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A System for the Monitoring and Evaluation of Appropriate Technology Projects

by

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Introduction

Appropriate Technology International (ATI) is a not-for-profit corporation concerned with development assistance. It is based in Washington, D.C. and is principally funded by the U.S. Agency for International Development (AID). ATI's mission is to field test innovative approaches for increasing the availability and use of appropriate technologies for commercially viable and economically sustainable productive activities in less developed countries (LDCs). ATI's program currently focuses on three priority technical fields: 1)the processing of agricultural products and the utilization of agricultural residuals, 2)the processing of local mineral resources, and 3) equipment and support for small farms.

ATI's projects are based on the premise that development strategies will be most cost-effective and will have the fewest unintended negative impacts when low-income people can own and operate profitable enterprises that match their skills and resources. Through collaboration with organizations in LDCs, ATI supports projects that create or improve productive activities that employ appropriate technologies. ATI's projects are designed to increase the access of the poor to goods and services, raw materials, financing, technical information, and markets and to increase the participation of the poor in the development decisions that affect them. These opportunities frequently have been neglected by commercial sources of capital because they are relatively risky, small-scale, rural, and labor-

intensive. In many cases, it is necessary to integrate and augment the abilities of organizations involved in these activities to reach the poor.

The design, implementation, monitoring, and evaluation of ATI's projects place a strong emphasis on the commercial (financial) viability and economic sustainability of productive activities. ATI also has a mandate for wide dissemination of general and project-related information on successes and failures in technical, financial, institutional, marketing, and policy innovations in the areas of appropriate technology.

ATI has developed a scheme for monitoring and evaluating appropriate technology projects, the Project Monitoring and Evaluation System (PMES). This paper describes the nature and the use of PMES. PMES is used as a schedule of items or a data checklist which is applied to ATI's projects. Not every item in PMES is applicable to all projects. The differences in technology, production systems, raw materials, products, beneficiaries, and dissemination strategies across projects leads to variations in the type of data collected. Thus, PMES is adapted specifically to each project.

PMES is an important part of ATI's approach to project monitoring and evaluation. Data for PMES are collected by project implementing organizations, project officers, and evaluation staff. These data are recorded through briefing and debriefing sessions between project officers and evaluation staff. Thus, data are collected by different people but are reviewed, discussed, and checked by the evaluation staff. Project officers and evaluation staff routinely visit projects to

monitor project implementation and gather information about the status of various project activities. In addition, project implementing organizations file quarterly and annual progress and financial reports which contain data and information necessary for the PMES. ATI's Technology and Enterprise Development Group (TEDG) is preparing standardized profit and loss statements for use by field staff and project implementing organizations.

This description of ATI's monitoring and evaluation system is designed primarily to assist ATI's field staff and the organizations in LDCs that collaborate with ATI in evaluating selected projects. It also should prove useful to other individuals and groups involved in monitoring and evaluation of development projects. This system is described here as it is now envisioned, but undoubtedly will undergo further refinements as more experience is gained with its use. The information framework which is part of this system is oriented toward issues surrounding small-scale technologies in ATI's priority technical fields. Nevertheless, many of the questions are broadly applicable to rural development projects.

The first part of this paper contains a general discussion of monitoring and evaluation -- their definitions, objectives, and relationship to the project planning and implementation process. It also states the case for preparation of an information framework for systematic and efficient monitoring and evaluation. Part 2 discusses the information framework adopted by ATI -- the Project Monitoring and Evaluation System (PMES). Appendix A includes a list of French and Spanish translations of

key terms relating to monitoring and evaluation. Appendix B contains an example of a completed PMES form for a hypothetical appropriate technology project. Appendix C contains a blank PMES form for reproduction purposes.

I. Description of Monitoring and Evaluation

The Importance of Monitoring and Evaluation

Monitoring and evaluation are two distinct, but overlapping activities with different purposes. The purpose of **monitoring** is to improve the operation of a project in accordance with the design of the plan. Thus, monitoring focuses on the project's use of inputs, day-to-day management, and the production of outputs. The purpose of **evaluation** is to help decision makers re-examine the design of the project and assess the project's impacts.

Careful monitoring and evaluation are especially important for innovative appropriate technology projects which are at the verge of demonstration and commercialization, or are adapted versions of technologies transferred to a new context. Broadly defined here, the term "technologies" includes, equipment, machines, and processes. The innovative element in an ATI project may be either the technology itself or a delivery system for bringing improved technologies to the rural and peri-urban poor.

Appropriate technology projects differ from conventional technology projects in that they rely on small-scale equipment and processes (often locally-manufactured), and different amounts, kinds, and sources of raw materials. Compared to

conventional technologies, appropriate technologies typically are less capital-intensive; more labor-intensive; less dependent on scarce foreign exchange for imported goods; and easier to operate, maintain, and repair. Yet, appropriate technologies often are labor-saving in comparison to traditional methods of production. It is often claimed that appropriate technologies are more productive per unit cost than either conventional or traditional alternatives, and that the final outputs are less expensive for consumers than those of conventional technologies and of superior quality to those of traditional methods. Other hypothesized benefits of appropriate technologies are a high potential for significant impacts on the economic and social well-being of the poor and a greater likelihood of sustaining natural resource stocks and environmental quality. ATI's evaluation efforts are intended to test whether the case made for appropriate technologies on these grounds is sound.

Monitoring is important to determine whether the technologies and delivery systems are working (see Table 1 for definitions of key project planning terms). In addition, since a large number of people with differing resources, abilities, and interests may be involved in an appropriate technology project, **monitoring** is necessary to identify which groups are participating and who needs more help. Furthermore, external conditions with natural or human causes can affect a

Table 1

Project Planning Terms

Inputs are the physical resources, new infrastructure, or incentives used in carrying out a project. Physical resources include land, labor, purchased agricultural goods, minerals (whether in raw or semiprocessed form), energy, chemicals, tools, and equipment. Infrastructure refers to basic installation and facilities that support a wide range of productive activities. Roads, irrigation canals, and power plants are examples of infrastructure. Incentives include cash or in-kind subsidies, grants, loans, equity capital funds, and insurance schemes.

Project activities are the various means used by organizations to disseminate the technologies and encourage their successful use. Examples of these activities include recruitment of participants, training, technical assistance, financing arrangements, and marketing assistance.

External conditions are positive or negative factors outside the control of the project that affect its chances of success. They may have natural or human causes. Examples: bad weather, natural disasters, pests and diseases, technological change, market conditions, and government policies.

Intermediate outputs are goods and services produced in a project which are used as inputs for a subsequent stage of production under the project. Examples include locally-manufactured machines (capital goods), buildings, and agricultural goods and minerals produced under the project (whether in raw or semiprocessed form) and destined for further processing under the project.

Final outputs are the goods and services yielded by a production processes and which are intended for direct consumption by purchasers or as an addition to the stock of fixed capital.

Impacts are positive or negative contributions toward the achievement of project objectives, expressed in terms of their consequences on human welfare. In addition to the **magnitude** (size and significance) of impacts, it is important to consider their **incidence** (distribution across various socio-economic, ethnic, and demographic groups). Examples of impacts include a higher Gross Domestic Product, increased incomes for the poor, improved health and safety, changes in the status of various social groups, and effects on resource conservation and environmental quality.

project's chances of success. Although monitoring cannot change some of these external conditions, it can help in suggesting measures to reduce their harmful effects and to take full advantage of new opportunities.

Evaluations can assess whether the design of the technology or the incentives and arrangements for the project need to be changed. Another important purpose of evaluation is to bring to light the project's economic, social, and environmental impacts.

Objectives of Monitoring and Evaluation

Monitoring is a continuous process of collecting, analyzing, and communicating information on project operation and performance. In other words, is the project being carried out as designed? Monitoring takes place during project implementation and is intended to assist project managers in making decisions on whether changes are necessary in the way the project is being implemented.

Since a "well-designed project" which has all of the necessary inputs, technical resources, and support services can fail as a result of problems in operation and management, monitoring is important as an early warning system. Monitoring can indicate whether the scale, location, and timing of project activities are on schedule and are being carried out **efficiently** (at minimum cost). If **targets** for inputs or the production of outputs are behind or ahead of schedule, monitoring should explain the reasons for any divergences from the original plan.

Evaluations examine the **effectiveness** of the project's design relative to its objectives, estimate the production and

distribution of outputs, and assess the impacts of the project. This involves determining causal relationships between the project and the impacts, and judging whether the impacts are good, bad, or neutral, and how important each impact is relative to the others. Evaluations are concerned with some of the same things as monitoring, but the timing and purpose of the analyses are different.

There are two types of evaluations: ongoing and ex post evaluations. Their differences have a bearing on the organization and design of the evaluation system. **Ongoing evaluations** take place during project implementation, often in conjunction with monitoring. They may be carried out routinely at periodic intervals or conditionally when difficulties or new opportunities arise. Ongoing evaluations also are intended to assist project management, but have a broader audience than does monitoring. The findings of an ongoing evaluation can be useful in making changes in the strategies, techniques, institutional arrangements, and resource allocations for the project. They also may indicate the need to seek the modification of government policies and legislation that affect the success of appropriate technology projects.

Ex post evaluations occur after completion of the project. They begin with the findings of **monitoring** and **ongoing evaluation**, but require additional information on subsequent

impacts. Ex post evaluations can

1) Indicate whether the technologies adopted under the project are likely to continue to be used in the project area without external assistance, or to spread to other places,

2) Help in the identification of complementary or follow-on projects in the same area,

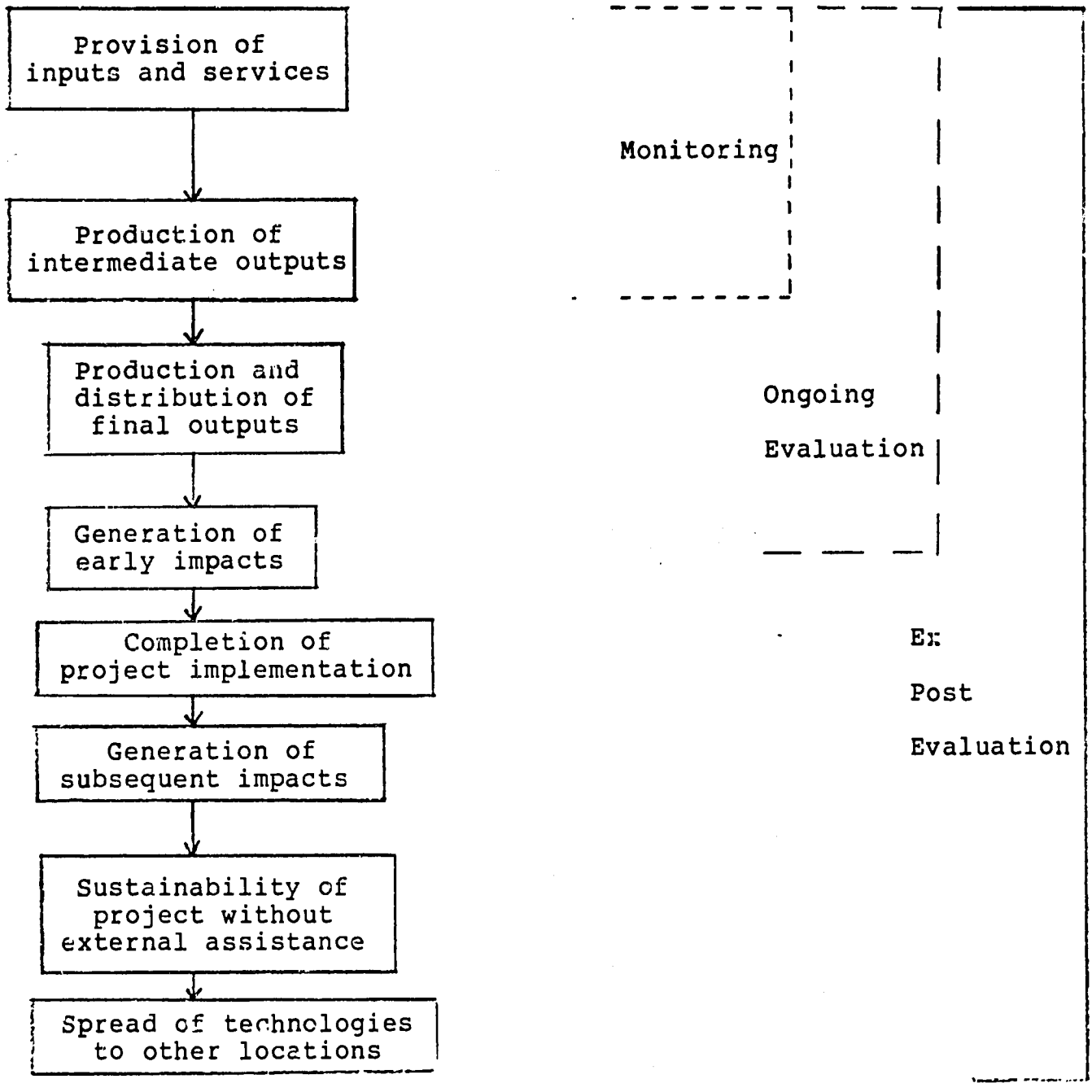
3) Demonstrate the need to mitigate unintended social or environmental impacts, and

4) Provide information to decision makers in other locations or organizations about the experience of the project so that the design of replications and related projects can be improved.

