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Guidelines

for the design of agricultural investment projects

FAO INVESTMENT CENTRE TECHNICAL PAPER

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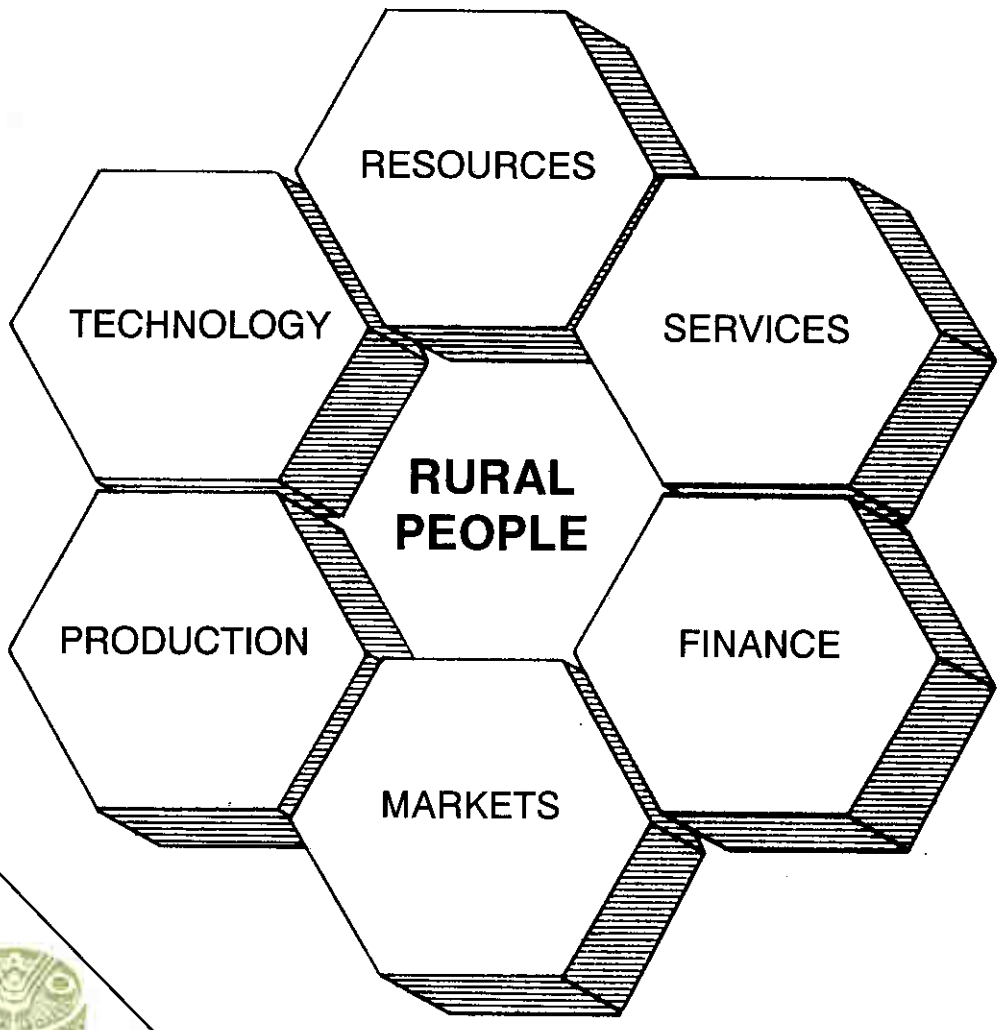

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GUIDELINES FOR THE DESIGN OF AGRICULTURAL INVESTMENT PROJECTS
(2005 Web PDF version of 1995 revised edition)

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[1] (published as a separate file in web PDF version)

PART 1: PRINCIPLES AND PROCESSES

1. INTRODUCTION

Objectives of the Guidelines

The aim of these guidelines is to help in the design of agricultural investment projects in developing countries. The intended users are FAO Investment Centre staff, trainees and consultants. Much of the material may also be useful to staff in governments, financing agencies and consulting firms who are responsible for designing or appraising such projects. The projects referred to are principally those sponsored and supported by governments, but in which farmers, herders, fishermen or foresters participate and carry out the productive activities. The guidelines address the need for such projects to be conceptually coherent, relevant to national needs and capabilities, technically sound, viable in economic and financial terms, attractive to the participants, socially acceptable, and environmentally and fiscally sustainable.

The guidelines are divided into three main parts. This first section covers the principles and processes of project design. The second section goes into more detail on the analysis and reporting of project proposals at different stages during their evolution. The third section consists of a comprehensive outline for a project preparation report. Summary outlines for other reports are given in Annexes. With so many topics receiving mention, especially in Part III, the overall effect of the guidance given may seem daunting. Readers should bear in mind, however, that each project will raise only a selection of the topics which the guidelines seek to cover. It is therefore essential that readers themselves select only what is relevant to their specific case, taking account also of the particular needs of the financing agency to which the project is to be submitted.

There are already a number of excellent works on investment project analysis in agriculture [1/] and the aim is not to substitute for these. Furthermore, guidelines on how to present and document prepared projects in the format required by financing agencies - notably the World Bank - have been evolved by the Investment Centre over many years, culminating in the 1985 version of these guidelines [2/]. However, the concerns of governments and financing agencies have shifted significantly over the past seven years, requiring a change in the type of guidance offered.

The limitations of top-down state planning in agriculture have become increasingly apparent and it has been more widely recognised that, if projects are to succeed, rural people

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1/ For example: FAO, *Guide for Training in the Formulation of Agricultural and Rural Investment Projects,* (1986), and Gittinger, J. Price, *Economic Analysis of Agricultural Projects,* 2nd Edition, EDI/Johns Hopkins University Press (1982). For fuller references see References and Bibliography.

2/ FAO, *Preparing Agricultural Investment Projects,* Investment Centre Technical Paper No. 1 (1985).

(including rural women) must play a more determining role in their design and implementation. It is also now acknowledged that the state can seldom operate as efficiently as the private sector for certain activities - for instance, furnishing farmers with inputs or marketing their produce. Similarly, in many countries it has been found that non-governmental organizations (NGOs) are better than governments at getting rural communities to work coherently and may therefore play an important role in project implementation. Another, and most notable, change in recent years has been the growing public concern for the environment and for the sustainability of natural resource use. This has not only led to new types of projects being put up for financing but also to the introduction of more rigorous procedures for assessing the environmental impact of all investment proposals being considered for external financing.

The context of project design has also changed. Projects are now seldom seen as isolated vehicles for funding self-contained actions. Instead they tend to complement or reinforce country commitments to adjustments in economic and institutional policies. Thus projects may underpin adjustments in prices, subsidies or land tenure, with the aim of encouraging farmers to adopt more sustainable land use practices; or they may explicitly support institutional reforms, for example by strengthening the support services required to encourage a stronger private sector role in agricultural trade. Alternatively, as in the case of targeted feeding programmes, they may be aimed at mitigating the potentially damaging side-effects of adjustments.

Beyond this, some financing institutions have awoken to the need to build greater flexibility into the design of certain types of agricultural projects. The aim is to move away from attempts to make precise predictions of actions and related expenditure far into the future and, instead, to endow project management with the discretion and powers to adapt the project during implementation as required to maximise its impact in a manner consistent with agreed objectives.

A further and even more compelling reason for the revision of the guidelines is provided by the growing body of evidence which shows that, although planners may have followed recommended preparation procedures and used the analytical methods advocated, the performance of many past investments has still fallen short of expectations [3/]. Renewed efforts to improve the quality of agricultural investment projects are, therefore, essential.

This new version of the Investment Centre guidelines does not claim to respond comprehensively to all these changes. But it does attempt to go further than earlier versions in addressing some of the design-related problems which have arisen in past agricultural investment projects. These are increasingly seen as having their origins not in poor analysis or documentation, but in more fundamental misconceptions which occur especially in the early stages of design. The present version draws heavily on the findings of the 1989 Investment Centre *Design Study* (see earlier footnote) which illustrates the considerable importance of conceptual problems in project formulation. The *Design Study* implies a need for more skilled and sensitive work at the identification stage if the performance of project-funded investments in agriculture in developing countries is to be improved. It also indicates a need for more flexible

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[3/] See: World Bank Operations Evaluation Department, *Annual Reviews of Project Performance Results*, Washington, various years, and FAO, *The Design of Agricultural Investment Projects - Lessons from Experience,* Investment Centre Technical Paper No. 6 (1989). (Referred to in the text as the *Design Study).*

designs, for a more rigorous analysis of technical options, and for greater attention to social, institutional and managerial factors.

The extent to which it proves feasible to introduce many of the improvements which are suggested here will depend to some extent on the availability of adequate time and manpower for the implied additional work. Securing the genuine participation of the intended beneficiaries in the design of a project is particularly time consuming. However better project identification, in particular, tends to facilitate the later stages of design and thereby save time downstream. Hence much of what is suggested here may be possible largely within existing resource allocations, through greater efficiency.

The title of the present document - Guidelines for the **Design** of Agricultural Investment Projects - is significant. Previous versions have focused mainly on how a specific proposal, once identified, should be written up at the preparation stage. Part I of the present document goes beyond this in seeking to draw on past experience so as to help the user approach the conceptual side of project design in ways which may give better chances of eventual success.

This said, some of the caveats attached to the previous guidelines still remain. On reading the present version - which despite its broader coverage, must of necessity be kept to a manageable length - specialists may still feel that their particular field of interest has not been addressed in sufficient depth: the references in the bibliography seek to point the reader towards more specialised texts in a wide range of topics. Furthermore, no general guideline can take full account of the particular policies and presentational requirements of each financing institution. Close association with the World Bank, and to some extent with IFAD and UNCDF, has had a major influence on the style of project presentation suggested here; but those preparing any project should take into account the special requirements both of the government concerned and of the intended financing institution and, whenever possible, seek guidance. These guidelines suggest a preferred style and sequence of presentation and explain why certain information or analyses are required, but they do not pretend to examine in detail how all the different types of issues faced in the course of preparing projects might be tackled.

Finally, in selecting from the general guidance given here, users must always remember that, although the financing institutions rightly insist on the presentation of adequate supporting data for any investment proposal, the future is seldom readily predictable. The temptation to resort to excessive fact-finding and unduly lengthy forward projections, computing and writing must be resisted. Even under the best circumstances the time needed for project design is long, and every effort should be made to accelerate the process. Users of these guidelines must therefore not only be selective in deciding on what to include in project documentation, but also rigorous in deciding what to *omit*.

Steps in Project Design and Implementation

Before discussing the factors considered most critical in arriving at workable concepts on which to base a project design, it may be useful to recapitulate briefly the usual sequence of events between the conception of a project idea and the point at which implementation can be started. Although one stage of what is sometimes termed the "project cycle" ideally merges with the next and the time required to pass through each stage varies

considerably, it has become conventional to distinguish the four major stages of *identification, preparation, appraisal* and *implementation* [4/]. The first two stages - on which these guidelines focus - are the responsibility of the government which intends to seek financing for a project. When governments request external assistance with project design, more than one assistance mission may be required for each stage, and workshops or seminars may usefully be scheduled between each.

Identification involves:

- a review of alternative approaches or options for addressing a set of development problems and opportunities;
- the definition of project objectives and scope at the degree of detail necessary to justify commitment of the resources required to complete feasibility studies;
- the identification of the major issues that must be tackled before a project based on this concept can be implemented.

The next chapter argues that this is the most critical stage of the cycle, although one which is often treated too lightly. Yet, if the potentially most viable concept is overlooked at the time of identification, there is little prospect that it will be retrieved at a later stage, when the emphasis shifts from examining options to filling in the details of a specific proposal. It is also difficult and costly to abort the preparation of a project, even if questions are raised about its feasibility, once it is considered to have been positively identified.

Preparation refers to the completion of the *feasibility studies* on which financing institutions usually base their appraisal of a project. The objective of project preparation is to demonstrate that a project based on the chosen concept is:

- in accordance with the country's development objectives and priorities;
- technically sound and the best of alternatives;
- attractive to the intended beneficiaries;
- operationally and managerially workable;
- economically and financially viable;
- sustainable and environmentally sound.

Feasibility studies must provide sufficiently accurate estimates of costs and expected results to enable decisions to be taken on project financing. In addition, the definition of the project components, organizational arrangements and procedures should usually be detailed enough to

4/ See: FAO, *The Project Cycle*, Investment Centre Technical Paper No. 4 (1986).

permit the executing agencies to use the study and its supporting working papers as a source of guidance for project implementation. The project preparation report, however, is not a complete substitute for a detailed project implementation plan or manual; these are normally drawn up later, often by management at the outset of implementation.

Project appraisal is the prerogative of the financing institution and involves the critical review of the feasibility study and the formulation of funding recommendations, including conditionalities where applicable. These recommendations are then submitted for the approval of the financing institution's board of directors.

Implementation is essentially a country responsibility but one which the lending institutions supervise at regular intervals during the project's disbursement period. Although the formal implementation phase only starts after loan negotiations and approval by the financing institution, certain activities, such as the completion of final designs for major civil works and preparation of tender documents, implementation plans and manuals, may be initiated immediately after project appraisal.

During the course of implementation, supervision missions may agree with governments on significant modifications to projects, for instance to the reallocation of funds between components or to adjustments in targets or phasing. The need for such changes may emerge from the findings of *monitoring* or management information systems, or may be identified in the course of *mid-term evaluations*, foreseen in the original design of the project. Such mid-term reviews have gained in importance during the past decade and this trend is expected to continue in line with a tendency to move towards more open and flexible project designs.

Most financing institutions require that a *post-evaluation* be carried out for each project at the end of the disbursement period. The resultant project completion reports take stock of achievements, reassess the likely impact of the project and seek to draw lessons from its performance. Some projects are revisited several years later - when they should have reached full development - in order to make a more definitive *impact evaluation*.

Even when the exact terms used above are not applied, the process of project elaboration will still usually move in steps from an initial concept to a final design. The stages described above, however, need to be tailored to the particular requirements of each project and can sometimes be telescoped. Thus, to bring area development projects involving small-scale farmers up to the point at which they are ready for appraisal, the following operational sequence may be appropriate. Its first two steps give special prominence to thorough identification. The final shape of the project to be prepared may emerge only when the third step - formulation - is complete.

- **Reconnaissance** - a lightweight input aimed at generating sufficient information on project options to enable the government and financing agency to select a priority project: this also provides an opportunity for reaching agreement with the government on arrangements for preparation work, including the setting up of steering committees or national preparation teams.

- **Diagnosis** - social and farming systems analysis, usually involving the application of rapid rural appraisal techniques, to generate socio-cultural information on the target group for the project, on the agricultural systems in the project area and on the aspirations of the potential beneficiaries.

- **Formulation** - refinement of the project concept and strategy by a multi-disciplinary team on the basis of the findings of the diagnostic work, leading to a first approximation of a specific project and to the definition of any further studies (e.g. preliminary design of irrigation systems) and analyses required to complete project preparation. If no such studies are needed, formulation and final preparation can be combined as a single exercise.

- **Final Preparation** - completion of the feasibility study to the point at which the project can be submitted for appraisal.

For projects in which investments are to underpin policy or institutional reforms, the sequence usually begins with a **sectoral** or **sub-sectoral review** aimed at establishing long-term goals and priorities, identifying constraints and examining possible strategies for overcoming them. Such reviews may include the identification of projects.

The evolution of a project from its initial identification through to the point at which it is ready for implementation is an iterative process. If not carefully organized, the progressive deepening of the levels of investigation and analysis between each decision-making stage may lead to an undue amount of duplication in reporting. To avoid this, documentation at each stage needs to focus mainly on those elements which are required as a basis for arriving at well informed decisions as to whether to proceed to the next step.

The Role of the Investment Centre

The design of agricultural projects for international financing is a government responsibility. The FAO Investment Centre exists to assist member governments principally with project identification and preparation. The guidelines therefore focus on these first two of the four major stages discussed in the previous section and do not touch on the requirements of appraisal and implementation.

Assistance by the Investment Centre is usually provided to FAO member governments by short-term multi-disciplinary missions. The way in which the responsibility for various aspects of the preparation task is shared between the Investment Centre and the concerned government is decided on a case by case basis, depending on the nature of the project and the level of national project preparation capacity. The Investment Centre seeks to limit its inputs only to those required to complement locally available staff resources.

Operational procedures are discussed further in Part I, Chapter 4.

2. PROJECT IDENTIFICATION: CHOOSING THE BEST CONCEPT

The Need for Better Identification

The Investment Centre's *Design Study* has sought to classify the main types of problem into which past agricultural development projects have run and the extent to which, with the benefit of hindsight, these can be traced to errors or misjudgments in preparation. Many of the design-related problems may be attributed to a poor diagnosis of the constraints to be addressed and to a pervasive optimism over possible solutions. Thus designs frequently ignored or passed superficially over crucial technical constraints and opportunities, limitations in institutional capacities or factors likely to affect farmers' responses to the opportunities to be provided by the project. Too often designs included excessively ambitious targets, time schedules and productivity projections, and placed unrealistically heavy burdens on weak institutions. These faults were compounded by a tendency to underestimate the impact of unfavourable policy or macro-economic environments and by the uncritical acceptance of conventional wisdom or development fashions, without giving sufficient thought to their relevance to the particular setting for which the project was being designed.

The table opposite is drawn from the *Design Study* and lists in descending order of severity the main problems encountered during the implementation of 70 projects - successful and unsuccessful - which were prepared by the Investment Centre. A subjective assessment is made of the extent to which the problem may be attributable to errors at the design stage.

The most important point is that the implementation problems which the study reported occurred despite the adoption of recommended procedures and project analysis techniques at the preparation stage. The projects had also passed the added check of independent appraisal by the financing agency. This suggests that the designers may have failed to recognize flaws in the underlying concepts on which the projects were based. Preparation may have been carried out correctly: it was perhaps the earlier identification stage that was inadequate. Examining and refining alternative strategies was probably the aspect of project design that was most neglected. Identification, not preparation, is therefore indicated as the phase of the project cycle most in need of improvement.

There are many factors, often related to the way in which projects are processed in the financing institutions, which can contribute to the current neglect of the identification stage of project design. These include the fixing of lending programme targets before the complexity or appropriate scale for a project is evident, as well as premature claims that a project has been identified (and hence is implicitly ready for final preparation) before the investigations required to confirm its validity - particularly its interest to the intended beneficiaries - have been conducted. The very limited allocations of manpower and the tight schedules frequently stipulated for project formulation by the financing institutions may also militate against thorough project identification. When a project has been wrongly labelled as being "identified" and a target loan amount has been included in a lending programme, it is not easy to induce all involved parties to look afresh at the options and reopen issues which may have a fundamental impact on the scope and size of the project. Not to do that, however, runs the risk of proceeding with the preparation of a second best project which is not sufficiently matched either to the

needs of the borrower or of the intended beneficiaries, nor to the managerial capacity of the implementing agency.

Problems in Project Implementation

Order of Severity	Type of Problem	Extent Attributable to Design		
		Large	Medium	Slight
1	Schedule too tight	–		
2	Under-estimated costs		–	
3	Production technology deficiency	–		
4	Bad management and staffing			–
5	Poor engineering	–		
6	Procurement difficulties		–	
7	Poor monitoring and evaluation		–	
8	Wrong organizational structure	–		
9	Ineffective technical assistance		–	
10	Too many components	–		
11	Low output prices/market problems		–	
12	Too big	–		
13	Non-sustainable		–	
14	Inequitable benefit distribution		–	
15	Slow adoption	–		
16	Insufficient government commitment		–	
17	Recurrent budget shortage		–	
18	Natural disaster			–
19	Political turmoil/war			–
20	Land acquisition difficulties		–	
21	Inflexible	–		
22	Resource degradation		–	

An added problem is that of professional bias, either of the individual or on a departmental scale. For instance, those who deal with irrigation may see that as the preferred way to attain a national objective such as food self-sufficiency: on the other hand the national grain storage agency may claim that to expand its own infrastructure is the only valid approach to achieving the same goal. If the real problem is a lack of price incentives for cereal growers, then it becomes apparent that neither agency's proposed "solution" is conceptually valid.

It is for reasons such as the above that a project identification team, in its search for project ideas mutually acceptable both to the would-be borrower and to the potential lender, may be pressured into merely accepting what appear at first sight to be viable existing proposals, without looking much further. Subsequent preparation is then reduced to making the best case for what the team has accepted, whether or not the proposed project comes close to being the best way of solving a stated problem or makes the best use of scarce resources.

Towards More Effective Identification

If such problems are to be reduced it is essential, before plunging into detailed preparation, to step back and take a broader view of possible development approaches and concepts. Only if this is done, can the borrower and the lender be sure that the projects which are subsequently prepared will come close to making the best use of available resources and be less prone to implementation problems.

Project ideas arise in many different ways. Sometimes they are the outcome of a formal planning process, of sectoral analysis, a sector study or of a general project identification exercise which sets priorities for investment which are consistent with clearly defined government policies. Alternatively they may be prompted by the lending policies of the financing agencies, whose staff may encourage client governments to direct resources to priority sub-sectors or sections of the population. Often, however, they emerge from the less systematic recognition of problems or opportunities either by staff working in the concerned government institutions or by politicians. Just as the sources of project ideas are many, so too is the extent of their maturity when they are brought to the attention of potential sources of finance. At times they may be simply a title, indicative of a government's intention to seek funding, for instance for a forestry project. More frequently, however, ideas have been more fully developed, an area of focus defined, some relevant information gathered and objectives set in a provisional manner.

For these reasons the approach adopted in practice to project identification must be adjusted to take account of the state of maturity of the project idea when the exercise formally begins. Even if the project concept is reasonably well advanced, however, it is useful to go over the proposal carefully to confirm the correctness of the diagnosis and the validity of the objectives set for the project. Listed below are some typical questions to be asked at identification.

- Are the constraints, problems or opportunities to be addressed properly diagnosed and understood? Is there really a need for a project? Are there any over-riding constraints which cannot be readily overcome? Why has the proposed investment not already been made?

- Are the stated objectives realistic and attainable, or are revisions needed in the goals? Should these be scaled down?

- Does the proposal fit with national and sectoral policies and priorities? Is it also consistent with the current financing policies of the intended funding institution?

- Are the proposed project actions the most appropriate for the declared overall aim, a coherent response to the specific constraints, problems or opportunities to be addressed, and on the right scale? Or would an alternative strategy and scale be better?

- Is the technological basis for the proposed actions well established?

- Is the government fully committed politically to playing its allotted role, and does it have the laws, institutions, management skills and motivated staff needed to transform its political commitment into effective action? If not, is it prepared to make the policy or other adjustments required to ensure project success?

- Can the government mobilise the local resources - especially counterpart funding and skilled manpower - upon which successful investment will depend? Can this be done without drawing resources away from equally deserving programmes?

- Is the suggested time-frame realistic?

- Is there a good "fit" between the proposals put forward and the priorities of the intended beneficiaries? Does the design offer the intended beneficiaries (often large numbers of small-scale farmers, livestock owners or fishermen) sufficient incentives to play their part? In particular, are there technical opportunities for them to enhance their productivity without running what they see as unacceptable risks; have they access to the necessary cash, labour, land or other resources; can they reach the technical information, credit, inputs or markets that they need in order to exploit the latent technical opportunities; will the returns from doing so justify the costs or perceived risks, as well as compete successfully with any other options which beneficiaries may have to improve their lives; are there any cultural barriers to the project's acceptability?

- Even if all the prospective participants respond, would the project make the contribution to national development, and to the economy, which is claimed? Does preliminary analysis suggest any alternative strategies that might be more effective in meeting social or economic goals?

- Has the borrowing country the financial as well as the natural resources to maintain the project in the longer term, after external funding ends? That is, would the project be fiscally and environmentally sustainable?

- Will the benefits be obtained at the expense of unacceptable environmental or social side-effects? Can modifications be introduced into the project which would enhance its beneficial impact on poorer members of the population and on the environment?

Clearly there will not be positive answers to all these questions. If the project idea has emerged from a sound sectoral analysis, most replies can be expected to be favourable. However not all project ideas have such origins. In practice the identification team will have to assess the weight of any negative conclusions and the extent to which they could undermine the ultimate feasibility of the project proposal, or whether they can be resolved or harmlessly sidestepped.

If approached in this way, identification might follow the sequence below. From the breadth of the agenda it can be seen that a multi-disciplinary approach will usually be essential.

(a) Review of the **national and sectoral analyses, plans and priorities** both of the government and of the potential financing agency, and relevant available **information.** (This is appropriate as a first step in general project identification studies, but once a project proposal has been put forward, its fit with sectoral priorities may be best taken up as part of (e) below).

(b) Unambiguous recognition of the **opportunities** which it is expected to exploit or the **problems** which the investment project is intended to overcome. **Diagnosis** of the underlying causes of the problems or of the factors which underpin the opportunities.

(c) Definition of ultimate and immediate **objectives**.

(d) Conception of **alternative possible solutions** or **development strategies**, including an objective assessment of past and current development efforts in the same or related fields.

(e) **Evaluation and comparison** of the more promising **options** to be taken up by an investment project. This needs to be done in various senses: in relation to the likely market demand for project output; from the standpoint of technical soundness and risks; from the point of view of attractiveness to the possible beneficiaries; taking account of policy, managerial and cost implications for the government; from the standpoint of the aims and priorities of the potential lender; and considering the impact on the national economy, environment and resource base.

(f) Outline of the **preferred solution**.

(g) Provision of detailed guidance on the **follow-up** required to bring this to full preparation and an explanation of the main **issues** to be resolved if the project is to achieve its objectives.

Each of these steps is discussed in more detail below [5/].

Sectoral Priorities. Many countries have an agricultural sector plan, based on a thorough analysis of the sector. If available, this will usually be the preferred starting point for project identification. Such a plan explains agricultural development, production or resource management objectives and their relationships with national planning priorities and goals; outlines the strategies through which the government intends to achieve these sectoral objectives; describes any adjustments in policy which might have to be adopted to provide incentives for the developments to take place; and indicates financial and other resource needs

5/ See also: Smith, P. (ed). *Proceedings of a Conference on Project Identification in Developing Countries*, University of Manchester, Institute for Development Policy and Management (1988).

of the government and producers, and how these would be allocated amongst priority objectives or programmes. To be complete it should also discuss cross-sectoral linkages, providing the understanding of the dynamics of population, poverty, environmental trends and urban or industrial change which is necessary for effective planning of sustainable agricultural development and natural resource management. Sectoral plans sometimes also make explicit reference to projects, but often these will be defined in name only, with few details of their possible components, cost or feasibility.

In spite of the importance of sectoral plans, project identification may still take place in their absence, especially when self-evident problems or opportunities emerge. For instance a country faced with an acute shortage of foreign exchange may see the need for a project to finance the importation of agricultural inputs, or there may be little doubt about the need to embark on a long overdue programme of irrigation system rehabilitation if there is a deficit in the supply of irrigated crops. The converse is also true: project identification may point to a need for adjustments in sectoral goals or policies so that these become more supportive of what appears to be a sound investment idea.

Opportunities or Problems may have been stated only in general terms before systematic project identification begins. It is likely that some commitment also exists to address them. However definitions are often very broad. For instance a recognized need to address "growing trade imbalances" begs the question of whether export growth or import substitution is likely to be the most economically advantageous or socially equitable strategy, or whether the solution perhaps lies in a mixture of both: and which sectoral products are the ones most amenable to export promotion or to import substitution? Problems such as "diminishing food security in region A" or "serious land degradation in region B" raise similar multiple questions as to what are the underlying causes of the problem and therefore what might be an appropriate strategy and project approach. While national development plans or the sectoral reviews of financing agencies may sketch possible solutions or set priorities, it is important for those involved in project design to keep an open mind on approaches at the initial identification stage. More detailed examination may lead to the realization that other, perhaps better, options exist, or that the problems which have been indicated are simply the side-effects of problems so far unrecognized in other sectors. In diagnosing problems facing farmers, it is important to recognize the significance of linkages between agriculture and other sectors, not just at the level of the economy as a whole, but also within farming families: how farmers react to opportunities to expand production may well depend on the relative attractiveness of farming vis-à-vis employment off the farm, or rural versus urban social amenities.

Diagnosis is a crucial step in project identification. Literature on project analysis often takes it for granted and too often in practice it is given insufficient attention. Nevertheless there are many examples of mistaken diagnosis in project design. Perhaps the most widely-discussed relate to a failure to understand the motivation of the intended project beneficiaries or the existence of factors which would restrict their participation in, or response to, the project - for instance due to the non-availability of credit in some countries to women farmers. Hence the inclusion of a specific step in the project design sequence for diagnosis of beneficiary needs is preferred by some financing agencies. Early steps are also necessary to anticipate the possible negative environmental impact of actions which appear to be otherwise sound from a financial, social or technical point of view (see box on Environmental Assessment).

However, mistaken diagnosis is not confined to the misinterpretation of beneficiary motivation or environmental issues. Project designs may also be flawed from the outset due, for instance, to failure to:

- understand the factors which set limits on foreseeable improvements in institutional performance;

- take account of demand prospects for the commodities to be produced in larger quantities by the project and of the impacts on markets and prices of parallel expansion of output under other projects or in other places;

- realise the dependence of a particular form of development on subsidies or fiscal incentives which a government may not be able to sustain or is committed to remove under macro-economic reforms;

- recognise the possible unattractiveness to entrepreneurs of the services which a government seeks to privatise;

- understand the physical causes of water losses within an irrigation scheme;

- recognise the difficulty in the humid tropics of maintaining soil fertility and structure, on which the sustainability of annual cropping depends;

- understand the political or social factors which in practice militate against decentralisation or meaningful people's participation in project design and execution.

