifications and skills of project personnel and on the relationships of donor and host-country personnel.
- For follow-on or remedial actions to be taken by the host country.

SUGGESTED OUTLINE: IMPACT EVALUATION REPORTS

- i. Title Page
- ii. Executive Summary -- two pages
- iii. Table of Contents
- iv. Preface
 - a. Brief statement of evaluation methods
 - b. Acknowledgements
- v. Project Data Sheet
- vi. Map

A.I.D. Impact Evaluations should cover SECTIONS I - V below in NOT MORE THAN 15 PAGES.

- I. Project Setting
 - a. The problem which gave rise to the project.
 - b. Description of the beneficiaries, their society and their environment prior to the project--appropriate baseline information.
- II. Project Description
 - a. Outputs, purposes, goals (levels), (targets for each)
 - b. Strategy--the proposed course of action--intended to do.
 - c. History--what actually happened, and the people involved. Include whether outputs were achieved.
- III. Project Impacts: Findings
 - a. Achievement of specified purposes, goals and targets.
 - b. Unplanned effects on beneficiaries, their society and environment--any and all changes that can be linked to the project.
 - c. Cross-cutting issues such as: local participation, womens' role changes, rising energy costs, environmental effects, and appropriate technology.
- IV. Project Impacts: Analysis
 - a. Evaluate causal relationships
 - b. Competing explanations
 - c. Sustainability/recurrent cost burden
 - d. Replicability/Spread
- V. Lessons Learned and Policy Implications
 - a. AID's role in development projects
 - b. For other major development issues
- VI. Appendices
 - a. Last logical framework for projects
 - b. Detailed statement of field methods
 - c. Field notes, etc.

Lessons Learned

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Report of a Project Impact Evaluation

Evaluation Report Abstract

SMALL FARMER MARKET ACCESS

(Pico y Pala)

December 1979

by

G.R. van Raalte (AID/Washington)
Steve Singer (AID/Washington)
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EXECUTIVE SUMMARY

In November 1979, a four-person team spent three weeks in Columbia evaluating the nearly completed Small Farmer Market Access Project better known as Pico y Pala (Pick and Shovel). This was the first in the series of impact evaluations initiated under the Administrator's directive for A.I.D. to carry out impact evaluations largely using direct hire staff. The project will result in the construction of 69 all-weather, unpaved mountain roads of 8 kilometers average length. They are being built under the direction of a Colombian government entity, Caminos Vecinales, but with most of the work performed by the small farmers and landless rural laborers who were the intended beneficiaries of the completed roads.

Although long-term questions remain, the overwhelming character of the short-term results leaves little doubt of the project's positive impact. The key-stone of this success was the sharp reduction in transport costs following the switch from animal to motorized transportation. As transport costs fell, economic incentives increased and production rose without changes in policy or such services as agricultural extension. When it was in the farmers' interest to grow more, they grew more; in rural Colombia at least, they did not have to be taught or exhorted to do so.

In fact, the flow of public services expected from other government entities, such services as health and education, has not yet followed the road as anticipated. Any impacts in these areas resulted from increased capacity of those heretofore isolated to seek services in town.

There are three long-term concerns about the project: maintenance, environmental impact and replication.

Maintenance

Although the roads' beneficiaries can and do carry out sufficient first-line curative maintenance to keep the road operational - such as clearing off landslides - there is no budget for the large-scale maintenance required in this geologically young and unstable area. There are occasional major landslides or collapses that the campesinos cannot handle without outside resources, and there is no mechanism to deal with this eventuality. Preventative maintenance has also received insufficient attention.

Environmental Impact

To protect against erosion and siltation of the rivers in the manner recommended by U.S. consultants would require standards and commitment of resources not now applied to the major highways in Colombia, let alone to this tertiary road system. There are signs of erosion though not yet of the more insidious siltation. On similar roads constructed under a previous project five years ago, regrowth and recovery were observed. It is accepted that serious environmental degradation can result from road construction in mountainous terrain but the gravity of the threat in Colombia and the appropriate response in the context of low-cost road construction must be the subject of further analysis (See Annex D).

Replicability

The project is considered a success at the grass root level, and by important Colombian officials. It is an example of a road construction project successfully designed to use hand labor in a cost-effective manner, and it provides a replicable model for the contracting, management and payment of unskilled workers. The knowledge, institutional capacity and proof of efficacy now exist for this program, but political support may be lacking and its continuation seems uncertain. Colombian funds allotted to the program in 1980 are lower than in 1979. Figures are unavailable for subsequent years. Unless additional funds are budgeted or external resources applied, no new starts of Pico y Pala roads will be possible. If so, the experience will have been of little but academic interest. A continuation of this program in Colombia, or its replication elsewhere under comparable conditions, however, would represent a refinement in our thinking about rural development: a move away from the complexities of integrated rural development to the sparseness and selectivity of attack on key constraints (See Annex B).

Since the roads completed under the project are all less than a year old, a follow-on evaluation is recommended in 1983.

Copies of the complete report may be obtained from Ms. Sandra Malone, PPC/E, Room 2839 NS, Agency for International Development, Washington, D.C. 20523.

LESSONS LEARNED ABOUT EVALUATION

Several operational principles have emerged from past experience with various evaluation practices. They are not hard and fast -- nor eternal truths -- but they have been mentioned frequently enough that people in the business of bringing about change should take note.

1. The effectiveness of the evaluation process is largely dependent upon the quality, explicitness and rigor of program or project design. The quality of design is the major limiting constraint in evaluation.
2. Evaluation must comprehend the total program or project. It is neither feasible nor productive to limit the evaluation process to the fractional resource input of a single source or donor.
3. Evaluation should not be conducted for its own sake nor to generate potentially useful information. Evaluation should be decision-driven -- i.e. evaluation should be undertaken only in response to a need for a decision.
4. The responsibility for evaluation should be placed as close -- functionally and organizationally, as possible to the user who will base his decision on the evaluation findings.
5. The host country should take the leading role in evaluating donor assisted projects with the donors playing a supportive role. Where the host country does not have adequate capacity for evaluation, the donors should offer training in evaluation methods.
6. In designing and implementing evaluation studies, maximum use should be made of host country skills and resources, e.g. local universities, consulting firms, etc.
7. Achieving maximum transfer and utilization of evaluation findings requires an information system capable of collecting, storing, retrieving and disseminating experiential data.
8. If programs, projects, and their evaluations are to be successful, the host country commitment needs to be long-range. Development efforts, training and institution building take time.
9. After an evaluation, a gradual transition at the end of a program or project is important. Access to funds, supplies and equipment should not be terminated so abruptly that development work suffers, nor should program participants be made to feel that their work is no longer important or useful.
10. Clear understandings should be reached at the onset of an evaluation with regard to the roles of various participants. Each person's role should be so defined that their experience will be used effectively and compatible arrangements will be agreed upon.
11. There is a need to view evaluations as guidelines rather than intractable laws. Sufficient flexibility should be maintained to exploit opportunities that seem sensible and useful.
12. Evaluation procedures should be as simple as possible with rapid feedback of recommendations and conclusions.
13. Evaluation should occur on all levels of a project - national, regional, district and village (or community) - level.

NOTE: The first eight "Lessons Learned" are from "Program Evaluation in AID - Lessons Learned" by Herbert D. Turner, AID, July 1976. Others have been copied from various evaluation reports.