Figure 1 summarizes the main elements of monitoring, ongoing evaluation, and ex post evaluation. A simple example also illustrates their differences. Suppose that a labor-intensive technology has been designed for sugar processing. **Monitoring** may show that inadequate maintenance of machinery is limiting production. An **ongoing evaluation** may find that consumers are only willing to pay 90% of the market price of standard sugar for the project output because of its uneven crystal size and off-white color. An **ex post** evaluation might compare the commercial viability and economic sustainability of the labor-intensive technology to that of alternative sugar production technologies.

A focus on targets encourages a rigorous, quantitative approach to **monitoring** and **evaluation.** However, planning targets established in advance of project implementation can be arbitrary. If targets have been set too low, a project may appear more successful because it met all of the targets. Conversely, targets might not be reached because they have been set unrealistically high. In fact, the appropriate targets may

Figure 1. Elements of a Project Addressed in Monitoring and Evaluation

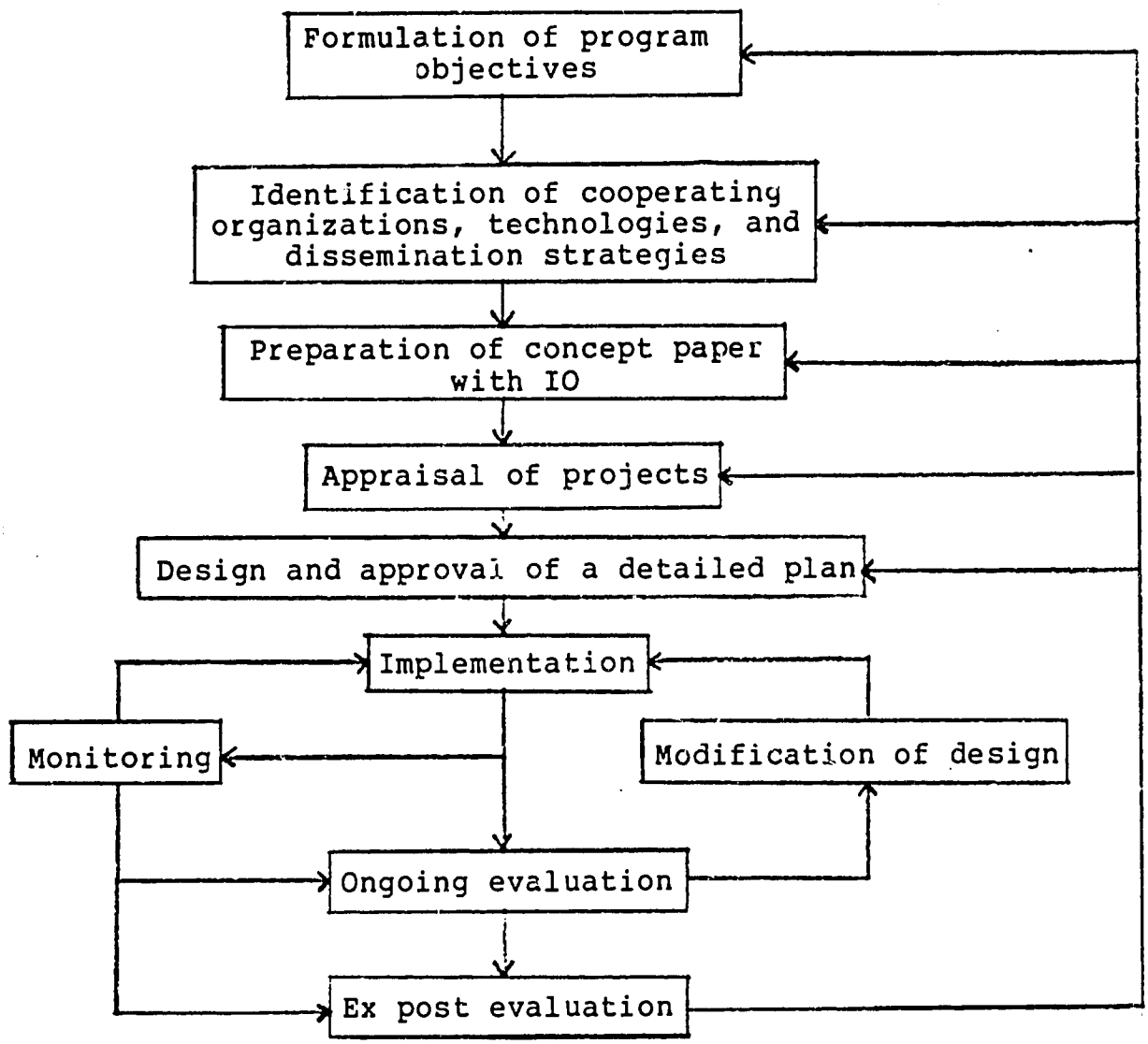


evolve over time in response to changes in conditions or consumer preferences. Thus, nonattainment of a target set at the time of project appraisal does not necessarily indicate a failure. What is more important is understanding the reasons for accomplishments and shortfalls in order to determine whether changes in the targets are necessary.

Relationship to the Planning Process

ATI's approach to development projects is marked by careful attention to project appraisal, planning, and implementation. Figure 2 depicts ATI's project planning process. ATI's process for project appraisal emphasizes technical feasibility, institutional capacity, commercial viability, economic desirability, social impacts, and environmental and natural resource impacts. Since uncertainty cannot be avoided in any planning for the future, monitoring and evaluation are an essential part of ATI's planning process. **Monitoring** and **ongoing evaluations** feed back into implementation of the project directly and indirectly and are especially important in the early stages of a project when technologies are being adapted or adopted into a real context. **Ex post evaluations** can influence the formulation of program objectives, dissemination strategies, and the design of replication projects. Some of the information for **monitoring** and **ongoing evaluation** is obtained continuously while the rest is obtained at regular intervals (quarterly or annually).

Figure 2. ATI's Project Planning Process



The principal categories of questions addressed in ATI's approach to monitoring and evaluation are listed below:

- How efficiently do the technologies work under continued operation and are they cost-effective?
- Are the productive activities profitable enough to entrepreneurs and investors so that they can continue on their own once established?
- Can small-scale producers and consumers afford to take the risks associated with the project?
- Do the enterprises increase net value added in the economy, after accounting for the opportunity costs to society of land, labor, capital, and raw materials.
- Are cooperating organizations carrying out their activities efficiently and effectively?
- Do skills and institutional performance improve as a result of the project?
- Are the promotion, outreach, and recruitment activities of the project securing the participation of the intended beneficiaries and is the project meeting their perceived needs?
- Does the project ultimately produce favorable effects on productivity, employment, the distribution of income, health and safety, and other aspects of social development?
- Are use rates for natural resources required by the enterprises sustainable and are there any positive or negative environmental impacts off-site?

ATI's monitoring and evaluation system is based on a collaborative approach among the cooperating organizations in LDCs, ATI's field project officers, and ATI's evaluation staff. In some cases, universities or research institutes in LDCs may be involved as well. Shortly after approval of project plans, evaluation staff meet with the project officers to discuss specific issues to be considered in data collection and analysis. The project officers discuss these general and project-specific issues with the cooperating organizations during their routine missions abroad. After their return from missions, project officers hold debriefing meetings with the evaluation staff for timely recording of information and accuracy of interpretation.

The evaluation staff also work closely with the technology and enterprise development group (TEDG) which is concerned with technology assessment for appraisal, and technical trouble-shooting and small business development during implementation. The TEDG cross-cuts regional divisions.

To the extent possible, monitoring and evaluation data are obtained from routine progress and financial reports submitted by the implementing organizations quarterly and annually. During the course of the project and after its completion, ATI's evaluation staff travel to the field for rapid reconnaissance. Whenever possible on their first trip to a project, the evaluation staff will be accompanied by the concerned project officer. This process helps the evaluation staff obtain the necessary data at minimum cost by recording what project officers have learned in a more general and accessible way without imposing a large time burden on their operational duties. This process also ensures the objectivity and consistency of the analysis across projects because the task of interpreting and writing up the findings is reserved for the evaluation staff. ATI's system for monitoring and evaluation has three parts: 1) project-specific **Supplementary Data Requirements**, 2) a standard format for financial reporting, and 3) a general information framework checklist (the PMES).

The Supplementary Data Requirements

After reviewing the plan and discussing the project with the project officers, the evaluation staff drafts the **Supplementary Data Requirements.** This list addresses the geographic, socio-economic, and institutional settings of the project as well as the origins and evolution of the technology or delivery system. It also provides for the acquisition of important baseline data not covered in the project plan and project-specific information for the monitoring and evaluation of special technical issues. These project-specific issues might not be adequately addressed in the general questions of the PMES. Some of the questions in the **Supplementary Data Requirements** are only answerable over time as project implementation proceeds. The project officers are responsible for finding out the information requested in this list while the evaluation staff records, analyzes, and writes up the findings.

Financial Reports and Progress Reports

The project implementing organization is responsible for submitting financial and progress reports, quarterly and annually. The evaluation staff analyzes these data. A separate manual is being developed to explain the standard formats for financial reporting.

The PMES

Collecting information in rural areas or on informal sector activities in peri-urban areas can be quite difficult. Monitoring and evaluation systems for development projects often collect too much or too little data, or the wrong type of data.

As a result, reports are produced too late to be useful to project management and the systems have been costly. To avoid these pitfalls, ATI has developed a flexible framework for data collection and analysis. This framework, the PMES, helps avoid the collection of unnecessary data or the omission of important data. It also serves as a guide to interpretation, thus facilitating comparisons across projects. The PMES is intended to be used by the evaluation staff as an interactive tool in discussing issues with the project officers.

The PMES should be viewed as a checklist of the factors to be considered in monitoring and evaluation. Not all of these factors are relevant for any particular project. Although the checklist is meant to be broadly applicable, some factors pertinent to a specific project may not be included. Thus, meetings between the evaluation staff and project officers to explore the project-specific issues are important. The PMES is a structured way of asking the questions that are likely to be important.

As much as possible, the questions in the PMES are quantitive. Qualitative variables are expressed in terms of levels (as ordinal variables) to facilitate analysis and interpretation. Likely responses to questions involving qualitative variables have been anticipated, but other responses should be specified and explanations added, where needed.

Because certain projects have particular significance as field tests of technologies or models of delivery systems, those projects will receive greater attention in **evaluation.** For those projects, ATI may commission small studies for gathering baseline

data or surveying participants and nonparticipants to assess impacts. The context of certain other projects may be so special that it is difficult to reach conclusions about their transferability. When surveys are needed to obtain information on socioeconomic impacts, the PMES can assist in the design of questionnaires for specific projects. The evaluation staff and the implementing organization or a research organization work together in setting the sample size, sampling procedure, and survey techniques.

The PMES is suitable for monitoring, ongoing evaluation, and ex post evaluation of appropriate technology projects. During monitoring and ongoing evaluation, the following sections of the PMES usually can be filled out: nature of the technology, organizations and participation, inputs, project activities, credit and equity financing (if part of the project), outputs, and markets. The sections of the PMES primarily intended for the ex post evaluation cover impacts, and policy issues and replication. The rest of this paper briefly discusses some of the issues that fall under the various sections of the PMES. The topic headings of the text correspond to the lettered sections of the PMES.

A. Technology

The first step is to verify the inherent merits of the technology in relation to its context. A **productive activity** relies on one or more technologies for combining inputs to produce outputs. An **enterprise** is a single administrative unit that carries out productive activities; it may be privately-owned

or a parastatal. An ATI project may involve developing or adapting a technology, designing a prototype, field testing, or transferring a technology to capital goods manufacturers or potential users.