Examples relating to mistaken diagnosis of farmer motivation are especially numerous. For instance, agricultural extension may be reinforced in the hope of raising production, when in practice farmers may lack not the knowledge, but the means, markets or incentives to adopt the practices being advocated. Or, while livestock may be seen by the planner as a potentially productive asset capable of generating more saleable output, traditional herdsmen may see their stock largely as a means of capital accumulation and an insurance against risk, or as a means of securing an advantageous marriage for their daughters: they will not easily be persuaded to adopt more intensive systems of management if these are aimed at improving animal productivity and sales, instead of increasing stock numbers. New varieties of wheat or rice may produce a spectacular jump in yield potential, but not be adopted by farmers because of poor cooking characteristics or perceptions of risk. Costly soil conservation works can check erosion when farmers cultivate steep slopes, but since such works may give production benefits only in the long term and may use up scarce land, farmers are usually unwilling either to construct or to maintain them: meanwhile conservation works, even if they are taken up, may not address the problems which drive farmers to clear sloping land in the first place, which may not be related to land shortage *per se* but be the consequence of restrictive land tenure arrangements combined with rising population. Similarly, in engineering projects, a full understanding not only of the technical but also of the institutional and social factors

contributing to accumulating soil salinity or to the neglect of irrigation infrastructure is a prerequisite for the design of successful remedial measures.

Environmental Assessment

An early recognition of the likely environmental impact of a project is an important element in the comparison of alternative project options and in their eventual selection, siting and planning as well as in the design of the preferred option. Initial Environmental Assessments (EAs) can point to means of improving projects environmentally, by preventing, mitigating or compensating for adverse impacts. Like most other aspects of project design, the assessment of environmental impact is best carried out with the full participation of the affected people. The assessment process should start at the time of project identification to ensure that environmental concerns are reflected in project design from the outset. The assessments should be progressively deepened as project preparation advances, so that by the time a project (with any foreseeable negative effects) is ready for appraisal, a full EA report has been completed.

In keeping with all other aspects of project formulation, EA work is regarded by financing institutions as a country responsibility. In order to determine the depth of environmental analysis required, the World Bank seeks to classify all projects into three categories:

Category A: Projects which have significant potential adverse impacts that may be sensitive, irreversible and diverse, particularly if they are sector-wide or precedent-setting, for which a full EA is required. In the agricultural sector such projects are likely to be for dams and reservoirs, forestry production, large-scale irrigation and drainage, land reclamation, resettlement, river basin development and large agroindustries.

Category B: Projects likely to have less adverse and less irreversible adverse impacts than those in Category A, for which a plan for mitigating the adverse environmental effects is expected to be necessary, but for which a full EA is not required. Projects falling in this category typically include rural electrification and roads, small-scale irrigation, aquaculture and watershed management projects.

Category C: Projects not expected to have negative impacts, for which no EA is normally required.

For projects in Category A, an EA should be prepared at least in draft or interim form well before final preparation so that the findings can be integrated in the project's design. For large projects having significant impacts, such as major dams or large-scale resettlement projects, independent specialists not connected with the project should be used to carry out the EA. In order to avoid undue delays in project processing, and provided that the financing agency involved agrees, preliminary, conservative estimates of project impacts may be used for preparation, pending the completion of detailed assessments before appraisal.

Special efforts need to be made to involve affected groups and concerned NGOs in the preparation of EAs. Their views should be canvassed in carrying out field surveys and their representatives should be consulted at the beginning and towards the end of work on the EA. At the latter meetings, feedback should preferably be sought on the draft EA report. At the least, the acceptability of any proposed preventive, mitigatory or compensatory measures should be discussed with them.

Each financing agency and government has its own EA procedures and requirements [a/] but a project-specific EA should normally cover baseline environmental conditions; potential environmental impacts and enhancement opportunities; environmental impacts of design alternatives; preventive, mitigatory and compensatory measures; their costs and plans for their implementation; environmental management and training, and monitoring.

[a/] For example, see: **World Bank Operational Directive 4.01**, on which this text is based.

If farmer motivation is to be fully understood it is almost always necessary to consult the intended beneficiaries before diagnosis can be considered complete. To propose a project for a given target group implies that they will welcome and respond to the development opportunity that the project offers. To do so without a clear appreciation of how the intended clients view the world, their problems and possible means of overcoming them, makes it impossible to know with an acceptable degree of certainty whether or not the opportunities offered by the project will in fact be taken up. Even if the financial analysis of proposed technological change shows apparently attractive results for the intended beneficiaries, this is no guarantee that the changes will in fact be adopted. What is needed is a thorough analysis of the socio-cultural setting of the project and of the farming systems. This is also likely to unlock a considerable amount of local technical knowledge, for example on land capability or seasonal surface water availability, of relevance to project design. This aspect is discussed in more detail in Chapter 4, which gives special attention to the use of rapid rural appraisal techniques as a cost-effective means of deepening the design team's understanding of constraints and opportunities, particularly as these are perceived by the intended beneficiaries.

Setting Objectives is, like most aspects of project design, an iterative process. Broad goals for the project are progressively narrowed down to specific and attainable objectives for each of its components.

Conceiving Alternative Solutions for achieving the objectives might be considered the most important step of all in the design process. It is certainly the one in which the identification team needs to be at its most creative and imaginative, and where an inter-disciplinary approach and consultation with the widest practicable constituency are the most important. Few problems have only one possible solution and there are no demonstrably "right" or "wrong" answers in the design of investment projects: only varying degrees of plausibility or risk. The range of options from amongst which choices must be made is likely to broaden as the team draws together ideas from a widening range of sources. Such contacts, and chances for brainstorming either formally or informally within the team, with different branches of the government, with non-governmental contacts and in particular with the intended beneficiaries, should be cultivated.

When it comes either to identifying or to ranking options, precedent - local or foreign - is likely to be a powerful guide. How have people in the potential project area or analogous settings tackled similar problems in the past and to what extent have they been successful? Is there a pilot exercise or experimental work somewhere similar which is already giving promising results? What are the most successful farmers doing or achieving? Do the local people already have a well-founded solution but simply lack the means with which to implement it? Which are the development agencies, governmental or other, which are already contributing successfully to development? Why are they successful? Why have other development initiatives been less successful? Has short-term success been attained at the expense of sustainability? To the extent that data allow, the qualitative assessment of options should be underpinned by preliminary economic and financial analysis, although excessive detail must be avoided at identification.

Formulating Proposals and Comparing Options. Project identification teams often feel themselves to be under pressure to arrive quickly at positive, specific proposals, in

response to the strength of the government's wish to invest and of the financing agency's propensity to lend. It is therefore easy to lose sight of the fact that the desired output of project identification (unlike preparation) is not normally one specific proposal, but the development of concepts and the analysis of options. It is the stage at which the well reasoned rejection of some options is just as important as the retention of others: in fact it is the last stage in the design process at which rejection is normal. If the government can achieve its development objectives better by means other than more external borrowing, for instance by mobilizing domestic resources, by making policy or institutional changes which have insignificant financial cost, or by using its existing capacities better, identification is the stage at which to make this clear. It is not in the interests of any government to increase its debt burden unnecessarily. For the same reason identification is the stage to state - if such is truly the case - that the opportunity or problem which it is proposed to address is simply not amenable to any practical solution, that this is not the right moment to resolve it, or even that it is illusory.

For proposals which are retained for further consideration, the report should explain the strategy to be adopted and provide the reader with all the reasoning behind the mission's recommendations, taking account of its assessments of resource availability, technical viability, demand limitations, government constraints, attractiveness to beneficiaries, likely environmental impact and so on. Positive findings at the identification stage are, however, likely to be conditional. Often more than one option is still in contention at this stage. Final selection may only be possible after obtaining more information on topics which may range from natural resources to farmer motivation, the capability of government institutions or international market prospects for the commodities which would be produced. Very often, also, a potentially positive identification will be conditional upon certain changes (e.g. in the government's sectoral or fiscal policies, laws or institutional arrangements) which the would-be borrower is invited to consider. Issues may also be raised for the potential lender: for instance to agree to fund types of expenditure or components which it does not customarily finance.[6/]

It is understandable for a team engaged in project identification to wish to give the government and financing agency the maximum of information on the possible components, the scope, the costs and the benefits implied by the various project ideas on which it has worked. But it is premature and often distracting for the mission's report to give such details without first disposing of the main priorities of identification. Rather, identification reports should:

- clarify the rationale behind the alternative concepts and strategies which the team considers relevant and the criteria to be used in choosing between them;

- highlight the possible merits and demerits of these alternatives, at the present state of knowledge and decision-making;

6/ The lending policies and priorities of the major financing institutions are constantly evolving - sometimes with bewildering speed - and hence it is important to check at a very early stage in project design as to whether the proposed approach is consistent with current policy. Most financing agencies publish policy statements and periodically issue Operational Directives (ODs) for the use of their staff. For instance in 1991, alone, the World Bank issued new or revised ODs on Environmental Assessment, Involuntary Resettlement, Indigenous People and Non-Governmental Organizations. It also released a new Forestry Policy Paper.

- present a rough and ready assessment of the likely scale, costs and benefits of each alternative.

Only then can a **preferred solution** be outlined, perhaps still as one among several options which may yet remain under consideration.

Follow-up Actions. The team should prepare detailed lists of any extra **information** to be assembled, and identify the **studies** to be carried out, **steps** to be taken and **issues** to be resolved before a decision could be made to prepare one option or another. Detailed specifications, terms-of-reference and schedules should be prepared for all surveys and studies (including environmental assessments) considered necessary to complete the preparation of the preferred option. Care should, however, be taken not to ask for more information and studies than are absolutely necessary, as the accurate gathering and analysis of primary data and the conduct of surveys of all types is expensive and time-consuming. Organizational arrangements should be established for this work and the resource requirements, both financial and human, should be estimated. The report should indicate how these might be funded.

The need to shape the reporting format to these specific needs of identification is discussed in Part II and an outline for a typical identification report is given as Annex 1.

3. PROJECT PREPARATION: ARRIVING AT AN APPROPRIATE DESIGN

The end product of identification, once all necessary follow-up decisions have been made, is a project concept which is agreed by all concerned as the likely best choice on which to base a final design. The purpose of the next, preparation, stage is to advance from that agreed concept to a detailed project design, and then to analyse and present this in the form of a feasibility study.

More data, derived from specially mounted surveys, provided by government agencies or obtained by visiting missions, will usually be needed to refine, confirm and justify the concept already identified and to explain, quantify, analyse and present the chosen design in the final documents. This makes project preparation heavy in its demands for skilled manpower. The costs, especially if engineering design work is involved, may be considerable. For this reason, if a project is intended for external financing, there is little point in proceeding beyond the identification stage until a funding agency has indicated its interest in financing the project. In practice, the Investment Centre does not commit its resources for project preparation until a project has a place in the lending programme of an associated financing agency.

Project preparation is an iterative process and does not consist simply of starting at the beginning of a detailed checklist for the contents of a preparation report, such as that given as Part III, and continuing to the end. Backtracking, cross-checking and advances by successive approximations are fundamental to arriving at the final detailed design. Furthermore there is the need, in practice, for constant interactions with different individuals and institutions both within and outside government, including any specially-constituted preparation groups, steering committees, or interest groups such as those concerned with environmental issues. This will also influence the sequence of work from which the final project design is generated. In reality, arriving at a final project design is more like completing a jigsaw puzzle: some fixed points can be defined quite easily at the outset; a series of successive approximations is required in locating the next-door pieces until the right one is found; work normally proceeds on several fronts simultaneously, some advancing fast while others prove more difficult or may remain stalled, pending solutions to problems in other parts of the picture.

Despite the importance given to documents, their generation is far from being the single goal of final preparation. Preparation teams, especially if they are missions made up mainly of foreigners, need to ensure the close involvement in the design process of all interested parties. These include not only government staff but also the intended beneficiaries, who are eventually to assume much of the responsibility for project implementation and subsequent maintenance, as well as the production risks. If both groups are fully conversant and in agreement with the proposals, through having participated meaningfully and interacted in designing the project, they will understand it better and are much more likely to see it as "theirs" when implementation starts. Consultation with groups or persons who feel opposed to or threatened by the project should also not be ignored. Experience shows that, even though such participative approaches to project design take longer, they reduce the risk of some of the implementation problems described in the Introduction.

Operational Sequence of Preparation

The report which emerges at the end of preparation must inform senior government decision-makers about the national commitments and resources which the project would demand. It must also anticipate, and provide answers to, the many and detailed questions which will be directed at the government by the appraisal mission which subsequently evaluates the project on behalf of the potential financing agency. This may partially explain why project preparation reports often give most attention to the government's role, government institutions, and the implications of the project for the government budget. Technical questions and the implications of participation in the project for farmers and other private decision-makers often get insufficient attention in preparation reports or are dealt with at length only in annexes. Because of this over-riding concern about government roles, there is often a sub-conscious tendency for final preparation work to be slanted similarly. What the government is going to do may get defined prematurely; technical questions and the anticipated response of the public may then be manipulated so as to give the best justification for the government's role.

In practice, it is potentially hazardous to define the government's role *a priori*. It perpetuates the image of the state as master of development and prevents the emergence of the more realistic view - in most countries - of the state as the facilitator of rural progress. It may also lead to an unjustified concentration of financial and skilled manpower resources in the public sector, as, for instance, in cases where government agricultural support services have been built up in areas in which there are very few opportunities for introducing technical improvements into current farming systems: ideally the provision of services to farmers should be demand-driven.

A sequence of work objectives for preparation such as that which follows is more likely to lead to a sound final design. It can help to ensure that the fundamental project concept comes through preparation undistorted. It can also help to avoid any possible unrealism over the government's capability and role, as well as any over-dimensioning of investments in state actions.

(a) **Confirmation of Commitment.** Confirm the continued commitment of all parties to the project concept, especially if there has been a lapse of time, change of government or change in financing agency staff responsible for the project between project identification and preparation.

(b) **Data Base.** Ensure that any critically important surveys, studies, technical designs and environmental assessments requested at identification - or found necessary later - are complete and adequate. To do otherwise, simply results in wasted staff time or in preparation of the project proceeding without essential information.

(c) **Technical and Social Strategy.** Evaluate technical opportunities and constraints, and the needs and aspirations of the people concerned. On this basis, define the technical changes which are relevant to and attainable by, the intended beneficiaries. Bear in mind that some constraints will continue to apply even after project support to lift others has been provided. Once realistic account has been taken of such permanent and overriding limitations, estimate the key

physical parameters (climatic and fertility assumptions, crop input levels and yields, growth rates, conversion ratios, water requirements, livestock production parameters etc.) related to the productive elements in both the with and without-project situations. Give particular attention to those technical parameters which determine producer returns and risks, and to examining the environmental implications of applying the strategy.

(d) **Attractiveness to Participants.** Show by quantitative analysis that the proposals of the technical and social strategy are likely to be adopted by farmers and any other participants. Analysis should focus on those aspects most likely to affect rural household behaviour. For some households, the prospects of increased food security may be of over-riding importance, while for others, higher cash incomes, a good return on investment or a better income for their labour may be key criteria. The analyses should also consider factors such as perceived risk, palatability of new varieties, or alternative income-enhancing employment options, and show that these are unlikely to prevent the adoption of the changes proposed.

(e) **Constraints to Strategy Implementation.** Categorize the main constraints which would need to be overcome by, or in association with, the project for the target beneficiaries to profit from the proposed technical strategy. These constraints could be internal to the farming system (e.g. shortage of investment funds, lack of market access) or external (e.g. government price policy, weaknesses in support services).

(f) **Government's Role and Strategy.** On the basis of the above, reach a credible consensus on the nature and scale of the actions which the government could take, and is committed to taking, in order to overcome these constraints and thereby allow the technical and social strategy to become a reality. Such actions may involve shifts in policy, legislative changes, adjustments in institutions or simply commitments of additional resources. Define each of the actions to be taken by the government and other parties, and the preferred sequence.

(g) **Government Resource Needs for Implementation.** Agree on the workable minimum of government resources which would need to be committed for the above purposes (money, people, fixed and mobile physical assets), taking into account all reasonable opportunities for devolving responsibilities to the private sector, non-governmental organizations and individuals. Before recommending the commitment of additional resources, ensure fully efficient use of existing resources, for instance through transfers of functions between people and institutions. Hence derive incremental resource needs.

(h) **Component Definition.** From the above, define the project components. This should be done initially in physical terms, and later in terms of cost. The level of precision appropriate in the definition of components and costs will depend on the nature of the project, and the extent of flexibility which is desirable (see box overleaf).

(i) **Phasing.** Define the phasing of project actions taking account of the scale of the tasks involved, their degree of complexity or susceptibility to external factors outside direct project control, sequencing prerequisites, and the time required to complete essential work on each task. Recognise that highly innovative approaches to development will take time to be accepted, proven and then disseminated. Give special attention to the time needed for selection and appointment of key staff and for procurement. If necessary adjust components and staffing to ensure a fit with the proposed schedule.

(j) **Organization and Management.** Define the organizational arrangements, management responsibilities and staffing for project implementation, taking account of the nature and scale of the components, the proposed phasing and the scope of the management task, and recognizing any opportunities for redeployment from redundant functions. Agree on the planning, budgeting, administrative, monitoring and reporting arrangements, and on arrangements for the evaluation of project impact and for quality control. If tasks lie beyond the possible reach of the institutions, even allowing for any strengthening, the project scope should be reduced accordingly.

(k) **Benefits.** On the basis of all the definitions and decisions above, assess project benefits, and show how they would accrue over time. Identify any negative effects, especially ones which might occur outside the institutions or areas directly affected by the project.

(l) **Analysis.** Make appropriate economic, risk, sensitivity, social and environmental impact analyses, with the aim of demonstrating that, under the stated assumptions, the proposed project would contribute positively to the national economy and to the achievement of the country's development objectives. Assess the project's ecological, environmental or social consequences, and its sustainability. Adjust the design - redefining components, if necessary - to improve impact to the extent that the analyses suggest this might be possible, for instance by excluding elements with marginal returns, ones which are unduly risky or those which could have adverse effects on social equity or on the environment.

(m) **Issues.** Most critical issues should have been resolved through negotiations during the course of project preparation. Any residual issues, upon the resolution of which successful project implementation would depend, should be listed. Recommend solutions and suggest how, by whom, and by when a resolution could be expected.

Incorporating Flexibility into Project Design

One of the most critical decisions which must be taken early in the process of project design concerns the extent to which flexibility will be built into the project and the means by which this will be achieved. This has an important bearing on the extent of prior detailed studies required and hence on the time and manpower needs for project preparation. It also influences the approach to institutional design.

For projects intended to finance major civil works, reasonably advanced designs, accurate quantity and cost estimates, and carefully scheduled implementation plans are essential. In contrast, for "soft" projects, such as rural development projects or projects intended to provide services to farmers, there are many advantages in deliberately building in sufficient flexibility to enable project management to respond to unfolding events (such as the findings of applied research programmes, or feedback from monitoring systems on farmers' reactions to project initiatives) and to changes in the broader policy and economic environment in which the project is being implemented.

If it is agreed between all parties (including the financing institution) that it is desirable to build an element of flexibility into a project, a number of options exist for this. The common features are that special emphasis must be placed during preparation on:

- clear definition of intermediate and ultimate project objectives;
- setting of upper and lower expenditure limits on key components;
- prior agreement on the circumstances which will be taken as indications of a need for review of the project design (e.g. serious shortfall in some quantified objective, overspending on certain components);
- incorporation of specific monitoring and supervision arrangements for these key indicators;
- creation of organizational procedures and consultative mechanisms which ensure that the results of such monitoring can feed through quickly and rationally into recommendations for project revisions;
- devolution of decision-making authority to the levels which permit prompt action on the basis of such recommendations;
- creation of project budgets and operating procedures which allow changes, once authorized, to be executed easily;
- clear definition of the consultative arrangements between the government and the financing agency for sanctioning of changes of different magnitudes.

In addition there are several specific means available for endowing projects with flexibility.

Development Funds: creation of Development Funds from which disbursements, both reimbursable and non-reimbursable, can be made to cover the government's share of investment costs: these are appropriate mechanisms for the financing of programmes aimed at responding expeditiously to the demands of rural communities and involving large numbers of dispersed, small rural works or items of infrastructure.

Annual Operating Plans: in this case project preparation includes detailed programmes for the first year or two of the project, but only indicative global estimates for later years. Detailed expenditure programmes for the later years are prepared by the project's management, ahead of each financial year, for approval by the financing agency's supervision missions.

Mid-Term Adjustments: a project may be prepared in detail for the first few years of the disbursement period, but with only indicative financial allocations being made for later years. The precise allocation of the latter resources is made dependent on the findings of a mid-term review conducted jointly by the government and the financing agency.

If such approaches are followed in project design, less manpower is likely to be needed during the preparation stage, allowing correspondingly more to be used for project implementation and supervision.

When project preparation is being undertaken with external assistance, this sequence may be followed in its entirety by one preparation mission. Alternatively, it may be divided between two or more consecutive missions pending, for instance, the receipt of crucial additional survey data or a particular government decision. In either case, the process will involve many feedback loops and successive approximations. If the need for backtracking spans many steps - for instance if economic analysis shows that the technical strategy adopted at the outset needs major revision - then adjustments will need to follow all along the sequence. In other cases - for example fine tuning in the allocation of executive responsibility between levels within the proposed project management structure - there may be no repercussions for the basic design, or on the project's costs or benefits.

After the intellectually satisfying period of initial generation of project ideas, a period of repetitive fine tuning can be tedious and tiring. It may also be difficult, and make a visiting preparation support team unpopular, to require such backtracking by a local preparation group, which may believe that, having gone through the sequence once, the job is done. It is an inescapable fact, however, that a chain is only as strong as its weakest link: thus to neglect one key aspect of farmer attitudes to change, or to involve one uncommitted public institution in a key executing role, may prejudice the whole project.

The main visible products of this stage of intensive activity are the preparation report, its annexes, and the supporting working documents, studies, designs, maps etc. which will be submitted in support of its loan request by the government to the financing agency and its appraisal mission. Guidance on drafting, content and format of these documents is given in Part II, and especially in the detailed checklist for preparation reports given as Part III. Planning teams, whether they follow the operational sequence of preparation described above or a logical planning matrix method (see box on page 33), are encouraged to familiarize themselves with these documentation requirements before preparation work begins. Pre-warned in this way, they can ensure that the process of discussion, data gathering and decision making is focused on the relevant questions or issues, and that no gaps remain at the end. On the other hand, without a clear idea of what is needed and why, preparation teams risk losing themselves in a directionless mass of irrelevant paperwork and numbers.

4. PROJECT DESIGN PROCESSES AND PROCEDURES

A project design, if it is to be workable, needs to attract the participation of the intended beneficiaries. It must also obtain the political commitment of government decision-makers. It must be within the executive capability of the entities and individual managers who will implement it. And it must conform to the criteria of the intended financing agency. It will only be satisfactorily prepared when all these requirements are met.

To respond to such wide requirements, the project design team must work with many sorts of people at all levels in society. While the team members may have a background in economics, agronomy, civil engineering or some other technical discipline, the techniques they need in dealing with these human factors in project formulation may more closely resemble those of other callings - market research, salesmanship, sociology or politics.

In the previous chapter it was suggested that the formulation of a technical strategy compatible with the real needs and constraints of the intended beneficiaries and demonstrably atttractive to them should be the starting point for detailed project design. Procedures for ensuring that beneficiary aspirations, needs and capabilities are, indeed, the basis of the technical strategy are therefore discussed first.

Consulting the Beneficiaries

Field trips to the intended project area are an important feature of project design. The conclusions drawn from such visits depend heavily on the experience, intuition and common sense of the team members as well as on the range of contracts made and the time available. However, in many cases contacts are not sufficient to generate a complete or reliable picture of the details of rural life: hence the frequent failure of farmers to respond as expected to the technical strategies which are subsequently proposed. Certainly many such trips give minimal opportunity to consult the intended beneficiaries. More time is often spent on the move or being shown government facilities than in visiting villages or talking to farmers; when farm visits are arranged these may be with a large (and, to the rural dweller, intimidating) entourage, or to the local showplace rather than to the land of the poor or merely average farmer.

Much can be done to increase the value of such field trips by allocating more time generally, and by deliberately widening the range of contacts to include not just local government staff but also persons working with NGOs and religious organizations, politicians, traditional leaders, traders, members of formal and informal groups and especially farmers and their wives. To aid communication, parties visiting the field should be kept small and, where language translation is needed, someone should be chosen to interpret who has a quiet manner, and can be relied on to translate accurately rather than bully or put words into the mouth of the respondent. Relaxed, informal settings can be deliberately chosen for individual and group meetings, in which rural people are most likely to volunteer information, speak their minds, and react frankly to preliminary proposals put forward by the design team. This dialogue should not be hurried; if time is restricted, it is unlikely that themes will be adequately explored or that a

full mutual understanding will be reached. The contribution to project design of the beneficiaries' own ideas will thus be limited.

Even after taking such precautions, however, the team may be left with no more than general impressions, derived from a small and probably not particularly representative sample. To redress this, loosely structured field visits may have to be supplemented by more systematic surveys or case studies. Though various methodologies may be used for gathering first-hand information, the Investment Centre is increasingly using Rapid Rural Appraisal (RRA) techniques to improve its teams' knowledge of the socio-economic conditions, farming systems and the causes of rural poverty in project areas. These studies are most effective if carried out in the early phases of project design, when the findings can influence the range and nature of components and the design of management systems. Principles and methodology are described in detail in another Investment Centre publication, and elsewhere.[7/]

Such sociological analysis, which has been refined through practical application in many different countries, provides a cost-effective means of deepening the project design team's understanding of the household economy and farming systems of the intended project beneficiaries. It is increasingly evident that, through generating up-to-date and relevant first-hand information, such studies are warranted for many types of agricultural development project and not simply for those with a poverty orientation. Details are given in the box opposite.

Such studies and other participative planning approaches not only generate useful primary data on the current situation in the project area, but also provide the design team with both local and official views of problems and opportunities. In particular:

- they give the team access to indigenous knowledge and practice, which is especially valuable in identifying resource development potential and constraints;

- they contribute to a dynamic view of changes taking place in the community, making it possible to identify trends in land use, input use, output, livestock numbers, population, sources of income, and so on: case histories, derived from the selective deepening of interviews, can throw light on these trends and on the underlying causes for success and wealth accumulation by some farmers and for the impoverishment of others;

- they enable the team to test the fit between government policies, technical strategies and proposed project actions, and the survival strategies and aspirations of different types of farmers. If these are not fully compatible, the studies provide tangible data on which to base the discussion of possible adjustments;

7/ FAO Investment Centre, *Guideline on the Role of Sociological Analysis in Agricultural Investment Project Design* (1992), and Kumar, K. and Casley, D., *Rapid Rural Appraisal Data Collection Methods*, Economic Development Institute (forthcoming). See also References and Bibliography, section 6.

Applying Rapid Rural Appraisal Techniques in Agricultural Project Design

An essential first step in the design of projects which seek to improve social equity or reduce poverty is an appreciation of the underlying causes of the low incomes of potential project beneficiaries, and of possible means to increase these incomes. For most agricultural projects it is essential, in addition, to have a good analysis of the existing farming systems, and particularly of the constraints under which farmers operate, against which to test various assumptions on possible interventions. Only with such data can a proper constraints analysis be made and a valid technical and social strategy designed.

A study, using Rapid Rural Appraisal (RRA) techniques, is typically carried out early in the formulation of a project jointly by members of the project design team, both government staff and mission members. A key role has been played in this by rural sociologists and agriculturalists, but, depending on the nature of the project, other disciplines may also be involved. The extent of the study depends on the likely coverage of the project but it can usually be completed in a period of 5 to 6 weeks. Key informant interviews are typically carried out in 15 to 30 villages, with the local leadership as well as with formal and informal groups of residents and with the heads and members of farming households. Some interviews are also conducted with government officials, especially those working within the support services in the selected villages. The agriculturalist supplements these interviews with field visits - ideally including a walk across the village lands guided by the farmers - aimed at developing an appreciation of the present farming systems and of the land and water resources available to the community and to individuals.

Where the aim is to throw light on the nature and causes of social differentiation (when this is relevant to project design), respondents may be deliberately sought from "rich", "medium" and "poor" villages, and within each selected village from households which are locally perceived as "rich", "medium" and "poor". Structured interview schedules are used to generate comparative quantitative data. The interviewers, however, move beyond the schedule to probe deeper into issues which emerge during the course of the study and which they consider relevant to project design. A total of 30 to 40 households might be interviewed.

Studies using RRA methodologies, because of the necessarily small and purposive sample, do not generate information of statistical significance and hence do not provide accurate baseline data against which project performance can subsequently be evaluated. Consequently care must always be taken in extrapolating from their findings, and quantitative interview data should be interpreted cautiously. Nevertheless the studies provide much deeper and more reliable information of relevance to project design than less structured field visits, and, in contrast to surveys and censuses, can be carried out, analysed and interpreted without unduly lengthening the project formulation period. The modest additional costs, however, would need to be budgeted for as part of the expenditure on project preparation.

- they can throw light on power structures, decision making processes in the community and the capacity for group action, which is particularly important when project implementation involves adjustments in the use of common property or collective initiatives.