OBTAINING INFORMATION ON
DEVELOPMENT PROJECTS

- . . What are the lessons learned from past A.I.D. approaches to marketing of fruits and vegetables?
- . . Please synthesize A.I.D.'s experience in combatting protein deficiency.
- . . Where do I find Tropical Soils expertise?
- . . Do you have information on past A.I.D. projects involving the implementation of rural health delivery systems?
- . . What's the latest information on renewable energy sources?
- . . Please send me 20 copies of the Appropriate Technology Source Book in Spanish.
- . . Can I receive regular listings of new literature in my technical speciality?
- . . Where can I receive technical assistance in the setting up of an Information Center?

THE OFFICE OF DEVELOPMENT INFORMATION AND UTILIZATION (DIU)

The Office of Development Information and Utilization (DIU) has been established in part to answer these and virtually any requests for technical and project experiential information from LDC individuals or institutions, Missions, A.I.D./Washington, Peace Corps and the Voluntary Agencies. A staff of both Foreign Service and A.I.D./Washington personnel will locate and select information from various sources, analyze and synthesize as required, and "package" a specific response to the requestor.

DIU Development Information Resources

- .. The DIU Development Information Centers in the State Department building, (Room 1656, N.S., Te., 202-632-8701) and in Rosslyn, (Room 105, SA-18, Tel. 703-235-1000), provide "walk-in" reference library services. The Centers contain some 125,000 reports and publications related to development assistance. Equally important, the two Centers have access to all major special, academic and technical libraries nationwide and, in addition, have on-line access to some 100 automated specialized data bases citing development literature published worldwide.
- .. DIU directly manages three major A.I.D. data systems:
 - (1) The Development Information System, functioning as A.I.D. "memory", provides project descriptions, evaluations and other program documents.
 - (2) The Research and Development system contains abstracts of available A.I.D. - funded technical and research reports.
 - (3) The Economic and Social Data System maintains combined economic and social data from IBRD, IMF, USDA, and A.I.D. sources for virtually all countries covering, in most cases, a 20-year period. The ESDS also provides data analysis services for researchers, analysts, economists and project designers in development areas of specific concern.
- .. Contract or other working arrangements are maintained with the USDA, Bureau of Census, Department of Commerce, and organizations such as Volunteer In Technical Assistance to allow rapid access to additional specialized information of priority interest to A.I.D.

In summary, the development information resources available to users through DIU are vast and complex. However, through automation, rapid reproduction and other techniques, DIU is capable of prompt identification, selection, duplication and transmittal of specific material to meet a specific need.

Publications and Dissemination Services

In addition to responding to individual development information request, DS/DIU produces various regular and ad hoc publications of development interest.

- .. A.I.D. Research and Development Abstracts, published quarterly since 1973, provides abstracts of A.I.D. supported research reports. With a mailing list of approximately 7000 worldwide, ARDA offers to requestors, full research documents in microfiche or paper copies of reports cited, at cost or subsidized cost to LDC requestors. ARDA items are free to A.I.D. staff and other U.S. Government development agencies. In the last four years over 124,000 documents have been provided. Over 92% of these were provided directly to LDC institutions, individuals or others outside the U.S.
- .. Directory of Development Resources first published in June 1979, is a 400-page compendium of information resources including data banks, newsletters, information clearinghouses, and development resource institutions in the LDCs and the U.S. that have been financed or otherwise sponsored by A.I.D. A detailed description of each resource and means of direct access by the reader is provided. It is published in English, Spanish and French and updated annually.
- .. Technicians On Call for Development first published in March of 1979, is a listing of Development Support Bureau technicians (with education, language and professional experience) available for TDY or other assistance to U.S.A.I.D. Missions. It is to be updated semi-annually and is distributed only within A.I.D.
- .. AID Resources Report first published in February 1978, is a bi-monthly newsletter which presents concise information on new technology, procedures and development findings that is directly applicable and useful to the development technician. On request, full documentation is provided to the reader on any of the items included and personal contact encouraged with the technical office responsible for the item. AID Resources Report is produced in French, Spanish and English and the mailing list includes the Peace Corps, the Voluntary Agencies and LDC institutions or individuals who wish to participate. There is no cost to the requestor for the services.
- .. Research Literature for Development, (Vol. I, December 1976, 427 pages, Vol. II, December 1977, 596 pages). This is a catalog of approximately 70% of A.I.D. - sponsored research and development reports from 1962-1977. All are available on request to LDC institutions and U.S.A.I.D. Missions in paper copy or microfiche from DIU. A third volume reflecting new acquisitions since publication of Volume II, is planned.

- .. Project Experience Summaries are written specifically for A.I.D. field personnel and project designers. DIU produces for A.I.D. field Mission distribution, four to six summaries annually of state-of-the-art" discussion and experience of the development community on topics of special developmental interest. Recent summaries have included Appropriate Technology and Integrated Rural Development.
- .. Indefinite Quantity Contracts. DIU is producing a compendium of Indefinite Quantity Contracts for field use. All contracts will be listed and defined as to function, duration, costs, etc. Generally limited to no more than 90 days, IQC work orders can assist the Missions with short-term expertise not otherwise as readily available.

DIU Technical Assistance in Information Science

DIU provides TDY assistance in design, implementation and evaluation of A.I.D. projects with development communication and information components such as publication and mass media extension efforts, clearinghouses, information centers and data systems. Assistance in development of brochures, newsletters and other information support needs is also available.

Project Activities

Impacting on future information services and their scope, certain current project activities of DIU are:

- .. Under a contract with a major non-profit organization an action plan for the implementation of a worldwide "Appropriate Technology Information Exchange Network" is being developed.
- .. Working with a consortium of scientists and educators, a major effort is underway to synthesize available information on environmental health. Materials will be aimed at the policy maker, the technical manager and the "how to" level of the community field worker. Field testing will be carried out in 1980.
- .. DIU is working closely with the National Technical Information System of the Department of Commerce in encouraging the increase of low-cost availability of U.S. technology to the developing countries.
- .. DIU is working now on a Ready Data Book for each A.I.D. country and region which will provide on a regular basis selected economic and social data in policy and sectoral areas of priority interest.

How to reach DIU

DIU accepts information requests by letter, cable, phone call or personal visit. Be as specific and detailed as possible in describing your information need. Your intended use of the information, language needs, probable audience and any other pertinent details will help us select and tailor the response to your requirement in the shortest period of time.

With the exception of the directory, Technicians On Call for Development, the Project Experience Summaries, and the compendium on Indefinite Quantity Contracts -- which are designed for A.I.D.'s own purposes, all of the information services listed, are available to LDC and other donor individuals and institutions, and their use is encouraged.

Correspondence for DIU should be addressed:

International Development Cooperation Agency
Agency for International Development
DS/DIU, Room 509, SA-14
Washington, D.C. 20523

Phone: (703) 235-1840

A REMINDER

In order for DIU to better serve overall LDC and A.I.D. information requirements, we need mission documents, special internal mission reports or analyses, plus host country publications, journals, research findings and other documents of development interest which are not routinely available to A.I.D./Washington. DIU will microfiche documents and return them to the sender if desired and will also in some cases, assist in support of microfiche installations at Missions or in LDC institutions supported by the Mission.