In order to test assumptions about technologies, it is useful to classify the technologies and their status: traditional, upgraded traditional, off-the-shelf modern, downscaled modern, and innovative replacement. **Traditional technologies** are those that have been used in production or consumption in rural or peri-urban areas for a relatively long time. These technologies rely mainly on human labor or animal power. **Upgraded traditional technologies** incorporate key elements of traditional technologies, but have been improved to take advantage of the potential for higher inherent efficiencies or economies of scale. **Off-the-shelf modern technologies** have been in use for a relatively short time, generally less than twenty-five years and often are larger in scale than traditional technologies. **Downscaled modern technologies** are versions of modern technologies that have been adapted for a smaller scale or the resources available in rural or peri-urban areas. **Innovative replacement technologies** are generated by direct application of new knowledge.

The advantages and disadvantages of the technology should be noted: costs (capital, labor, raw materials, maintenance and replacement, and transportation); availability of raw materials including energy; skills requirements; productivity and production time; useful life; downtime (availability of spare

parts and technicians for repair); consumer prices; quality of output; flexibility; occupational health and safety; environmental impacts, and the ability of small producers to participate in productive activities. The timeliness of installing the technology is affected both by the nature of the technology itself and a wide variety of administrative and managerial factors that should be explained. Machinery and equipment manufactured in the project area may be distinguished from that produced abroad in order to estimate foreign exchange requirements and because domestically-produced parts usually can be repaired or replaced faster or more easily.

B. Institutional Capacity

The second step is to consider the institutional capacity supporting the application of the technology and also the decisions by participants to adopt and continue using the technology. The **implementing organizations** that ATI works with may carry out the projects directly or may establish a special division concerned solely with the project for greater efficiency, to meet legal requirements, or to separate profit-making activities from charitable or voluntary activities. In other cases, the implementing organizations subcontract with **intermediary organizations** that are better able to work with certain groups, cover particular geographic areas, or offer specific substantive expertise.

Cooperating organizations (implementing or intermediary organizations) may be composed of small enterprises directly, or may represent them as an association, cooperative, or common

service group. Alternatively, the organizations may have broader purposes such as economic, social, community, or technology development. Generally, ATI works with nongovernmental organizations such as private voluntary organizations, private companies, and trade associations that work with small enterprises, but in some cases, parastatals, government development banks, and government agencies may be involved. The cooperating organizations may work at the local, provincial or state, national, or international level.

Cooperating organizations may provide a variety of incentives and services such as grants, subsidies, credit, technical or managerial assistance and training, input supply, marketing arrangements, and representation in policy debates. One project often supports multiple productive activities. The number of units, size, and location of each type of productive activity supported should be recorded.

Institutional capacity includes experience; leadership; position in society; access to resources and information; processes for reaching and implementing decisions, and efficiency. It is important to note the budget, staff size, and age of the cooperating organizations because these may be related to other factors that affect the success of the project.

Participants are those people who actually take part in the project (e.g. small entrepreneurs and farmers). **Intended beneficiaries** are the people whom the project was designed to involve. In practice, if the intended beneficiaries are not informed about the existence of the project, are not interested in the project, or lack the resources and skills needed to take

part in it, then the actual participants may not be from the target group. Consequently, key characteristics of the actual participants such as household income (cash and in-kind), household size, geographic location, and land holdings should be determined to check whether the actual participants are from the group of intended beneficiaries.

Since the number of participants also may differ from the planned target or the drop-out rate may be high, participation and continuation rates should be **monitored** and reasons for any major differences from the plan noted. Some related questions for **evaluation** are what incentives have motivated various groups of participants to join the project and what constraints have precluded the participation of other intended beneficiaries?

Sometimes, new organizations developed under a project start out successfully (or unsuccessfully), but their effectiveness and efficiency change over time. If surveys are conducted, participant evaluations of the effectiveness of implementing organizations may be obtained. However in some cultures, people tend to avoid expressing negative judgments about an organization when representatives of that organization are present. As users of the technology, participants often can provide useful feedback to technology designers as well.

C. Project Activities

Other activities that are commonly part of development projects include outreach and promotion, the processing of applications, administration, provision of technical and managerial assistance, training, and reporting. The main focus

of **monitoring** should be on reasons for positive and negative aspects of these activities, ways of improving their efficiency and effectiveness, and keeping track of administrative costs.

Regardless of the project's expected desirability for the intended beneficiaries, the goals of participation will not be reached if outreach and promotion activities are inadequate. Sometimes, the recommended technical packages are too costly or time-consuming for the intended beneficiaries or are not suitable for the actual sites that are available. Flexibility is necessary because changes in the original technical packages may turn out to be desirable.

In **monitoring** training, the number of people trained and the duration and subjects of the training can be compared to the targets. It is more difficult to **evaluate** training because its effects may be diffuse or long-term.

The timeliness and quality of financial reports and progress reports should be monitored, but good reporting or its absence cannot be equated with project success or failure.

D. Credit and Equity Financing

Even where most of the preconditions for successful entrepreneurship exist, lack of capital and the inability of low-income people to bear risks can be serious constraints to the adoption of improved technologies and the expansion of small enterprises. These constraints can be overcome through credit or equity financing programs. Many of the same questions that apply to monitoring and evaluation of credit programs also are relevant in modified form to venture capital development companies.

In **monitoring** a credit program, loan approvals over a given time period are compared to the targets. Sometimes, loan disbursements fall below targets even when loan approvals have met targets. It is important to **monitor** the sizes of approved loans to ensure that most of the funds do in fact flow to small enterprises. If the loan size is not adjusted over time for inflation, enterprises that start in the later years of the project could face cashflow problems or an inability to afford the cost of recommended technical packages. The median may be a better measure of central tendency of loan sizes than the mean because the mean may be skewed by a few large values. The loan terms (interest rate, and length of the grace and repayment periods) generally are matched to the planned cashflows of the enterprises, but may differ substantially from the actual cashflows.

Some organizations are reluctant to classify a loan as being in default while others write off late repayments more quickly. Consequently, statistics on repayment rates across projects must be compared together with the definitions of lateness and defaults. The incidence of repeat loans is not necessarily an indicator of project success since it depends on whether the credit program was originally structured with short-term or long-term loans and whether enterprises are drawing down assets needed for their long-term commercial viability in order to repay their loans.

E. Inputs

If additional land is required for a project, the change in the land area used should be recorded, keeping the irrigated and nonirrigated hectarage separate. Even if there is no change in the amount of land used, this land has an opportunity cost because it could have been devoted to some other use.

The quantity (in person-days), skills requirements (unskilled, semi-skilled, and skilled), and seasonality of the project's labor usage should be noted. Wage rates should be recorded for each skill level. Even though household labor or volunteer village labor might not be paid a direct wage, it generally has an opportunity cost because this labor could have been hired out or devoted to other productive activities. If part of the wage is paid in-kind (for example through food), the value of the in-kind benefits should be added to the cash wage rate. The composition of the labor (men, women, and children) also matters.

In some cases where unemployment in pervasive, a portion of this labor may have little or no opportunity cost. In those cases, wage costs can be shadow priced to reflect this lower opportunity cost. The shadow pricing of labor is only relevant in an economic analysis, not in a financial analysis. However, shadow pricing labor increasingly is being questioned because in most LDCs, labor is costly even where it is abundant. While some unemployment may exist among unskilled workers, the demand for semiskilled and skilled labor usually exceeds the supply. In many rural areas, there is little unemployment during peak periods for agricultural work, but seasonal variations in work

opportunities may be large. Usually, some opportunity cost is incurred in tapping unskilled or skilled labor although where underemployment does exist, the opportunity cost may be less than the prevailing wage rate.

Firms generally keep records on the unit prices and the quantity of raw materials required per unit of output. However, use records rarely are kept for unpriced raw materials such as water even where it is scarce. Tracking the availability and timeliness of raw materials supply is an important task of **monitoring.** It indicates whether the 1) substitution of other types of sources of raw materials will be necessary, 2) the schedule for purchases of complementary inputs or provision of services should be changed 3) inventories of inputs are too large, or 4) the availability of raw materials could support an expansion of production.

F. Outputs

A productive activity may yield multiple outputs, each with a different time cycle for production. Home consumption of output is included in production data; however, physical losses in processing, storage, and transport should be deducted. Losses due to theft also are subtracted from production in a financial analysis, although not in an economic analysis because they affect profitability, but not productivity. Large shortfalls between actual production and expected output may indicate the need for some changes in the design or implementation of the project. Common reasons for such shortfalls include the availability of raw materials, labor, spare parts, or technicians for

repair; cash flows; external conditions such as weather, natural disasters, or pests and diseases; theft; and technical or managerial considerations. If market demand is low, it may be financially and economically desirable to reduce production. Seasonal variations in supply and demand should be noted.

The quality of the outputs can vary across batches or over time. The actual quality may be compared to the planned quality. Some major attributes of quality are appearance, taste, nutrition, storability before use, convenience, strength, power, useful life, health and safety impacts, suitability for further processing, and conformity with industrial standards or government regulations. Consumers' overall impressions of the quality of the product generally are reflected in the price that they are willing to pay for a given quartity of the good.

G. Markets

Even when the technical performance of a project is good and production goals have been reached, serious marketing problems may occur. There might not be enough consumers willing to buy the product at the established price or substitute goods may be more economical.

Some projects produce outputs that previously were on the market. In those cases, data may be available on the price and quantity of these goods demanded before the project. When projects produce outputs that were on the market before the project, sales prices may fall as a result of the expansion in the quantity produced. Existing consumers of the good might not be willing to pay as much per unit for additional units beyond

the amount they previously consumed. New consumers of the good might be willing to pay some price for it, but less than the current market price. The new prices should be used in the financial and economic analyses.

In order to estimate future price changes due to an expansion of production, it is necessary to have some idea of the price elasticity of demand. Calculating the price elasticity of demand for goods consumed in rural areas of LDCs is difficult. Instead, several values for the price elasticity can be assumed and the effects of the selection can be tested in a sensitivity analysis.

In many cases, however, good data on past consumption rates are unavailable. Written records of sales rarely are kept in rural areas or might be inaccurate due to the dispersed nature of small transactions, barter, and efforts to circumvent taxation or government regulation. Or, the output may be new products not previously on the market.

It often is possible to judge whether the price elasticity of demand exceeds or is less than unity, even if the good is new on the market. If the demand for a good is price elastic (greater than unity) total expenditures on the good will increase when the price falls and will decrease when the price rises. The opposite is true when the good is price-inelastic (less than unity). If good substitutes are affordable and can be obtained locally, the demand for the project output will tend to be elastic. The wider the range of uses for a good, the more elastic will be its demand. If consumption of a good takes up a

large share of the buyer's purchasing power, the demand is likely to be elastic.

Consumer acceptance of a product can be difficult to predict in advance, particularly when the product is new or differs in quality from what previously was available. If incomes are rising due to general economic development, the commercial viability and economic sustainability of an enterprise can be dramatically boosted over time due to increases in the per capita demand for the outputs. Thus, consumer acceptance and the factors affecting it deserve careful attention in an **ongoing evaluation.** Promotion and marketing costs often are high at first for new products, but may decline over time as consumers become familiar with the new items.

Where prices of the output are subsidized, the economic analysis (but not the commercial analysis) should be based on what consumers would be willing to pay for the good if it were not subsidized. One way of estimating maximum willingness-to-pay is to consider the price of the least costly substitute that is likely to be used instead of the good. For example, farmers would be willing to pay a price for rhizobium inoculant to increase nitrogen fixation on legume root nodules up to the cost of the cheapest alternative source of nitrogen fertilizer (chemicals or animal), providing that the benefits of using fertilizer (the value of the increase in yields) exceed the cost.

H. Commercial and Economic Analysis

The commercial (financial) and economic analysis of each of the productive activities and the project as a whole is a major

focus of ATI's monitoring and evaluation system. The input data for these analyses are provided by the implementing organizations in a standard format. In order to compare **costs** (cash outflows) and **benefits** (cash inflows), the evaluation staff will have to make several adjustments to the data: 1) remove the distorting effects of inflation to express values in **real** (constant money) terms, 2) discount values to account for the time value of money, and 3) shadow price certain benefits and costs to better reflect their true values in an economic analysis (not applicable in a financial analysis).

Except in countries with very rapid inflation, it is sufficient to make the inflation adjustment on an annual basis. The amount of the adjustment can vary considerably depending on which inflation index is used: consumer prices, producer prices, construction costs, or the Gross Domestic Product Implicit Deflator. Some inflation indices have a national scope while others pertain to just urban or rural prices. It may be appropriate to apply a different inflation index to production costs and market prices; however, this level of sophistication of inflation indices only can be found in some LDCs.