Studies using RRA or similar techniques bring members of the design team (as well as accompanying government officials who will ultimately be responsible for project implementation) face to face with the intended beneficiaries, so that they see at first hand the constraints and opportunities which confront the rural population. While rapid appraisal may furnish the project preparation team with a reasonable appreciation of how the rural population is likely to react to the project and of how the design might need to be structured to respond to

their expressed needs, RRA studies are nevertheless not substitutes for formal socio-economic surveys based on statistically valid sampling procedures. Formal surveys may still be necessary to generate baseline information to use in the preparation of some projects: although they are time consuming, costly and difficult to analyse they can, if conducted properly, generate valuable information with a definable level of accuracy. They may also be used to provide a benchmark for future evaluation of project impact.

It should be borne in mind that, while RRA techniques may start a dialogue with the rural population which can serve to introduce a more participatory way of thinking, they fall far short of representing a complete system of participative planning. Ideally the design of a project should evolve from systematic consultations with a large proportion of the intended beneficiary population, their leaders and other parties - such as religious organizations and NGOs - interested in their well-being. Time pressures generally prevent this; but where it is possible (and indeed it may be essential in the formulation of community-based land resource management projects in areas where there are no successful precedents), preparation teams should seek to move beyond the mere collection of data and the probing of reactions, to the completion of local level plans for a number of specimen communities, using the same participative techniques as would be applied during project implementation.

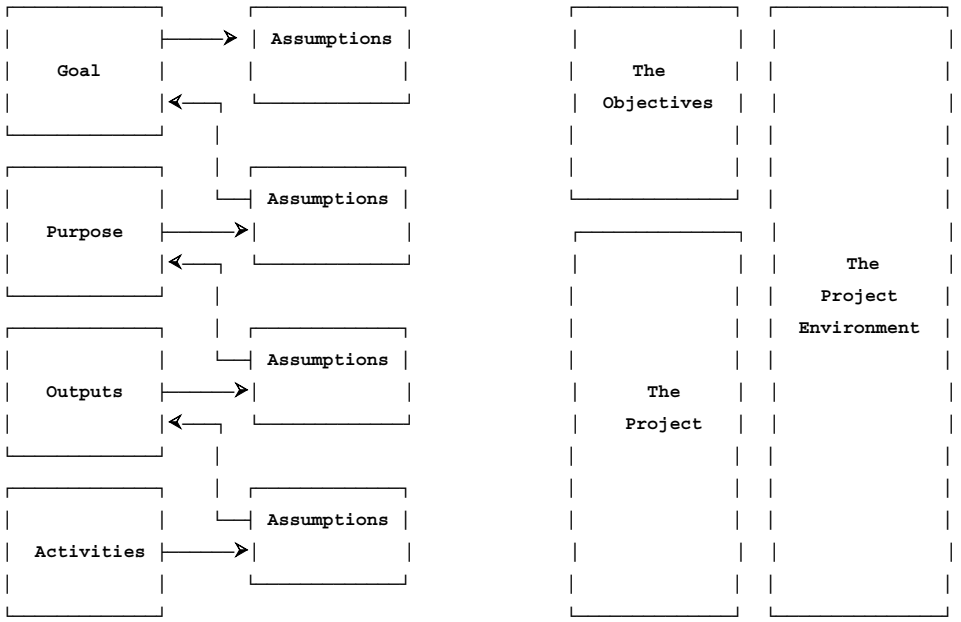
If the communities selected for such exercises represent the different ecological zones, ethnic groups and farming systems in the proposed project area, then in addition to providing a good basis for estimating the required mix of project actions and related resource requirements, the exercises will also offer a means of testing and refining participative planning techniques. They can then generate pilot plans which can be used for training purposes during the initial stages of project implementation. If this is tried, however, it is vital that government funding for the selected project actions be readily available from the start: otherwise participative planning risks raising false hopes which will turn to community disillusionment if the government fails to deliver on time its part of the commitments.

Similar consultative methods of investigation may be used to identify affected parties' views of the potential environmental impact of the project. The World Bank requires that such consultations take place both early on and towards the conclusion of environmental assessments of Category A (potentially high-impact) projects submitted for its financing.

Logical Planning Frameworks

In recent years there has been an increase in the frequency with which logical planning frameworks (LOGFRAMES) are being used in project identification and preparation. The LOGFRAME is a managerial tool for defining realistic objectives and the means for accomplishing them. LOGFRAMES view any development project as a set of causally linked elements (hypotheses) identified as the project goal, purpose, outputs and activities. The LOGFRAME provides a mechanism for the step by step conceptualisation of these elements, and of the assumptions or uncertainties lying outside the direct control of the project which must be fulfilled or contained for the development process to succeed.

Basic Elements of the Project Matrix



LOGFRAME analysis can be used to build consensus amongst all parties, from policy makers to beneficiaries, who are interested in a development programme. The technique is usually applied at a workshop or series of workshops, commencing with the identification of the focal problem to be addressed by the project and its substantive and direct causes. The desirable situation which must be reached in order to overcome an identified problem is then specified in the form of a project objective, which in turn leads to the definition of desired outputs and of the activities required to generate them. Underlying assumptions and factors external to the project that could affect or constrain its success are identified as the exercise proceeds, and finally verifiable indicators of achievement, agreed as appropriate by all participants, are established.

The decision to use LOGFRAMES must be taken early in the process of designing a project, before too many implicit decisions have been made on its objectives and scope. Considerable effort must be made to set up the preparatory workshops in a way which ensures not only good representation of all stakeholders, but also that the necessary communication between the different parties in fact takes place: in societies which tend to be hierarchical or autocratic this may prove difficult. An essential element is the appointment of a neutral but respected moderator to guide the discussions and to record the agreements reached[8/]. Computer

8/ See: Deutsche Gesellschaft Für Technische Zusammenarbeit (GTZ) *Zeil Orientierte Projekts Planning (ZOPP), (1981).* Also available in English.
Abramson, R. and W. Halset, *Planning for Improved Enterprise Performance (Performance Improvement Plan - PIP),* ILO, Geneva.
The Logical Framework. A Manager's Guide to a Scientific Approach to Design and Evaluation; Practical Concepts Incorporated, Washington, USA.

software is now available to support this planning process and the subsequent preparation of matrices and reports[9/].

Where time constraints do not permit the full application of LOGFRAME planning, elements of the methodology can still be usefully applied. The brainstorming approach to problem and strategy identification which is the basis of LOGFRAME planning takes little time, has a catalytic effect on the generation of ideas and information, and can be applied in several forms if the necessary communication between project participants is lacking. The LOGFRAME matrix can also be used to summarize the project design. The process forces planners to test causal linkages between activities, outputs, purposes and goals and between verifiable indicators and the functions they are intended to define, as well as to clearly identify the important assumptions upon which project success could hinge. It can also contribute usefully to management plans for project implementation. See sample matrix.

SWOT Analysis

SWOT stands for Strengths, Weaknesses, Opportunities and Threats, which are the themes under which ideas are catalogued using this analytical tool. SWOT analysis involves brainstorming sessions with concerned participants and can be applied equally well to a project proposal or to the ultimate implementation of that proposal. Participants are required to list quickly on display boards all their ideas (no matter how idiosyncratic) concerning the matter being reviewed, under each of the four themes above. All ideas are then reviewed and consensus reached on which are critical to the success of the matter under review. The resultant list helps crystalise thoughts on strategies for development or for improved management. SWOT analysis is particularly useful in the project identification process and provides a valuable checklist when preparing Aide Mémoires.

9/ PC LogFRAME R & D™, from Team Technologies, USA

Sample Logical Framework Matrix

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Goal: To improve the sustainability and profitability of smallholder-based ruminant livestock production systems.	Integrated crop/forage farming systems adopted by 40% of farmers in region by 1995. Average income of participating farmers raised by Rs2000 by 1995.	Collaborative University/NGO monitoring of farming systems on 50 selected smallholder farms.	That smallholder farmers will adopt proposed forage production strategies.
Purpose: To raise ruminant livestock productivity through improved dry season forage protein supply. Specific objectives include: - The integration of selected legumes into conservation and cropping systems in all agroecological zones. - The establishment of a smallholder-based forage seed production programme. - The improvement of fodder conservation techniques and feeding strategies.	Dry season weight loss of ruminant livestock owned by participating farmers is prevented. Mortality of weaned yearling stock is reduced to < 8%. Reproduction rates improved by 30% on base rate after 5 years. 15,000 kg fodder legume seed produced in 1995.	On-farm monitoring of livestock production by Department of Animal Husbandry, Veterinary Epidemiology Unit. Annual review of University reports and research proposals by Project Research Committee. Auditing of Forage Seed Unit accounts.	That leguminous forage production technologies developed under comparable agroclimatic conditions in the region can be successfully transferred to smallholder farms in the project area. That Government will accept the cost of free fodder seed distribution during the first 5 project years. That Government will sanction incremental staff positions.
Outputs: Increased fodder crop area. Staff and farmers trained in appropriate technologies. Adaptive forage research programme in place. Establishment of Forage Production Unit (FPU). Implementation of Technical Assistance recommendations.	Forage crop area and dry matter production in accordance with schedules X, Y, Z 84 person months of staff in-service training; increased staff capability. 760 farmer-days of practical training. Field research in place on 10 sites. 40% adoption of two or more new technologies.	Reports of the farm monitoring and adaptive research programme, together with 6 monthly project management and consultant reports.	That assumed forage and seed yield estimates are accurate. That trained staff are able to implement their acquired skills. That species and strategies proposed for research are successfully tested. That government fills sanctioned staff positions in a timely manner.
Activities Supply and satisfactory storage of seed; and equipment commissioning. Implementation of visit schedules for technical advisors. Implementation of workshops. National staff positions sanctioned and staff in place. Financing of project activities. Visit by supervision mission.	**Inputs:** Imported seed and equipment. Technical assistance. Local and overseas training. Incremental national staffing. Incremental recurrent costs. Project supervision by financier.	Annual auditing of project accounts and associated stocktaking. Reports on training by Departmental Director. Receipt of consultant reports. Receipt of supervision report.	That sufficient, suitable staff are available. That suitably experienced technical advisors are available. That procurement and delivery schedules can be met. That recommended legume species will receive quarantine clearance.

The Roles of National Preparation Teams and Visiting Missions

Investment project design is a government responsibility. The role of outsiders, such as staff of the financing institutions, the Investment Centre and consulting firms, is merely one of technical assistance. Indeed, the assumption by outsiders of too dominant a role in the design of a project may militate against its eventual success. Members of visiting missions should always bear in mind that they are in the field to help governments to articulate *their* proposals.

Some governments have been successful in institutionalising a capacity for agricultural investment project preparation. Their needs for external assistance may, if they exist at all, be limited to filling gaps in specialised technical skills. What is more common is for countries to constitute *ad hoc* teams for the preparation of specific projects. Such teams may go on to play a role in the eventual implementation of the project, but may not be available to prepare any other projects in future.

Whatever the institutional arrangements, it is essential to agree at a very early stage of project design on the respective roles and responsibilities of the national team and of any technical assistance provided to it. Only if this is done can it be sure that there will be no misunderstandings or vital work omitted. If agreement is reached to appoint a national project preparation team or steering committee during the course of a reconnaissance or identification mission, then the aide-mémoire written at the conclusion of such a mission should confirm understandings reached on team composition, responsibilities, reporting arrangements, funding and programme of work. In many cases, it is advisable that detailed written guidance on any required studies and analyses as well as on the presentation of written material be provided by visiting missions and discussed thoroughly with the concerned persons. This should be complemented by a listing of the assignments taken on by the visiting mission, and an indication of when these will be completed and what will be the subsequent steps to be taken by each party.

The effectiveness of national project design teams often depends not so much on their composition - though this is important - but on the way in which they are led, constituted and funded. To contribute their best, team members need to be freed of other responsibilities and to work *full time* on the project; the leader of the team must enjoy ready access to senior staff in the sponsoring government agencies so as to be able to get prompt guidance on how to address key issues; and sufficient resources (and freedom from restrictive bureaucratic controls) must be provided to enable the team to go about its field work expeditiously. The extent to which a government succeeds in creating such conditions for effective work may be one indicator of its level of commitment to the project.

In some cases the cost of preparation, particularly when it involves the hire of consulting firms to do complex field surveys and engineering design work, may not easily be met from the regular budgets of the concerned institutions. In this case, visiting missions may have to assist the government in identifying appropriate sources of finance (such as the Project Preparation Facilities and Trust Funds managed by the financing agencies or FAO's Technical Cooperation Programme), in preparing the documentation required to gain access to these sources, and in supervising the studies.

Where lead responsibility for completion of the project documentation rests with a strong national team, external assistance may be used principally to provide periodic guidance and specialised technical inputs, and to review draft reports at critical stages in the formulation process. However, if the external parties assume the principal role in report writing and do this outside the country, provision should usually be made for at least the leader of the national team to take part in report preparation and to review and comment on draft materials on behalf of the government. In this way the final documentation should find ready endorsement in government.

Joint work between visiting missions and national project design teams is likely to be most effective if:

- both groups work within the country out of the same office;
- each visitor is paired with a corresponding member of the national team and both are together at all substantive meetings and field visits;
- there is regular sharing of ideas or progress reports by visitors, especially in advance of important meetings;
- at such meetings the national team presents the combined position of the two parties;
- any reports prepared outside the country by the mission are discussed thoroughly with members of the national team and amended to take account of their observations.

Preparing the Implementers

In almost all cases, successful project implementation will demand a contribution from a wider range of institutions and individuals than those forming part of the national design team, or conveniently and easily contacted on a day-to-day basis in the course of design work. A vital part of project design is to reach these implementers, listen to them, involve them in all key stages of the design process, ensure that they understand the implications for them and the role they are expected to play and, finally, convince them - if this is still necessary - of the project's validity. Experience shows that it is risky to assume that this process will take place automatically. A key rationale for externally-funded projects is that they catalyse development opportunities which would otherwise lie dormant. It is an essential part of the design team's responsibilities to contribute to that catalysis.

Workshops, seminars, presentations or decision meetings are useful methods of promoting interactions between the major stakeholders. Depending on the stage which design has reached, these may take place at various levels. If they concern the technical or social strategy, it will be essential to solicit the views of producers and other private decision-makers, possibly starting with a rapid rural appraisal and farming systems study, as described earlier. At a later stage, when the technical strategy of the project is defined and means of coordinating the necessary supporting government actions, or of channelling of project finance, are to be decided, the discussions should be largely with public officials. As with all gatherings of this type, thorough preparation is essential.

- Matters to be discussed, decided or explained must be carefully defined well in advance. Ideally these should be illustrated in a well prepared visual aid (eg. flip chart, video etc.).

- Briefing material must be distributed before or at the meeting, as this serves to focus discussion.

- Participation must be assured from the appropriate people and levels of society or government. This may require that funds be provided to cover their travel, lodging and attendance.

- Timing, duration and venue must be as convenient as possible to those whose participation is desired. Settings should be avoided which tend to intimidate some participants or lead them to say only what they expect that others wish to hear. It is unrealistic to expect busy top-level individuals, such as government ministers, to devote more than an hour or two to such concerns; or to expect the representatives of poor rural households to articulate their concerns at a large meeting in the capital city.

- There must be provision for the outcome of the event - usually decisions on one or another aspect of project design - to be summarised clearly to participants, at least verbally, but preferably also in writing.

Those providing external support for project design should ensure that these conditions are met, but as unobtrusively as possible. The aim should be to persuade all participants to start thinking of the project as their own, rather than the property of government or outsiders. National design team members should therefore lead such meetings and explain the project to a wider constituency, so that in the end all, whether government or private decision-makers, will identify themselves with it.

The most difficult problems of ensuring acceptance of a project occur when individuals or agencies feel threatened or by-passed by the proposals, and are therefore inclined to challenge them openly or simply resist them passively. Such a situation arises most frequently when major changes are to take place in institutional responsibilities (eg. privatisation of activities formerly handled by parastatals), or when resource ownership or rights of use are to be regulated or reallocated. These cases have to be treated with special sensitivity to the issues involved. Considerable time may be needed for positions to change or a consensus to be reached. Occasions may arise when it remains impossible for all parties to reach agreement; the risks of proceeding without agreement must not be underestimated.

When the team's report or key interim documents are submitted eventually to the government, it is desirable that the team leader should present the main conclusions and recommendations and respond to questions from the same wide constituency of project stakeholders/implementers. To omit this important step may result in a project being "orphaned" or misunderstood by the implementers.

Organizing the Work of External Preparation Assistance Missions

With project designs seemingly becoming increasingly complex and time allocations for their elaboration becoming ever more restricted, it is essential that teams coming from the outside to assist governments in project design - such as FAO Investment Centre missions - be fully briefed before they start field work, and use their time to maximum effect from then onwards. This means that they should ensure, well before travelling to the country, that conditions are right for productive work: particularly that the purpose of the mission is well understood in government, that key persons are available for consultation and that any studies which might be prerequisites for further processing of the project have been completed.

Clear pre-mission thinking on the tasks ahead, unequivocal allocation of individual responsibilities, and early recognition of critical paths in the sequence of work can do much to set an orderly pattern which will also be of value even after the mission returns to base and the members draft their reports. The Investment Centre system of Pre-Mission Briefs, described in Part II, is intended to help mission leaders to focus their thoughts on addressing the tasks ahead, as well as to draw out the opinions of other well informed persons on the key issues which the mission will face, and to focus on any information gaps and on the content of mission terms-of-reference. Writing of such briefs can be equally useful for national project design teams at the outset of their assignments.

Style of mission leadership varies but more experienced leaders point to the importance of the following points:

- defining clear goals for each person on the mission in the terms-of-reference, modifying these as necessary according to progress;

- agreeing as early as possible in the mission on a preliminary outline for any written work which each member would eventually have to produce;

- adopting a systematic approach to field work, setting clear objectives in terms of issues to be taken up, points to be verified, information to be collected, persons to be met, places to be visited by each team member etc.;

- meeting frequently with the mission as a whole and individually with each member; encouraging a maximum of informal communication between mission members, so as to take full advantage of the complementarity between different disciplines on the team in conceptualizing the project, to ensure consistency and to avoid duplication;

- ensuring that all members of the team agree on the substance of end-of-mission documentation.

Once Investment Centre missions return to base, it is important to continue regular within mission consultations during report writing, and in particular to:

- put specialists in touch with persons of the same discipline in the Investment Centre and technical divisions of FAO at the outset of report

writing, encourage regular consultation during writing, and ensure the participation of the same people in the review of the report;

- have consultants submit draft material for review several days before the end of their assignments.

Keeping in Touch with the Financing Agency

The final project design needs to be as acceptable to the potential lender as it is to the would-be borrower. Contacts with concerned staff of the financing agency should therefore be maintained, both at the conceptual stage of project formulation and later in arriving at the final design.

Project design teams, especially their leaders, should take advantage of any opportunities to meet relevant staff of the financing agencies in the field, particularly the individuals who are likely to appraise the project - the task managers and project controllers - or their immediate superiors. Informal briefings or, if this is possible, joint meetings with key government decision-makers or joint field trips, can do much to avoid misunderstandings and create a receptive atmosphere for the project within the financing agency. It will further enhance the project's acceptability to send copies of key working documents to relevant staff of the financing agency for interim comments, or to make telephone or FAX contacts on critical questions. After a project has been prepared with external assistance, it is often useful to arrange for the preparation team leader to return at the start of appraisal, to assist the government in presenting the project to the financing agency.

PART II: DOCUMENTATION AND ANALYSIS[1]

1. INTRODUCTION

As part of the process described in Part I, the project which has been designed must be documented and analysed. If this presentation is not clear, decision-makers in government will be unable to judge the merits of what the preparation team is advocating, the potential financing agency will find it impossible to appraise the proposal, and the project cannot move forward towards implementation. Bad presentation can jeopardise the finest project design.

This second part of the guidelines describes the various documents which are commonly written at different stages of the design process. Some, such as the Pre-Mission Brief and the Back-to-Office Report, relate to FAO Investment Centre operations and may be of only limited wider interest. The rest are as germane to local design teams as to assistance missions coming from outside the country. Guidance is also offered in this part on analytical procedures and on the presentation of textual and numerical data.

Essential underpinning to the whole of Part II is given by the detailed checklist and guideline for the main text of project preparation reports, presented in Part III. Summary checklists for identification reports and project briefs are given in Annexes 1 and 2. As well as offering presentational guidance on many topics, based on over twenty-five years of Investment Centre experience, Part III also provides a convenient checklist of almost all subjects that may need to be touched on at one stage or another during the whole preparation process. For this reason, it is worth scanning for general guidance even by teams just starting out on project design. As noted previously, if the points which the eventual presentation of the particular project must cover are selected early, coherence and direction can be given to the whole design sequence described in Part I.

Nevertheless, since Part III tries to describe a general approach which is potentially applicable with appropriate adaptation for the formulation of all types of agricultural investment projects, it will inevitably be found more relevant to some kinds of project than to others. To remedy this, over the years various subsidiary guidelines and checklists have been produced by the Investment Centre, referring either to specific types of project, such as irrigation or fisheries, or to important single elements of the formulation process. These are periodically updated. The list at the time of writing is given in Section 7 of the References and Bibliography.

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[1] (Editor's 2005 Note: Large sections of Part II were updated in 2003, in particular chapter 4. Use of Computers in Project Analysis. The list of computer programs appearing as section 8. in the References and Bibliography in the 1995 publication has also been deleted as it was out-of-date and no longer relevant.)

A much wider range of specialised guidance is also available in the numerous publications of the technical divisions of FAO and of the financing institutions. While many are too technical in their aims to merit specific mention here, FAO periodically issues a list of current publications which can be scanned by those looking for details on individual aspects of rural development, organization or technology. Some publications of more direct relevance to investment project design are also listed under References and Bibliography.

Finally, before starting to document project ideas, it is important that those responsible brief themselves on the specific presentational and analytical requirements of the external financing agency to which the project is to be submitted. These are usually set out in the Operational Directives of the financing agency itself, which should be consulted by the project design team.

2. TYPES OF DOCUMENT

The Pre-Mission Brief

Pre-mission briefs (PMBs) have been used by the Investment Centre as aids to focusing the thinking of missions prior, to their work in the field, on the tasks that await them there. The PMB should be a short (5-10 pages), ephemeral document. It covers the main topics or issues which the forthcoming mission expects to address, explains how it proposes to tackle them, and indicates the intended outcome. As such, a PMB may be little more than a listing of mission tasks which the leader might in any case note informally before departure. However, preparing a PMB provides the opportunity to review available documentation and to canvass opinions of persons knowledgeable about the subject of the mission. Moreover, committing thoughts to paper encourages more focused and deeper thinking, and allows the sharing of ideas with others, both inside and outside the mission, who will be stimulated to provide additional thoughts of their own and to guide the mission towards relevant reference material.

The PMB is thus a document which the mission leader uses mainly for his or her own benefit, to pick the brains of others and to ensure that mission members have a common starting point. The mission leader should be both the author and the ultimate judge of what the PMB should contain.

Background material, although it may refer briefly to many topics (e.g. the country and sector situation, policy and social factors, institutions, past project experience, farm-level opportunities and constraints, or the current status of project elaboration), needs to be highly selective and should be limited only to that which is strictly relevant. It should relate directly to the tasks, questions or issues to which the mission proposes to give priority. The content of the PMB is likely to cover:

- a summary of the relevant background to the forthcoming mission, highlighting any initiatives or precedents relevant to the design of the project;
- a concise summary of the highest priority tasks or issues to be taken up;
- the mission leader's views on how these should be addressed;
- an indication of outcomes which the mission should aim for, either as an ideal, or any second-best or fallback positions which could still be accepted if the ideal proves unattainable in practice.

Draft terms-of-reference (TOR) for the mission should be attached to the PMB. The content of the TOR and the proposed allocation of work among mission members should be fully consistent with the PMB. The PMB may also contain a list of any relevant documentation and maps: its preparation may be aided through bibliographic searches using current FAO data bases, or other major computerised bibliographies.

Whenever possible, PMBs should be drafted a few weeks before the mission sets out. They should be discussed at a pre-mission meeting with Investment Centre management and with other colleagues with relevant experience or knowledge, sufficiently far in advance of mission departure to allow adjustment of the mission's objectives, field programme, or even its composition if this is considered necessary. It would also be useful to seek the comments of the potential financing agency on the PMB.

In some cases, it is advantageous for the mission leader to make a brief visit to the concerned country *prior to* preparing a PMB - in advance of either an identification mission or the first of a series of missions supporting the formulation work. Such a visit can be helpful in generating up-to-date information, in briefing government staff of the scope, content and timing of the forthcoming mission's work and in setting up national pre-formulation studies, and administrative and logistical arrangements. In these cases, the PMB is likely to be a more substantive document, and may serve as a useful basis for subsequent discussions with the government and financing agencies (to which it should be transmitted).

The Aide Mémoire

Before leaving a country after assisting its government with project identification or formulation, it is normal for a mission to prepare, discuss and leave with its counterpart institution an aide mémoire. If less formality is appropriate, an end-of-mission note should be prepared. Ideally, and especially for complex projects, the aide mémoire should be distributed to the concerned government institutions well ahead of any final meetings, so as to give staff an opportunity to study its recommendations and consider how to respond. In practice, however, time constraints may make this difficult. The document should briefly summarize the status of project design which has been reached, indicate the main features of the project as they appear at that time, list the topics, questions or issues which next require attention, and explain possible follow-up actions. In some respects it resembles the back-to-office report which Investment Centre missions issue after their return to base, although with two important differences:

- an aide mémoire is the mission's own view, and does not represent an official position of either the Investment Centre or the government: this is inevitable for a document written under time pressure in the field and without consultation with Centre management. As a result, views presented in the aide mémoire, and in particular the commitment of Investment Centre resources to follow-up action, must be provisional, and clearly stated as being subject to subsequent management agreement;

- an aide mémoire is targetted only at the government, hence should always stress the specific information which the government and its affiliates need, and point to required decisions or follow-up commitments on the government side.

The main points to cover in an aide mémoire are likely to be:

- a brief recapitulation of the mission's terms of reference;

- who the mission worked with or met, where it went and what it did, and an expression of thanks for courtesies extended to the mission;

- a résumé (preferably not more than three single-spaced pages) of the project as it currently stands. Depending on the stage reached in project elaboration, this may include a description or comparison of project concepts or alternatives, an outline of a single possible project, or a more detailed description of specific project components, provisional costs, organizational arrangements and likely benefits;

- a listing of the main questions, problems or issues which still have to be resolved before project elaboration can advance further, focusing mainly on those aspects which are the responsibility of the government and, to the extent that this is appropriate or possible, indicating the sort of outcome considered most likely to be endorsed by the prospective financing agency;

- a clear indication of follow-up activities (what tasks remain to be done, responsibilities for their execution and a timetable) for the government, the Investment Centre, and any other institutions or individuals with a role in, or contracted for, further formulation work. Steps to be taken to mobilize funding for follow-up work, if required, should be listed. Where detailed terms of reference and schedules for further work have been prepared, these should be attached as annexes to the aide mémoire.

It is not appropriate to include much background information in an aide mémoire since this will usually be known to the government.

Back-to-Office Reports

The back-to-office report (BTOR) is the vehicle through which Investment Centre missions present their broad findings to their own management and the concerned financing institution within a few days of their return to headquarters. While still in draft, the BTOR provides the written material on which mission debriefing is based. The BTOR is distributed as an attachment to the mission's Assignment Summary Report and together they serve as a record of the mission's objectives, tasks and accomplishments, to inform other staff of work which may be relevant to their assignments, and to attract comments.

The content of the BTOR will vary according to the type of assignment, but will be broadly similar to that of an aide mémoire, although weighted to address the information requirements of Investment Centre management. As a rule it will cover:

- mission purpose, composition, duration, main contacts, relationship to other activities;
- relevant national background information, to place the project in context;
- summary of the mission's findings: as in the case of the aide mémoire, content will depend on the stage of project elaboration; it may cover alternatives or concepts, or it may summarise the justification for a specific proposed project, noting its location, components and approximate costs;
- the status of project design so far achieved and issues resolved by the mission;
- issues still outstanding and the solutions proposed by the mission;
- the scope of follow-up work, its timing and manpower requirements;
- requirements for technical assistance during project implementation.

Back-to-office reports should be succinct and generally not more than four pages in length (some donors prefer to receive a fuller document at this stage, so this limit should not be viewed as one to be strictly followed). If no other reports are to be issued by the mission, however, just an Assignment Summary Report may be issued, following the same general format but without such a tight limit on length.

Terms-of-Reference for Supporting Studies

Institutions or individuals will often need to be contracted to work, under the general guidance of the design team, on specialised surveys, mapping or designs which provide the detailed supporting data needed to define the project. The degree of detail to be given in the terms-of-reference for such studies will depend, in particular, on whether they will be done by people with whom the preparation team will work directly, or by someone else - for instance private consultants or a locally-contracted university team. If the work concerned is simply an expansion of the tasks of a national team which an outside mission is assisting, much can be achieved by verbal briefing before the mission leaves and written instructions may be kept brief. On the other hand, if a new group is to become involved and the individuals concerned are unfamiliar with the project or with the aims of the specific assignment, more comprehensive terms-of-reference will be needed. If a legally binding contract is to be made, the terms-of-reference will become the technical specification underpinning the legal agreement, and need to be very carefully worded. Comprehensive terms-of-reference for further studies are likely to cover the following aspects:

- background and project objectives: the main objectives or concept of the project being designed and its principal components;

- contribution expected from the work to be done: where the work covered by the terms-of-reference fits in the provision of base data, the elaboration of project ideas, quantification of components, costs, benefits, etc.;

- particular points to receive attention in the work (e.g. training of national staff) and how they are to be approached;

- specific information to be provided or gathered, the general means by which data will be collected and the expected level of accuracy, results to be generated, proposals to be elaborated, quantities to be estimated, costs to be calculated etc.;

- the level of detail, format, documentation, scales etc. of final presentations, maps or designs, as well as indications of the length of any textual material;

- deadlines for delivery, with interim review or reporting dates if appropriate;

- manpower and other inputs or equipment to be used to complete the work, costed if appropriate; the ownership of equipment after completion of the studies;

- minimum qualifications or experience of key individuals to be involved;

- the services, materials and facilities to be provided by government.