ACRONYMS COMMONLY USED IN AID

| | |
|------------|---|
| ADB | Agricultural Development Bank |
| ADB | Asia Development Bank |
| AID | Agency for International Development |
| AID/W | Agency for International Development in Washington, D.C. |
| BIFAD | Board for International Food and Agricultural Development |
| BOPS | Beginning of Project Status |
| CBD | Commerce Business Daily |
| CDSS | Country Development Strategy Statement |
| CO | Contracting Officer |
| DSB | Development Support Bureau |
| EEOC | Equal Employment Opportunity Commission |
| EOPS | End of Project Status |
| FAO | Food & Agriculture Organization |
| FPR | Federal Procurement Regulations |
| FY | Fiscal Year (begins October 1) |
| GPOI | Inputs-Outputs-Goal-Purpose |
| HC | Host Country |
| IBRD | International Bank for Reconstruction & Development (World Bank) |
| IDB | InterAmerican Development Bank |
| IDCA | International Development & Cooperation Administration |
| ILO | International Labor Organization |
| IQC | Indefinite Quantity Contract |
| JCAD | Joint Committee on Agricultural Development |
| LAC | Bureau for Latin American and The Caribbean |
| LDC | Less Developed Country |
| MinPlan | Ministry for Planning |
| MIS | Management Information System |
| MOE | Ministry of Education |
| MOH | Ministry of Health |
| MINAG | Ministry of Agriculture |
| OMB | Office of Management & Budget |
| OYB | Operational Year Budget |
| PES | Project Evaluation Summary |
| PDC | Bureau for Private Development & Cooperation |
| PID | Project Identification Document |
| PIO/C | Project Implementation Order for Commodities |
| PIO/T- | Project Implementation Order for Technical Services |
| PIO/P | Project Implementation Order for Participant Training |
| PO | Purchase Order |
| PP | Project Paper |
| PPC | Bureau for Program & Policy Coordination |
| PROAG | Project Agreement |
| PSC | Personal Services Contract |
| PVO | Private & Voluntary Organization |
| RFP | Request for a Proposal |
| Title XIII | New section of the Foreign Assistance Act which places heavy emphasis on utilization of land grant universities and other institutions in fostering development in food and agriculture |
| UN | United Nations |
| UNCTAD | United Nations Commission on Trade and Development |
| UNICEF | United Nations International Children's Emergency Fund |
| USG | United States Government |
| USAID | Mission of the Agency for International Development within another country |
| WHO | World Health Organization |

BRIEF GLOSSARY OF EVALUATIVE TERMS

Administrative audit - Evaluation of the degree of compliance of policies, procedures, and practices with stated rules, regulations, directives, guidelines, or laws; evaluation of the adherence of staff and program to predefined standards.

Assumption - an event or action which must take place, or a condition which must exist, if a project is to succeed, but over which the project management has little or no control. There are normally different assumptions, or external factors for each level of the project design. Assumptions or external factors must be checked for their occurrence or not during the search for causes of an evaluation.

Baseline Data - Data collected at the start of a project or program which provide a basis for comparison for assessing results made at a later time.

Benefit/Cost Analysis - Analysis of the economic or other benefits or degree of goal attainment of a project in comparison with the cost of delivering those benefits; a comparison of the relative benefits and costs of a project - usually expressed as a ratio.

BOPS - Beginning-of-Project-Status; the baseline from which change will be assessed by comparing with measures made later during the life of the project or at the End-of-Project Status (EOPS).

Criterion - A standard on which a judgment or decision may be based; an observation or set of observations which permit judgment as to the attainment of an objective. (Note: the plural of criterion is criteria)

Data - The plural of datum. A collection of factual information used as a basis for discussion or a decision; a number of observations - either qualitative or quantitative.

Design - A detailed comprehensive plan for carrying out a research or other project. An experimental procedure which lends itself to being analyzed statistically.

Donor - A giver; a government or other organization which provides foreign assistance.

EOPS - End-of- Project Status; The condition or situation which will exist if the project achieves its purpose; an objectively verifiable description of those conditions, in the form of measures, indicators, or proxies that will show that the project Purpose will have been attained.

Evaluation - the retrospective analysis of what happened in a development project, and why. The making of judgments about the success or failure of a project. The assignment of value to something.

Evaluation Team - A group making an evaluation - usually a director or project manager, an evaluation officer, appropriate technical experts, and such other staff as thought advisable, - who plan, conduct, and report on the evaluation of a program or project.

Effectiveness - A measure of the degree to which a project or program attains its objectives; the degree to which an output, purpose, or goal target is reached.

Efficiency - A measure of the degree to which a project or program succeeds in maximizing its beneficial results at the least cost.

Evaluative Research - Research or experimental studies conducted in order to provide the data and information upon which an evaluation may be based.

External Evaluation - Evaluation which is conducted by a group or team external (i.e., not members of) the program or project.

External Factors - (See Assumptions) - Factors, conditions, or causal influences outside the control of the project management -- but which have an important effect on the success or failure of the project. Necessary conditions for the attainment of the next higher level of a GPOI - but not sufficient by themselves for the attainment.

Feasibility Study - A study conducted to determine whether implementation of a proposed project or program is possible or advisable.

Feedback - Redirection of part of the information from a project to the project manager for purposes of control. In evaluation, the return of information about project effects, outcomes, or results to the project manager for the purpose of improving the project planning or the project implementation.

Goal - An objective of a national program or sector; the expression denoting the objective beyond the project purpose. The program or sector end to which a project contributes. The target toward which the project efforts of AID and the cooperating government are directed. The goal normally deals with broad economic, social, and/or political aims. It may be measurable in quantitative terms, or it may be identified only through qualitative and behavioral criteria.

Goal-Attainment - A measure of the degree of success or failure in reaching a pre-set objective.

GPOI - An acronym for Goal - Purpose - Outputs - Intputs

Hypothesis - A proposition tentatively assumed in order to draw out its logical or empirical consequences and so test its accord with facts that are known or which may be determined. It is usually a statement in the form "if A, then B" where there is uncertainty about the causative relationship between the existence of A and the achievement of B.

Indicator - An explicit and objectively verifiable measure of results expected. Good project design must include pre-establishing what will be measured or observed to demonstrate progress - i.e. a change for the better. Progress should be verifiable objectively so that two or more people would agree that progress has or has not been as planned. Objectively verifiable indicators help focus attention on evidence rather than on subjective opinions.

Input - An expression borrowed from systems analysis meaning the flow of resources, or raw materials into a process or project. In AID, inputs or the resources such as money, technical advice, commodities, training, and so forth which the USAID Mission provides with the expectation of producing certain outputs. In the logic of the input/output relation, inputs are the "cause" and outputs are the "effect".

Internal Evaluation - Evaluation conducted by an organization of its own project results in order to monitor, control, replan, and make decisions.

Logframe - Abbreviated expression for Logical Framework Matrix - a summary in matrix form (rows and columns), showing the overall design or plan of a development project.

Longitudinal Study - A study conducted over a period of time for the purpose of studying changes which occur with time. This is opposed to a "cross-sectional" study, which focuses on a single point of time, - often for the purpose of studying differences or similarities between or among groups.

Matrix (Logical Framework) - A summary worksheet for the analysis of a project design divided into four horizontal rows (for Goal, Purpose, Outputs, and Inputs) and four columns (for Narrative, Objectively Verifiable Indicators, Means of Verification, and Important Assumptions). Modifications may be made to suit local circumstances.

Measures of Achievement - Indicators. The means of verifying whether the objective was reached.

Objective - The end, aim, or target that has been pre-established. A specific measurable result or effect which a program or project is to accomplish.

Outputs - The specifically intended objective to come out of the resources put into a project.

PROAG - Project Agreement. A written document specifying the responsibilities and obligations of the U.S. government and a host country government with regard to a project.