Usually, the discount rate is defined as either the **social rate of time preference in consumption** or as the **opportunity cost of capital.** The evaluation staff will obtain the current discount rate(s) used in government planning from the World Bank.

Since all costs are charged to the year in which they are incurred and then converted to present value terms, **accounting depreciation** (an arbitrary allocation of capital costs over a set time period) is excluded from a financial or economic analysis.

However, accounting depreciation may have implications for actual tax payments and that does show up in a financial analysis.

If the project requires imported capital goods or inputs, or produces outputs that are exported or are import-substitutes, changes in currency exchange rates can distort comparisons of values over time. Therefore, the dates of major currency devaluations or revaluations should be noted. It is most correct to use the exchange rate in effect at the time the transaction occurred; however, the current exchange rate is sometimes used throughout to simplify the analysis.

Where countries overvalue the exchange rate for domestic currency, a premium (shadow price) can be placed on foreign exchange costs or benefits to reflect their true scarcity. The implementing organizations are required to keep track of domestic currency and foreign exchange cashflows separately to allow this modification. The evaluation staff will obtain the shadow price for foreign exchange from the World Bank.

In an economic analysis (whether or not foreign exchange is shadow priced), import and export prices are converted into border prices. Thus, imports are valued at cost, insurance, and freight (c.i.f.) at the port of entry, including unloading charges. The c.i.f. cost excludes subsequent delivery charges to the point of use, domestic tariffs, and other taxes or fees. Exports are valued free on board (f.o.b.)--the price at the border loaded for shipment abroad.

Working capital is the money that businesses need to have on hand in advance of making expenditures in order to

avoid cashflow problems. Working capital is not counted as a cost until the money is spent because it would be double-counting to include it together with the operating costs for which it is used. However, interest costs for borrowing working capital are a financial cost and an economic cost. **Net inventory changes** are excluded because that is an accounting concept rather than an actual financial or economic cost. Loan repayments and taxes are financial costs, but not economic costs.

Gross benefits include cashflows received by producers (sales, other income, and salvage value), and consumer's surplus. **Salvage value** is the estimated market value of the assets of the enterprise at the end of the period of analysis, or alternatively, the present value of the additional net benefits that could be obtained after the expected project life without any additional capital investment or replacement expenditures. Working capital left over at the end of the period of analysis also may be included in salvage value. Subsidies and loan receipts are counted as gross cash inflows in a financial analysis, but not in an economic analysis.

Some technologies reduce production costs. A financial analysis would focus on how the reduction in costs affects the profits of the enterprise. An economic analysis also has to consider whether consumer prices have fallen as a result of the cost reduction. **Consumer's surplus** benefits reflect the difference between what people are willing to pay for a good and the market price. When the price of a good falls from P_0 to P_1, the quantity demanded rises from Q_0 to Q_1. If the demand curve is

linear, the change in net consumer's surplus benefits = $(P_0 - P_1)$ $[(Q_0 + Q_1) / 2]$. Both prices are defined in real terms because an increase in prices which is less than the inflation rate is a decrease in real prices. The evaluation staff will estimate the consumer's surplus benefits from data provided by the implementing organizations.

Net benefits (net cash flows) are the difference between gross benefits and costs. **Gross benefits** include consumer's surplus and revenues to producers. Net revenues to producers can be retained for use by the enterprise, distributed as dividends, capital gains, and taxes; or invested in other productive activities. The concept of economic efficiency is indifferent to how the net benefits are split across these categories. However, in a financial analysis, producer's taxes are deducted because they reduce the surplus available to the enterprise. Nevertheless, the distribution of costs and benefits is important for equity reasons. The costs and benefits of each productive activity and enterprise may be aggregated in **evaluating** the project as a whole.

The real present value of net benefits (NPV) is the basic criterion of financial viability or economic sustainability calculated by the evaluation staff. The internal rate of return (IRR) has some intuitive appeal as a criterion, but since it has inherent flaws under certain conditions it only will be calculated as supplementary information. In either case, a **sensitivity analysis** will be conducted to examine how much the financial or economic sustainability of the project changes when

key assumptions (costs, yields, and prices) and parameters (discount rate and shadow prices) change.

Comparisons of the economic sustainability of alternative technologies of different scales are often of interest, but they may be difficult to make. In practice, it is often hard to obtain proprietary data on cashflows of large, private firms. Furthermore, care must be taken in comparing the economic benefits of a small-scale technology to those of large-scale alternatives. First, plants using different technologies do not always produce equivalent products. Second, large-scale, urban-based industries often receive a large number of direct subsidies and tax preferences as well as indirect subsidies in the form of credit, low energy and water costs, administered transportation rates, built infrastructure, and trade protection. These subsidies may make the large-scale technology appear to be more economical than it really is. Third, there often is a wide range in the prices paid for comparable imported equipment used by large industries. Even where a large-scale technology has an inherently higher physical efficiency (e.g. solvent extraction of oil) or lower operating costs due to economies of scale, that may not be relevant where the capital costs, complexity of the technology, or requirements for imported inputs preclude its adoption. Only small and intermediate-scale technologies are likely to be replicated widely in LDCs as a basis for development in rural or peri-urban locations.

I. Impacts

Impacts are the ways in which various groups of people are

affected by the project. The principal **impacts** considered in **evaluation** are increases in net incomes (cash and in-kind) and employment resulting directly from the project's productive activities. There also may be other direct social and environmental impacts of the project. These other social impacts are important, but sometimes occur gradually and are difficult to observe. A project typically has diverse impacts on the unemployed, the self-employed, employers, owners of productive assets, and consumers.

There are five main difficulties in analyzing impacts. First, there are time lags between the production of outputs and the generation of impacts. This is particularly true for impacts on health, education, social well-being, and the capacity to participate in development; these changes may not be obvious until many years after an increase in incomes. Second, without baseline studies of the initial social, economic, and environmental conditions in an area before implementation of the project, it is difficult to tell what changes have occurred. For small-scale projects, it usually is necessary to rely on generally available data. Without baseline data, it still may be possible to make some inferences about impacts by studying places that are similar to the project area in all other respects besides the presence of the project. Third, since conditions change over time in developing areas for many reasons, it may not be possible to attribute particular changes to the effects of any one project. Fourth, rural development projects may have unintended impacts on some groups of people and these impacts might not be obvious. Fifth, since environmental impacts may be

site-specific, or dispersed over a large area and are influenced by many other natural factors and human activities, it can be difficult to isolate their causes.

Linkages are sometimes emphasized in an analysis of impacts, but generally are included incorrectly. Linkages refer to secondary changes in net incomes or employment that are indirect outcomes of the project. **Backward linkages** pertain to industries supplying inputs for the project. **Forward linkages** refer to industries that process or sell outputs of the project.

In an economic analysis from the viewpoint of the nation, the relevant measure of net efficiency benefits is the change in Gross Domestic Product (GDP). GDP is the value of final goods and services generated within the country's borders. GDP's geographic scope differs from Gross National Product (GNP) because the latter is based on ownership of factors of production. The profits earned by a U.S. company in an LDC are counted in the U.S. GNP, while the value added excluding profits is counted in the GDP of the LDC.

Neither the GDP nor the GNP counts the total value of intermediate goods and services (backward linkages) in addition to that of final goods and services because this would be double counting. For example, the value of cooking oil already includes the sale price of the oilseeds (a backward linkage) used to produce it. Furthermore, the labor and other resources used to produce the oilseeds have an opportunity cost because they could have been devoted to other uses. If the oil then is used to fry tortillas that are sold in markets (a forward linkage), then the

value of the tortillas includes the sale price of the cooking oil consumed in making them. However, if households prepare the tortillas themselves, then the cooking oil and the flour used are both final goods. Another way of counting the total value of final goods and services is to sum the value-added at each intermediate stage of production.

Forward linkages also are omitted unless it can be shown that the same value would not have occurred anyway in the absence of the project, either using different sources of inputs to produce the same output or different inputs to produce other outputs. It generally is difficult to justify inclusion of forward linkages on economic efficiency grounds.

Secondary benefits from backward and forward linkages can be counted as economic efficiency benefits only under special circumstances: when there is excess capacity in existing production units, or when labor or other resources which would have been unemployed and have no opportunity cost are tapped. Otherwise, expanding output in one area means withdrawing resources from other uses. However, these special circumstances usually are handled by shadow pricing on the cost-side rather than by augmenting benefits.

Even though backward and forward linkages are not counted in determining the size of the economic pie, they are relevant in estimating the distributional impacts--how the pie is sliced. If markets are competitive, a production process that uses inputs produced by small farmers or cottage industries is likely to have favorable impacts on the distribution of income. The same is true when the outputs of a production process are marketed by small-

scale sellers or undergo further processing by cottage industries before sale. It is best to separate these income distribution benefits from economic efficiency benefits. So-called "multiplier effects" from respending of an initial injection of money should not be counted as economic efficiency benefits or income distribution benefits because they would be generated by any investment of comparable size.

Income and employment changes directly resulting from a project should be estimated separately for unskilled, semiskilled and skilled workers, and entrepreneurs. As discussed above, it is questionable on the grounds of economic efficiency to count indirect income and employment changes to suppliers of inputs and processors of the outputs of a project. The total change in income to a group such as unskilled workers can be estimated by multiplying the average change in net income per unskilled worker by the number of beneficiaries in that group. By summing across groups and incorporating some judgments about the average before-project income of members of that group relative to that of the whole nation or region, the overall impacts on income distribution can be estimated.

Income quartiles (e.g., incomes of the lowest-earning 25%, second lowest-earning 25%, and so forth) are a convenient measure of relative incomes. If income quartile data are not available, income ranges may be based on fractions of GDP per capita. Frequently, the average income in the project area will differ substantially from the national average. Since the mean may be skewed by a few exceptionally high incomes, the median may

represent typical income levels better. It would be double counting of benefits to include along with the income gains any interest savings from the reduced need to borrow when incomes rise.

Employment is mainly important because of the income that it brings in, but employment also may increase perceptions of self-worth. Since productive activities differ in their degree of labor-intensiveness and skill requirements, employment is not necessarily directly proportional to the income generated by a project. Sometimes, the employment associated with a development project is proclaimed as a benefit while the amount of labor displaced is erroneously ignored. Labor displacement can be viewed as a cost that reduces net employment gains. It also is important to **monitor** what happens to displaced workers because these groups may react in ways that jeopardize project success (e.g., arson, vandalism, or theft).

Increases in land values sometimes are incorrectly attributed as an economic benefit of a project. In theory, the price of land reflects the present value of net benefits from the highest-valued use of the land. If the increased output resulting from a project is valued along with changes in land values, that amounts to double-counting. For example, suppose wheat yields increase after installation of water pumps for irrigation. As a result, land prices would increase because of the greater future outputs that land owners would be giving up when they sell the land. Where markets for land are absent or land prices poorly reflect productivity, the opportunity cost of additional land required for a project may be calculated directly

as the present value of future net farm revenues per hectare. In some cases, land prices may exceed the opportunity cost due to speculation, the desire to hedge against inflation, or the status value of land holdings. In those cases, although land prices should be used in a financial analysis, the opportunity cost should be used in an economic analysis, rather than the price. Increases in land values resulting from a project can have negative distributional effects on land tenants and sharecroppers. Land competition may displace previous users of the sites to different locations or even other occupations.

J. Policy Issues and Replication

Government policies and the relationships among government agencies, parastatals, transnational corporations, national businesses, and local businesses can have major positive or negative effects on the operation of a project. Yet, sometimes it is hard to decide how well the project would have operated if policies and institutions had been different. These policies and institutions can affect the quantity or quality of inputs and outputs, costs and location of production, and output prices. Key areas to look into include subsidies and taxes; foreign trade restrictions (tariffs on inputs, foreign exchange quotas, imbalanced exchange rates that distort import and export prices, and export levies or bans); license and permit requirements (fees, paperwork, delays, and restrictions on operation); minimum wage laws and labor rules; price controls on other inputs; location and pricing of infrastructure (water resources, energy, and transportation); availability and cost of external credit and

information services (when not a part of the project); and price controls or quality standards for outputs. Policy issues also have a large bearing on the transferability of monitoring and evaluation findings to other areas.

The sustainability of the use of the technology once the tap of external resources is turned off is a major issue for **evaluation.** Where participants who had not worked together previously are now cooperating, a key question is whether this will continue or even extend to additional activities.