Identification Reports

Project identification is the most crucial and sensitive stage of project design: it leads to the key decisions on project choice, concept and content. As indicated in Part I, Chapter 2, there is a danger that the concept of a project may be defined too early and that excessively detailed proposals may be formulated prematurely, without alternative approaches to addressing identified opportunities or problems having been adequately explored.

Reporting at the project identification stage should, in general, reflect the results of the process of identification, and should:

- explain the context in which the project is being identified;
- concentrate on establishing the rationale and concept for a proposed approach to investment, allowing the reader to follow the reasoning process which led the mission to its conclusions;
- outline and compare - against a range of relevant criteria - options for the project or programme proposed within the approach defined;
- set out clearly those issues which would have to be taken up between the potential borrower and the lender in deciding whether or not to prepare one or another of the project or programme options identified, and in arriving at other major decisions;
- include detailed terms-of-reference, timetables, distribution of responsibilities and cost estimates for further studies;
- recommend the sequence of steps to be taken to develop the project or programme concept.

Some modification in reporting will, of course, have to be made when an identification report refers to several possible projects, as may be the case following a general identification mission. Much of the background material in this case would be common, but more attention would have to be given to showing how the various projects complement each other or fit into the broader development strategy of both the country and the donor(s).

Although background material and annexes written at the identification stage may be useful later on, the identification report itself is likely to become rapidly outdated. It needs to be short (preferably no more than 20 pages), to-the-point and produced quickly to satisfy the requirements of the donor(s) and Government without unduly interrupting the process of further formulation. Typical contents are outlined in Annex 1.

The comprehensive guideline for preparation reports, which is given as Part III, may also be a useful checklist from which to select the points which may need mention at identification. However, Part III is not a suitable outline for an identification report as it is aimed at presenting one investment project or programme option only and is not framed to allow for comparing alternatives. Furthermore, it is far too detailed, especially in its treatment of project components, costs and in the analysis of benefits - subjects which identification reports, based as they are on limited investigations, should deliberately treat in broad and mainly qualitative terms.

Project Briefs

Project Briefs, as used in the work of the Investment Centre, are relatively short (10 to 20 pages), issues-oriented, operational documents which may be produced at any stage of project design. They summarise the status reached and the actions to be taken or decisions to be made to complete the design process. They may, therefore, be up-dated at various times.

The content of a project brief varies according to the stage of project design, with the emphasis changing as the project moves from identification to full formulation. A general outline is given as Annex 2. As formulation is nearing completion, the focus will shift from a review of options and summary of next steps to fuller details of the investment project or programme itself - components, costs, implementation arrangements, and its financial and economic returns. Working papers or annexes attached to a Project Brief tend, similarly, to be interim statements, which may be fleshed out and completed later, perhaps eventually becoming attachments to a final formulation report.

However, it is the intended audience and the tone, rather than the content, which principally distinguishes the project brief from identification and formulation reports. Project Briefs are usually aimed at keeping the responsible Task Managers or Country Portfolio Managers in the intended financing agency informed of progress. Rather than methodically building the logical case for a project for a wide audience, the Project Brief should aim more to respond to the management question "Where have you got to ?". They are also intended to allow management to respond to the design team's question "Are we getting on all right ?". Since a degree of prior knowledge can generally be assumed, background information and scene-setting can usually be very reduced, allowing the Project Brief to focus on facts and issues as they are understood at the present.

Project Briefs should involve the design team in just as much careful thought as an identification or a formulation report. But they will generally be shorter, and quicker to write. As a general rule, if the design team has reached an in-between stage in its work and is thinking of issuing a "preliminary" or "interim" identification or

formulation report, it should consider writing a project brief instead. At such a stage, it may be a more cost-effective use of reporting time.

Preparation Reports

Part III gives detailed guidance on the drafting of preparation reports. The outline and format suggested there have been found generally useful by the Investment Centre over the years. However there are no rules on the form which a preparation report should take. In each case it will be necessary to make a careful selection from among the many topics listed in Part III, taking account of the particular characteristics of the project to be presented. The guidance in Part III tends to be biassed towards projects involving crop production, small-scale farmers and area development since these are still the commonest types of externally-financed investments. Greater adaptation will be needed - for instance - if the project to be presented concerns fishery or agro-industrial investment. Judicious adaptations may also be appropriate to improve clarity or respond to the financing agency's particular concerns. Most weight is given in Part III to the requirements of the World Bank and IFAD, due to their long association with the Investment Centre. For some agencies, most notably UNCDF, requirements are substantially different, although still capable of being covered by adaptation (see Box opposite). Finally, as stated earlier, before starting to write a preparation report it is important for the preparation team to consult the intended financing agency, especially in cases of doubt.

Most financing agencies prefer to receive a relatively short "main report" of 30 to 50 single-spaced pages. Its overall purpose is to connect and summarise all the preparation work. It is aimed at the informed generalist rather than the specialist.

Format of UNCDF Formulation Reports for Investment Projects

-**Part I: The Project**, giving elements of background (country and project area), the project rationale, objectives, project components, costs, organization and management, plan of operation and supervision. Part I is the basis for the preparation of the legal project agreement to be signed between UNCDF and the government.

-**Part II: Analysis of the Project**, which appraises the proposal on technical, financial, economic and environmental grounds. It is prepared concurrently with Part I but is not sent to the government.

-**Part III: Conclusions and Recommendations.**

-**Part IV: Decisions of the Chairman.**

-**Annexes** and **Working Papers**, which provide details on project financing by UNCDF, the government and UNDP, terms-of-reference for studies and consultants, specifications of equipment to be supplied, projections of expected project output, maps, charts and drawings.

Parts I and II of the UNCDF report correspond, more or less, to the main text according to the project preparation report outline given in Part III of this guideline, but with more details. UNCDF Part III is a project summary. Annexes are short appendices consisting largely of tables, lists of equipment, and terms-of-reference for technical assistance staff.

Therefore:

– the text should be highly compressed, but comprehensive;

- the internal logic of the whole is vital; each conclusion reached or proposal made *must* be supported by relevant data or background information, usually introduced earlier in the text as a "peg" for the statement, or given in annexes to which reference must be made;

- it is unwise to go too far in drafting the main report until all necessary supporting material is complete, otherwise there will be a risk of contradictions or inconsistencies between the main report and supporting material;

- throughout drafting of the main report constant vigilance is needed against excessive detail, wordiness, repetition or improper location of material: concise summary tables should be used to substitute for lengthy textual description.

Typically the main report will have up to ten chapters. The sequence and contents of each chapter will vary according to the type of project, but for area development, projects can conveniently be arranged as follows.

1. Introduction
2. Background
3. The Project Area, its People and Development Potential
4. Project Rationale and Design Considerations
5. The Project
6. Organization and Management
7. Agricultural Development, Production and Financial Results
8. Market Prospects and Prices
9. Benefits, Risks and Sustainability
10. Commitments, Issues and Follow-up Actions

In practice, the list of chapters will need to be tailored to the particular project. For instance for projects for IFAD funding, a separate chapter on the "target group" may be appropriate. However, for projects which are not area-specific, Chapter 3 can be dropped, but correspondingly more emphasis might be given in "Background" to describing the sub-sector(s) with which the project is designed to deal. Similarly, some writers find it convenient to address the question of project rationale before the description of the project area (so as to justify its selection), and to have a separate chapter on design considerations which gives greater attention to the choice of strategy, components and scale, once the project area has been described. For sector loans, a critical review of the sector would replace the project area chapter, and additional chapters might be included to cover the institutional and policy reforms to be supported by the project. For some projects - for example research projects - the chapter on market prospects and prices is clearly not required. The special features of a particular project may also justify variations in the sequence of sections within the various chapters. Thus, where the mitigation of environmental impacts is a major factor affecting project design, how this has been addressed would appropriately be taken up under design considerations. For projects classified as Category A for environmental risks, the findings of an annexed environmental assessment should usually be summarised in a separate chapter. Similarly if a project is intended to support government policy changes, these might also best be addressed in a separate chapter.

The main text should be supported liberally with *annexes* containing more detailed descriptive material, preliminary designs, technical prescriptions, specifications and cost estimates, and economic and financial analyses. Annexes are communications from specialist to specialist, so can proceed straight to technical substance with few prior explanations or definitions. There are no fixed outlines for annexes: their content is generally a matter for agreement between the specialist concerned and the preparation team leader. Where they describe components of the project in detail, however, it may be appropriate to follow the same general sequence of background, justification and description of project actions or components suggested for the whole project in the main text. Annexes should not generally have more than twenty pages of

single-spaced text, and will often be shorter. More voluminous or detailed material, such as the full results of socio-economic or soil surveys, quantity estimates for civil works or documents covering aspects peripheral to the principal themes of the main report, are more conveniently put on file as *working papers*. Working papers and all other supporting documents should be listed in a final annex to the main report, and noted as being available, if required, for specialists within the government or on the project appraisal team.

While there are many ways of organizing the drafting of a project preparation report, Investment Centre experience suggests that it is best done by a full-time team, led by a person with a broad understanding of the project and with ready access to the senior staff of the government agencies who will be involved in approving and implementing it. If the Investment Centre itself is responsible for the main report, this individual will be the mission leader. Other members of the team may be assigned responsibility for preparing specific annexes, under the general supervision of the team leader, who ensures consistency and relevance. Unless a project contains a very large number of different components requiring the inputs of specialists, experience suggests that the team drafting a preparation report should not exceed 4 to 6 persons, and that all of these should work exclusively on the project until documentation is complete. It is of utmost importance that they should function as a team, rather than in isolation, so as to ensure the necessary cohesion in project presentation. If it is necessary to involve more people in the preparation process, this can be done by means of meetings, surveys, steering committees, etc. The need for the team to maintain regular contact with agencies associated with the project and with potential beneficiaries, and the importance of well organized field visits for arriving at sound judgements, cannot be over-emphasised. Dealing with these operational factors at all stages of project design was discussed in more detail in Part I, Chapter 4.

3. DRAFTING

The most difficult drafting decision is to select a depth of treatment which is right for the document being written and for the intended audience. This applies as much to the concise and convincing substantiation of arguments at identification as to the drafting of a full project or programme formulation report. A busy official may require only a few relevant facts in a short aide mémoire to decide on a key project issue. On the other hand, a final formulation report must give each of the members of an appraisal mission from the intended financing agency sufficient information on which to judge a project's feasibility, without being so highly detailed and bulky that the user loses track of essential matters. To some extent, the problem resolves itself if the writers observe the recommended length for reports and annexes, and follows that guidance in setting lengths for each chapter.

When it comes to writing narrative, the writer needs to bear in mind the following questions at all stages of drafting:

- Should this point be included?
- If so, is this the right place?
- Is this what really needs to be said?
- If so, can it be said more simply or with fewer words?
- Could what has been written be misunderstood, even deliberately (for if so, it surely will)?
- Are the terms and words used easily translatable into other languages?

The actions and impact of the project or programme should be referred to in the conditional tense ("would") at all stages of design. Only after the proposals of the design team have been successfully appraised and funded - ie. the design has become an operational reality - can the future tense ("will") be applied to any proposal.

The readability - and persuasiveness - of project documentation, can be much improved if editorial time is spent in avoiding the following common pitfalls:

- inclusion of spurious detail, particularly in lengthy tables and other numerical data, where statistics or estimates of doubtful original accuracy are subject to excessively precise forms of analysis or presentation. Tables should only be included in their original form if they are relevant to the project proposal and numbers should be rounded to a realistic number of significant figures and presented as thousands or millions rather than in units. Graphs, pie charts and bar charts may be the best ways of communicating numerical data and schedules;

- insufficient use of small tables in the main text to summarize key figures and to substitute for lengthy descriptive writing; failure to "prune" and consolidate tables to avoid repetitions and to ensure a logical flow from table

to table; failure to indicate units, or the sources of the information quoted in tables; numbering of supporting tables at variance with the sequence in which they are referred to in the text;

- excessive use of indirect grammatical forms and abstract words instead of direct statements; presentation of too many ideas within a sentence or paragraph; presentation in a sequence which does not follow natural logic; use of the same word to convey different meanings or, conversely, unnecessarily altering of the form of words when the meaning to be conveyed has not changed;

- excessive use of acronyms; introducing acronyms before their meaning has first been explained; re-using acronyms in a distant part of the subsequent text without first re-quoting their full meaning.

In order that a large report is easy to follow, it is essential that topics should be considered in the same sequence in the summary, the main text, the annexes and any supplementary working papers, and that liberal use be made of cross references. The judicious use of diagrams, charts and maps can contribute to the ease with which the reader understands the essential features of a project. Skilled writers introduce key words which relate to the content of a paragraph at the beginning, to allow the fast reader to decide whether to read on or to skip. Key words or phrases may also be deliberately repeated to echo earlier references, thus giving the reader a "handhold" in following complicated descriptions or arguments.

4. USE OF COMPUTERS IN PROJECT ANALYSIS

Some specialized computer programs have been developed by the World Bank and the Investment Centre to carry out crop and farm modeling, and budgeting and analysis of agricultural investment projects. Such tailor-made analytical software enables the rapid costing and reorganization of budgets and activities at various stages of project design. The programs help analysts to:

- simulate or compare several different scenarios at the identification stage
- analyze a project's sensitivity to risks
- expedite many similar or repetitive calculations (e.g. cost estimates for several sub-projects and their aggregation into total project costs)
- quickly update variables or underlying assumptions during project preparation (e.g. yield assumptions or prices following devaluation of a currency, etc.)
- perform complex analyses (e.g. switching value tests or yield probability estimates) to test the robustness of a project's design.

The programs noted below are designed to provide standardized formats and data that can be easily followed and amended by every member of an Investment Centre and financing agency project team, to facilitate necessary adjustments by appraisal staff during the evolution of the project.

World Bank Computer Programs for Project Analysis

Costab, Farmod, Display

Costab, Farmod and Display were developed by the World Bank to help their project staff and borrowers organize and analyze project preparation and appraisal data. The Centre assisted the Bank in developing Costab for personal computer use and promoted the widespread use of these programs in agricultural investment project analysis.

Costab is designed to prepare, organize and analyze project costs. It produces standardized tables that show the costs of each project component, as well as costs attributable to the specific categories of expenditure of which the project or components are composed. Costab estimates total costs with and without physical or price contingencies, computes the operation and maintenance costs of capital goods, and estimates the foreign exchange components of costs. It also allows for conversion of costs from financial to economic terms and for changes in exchange rate assumptions. The data are then incorporated in the economic evaluation of the project using the computer programs Farmod and Display.

Farmod is designed for the analysis of financial returns to the producer. It helps in developing crop budgets, farm models, sub-projects and projects. It generates standard tables for crop and livestock budgets and farm models, and has the capacity to aggregate these as a basis for estimating total farm development costs and returns.

Display is used for calculating the switching values, present values and internal rates of return. It also calculates user-specified sensitivity analysis. Data can be entered directly by users or generated by Costab. The results are presented in standardized tables.

These programs are available at no cost to staff and consultants of the World Bank, FAO, member government institutions and universities, and other multilateral financing agencies. They may be downloaded from the World Bank website at: www.worldbank.org/html/opr/costab/contents.html.

FAO Computer Programs and Tool Kits for Project Analysis

RuralInvest

RuralInvest is an analytical support package developed by the Investment Centre in collaboration with the Regional Unit for Technical Assistance (RUTA) in Costa Rica, to manage community-level rural investment funds and programmes. RuralInvest is designed to assist projects, banks and other institutions promoting economic development, in the identification and preparation of small- and medium-scale investments covering a wide variety of areas from agriculture to roads, clinics, watershed protection and tourism. Evaluation of investment sustainability in technical, financial, administrative and environmental terms is central to the process, and community participation throughout a project's development is heavily stressed. Key tools in the RuralInvest package are a series of modules that provide assistance in determining financing needs, employment generation, cash flows and overall returns to investment. Training modules for RuralInvest users are supported by case studies and practice exercises.

Cropwat and Climwat

Cropwat is a computer program developed by FAO's Land and Water Development Division for preparation of irrigation projects. It provides a decision-support system for calculating reference evapotranspiration, crop water requirements and crop irrigation requirements. It is also designed to estimate crop water requirements at the field level and convert these into water demand at various points in an irrigation system, taking into account cropping patterns, consumptive use and transmission efficiencies.

Cropwat is used in combination with FAO's Climwat, a global climatic database that allows calculation of crop water requirements, irrigation supply and

irrigation scheduling for various crops, with reference to a range of climatological stations worldwide.

Commercial Spreadsheet Programs

Commercial spreadsheet programs can also be used for cost table presentation in project projection and budgeting, but they are not entirely satisfactory substitutes for the specialized World Bank and FAO computer programs. Developing analytical frameworks on spreadsheets may be more time-consuming and not all users may share the same software. It is therefore recommended that, while spreadsheet programs can be useful support tools in project costing and data organization, project teams should use the standardized programs developed for this purpose.

Logical Frameworks (Logframes)

Logframes are designed to help groups of people or organizations to conceive, design and implement development projects. For more information, see the logical planning framework methodology described in Part I, Chapter 4.

Other FAO Support Software and Statistical Databases

A number of other computer programs, databases and statistical information are available from FAO as support to investment project design, analysis and appraisal. Given the rapidly growing availability of databases and web tools, project analysts are encouraged to periodically search the web for new and updated resources pertinent to their sector specializations. Sample FAO databases include:

FAOSTAT

FAO's global statistics database FAOSTAT provides extensive multilingual information online covering a wide range of statistical data on agriculture (including livestock), fisheries, forestry, nutrition and rural development.

AGRIS

AGRIS (International Information System for Agricultural Sciences and Technology) is a worldwide multilingual database on agriculture operated by FAO, with several million entries since 1975 including both published and "grey" literature. In addition to technical aspects of food and agriculture (including natural resources and the environment as related to agriculture), AGRIS covers rural development, agricultural economics, human nutrition, agricultural administration, legislation, information, education and extension. AGRIS provides a number of documentation tools, a multilingual vocabulary, and links to agricultural information resources worldwide.

PART III: OUTLINE FOR A PROJECT PREPARATION REPORT

As indicated in Part II, Chapter 2, the main text of a comprehensive final preparation report, depending on the project to which it refers, will have up to ten chapters. These are listed below and the content of each is discussed in sequence. The main text should be preceded by a summary and conclusions and, inside the front cover of the report, a list of acronyms and abbreviations, currency equivalents, and any local weights or measures which need special explanation. If appropriate, selected country statistics may also be given.

Acronyms and Currency Equivalents
Summary and Conclusions
1. Introduction
2. Background
3. The Project Area, its People and Development Potential
4. Project Rationale and Design Considerations
5. The Project
6. Organization and Management
7. Agricultural Development, Production and Financial Results
8. Market Prospects and Prices
9. Benefits, Risks and Sustainability
10. Commitments, Issues and Follow-up Actions

The guidance given on the appropriate content for each chapter of main text, as well as the examples of typical forms of presentation of sections of text and numerical data, are intended mainly as reference sources on specific points, to be consulted by preparation teams as they arise in the course of documenting a final project design. However since this section seeks to cover the great majority of topics customarily dealt with in designing any investment project, it can also be read as a checklist which can serve to give direction and purpose to the whole design process described in Part I.

SUMMARY AND CONCLUSIONS

The main aim of this section is to provide a brief synopsis of the essential elements of the project. It should not exceed ten percent of the length of the main text or a maximum of 4 pages. It is most easily drafted after the rest of the main text has been written, and will generally have one paragraph for each main text chapter. It will usually focus on those aspects of the national situation which are most relevant to the project, the reasons for project selection, the project's relationship to the country's development plan and policies, project objectives, main components, disbursement period, costs and organization, expected output, beneficiaries and the project's impact on their incomes, economic results, risks and fiscal and environmental sustainability, and the main issues still to be resolved before appraisal and implementation.

CHAPTER 1: INTRODUCTION (1 to 2 pages)

This chapter should be administrative rather than dealing with the substance of the project, indicating in particular how and by whom the project has been prepared, the origins of the project proposal (with reference to related reports such as sector reviews and environmental assessments), the purpose of the present report, and to whom it is addressed. It should be very brief.

CHAPTER 2: BACKGROUND (3 to 4 pages)

The background chapter should be short and to the point, and this applies equally to any additional background material annexed to the report. However a well thought out and properly constructed background chapter is essential to establish the framework for the project and make it intelligible in a broader political, economic and social perspective. **Its main aim, therefore, is to provide the "pegs" needed to establish the project rationale and scope in later chapters**. In addition to introductory paragraphs briefly touching on geography, natural resources and population, this chapter usually discusses such topics as the following.

a) *Key features of the political and economic situation,* including reference to the political system under which the country operates, the contribution of agriculture to GDP, per caput income, dependence on particular imports and exports, balance of payments considerations, inflation, indebtedness, exchange rate adjustments, public investment programme, adequacy of revenue to meet recurrent funding requirements and other features of recent economic developments which have a bearing on the project. Recent changes and trends should be highlighted.

b) *The agricultural sector*, describing its main characteristics (including brief references to main forms of land use, farm size and land tenure, dominant farming systems, production, input availability and utilization, and constraints to overall development) and relevant sub-sectors (e.g. forestry, fisheries, horticulture, animal production), as well as present and future estimates of supply and demand for specific commodities and the country's comparative advantage for their production. An expanded treatment of market

prospects is desirable where these might have an important bearing on project design; for example, on the scale of an irrigation or plantation crop project (see also Chapter 8).

c) *Income distribution and poverty* (subjects which should be given special attention when the project is shaped to benefit a particular target group of the rural poor), discussing income distribution and poverty levels, related indicators (e.g. access to land or services, nutrition, health etc.), and the factors contributing to differentiation; this should establish a framework for selecting a particular region or line of action for priority attention under the project.

d) *Development policies and social objectives*, noting the main elements of the national agricultural development policy and strategies such as those relating to price and interest rate subsidies, social equity, targets for rural income, nutritional goals, respective roles of public and private sectors, land tenure, environmental management etc.

e) *Institutions and services*, briefly describing and assessing the key institutions and services concerned with development and financing in the sub-sectors covered by the project, examining their operating policies and pointing to any constraints which might hinder project implementation (see box on institutional analysis overleaf). Institutions might include the Ministry of Agriculture, the Agricultural Development Bank, the Livestock Development Authority and the like, as well as non-governmental organizations and farmer-managed institutions such as cooperatives or informal savings groups. In projects for the improvement of agricultural services (for instance extension, research, or input supply) this section should, of course, receive special prominence.

f) Ongoing and proposed projects being implemented in the sub-sector and relevant to the project, with emphasis on those already catering for needs which would otherwise be met by the present project and those which could provide models or precedents for success or failure. If the proposed project is intended to follow on from a previous project, the lessons drawn from past experience should be highlighted.

Institutional Analysis

Matching project actions with institutional capacities is a crucial element in project preparation. Should any doubts exist over the capacity of key institutions to fulfill their responsibilities, these should be subject to a thorough analysis conducted by management consultants.

Institutional analysis may be carried out at different depths but must usually cover the following themes.

Purpose: what are the goals and objectives of the institution? Are they still valid or is there a need for redefinition (e.g. through new legislation) or reorientation, taking account of the requirements of the project? Is there undue overlap with other institutions?

Capacity: what are the resources of the concerned institution, in terms of staff, physical facilities and budget? Are there areas of weakness, imbalances and inconsistencies? When assessing manpower resources, judgments should be made on the level of technical skills: for example, are the qualifications of the staff adequate for the tasks assigned to them? Where have senior staff been trained? What training facilities are available, how appropriate is the curriculum, and how often do staff receive in-service training? The staffing structure can be examined by looking at the ratio of staff to clients at different levels, and the ratio of senior to supervisory to field staff, for example. More difficult, however, is the assessment of the intangible "morale" - whether the people working in the institution have professional pride in their work, are respected and are motivated. This might be approached by asking what is the rate of vacancies? What is the turnover in staff at different levels, especially in senior positions? How are appointments made - on the basis of technical or political criteria or seniority? How do salaries and allowances compare with those of competitive employers? What other staff incentives operate, such as free housing or transport? What is the perceived status of the institution's employees? The state of the institution's infrastructure might indicate the importance given to it by government. Are buildings in good repair? Are vehicles available? What proportion is on the road or in the workshop? It is important to determine the sources of funding, looking in particular at the balance between capital and operating budgets, the proportion of the total that is made up of salaries and wages, and whether there are marked seasonal or other variations in the flow of funds.

Organizational structure: organization charts can be useful in indicating the degree of complexity of the organizational structures and might also give a clue to problems of management, especially span of control and the critical responsibilities for decision-making. Features to look for might include: whether financial and administrative lines of responsibility are divided; whether lines of authority conflict with lines of consultation. Questions of centralized versus decentralized structure often emerge and it is important to understand the relationship between national and provincial organizational structures. One might need to know for example, whether the flow of funds supports the degree of decentralization required, or actually impedes it. The position of the institution within the organizational structure of the sector can also be crucial - for example, with respect to other related ministries, the central planning agency, or parastatals.

Performance: is the institution able to fulfil its objectives in a timely and efficient manner? Are there any significant operational problems - for example delays in decision-making, late release of funds, problems over procurement of goods, and so on? What is the source of these problems and what options exist for overcoming them?

One the basis of such an analysis, judgments can be made on the institution's capability to assume the additional work load implied by the project. This assessment can lead to proposals for institutional strengthening which should be reflected in the proposed project components and organizational arrangements (Chapters 5 and 6 of the preparation report).

CHAPTER 3: THE PROJECT AREA, ITS PEOPLE AND DEVELOPMENT POTENTIAL (5 to 10 pages)

This chapter (which, of course, need only be written for area-specific projects but could be replaced in the case of sub-sectoral projects with a review of the sub-sector [1/]) is to give the reader a picture of the project area, particularly the socio-economic situation, and of the opportunities for improvement. While the chapter needs to begin with brief descriptive material, the main aim should be to draw out the implications of the current situation for the design of the project. It should therefore be diagnostic in tone, pointing not simply to constraints and potential, but also to the underlying reasons for these (see Part I, Chapter 2).

Thus, for instance, rather than simply providing a description of current land use, it should explain the reasons for the apparent availability or under-use of any good quality land (which might be due to poor accessibility, low population density, prevalence of human or livestock diseases, or perhaps the system of land tenure) and thereby point towards possible solutions, to be taken up in the design of the project. In the same way, an examination of the socio-economic situation of different types of producers in the area should give special attention to interpreting the factors (such as farm size, tenure, labour availability, access to remunerative non-farm employment etc.) which might affect the rate at which persons from different income or cultural groups would adopt the technologies to be promoted by a project. A similar approach should be followed in dealing with institutions in the project area: what is required is not a lengthy description of the institutions, but an assessment of their efficiency or of the limitations under which they operate, of how they are perceived by the people whom they are meant to assist and of their ability to assume the new roles or additional responsibilities implied by the project (see box on page 62).

Detailed descriptive material and statistics on the project area and it people, to the extent that these are germane to the project, are best placed in an annex. The main text of the report can then concentrate on highlighting those aspects of the area's natural resources, its people and current development programmes which have been the important determinants of project design. Set out below is a suggested framework for these analyses, which provides a checklist of topics from which the writer should select and amplify only those of relevance to the project in hand.

A. Natural Resources

What is necessary in this section will depend very much on the nature of the project under consideration. The suggestions set out here are appropriate for most types of agricultural production project. If, however, the project is directed for instance at fisheries improvement, clearly the emphasis should be on a description and assessment of the natural resources in and around the area that have a bearing on the specific type of fisheries the project seeks to improve.

1/ For instance for an agricultural credit project, the themes to be covered would include the monetary policy of the country, the mobilisation of domestic resources, the performance of the credit institutions, resource flows to agriculture and to the target population (from both formal and informal sources), as well as any divergences between general credit policies and those applying to agriculture.

Location

Explain where the project area is in the country in relation to important features (the capital, administrative boundaries, major rivers etc.) and indicate its size. The project area might, for example, be a province, a district, a watershed, the command area of a dam, or a combination of these. A tree crop rehabilitation project might be concerned with particular estates or plantations and a livestock project with certain rangelands. An important consideration in project formulation is to avoid setting any boundaries which are unnecessarily arbitrary and which ignore social and other interactions with adjoining areas. The relevant features of the area (or country if the project is nationwide) should be shown on maps.

Climate

The purpose is not so much to describe the climate in detail, but simply to demonstrate that it is not a limiting factor to the general project concept and is compatible with assumptions on future productivity. This is likely to require reference to rainfall (monthly, annual, intensity, and especially probability), temperatures, insolation and humidity. If necessary these may be summarized in short text tables and graphs; detailed figures, if available, should always be confined to annexes. For rainfed farming projects, it needs to be shown that there is a suitable combination of climatic conditions to support the cropping patterns proposed and the forecast yields, and that the risks associated with the adoption of any proposed changes are likely to be acceptable to the farmers. For irrigation development projects, enough information on climate (especially rainfall, temperature, hours of sunshine, windspeed and evapotranspiration) is required to determine crop water requirements. These figures should also be used to confirm the justification for irrigation, as opposed to the exploitation of rainfed opportunities (though there may also be an economic dimension to this argument). In all cases, attention should be directed to any climatic hazards which act as constraints on agriculture (e.g. late frosts, typhoons, hailstorms, etc.).