Project Evaluation - The retrospective analysis of what happened in a project and why; it is the assessment of the effectiveness of an individual project in achieving its stated objectives. In AID, project evaluation stops with the assessment of whether or not a project has achieved its Purpose - the end-objective of a project. If the assessment continues to determine the achievement of objectives beyond the Purpose - it is Program Evaluation. If the assessment is conducted to determine the effect the project had after it had been completed, - it is Impact Evaluation. . .

Purpose - the ultimate reason for the project; the primary objective for conducting the project; the development change which will be attained, or the problem which will be solved if the project is completed successfully and on time.

Program - The providing of funds and other necessary support to accomplish a prescribed set of objectives through specified activities. A program may encompass a number of projects.

Program Analysis - Collection and analysis of data relating to the organization, function, and outcomes (planned or unplanned) of a program, or more than one project.

Project - An organized effort for change; an integrated activity or set of activities which converts resources or inputs (e.g. personnel, material, finances) into outputs, purpose, and goal. In AID Handbook 3, a project is defined as the total discrete endeavor to create through the provision of personnel, equipment and/or capital funds, a finite result directly related to a discrete development problem.

Reliability - Dependability' the degree to which a measurement or instrument can be relied upon to give consistent results.

Sample - A limited number of observations, usually taken systematically or at random, - and made for the purpose of inferring some attribute of the larger whole -- called population or universe.

Statistics - A collection of quantitative data. A branch of mathematics dealing with the collection, analysis, interpretation, and presentation of masses of numerical data. The purpose of such analysis is usually to make a more general prediction about a larger number of occurrences or an ongoing process on the basis of sample observations.

Survey - A study usually using interviews or questionnaires to ascertain the attitudes, beliefs, or behaviors of a particular segment of the population.

Target - In AID, the specific end-product expected at any level of the objectives of a project (outputs, purpose, goal). The word target has reference to the aims set forth in Column 1 (Narrative) of the Logframe. When the statement of results expected is specifically targetted - it becomes the indicator or measure of the target when it clarifies the magnitude of the desired end-product, and the time it will occur. When targetted, it is set forth in Column 2 (Indicator), and has reference to What is being aimed at; How Much of it; and When.