A related issue is **replication potential** -- the maximum realistic number of commercially-viable enterprises that could be set up in various locations over a certain time period. An **ex post evaluation** often assesses the potential for further replications in the project area and elsewhere in the country and in other LDCs. The spontaneous spread of an appropriate technology outside the domain of the project is a particularly important aspect of replication. In other cases, external resources may be needed to overcome the constraints to widespread adoption. The relevant time frame for analyzing replication potential varies with the nature of the technology, institutional capacity, and the availability of resources for carrying out such projects. Usually, a set of time frames such as less than 5 years, 5-10 years and 10-20 years will suffice. Some judgments also can be made about the likely scale of the replicated units, and the expected control over their operation (households; small private enterprises; large private companies; village associations of small enterprises; cooperatives, or common

service organizations; parastatals; or foreign companies). An experimental approach based on the testing of various project models can maximize the usefulness of the information generated in **evaluation** for the design of replication projects.

Appendix A

French and Spanish Equivalents of Key Terms

English	French	Spanish
Affected persons	Personnes affectées (-); Bénéficiares (+)	Personas afectadas (-); Beneficiarios (+)
Appraisal	Evaluation ex ante	Evaluación a priori
Benefit-cost analysis	Coût-avantages	Analisis de costo-benefi io
Constraints	Contraintes	Restricciones
Cost-effectiveness	Cout-efficacité	Costo-eficacia
Decision making	Prise de décision	Toma de decisiones
Effectiveness	Efficacité	Efectividad; Eficacia
Efficiency	Efficiencé	Eficiencia
Equity	Equité	Distribución de ingreso
Ex post evaluation	Evaluation ex post	Evaluación a posteriori
Extension services	Services de vulgarisation	Servicios de extensión
External conditions	Facteurs externes	Factores externos
Impacts	Effets	Efectos; Impactos
Implementation	Exécution; Mise en ouevre	Ejecución
Incidence	Incidence	Incidencia
Indirect effects	Effets indirets	Efectos indirectos
Inputs	Moyens	Insumos
Intended beneficiaries	Bénéficiares présumés; Groupes cibles	Beneficiarios
Monitoring	Suivi	Monitoreo; Sequimento
Objectives	Objectifs	Objetivos
Ongoing evaluation	Evaluation en cours de projet	Evaluación continua
Operation and management	Gestion	Gestión; Operación

English	French	Spanish
Outputs	Produits	Productos
Participants	Participants	Participantes
Performance	Performance	Desempeño
Perspective of analysis	Point de vue de l'analyse	Punto de vista del analisis
Physical inputs	Intrants	Insumos fisicos
Planning process	Processus de planification	Proceso de planificación
Project life	Durée du projet	Vida del proyecto
Targets	Objectifs quantifies	Metas
Time horizon	Horizon temporel	Horizonte de tiempo

Sources: Arnold Contreras (FAO) and Françoise Pétry (FAO)

APPENDIX B: Hypothetical Example

Appropriate Technology International

Project Monitoring and Evaluation System
Eric L. Hyman and Tom C. Corl
December 1984

Project name Coconut Processing Industries
Project number X-20 Location Copra Province, Freedonia
IO Small and Beautiful, Inc. (SAB)
Beginning date 1/1/80 Completion date 12/31/84
Date of evaluation 3/15/84

Abbreviations:

P.A. = Productive Activity
Tech. = Technology
IO = Implementing Organization
INT = Intermediary Organizations

For each question. the following additional answers are possible:

(55) Too soon to tell
(66) Other (Specify)_____
(77) Don't know
(88) Missing data
(99) Not applicable

Where multiple technologies are employed in a project, subdivide answers to each question for each technology.For a single technology. multiple answers are possible for questions marked [M]. Starred items [*] are one-time questions answered at an early stage of monitoring. Unstarred items are answered periodically in monitoring and ongoing evaluation. Double starred [**] items are considered once during ex post evaluation.

See "Supplementary Data Requirements" for project-specific discussion of the context and special isssues surrounding the project. Also, see financial reports submitted by IO.

A. Technology (equipment, machines, or process)

*1. Priority technical field (01) [M]
(01) Processing of agricultural products or use of agricultural residuals
(02) Processing of local mineral resources
(03) Production and distribution of farm equipment and supplies

*2. Type of technology (02) [M]
(01) Traditional
(02) Upgraded traditional
(03) Off-the-shelf modern
(04) Downscaled modern
(05) Innovative replacement

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*3. Purposes of the project (03) [M]
(01) Technology development, adaptation, or prototype design
(02) Technology assessment or field testing
(03) Technology transfer to users or commercialization
(04) Technology manufacturing

*4. Describe the components of the technology and their expected lifetimes Coconut dehusking, grating, milk and oil expelling, milk settling and separation, heating and oil separation, coconut milk and ice candy making, coconut shell charcoal making, soap making, and packaging.

*5. Capital costs of purchasing and installing the technology per P.A. T 44,600
a. Share due domestically-produced components 73 %
b. Share due to imported components 27 %

*6. Working capital required T 33,000

*7. Current availability of the technology
a. Number of similar models previously in project area 0
b. Number of similar models previously in country outside of project area 1
c. Number of similar models in other LDCs 5
(Specify where) Fort Richards (Caromenia), Tillertown (Czarraland)
d. Number of similar models in DCs 0
(Specify where)

*8. For each of the following characteristics, compare this technology to the types previously used:

(01)	(02)	(03)	(04)	(05)
Lower (Less)		Similar		Higher (More)

a. Capital costs per unit of output (05)
b. Labor costs per unit of output (02)
c. Raw materials costs per unit of output (02)
d. Other operating, maintenance, and replacement costs (02)
e. Foreign exchange costs (02)
f. Transport and distribution costs (02)
g. Simplicity of construction or tolerance of errors in manufacturing or adaptation (05)
h. Simplicity of operation and management or tolerance of errors in use (03)
i. Flexibility of raw materials used (03)
j. Expected quality of product (03)
k. Potential for outputs as import substitutes (03)
l. Potential for export of outputs (99)
m. Amount of output per unit time (02)
n. Expected downtime (02)
o. Match between capacity and demand (04)
p. Occupational health and safety risks (03)
q. Value-added for small producers (05)
r. Risks borne by small producers (04)

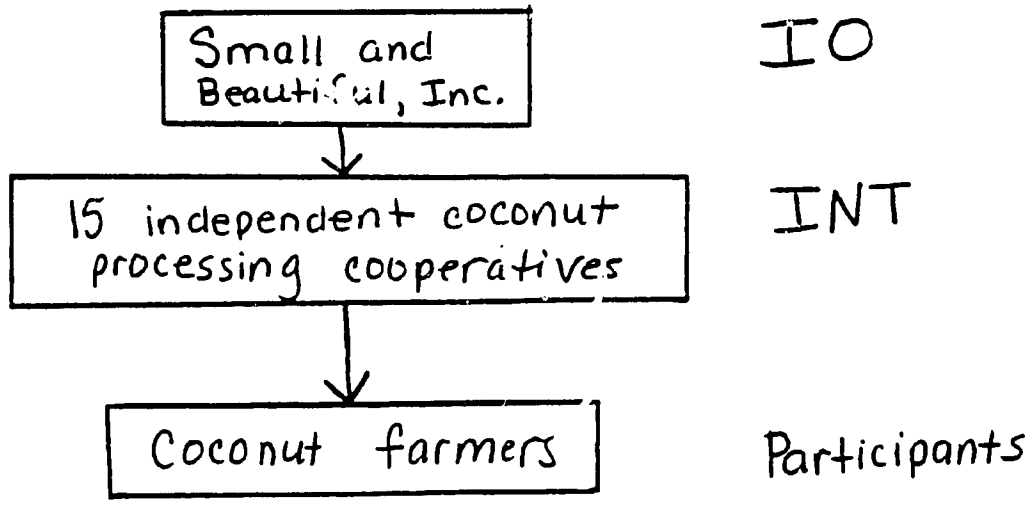
9. Timeliness of installing the technology (02)

(01)	(02)	(03)	(04)	(05)
Behind schedule		As planned		Ahead of schedule

Explain 3 months behind schedule due to delays in hiring staff at 2 sites and in organization of farmer cooperatives at 3 sites.

B. Institutional Capacity and Participation

*1. Diagram the relationship between the IO, INT, other involved organizations or groups (including government and private industry), and the intended beneficiaries.



*2. Relationship of IO to small enterprises (04) *3. Same for INT (01)

(01) Consists of small enterprises directly
(02) Association of small enterprises
(03) Cooperative or common service organization
(04) Economic development organization
(05) Social or community development organization
(06) Technology development or dissemination organization

*4. Relationship of IO to government (03) *5. Same for INT (04)

(01) Government agency
(02) Parastatal (including development banks)
(03) Private voluntary organization
(04) Private companies
(05) Other nongovernmental organization

*6. Geographic coverage of IO (04) *7. Same for INT (01)

(01) Local
(02) Provincial or state
(03) National
(04) International

*8. Size of IO *9. Same for INT

a. Number of paid staff (full-time equivalents)	50	6
b. Number of volunteer staff (full-time equivalents)	15	0
c. Typical annual budget (before project)	T1,300,000	-
d. Year established	1979	-

Responses for 10-12:
(01) Provides grants or subsidies
(02) Owns equity share
(03) Provides credit
(04) Provides technical assistance or training
(05) Provides managerial assistance
(06) Provides inputs
(07) Assists in marketing
(08) Buys their products
(09) Represents them in policy discussions

*10. Relationship of IO to participants (99)
*11. Relationship of IO to INT (03)
*12. Relationship of INT to participants (08)

*13. Types of productive activities supported:

a. Type	b. Number of units	c. Capacity /month
Coconut processing plant	15	12,000 coconuts

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14. Number of participants (03)

(01)	(02)	(03)	(04)	(05)
Below target		On target		Above target

Explain _____

15. Characteristics of the actual participants:
   a. Household income before project (cash and cash-equivalent of in-kind): median T 8,000, range T 3,000 - T 12,000
   b. Mean household size 6
   c. Geographic locations %
      Copca province 100
      _____ --
      _____ --
      _____ --
      _____ --
      _____ --
   d. Household's land holdings: median 1.2 ha, range 0.8 - 7 ha
   e. Involvement of women 33 %

16. Differences between characteristics of the participants and the intended beneficiaries

(01)	(02)	(03)	(04)	(05)
None		Minor		Major

Specify Median income slighily higher for participants

17. Drop-out rate among participants 10 (%)
   Explain _____

18. How well are new organizations developed under the project functioning?

(01)	(02)	(03)	(04)	(05)
Below expectations		As expected		Above expectations

   a. During initial period of establishment (03)
      Explain: some were slow to get started
   b. After initial period of establishment (04)
      Explain: good profitability of enterprises

Responses for 19-20 (if participants surveyed):

(01)	(02)	(03)	(04)	(05)
Poor	Fair	Good	Very good	Excellent

**19. Participants' evaluations of IO _____ (not surveyed)

**20. Participants' evaluations of INT _____

C Project Activities (Other Than Input Supply)

1. Effectiveness of project promotion and recruitment (04)

(01)	(02)	(03)	(04)	(05)
Inadequate		Satisfactory		Outstanding

Explain sites are generally accessible and in lowlands

2. Technical capability of IO (04) 3. Of INT (02)

(01) Inadequate (02) (03) Satisfactory (04) (05) Outstanding

Explain Technology relatively simple, IO staff travel to provide T.A. to INT

4. Managerial capability of IO (04) 5. Of INT (03)

(01) Inadequate (02) (03) Satisfactory (04) (05) Outstanding

Explain Managerial capability less good in 5 of the INT

6. Coordination between project and government agencies (02)

(01) Inadequate (02) (03) Satisfactory (04) (05) Outstanding

Explain Fredonian Coconut Authority supportive, but provided no real assistance

7. Frequency and quality of extension services provided by the project (04)

(01) Inadequate (02) (03) Satisfactory (04) (05) Outstanding

Explain Pertains to IO's T.A. for INT.; Extension services for farmers not a part of this project.