Geology, Soils, Topography and Land Use Potential

Land in the project area should be described only in sufficient detail to permit conclusions to be drawn by an informed generalist on its agricultural potential, erodibility, need for drainage, suitability for irrigation, etc. More voluminous data, as well as detailed technical descriptions or surveys, should remain in annexes or working papers.

Judgment will be required as to the scale of any soils and land evaluation maps needed. This can be a contentious element in project preparation and, where doubts exist, the advice of the potential financing institution should be sought at the stage of project identification, particularly if time-consuming and costly new surveys might be required [2/]. The use of remote sensing methods and geographic information systems to evaluate the resource base, monitor trends and produce physical plans is discussed in the box overleaf. Results of land suitability studies should be annexed or submitted as working papers but may be summarized in tabular form.

2/ For guidance on land evaluation see: FAO, *Guidelines for Land Evaluation for Rainfed Agriculture,* Rome, (1983); FAO, *Guidelines: Land Evaluation for Irrigated Agriculture,* Rome, (1985) and FAO, *Guidelines for Land Use Planning*, Rome, (1991).

Water Resources

Surface and underground water resources should be described to the extent that they are relevant to project actions. Reliable long-term hydrological records normally will be required if the project involves surface water diversion or storage, and these should be annexed. Where hydrological records are inadequate, a synthesis of rainfall, catchment area, run-off coefficients and other data may be acceptable in justifying minor works. Evidence on the nature and yield of aquifers will be necessary if groundwater development is envisaged. Water quality should be examined and any aspects which could limit its use discussed.

Use of Remote Sensing and Geographic Information Systems in Project Design

Remote sensing data - consisting of aerial photographs or images of land, derived from sensors which respond to visible or invisible parts of the spectrum - can provide maps of land potential, current use, degradation or vegetation. Time series allow past changes to be quantified or future changes to be monitored.

Digitization of maps of various land resources or socio-economic features, derived from remote sensing or from other sources, allows them to be overlain to form a geographic information system (GIS). Computer manipulation of such information systems permits the delimitation of areas with particular combinations of characteristics. Such delimitations can be used for land management or settlement planning, indication of rehabilitation needs and potential, resource assessment, or identification of areas with particular risks or natural hazards. Land or resource quality data can also be integrated with geographical information such as proximity to roads or population centres, population density and so on. Thus both remote sensing and GIS can be extremely useful aids to project design.

The degree of mapping detail required will depend on the stage of design and nature of the project, usually becoming progressively greater as work proceeds. This will in turn influence the choice of remote sensing method and the cost.

The main sources of remote sensing data are:

Environmental satellites (NOAA series, METEOSAT, GOES), which monitor the atmosphere and sea and land features, at scales between 1:1 million and 1:10 million. Data are generated in near-real time and can, for instance, monitor changes in vegetation over broad areas, day-to-day if necessary. Cost will be US$0.2 per km^2 or lower.

Earth observation satellites (Landsat, SPOT and the future ERS-1), which provide sufficiently detailed images for mapping at between 1:50,000 and 1:1 million. A typical land use map for a medium-sized country using imagery from these satellites, would cost between US$3 and US$15 per km^2 and could be produced in 8 to 18 months.

Aerial surveys, which are essential for planning at scales more detailed than 1:50,000, and cover the range from 1:1,000 to 1:100,000. Existing aerial photographs may be obtainable for as little as US$0.2 per $km^{2,}$ but will need to be recent if dynamic features such as the extent of deforestation are to be mapped; for physical features such as topography, however, old photographs may be adequate. New photography can cost from US$5 to US$50 per km^2 depending on the detail needed. Additional costs for ground control, photo interpretation and mapping will vary widely but, especially for detailed maps such as are needed for design of irrigation schemes, will greatly exceed photography costs.

Frequently the time required to make detailed maps of large areas is incompatible with the timeframe for project design set by the financing agency or government. In this case part of the task, and the evolution of some of the detailed designs to be based on the maps, may have to form part of project implementation or take place between appraisal and loan effectiveness using retroactive financing. Estimates of quantities and costs at the end of preparation will in such cases therefore have to be based, **pro rata**, on detailed designs for representative sample areas.

Technicians sometimes over-estimate the need for formal maps and surveys. In the design of community land resource management projects involving participative planning, maps or models made by members of the community themselves, may provide a much better basis for arriving at an agreed programme of change and at estimations of resource needs, than more accurate formal maps which may not be readily interpreted by laymen.

B. The Economy and the People

The Local Economy

What can be achieved by a project will be strongly influenced by the immediate economic environment in which it is set. A brief overview of the economy of the project area, focusing on the importance of agriculture relative to other sectors (in terms of output, employment, dynamism, etc.) should be provided. The emphasis should be on those aspects (some of which may be touched on in more detail in subsequent sections) which would influence the design of the project - for instance urban population and income growth expectations and their impact on demand for foodstuffs or fuelwood; the effects of growth in the industrial sector on the demand for labour and the extent to which this affects labour availability and wage rates in rural areas; or the emergence of competing demands for water from urban and industrial uses which could influence the availability for irrigation development.

The People

Many of the judgments made in formulating a project relate to the expected reactions of the people living in the target area to the opportunities, inputs, services or incentives which will be offered. The reader, therefore, needs to be given a good picture of the people, their culture and ways of life as well as *their* perceptions of means of improving their livelihood. The description of the socio-economic situation should give special attention to those aspects which could affect the rate at which the target population for the project might adopt changes. For projects for IFAD financing, in which targeting receives special importance, a separate chapter on the *Target Group* should be written.

The report should provide information on the number of people in the project area, the forms of settlement, their ethnic origin and their occupations. An explanation should be given of the way in which farms, livestock and land resources are managed in the project area, distinguishing between the roles of the household (and members within it), the extended family, different ethnic groups and the community as a whole. The relative power of different groups and the extent of influence on individual behaviour and resource management exercised by traditional leaders should be examined. Special mention should be made of any cultural or political factors which could impede the acceptability of the project proposals.

If the objective of the project is to improve the welfare of the poorest people in the area, then special emphasis must be given to analysing income and wealth distribution and to explaining the causes of differentiation (see Part I, Chapter 4, box on Rapid Rural Appraisal). Successful strategies that have been used for escaping from poverty should be analysed so that, where practical, their emulation can be encouraged under the project. It is also important to examine the relative importance of off-farm earnings in the total household income, and to assess whether access to off-farm employment opportunities could limit commitment of more labour to farm development, or perhaps be a source of wealth to invest in agricultural improvements. In the case of projects aimed deliberately at reducing poverty, such as those to be funded by IFAD, special attention needs to be given to justifying the selection of the target population.

Particular attention should be given to identifying any people, such as members of forest dwelling tribes, nomads or aboriginals, whose way of life could be disturbed by the proposed project. This is true also for people who could be displaced by the project, for example families living in areas to be flooded by the construction of a dam.

This is also the place to examine such issues as the respective roles of men and women in the household and in agriculture, and to highlight any areas in which women, in particular, are put at a disadvantage (e.g. in access to land, extension services, credit etc.). An analysis of the ways in which different members of the household spend their time during the day (for example in collecting water or firewood, in cooking or working in the fields) may be helpful in devising a strategy aimed at increasing labour productivity or family welfare.

In most rural communities both women and men play a critical role but often undertake different activities, are responsible for different decisions and face different problems. In deciding on activities to be supported by the project, the preparation report should take account of these gender related differences. Obviously not all projects have to include a "women's development component". What is more important is to take full account of gender issues in the design of all components, as well as the project as a whole. These concerns are reflected in the box opposite.

Other factors which might affect the community's response to the project or the strategy to be adopted should also be reviewed. These might include education and literacy, nutritional standards and food security, land tenure and the availability of labour during the various seasons of the year. Often both customary and modern laws governing land allocation and tenure and the management of communal forestry and rangeland exist side-by-side: their impact on land use, farming systems and environmental degradation may require special examination.

If socio-economic studies have been conducted in the project area, their findings on people's aspirations and felt needs should be summarised, and conclusions drawn on their implications for project design. The full findings of the studies may be presented in an annex.

Example

Gender Analysis in a Description of a Project Area, and its Influence on the Choice of Components

The project area, which lies in the hilly northern parts of Pakistan, is characterized by low productivity, rainfed agriculture and small land holdings. Farm incomes in the majority of cases cannot meet family requirements and many young men migrate in search of employment. Women remain behind and carry out most farming activities. However, men who migrate usually return to their farms at the times of land preparation and harvest of major crops, when they participate in the heavy manual work and make decisions about cropping patterns and disposals of crops and cash income. Women on the other hand look after the major crops in the absence of men; carry out post-harvest activities such as winnowing, grinding and husking; tend small plots of vegetables for home consumption; and look after livestock which are an important source of meat, milk and draught power. Women are also responsible for normal household chores such as food preparation, child care, and washing and cleaning. Lastly it is their responsibility to collect firewood and fetch water. Field surveys indicate that rural women with children work 16-18 hours a day. Of this 3-4 hours are spent on looking after field crops, 2 hours on animal husbandry, 6-7 hours on household chores and up to 5 hours on the collection of fuelwood and water. The large allocation of time for water and wood collection reflects the fact that most households do not have access to piped water, and forests in the area have been receding due to overexploitation and lack of replanting, especially on communal lands.

In the future two factors are expected to change the demands on women's time. With IDA assistance the Local Government and Rural Development Department is undertaking a major programme of providing piped water to rural households. Under this programme the proportion of households with access to piped water will rise from 25% to 60% in the next five years. The other relevant development is the increasing use of kerosene and LPG as a source of fuel for household purposes.

These factors could reduce women's workload by up to five hours per day in affected households, releasing labour in particular to increase their earnings from livestock, vegetable production and sericulture.

C. Agriculture and the Sustainability of Natural Resource Use

Land Use and Farming Systems

The major uses of land in the project area should be described, highlighting the existence of under-utilised or over-exploited land, and the reasons for this.

The agricultural, livestock, fishery and forestry resources of the area should be outlined briefly and the major features quantified. The area and output of main products should be specified, and an indication given of the relative importance of these sectors in the local economy. The description should be in dynamic terms, highlighting short and long-term trends, and the possible causes for any trends should be explained.

Farm size, agricultural practices, crop rotations, role of livestock, availability of farm labour, level of technology and yields should be examined for each main farming system in

the project area, highlighting any differences between high and low income farmers. Changes which are taking place in farming practices should be noted and the reasons explained. Present production of main commodities and typical production costs should also be discussed. Production opportunities and constraints, as well as the various factors (social, land tenure, input shortages, lack of extension, etc.) which impede farmers from exploiting opportunities, should be clearly described and briefly analysed.

Such information, if it is not already available at the time of identification or is of doubtful accuracy, is a sufficiently important input into project design to justify special surveys or studies using rapid rural appraisal techniques, to be conducted early in the process of project preparation (see Part I, Chapter 2). The studies could cover such subjects as:

- land tenure
- farm size and land use
- cropping patterns, practices, varieties and yields
- livestock production
- production technologies
- farm inputs, sources, availability
- labour availability and utilisation
- financing (including credit)
- domestic consumption, markets and marketing
- producer prices
- on-farm and off-farm income
- perceptions of constraints, opportunities and priorities.

Sustainability of Natural Resource Use [3/]

This section should focus on environmental issues, especially on the sustainability of natural resource use in the project area. It should point to any particular areas of environmental concern - the clearing of mangroves for fish pond construction, rangeland degradation from overgrazing, the depletion of fuelwood resources, salinity problems in irrigated areas, sand dune encroachment, and so on. Areas affected should if possible be quantified, the economic and social cost assessed (if this is feasible) and trends established. Of particular importance is the identification of the underlying causes of any degradation processes, whether these are due to population growth, climatic deterioration, excessive ground or surface water abstraction, pollution, current farming practices, the construction of new roads, land tenure arrangements, or pricing and subsidy policies. Competition for natural resources, for instance between cultivators and pastoralists, or between irrigators and urban water users, should be noted and the effectiveness of regulatory measures examined.

Reference should be made to any instances in which degradation trends have been successfully halted or reversed, and the ingredients of such success explained.

Technologies

A careful assessment should be made of improved technologies which might be considered suitable for wider application under a project. This review should cover both

3/ This guideline does not set out the full procedures for environmental assessment (EA) studies, which differ between financing agencies. For the World Bank, guidance is provided in OD 4.01 Environmental Assessment and in the *Environmental Assessment Source Book (1991).*

technologies emanating from the research system and those of indigenous origin. It should show how each of the promising technologies could fit into the farming systems in the project area and assess its likely appeal to farmers of different types. Reference should be made to the degree of maturity of the technologies, particularly the extent to which they have been tested under farm conditions, either in the project area or under analogous agro-ecological conditions. Care should be taken in interpreting the results of trials carried out by farmers in which inputs have been supplied at artificially low costs.

D. Rural Institutions and Infrastructure

Input Supply, Produce Marketing and Processing

Special attention should be given to institutional arrangements and their effectiveness, as perceived by farmers, in supplying inputs (fertilizers, seeds, vaccines, etc.) and in marketing farm produce. Any particular impact of government agricultural policies (price supports, subsidies on inputs, taxes on products, etc.) in the project area should also be described and evaluated. Note should be made of the adequacy of distribution and storage facilities, as well as of the presence, capacity and current utilization of agro-industries. The respective roles of the public and private sectors in input supply and marketing should be examined.

Infrastructure

Roads, railways, telecommunications and other means of communication and services should be reviewed, particularly from the viewpoint of their relevance to the supply of farm inputs and the marketing of output. Particular attention may be given to the adequacy of arrangements and funding for infrastructure maintenance. For projects concerned exclusively with the financing of rural infrastructure, such as feeder roads or storage, the weight given to this section of the report would be substantial.

Administration, Services and Farmers' Organizations

This section (which supplements the discussion of the national situation in Chapter 2) should briefly describe and evaluate the *local* activities of extension, research and credit services, the system of local government administration, and special institutions (such as non-governmental organizations) operating in the project area, to the extent that this is relevant to the project. Special attention should be given to evaluating farmers' organizations, present initiatives towards peoples' participation, informal savings groups and cooperatives, and to assessing the extent to which these benefit the target population; the section should review their present functions, organization, financing, staffing and effectiveness and long-term viability, and draw attention to any problems affecting their performance or capacity to fulfill their responsibilities. The main purpose of this section is to provide the background to the eventual project organization and management proposals given in Chapter 6. It should therefore focus on telling the reader which institutional arrangements are working satisfactorily and which would need improvement under the project. Where peoples' participation or other community or non-governmental initiatives are expected to play a part in the project, the prospects for their success should also be analysed here.

E. Projects and Ongoing Development Programmes

Other projects taking place in the area should be outlined (to the extent that this has not been covered under Chapter 2), and an assessment made of their performance, impact and any lessons learned, so far as they are relevant to the proposed project.

CHAPTER 4: PROJECT RATIONALE AND DESIGN CONSIDERATIONS

(3 to 6 pages)

This chapter leads the reader up to the point at which he or she can appreciate the overall need, justification and feasibility of the project proposals that are to be made. It is the part of the preparation report which is most likely to repeat arguments developed first at identification, but these should be modified and deepened to reflect the findings of further thinking and studies. It may briefly refer to any options which were discarded or adjusted at earlier stages, but should then explain the reasons why the particular project concept which is now being brought forward for financing was chosen. Based on the information already given in the background sections of the report, its purpose is to complete the explanation of why an investment project is needed, define its overall objectives, and indicate what kind and scale of project would be best suited to the existing circumstances. However, it is *not* the purpose of this chapter to present the actual project proposals; that is the function of later chapters and anticipation at this point should be strictly avoided.

Occasionally, when area-specific projects are presented, it may be useful to discuss the *rationale* for the project (especially the reasons for selecting the area) *before* the chapter on the project area, leaving the treatment of *design considerations* to a later chapter.

A. Project Rationale

A good starting point for building up arguments on the general need for a project and on the level of priority that it deserves is to make reference to the country's goals for the rural sector or for specific sub-sectors, to food needs or market opportunities, to its comparative advantage in the production of specific commodities or to the need for a more rational use of natural resources. It is necessary to show how these goals also converge with (or diverge from) the priorities of the intended beneficiaries and are consistent with responsible environmental management and technical sustainability. Consistency with the lending policies of the proposed financing institution should also be demonstrated. From these considerations, the general objectives of the project should be derived and presented.

The next step is to move from such general needs and objectives to a strategy, and the justification of specific actions. This is most often initiated by reference to *opportunities* which exist. These may take the form of unsatisfied markets, of technical opportunities for increased productivity or of more sustainable use of natural resources, or they may be expressed in socio-economic terms by referring to the existence of producers or communities who can be shown - by precedent or through surveys - to be interested in exploiting such opportunities. *Constraints* which prevent the successful and sustained exploitation of these opportunities can then be identified. Finally, referring particularly to the government and its associated

institutions, the *broad actions* can be specified which could be taken, or would need to be taken, to overcome the constraints and to create conditions in which the opportunities would be exploited. To arrive at a strategy it is necessary to consider how best to orchestrate and phase the proposed actions.

By such a sequence the concept of a possible project is built up. Much of this section will refer to topics initially raised at identification (see Part I, Chapter 2) and subsequently refined by preparation work. A practical example is given in the first box overleaf. The second box gives an example of text for the opening section of a project rationale chapter.

Example

Developing the Rationale for a Fuelwood Production Project

- Review the country's plans for energy self-sufficiency, and related lending policies of the proposed financing agency.
- Refer to actual or projected fuelwood shortages and the secondary effects of these - time spent by rural households (especially women) in wood collection, erosion, loss of soil fertility due to use of manure as a substitute for wood fuel, etc.
- Indicate that, in the absence of specific actions such as might be taken by a project, the situation is likely to become still more serious.
- Examine alternative potential fuel sources and their relative costs, but conclude that - either for economic or social preference reasons - there is likely to be a continuing growth in demand for fuelwood.
- Show that prevailing or expected prices would be sufficient to provide reasonable financial returns on tree planting.
- Establish that land tenure, tree ownership and other socio-cultural constraints to afforestation could be overcome.
- Examine in detail the performance of past plantation programmes and identify the reasons for success or failure.
- Demonstrate, by reference to precedents and to enquiries with the rural people, that certain species will grow at satisfactory rates in the selected area, and that - if the planting is to be on private land - farmers would be interested in tree planting.
- Indicate that it is institutionally and fiscally feasible to carry out the actions that are to be proposed.

Example

A. Project Rationale

The Northern Areas of the country are primarily agricultural, with very little industry. Their poor resource base and slow past agricultural development have resulted in a failure of farm employment opportunities to keep pace with population growth. As a result, off-farm incomes are becoming increasingly important. Despite increasing out-migration and a reduced interest in farming as a consequence, there remain three major reasons for intervention to improve agriculture. First, there are a number of opportunities in the agricultural sector to increase production of high value cash crops, particularly fruit and vegetables. Secondly, the pattern of migration is such that normally only young adult males work off-farm while women, children and old men stay on the land: these people continue with traditional subsistence activities such as production of basic cereals, fodder and milk; although their productivity tends to be low, it could be substantially improved. Thirdly, a combination of the environmentally fragile resource base and pressure in key areas, such as forests and grazing lands, is leading to degradation; urgent action is needed to introduce more sustainable exploitation of these resources within the constraints imposed by the topography and geology of the area.

The overall objectives, which are close to the Government's sectoral priorities, would therefore be to expand production of high value crops; raise productivity of subsistence activities, and conserve the environment. The project envisages that all directly productive activities would be carried out by private farmers. The Government would limit itself to creation of essential infrastructure and to providing certain indispensable support services where the private sector is unlikely to be active in the short to medium term.

B. Design Considerations

Once the conceptual case for a project has been made under the section on project rationale, attention needs to be directed to defining the specific form that it should assume and to explaining this to the reader.

As indicated in Part I, the process of project design usually involves the establishment of broad objectives, a review of the options for achieving those objectives and a progressive narrowing down of these options through the application of a series of criteria. This leads to decisions on the strategy which, as a consequence, should be built into the final design. This section on design considerations is the place to present the results of that process, focusing on the considerations which have led the concept outlined in the rationale to evolve into the project and its main components in their final proposed form. In particular, it should address questions such as:

- -selection of the *location(s)* for the project;

- -selection of the *target population* for the project and any special targetting measures required to ensure that the project really does benefit these people; the complex issue of how to prevent project resources bringing undue benefits to persons outside the target group, but without whose influence the project might nevertheless not succeed, needs special treatment;

- the *appropriate scale* for the project: this should give special importance to an analysis of the scale and success of any precedents, to assessments of institutional capabilities and to a review of the possible impact of government funding constraints; it should also examine, to the extent that these are relevant, the implications on project size of market possibilities, economic and financial viability, environmental concerns and risk exposure;

- the *range of components* to be included in the project, showing how those selected fit with the proposed development strategies, and the reasons for excluding other candidate components: exclusion might be based, for instance, on concerns over managerial complexity, non-viability, inconsistency with the mandate of the financing agency, or the need to avoid or mitigate potentially adverse environmental impacts;

- the *choice of technical strategy and technology*: whether, for example, in a tuna fisheries project to use ship-based or on-shore freezing facilities (see box below); whether to base a farm development programme on the introduction of a cash crop or on the intensification of traditional mixed farming systems; the extent of confidence which can be placed in the findings of trials and research as a basis for projecting the uptake by farmers of innovative practices; what technical practices to promote in seeking to reverse rangeland degradation, deforestation or soil loss from continuously cultivated land, taking account of both environmental concerns and farmers' expected reactions to the technical proposals;

- the selection of *organizational arrangements* for the project: for example whether to reinforce existing entities to run the project or to create a new unit; the strategy for eliciting and sustaining the commitment of the intended beneficiaries to the project, particularly the means of securing their effective participation in project management;

- the appropriate *time frame* for the project and phasing within this;

- the need for *ancillary adjustments* in laws, policies and institutions.

Example

Design Considerations: The Choice between Land and Ship-Based Fish Freezing Operations in the Maldives

For the future, tuna fishermen in the high potential atolls in the extreme north and south of the Maldives can be served either by a new land-based freezing/cold storage complex or by new mother ships with on-board freezing facilities. Operating costs incurred by existing ship-based freezing and cold storage facilities are currently about 80-90% higher than those of freezing and cold storage costs at the land-based facilities in Felivaru. Costs do not vary significantly between old and new ships. In fact, costs are slightly lower on the old ships due to the fact that these are fully depreciated and not eligible for insurance. Although the land-based plants require extensive infrastructure facilities, their efficiency would be substantially higher than that of the present floating operations, and, in addition to the cost advantages, land-based facilities also tend to be more reliable. Repairs and maintenance work can be carried out by a resident team and adequate stocks of spares can be maintained on hand. In contrast, vessels need to be pulled out of service for 2-3 months of the year for annual dry-docking and surveying, the facilities for which are not available in the Maldives. Also, given the manpower situation in the Maldives, it is often difficult to find qualified crew prepared to spend long periods on board ships. As a result, foreign crews have to be recruited, which makes operations expensive. Finally, establishing land-based facilities would create employment, raise incomes and improve services in the smaller islands. This would significantly contribute towards the Government's objective of developing growth centres in the outer atolls so as to reduce the pressure to migrate to the capital.

This is also the place to discuss the extent to which it is desirable to build *flexibility* into the design of the project and to say how this could be done in ways which are consistent with the funding practices of the financing agency. While there is little need for flexibility in "hard" projects, involving, for instance, the construction of major civil works, there are many advantages in designing "soft" projects - for rural development or strengthening of services - so that these can readily respond to new information or opportunities which arise in the course of implementation. Given the inherent difficulties of predicting, for instance, the availability of new agricultural technologies, the rates at which innovations will be adopted by farmers, future prices or even the capabilities of a new institution, it is not advisable to design into projects of this type an excessive rigidity in the allocation of resources.

Where flexibility is being sought, a very important element of the section on design considerations will be a discussion of the possible mechanisms to be used to provide it and of the safeguards to prevent its abuse (see box in Part I, Chapter 3). If flexibility is to be attained, as is often the case, by the creation of a Development Fund, the criteria to be used in approving releases and managerial arrangements should be foreshadowed under design considerations, though dealt with in detail in subsequent sections of the report.

In the case of *repeater projects*, reference should be made to the performance of previous phases, and it should be explained how the lessons learnt from their evaluation would be taken up in the design of the later project.

CHAPTER 5: THE PROJECT (5 to 8 pages)

As a sequel to the previous chapters, in which the framework of constraints and opportunities for development would have been established and a project rationale, objectives and strategy derived, this chapter and its supporting annexes should define and describe in detail the project works and activities, their phasing, their costs and how they would be financed and procured. In arriving at a definition of the works and services needed to attain project objectives, the project design team should always be on guard against over-dimensioning, especially of government services. Rigour should be exercised both in defining minimum needs for the tasks ahead and in maximizing the use of any existing resources or capacity. Only incremental funding needs should usually be proposed for financing.

In the case of sector and sub-sector loans, a modified approach is likely to be required, in which a separate chapter describing related policy and institutional reforms is inserted before the detailed treatment of the investment components given in this chapter.

In describing a project, either in summary form (see A. General Description, below or subsequently under B. Detailed Features), it is convenient to distinguish between *project objectives* and their related *components* on the one hand, and *expenditure categories* on the other. This distinction is explained by means of an example in the box opposite. A corresponding distinction should be retained in the tabular presentation of costs, whether these are prepared manually or using computer programmes such as COSTAB (see Part II, Chapter 4). The sequence in which topics are addressed should be consistent between the text and the tables.

A. General Description

This section, which generally should be no longer than one page, presents the reader with a brief overview of the proposed project. It can often be quoted more or less unchanged in the Summary and Conclusions at the beginning of the report. The usual content is;

- A short description of the project's overall and immediate objectives.
- A brief summary of each main component.
- A reference to costs and phasing.
- An indication of organizational arrangements.

An example is given in the box on the next page.

B. Detailed Features

The aim of this section is to describe the project in more detail so that the reader acquires a fuller understanding of each of its components and the inter-relationships between them. Careful thought must be given to the depth of description required. The nature and scope of project actions must be described in sufficient detail for the general reader to appreciate their relevance and technical soundness. But lengthy descriptions, specifications, designs and cost estimates are tedious and should be placed in supporting annexes or working papers.

The core of this section is usually a separate résumé, for each of the project

components, of the main physical quantities which are proposed for financing, grouped under expenditure categories if appropriate. While cost estimates are only presented in detail in Section D of this chapter, it often helps to note in brackets, at the start of the component description, its total cost and the percentage of total project costs which it represents. Increasingly, also, financing agencies prefer each component résumé to end with a brief reference to the field-level implementation arrangements, leaving the description of the broader (not component-specific) institutional arrangements for Chapter 6. An example of a component résumé incorporating all these features is given in the box on page 81.

Objectives, Components and Expenditure Categories

Objectives. A project normally has a specific objective which can be expressed in relatively simple terms - such as "to increase foreign exchange earnings through raising the national output of rubber by 25,000 tons per year within 10 years". The means by which this objective would be achieved may be termed the **components** of the project.

Components, for instance, could include:

- establishment of 15,000 ha of new smallholder rubber plantations;
- rehabilitation of 7,000 ha of mature rubber on a nucleus estate;
- construction of a latex concentrate factory (capacity 50 tons per day);
- strengthening the management and operations of the nucleus estate company.

In turn, it is possible to identify **sub-components;** for instance "Establishment of 15,000 ha of new smallholder rubber" could include:

- establishment and operation of nurseries;
- mechanical land clearing of 10,000 ha of forest land;
- planting of 15,000 ha of rubber, divided into 2 ha units;
- construction of housing and provision of community facilities for 7,500 settler farmers;
- construction of 80 km of roads;
- provision of technical advisory services to farmers.

Expenditure Categories. Expenditure categories (known as **summary accounts** in COSTAB terminology) are used to classify the items against which disbursements will be made under the project. Thus, for each objective or component of a project, there are likely to be several categories of expenditure, such as:

Civil works
Equipment
Technical assistance
Training
Incremental operating costs

Each of these categories may, in turn, be broken down into a series of items and ultimately into a set of detailed specifications for goods and services.

Thus, the sub-component for "Establishment and Operation of Nurseries" in our illustration could include:

Category	**Item**	**Specifications**
Civil works:	Gravel surface road (1 km)	
	Fencing (2.5 km)	
	Water tank (50,000 litres)	
	Shed/store (150 sq m)	
Equipment:	Tractor (65 hp) and implements	
	Irrigation equipment	Water pump (5,000 litres per hour)
		Portable aluminium piping (110 mm x1,000 m) and sprinkler fittings

Example
Project General Description

The main objectives of the project would be to raise agricultural and forestry output in selected watersheds in conjunction with improvements in soil conservation and watershed protection. A related objective would be the strengthening and development of government agencies involved in project implementation and supervision. The proposed project would, in addition, provide a framework for the future integration of other donor support for initiatives in the fields of hillside agricultural production, watershed management and forestry. These objectives would be achieved by introducing within selected watersheds an appropriate mix of improved hillside farming systems on lower more accessible slopes, forest planting and management on steeper slopes, and some mechanical soil conservation measures. The ability of the government to implement the project would be enhanced by the provision of support to the extension service and to the Forestry Department (FD). Components and subcomponents of the project would include:

(a) Watershed Protection and Small Farmer Development:

- strengthening the managerial and operational ability of the Rural Agricultural Development Authority (RADA), including the rehabilitation of the Soil Conservation Training Centre;

- establishment of 3,200 ha of fruit trees and improved annual cropping practices on 32,000 ha of farmers' lands in the upper catchments of critical watersheds, including grass barriers and field ditches;

- provision of funding for essential soil conservation civil works or gully plugging in critical areas;

- support for research into improved hillside farming systems.