Validity - Accuracy. The degree to which a measure actually reflects the true quality of what it purports to measure.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | | | |
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| 1. | 0 | 5 | 1 | 2 | 8 | 5 | 9 | 8 | 6 | 6 | 5 | 1 | 2 | 8 | 1 | 6 | 8 | 1 | 2 | 4 | 7 | 5 | 0 | 6 | 4 | 7 | 9 | 4 | 1 | 9 | 2 | 2 | 3 | 5 | 9 | 6 | 5 | 2 | 0 | 6 | | | |
| 2. | 3 | 6 | 7 | 4 | 6 | 8 | 9 | 6 | 9 | 8 | 5 | 6 | 0 | 2 | 0 | 3 | 7 | 8 | 1 | 0 | 8 | 8 | 6 | 8 | 4 | 5 | 9 | 9 | 1 | 4 | 0 | 4 | 1 | 4 | 6 | 0 | 1 | 4 | 1 | 9 | | | |
| 3. | 8 | 7 | 5 | 1 | 3 | 1 | 7 | 6 | 9 | 0 | 6 | 1 | 4 | 2 | 7 | 7 | 2 | 9 | 1 | 4 | 4 | 8 | 5 | 6 | 3 | 4 | 3 | 3 | 7 | 4 | 2 | 5 | 4 | 7 | 3 | 6 | 0 | 9 | 8 | 2 | | | |
| 4. | 0 | 2 | 6 | 2 | 2 | 4 | 1 | 0 | 2 | 6 | 8 | 0 | 8 | 7 | 5 | 4 | 1 | 2 | 9 | 3 | 2 | 1 | 5 | 2 | 9 | 2 | 2 | 1 | 9 | 9 | 1 | 1 | 8 | 6 | 5 | 2 | 6 | 2 | 0 | 1 | 4 | | |
| 5. | 6 | 4 | 9 | 8 | 1 | 2 | 8 | 1 | 8 | 0 | 3 | 8 | 6 | 2 | 9 | 7 | 6 | 9 | 6 | 2 | 9 | 3 | 2 | 8 | 5 | 1 | 3 | 7 | 8 | 6 | 2 | 7 | 4 | 7 | 5 | 3 | 1 | 2 | 5 | 4 | 4 | | |
| 6. | 5 | 7 | 8 | 8 | 8 | 1 | 3 | 9 | 3 | 8 | 3 | 8 | 5 | 5 | 4 | 8 | 6 | 8 | 3 | 6 | 0 | 2 | 1 | 9 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 1 | 0 | 5 | 9 | 5 | 5 | 1 | 4 | 2 | 2 | | |
| 7. | 5 | 6 | 3 | 1 | 6 | 3 | 7 | 7 | 2 | 3 | 0 | 0 | 2 | 3 | 4 | 2 | 1 | 4 | 2 | 4 | 2 | 6 | 6 | 6 | 4 | 2 | 1 | 0 | 6 | 7 | 5 | 7 | 2 | 3 | 8 | 3 | 5 | 3 | 5 | 5 | 2 | | |
| 8. | 9 | 8 | 8 | 4 | 9 | 7 | 2 | 7 | 6 | 2 | 5 | 9 | 7 | 6 | 7 | 5 | 2 | 4 | 9 | 7 | 2 | 4 | 2 | 6 | 7 | 3 | 0 | 3 | 0 | 2 | 9 | 5 | 3 | 2 | 7 | 1 | 2 | 8 | 4 | 3 | 9 | | |
| 9. | 5 | 1 | 6 | 3 | 2 | 5 | 4 | 7 | 9 | 9 | 2 | 7 | 9 | 7 | 3 | 6 | 8 | 5 | 6 | 8 | 6 | 8 | 4 | 2 | 6 | 5 | 7 | 0 | 0 | 4 | 0 | 9 | 1 | 3 | 8 | 5 | 9 | 6 | 4 | 3 | 6 | | |
| 10. | 1 | 2 | 8 | 7 | 4 | 8 | 2 | 1 | 6 | 0 | 6 | 7 | 2 | 0 | 8 | 5 | 1 | 9 | 9 | 2 | 7 | 9 | 0 | 8 | 1 | 3 | 3 | 5 | 1 | 4 | 8 | 3 | 2 | 1 | 2 | 8 | 3 | 5 | 7 | 4 | 7 | | |
| 11. | 5 | 7 | 5 | 8 | 0 | 7 | 7 | 8 | 8 | 4 | 0 | 7 | 0 | 3 | 2 | 0 | 1 | 6 | 7 | 1 | 5 | 3 | 3 | 6 | 2 | 1 | 5 | 5 | 6 | 4 | 0 | 4 | 7 | 1 | 6 | 1 | 4 | 5 | 9 | 4 | 8 | | |
| 12. | 5 | 1 | 8 | 7 | 5 | 6 | 4 | 6 | 1 | 1 | 1 | 9 | 7 | 3 | 6 | 2 | 5 | 5 | 3 | 9 | 4 | 6 | 5 | 6 | 9 | 3 | 0 | 9 | 8 | 7 | 5 | 7 | 6 | 5 | 7 | 3 | 3 | 3 | 9 | 8 | 6 | 1 | |
| 13. | 3 | 9 | 1 | 3 | 3 | 3 | 0 | 3 | 9 | 3 | 5 | 8 | 3 | 1 | 9 | 8 | 5 | 0 | 9 | 8 | 6 | 6 | 5 | 1 | 9 | 7 | 9 | 1 | 7 | 2 | 7 | 2 | 7 | 6 | 4 | 6 | 6 | 4 | 4 | 6 | 6 | 1 | |
| 14. | 2 | 4 | 5 | 4 | 1 | 6 | 1 | 4 | 7 | 7 | 8 | 9 | 7 | 3 | 1 | 1 | 8 | 4 | 2 | 1 | 2 | 9 | 8 | 6 | 1 | 5 | 7 | 8 | 7 | 5 | 4 | 5 | 2 | 2 | 8 | 4 | 9 | 2 | 1 | 5 | 9 | 3 | |
| 15. | 5 | 0 | 8 | 5 | 9 | 8 | 4 | 7 | 4 | 6 | 2 | 8 | 3 | 0 | 2 | 1 | 3 | 2 | 6 | 4 | 0 | 7 | 5 | 9 | 5 | 5 | 7 | 1 | 4 | 6 | 6 | 4 | 6 | 6 | 5 | 3 | 1 | 1 | 5 | 9 | 3 | 0 | |
| 16. | 2 | 8 | 1 | 1 | 9 | 2 | 4 | 2 | 0 | 0 | 0 | 9 | 1 | 1 | 0 | 2 | 8 | 4 | 8 | 5 | 3 | 0 | 3 | 2 | 6 | 4 | 2 | 8 | 2 | 6 | 0 | 6 | 9 | 7 | 4 | 6 | 1 | 0 | 6 | 6 | 3 | 0 | |
| 17. | 4 | 5 | 2 | 0 | 6 | 5 | 3 | 3 | 0 | 0 | 3 | 8 | 6 | 8 | 8 | 3 | 9 | 9 | 6 | 8 | 3 | 2 | 6 | 0 | 4 | 9 | 3 | 9 | 2 | 9 | 0 | 1 | 8 | 3 | 6 | 6 | 5 | 9 | 0 | 1 | 0 | 0 | |
| 18. | 5 | 7 | 5 | 7 | 1 | 6 | 5 | 9 | 1 | 9 | 5 | 6 | 4 | 0 | 5 | 1 | 7 | 8 | 3 | 9 | 9 | 2 | 0 | 7 | 3 | 8 | 3 | 5 | 8 | 5 | 0 | 0 | 4 | 1 | 4 | 6 | 2 | 4 | 3 | 4 | 3 | 3 | |
| 19. | 5 | 2 | 8 | 2 | 9 | 0 | 1 | 1 | 7 | 2 | 0 | 8 | 9 | 1 | 5 | 1 | 1 | 4 | 6 | 7 | 1 | 4 | 7 | 9 | 3 | 2 | 7 | 5 | 4 | 8 | 3 | 7 | 5 | 1 | 6 | 2 | 4 | 3 | 4 | 4 | 3 | 3 | |
| 20. | 0 | 0 | 1 | 3 | 4 | 3 | 6 | 2 | 3 | 3 | 8 | 9 | 4 | 3 | 4 | 3 | 8 | 6 | 6 | 9 | 9 | 1 | 5 | 9 | 2 | 3 | 2 | 9 | 8 | 2 | 5 | 6 | 4 | 5 | 5 | 5 | 3 | 1 | 2 | 9 | 9 | 0 | |
| 21. | 9 | 9 | 8 | 2 | 6 | 6 | 4 | 0 | 0 | 5 | 9 | 4 | 3 | 2 | 5 | 7 | 3 | 5 | 5 | 3 | 7 | 8 | 2 | 8 | 0 | 3 | 0 | 1 | 0 | 4 | 6 | 7 | 1 | 2 | 6 | 7 | 6 | 6 | 5 | 6 | 6 | 5 | |
| 22. | 1 | 1 | 6 | 9 | 4 | 4 | 6 | 2 | 6 | 2 | 5 | 5 | 0 | 6 | 7 | 6 | 4 | 6 | 0 | 3 | 5 | 9 | 7 | 6 | 2 | 3 | 5 | 2 | 4 | 0 | 0 | 0 | 3 | 1 | 8 | 0 | 9 | 1 | 3 | 6 | 6 | 0 | |