8. Training provided through project

a. Number trained: unskilled 0

Semiskilled and skilled 15

b. Average duration of training: unskilled (99)

Semiskilled and skilled 2 weeks

c. Subjects of training: unskilled (99)

Semiskilled and skilled Operation and repair of equipment; management and accounting

d. Extent that the people trained work and remain at jobs that use the training directly

(01) Small (02) (03) Average (04) (05) Large

Unskilled (99)

Semiskilled and skilled (04)

9. Extent that the recommended technologies are being followed (03)

(01) Well-grounded recommendations ignored (02) (03) Recommendations followed closely (04) (05) Recommendations modified where advisable

10. Divergences from recommended technologies (99) Reasons

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11. Submission of progress reports:

(01)	(02)	(03)	(04)	(05)
Poor	Fair	Satisfactory	Very good	Excellent

a. Timeliness (02)
b. Quality (03)

12. Financial reports:

a. (02)
b. (03)

13. Explain any changes in sources and uses of funds from the project budget None

D. Credit (or Equity Investments)

1 Loan (investment) approvals
a. Amount loaned (invested) to date 15 x 67,600 = T 1,014,000
b. Share of total loan (investment) fund 100 %
c. Relative to planned schedule (03)

(01)	(02)	(03)	(04)	(05)
Behind targets		On target		Ahead of targets

Explain slight delays did not significantly impair targets

2. Loan (investment) sizes
a. Median T 67,600
b. Mean T 67,600
c. Maximum T 67,600
d. Minimum T 67,600
e. Share of total costs financed 97% of capital and working capital
f. Adjusted over time for inflation? (01) all obligated in same year

(01)	(02)	(03)	(04)
Not at all	Less than inflation	Matched inflation	More than inflation

3. Loan terms (average)
a. Interest rate 12 %/year
b. List dates of any interest rate changes and the amounts (99)
c. Grace period 3 months
d. Repayment period 5 years

4. Timeliness of disbursements for approved loans (investments) (03)

(01)	(02)	(03)	(04)	(05)
Behind schedule		On schedule		Ahead of schedule

Reasons minor delays in bank clearing of ATI checks

5. Definition of lateness in repayment More than 3 months in arrears

6. Incidence of lateness in repayment
a. Number of enterprises 3
b. Share of enterprises 20 %
c. Total principal still owed by late-repaying enterprises T 54,000
d. Share of loan fund 4 %

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7. Definition of repayments in default (or bankrupt enterprises)
More than one year in arrears and without prospects for improved commercial viability.

8. Incidence of repayments in default (or bankrupt enterprises)
   a. Number of enterprises 3
   b. Share of enterprises 20 %
   c. Total principal owed by enterprises in default (or equity loss to capital fund) T 54,000
   d. Share of loan (capital) fund 4 %

9. Repeat loans (or investments)
   a. Number 6
   b. Share of total number 0 %
   c. Amount of principal 0
   d. Share of loan fund 0 %

10. Uses of the repaid loan funds (profits of capital fund) revolving loan fund for agricultural product processing projects of SAB

11. a. Total administrative costs of the loan (investment) program T 11,800/year
    b. Relative to total amount loaned (invested) 6 % over 5 years

E. Inputs

1. Land requirements per P.A.
   a. Irrigated:
      Before project 0 ha; After project 0; Cost/ha T 15,000
   b. Unirrigated:
      Before project 345 ha; After project 0; Cost/ha T 8,000

2. Labor Per P.A.

	(Person-days/Year)	Avg Daily Wage
a. Unskilled	5X5X52 = 1,300	T 18
b. Semiskilled	1X5X52 = 260	T 25
c. Skilled	1.6X5X52 = 416	T 125

   Calculate as (# people)(# days per week)(# weeks per year). Include volunteer labor in person-days. but not in average wage calculations.

3. Composition of labor
   a. Unskilled: Adult men 70 % Adult women 30 % Children 0 %
   b. Semiskilled and Unskilled:
      Adult men 95 % Adult women 5 % Children 0 %

4. Seasonality of labor requirements (list months by number)
   a. Peak season (specify months and reason) 5,6,9--planting; 8,9,12--harvesting
      Percent of annual labor requirements: Unskilled 50 %
      Semiskilled and skilled 50 %
   b. Off-peak season (specify months and reason) 1-4, 7, 10-11
      Percent of annual labor requirements: Unskilled 50 %
      Semiskilled and skilled 50 %

Within a skill class, peak and off-peak employment should total 100%.

51.

5. Raw materials used per P.A. (including energy and water)

Types	Quantity/Year	Unit Price	Cost/Year (T)
Coconuts	144,000 nuts	0.40	57,600
Electricity	4,200 kWH	1.24	5,210
Kerosene	144 liters	4.67	670
Plastic bags	192 bags	1.00	190
Plastic wrappers	57,600 wrappers	.01	580
Bottles	32,640 bottles	.03	9,790
NaOH flakes	415 kg	7.50	3,110
Lime	288 kg	0.40	120
Sugar	2,880 kg	3.50	10,080
Fuelwood	26 m³ (Stocked)	30.00	580

If water is not priced, list its opportunity cost "low", "medium", or "high" in the unit price column and explain.
Explain low in rainy season, medium low in dry season

6. Location of raw materials sources
   a. Domestic 82 %
   b. Imported 18 % (Specify from where) 80% of kerosene cost and 60% of electricity cost due to petroleum imported from the Sultanate of Marshallia

7. Availability and timeliness of raw materials supply (05)

(01) Major cause of delays	(02) Minor cause of delays	(03) Inventories too large	(04) Met targets	(05) Could support moderate expansion
		(06) Could support large expansion		

Principal bottlenecks Coconuts in abundance. Fuelwood becoming scarce, but still available. Electricity outages frequent.

F Outputs

1.

Product	Output Capacity/Yr	Actual Production/Yr	Capacity Use Factor %
Edible oil	32,640 bottles	21,430	66
Soap	44,640 cakes	29,608	67
Charcoal	7,776 kg	5,616	73
Ice candy	288,000 pcs.	201,290	70

(Average over 5 years across 15 P.A.'s, see financial reports for disaggregated annual data)

Include home consumption. Deduct losses in processing, storage, and transport. List average per P.A. separately for each year of project.

2. Actual production relative to expected output (03) [M]

(01) Less than expected (02) (03) As expected (04) (05) More than expected

Explain _____

3. Variation in production across P.A.'s [M]

	Oil	Soap	Charcoal	Candy
Median	19,552	27,711	5,483	193,212
Mean	21,430	29,608	5,616	201,290
Minimum	15,341	18,302	4,666	141,120
Maximum	27,360	34,248	6,221	221,760
Standard deviation	2,965	3,986	400	20,185

(Average over 5 years)

4.

Product	Length of Output Cycle
Oil	1 week
Soap	1 week
Charcoal	1 week
Candy	1 week

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5. Reasons for difference between actual and expected output: [M]

(01)	(02)	(03)	(04)	(05)
Major negative factor		Moderate negative factor		Not a factor

(06)	(07)	(08)	(09)
	Moderate positive factor		Major positive factor

a. Availability of spare parts (05)
b. Availability of technicians to repair equipment (05)
c. Availability quantity of raw materials (05)
d. Availability of labor (05)
e. Cash flows (04)
f. Market demand (04)
g. Adverse natural conditions (bad weather, pests and diseases, fire, etc.)
h. Theft (04)
i. Wastage and damage (03)
j. Actual technical efficiency of process relative to expectations (05)
k. Other (Specify) _____
Explain _____

6. How does the quality of the product differ from that of the most likely substitutes? (list separately for each product) [M]

(01)	(02)	(03)	(04)	(05)
Much worse		Same		Much better

a. Appearance (03) - oil, candy
b. Taste (04) - oil, candy
c. Nutrition (04) - candy
d. Storability before use (03) all
e. Convenience (03) - all
f. Strength (07) - charcoal
g. Power (99) - all
h. Useful life (03) - all
i. Health and safety impacts (03) - all
j. Increased suitability for further processing (03)
k. Conformance to industrial standards or government regulations (99)
l. Other (specify) (03) - calorific value of charcoal

54.

G. **Markets**

1. Changes in price and quantity resulting from the project:

Products	Price Before the Project	Quantity Sold Per Year Before Project	Uses
Oil	4.75 /380 g	77,600 bottles	cooking
Soap	1.25 /cake	153,900 cakes	cleaning
Charcoal	4.00 /kg	23,400 kg	heating
Candy	–	0	feed

(in project area)

2.

Products	Quantity Sold	Avg. Unit Prices(T)	Gross Revenue(T)
Oil	21,200 bottles	3.55	75,260
Soap	29,000 cakes	0.75	21,750
Charcoal	5,050 kg	2.00	10,100
Candy	187,700 pcs (124 mg each)	0.20	37,540

Per P A for each year

Average over 5 years. Prices in real terms[M]

3. Variations in price of outputs:
   a. Minimum _____
   b. Maximum _____
   c. Mean_____
   d. Standard deviation _____

Charcoal price is 20% higher in rainy season than in dry season due to reduced accessibility of substitutes (fuelwood and crop residuals)

4. Estimate maximum willingness to pay (WTP) for outputs that are sold at subsidized prices:

Products	WTP

(99)

Explain _____

5. Factors affecting the elasticities of demand: [M]

a. Number of substitutes for the good_____ Oil-(04) Soap-(04) Charcoal-(05) Candy-(05)

(01) None (02) Few (03) Some (04) Many (05) Large Number

b. Importance of the good_____ Oil-(02) Soap-(02) Charcoal-(02) Candy-(02)

(01) Basic need for poor (02) Basic need for all (03) Average (04) Useful, not essential (05) Luxury

c. Expenditures on the good as a fraction of buyer's purchasing power_____

(01) Low (02) (03) Moderate (04) (05) High

Oil-(04) Soap-(03) Charcoal-(03) Candy-(02)

6. Change in net consumer's surplus (T) [M]

Year 1	Year 2	Year 3	Year 4	Year 5	
42,000	42,000	42,000	42,000	42,000	T14/year/HH X3000 HH

Calculated by evaluation staff.

7. Most likely substitutes for the good:

Product	Substitute	Price	Origin: Domestic or Imported
Oil	Soybean oil	7.5/380g	Imported
Soap	Palm Oil soap	2.5/cake	Domestic
Charcoal	Wood charcoal	4.0/kg	Domestic
Candy	various candies	—	Domestic

8. Consumer acceptance of the products _____ [M]

(01) Less than expected (02) (03) As expected (04) (05) Greater than expected

Oil-(03) Soap-(03) Charcoal-(02) Candy-(04)

Reasons: Oil and soap are cheaper than substitutes. Few households previously used charcoal in cooking. Candy has become a fad.

9. Distribution of the output [M]

	Value (%)
a. Domestic	97
b. Export	0
c Unsold or damaged	already deducted from production figures
d. Stolen	3

B. Commercial and Economic Viability

1. Inflation indices for period since date of plan:

Index Value	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year
a. _____	100	110	121	133	146	161	____

b. Type of index ___(04)___

(01) Consumer price (02) Producer price (03) Construction (04) GDP Deflator

c. Geographic scope of index __(03)__

(01) Rural (02) Urban (03) National

2. Current discount rate(s) used in national planning __15% real__

3. Average currency exchange rates (official)

Plan Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year	Year
T8=$1	T10=$1	T10.5=$1	T11=$1	T11.5=$1	T12=$1	____	____

4. Shadow price for foreign exchange

Plan Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year	Year
1.2	1.2	1.2	1.2	1.2	1.2	____	____

Questions 5, 6. 7. 8, and 9 to be calculated by Evaluation Group from quarterly financial reports.

5. Real present value of net benefits (NPV) for each P.A.
   a. Financial T 67,000
   b. Economic T 70,200

6. Real internal rate of return (IRR) per P.A.
   a. Financial __:=__ % none exists since the first cashflow in positive
   b. Economic __108__ %

7. How sensitive is the NPV or IRR for each P.A. to changes in financial or economic assumptions (costs, yields, prices) and parameters (discount rate and shadow prices)? r=10% : Fin NPV=74,000 Econ NPV=82,200; r=20% : FIN NPV=62,400; Econ NPV=60,100

   (all NPV values in T 1000)

8. Real present value of net benefits (NPV) for whole project:
   a. Financial __—__ Despite consumer's surplus benefits
   b. Economic (-207,698) due to sunk overhead and training costs, project as a whole involves subsidization although individual P.A.'s are profitable.