(b) Forestry:

- improved management and protection of forest reserves, which would involve the establishment of 3,200 ha of plantations on degraded public forest reserve land;

- tree planting by private land owners on some 2,000 ha; and

- institutional strengthening of the Forestry Department.
-

(c) Development of the Natural Resources Conservation Authority (NRCA):

- provision of institutional support to NRCA to enable it to undertake its responsibilities as an environmental agency, especially with regard to watershed protection.

Funds would also be provided for a Project Coordination and Monitoring Unit.

Total project costs, over five years, are estimated to be US$16.5 million, (J$132.0 million) of which US$5.8 million (J$46.0 million) would be the foreign exchange component.

The Ministry of Agriculture, through RADA and the FD, would be responsible for implementation of the hillside farming and forestry activities respectively. A Project Coordination and Management Unit (PCMU) within the MOA would provide a means of coordinating project activity with that of other donors in the fields of forestry and watershed protection, and of providing linkages with other involved government agencies and departments.

Example

Description of a Project Component

Adaptive Research (US$2.5 million, 12% of total cost). In order to test and propagate existing technology and to generate applicable new technologies in soil conservation and land management, the project would finance: (a) some 30 major trials on soil conservation practices, focussing on combinations of soil preparation methods, crop rotations, green manuring and soil fertility, and another 110 applied research trials on input use rationalization, cropping diversification and practices for improvement of environmental quality; (b) demonstrations of improved pasture management (total 350 ha of plots) and mechanical conservation practices (800 km of terracing, drains or erosion control works); (c) detailed resource monitoring and socio-economic studies in 8 pilot microcatchments; and (d) production of seeds for green manure crops on about 120 ha.

To carry out these tasks, 15 researchers, 50 mid-level technicians, and about 15 support staff would be recruited. The project would finance rehabilitation and construction works in the 7 research stations involved in the project, the acquisition of laboratory and agricultural equipment, incremental operating costs, and 18 man-months of short-term training overseas and 6 man-months of external consultancies.

The Secretariat of Agriculture's agricultural research affiliate (CPA) would be responsible for implementing this component through its subordinated research institutes. Annual operating programmes would be prepared to establish the institutes' respective tasks, physical targets, costs and source of funds.

Set out below are suggestions on the treatment of a number of points which are found to be frequent sources of confusion to project preparation teams in defining project components.

Items for Inclusion in the Project Costs

- Include *all* components and inputs necessary for the project's success, regardless of source of financing - i.e. include the value not just of public sector inputs but also of farmers' own contributions to the investments, whether in cash, materials, equipment or in the form of labour.

- While projects were once regarded as vehicles for financing capital investments only, most financing agencies have broadened the definition of eligible items to include such items as:

- *Incremental operating costs* - i.e. recurrent costs over and above the "normal" running costs of the concerned agencies - incurred during the disbursement period specifically for the implementation, management and monitoring of the project.

- *Technical cooperation*, either foreign or national, aimed at increasing the capacity of concerned institutions to implement the project. Note that such technical assistance should usually be treated as a category of investment expenditure (related to specific

project components, such as "project management") rather than as a project component in its own right.

- *Training,* both overseas and local, aimed at improving staff capabilities: most frequently training is related to meeting the staffing requirements for implementing the project, but usually training aimed at more general institutional strengthening also qualifies for project financing.

- *Project preparation costs,* **if** these have been financed by reimbursable loans from the financing agency, for instance under the World Bank's Project Preparation Facility.

- *Engineering costs and architects' fees* that would be incurred during the disbursement period.

- *Interest during construction:* some financing agencies are prepared to consider as a project cost interest payable during the disbursement period of the loan. Amounts, however, can only be calculated once a financing plan has been finalized (see E below).

- *Start-up costs:* one-time costs such as legal fees, payments for feasibility studies, licensing or registration fees.

- *Studies and trials: particularly those concerned with project evaluation and aimed at providing a stronger technical basis for later projects.*

- *Working capital:* to cover the projected incremental working capital required to bring a project-funded enterprise to the point at which it reaches steady-state operation.

Items Conventionally Excluded from Project Costs

- *Sunk costs:* costs which have been incurred prior to the commencement of a project (e.g. in constructing a dam prior to a project which would complete the irrigation water distribution network) are conventionally excluded from project cost estimates, but the amounts already invested should be noted if these are known.

- *Taxes and duties:* duties and other taxes on imported goods are usually excluded from project cost estimates, especially if the government has agreed to waive these. Should they be included, rates and amounts should be indicated so that appropriate adjustments can be made in the economic evaluation.

- *Land:* the value of land (e.g.. farm land) required for the project is normally excluded from project costs *except* in cases where important amounts have to be purchased by government for project implementation purposes (e.g. for construction of main canals in an irrigation system or for siting of a wholesale market).

Level of Detail

While only a summary description is required of each component in the main text of the report, this must normally be derived from more detailed specifications and estimates given in annexes or working papers, or in separate studies, to which reference should be made.

A summary of the extent of detail and degree of accuracy appropriate at each step in the formulation of projects with engineering components, which is broadly relevant also for other types of projects given as Table 1 (pages 127-131 of published book).

The level of design required for appraisal of civil works and machinery is a matter of engineering judgment, and treatment will depend on the nature of the investments, which may be considered in three broad groups.

- *Important major works*, such as dams, specialised processing plants, main roads. Detailed site investigations are normally required, and at least preliminary designs and specifications should be complete. All multilateral financing agencies have strict procedures to be followed in engineering studies and designs for major dams and for the resettlement of people displaced by reservoirs or other major works.

- *Relatively homogenous repetitive works*, such as tertiary and quaternary irrigation channels and drains. For these it is necessary to complete surveys and prepare detailed designs and quantity estimates for representative sample areas and, in all cases, for the area to be covered in the first year of the project. Total quantities and costs for the whole component can be derived by extrapolation.

- *Minor works*, such as small bridges, farm access roads, etc. Estimates can be derived from standard type designs.

Most financing institutions accept that preliminary design standards form a satisfactory basis for project preparation. The World Bank, however, requires that "by the time of appraisal/negotiation, engineering work (field investigation and detailed design) should be well advanced so that bidding documents are available about the time of Board approval to facilitate tendering, to shorten the project cycle and provide accurate project costs" [4/] . However, in the absence of specific instructions from the financing agency, preparation should not proceed beyond the point of ensuring completion of the work and studies necessary to provide an adequate basis for appraisal.

Where the degree of accuracy of the preliminary estimates is difficult to determine because of lack of adequate engineering or survey data, or where the extent of possible error is greater than that considered tolerable - and particularly in respect of those projects with borderline economic rates of return - it normally would be necessary to commission detailed engineering studies. This is most often the case in roads and port development projects, but it should also apply, for example, to the main canals or storage structures of an irrigation project.

Credit

Many agricultural projects finance the lending programmes of agricultural credit institutions. Credit, as such, is, however, seldom a component of a project, but merely the *means of financing* part of a component. Thus, a project may have a component, for example, for the establishment of coffee plantations, which could be financed from a combination of three sources:

- farmers' contributions in the form of labour for land clearing;

[4/] See: World Bank OMS2.28. *State of Project Preparation Necessary for Loan Approval* (1978).

- government subsidy on seedlings;

- long-term loans from the agricultural credit bank to cover purchased inputs and hired labour.

The total cost of the component (rather than just the credit element of costs) would be shown in the estimate of project costs (see D below), and described in the text. The credit-financed element of project costs should only be shown separately later in the main report, in a project financing table (see E below).

An exception to this convention may have to be made when a project provides funds for on-lending by the banking system for a mix of sub-projects in several sub-sectors. In this case the line of credit (rather than total costs which may be difficult to assess) may be treated as a component.

Note that for short-term credit programmes (e.g. for an input distribution component), it is usually assumed that repayments will be made in the year immediately following a disbursement and hence only the *incremental* amount of finance required each year to cover costs of an expanding programme is treated as a project cost. In assessing incremental credit needs, however, allowance should be made for any expected shortfalls or delays in repayments. Thus, if in a project for funding short-term fertilizer distribution loans, the value was to rise from $1 million in the first year, to $2 million in the second and $3 million in the third, it would be assumed that repayments in the initial years would be available to fund part of the subsequent years' disbursements - and hence the total charge on project costs would only be $3 million (assuming full repayment). If, however, a project is intended to assist a country in importing fertilizer, through providing the necessary foreign exchange, the total import cost over the whole disbursement period might be treated as a project cost.

C. Project Disbursement Period and Phasing

The disbursement period for agricultural projects commonly extends from around three to as much as eight years. Disbursement periods which finance major civil works usually match the time needed to complete construction. For other projects a long disbursement period offers the advantage of continuity; but the longer the time span over which predictions of costs and benefits must be made, the more likely their inaccuracy and the greater the need for mid-term evaluations, leading to adjustments in project scope. To overcome these problems, some lending agencies finance long-term development programmes through a succession of "time slice" projects, each with a fairly short (3 to 5 year) disbursement period. As lending practices vary between agencies, it may be necessary to tailor the implementation period to the policies of the financing agency in view. When, for instance, an institution charges commitment fees on the undisbursed balances of a loan, lengthening of the disbursement period may unduly increase borrowing costs for the government.

One of the most important aspects of project cost estimation is the preparation of a realistic expenditure plan, in which forecasts of annual expenditure throughout the disbursement period are made. The timing of expenditure has a significant impact on the costs of a project (especially in periods of inflation) and on its viability. Reviews of past project performance show that unrealistically tight scheduling, particularly over-optimism on what can be achieved in the

first year, is the most frequent design-related problem encountered by agricultural investment projects (see Part I, Chapter 2). The World Bank has examined precedents in order to develop standard disbursement profiles for countries and sectors and these can serve as an input in arriving at a judgment on appropriate lengths of disbursement period and on phasing within this.

Phased estimates of costs should be derived from careful scheduling of the main tasks to be undertaken during project implementation. In the case of projects involving complex engineering works, or in which there is considerable interdependence between components, the use of formal scheduling tools such as critical path analysis, network analysis or PERT (Programme Evaluation and Review Technique), is recommended. For most projects, however, it may be sufficient to apply less structured scheduling techniques to confirm or refute the validity of the implicit judgements on which most timing estimates tend to be based. This could simply involve listing the key tasks implied by each of a project's main components, placing these in an operational sequence (for instance on a bar chart), estimating the likely time required for each step, listing demands on management staff or skills in potentially short supply, and noting other potential constraints or risks. From such a simple exercise, it is possible to derive a reasonably accurate expenditure profile for each component over time, to assess critical demands on management and staff, and identify needs for coordination between components or with activities outside the project.

D. Cost Estimates

Project Costs

The importance of sound cost estimates cannot be over-emphasized. They provide the basis for determining the project's financial and economic viability and also its funding.

The text of the main report conventionally refers to the total costs implied by the project proposal (i.e. to all incremental expenditures which will be incurred during the course of the proposed disbursement period). But to advise the government on the longer-term budgetary implications of the project, the costs required to sustain the project after the close of disbursements should also be estimated in a separate table and commented upon (see Operating Costs, below).

Up to five summary project cost estimate tables can usefully be included in the main report.

- A project cost summary by component, expressed in local and foreign currency equivalents.

- A project cost summary by component and year of disbursement.

- -A project cost summary by expenditure category, expressed in local and foreign currency, showing the proportion of total costs attributable to each category.

- A project cost summary by expenditure category classified by year of disbursement.

- A summary matrix of project costs, classified by component and expenditure category.

Examples of typical tables, prepared using PC-COSTAB, are given in Tables 2 to 6 (pages 132-136 of published book).

For projects being prepared for financing by IFAD, additional cost tables are required to show (i) a cost breakdown which separates out direct support to farmers (e.g. credit, inputs) from funding for government institutions (vehicles, buildings, salaries, operating costs); (ii) a cost breakdown which allows IFAD to distinguish the percentage of the base cost which goes to targettable versus untargettable components; and (iii) an analysis of the cost per beneficiary of each component (or, alternatively, the cost per household of each credit module to be taken up by beneficiaries).

The text (see box below) is usually "written around" the tables It should:

- indicate the sources (and dates) of unit costs from which the estimates are derived, giving an indication of their accuracy;

- highlight the importance of any major elements;

- provide an estimate of the total costs and of the foreign exchange component of project costs: this includes both the outlay on fully imported items and the estimated import content of goods and services paid for in local currency (e.g. the imported elements of locally-assembled tractors);

- distinguish between capital costs and those recurrent costs (e.g. for training) which have been treated, for the purposes of estimating project costs, as investment costs;

- explain assumptions on physical and price contingency rates.

Example
Main Text Section on Cost Estimates

Project Costs

Total project costs, including physical and price contingencies, of the 5-year project are estimated at Rp.77 billion (US$41.7 million), with a foreign exchange component of about 40%. About three-quarters of the costs concern the project's seed production programme, while the remaining quarter would support cotton research. About 60% of the baseline costs are represented by investments in fixed assets and equipment, most of which would be made during the first three years of the project; the remainder are incremental net recurrent costs during the disbursement period. Operating costs after the close of disbursements are expected to continue to run at about Rp.250 million per year.

The cost estimates have been derived from preliminary designs for civil works, from suppliers' quotations for equipment and - for recurrent costs - a detailed assessment of the current operating costs of the Cotton Corporation. All costs refer to the last quarter of 1990. Physical contingencies, totalling Rp5.5 billion, have been calculated as follows:

Civil works - 15%
Equipment - 10%
Vehicles - 10%

Price contingencies on the foreign exchange component of the project have been estimated at rates of 4% per year for the first 2 years, declining to 3% p.a. for the final 3 years. Price contingencies on local expenditure assume that domestic inflation will continue at 5% per year. A 1.5 year delay is allowed before disbursements would begin. Under these assumptions, price contingencies amount to Rp18.4 billion.

An indication should be given as to the *accuracy* of the cost estimates and how these have been derived. Baseline costs are expressed in market prices in constant terms; if the costs of any payable taxes and duties are included, the value should be clearly identifiable. Estimates should all relate to the same date, which should be specified and is usually around the time of project preparation. Special problems arise when preparing cost estimates for projects in countries which suffer chronically from rapid inflation and regularly devalue their currency. Here it is advisable to "freeze" all unit values in local currency at an indicated date and exchange rate, and from then on quote all values, for both local currency equivalents and foreign exchange, in US dollars.

Detailed breakdowns of costs should be given in annexes. Estimates of the costs of civil works should be based on unit rates and quantities derived from at least preliminary designs. Costs of major equipment items are normally based on recent quotations from potential suppliers. Costs of on-farm development may be drawn from an aggregation of representative farm models (which can be computed using FARMOD), but it should be clearly indicated whether or not these include non-cash contributions (e.g. in the form of family labour contributed by the farmers).

Contingencies should be added to the base-line costs at rates specific to each category of expenditure to determine total project costs.

- *Physical contingencies* are included in the project costs to allow for uncertainties and to compensate for possible inaccuracies in the estimates of work quantities. They should not, however, be treated as a miscellaneous category of costs to cover items either

overlooked by the planners or included to give a project greater flexibility. In the latter case, the amounts allocated should be identifiable (e.g. as an "unallocated" component). The rate of physical contingencies to apply varies according to the degree of confidence placed in the estimates but, for civil works, commonly lies between 10 and 15 percent by the time project preparation is complete, although under exceptional circumstances it may be greater if local conditions preclude accurate estimates. Assumptions should be explained.

- *Price contingencies* may also be estimated (on phased base-line costs *plus* physical contingencies) to demonstrate the probable escalating effect of inflation on project costs and hence the magnitude of financing required. Assumptions on price contingency rates (which may be different for foreign exchange and local costs) should be noted, together with those on the assumed period between the date of the base-line cost estimates and project effectiveness. The economics staff of financing agencies are usually in a position to provide project analysts with forecasts of inflation in borrowing countries, as well as standard assumptions on international rates. It should be noted, however, that in countries which operate floating exchange rate policies, rates of inflation tend to be matched with corresponding devaluations of the currency. In such cases, so as to avoid possible over-financing in dollar terms, probable countervailing movements of the exchange rate should be taken into account in establishing the dollar equivalent of domestic inflation.

Operating Costs

For projects - especially those concerned with improving services - which lead to substantial increases in recurrent costs to be borne by government, a table projecting operating and replacement costs after the close of the disbursement period should be prepared. The table should show by categories the continued cost of running, maintaining and replacing the assets created by the project, and the cost of operating services at the levels necessary to achieve project objectives. It may be desirable to comment on the government's capacity to continue to meet the implied financial commitments, and on any steps that would be taken to improve fiscal sustainability, such as increased cost recovery from beneficiaries or privatisation of services (see Chapter 9 below).

E. Financing

Some financing agencies, but not the World Bank or IFAD, expect a preliminary financing plan to be proposed by the country submitting the project for appraisal. Such a plan, in the form of a table, would indicate for each main expenditure category the amount proposed for financing by external financing agencies, the government, implementing agencies (from their own resources), credit institutions and beneficiaries. Since the final plan will be a matter for negotiation between the financing agencies and the country concerned, and in any case it is the prerogative of the financing agency to determine what it will and will not finance, care must be taken not to imply a commitment of the agencies to the proposal. It is perhaps pertinent to point out that some financing agencies restrict financing to the direct and indirect foreign exchange component of the project. More frequently, however, a proportion of local costs may also be financed. Assurances of government capacity to meet its proposed share of project costs should be sought, especially for projects in countries which have a record of failure to meet counterpart funding obligations in earlier projects.

Assumptions on the beneficiaries' contribution - in cash or kind - to project

financing may need discussion. Particularly for disadvantaged groups, the proportion of incremental capital and recurrent costs which they are assumed to meet from their own resources, unofficial borrowing or project-funded credit may need to be justified.

For *all* projects an explanation should be given either here or in Chapter 6 as to how funds would flow and be monitored and how reimbursements would be made. For projects with a substantial credit element, the terms and conditions under which loans would be made to farmers and other borrowers should be given. Reference should be made to eligibility criteria (including any special measures for improving access of women, the landless or other disadvantaged groups), sub-loan periods, grace periods, interest rates in both nominal and real terms, and to ceilings and conditions for financing. Special note should be made if any of these differ significantly from standard loan terms in the country.

F. Procurement

Most multilateral and bilateral financing institutions have their own requirements for procurement which are set out in guidelines issued for borrowers [5/] : their relevance to the items to be purchased under the project should be explained. For example, the World Bank normally requires that borrowers obtain goods and contract major civil works through international competitive bidding (ICB), open to suppliers and contractors in all of its member countries. Allowances may be made for preferences for local and regional manufacturers and, where appropriate, for local contractors under prescribed conditions. Procurement under loans for agricultural credit, livestock or rural works programmes, typically consisting of many small sub-projects, generally does not involve international competitive bidding except where items can be suitably contracted or procured in bulk - for example, fertilizer. The principle of "competitive procurement" from potential suppliers, however, remains the same, but it is recognized that small projects, or projects dispersed over remote areas, are unlikely to attract international competitive bidding. In such cases, the existing procurement procedures practised by government should be summarized, and the capacity of domestic channels to supply the investment items should be assessed. An estimate should be given of the likely time requirements for the procurement of the main project inputs. This must be fully reflected in the phasing of costs (Section C, above).

G. Accounts and Audit

The arrangements for keeping project-related accounts and for their annual audit should be explained.

5/ See, for instance, World Bank and Inter-American Development Bank, *Sample Bidding Documents: Procurement of Goods* and *Procurement of Works,* (1985, 1986).

CHAPTER 6: ORGANIZATION AND MANAGEMENT (4 to 7 pages)

This chapter explains how and by whom the project would be executed and operated. Once the technical and economic parameters have been defined, the establishment of efficient arrangements for management is likely to be the key to project success. In writing this up, any duplication with the background and assessments of institutions given in Chapters 2 and 3 should be avoided. The current chapter should concentrate only on the particular institutional arrangements which would be adopted in the future, for project implementation. It should particularly emphasise any differences from past arrangements which would be introduced.

A common feature of project design in the 1970s was to establish special, relatively autonomous, units for the management of projects. While this often resulted in good management during the development phase of the project, questions have arisen over the sustainability of such institutions and of their possible negative side effects on the mainstream of the public service. Hence, although still a valid approach in some cases, the tendency has been to look increasingly to existing organizations and departments, duly reinforced, to take the lead in project management. The limitations of most types of public sector institutions - whether special units, parastatals or regular departments - as project management entities and as sources of services are, however, all too evident. Therefore it is now usual in project preparation also to examine opportunities for mobilizing private sector interests, particularly traders and non-governmental organizations (NGOs), to provide services formerly offered by the public sector. The difficulties of such an approach, however, are also considerable and the private sector, which is often as yet poorly developed in many countries, should not be seen as a panacea to all the problems encountered by public entities. Finally, increasing attention is belatedly being given to developing means of ensuring that the intended beneficiaries of projects themselves have a voice in their planning and implementation, so as to ensure that the actions of the project are consistent with their perceptions of problems and the means at their disposal to overcome them (see Part I, Chapter 4). The ways in which such participation would be institutionalized should be explained.

To the extent that adjustments in the roles and responsibilities of institutions are intended to take place, (e.g. through divestiture or privatization), the full implications of these changes need explanation, including the measures to be taken by existing institutions to address problems of redundant functions, staff and assets.

Ultimately, however, it is individuals, and not abstract entities, who take initiatives, make decisions, draw up plans, approve expenditure, hire or fire staff and decide each day whether or not a certain situation requires support or intervention. Their capacity to do this will be strengthened or curtailed by the institutional environment in which they work. This chapter (and its supporting annexes) should avoid repeating the description of the executing entities which should have been given in the background chapters. Instead, it should move directly to an explanation as to how these organizations would operate in the project context. Finally, it should refer to the jobs and the required qualifications of the key individuals who, through the exercise of such responsibilities, will make the system work.

A. General Aspects

The entity or entities which will be responsible for the various aspects of project execution and operation should be identified. How they would carry out their responsibilities should be explained. The aim should be to show that they are the most appropriate bodies to assume the particular assignments, and that they have the powers, structure, staffing, equipment, finance and motivation to undertake their respective functions; that they are capable of carrying them out effectively; and that there are satisfactory arrangements for coordination between (or within) entities responsible for each of the various project activities. Where deficiencies in any of the foregoing respects have been noted in earlier background material, the changes and improvements which the project would introduce to overcome them should be stated clearly and prominently. In some cases it may be necessary to consider reductions in project scope to conform with institutional capacities. An example of a general description of project organization and management is given on the opposite page.

Should any new institution have to be created for the management of the project, it is necessary to give, usually in an annex, details of its legal status, functions and powers, internal organization, operating procedures, staffing and budget. If the entity is not a government department, particulars should be given of its legal charter (basic law) and direction (Board of Directors; how appointed; extent to which subject to political directives, etc.) and any special provisions concerning its funding.

If there is more than one entity involved in project implementation (such as a project authority, a government department and a credit institution), arrangements for coordination in such areas as joint representation boards, commissions and committees, and in field activities should be described.

A distinction should be made between policy, advisory or coordinating bodies, and those with executive powers. Bodies in the former categories may decide or make recommendations on overall policy, distribute assignments between different participating entities, approve plans, budgets, accounts or reports, authorize major expenditures or contracts, or hire and fire top-level staff. Executive bodies, on the other hand, supply the former entities with the basis - usually information - on which to exercise these responsibilities; they then implement their decisions and report back on results. Often there are executive and non-executive entities at various levels - for instance national, regional, and in the field. It may be useful to begin the O&M chapter with proposals on institutional arrangements and responsibilities at each of these levels. This is also the place to explain institutional arrangements aimed at enhancing the involvement of rural families in the management of project implementation: for a text example see the box on page 94.

Example
General Description of Project Organization and Management

The Northern Sinai Agricultural Development Authority (NOSADA) would be established as an autonomous institution under MALR to plan, execute, supervise and monitor the development project. To do so effectively, the Authority would operate as a regional institution, working closely with the three concerned Governorates as well as Central Government institutions. It would have an independent budget for undertaking project construction and for operation and maintenance (O&M) activities, and its staff would come on secondment from relevant Government agencies and Ministries. Adequate incentives would be built into the salary structure of all staff.

The proposed organizational structure of NOSADA headquarters is shown in Chart 1 [not attached to this example]. Overall, the Authority would have a three-tiered management structure, allowing for the coverage of all 27 villages within the project area, and for their ultimate integration into the current governorate administrative systems. It would have 27 village centres and 4 regional centres, in addition to the headquarters.

The policy making, planning and coordination functions of NOSADA would be the responsibility of the Chairman, supported by a Board of Directors and a Technical Coordination Committee. Headed by a **Chairman** appointed by the Minister, MALR, the **Board of Directors** would include among others, the 3 Governors, the Undersecretaries of State of MALR, MPW, EEA, Ministry of Health, Ministry of Education, Ministry of Social Affairs, and Ministry of Planning. Other than providing the principal coordination mechanism between the various agencies represented in NOSADA, the Board would have an important policy-making function. The **Technical Coordination Committee** would be chaired by the Chairman, NOSADA, and its members would include senior representatives of all the technical ministries, the 3 Governors, PBDAC, ARC, and 2 elected representatives of the Village Associations' Central Committee. Its functions would be to advise on all technical and coordination matters.

Project implementation would be carried out through the **five operational departments** of NOSADA. The Department of Engineering would include units for design, procurement, construction management and supervision, and for operation and maintenance of all civil works. In accordance with current practice, NOSADA would arrange clearance of major irrigation and drainage infrastructure designs by MPW. For cooperative management, operation and maintenance of pumpsets and common irrigation facilities, NOSADA would assist in forming Water Users' Groups among farmers who share a tertiary canal and a pumpset, or a buried mainline; it would also help to form Irrigation Unit Associations of farmers who share irrigation block facilities or a booster pumping station. Above farmer level, the operation and maintenance of the major irrigation and drainage facilities would be performed by engineers mostly seconded from MPW. As under the present system, the Irrigation Sector Organization of the Department of Irrigation (of MPW) would be responsible for water distribution and the O&M of canals and open drains.

The Department for Agricultural Development would be responsible for agricultural research and extension, veterinary services, cooperatives, farm machinery services, credit and input supply, and marketing. The Department of Social Services would be responsible for education, health and community services. It would also assist villagers in establishing Village Associations to represent villagers' interests and to assume eventual responsibility for the provision of some services; once the latter have been effectively established and are functioning, the Department would initiate the establishment of Village Associations' Regional Committees. The Department for Land Settlement would be responsible for settler selection, land allotment and auctions, as well as resolution of any land disputes. Finally, the Department for Finance and Administration would be responsible for preparing annual budgets and financial accounts, maintaining personnel records, farmer accounts, and for general administrative matters.

Example

Involvement of Rural Families in the Project

It is intended that the project should be implemented in such a way that beneficiaries would participate fully in the identification and selection of activities. Decision-making functions would eventually be devolved from government agencies to groups affected by the project. Participation of beneficiaries would be obtained through the establishment of locally-organized Community Development Groups (CDGs) which would be responsible for the identification and execution of most sub-projects. These groups would also ensure the continuation of development activities beyond the life of the project. The CDGs would:

(i) provide a mechanism whereby the community would identify development priorities and investigate methods to carry out required actions;

(ii) seek the participation of those households of a community which constitute the project's target group and are interested in specific project interventions;

(iii) provide a forum where individual farmers with similar interests and needs would request and receive funds, technical assistance and training in skills to implement the chosen activities;

(iv) organize members to take responsibilities for different implementation tasks associated with the projects selected;

(v) encourage the participants to mobilize their resources and management skills to promote economic development generally, taking advantage of the technical training and innovations introduced by the project.

Having thus described and justified the overall institutional framework, it is usually then convenient to proceed to a description of the **procedures** which would be followed by the project organization in carrying out its main functions. Stress should be given to the annual or seasonal flow of information and funds within this institutional framework and to the processes for decision-making. This is likely to cover:

- the generation (usually starting at field level and involving beneficiaries) of physical plans and targets, their consolidation and approval (with reference, if necessary, to approval criteria);

- the preparation, consolidation and approval of budgets on the basis of these plans and how these fit in with national budget processes;

- procedures and responsibilities for release, transmittal and expenditure of project funds on the basis of approved budgets, including arrangements for requesting reimbursement from financing agencies;

- procedures for tendering, design, award of contracts and supervision of the construction of civil works and for procurement of goods and equipment (cross referenced to Chapter 5, Section F above);

- arrangements for implementing each of the project's major components;

- arrangements for monitoring by project management of the physical and financial progress of implementation and for responding to management information, as well as for the monitoring, control and auditing of expenditures. The careful design of management information systems, including the identification of the key parameters on which reporting should focus, is a critical aspect of project design, particularly for projects intended for flexible implementation;

- the format, frequency of generation, consolidation, onward transmittal and ultimate approval of project reports and accounts;

- arrangements for periodic external assessments of project performance - for example, mid-term evaluations, evaluation of the socio-economic impact on the intended beneficiaries, or external review of the quality and relevance of research programmes.

From here it is usually possible to focus on the **key posts** or individuals within the system. Points to receive attention are the functions of the posts or individuals; the minimum qualifications and experience required for appointment; who appoints the key individuals, their terms of service, to whom they are accountable and who reports to them; the plans, budgets, works, reports etc. with which they will deal; the limits of their authority over expenditure, over use of equipment and facilities, and over subordinate staff; how they coordinate their actions with others active in similar or related fields; and the main project results for which they will be accountable and on the basis of which their professional performance will be assessed. An example is given below.