| 23. | 5 | 7 | 6 | 2 | 2 | 9 | 3 | 3 | 2 | 8 | 9 | 8 | 8 | 8 | 5 | 0 | 7 | 7 | 8 | 3 | 0 | 4 | 3 | 5 | 1 | 9 | 4 | 0 | 3 | 1 | 6 | 2 | 2 | 0 | 9 | 4 | 3 | 7 | 4 | 0 | 8 | 8 | |
| 24. | 8 | 2 | 6 | 9 | 1 | 5 | 1 | 2 | 3 | 8 | 1 | 4 | 1 | 0 | 6 | 4 | 3 | 9 | 8 | 3 | 3 | 3 | 3 | 5 | 6 | 9 | 9 | 3 | 2 | 1 | 1 | 1 | 3 | 3 | 1 | 0 | 6 | 8 | 3 | 8 | 8 | 4 | |
| 25. | 8 | 8 | 7 | 9 | 9 | 6 | 5 | 6 | 2 | 1 | 5 | 9 | 8 | 0 | 9 | 3 | 7 | 8 | 5 | 0 | 6 | 6 | 1 | 2 | 8 | 7 | 8 | 2 | 3 | 6 | 7 | 1 | 7 | 3 | 2 | 0 | 4 | 7 | 0 | 4 | 7 | 0 | 4 |
| 26. | 6 | 9 | 1 | 2 | 5 | 9 | 5 | 5 | 9 | 1 | 8 | 1 | 1 | 6 | 8 | 9 | 9 | 2 | 4 | 6 | 6 | 6 | 4 | 1 | 6 | 4 | 3 | 1 | 0 | 8 | 5 | 6 | 0 | 9 | 5 | 8 | 6 | 0 | 7 | 0 | 6 | 6 | |
| 27. | 7 | 4 | 6 | 9 | 8 | 4 | 4 | 2 | 3 | 6 | 7 | 6 | 0 | 2 | 2 | 1 | 6 | 1 | 5 | 7 | 2 | 3 | 6 | 9 | 1 | 6 | 9 | 1 | 0 | 5 | 8 | 6 | 0 | 5 | 5 | 8 | 2 | 4 | 2 | 7 | 0 | 6 | 6 |
| 28. | 7 | 7 | 4 | 5 | 1 | 4 | 7 | 3 | 5 | 0 | 2 | 1 | 2 | 3 | 4 | 6 | 7 | 6 | 7 | 2 | 8 | 0 | 5 | 6 | 7 | 9 | 8 | 1 | 7 | 2 | 4 | 4 | 3 | 4 | 6 | 6 | 0 | 4 | 3 | 0 | 4 | 3 | 0 |
| 29. | 6 | 1 | 7 | 1 | 5 | 9 | 6 | 4 | 8 | 5 | 2 | 2 | 1 | 2 | 1 | 9 | 8 | 8 | 4 | 4 | 5 | 9 | 2 | 8 | 9 | 1 | 2 | 5 | 2 | 3 | 5 | 7 | 3 | 4 | 5 | 4 | 1 | 2 | 4 | 6 | 4 | 6 | |
| 30. | 9 | 2 | 7 | 3 | 5 | 4 | 5 | 0 | 6 | 4 | 5 | 0 | 9 | 2 | 4 | 0 | 0 | 8 | 6 | 5 | 1 | 9 | 6 | 9 | 0 | 6 | 6 | 6 | 8 | 2 | 8 | 2 | 5 | 1 | 7 | 3 | 3 | 1 | 5 | 0 | 8 | 5 | 0 |
| 31. | 7 | 2 | 3 | 5 | 3 | 4 | 5 | 7 | 7 | 5 | 6 | 8 | 5 | 9 | 0 | 8 | 5 | 6 | 8 | 5 | 9 | 9 | 9 | 7 | 5 | 0 | 1 | 0 | 5 | 6 | 2 | 7 | 5 | 3 | 4 | 2 | 3 | 0 | 8 | 5 | 3 | 3 | |
| 32. | 1 | 2 | 9 | 7 | 9 | 0 | 5 | 7 | 2 | 0 | 9 | 2 | 7 | 5 | 4 | 7 | 6 | 9 | 1 | 1 | 5 | 5 | 2 | 4 | 0 | 1 | 8 | 7 | 3 | 0 | 9 | 6 | 1 | 9 | 7 | 6 | 4 | 4 | 8 | 3 | 8 | 3 | |
| 33. | 4 | 4 | 3 | 6 | 5 | 7 | 0 | 2 | 5 | 4 | 5 | 0 | 8 | 6 | 4 | 3 | 6 | 6 | 1 | 9 | 3 | 0 | 0 | 9 | 4 | 0 | 7 | 7 | 9 | 4 | 6 | 0 | 4 | 7 | 5 | 4 | 9 | 6 | 6 | 6 | 6 | 6 | |
| 34. | 4 | 9 | 0 | 7 | 6 | 1 | 8 | 4 | 3 | 9 | 2 | 9 | 5 | 2 | 2 | 4 | 2 | 5 | 4 | 1 | 7 | 9 | 3 | 2 | 7 | 4 | 8 | 8 | 8 | 3 | 7 | 7 | 1 | 5 | 4 | 7 | 4 | 9 | 7 | 3 | 3 | 3 | |
| 35. | 7 | 8 | 1 | 4 | 3 | 6 | 5 | 9 | 1 | 9 | 1 | 3 | 6 | 9 | 9 | 1 | 8 | 4 | 4 | 1 | 0 | 6 | 7 | 6 | 7 | 0 | 1 | 7 | 1 | 5 | 9 | 4 | 3 | 1 | 7 | 6 | 0 | 3 | 7 | 1 | 7 | 3 | 1 |
| 36. | 0 | 3 | 4 | 7 | 4 | 7 | 6 | 0 | 2 | 5 | 9 | 7 | 0 | 4 | 3 | 3 | 3 | 8 | 3 | 4 | 4 | 4 | 6 | 3 | 8 | 4 | 8 | 3 | 0 | 5 | 5 | 0 | 2 | 9 | 1 | 0 | 3 | 7 | 1 | 0 | 3 | 7 | 1 |
| 37. | 3 | 5 | 8 | 7 | 0 | 8 | 9 | 1 | 5 | 8 | 5 | 5 | 8 | 6 | 4 | 9 | 8 | 0 | 7 | 8 | 5 | 0 | 5 | 6 | 3 | 7 | 3 | 1 | 5 | 1 | 6 | 4 | 4 | 6 | 3 | 5 | 0 | 0 | 5 | 8 | 8 | 8 | |
| 38. | 7 | 3 | 8 | 8 | 7 | 6 | 7 | 9 | 2 | 8 | 6 | 0 | 0 | 4 | 5 | 7 | 0 | 7 | 8 | 2 | 1 | 1 | 9 | 3 | 7 | 0 | 6 | 5 | 7 | 1 | 9 | 5 | 9 | 3 | 4 | 0 | 9 | 1 | 3 | 2 | 2 | 2 | |
| 39. | 4 | 5 | 9 | 6 | 8 | 7 | 3 | 6 | 6 | 7 | 6 | 5 | 0 | 6 | 2 | 7 | 3 | 3 | 0 | 6 | 7 | 6 | 0 | 4 | 5 | 7 | 6 | 6 | 0 | 9 | 5 | 2 | 5 | 5 | 3 | 4 | 7 | 5 | 0 | 8 | 8 | 8 | |
| 40. | 6 | 7 | 6 | 2 | 2 | 5 | 4 | 5 | 7 | 9 | 1 | 7 | 2 | 7 | 9 | 6 | 7 | 4 | 4 | 0 | 5 | 6 | 4 | 4 | 1 | 3 | 2 | 1 | 3 | 8 | 6 | 1 | 1 | 9 | 7 | 9 | 5 | 4 | 7 | 6 | 6 | 6 | |
| 41. | 6 | 6 | 9 | 1 | 3 | 6 | 0 | 6 | 6 | 4 | 6 | 7 | 5 | 4 | 7 | 3 | 9 | 5 | 2 | 3 | 0 | 2 | 0 | 4 | 3 | 0 | 4 | 8 | 5 | 5 | 2 | 7 | 0 | 2 | 9 | 0 | 1 | 5 | 4 | 2 | 2 | 2 | |
| 42. | 7 | 4 | 8 | 5 | 9 | 6 | 2 | 1 | 5 | 5 | 0 | 9 | 2 | 3 | 4 | 4 | 7 | 3 | 6 | 7 | 1 | 3 | 0 | 4 | 7 | 6 | 5 | 4 | 3 | 4 | 1 | 2 | 1 | 2 | 4 | 9 | 1 | 0 | 8 | 7 | 7 | 7 | |
| 43. | 9 | 0 | 8 | 7 | 9 | 4 | 4 | 9 | 6 | 9 | 1 | 1 | 1 | 2 | 9 | 1 | 7 | 1 | 3 | 9 | 7 | 9 | 6 | 3 | 0 | 8 | 6 | 8 | 0 | 0 | 1 | 6 | 7 | 8 | 1 | 6 | 5 | 9 | 7 | 7 | 7 | 3 | |
| 44. | 9 | 5 | 9 | 0 | 9 | 8 | 2 | 4 | 5 | 9 | 9 | 6 | 2 | 1 | 8 | 6 | 0 | 7 | 6 | 8 | 7 | 6 | 4 | 1 | 7 | 5 | 1 | 2 | 3 | 3 | 8 | 1 | 4 | 0 | 9 | 4 | 6 | 7 | 7 | 3 | 9 | 9 | |
| 45. | 2 | 9 | 2 | 1 | 2 | 4 | 0 | 8 | 7 | 3 | 4 | 1 | 5 | 9 | 0 | 6 | 7 | 2 | 5 | 5 | 3 | 0 | 7 | 5 | 7 | 9 | 2 | 9 | 3 | 3 | 7 | 7 | 3 | 4 | 1 | 2 | 0 | 8 | 3 | 9 | 9 | 9 | |