9. Real internal rate of return (IRR) for whole project:
   a. Financial __—__ %
   b. Economic (-9.7) %

10. How sensitive is the NPV or IRR for the whole project to changes in financial or economic assumptions? r=10% : Econ NPV=(-144,526); r=20% : Econ NPV=(-259,945)

    (all NPV values in T 1000)

I. Impacts

**1. Average changes in net incomes (cash and in-kind)

Direct (Primary):

a. Per unskilled worker T 5,200/year

b. Per skilled and semiskilled worker T 7,200/year

c. Per small entrepreneur T 5,100/coop family

d. Per average household consuming the good (if the price is reduced)

Indirect (Secondary):

e. Per supplier of inputs T 397/year due to 15% higher purchase price for coconuts (1,521,000 coconuts

f. Per processor of outputs 0

**2. Number of beneficiaries

Direct (Primary):

a Unskilled workers 75

b. Skilled and semiskilled workers 15

c. Small entrepreneurs 30 households

d. Number of households consuming the outputs 3,000

Indirect (Secondary):

e Suppliers of inputs 230

f. Processors of outputs 0

**3. Distribution of direct net income benefits by households:*

a. Lowest-earning 25% 40 %

b. Second lowest-earning 25% 40 %

c. Second highest-earning 25% 20 %

d. Highest-earning 25% 0 %

If income quartiles are not available, use a) less than 50% GDP per capita; b) 50-100% of GDP per capita; c) 100-150% of GDP per capita; and d) greater than 150% of GDP per capita.

**4. Income:

a. Project area median T 6,000/year

b. National median T 8,500/year

c. National GDP per capita T 11,000/year

**5. Change in number of person-days of direct labor employed:*

a. Unskilled 19,500/year

b. Semiskilled } 3,900/year

c. Skilled

Explain any displacement: _____

**6 Share of new person-days of direct labor, tapped by project and otherwise unemployed in absence of project(%):

a. Unskilled 25 -- Not shadow priced in economic analysis.

b. Semiskilled } 0 Results in additional benefits of T 73,125/

c. Skilled year. Extra NPV = T 245,130 at 15%, T 277,202 at 10%, and T 218,688 at 20%. This is sufficient to make the project as a whole economically favorable at the 10% and 15% discount rates, assuming use of the unemployed labor has no opportunity cost.

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Pertains to P.A.'s: Coconut land already planted prior to project.

**7 Land required for the project:
a. Previous uses and amount grazing land 3 ha used for processing plants
b. Value of the output foregone (yields/ha x price) ₱300/ha/year X 3 years
c. Socioeconomic groups previously using this land landless and other small herders
d. Changes in occupation or location of previous users changed location since insignificant amount of land involved

**8. Importance of industries supplying raw materials to the project:

(01) Low	(02)	(03) Medium	(04)	(05) High

a. Local economy (04)
Explain Major coconut-growing area
b. National economy (03)
Explain Copra is an important export crop although the market currently is depressed

**9. Importance of industries processing outputs of the project:

(01) Low	(02)	(03) Medium	(04)	(05) High

a. Local economy (02)
Explain Mostly household consumers and small restaurants cooking with oil
b. National economy (01)
Explain local use

**10. Environmental impacts (03)

(01) Strongly negative	(02)	(03) Neutral or not significant	(04)	(05) Strongly positive

Specify

**11. Other social impacts (04)

(01) Strongly negative	(02)	(03) Neutral or not significant	(04)	(05) Strongly positive

Specify

51.

J. Policy Issues and Replication

**1. For each of the following policy issues outside the project, evaluate the effects of the policy on the project:

(01)	(02)	(03)	(04)	(05)
Strongly negative		Neutral or not significant		Strongly positive

Also, describe the policy and its effects.

a. Subsidies (03) None

b. Taxes (03) Project exempted from profits tax for five years

c. Foreign trade restrictions (tariffs on inputs. imbalanced exchange rates, foreign exchange quotas, and export levies or bans (03) Locally-consumed goods, not traded abroad

d. Licenses and permits (fees. paperwork, delays. and restrictions on operation) (03)

e. Minimum wage and labor rules (03)

f. Price controls on nonproject output (03) Price controls on nonproject outputs have little bearing directly

g. Transportation infrastructure and pricing (03)

h Water resources infrastructure and pricing (03)

i. Energy facilities and pricing (03) Petroleum products not subsidized. Electricity subject to frequent outages

j. External credit availability and cost (03) None needed, provided as part of project

k. External information services and extension (02) Coconut quality and yields could be improved with better farm extension services

l. Output quality codes and standards (03)

m. Output price controls (01) Equilibrium price of edible oil would be 20% higher than controlled price.*

**2. Estimated maximum realistic potential for total number of commercial replications of the P.A.

Location	Less than 5 yrs	5-10 yrs	10-20 yrs
a. Local	25	28	34
b. Nonlocal, domestic	50	56	68

c. In which foreign countries are there particularly good prospects for replication All major coconut-producing countries

Explain

* Increase in Econ NPV from instituting the equilibrium price for oil:

r = 10% ; T 855,890
r = 15% ; T 756,860
r = 20% ; T 675,220

This effect alone would make the Econ NPV positive in all of the scenarios.

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**3. Likely scale of the replicated units (03)

(01)	(02)	(03)	(04)	(05)
Less than scale of project units		Same scale as project units		Greater than scale of project units

Explain _____

**4. Expected control over operation of the replications:

a. Household-based _____%
b. Small private enterprises 80%
c. Large private companies _____%
d Villages _____%
e Associations of small enterprises or cooperatives 20%
f. Parastatals _____%
g. Foreign companies ____%

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APPENDIX C: Blank PMES Form for Reproduction

Appropriate Technology International

Project Monitoring and Evaluation System

December 1984

Eric L. Hyman and Thomas C. Corl

Project name _____
Project number _____ Location _____
IO _____
Beginning date _____ Completion date _____
Date of evaluation _____

Abbreviations:

P.A = Productive Activity
Tech. = Technology
IO = Implementing Organization
INT = Intermediary Organizations

For each question, the following additional answers are possible:

(55) Too soon to tell
(66) Other (Specify)_____
(77) Don't know
(88) Missing data
(99) Not applicable

Where multiple technologies are employed in a project, subdivide answers to each question for each technology.For a single technology, multiple answers are possible for questions marked [M]. Starred items [*] are one-time questions answered at an early stage of monitoring. Unstarred items are answered periodically in monitoring and ongoing evaluation. Double starred [**] items are considered once during ex post evaluation.

See "Supplementary Data Requirements" for project-specific discussion of the context and special isssues surrounding the project. Also, see financial reports submitted by IO.

A. Technology (equipment, machines, or process)

*1. Priority technical field _____ [M]
(01) Processing of agricultural products or use of agricultural residuals
(02) Processing of local mineral resources
(03) Production and distribution of farm equipment and supplies

*2. Type of technology _____ [M]
(01) Traditional
(02) Upgraded traditional
(03) Off-the-shelf modern
(04) Downscaled modern
(05) Innovative replacement

*3. Purposes of the project _____ [M]
(01) Technology development, adaptation, or prototype design
(02) Technology assessment or field testing
(03) Technology transfer to users or commercialization
(04) Technology manufacturing

*4. Describe the components of the technology and their expected lifetimes _____
_____
_____
_____
_____
_____

*5. Capital costs of purchasing and installing the technology per P.A._____ ___
a Share due domestically-produced components_____%
b. Share due to imported components_____%

*6 Working capital required_____

*7. Current availability of the technology
a. Number of similar models previously in project area _____
b. Number of similar models previously in country outside of project area _____
c. Number of similar models in other LDCs_____
(Specify where)_____
d. Number of similar models in DCs_____
(Specify where)_____

*8. For each of the following characteristics, compare this technology to the types previously used:

(01)	(02)	(03)	(04)	(05)
Lower (Less)		Similar		Higher (More)

a Capital costs per unit of output ____
b Labor costs per unit of output_____
c. Raw materials costs per unit of output _____
d. Other operating, maintenance, and replacement costs_____
e. Foreign exchange costs_____
f. Transport and distribution costs_____
g. Simplicity of construction or tolerance of errors in manufacturing or adaptation _____
h Simplicity of operation and management or tolerance of errors in use_____
i. Flexibility of raw materials used_____
j. Expected quality of product_____
k. Potential for outputs as import substitutes_____
l. Potential for export of outputs_____
m. Amount of output per unit time ____
n. Expected downtime_____
o. Match between capacity and demand_____
p. Occupational health and safety risks_____
q Value-added for small producers_____
r. Risks borne by small producers_____

9. Timeliness of installing the technology _____

(01)	(02)	(03)	(04)	(05)
Behind schedule		As planned		Ahead of schedule

Explain _____
_____

B. Institutional Capacity and Participation

*1. Diagram the relationship between the IO. INT, other involved organizations or groups (including government and private industry), and the intended beneficiaries.

*2. Relationship of IO to small enterprises_____ *3. Same for INT_____

(01) Consists of small enterprises directly
(02) Association of small enterprises
(03) Cooperative or common service organization
(04) Economic development organization
(05) Social or community development organization
(06) Technology development or dissemination organization

*4. Relationship of IO to government_____ *5. Same for INT_____

(01) Government agency
(02) Parastatal (including development banks)
(03) Private voluntary organization
(04) Private companies
(05) Other nongovernmental organization

*6. Geographic coverage of IO _____ *7. Same for INT_____

(01) Local
(02) Provincial or state
(03) National
(04) International

*8. Size of IO *9. Same for INT

a. Number of paid staff (full-time equivalents)	_____	_____
b. Number of volunteer staff (full-time equivalents)	_____	_____
c. Typical annual budget (before project)	_____	_____
d. Year established	_____	_____

Responses for 10-12:
(01) Provides grants or subsidies
(02) Owns equity share
(03) Provides credit
(04) Provides technical assistance or training
(05) Provides managerial assistance
(06) Provides inputs
(07) Assists in marketing
(08) Buys their products
(09) Represents them in policy discussions

*10. Relationship of IO to participants_____
*11. Relationship of IO to INT_____
*12. Relationship of INT to participants_____

*13. Types of productive activities supported:

a. Type	b. Number of units	c. Capacity /month
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

14. Number of participants_____

(01)	(02)	(03)	(04)	(05)
Below target		On target		Above target

Explain _____

15. Characteristics of the actual participants:
    a. Household income before project (cash and cash-equivalent of in-kind): median _____, range_____
    b. Mean household size ____
    c. Geographic locations %

    _____ --
    _____ --
    _____ --
    _____ --
    _____ --
    _____ --

    d. Household's land holdings: median _____, range _____
    e. Involvement of women __ %

16. Differences between characteristics of the participants and the intended beneficiaries_____

(01)	(02)	(03)	(04)	(05)
None		Minor		Major

Specify _____

17. Drop-out rate among participants_____(%)
    Explain _____

18. How well are new organizations developed under the project functioning?

(01)	(02)	(03)	(04)	(05)
Below expectations		As expected		Above expectations

    a. During initial period of establishment_____
       Explain:_____
    b. After initial period of establishment_____
       Explain:_____

Responses for 19-20 (if participants surveyed):

(01)	(02)	(03)	(04)	(05)
Poor	Fair	Good	Very good	Excellent

**19. Participants' evaluations of IO _____

**20. Participants' evaluations of INT_____

C. Project Activities (Other Than Input Supply)

1. Effectiveness of project promotion and recruitment

(01)	(02)	(03)	(04)	(05)
Inadequate		Satisfactory		Outstanding

Explain _____
_____

2. Technical capability of IO_____ 3. Of INT_____

(01) (02) (03) (04) (05)

Inadequate Satisfactory Outstanding

Explain _____

_____

4. Managerial capability of IO_____ 5. Of INT _____

(01) (02) (03) (04) (05)

Inadequate Satisfactory Outstanding

Explain _____

_____

6. Coordination between project and government agencies _____

(01) (02) (03) (04) (05)

Inadequate Satisfactory Outstanding

Explain_____

_____

7. Frequency and quality of extension services provided by the project _____

(01) (02) (03) (04) (05)

Inadequate Satisfactory Outstanding

Explain _____

_____

8. Training provided through project

a. Number trained: unskilled _____

Semiskilled and skilled _____

b. Average duration of training: unskilled _____

Semiskilled and skilled_____

c. Subjects of training: unskilled_____

_____

Semiskilled and skilled_____

d. Extent that the people trained work and remain at jobs that use the training directly

(01) (02) (03) (04) (05)

Small Average Large

Unskilled_____

Semiskilled and skilled_____

9. Extent that the recommended technologies are being followed_____

(01) (02) (03) (04) (05)

Well-grounded recommendations ignored | Recommendations followed closely | Recommendations modified where advisable

10. Divergences from recommended technologies Reasons

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

11. Submission of progress reports:

(01)	(02)	(03)	(04)	(05)
Poor	Fair	Satisfactory	Very good	Excellent

a. Timeliness_____
b. Quality _____

12. Financial reports:

a._____
b._____

13. Explain any changes in sources and uses of funds from the project budget _____
_____

D. Credit (or Equity Investments)

1 Loan (investment) approvals
a. Amount loaned (invested) to date _____
b. Share of total loan (investment) fund _____%
c. Relative to planned schedule ____