Example

Responsibilities of Key Individuals

Research Division Directors would be responsible, in consultation with their colleagues, development agencies, the users of research and other external contacts, for proposing specific experimental programmes in compliance with the general research policy framework and budgetary envelope provided by the Board of the National Agricultural Research Agency. They would be held accountable for the technical standards of design and execution of approved programmes and for all day-to-day administration of the stations, sub-stations, staff and equipment under their responsibility, as well as for planning the professional development of their staff by on-the-job and outside training. They would provide the Director-General with appropriate technical and financial progress reports. They would be responsible for staff appointments at technician level and below, would be able to decide on the quarterly phasing of expenditures within their approved annual budget, and operate or have access to loan and savings accounts to manage their divisional funds.

For planning and reporting it is necessary to distinguish between information which

individuals themselves are required to generate, as opposed to receive from others, and whether they consolidate and pass on information or act on it on their own authority. It is also necessary to indicate the annual deadlines for successive phases of the planning/budget/implementation and reporting cycle for project actions and how these fit with normal government procedures. It is failure to meet these deadlines which will provide the project management with early warnings of slippage: clear deadlines are thus important in helping to reduce the implementation delays which feature so commonly in past project experience.

A most important aspect in the preparation of a project's organizational arrangements is defining the responsibility for maintenance of project funded works and equipment, the means by which maintenance will be assured, and how the costs will be covered.

Proposed organizational structures, lines of authority and processes can usefully be illustrated through charts, such as bar charts for project financing and execution.

B. Technical Cooperation and Training

The implementation of a project, especially if it is intended to introduce innovations, often creates demands for skills which are either in short supply in the concerned country as a whole or inaccessible to the involved institutions. It is common, therefore, for investment projects either to fund the temporary hiring of outsiders who have the skills needed to fill these gaps, or to be associated with parallel grant-funded technical assistance projects financed by UNDP or bilateral agencies.

Historical experience suggests that, while such technical assistance may successfully ease some project implementation problems, it does not provide a ready recipe for project success. If project management and services are heavily dependent on outside technical assistance, whether foreign or national, the sustainability of the project is likely to be in doubt, because of the lack of experienced persons to assume the roles of the outside consultants once they have left. Problems also arise with the selection of technical assistance staff who may not fulfill expectations, and with the understandable tensions which occur when foreigners occupy senior and well-paid posts denied to the nationals of the country.

Preparation of a technical cooperation element of a project, therefore, has to be done with care. Proposals for technical assistance should be based on a rigorous analysis of manpower needs and skill gaps and should only be put forward as a last resort, with the full agreement of all concerned parties that recourse to outside assistance is essential. Reference should be made to the preferred sources for the particular types of technical assistance required, taking account of both local and international consulting firms, bilateral and multilateral agencies (including FAO and other UN specialised agencies) and NGOs. So as to avoid subsequent misunderstandings, terms of reference for each technical assistance assignment (which should be annexed to the report) should spell out functions and reporting arrangements, as well as the minimum qualifications for candidates, as precisely as possible. If the technical assistance is not for the completion of a finite task, such as the completion of engineering designs, how it would be phased out and how the functions would be assumed by regular staff should also be explained.

The key to reducing dependence on technical assistance is a good training programme for national staff. One of the dilemmas is how to combine academic and on-the-job training in the most effective manner. Many technical assistance staff find themselves so busy fulfilling their routine functions that they give insufficient attention to training the staff who

should succeed them. Problems also occur when their intended successors are absent on training for a large part of the assignment period of technical assistance staff, thus limiting the opportunity for side-by-side work. Training arrangements must, therefore, be designed with special care, in order to ensure maximum benefit to local counterparts and a smooth transition after the end of any technical assistance.

Training, however, goes beyond merely equipping people to take over the role of technical assistance staff. An important part of project preparation is the projection of wider manpower and skills needs, and the design of training components aimed at satisfying these. The choice has to be made between national training and training in overseas academic institutions. Sometimes these can be combined when, for instance, a post-graduate student at a foreign university does the field work for a thesis in his/her own country, or when a foreign university is "twinned" with a local institution.

If a training programme is to be effective in strengthening institutions, project support for training of individuals may have to be linked to their agreement to work in the implementing agencies for a reasonable length of time after the completion of their studies.

C. Specific Aspects

For projects for which significant changes in organization are required, it may be useful to supplement the overall description of organizational arrangements with a more detailed treatment of the specific aspects which are critical for project success, particularly if these are new or changed and have not already been fully addressed in the description of project components (Chapter 5). This would be the case, for instance, if a new system for participative planning was to be developed and introduced under the project, or if modified organizational measures were to be incorporated in the project with the aim of improving on-farm water management in irrigation schemes. The steps to be taken to privatize or divest activities previously performed by government would also be appropriately described here, together with any related measures to improve the overall environment for an expanded private sector role in the economy. Arrangements for targeting project support towards the poorest members of the rural community, for monitoring project performance or for safeguarding the environment are all topics warranting special treatment. Sometimes it may be also be appropriate to have specific sections relating to the operation of services or other functions which are of central importance to project success, especially at field level (e.g. agricultural extension, grain procurement, adaptive research, rural road maintenance).

CHAPTER 7: AGRICULTURAL DEVELOPMENT, PRODUCTION AND FINANCIAL RESULTS (4 to 6 pages)

The purpose of this chapter is to explain the technical changes which the project is expected to introduce and make it clear that they are compatible with the physical and socio-economic characteristics of the project area. Only if it is shown that the proposed technical changes match the circumstances and aspirations of the beneficiaries as well as the perceived risks to which they are subject, can it be assumed that they will be readily adopted. The chapter should quantify the returns to the individual adopter of technical changes, and summarise the

aggregate impact of technical changes on production, demand for inputs and employment in the project area. It should demonstrate that the changes would be technically and financially sustainable.

For projects with agricultural production components, the chapter usually starts with a review of the technologies to be introduced, followed by an assessment, drawing on crop budgets and farm models, of the impact on the output and income of typical participants. It should explain the assumptions made on the rates at which technologies would be adopted by farmers and, derived from these and the models, arrive at estimates of the overall impact of the project on farm development and output. Analogous approaches may be used for other types of project; for instance for agro-industry development the starting point would be an explanation of the main types of industry to be developed, the technologies to be promoted and simulation models of typical plants. In this case, the key points to be highlighted would include past performance and current financial position, projected output and performance standards (e.g. capacity utilisation), projected financial prospects, financial rates of return and sensitivity analysis. The text of the chapter should not normally be drafted until technical assumptions and analysis of financial models, which should be presented in full only in annexes or working papers, have been finalised.

While the models, projections of adoption rates and aggregations can be prepared manually using an electronic calculator, there are considerable advantages in using FARMOD for this (Part II, Chapter 4). This program produces standard, clear tables for crop budgets, for farm models and for the project as a whole. The results can be readily converted from financial to economic prices and aggregated, for use in the estimate of a project's economic benefits. Examples of summary tables generated by FARMOD are given in Tables 7 to 9 (pages 137-139 of published book).

A. Nature of Technical Changes

In many projects, the benefits are heavily dependent on the extent and rate of adoption by farmers of changes in the way in which they use land or water, tend crops, manage livestock or catch and conserve fish. Proposed changes need to be explained briefly but clearly, highlighting those features which distinguish them from current practices. Careful reference must be made to the origins of the proposed changes, indicating the level of confidence with which their acceptability to farmers and their results can be predicted. Caution should be used in interpreting results of trials on research stations: these are likely to be a less reliable indicator of what farmers might attain than on-farm trials, should any have been conducted. Any assumptions on changes in farmer behaviour should be fully compatible with the socio-economic constraints which these farmers face and their perceptions of risk, as revealed, for instance, by socio-economic and farming systems surveys in the project area (Part I, Chapter 4).

In examining the prospects for changes and their impact on yield, intensity of land use or extent of uptake of costly technology, prudence is necessary. It is important to bear in mind just how susceptible crops may be to periodic damage by adverse weather (drought, storms, frosts), to the non-availability of inputs and to the attacks of pests and diseases. In forecasting farm performance, all these risk factors as well as the impact of market constraints should be borne in mind. An analysis of the practices followed by more advanced farmers in the project area is often the best indicator of the likely acceptability of certain innovations.

It is also important to bear in mind that the values of physical parameters in the future without the project will not necessarily be the same as the present ones. Past underlying trends for gradual intensification and productivity improvement may continue in future, even without the project. Alternatively current declines in output, due, for instance to natural resource degradation, may get worse. In an extreme case, the project may do no more than slow a decline which would otherwise be catastrophic so that, even with the project, future productivity may be lower than at present.

B. Impact on Individual Producers

This section should show, largely through reference to the farm models, or through household models if non-farm income is significant, what would be the expected impact of adopting the recommended technologies on the income and welfare of typical individual producers, or in some cases, communities. Models should be developed for each major beneficiary type, an attempt being made to ensure that each model represents a typical situation in terms of farm size, farming system or tenure status. The box overleaf gives an example of a summary description of farm models, which would then be followed by a summary of analytical results. Models or, if these entities are already defined, projections of financial results, should also be prepared for any trading or processing units to be funded by the project.

Earlier sections should have indicated the nature of the constraints and needs faced by each type of producer, the opportunities for increased production, and the technical strategy by which it is intended to open these opportunities to them. The results summarised at this point should focus on the same strategy and opportunities but express the expected results in financial terms, using the estimated prices which will be justified in the following chapter.

The essential elements of production models are forecasts of land use and input needs, with and without the intervention of the project, and of productivity or yields. From these a forecast of physical output is derived, on which a value can be placed by attributing prices to each commodity. In portraying inputs, the models should distinguish between those of a capital nature (for example, land improvement, planting and early maintenance of tree crops, or purchase of breeding stock or machinery), and recurrent elements such as seeds, fuel, feed or fertilizers. In complex farming systems it is useful to build the models on the basis of a series of crop or livestock budgets, illustrating expected inputs and outputs for each commodity to be produced and demonstrating their inherent viability. These budgets and the complete models should include forecasts of the quantities, prices and costs of all purchased inputs used, and the quantities of any inputs (such as family labour or draught power) provided at no financial cost.

Example

Summary Description of Farm Models

Two farm models have been used to examine the attractiveness of project participation to rainfed farmers in the project area.

Model A: represents a female farmer with 0.7 ha of land who produces sorghum, millet and interplanted cowpeas, largely for subsistence, who has no access to official credit, few cash savings, and is unable to risk major innovations. It is assumed that she would take up, although initially on only 25% of her planted area, the shorter-term sorghum and improved cowpeas which are already gaining acceptance in the project area. In addition to improving the supply of these seeds, the project would promote low-cost seed dressing to improve crop establishment, and more timely sowing and weeding to optimize use of available rainfall.

Model B: represents a male-headed household with 2.5 male equivalents of available labour, which cultivates 2.5 ha using manual techniques. In addition to this area of traditional cereals and legumes, of which there is a small marketable surplus in most years, this farmer has six sheep which feed on natural vegetation and crop residues and represent a form of savings to be drawn on in unfavourable years. Here the changes envisaged for Model A would be supplemented by the purchase of low doses of fertilizer on credit. Parallel emphasis on livestock health (vaccination/endo-parasite control), management (selective castration) and nutrition (improved conservation of natural fodder and crop residues) would increase flock size, thus offsetting increased risks and returning more organic matter to the soil. Extension would emphasize combining the FYM with careful timing and placement of the inorganic fertilizer, to maximize efficiency in use of this purchased input.

Farm models also provide the basis for estimating the likely long and short term credit needs of project participants, and for forecastng their debt service obligations. Particular care needs to be taken by the analyst in estimating working capital requirements and the means by which these can be financed [6/].

The cost and return implications derived from the financial analysis of the crop or enterprise budgets can usefully be summarised in a short text table which may also compare financial return per unit of land, labour, cash expenditure, cubic metre of water etc., without and with the project. Only after it is clear that all activities amongst the building blocks of the models are financially viable is it justified to proceed to an analysis of a financial model of the complete farm or enterprise over time. A further summary table or tables should be given for the key

6/ See FAO Investment Centre Technical Paper No.8 (1991) *Financial Analysis in Agriucltural Project Preparation,* Chapter X.

results from the analysis of the annexed financial models.

Financial models should assume constant financial unit costs and prices over the period of analysis, unless there is any special reason to depart from such assumptions - for instance, if the expected output from the project would be big enough to depress product prices. If, as is the case in inflationary situations, there is a major discrepancy between nominal and real interest rates, it is appropriate to adopt the real rate in calculating debt service obligations, while at the same time also holding prices constant.

The basic models which are analysed in annexes and summarised in the main text should aim to represent average situations. In practice however, physical and financial results are likely to vary significantly between farmers and from one year to another due to factors such as weather differences or pest attacks. There may also be a general shortfall in assumed average productivities due, for instance, to unforeseen difficulties by the beneficiaries in mastering a new technology or by their taking a step-by-step approach and adopting only a part of any proposed package. In addition, relationships between costs and prices may change as a result of market trends or be deliberately manipulated by government policy intervention. For such reasons, a series of variants on the basic financial models may need to be run to demonstrate the extent of their sensitivity to risks or changes. The purpose of these variants is to show whether or not the project's technical strategy is robust enough to sustain project beneficiaries through misfortunes such as a series of consecutive years of unfavourable weather or a drought falling in the first year of their project participation. The variants may also be used to assess the implications for project participants of alternative pricing policies or market scenarios, or of partial adoption of technology. Such financial examinations of risk and uncertainty were seldom a part of project preparation formerly but are now relatively easy to run using computer programs such as FARMOD: furthermore the *Design Study* suggests that many cases of under performance could have been anticipated if these analyses had been made. Additional tests for risk and sensitivity which can be applied in financial analysis are discussed in section D on page 105.

The results of any financial model must be interpreted with considerable care, however. The mere calculation of an attractive financial rate of return on investment should not be taken to imply that the proposed technical changes will necessarily capture the interest of all farmers. For a small-scale farmer the most attractive opportunity may be to earn more per day of family labour, or perhaps to generate more of the family's needs for subsistence food with less cash outlay, labour or risk so that resources can be freed for more profitable (perhaps off-farm) use. For small farmers, concerns over the risks implied by innovation are particularly likely to affect the response to project opportunities. For the specialist vegetable grower who is restricted to a small, perhaps irrigated, area, yield per hectare (or return per cubic meter of scarce water) may be the most important criterion to examine. On the other hand for large-scale commercial farming or processing, net production cost per ton, a balanced cash flow or the financial return on equity capital may be the critical parameters. The analysis should always be made in those terms which are thought (or, ideally have been shown through diagnostic studies) to be those most relevant to the people whom the project is intended to benefit.

For some projects the individual household or firm is not the appropriate unit for analysis. For instance, many components of projects for improved land management, natural resource conservation or social forestry are intended to bring benefits to the community as a whole. In the justification of these projects it is desirable to simulate the impact of the proposed changes both on typical individuals and on the overall community (or communities) dependent on the resources. Such modelling may in many cases be better carried out in physical rather than

financial terms, to illustrate, for example, the dynamics of a rising population, the growing demands for food, feed and fuel, and the extent to which these can be met from adjustments both in the purposes for which the land available to the community is used and in the technologies applied. Assumptions might also be built in on target self-sufficiency levels, on migration and on the growth of income from non-agricultural sources.

C. Adoption Assumptions and Perceptions of Risk

This section should describe and justify the rate at which the technical changes described earlier are expected to be made, and the final extent to which they will be adopted by the farming popultion. In practice, as experience makes very clear, not all farmers will respond to production opportunities or technology changes in the same way. Farming communities are heterogenous, with farmers of different gender, age, education, financial resources, family labour availability, and having access to land with differences in quality of soil, distance from markets, accessibility to vehicles, and so on. Thus farmers are bound to hold different attitudes towards the adoption of the same suggested change. Some will not be impressed by the package on offer and may never adopt it; others may wish to adopt it but, through a poorer resource endowment, supply failure or unfortunately timed family problems, may be prevented from doing so. Others - and this applies particularly to resource-poor farmers in areas of uncertain rainfall - may initially adopt the elements of a package which they feel easiest or safest with and only later come to what are, for them, the more problematic or risky elements. They thus dismember any package into a "staircase" of technology, which they may take several years to climb: and at each step some farmers will decide to go no further. An example of such a "staircase" is given in the box overleaf, which distinguishes between the present status of most farmers, the level which it is assumed may be reached by the average project participant at full development, and more advanced technologies which will remain beyond the reach of all but a few.

It is the aggregate of all these individual decisions which will determine the overall productive impact of the project. Experience suggests that technicians consistently overestimate the ease with which small-scale and especially resource-poor farmers (the targets of many multilateral investment projects) will adopt technological change. It is therefore essential to the credibility of the project's technical and social strategy that the factors affecting the rates at which changes in technology, as well as in the overall farming system, would be adopted should be systematically considered and then realistically estimated. This will require assessment not just of technical factors, but of farmers' perceptions of the advantages of an innovation and of the risks involved in its adoption. Difficulties in acquiring the necessary inputs, the persuasiveness of extension staff and farmers' price expectations will also affect adoption behaviour.

It is particularly important to establish the nature of risks as the farmer would perceive them. For well-endowed locations, such as a fully-controlled irrigation scheme, risks are likely to be low and it may be sufficient to treat the physical projections given in crop budgets as a fixed package, and simply estimate what percentage of farmers will adopt this full package (i.e. join the project) in the first, second, third etc. years, until the cumulative total reaches the expected ceiling. A similar projection may be appropriate for a settlement scheme where the farming community exhibits a considerable level of homogeneity. For less favourable settings the question of adoption rates becomes more complex, since some changes - especially those which imply few extra resources or low risks, such as crop spacing or better-timed animal weaning, mating or castration - may spread fast, while others which are more complex or imply greater risks may never be adopted by more than a minority of farmers. Here it may be appropriate to

tabulate the changes at activity and farm enterprise level which have been summarized earlier, according to whether the rate of adoption is expected to be high, medium or low. Treatment of differential adoption rates should remain brief in the main report, however, and, even in annexes, excessive detail which gives a spurious air of precision to projections of adoption - which by their nature are speculative - should be avoided.

Not only will the appeal of a given technology or package of technologies to producers vary: its reliability - ie the risks and uncertainties - in the hands of the farmer will also vary. The predictions of output for a given set of inputs used in crop and enterprise budgets should normally be averages reflecting physical risks, particularly climatic ones (droughts, flood, hail, sandstorms etc.). However these averages may cover variations ranging from relatively minor seasonal output fluctuations to a situation in which, perhaps, there are chances of total crop failure because of drought in four years out of ten: the extent of these risks should be examined, even if only in qualitative terms. There may also be uncertainty over the full applicability of, for instance, a new crop variety or farm management practice to the project area, because it has so far been used by only a small sample of potential users. Finally there may be non-technical risks for certain types of new technology derived from shortcomings of the input supply or marketing systems or from socio-cultural inhibitions. The degree to which the technical strategy and assumptions on agricultural development are subject to special risks or uncertainties of these sorts must be made clear. Some numerical indicators from which to gauge farmers' reaction to uncertainty are suggested in the next section.

Example

Sequence of Millet Interventions

Summary of Estimated Yield Response and Risk

Components	Input required	Expected Yield kg/ha	Expected Yield reliability[a/]
Base management level	Low inputs-low return approach	300	7/10
Weeding & FYM	Two weedings, application FYM	600	6/10
	→ → → → most farmers at this level		
"Starter" fertilizer/placement	1 bag fertilizer/HH[b/] close to seed at planting and early post emergence	750	7/10
Improved seed quality	Seed sized and dressed with Apron D	800	7/10
Plant population & time of planting, weeding	High population early in season and sequential plant thinning	850	7/10
Varietal diversity	Vars. with different maturity x stature	850	7.5/10
	→ → → → target level for project intervention		
Improved crop nutrition	2 bag urea/HH following emergence	1000	6.5/10
Weed control	One additional weeding, possibly using animal draught	1000	7/10
Crop residue retention	Residues on soil surface at time of planting	1000	8.5/10[c/]
Improved crop nutrition	1 bag urea + 1 bag NPK/HH additional	1200	7.5/10
Improved varieties	Vars. with high grain index	1300	8.0/10
Improved crop nutrition	1 bag urea/HH additional	1400	7.5/10

a/Yield reliability is a measure of the expected success frequency (e.g. success in 7 years out of 10).
b/1 bag fertilizer (urea or compound NP) per household or a rate of 50 kg for 1.6 ha or part thereof.
c/Highest yield reliability at medium yield threshold with crop residue retention.

D. Tests for Sensitivity

Some simple tests can be made on the financial results of enterprise budgets or farm models summarised earlier. The overall aim of such tests should be to confirm the plausibility of the design team's assumptions on technological change, from the producer's point of view. Tests should therefore be made only on the parameters previously identified as being crucial to the decision-making of the operators. The necessary calculations can be made using the FARMOD programme. Alternatively, results extracted from earlier crop or enterprise budgets or from farm models can easily be analysed using a calculator.

Ratio of incremental returns to additional resources committed. A key concern from the farmer's point of view is the extra return which he or she can expect to get from committing additional resources to technological improvement. Whether the incremental commitment takes the form of cash or the farmer's own labour, the reader must be assured that it will generate more return per additional unit committed than could be obtained without joining the project, or from any readily accessible alternative use of the resource - for instance off-farm. The plausibility of assumed changes in cash expenditures by small farmers can be cross-checked by calculating the ratio of incremental cash costs to the marginal benefits (i.e. increase in returns) which these are expected to generate, for the different technical changes which are assumed to take place. As a rule of thumb, if crop budgets at full development show increases in cash returns which are less than twice the value of the extra cash committed, or if the returns to the additional family labour which is committed are no greater than those which the farmer obtains at present or can obtain elsewhere, his/her participation in the project will be open to doubt. Returns on incremental cash expenditures of over 4:1, on the other hand, are in practice rare and would require special scrutiny and comment.

Fall in output price which would reduce net return to zero. The degree to which a new technology can remain profitable despite a fall in price of the commodity being produced is another key factor which will influence adoption behaviour. This can be assessed by dividing the projected increase in net benefit at full development for a given crop or enterprise into the gross benefit. Ratios of less than 0.2 for grains and other basic staples, or less than 0.4 to 0.5 for perishable crops, also throw doubt on the prospects for adoption of the technology being proposed: experience shows that fluctuations and/or margins of error in the projection of farm gate prices of up to 20% for grains or up to 50% for perishables are not uncommon.

Comparison of expected average incremental benefit to standard deviation of crop yields. Farmers' willingness to risk making a given technical innovation, and the amount of extra resources that they are prepared to commit to it, will depend on what they see as the chances of success. It is unrealistic to expect large extra commitments of cash or labour in, in particular, areas of unreliable rainfall. If the standard deviation of rainfed crop yields between seasons is known, this can be converted into a monetary value and then compared with the projected average increase in net benefits shown in crop budgets. If this measure of annual fluctuation equals or exceeds the average net gains which the design team has assumed, uptake of the proposed new technology by farmers will clearly be unduly risky, and in practice unlikely. Similarly, assuming the threshold ratio of 2:1 between incremental cash commitments and incremental returns mentioned earlier, uptake is unlikely if the increase in cash costs exceeds half the measure of annual fluctuation. If standard deviations of yields are not available, then the index of sensitivity to price decline given above may be used as a proxy to indicate, instead, sensitivity to a shortfall in yields.

Overall increase in cash costs. It is not uncommon for farmers to substantially increase the resources they put into an individual crop improvement or new enterprise when a sufficiently attractive opportunity arises. However most farmers are subject to tight overall limits on the extra resources (labour, land and particularly cash) which they either have access to or are prepared to risk; hence expansion of one farm activity will often be at the expense of contraction or substitution of another. A further key indicator for financial analysis, therefore, is the projected increase in total annual cash costs, including debt service, for the farm as a whole. As another rule of thumb, an increase of over 50% in cash costs from one year to the next over the first four or five years of farm development is likely to raise questions of plausibility of the farm model.

The application of these additional tests for risk and sensitivity to some crop budgets and farm models that were presented for internal review in the Investment Centre is shown in the box opposite.

E. Impact at Project Level

The remainder of this chapter should briefly summarise the aggregate impact of the project over time in generating extra output, increasing demand for items such as seeds, breeding stock, veterinary drugs, machinery, equipment etc., creating new employment, and raising the demand for credit. There are various ways of making these arithmetic manipulations, depending mainly on the uniformity of agriculture in the project area.

The simplest case typically concerns a new irrigation scheme or settlement, where a predictable number of farmers is assumed to move into a formerly virgin project area each year. Output and input demand streams will start at zero and can be readily calculated by aggregation of one or more standard models using FARMOD. As with the adoption of individual new technologies, it is important to avoid over-optimism on the pace of entry. A similar aggregation approach is possible if farmers are already present

Example
Sensitivity Tests Applied to Crop Budgets and Farm Models

1. Crop Budgets at Full Development (Financial Values = Dinars/Hectare

Crop Budget	Gross Benefit (GB)	Incremental Net Benefit (dNB)	Incremental Cost (dC)	Return to Incremental Costs [a/]	Percent Change in Gross Benefit to Reduce Incremental Benefit to Zero [b/]
Wheat 1	453	157	26	x6.0	-35
Wheat 2	300	107	13	x8.2	-36
Barley	352	36	105	x0.3	-10
Fodders	280	53	94	x0.6	-19
Vegetables 1	453	224	13	x17.2	-49
Vegetables 2	294	245	49	x5.0	-83

[a/] $\frac{dNB}{dC}$ [b/] $\frac{dNB}{GB} \times 100$

2. Year-on-year Changes in Total Cash Costs

Farm Model	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5
	..... Year				
Model 1 (3.5ha)	x1.8	x2.1	x1.1	x1.1	x0.9
Model 2 (3.5 ha)	x0.4	x1.1	x1.6	x0.9	x0.9
Model 3 (2 ha)	x0.3	x1.8	x1.0	x0.9	x0.7
Model 4 (4.4 ha)	x0.6	x2.0	x0.9	x1.0	x0.9

The data presented above raised the following comments at internal review, subsequently leading to modifications to the project technical strategy and agricultural development proposals.

(2) Incremental net benefits from barley and fodder crop development do not cover the cash costs of technical improvement.

(3) The likely fluctuations of prices or yields for these two crops also exceed those which would eliminate any incremental net benefit.

(4) Returns to incremental expenditures on the remaining crops are so high that they require special explanation.

(5) All models show rates of increase in total cash costs which require detailed justification, and probably some scaling back of assumed rates of farm development.

on the land to be developed but, for example, are expected to change progressively from rainfed to irrigated production as the new works reach their farms. Clearly the entry pattern must match assumptions elsewhere on the rate at which works will be built and become operational.

Aggregation becomes more complex for projects in areas which are more diverse. Here the practical need to limit the number of farm models for individual analysis and to keep them simple may cause some significant types of producers, crops or livestock species not to be properly represented. Aggregation of models in such cases would give an incomplete picture of total project impact. In that case, it may be more meaningful to aggregate total crop areas or livestock numbers instead. Here it will be necessary to estimate - again with due realism - the number of hectares/head of livestock on which the new project technology would be adopted each year of the project implementation period. Multiplying these figures by the technical parameters used in the crop budgets or herd models will then generate input and output totals. Crop or herd-based aggregation of this sort is also appropriate for calculating the overall impact of estate monoculture or ranching projects.

The most complicated situation arises where agriculture is also diverse, but in addition the project would promote a variety of technical changes which are likely to be adopted to different degrees by farmers within the area. This is typically the case in risky settings such as the dry savannas or semi-arid zones of Sub-Saharan Africa. Here the individual crop budgets in the previous section may - at least as a base case - have examined the financial impact of adopting a full package of technical changes. In practice, however, changes with low costs and risks, like seed dressing, may be adopted by most farmers while others, because they incur greater costs and risks (eg chemical fertilizer) may be taken up by fewer. In such cases it may be necessary to multiply the assumed adoption level of each input by its recommended dose to arrive at a weighted mean dose of each, then re-estimate the weighted mean yield which would result in the project area as a whole at full development. Only if such weighted mean budgets are then aggregated will realistic totals for output and inputs be generated. Special problems arise in marine fisheries projects, where the catch potential is finite. Under these circumstances, an increase in the number of fishing units operating will not result in linear increases in aggregate output but in a reduced return per unit of fishing effort.

The text of this final section of the chapter should therefore indicate briefly which approach to aggregation has been used. Short text tables should then be used to the extent possible to present total and incremental physical quantities for the outputs and inputs estimated, plus financial values where appropriate.

CHAPTER 8: MARKET PROSPECTS AND PRICES (2 to 3 pages)

The financial attractiveness to farmers of the proposed developments normally depends very much on the relationship between the prices for inputs and for the commodities which they intend to produce. In turn, the behaviour of prices, especially for farm outputs, may respond to changes in the supply and demand situation for the products, provided that this is not masked by the presence of price controls or subsidies. This chapter should review the market prospects for the products on which the viability of the project is most dependent and justify the price assumptions used in the financial and economic analyses of the project. In order to allow

the reader to compare assumptions made in calculating financial (i.e. market) and economic (i.e. accounting) prices, it is convenient also to set out the derivation of economic prices in this chapter. Some writers, however, may prefer to do this in Chapter 9 where the economic analysis of the project is presented.