TABLE I

A TABLE OF RANDOM DIGITS

TABLE 2

THE NORMAL CURVE AND RELATED PROBABILITY
(Both Sides of the Mean)

Size of the Standard Error - Percentage of occurrences falling within the range

Standard Deviation - (Probability desired)
or Value of "K" - (Confidence desired)

| | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | 00.00 | 00.80 | 01.60 | 02.40 | 03.20 | 03.98 | 04.78 | 05.58 | 06.38 | 07.18 |
| 0.1 | 07.96 | 08.76 | 09.56 | 10.34 | 11.14 | 11.92 | 12.72 | 13.50 | 14.28 | 15.06 |
| 0.2 | 15.86 | 16.64 | 17.42 | 18.20 | 18.96 | 19.74 | 20.52 | 21.28 | 22.06 | 22.82 |
| 0.3 | 23.58 | 24.34 | 25.10 | 25.86 | 26.62 | 27.36 | 28.12 | 28.86 | 29.60 | 30.34 |
| 0.4 | 31.08 | 31.82 | 32.56 | 33.28 | 34.00 | 34.72 | 35.44 | 36.16 | 36.88 | 37.58 |
| 0.5 | 38.30 | 39.00 | 39.70 | 40.38 | 41.08 | 41.76 | 42.46 | 43.14 | 43.80 | 44.48 |
| 0.6 | 45.14 | 45.82 | 46.48 | 47.14 | 47.78 | 48.44 | 49.08 | 49.72 | 50.34 | 50.98 |
| 0.7 | 51.60 | 52.22 | 52.84 | 53.46 | 54.06 | 54.68 | 55.28 | 55.88 | 56.46 | 57.04 |
| 0.8 | 57.62 | 58.20 | 58.78 | 59.34 | 59.90 | 60.46 | 61.02 | 61.56 | 62.12 | 62.66 |
| 0.9 | 63.18 | 63.72 | 64.24 | 64.76 | 65.28 | 65.78 | 66.30 | 66.80 | 67.30 | 67.78 |
| 1.0 | 68.26 | 68.76 | 69.22 | 69.70 | 70.16 | 70.62 | 71.08 | 71.54 | 71.98 | 72.22 |
| 1.1 | 72.86 | 73.30 | 73.72 | 74.16 | 74.58 | 74.88 | 75.40 | 75.80 | 76.20 | 76.60 |
| 1.2 | 76.98 | 77.38 | 77.76 | 78.14 | 78.50 | 78.88 | 79.24 | 79.60 | 79.94 | 80.30 |
| 1.3 | 80.64 | 80.98 | 81.32 | 81.64 | 81.98 | 82.30 | 82.62 | 82.94 | 83.24 | 83.54 |
| 1.4 | 83.84 | 84.14 | 84.44 | 84.72 | 85.02 | 85.30 | 85.58 | 85.84 | 86.12 | 86.38 |
| 1.5 | 86.64 | 86.90 | 87.14 | 87.40 | 87.64 | 87.88 | 88.12 | 88.36 | 88.58 | 88.82 |
| 1.6 | 89.04 | 89.26 | 89.48 | 89.68 | 89.90 | 90.10 | 90.30 | 90.50 | 90.70 | 90.90 |
| 1.7 | 91.08 | 91.28 | 91.46 | 91.64 | 91.82 | 91.98 | 92.16 | 92.32 | 92.50 | 92.66 |
| 1.8 | 92.82 | 92.98 | 93.12 | 93.28 | 93.42 | 93.56 | 93.72 | 93.86 | 93.98 | 94.12 |
| 1.9 | 94.26 | 94.38 | 94.52 | 94.64 | 94.76 | 94.88 | 95.00 | 95.12 | 95.22 | 95.34 |
| 2.0 | 95.44 | 95.56 | 95.66 | 95.76 | 95.86 | 95.96 | 96.06 | 96.16 | 96.24 | 96.34 |
| 2.1 | 96.42 | 96.52 | 96.60 | 96.68 | 96.76 | 96.84 | 96.92 | 97.00 | 97.08 | 97.14 |
| 2.2 | 97.22 | 97.28 | 97.36 | 97.42 | 97.50 | 97.56 | 97.62 | 97.68 | 97.74 | 97.80 |
| 2.3 | 97.86 | 97.92 | 97.96 | 98.02 | 98.08 | 98.12 | 98.18 | 98.22 | 98.26 | 98.32 |
| 2.4 | 98.28 | 98.40 | 98.44 | 98.50 | 98.54 | 98.58 | 98.62 | 98.64 | 98.68 | 98.72 |
| 2.5 | 98.76 | 98.80 | 98.82 | 98.86 | 98.89 | 98.92 | 98.96 | 98.99 | 99.02 | 99.04 |
| 2.6 | 99.06 | 99.10 | 99.12 | 99.14 | 99.18 | 99.20 | 99.22 | 99.24 | 99.26 | 99.28 |
| 2.7 | 99.30 | 99.32 | 99.34 | 99.36 | 99.38 | 99.40 | 99.42 | 99.44 | 99.46 | 99.48 |
| 2.8 | 99.48 | 99.50 | 99.52 | 99.54 | 99.54 | 99.56 | 99.58 | 99.58 | 99.60 | 99.62 |
| 2.9 | 99.62 | 99.64 | 99.64 | 99.66 | 99.68 | 99.68 | 99.70 | 99.70 | 99.72 | 99.72 |
| 3.0 | 99.74 | 99.74 | 99.74 | 99.76 | 99.76 | 99.78 | 99.78 | 99.78 | 99.80 | 99.80 |

TABLE 3

THE NORMAL DISTRIBUTION CURVE
(One Side of the Mean)

Percentage of all values included within the range formed by the mean plus, (or minus) a specified number of standard deviation (SD) units.

| SD Units | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .0 | 00.00 | 00.40 | 00.80 | 01.20 | 01.60 | 01.99 | 02.39 | 02.79 | 03.19 | 03.59 |
| .1 | 03.98 | 04.38 | 04.78 | 05.17 | 05.57 | 05.96 | 06.36 | 06.75 | 07.14 | 07.53 |
| .2 | 07.93 | 08.32 | 08.71 | 09.10 | 09.48 | 09.87 | 10.26 | 10.64 | 11.03 | 11.41 |
| .3 | 11.79 | 12.17 | 12.55 | 12.93 | 13.31 | 13.68 | 14.06 | 14.43 | 14.80 | 15.17 |
| .4 | 15.45 | 15.91 | 16.28 | 16.64 | 17.00 | 17.36 | 17.72 | 18.08 | 18.44 | 18.79 |
| .5 | 19.15 | 19.50 | 19.85 | 20.19 | 20.54 | 20.88 | 21.23 | 21.57 | 21.90 | 22.24 |
| .6 | 22.57 | 22.91 | 23.24 | 23.57 | 23.89 | 24.22 | 24.54 | 24.86 | 25.17 | 25.49 |
| .7 | 25.80 | 26.11 | 26.42 | 26.73 | 27.03 | 27.34 | 27.64 | 27.94 | 28.23 | 28.52 |
| .8 | 28.81 | 29.10 | 29.39 | 29.67 | 29.95 | 30.23 | 30.51 | 30.78 | 31.06 | 31.33 |
| .9 | 31.59 | 31.86 | 32.12 | 32.38 | 32.64 | 32.89 | 33.15 | 33.40 | 33.65 | 33.89 |
| 1.0 | 34.13 | 34.38 | 34.61 | 34.85 | 35.08 | 35.31 | 35.54 | 35.77 | 35.99 | 36.21 |
| 1.1 | 36.43 | 36.65 | 36.85 | 37.08 | 37.29 | 37.49 | 37.70 | 37.90 | 38.10 | 38.30 |
| 1.2 | 38.49 | 38.69 | 38.88 | 39.07 | 39.25 | 39.44 | 39.62 | 39.80 | 39.97 | 40.15 |
| 1.3 | 40.32 | 40.49 | 40.66 | 40.82 | 40.99 | 41.15 | 41.31 | 41.47 | 41.62 | 41.77 |
| 1.4 | 41.92 | 42.07 | 42.22 | 42.36 | 42.51 | 42.65 | 42.79 | 42.92 | 43.06 | 43.19 |
| 1.5 | 43.32 | 43.45 | 43.57 | 43.70 | 43.82 | 43.94 | 44.06 | 44.18 | 44.29 | 44.41 |
| 1.6 | 44.52 | 44.63 | 44.74 | 44.84 | 44.95 | 45.05 | 45.15 | 45.25 | 45.35 | 45.45 |
| 1.7 | 45.54 | 45.64 | 45.73 | 45.82 | 45.91 | 45.99 | 46.08 | 46.16 | 46.25 | 46.33 |
| 1.8 | 46.41 | 46.49 | 46.56 | 46.64 | 46.71 | 46.78 | 46.86 | 46.93 | 46.99 | 47.06 |
| 1.9 | 47.13 | 47.19 | 47.26 | 47.32 | 47.38 | 47.44 | 47.50 | 47.56 | 47.61 | 47.67 |
| 2.0 | 47.72 | 47.78 | 47.83 | 47.88 | 47.93 | 47.98 | 48.03 | 48.08 | 48.12 | 48.17 |
| 2.1 | 48.21 | 48.26 | 48.30 | 48.34 | 48.38 | 48.42 | 48.46 | 48.50 | 48.54 | 48.57 |
| 2.2 | 48.61 | 48.64 | 48.68 | 48.71 | 48.75 | 48.78 | 48.81 | 48.84 | 48.87 | 48.90 |
| 2.3 | 48.93 | 48.96 | 48.98 | 49.01 | 49.04 | 49.06 | 49.09 | 49.11 | 49.13 | 49.16 |
| 2.4 | 49.18 | 49.20 | 49.22 | 49.25 | 49.27 | 49.29 | 49.31 | 49.32 | 49.34 | 49.36 |
| 2.5 | 49.38 | 49.40 | 49.41 | 49.43 | 49.45 | 49.46 | 49.48 | 49.49 | 49.51 | 49.52 |
| 2.6 | 49.53 | 49.55 | 49.56 | 49.57 | 49.59 | 49.60 | 49.61 | 49.62 | 49.63 | 49.64 |
| 2.7 | 49.65 | 49.66 | 49.67 | 49.68 | 49.69 | 49.70 | 49.71 | 49.72 | 49.73 | 49.74 |
| 2.8 | 49.74 | 49.75 | 49.76 | 49.77 | 49.77 | 49.78 | 49.79 | 49.79 | 49.80 | 49.81 |
| 2.9 | 49.81 | 49.82 | 49.82 | 49.83 | 49.84 | 49.84 | 49.85 | 49.85 | 49.86 | 49.86 |
| 3.0 | 49.87 | 49.87 | 49.87 | 49.88 | 49.88 | 49.89 | 49.89 | 49.89 | 49.90 | 49.90 |