(01)	(02)	(03)	(04)	(05)
Behind targets		On target		Ahead of targets

Explain _____

2. Loan (investment) sizes
a. Median _____
b. Mean _____
c. Maximum _____
d. Minimum ____
e Share of total costs financed _____
f. Adjusted over time for inflation?_____

(01)	(02)	(03)	(04)
Not at all	Less than inflation	Matched inflation	More than inflation

3. Loan terms (average)
a Interest rate ____%/year
b. List dates of any interest rate changes and the amounts _____
_____
c. Grace period ____
d. Repayment period _____

4. Timeliness of disbursements for approved loans (investments)_____

(01)	(02)	(03)	(04)	(05)
Behind schedule		On schedule		Ahead of schedule

Reasons _____

5. Definition of lateness in repayment _____
_____

6. Incidence of lateness in repayment
a. Number of enterprises_____
b. Share of enterprises _____%
c. Total principal still owed by late-repaying enterprises____
d. Share of loan fund _____%

7. Definition of repayments in default (or bankrupt enterprises)
_____
_____

8. Incidence of repayments in default (or bankrupt enterprises)
   a. Number of enterprises_____
   b. Share of enterprises _____%
   c. Total principal owed by enterprises in default (or equity loss to capital fund) _____
   d. Share of loan (capital) fund _____%

9. Repeat loans (or investments)
   a. Number _____
   b. Share of total number _____%
   c. Amount of principal _____
   d. Share of loan fund _____%

10. Uses of the repaid loan funds (profits of capital fund)_____
_____

11. a. Total administrative costs of the loan (investment) program_____
    b. Relative to total amount loaned (invested)_____%

E. Inputs

1. Land requirements per P.A
   a. Irrigated:
      Before project _____ha; After project _____; Cost/ha ___
   b. Unirrigated:
      Before project _____ha; After project_____; Cost/ha ___

2. Labor Per P.A.

	(Person-days/Year)	Avg Daily Wage
a. Unskilled	_____	_____
b. Semiskilled	_____	_____
c. Skilled	_____	_____

   Calculate as (# people)(# days per week)(# weeks per year). Include volunteer labor in person-days, but not in average wage calculations.

3. Composition of labor
   a Unskilled: Adult men ____% Adult women_____% Children_____%
   b. Semiskilled and Unskilled:
      Adult men_____% Adult women_____% Children ____%

4. Seasonality of labor requirements (list months by number)
   a. Peak season (specify months and reason) _____
   _____
   Percent of annual labor requirements: Unskilled _____%
   Semiskilled and skilled _____%
   b. Off-peak season (specify months and reason) _____
   _____
   Percent of annual labor requirements: Unskilled _____%
   Semiskilled and skilled _____%

Within a skill class, peak and off-peak employment should total 100%

5. Raw materials used per P.A. (including energy and water)

Types	Quantity/Year	Unit Price	Cost/Year

If water is not priced, list its opportunity cost "low", "medium", or "high" in the unit price column and explain.

Explain _____

6. Location of raw materials sources

a. Domestic_____%

b. Imported_____% (Specify from where) _____

_____

_____

7. Availability and timeliness of raw materials supply_____

(01) Major cause of delays	(02) Minor cause of delays	(03) Inventories too large	(04) Met targets	(05) Could support moderate expansion

(06) Could support large expansion

Principal bottlenecks _____

_____

_____

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F. Outputs

1. Product	Output Capacity/Yr	Actual Production/Yr	Capacity Use Factor

Include home consumption. Deduct losses in processing, storage. and transport. List average per P.A. separately for each year of project.

2. Actual production relative to expected output_____ [M]

(01) Less than expected (02) (03) As expected (04) (05) More than expected

Explain _____

3 Variation in production across P.A.'s [M]

Median _____

Mean _____

Minimum _____

Maximum _____

Standard deviation _____

4. Product	Length of Output Cycle

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5. Reasons for difference between actual and expected output: [M]

(01)	(02)	(03)	(04)	(05)
Major negative factor		Moderate negative factor		Not a factor

(06)	(07)	(08)	(09)
	Moderate positive factor		Major positive factor

a. Availability of spare parts_____
b. Availability of technicians to repair equipment _____
c. Availability quantity of raw materials_____
d. Availability of labor _____
e. Cash flows _____
f. Market demand_____
g. Adverse natural conditions (bad weather, pests and diseases, fire, etc.)
h. Theft_____
i Wastage and damage_____
j. Actual technical efficiency of process relative to expectations_____
k. Other (Specify) _____
Explain _____

6 How does the quality of the product differ from that of the most likely substitutes? (list separately for each product) [M]

(01)	(02)	(03)	(04)	(05)
Much worse		Same		Much better

a Appearance _____
b. Taste _____
c. Nutrition_____
d. Storability before use _____
e. Convenience_____
f Strength _____
g. Power_____
h. Useful life _____
i. Health and safety impacts_____
j. Increased suitability for further processing_____
k. Conformance to industrial standards or government regulations_____
l. Other (specify)_____

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G. Markets

1. Changes in price and quantity resulting from the project:

Products	Price Before the Project	Quantity Sold Per Year Before Project	Uses
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---

2.

Products	Quantity Sold	Avg. Unit Prices	Gross Revenue
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---

Per P.A. for each year

3. Variations in price of outputs: [M]
   a. Minimum _____
   b. Maximum _____
   c. Mean_____
   d. Standard deviation_____

4. Estimate maximum willingness to pay (WTP) for outputs that are sold at subsidized prices:

Products	WTP
---	---
---	---
---	---
---	---
---	---
---	---
---	---
---	---
---	---
---	---

Explain _____
_____

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5. Factors affecting the elasticities of demand: [M]

a. Number of substitutes for the good_____

(01)	(02)	(03)	(04)	(05)
None	Few	Some	Many	Large Number

b. Importance of the good_____

(01)	(02)	(03)	(04)	(05)
Basic need for poor	Basic need for all	Average	Useful, not essential	Luxury

c. Expenditures on the good as a fraction of buyer's purchasing power _____

(01)	(02)	(03)	(04)	(05)
Low		Moderate		High

6. Change in net consumer's surplus [M]

Year	Year	Year	Year	Year
_____	_____	_____	_____	_____

Calculated by evaluation staff.

7. Most likely substitutes for the good:

Product	Substitute	Price	Origin: Domestic or Imported
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

8. Consumer acceptance of the products _____ [M]

(01)	(02)	(03)	(04)	(05)
Less than expected		As expected		Greater than expected

Reasons:_____

_____

9. Distribution of the output [M]

	Value (%)
a. Domestic	_____
b. Export	_____
c Unsold or damaged	_____
d. Stolen	_____

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H. Commercial and Economic Viability

1. Inflation indices for period since date of plan:

	Index Value	Year	Year	Year	Year	Year	Year	Year
a.	_____	____	____	____	____	____	____	____

b. Type of index _____

(01)	(02)	(03)	(04)
Consumer price	Producer price	Construction	GDP Deflator

c. Geographic scope of index_____

(01)	(02)	(03)
Rural	Urban	National

2. Current discount rate(s) used in national planning _____

3. Average currency exchange rates (official)

Plan Year	Year	Year	Year	Year	Year	Year	Year
_____	____	____	____	____	____	____	____

4. Shadow price for foreign exchange

Plan Year	Year	Year	Year	Year	Year	Year	Year
_____	____	____	____	____	____	____	____

Questions 5, 6, 7, 8, and 9 to be calculated by Evaluation Group from quarterly financial reports.

5. Real present value of net benefits (NPV) for each P.A.
   a. Financial _____
   b. Economic _____

6. Real internal rate of return (IRR) per P.A.
   a. Financial _____%
   b. Economic _____%

7. How sensitive is the NPV or IRR for each P.A. to changes in financial or economic assumptions (costs, yields, prices) and parameters (discount rate and shadow prices)?_____
   _____
   _____
   _____
   _____

8. Real present value of net benefits (NPV) for whole project:
   a. Financial _____
   b. Economic _____

9. Real internal rate of return (IRR) for whole project:
   a. Financial _____%
   b. Economic _____%

10. How sensitive is the NPV or IRR for the whole project to changes in financial or economic assumptions?_____
    _____
    _____
    _____
    _____

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I. Impacts

**1. Average changes in net incomes (cash and in-kind)
Direct (Primary):
a. Per unskilled worker ____
b. Per skilled and semiskilled worker _____
c. Per small entrepreneur ____
d. Per average household consuming the good (if the price is reduced)
Indirect (Secondary):
e. Per supplier of inputs _____
f. Per processor of outputs ____

**2. Number of beneficiaries
Direct (Primary):
a. Unskilled workers_____
b. Skilled and semiskilled workers ____
c. Small entrepreneurs _____
d. Number of households consuming the outputs _____
Indirect (Secondary):
e. Suppliers of inputs_____
f. Processors of outputs_____

**3. Distribution of direct net income benefits by households:*
a. Lowest-earning 25% _____%
b. Second lowest-earning 25% _____%
c. Second highest-earning 25% _____%
d. Highest-earning 25% _____%

If income quartiles are not available, use a) less than 50% GDP per capita; b) 50-100% of GDP per capita; c) 100-150% of GDP per capita; and d) greater than 150% of GDP per capita.

**4. Income:
a. Project area median ____
b. National median _____
c. National GDP per capita_____

**5. Change in number of person-days of direct labor employed:*
a. Unskilled _____
b. Semiskilled _____
c. Skilled _____
Explain any displacement _____
_____

**6 Share of new person-days of direct labor, tapped by project and otherwise unemployed in absence of project(%):
a. Unskilled _____
b. Semiskilled _____
c. Skilled _____

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**7. Land required for the project:

a. Previous uses and amount _____

b. Value of the output foregone (yields/ha x price)_____

c. Socioeconomic groups previously using this land _____

_____

d. Changes in occupation or location of previous users _____

_____

**8. Importance of industries supplying raw materials to the project:

(01)	(02)	(03)	(04)	(05)
Low		Medium		High

a Local economy _____

Explain_____

b. National economy_____

Explain_____

**9. Importance of industries processing outputs of the project:_____

(01)	(02)	(03)	(04)	(05)
Low		Medium		High

a. Local economy _____

Explain _____

b. National economy_____

Explain_____

**10. Environmental impacts_____

(01)	(02)	(03)	(04)	(05)
Strongly negative		Neutral or not significant		Strongly positive

Specify_____

_____

**11. Other social impacts_____

(01)	(02)	(03)	(04)	(05)
Strongly negative		Neutral or not significant		Strongly positive

Specify_____

_____

J. Policy Issues and Replication

**1. For each of the following policy issues outside the project, evaluate the effects of the policy on the project:

(01)	(02)	(03)	(04)	(05)
Strongly negative		Neutral or not significant		Strongly positive

Also, describe the policy and its effects.

a. Subsidies _____ _____
_____

b. Taxes _____ _____
_____

c. Foreign trade restrictions (tariffs on inputs, imbalanced exchange rates, foreign exchange quotas, and export levies or bans _____ _____
_____

d. Licenses and permits (fees, paperwork, delays, and restrictions on operation)_____ _____
_____

e. Minimum wage and labor rules_____ _____
_____

f. Price controls on nonproject output_____ _____
_____

g. Transportation infrastructure and pricing_____ _____
_____

h. Water resources infrastructure and pricing_____ _____
_____

i. Energy facilities and pricing_____ _____
_____

j. External credit availability and cost_____ _____
_____

k. External information services and extension_____ _____
_____

l. Output quality codes and standards_____ _____
_____

m. Output price controls_____ _____

**2. Estimated maximum realistic potential for total number of commercial replications of the P.A.

Location	Less than 5 yrs	5-10 yrs	10-20 yrs
a. Local	_____	_____	_____
b. Nonlocal, domestic	_____	_____	_____

c. In which foreign countries are there particularly good prospects for replication_____
Explain_____

**3. Likely scale of the replicated units_____

(01)	(02)	(03)	(04)	(05)
Less than scale of project units		Same scale as project units		Greater than scale of project units

Explain _____

**4. Expected control over operation of the replications:

a Household-based _____%
b. Small private enterprises _____%
c. Large private companies ____%
d. Villages _____%
e. Associations of small enterprises or cooperatives ____%
f. Parastatals _____%
g. Foreign companies ____%

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