PERCENTAGE OF ONE TAIL OF THE NORMAL CURVE
AT SELECTED VALUES OF Z FROM THE MEAN

| Z | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | 50.00 | 49.60 | 49.20 | 48.80 | 48.40 | 48.01 | 47.61 | 47.21 | 46.81 | 46.41 |
| 0.1 | 46.02 | 45.62 | 45.22 | 44.83 | 44.43 | 44.04 | 43.64 | 43.25 | 42.86 | 42.47 |
| 0.2 | 42.07 | 41.68 | 41.29 | 40.90 | 40.52 | 40.13 | 39.74 | 39.36 | 38.97 | 38.59 |
| 0.3 | 38.21 | 37.83 | 37.45 | 37.07 | 36.69 | 36.32 | 35.94 | 35.57 | 35.20 | 34.83 |
| 0.4 | 34.46 | 34.09 | 33.72 | 33.36 | 33.00 | 32.64 | 32.28 | 31.92 | 31.56 | 31.21 |
| 0.5 | 30.85 | 30.50 | 30.15 | 29.81 | 29.46 | 29.12 | 28.77 | 28.43 | 28.10 | 27.76 |
| 0.6 | 27.43 | 27.09 | 26.76 | 26.43 | 26.11 | 25.78 | 25.46 | 25.14 | 24.83 | 24.51 |
| 0.7 | 24.20 | 23.89 | 23.58 | 23.27 | 22.96 | 22.66 | 22.36 | 22.06 | 21.77 | 21.48 |
| 0.8 | 21.19 | 20.90 | 20.61 | 20.33 | 20.05 | 19.77 | 19.49 | 19.22 | 18.94 | 18.67 |
| 0.9 | 18.41 | 18.14 | 17.88 | 17.62 | 17.36 | 17.11 | 16.85 | 16.60 | 16.35 | 16.11 |
| 1.0 | 15.87 | 15.62 | 15.39 | 15.15 | 14.92 | 14.69 | 14.46 | 14.23 | 14.01 | 13.79 |
| 1.1 | 13.57 | 13.35 | 13.14 | 12.92 | 12.71 | 12.51 | 12.30 | 12.10 | 11.90 | 11.70 |
| 1.2 | 11.51 | 11.31 | 11.12 | 10.93 | 10.75 | 10.56 | 10.38 | 10.20 | 10.03 | 09.85 |
| 1.3 | 09.68 | 09.51 | 09.34 | 09.18 | 09.01 | 08.85 | 08.69 | 08.53 | 08.38 | 08.23 |
| 1.4 | 08.08 | 07.93 | 07.78 | 07.64 | 07.49 | 07.35 | 07.21 | 07.08 | 06.94 | 06.81 |
| 1.5 | 06.68 | 06.55 | 06.43 | 06.30 | 06.18 | 06.06 | 05.94 | 05.82 | 05.71 | 05.59 |
| 1.6 | 05.48 | 05.37 | 05.26 | 05.16 | 05.05 | 04.95 | 04.85 | 04.75 | 04.65 | 04.55 |
| 1.7 | 04.46 | 04.36 | 04.27 | 04.18 | 04.09 | 04.01 | 03.92 | 03.84 | 03.75 | 03.67 |
| 1.8 | 03.59 | 03.51 | 03.44 | 03.36 | 03.29 | 03.22 | 03.14 | 03.07 | 03.01 | 02.94 |
| 1.9 | 02.87 | 02.81 | 02.74 | 02.68 | 02.62 | 02.56 | 02.50 | 02.44 | 02.39 | 02.33 |
| 2.0 | 02.28 | 02.22 | 02.17 | 02.12 | 02.07 | 02.02 | 01.97 | 01.92 | 01.88 | 01.83 |
| 2.1 | 01.79 | 01.74 | 01.70 | 01.66 | 01.62 | 01.58 | 01.54 | 01.50 | 01.46 | 01.43 |
| 2.2 | 01.39 | 01.36 | 01.32 | 01.29 | 01.25 | 01.22 | 01.19 | 01.16 | 01.13 | 01.10 |
| 2.3 | 01.07 | 01.04 | 01.02 | 00.99 | 00.96 | 00.94 | 00.91 | 00.89 | 00.87 | 00.84 |
| 2.4 | 00.82 | 00.80 | 00.78 | 00.76 | 00.73 | 00.71 | 00.70 | 00.68 | 00.66 | 00.64 |
| 2.5 | 00.62 | 00.60 | 00.59 | 00.57 | 00.55 | 00.54 | 00.52 | 00.51 | 00.49 | 00.48 |
| 2.6 | 00.47 | 00.45 | 00.44 | 00.43 | 00.42 | 00.40 | 00.39 | 00.38 | 00.37 | 00.36 |
| 2.7 | 00.35 | 00.34 | 00.33 | 00.32 | 00.31 | 00.30 | 00.29 | 00.28 | 00.27 | 00.26 |
| 2.8 | 00.26 | 00.25 | 00.24 | 00.23 | 00.23 | 00.22 | 00.21 | 00.21 | 00.20 | 00.19 |
| 2.9 | 00.19 | 00.18 | 00.18 | 00.17 | 00.16 | 00.16 | 00.15 | 00.15 | 00.14 | 00.14 |