A. Markets and Marketing

The report should demonstrate that market openings exist or can be opened up (at the financial prices assumed) for the incremental output expected to result from the project. In many cases, as is usually the situation for non-perishable staple foods in grain deficit countries, no market problems exist. In such situations there is no need to dwell in the report on market issues. However, where the viability of a project depends on access to export markets or on sales of perishable commodities or of items of particularly high unit value, a careful review of market prospects and of possible means of improving these (e.g. lengthening of production season), is an essential element in project preparation. The adequacy of back-up services (e.g. availability of transport, packaging materials) and infrastructure (e.g. roads) also needs to be examined.

A main purpose of this review is to demonstrate that, in the absence of the project, there will be a shortfall in production vis-à-vis demand at the assumed prices in the target market, or alternatively that the project area (or country) is competitive in serving the market vis-à-vis other potential suppliers. Growth in domestic demand can be estimated on the basis of projections of population and income, and of assessments of income elasticity of demand. For most major traded commodities, reviews have been made by FAO, ITC and other agencies of the world market prospects, and reference should be made to these and their conclusions. Occasionally, however, for highly specialized products (such as silk, spices or exotic tropical fruits) some specific market research may have to be carried out as part of project preparation.

It is not necessarily sufficient to show simply that a market - in the sense of unsatisfied demand - exists for the extra production, because there may be barriers to access. Many markets are protected by tariff and non-tariff barriers, and trade in some commodities may be limited by quotas. Other restrictions may be imposed by lack of air freight space or of direct shipping routes. If such barriers exist, their impact on the marketability of project-generated output needs to be explored thoroughly, if necessary leading to a revision of production plans.

One aspect which usually presents particular problems is to estimate the extent of potentially competitive production capacity being built up, within the same country or elsewhere, to meet the same demand. Thus it may be possible to demonstrate that there is a rapidly expanding demand for apples in China, but there are no accurate statistics with which to quantify the extent of recent apple planting undertaken throughout the country in response to this perceived market opportunity: under these circumstances any estimate of the marginal demand for apples is bound to be speculative. The extent of such market-related risks should be brought out clearly in the report.

The report should also explain arrangements for marketing any extra output expected to be generated by the project.

B. Financial Prices

It is conventional practice to use prevailing, normal input and output prices in the financial evaluation of crop budgets, farm models or agribusiness enterprises. Farm-gate prices for farm-level analysis are usually derived from interviews with farmers or from wholesale and retail market price reports, adjusted for transport costs and traders' margins. The analyst, however, should explain the nature of any key factors affecting price formation, assess the extent to which the assumed prices are likely to be sustainable and, if there are doubts on this, test the sensitivity of the models to price changes (see Chapter 7).

The accountant's principle of *prudence* should, in general, be adopted in making financial price assumptions for both inputs and outputs. Thus, appropriate adjustments should be made if prices prevailing at the time of project preparation were out of keeping with trends, were unduly low or high because of seasonal gluts and shortages, or were likely to be influenced by the project itself - eg. through increasing demand for labour or through increasing the supply of a commodity to such an extent that it might influence prices on domestic or even international markets. Compensatory price adjustments might also need to be made, for instance, to the prices of inputs, if there were signs of impending changes in incentive policies. This would be especially necessary if such adjustments in incentives are recommended in the report itself.

Conventionally, financial price projections are not adjusted (unlike economic prices; see below) for forecast changes in the international prices for traded commodities. There is, however, no logical basis for such differential treatment of economic and financial price adjustments and, at least where significant downward changes in international prices for outputs are foreseen or where there is a strong likelihood of input price rises (e.g. as a result of demand generated by the project or through government commitments to reductions in subsidy), these *should* be reflected in the assumptions made in the financial analysis.

It is usual to make projections of prices - both financial and economic - in constant money terms, eliminating the effects of inflation which are implicitly assumed to affect input and output prices equally. Consequently it is important that all prices and costs refer to the same point in time, which must be clearly stated.

Financial price assumptions for the main inputs and outputs should be summarised in a text table, where they may be usefully compared with economic prices (see C. below).

C. Economic Prices

For those inputs or commodities which could have a significant bearing on the viability of the project, an explanation must be given of the assumptions underlying the forecasts of economic prices used in project evaluation. In this, a distinction must be made between traded and non-traded goods, and a decision must be taken as to whether to compensate for distortions in the pricing of foreign exchange through the use of a shadow exchange rate or through the application of conversion factors to the price of non-traded goods. If the analyses are carried out correctly, the final result should be the same. However, the use of conversion factors is to be preferred since it allows for differentiated treatment of different categories of traded goods.

In the case of internationally traded commodities such as fertilizer, grains, oilseeds or lumber, prices are usually derived from forecasts prepared periodically by the World Bank.

The accuracy of these forecasts and the related assumptions on inflation have often been questioned on the basis of retrospective assessments of earlier forecasts, but no better series has been developed and their use has the advantage of ensuring a measure of consistency in pricing between projects and countries. Nevertheless they should be interpreted with caution. Before use, the forecast prices should be converted to constant prices for the date of project preparation. It is then usually necessary to convert these figures to farm-gate prices by working backwards from the international forecast price, making adjustments for the economic cost of shipping, handling, internal transport and distribution and making allowances also, if necessary, for quality differences. Direct and indirect transfers (such as taxes or subsidies) are eliminated in the calculation and an important decision which has to be taken is whether a given commodity should be valued in import parity terms (in the case of products for which there is an unsatisfied national demand) or export parity terms, since this will have a major influence on the value given to that commodity in the analyses. Examples of calculations are given in Tables 11 and 12 (pages 141 and 142 of published book).

For non-traded goods, such as farm labour, locally-made raw materials (eg bricks) or many fruits and vegetables, the aim is to set prices which reflect their opportunity costs. The market price equals the opportunity cost in a truly competitive market; but in practice, distortions (for example official minimum wages, value-added tax etc.) exist in most cases, which require that adjustments be made to the financial price. It should be borne in mind that for non-traded goods, derivation of economic prices requires two steps: first, assessing the opportunity cost of the goods, which may be higher or lower than the nominal price (but may be equal to it where competitive markets exist); secondly, applying to the opportunity cost the appropriate conversion factor. Guidance on appropriate conversion factors can usually be obtained from economics staff of national planning agencies or of the financing agencies.

Unskilled labour is the most important non-traded commodity in most projects. It used to be customary to assume opportunity costs well below wage levels. However, experience has shown that the real opportunity cost is generally much closer to the actual wage levels. Caution and close scrutiny are therefore indicated before assigning low (or even zero) opportunity costs for labour. Seasonality is a key factor here. In seasons of peak activity, when the total rural labour force may be occupied, the opportunity cost is likely to be close to the prevailing daily wage rate, whereas in the slack season it may fall considerably below the amount actually paid to farm workers. All incremental unskilled labour employed at a particular time, whether paid in cash or kind or contributed free of charge by the farm family, should be valued at the same opportunity cost.

CHAPTER 9: BENEFITS, RISKS AND SUSTAINABILITY (3 to 6 pages)

This chapter is intended to provide decision-makers with an appreciation of the advantages, disadvantages and risks of embarking on the proposed project, from a national point of view. Convention requires that considerable weight be given to demonstrating the economic viability of the proposed actions, but economic soundness alone, as measured by the rate of return on capital employed, is seldom a sufficient justification for going ahead with a project. This chapter should seek to show that, apart from being economically viable in their own right, the proposed investments are also justifiable in the broader context of national resource availability, are consistent with the economic and fiscal policies of the government concerned

and compatible with the funding policies of the intended financing agency. Thus, for example, it is not enough simply to demonstrate that an irrigation project would generate a satisfactory economic rate of return if there are, within the same country, opportunities for producing the same level of output at a lower cost from rainfed farming. Nor should the justification of a project for improving extension services focus simply on reviewing its technical impact, to the exclusion of an examination of the budgetary implications of keeping the service going after the end of the period of external funding.

The point must also be emphasized that economic analysis should not be used simply to provide a proof of project viability. It should also illuminate the strengths - and reveal any weaknesses - of the project. The use of sensitivity analysis techniques is important in showing the nature and extent of risk to which the project is exposed and to point to possible means for improving robustness.

To the extent that a project has import substitution or export goals, the chapter should include a review of its impact on the balance of payments.

For projects aimed explicitly at alleviating poverty, the chapter should provide the reader with estimates of the without and with-project income distribution situation and with other indicators (for instance, nutritional) of the project's expected impact on rural poverty. The costs per beneficiary and the expected earnings of beneficiaries vis-à-vis wages in other sectors would also be relevant measures.

Finally the chapter should include a thorough assessment of both the positive and negative impacts of the project on the environment, and explore all aspects of sustainability, whether in the physical, institutional or fiscal sense.

In writing this chapter it is important to bear in mind that the people who have to take decisions on whether or not to fund the project may not be trained economists or technicians; care should therefore be taken to avoid jargon and the use of excessively complex analytical techniques which may confuse rather than illuminate the basis for decision making. What is required is a clear and objective appraisal of all those factors which should be taken into account in arriving at well-informed decisions on the future of the project.

A. Overview

In the case of complex projects it may be useful to include an introductory section which summarizes the broad justification for the project in qualitative terms and guides the reader on the approaches adopted in analysing its expected impact. In the design of any project, compromises and trade-offs have to be made: for instance, the cost of providing agricultural support services may rise substantially in response to a policy decision to increase the proportion of poor farmers amongst the project beneficiaries; or immediate potential benefits may be foregone in the interests of long term sustainability. The nature of these interactions and the extent to which they have been captured in the analyses which follow should be explained.

B. Economic Benefits and Costs

A project's economic benefits consist of the net incremental value of production

(expressed in economic or "accounting" prices - see Chapter 8, Section C) attributable to the investments being financed by the project. To establish the extent of incremental costs and benefits, it is necessary to compare what would happen without the project with what would occur with the project. In some cases it is possible to assume that, without the project, the present (i.e. pre-project) situation would persist. In other cases, however, as noted in Chapter 7, there may be historical evidence to suggest that, even in the absence of any intervention, production would continue either to rise (as a result perhaps of spontaneous settlement in a new agricultural area) or to fall (perhaps because of progressive increases in soil salinity in the absence of drainage).

There are several measures which can be used to demonstrate the economic feasibility of the project, some of which take account of the distributional impact of benefits: each has its own advantages and disadvantages. However, attention here is confined to the *Economic Rate of Return* and the *Net Present Value* concepts.

The *Economic Rate of Return* (ERR) may be defined as "the rate of discount at which the total present value of costs incurred during the life of the project is equal to the total present value of benefits accruing during the same period". Typically, in investment projects, costs are bunched at the beginning of the project, while benefits only begin to accrue after a lapse of time. Obviously benefits earned and costs incurred in the near future have higher values than similar benefits or costs arising several years hence. The application of a discount factor enables these costs and benefits to be compared on a present value basis, taking into account differences in the timing of expenditure and income. High initial investment costs and comparatively smaller but immediate benefits may give more satisfactory rates of return than the same investment costs followed by a longer development period and larger benefits.

To calculate the economic rate of return - whether on a whole project or on certain of its components - it is necessary to construct a table (which should be given in an annex) showing the forecast streams of incremental costs and benefits, and the resulting incremental net balances, as they accrue each year during the life of the project (see Table 13, page 143 of published book). The life of the project is usually taken as the period corresponding with the useful life of the major investment components, and typically ranges from around 15 to 30 years. Using Present Value Tables [7/] or computer programmes (e.g. MANIP or COSTBEN), the rate of return is calculated. The adequacy or otherwise of this rate may then be judged against criteria such as the opportunity cost of capital in the particular country where the project is to be implemented. As a very rough rule of thumb, the project analyst might recognize that the project is in the "danger zone" if the rate arrived at is less than about 10 to 12%, the minimum ERR conventionally acceptable to many financing institutions, but one which is probably still considerably above the long-term opportunity cost of capital.

The *cost streams* used in the construction of the foregoing table should include the capital costs of the project (including physical - but not price - contingencies) plus the operating, maintenance and replacement costs of project works expressed in economic prices; they should also include the operating costs incurred by the farmers or other project beneficiaries, as well as in providing services and running the project's management system. Operating costs for participating farmers or other beneficiaries may be derived from the representative models or crop budgets or herd models aggregated according to the number of units to give the overall project estimates. Annual

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7/ These are available in a variety of printed sources, e.g. Gittinger, J. Price (ed.), *Compounding and Discounting Tables for Project Evaluation*, World Bank (1984).

maintenance costs are usually estimated on the basis of an appropriate percentage of the capital costs of the works concerned (e.g. drains 4%, roads 3%). If the life of certain project-financed investments is less than the assumed life of the project (which is nearly always the case), provision should be made for the cost of their replacement when this is needed. Residual values of project-funded assets should be taken into account as benefits, usually at the end of the project life. In some cases (e.g. when equipment used in construction is transferred to another project) a residual value may be applied earlier in the project life and attributed to project income.

The *economic benefits stream* will normally include the value (at accounting prices, see Chapter 8, Section C) of the incremental output of the project. These values should reflect any price improvements attributable, for instance, to improved quality.

One of the main problems with using the ERR as a measure of economic viability is that it is only a relative measure, which gives no indication of the magnitude of the benefits. Thus a large project with a relatively low rate of return may generate more benefits in absolute terms than a small project with a very high return. In cases where this could be a problem - particularly where comparisons between different options are needed - the use of the *Net Present Value (NPV)* is appropriate. This is derived by discounting the net benefit stream by a factor equal to the estimated opportunity cost of capital.

For some types of projects such conventional approaches to economic analysis may be largely meaningless, either because of the difficulties of estimating the magnitude of the benefits (for example to investments in research or extension services) or because of valuation problems (e.g. protection of biodiversity). In such cases it may be sufficient to demonstrate that the proposals represent the least cost (i.e. most cost-effective) approach to attaining a set of agreed objectives.

C. Risk and Sensitivity Analysis

A thoughtful assessment should be made of the extent to which the proposed investments imply risks for the country and for the project (risks at the beneficiary level have been taken up earlier in Chapter 7). Risks should be explicitly identified and their possible impact on the economic viability of the project and on its sustainability examined. Possible sources of risk include the danger of cost over-runs stemming from the inaccurate estimation of quantities in civil works construction or from delays in implementation due perhaps to staffing or procurement problems. Such delays, in turn, may result in a slower build up of production attributable to the project and hence to reduced benefit streams. Reductions in benefits could also result from lower than expected yields, slower adoption of innovations or the effects of a succession of years with unusually poor weather conditions. Risks may also be derived from exogenous factors such as unexpectedly large rises in input prices or falls in commodity prices.

The report should systematically examine each major potential source of risk to which the project is exposed and explore its possible impact. The traditional way of treating risk has been first to establish the variables to which the project appears to be most sensitive (e.g. delays in benefits, increases in recurrent costs, capital cost overruns, etc.) and then to quantify the implications of these specific project risks, both singly and in possible combinations. An example is given in the box below.

Example

Sensitivity of ERR to Specified Risks

The pilot exercises described earlier suggest that the project would not face serious risks under normal circumstances. However, recent climatic trends could imply that severe droughts will become more frequent, while prices of the main project commodities - rice and coffee - might decline even more rapidly than has been assumed. There is also a risk that government agricultural support and supply services might not expand from the pilot to the project scale as fast as assumed. This would cause technology uptake, and hence yields of all crops, to fall short of estimates. The impact of each of these scenarios on the base case ERR of 22% is indicated below:

Climatic risk	**ERR (%)**
Severe drought in year 1	20
Severe drought in year 2	17
Severe drought in year 3	15
Severe drought in year 4	13
Severe drought in year 5	12
Change in prices of main commodities	
Price of rice and coffee fall 20%	15
Price of rice and coffee fall 50%	10
Change in expected yields	
Shortfall of 15% for all crops	18
Shortfall of 50% for crops with improved varieties	14
Shortfall of 50% for all crops	9

The shortcoming of this treatment is that the analysis does not assess the likelihood of each risk actually occurring. While the individual hypothetical events will vary in their probability some, at least, may in fact be rather likely: for instance, in the example in the box, a drought in at least one year out of five. The base case ERR thus reveals itself as assuming that everything goes according to plan. Considering the numerous risks to which complex investment projects are liable in reality, this may in itself be an improbable assumption. The burden of assessing the likelihood of risky events - and thereby the riskiness of the entire project - thus falls on the reader, i.e. the decision-makers in government and the financing institution. Being less familiar with the circumstances, they will be less able to make this assessment than the authors of the report. For these reasons it may be preferable to incorporate the main risk factors in the ERR estimate, by making the ERR a probability-weighted composite of a number of ERRs reflecting the most probable scenarios. Implicit assessments of risk factors are thereby made explicit and transparent.

To make this a feasible approach, the number of scenarios for analysis should be kept low; using two assumptions (high and low) for 2 or 3 key variables would yield 4 or 8 sub-estimates for the ERR, which would then be aggregated through probability weights in the way explained in the box overleaf.

In order to decide which variables to focus on, two dimensions should be considered: **sensitivity** and **probability**. It may be useful to first establish in abstract terms the variables to which the project outcome (in terms of the ERR) is most sensitive. This can best be done by calculating **switching values**.

The switching value is defined as the value of the variable under consideration at which the net present value of the project becomes zero at a given discount rate. Alternatively, a switching value is the value which a variable would have to reach as a result of a change in an unfavourable direction, before the project no longer meets the minimum level of acceptable returns on capital. For example, given an opportunity cost of capital of 12%, the switching value of the with-project yield of a crop would be that yield at which the project's ERR would be equal to 12%. Similar calculations can be made for other critical variables in the project (such as increases in construction costs or reductions in the irrigated area per pump) so that a considered view can be taken as to the extent of risk involved. Clearly, if the base-case assumption for the value of a given variable is close to its switching value, then the project will be sensitive to changes in, and hence risks affecting, that variable. Conversely, if the two values are widely different, this is an indication of a robust project design. Examples of sensitivity analyses and switching value calculations are given in Table 14 (page 144 of published book).

The switching value of a variable provides an important indicator of its sensitivity in the abstract, but it does not tell the reader how likely it is that a deviation from the projected course will actually happen. The second dimension to consider, therefore, is the probability of such deviations or, conversely, the firmness of the estimate of individual variables. If the projection of, say, the world market price of a project output is very uncertain but sensitivity tests show that the ERR is not sensitive to output price, it is not necessary to focus on this parameter. Conversely, for a very sensitive parameter, even a moderate degree of uncertainty as to its future value may warrant going to two or three scenarios, each with its estimated probability assigned to it. Risks of institutional failure by a government department responsible for operation and maintenance of an irrigation scheme, for instance, may be examined by analysing scenarios assuming various levels of transmission efficiency for irrigation water.

Variations in key parameters can be run on programmes such as COSTBEN or MANIP. Variations related to farm budgets can be fed into the system via FARMOD (see discussion in Chapter 7 section B). The earlier in the project cycle an appreciation of the strategic and sensitive parameters is made, the easier it will be, further downstream, to provide for the running of alternative scenarios, since the format of farm budgets and other tables can be organized from the beginning in such a way as to accommodate variations in assumptions with the minimum of extra work. An early identification of sensitive parameters is of course also desirable for the timely consideration of risk-mitigating measures that may be built into project design.

Calculating a Composite Probability-Weighted ERR

The ERR is calculated on the basis of a number of variables determining the cost and the benefit streams (yield, adoption rate, prices and quantities of inputs and outputs, etc.). For two of the parameters (say, yield response to the technical package extended by the project, and the export parity price of the main cash crop, for instance cotton) a higher and a lower estimate can be made and assigned probabilities according to the best - but in most cases subjective - judgement of the design team. (Only in a few cases can probabilities be based on objective data, such as inter-annual rainfall distribution determining fluctuations of yields.) If incremental yield assumptions are termed x_1 and x_2 with their assorted probabilities $p(x_1)$ and $p(x_2)$ (where $p(x_1) + p(x_2)$ is of course equal to 1), and export parity price projections are termed y_1 and y_2 with their respective probabilities $p(y_1)$ and $p(y_2)$, four scenarios are defined, i.e.:

$x_1p(x_1)$; $y_1p(y_1)$
$x_1p(x_1)$; $y_2p(y_2)$
$x_2p(x_2)$; $y_1p(y_1)$
$x_2p(x_2)$; $y_2p(y_2)$

Each of these will produce a sub-estimate of the ERR; these four estimates are then aggregated, weighing them with their respective probabilities, as follows:

If $p(x_1) = 40\%$
$p(x_2) = 60\%$
$p(y_1) = 25\%$
$p(y_2) = 75\%$,

this results in following probabilities for the four scenarios (adding up to unity):

for $x_1p(x_1)$; $y_1p(y_1)$: 0.40 x 0.25 = 0.100
$x_1p(x_1)$; $y_2p(y_2)$: 0.40 x 0.75 = 0.300
$x_2p(x_2)$; $y_1p(y_1)$: 0.60 x 0.25 = 0.150
$x_2p(x_2)$; $y_2p(y_2)$: 0.60 x 0.75 = 0.450

Assuming, for the sake of illustration, that the subsets of ERRs are, in the above sequence, 12%, 9%, 17% and 15%, the probability-weighted ERR will be 12.2%. In order to assess the likelihood of achieving, on the basis of the probability assigned to each scenario, an acceptable ERR (defined here as 12%), the scenarios can be arranged in descending order of the ERRs:

Case	p(x) . p(y)	ERR	p(x) . p(y) . ERR
x_2y_1	0.15	17	2.55
x_2y_2	0.45	15	6.75
x_1y_1	0.10	12	1.20
x_1y_2	0.30	9	2.70
	1.00		12.20

The table shows that the likelihood of achieving **at least** the acceptable ERR of 12% is in this case 70% (i.e. 0.15 + 0.45 + 0.10).

The number of variants to be explored can be increased at will but the complexity (not the difficulty) of the exercise increases exponentially and the incremental insights to be gained would normally not warrant going to that length. The few parameters for which it is decided to run different estimates as part of the composite ERR should therefore be selected carefully, taking into account the dimensions of probability of occurrence and sensitivity (impact on ERR).

Finally, it should be pointed out that varying individual parameters in isolation is not strictly correct because it neglects the possible interaction between them (as in price/quantity relationships). However, except where these interrelationships are quite obvious and robust, it may be justified to ignore them at the level of precision aimed at in this kind of exercise.

It is obvious that a composite, probability-weighted ERR will have a systematic downward bias compared to the traditional "if everything goes as planned" assumption. The failure to reflect the impact of less favourable developments in critical variables in the base ERR

estimate probably accounts to a significant extent for the gap between *ex-ante* and *ex-post* ERRs found for so many projects at the time when project completion reports are written up.

Finally, there are risk factors of projects which do not lend themselves to quantitative analysis. The case of government commitment is one. The efficiency of the public administration (unless it can be linked to a quantifiable determinant of output such as irrigation efficiency) is another. Availability of domestic financial resources to cover government share of project costs is a third example. Securing beneficiaries' participation is a fourth one, and several other examples could be quoted. The discussion of the risk factors should not be limited to quantitative analysis, but expand to cover the other major areas of concern, drawing attention to the possible need to take corrective measures before or during project implementation.

Risks of an environmental nature should be addressed as part of the assessment of a project's environmental impact (see G. below).

D. Balance of Payments

Where this is relevant to the justification of the project, an estimate should be made of the net impact of the project on the country's balance of payments. This implies estimating the foreign exchange component of both investment and operating costs and the extent of foreign exchange saved or generated through the use of the incremental output attributable to the project for import substitution or export purposes. It is usually sufficient simply to indicate the annual level of net receipts once the project has reached full production. It should be made clear, however, that the net foreign exchange earnings are *not* an additional benefit over and above those taken into account in the calculation of ERRs or NPVs (if these use a correct shadow price for foreign exchange). Thus the project's impact on the balance of payments should be mentioned only as a favourable side effect, for countries where this would be a particularly attractive feature.

E. Impact on Income Distribution and Poverty Alleviation

The expected impact of the project on the distribution of incomes and poverty alleviation in the project area should be demonstrated. Where appropriate, the relationship of anticipated impacts to the polices and priorities of the government and of the lending agency should be discussed, as well as any possible social implications.

A simple way of highlighting equity and income changes is a text table of the sort shown overleaf. Changes in the proportion of total income reaching farms of different sizes have been calculated by multiplying the incomes for each individual farm model which the design team analysed by the number of participants in this size category who are estimated to join the project.

Example

Impact of the Project on Aggregate Income of Selected Farm Sizes
(Values in Million Dinars)

	Pre-project		Full Development		Increment	
Model Size (ha)	Value	%	Value	%	Value	%
Below 2.0	420	4	1,242	5	822	6
3.0	1,938	20	6,782	30	4,844	37
5.0	1,756	19	4,693	21	2,937	22
24.0	5,369	57	10,034	44	4,665	35
Totals	9,483	100	22,751	100	13,268	100

The analysis shows that the project would have a positive impact on income distribution in particular for farms of 3 and 5 hectares, whose share of net benefits would rise from 39% to 51% of the total for the categories analysed, as well as more than trebling in absolute terms. Meanwhile, the share of the largest category would fall from 57% to 44%. The share of benefits reaching the smallest category - farms under 2 hectares - would also improve somewhat, although remaining restricted by the poorer resource and labour endowment of this group.

A further point to illustrate in this part of the analysis concerns the relative weight which has been given to social versus economic criteria in deciding on the balance between components. If the overriding consideration in project design has been the economic return on investment it should be shown, nevertheless, that the design team has chosen from among the components with the highest ERRs those best able, also, to spread benefits widely and equitably. If, in contrast, the aim has been to maximise the number of beneficiaries subject only to each component exceeding a minimum ERR, this should also be explained. Results should, of course, be consistent with statements on the project's overall objectives made earlier under Project Rationale and Design Considerations in Chapter 4. Discussion is best built around a summary text table ranking each component or activity according to its cost per beneficiary, its ERR and the operational limit on the number of beneficiaries which it can reach. If necessary this table may continue down to components which were *not* given priority in the final design, to highlight the reasons for the design team's decision to exclude them. An example is given in the box opposite.

Beyond these specific analyses, this is the point in the preparation report to highlight any more general impacts that the project may have on the poorer members of the rural population. Topics might include changes in access to productive resources -particularly land and irrigation water - and to communally owned or open access pasture, rangeland or forests. Reference should also be made to the expected effects of the project on other factors affecting living standards - especially health, nutrition and education. If the project is intended to bring special benefits to women, these benefits should also be highlighted, and, if possible, quantified.

Example

Selection of Components to Maximise the Number of Beneficiary Households
Receiving a Target Income of Y1,500/yr for a Cost Limit of Y120 million

	..... Activity			
	Sheep Rearing	Rice Cultivation	Fish Farming	Reed Cutting
Unit size (for calculation)	8 ewes	0.15 ha	0.15 ha	0.15 ha
Investment cost/unit (Y)	1,800	223	2,237	88
Net benefit generated/unit/yr (Y)	1,560	127	495	15
ERR of activity (%)	20	19	27	7
∴ 1Units required to reach target income (No.)	1	12	3	100
∴ 2Investment required/household (Y)	1,800	2,676	6,711	8,800
Operational limit (no. households)	8,000	35,000	3,500	10,000
∴ 3Number of households included in project	8,000	35,000	1,780	0
Cumulative cost (Y million)	14.4 →	108.1 →	120.0	

In the above project design the overall objective was to raise as many households as possible above the poverty line within a pre-defined total cost. The two less costly activities (sheep rearing, requiring an investment of Y1,800 per beneficiary household and rice cultivation, costing Y2,676 per household) were therefore included up to their operational limits. The next cheapest, fish farming at a cost of Y6,711 per household, was cut off at 1,780 households because the project cost limit of Y120 million had been reached. Reed cutting was excluded. The total number of beneficiaries was 44,780 households. If, in contrast, the aim had been to maximise economic returns reed cutting (7% ERR) would still have been excluded, but priorities would have started with fish farming (27% ERR; all 3,500 possible households taken up), followed by sheep rearing (ERR 20%; 8,000 households) and then rice cultivation (ERR 19%; cut off at 30,680 households). The Y120 million cost limit would thus have been reached with only 42,180 beneficiary households having been raised to the target income of Y1,500/year.

F. Fiscal Implications

Estimates should be presented of the net public cost of the project. This is the place to explain assumptions on cost recovery rates and mechanisms (e.g. stumpage rates on trees or irrigation water charges, which should have already been accounted for in the farm models in Chapter 7) and to examine the extent to which they would cover the capital and operating costs of the assets and services being financed by the project. If there are significant government revenues from taxes on agricultural output, trading, processing or export, these should also be quantified and taken into account. To the extent that, conversely, there would be a continuing net call on government funds, for example for the provision of agricultural support services or subsidies on inputs, the amount should be quantified and an assessment made as to whether the government would be in a position to sustain its obligations once external funding ceases. Given the number of projects which have run into funding problems at the conclusion of the disbursement period, these analyses are important in arriving at a financially sustainable project design.

G. Environmental Impact and Technical Sustainability

The expected environmental impacts - both positive and negative - should be weighed up. If a project has been the subject of a detailed environmental assessment (see box, Part I, page 16), the findings (presented in full in an annex) should be summarised here. Although the main purpose of this section is to focus on the expected effect of the project on the environment, it should also refer to the measures adopted in the design of the project to mitigate any adverse impact. Fuller details will have been given in Chapters 4 and 5.

Possible coverage would, therefore, include the following.

- Beneficial and adverse environmental impacts: these should be described, where possible in quantitative terms (e.g. reduced area of natural forest). Given the difficulty of predicting environmental effects, the basis for the predictions should be explained and an indication given of their likely accuracy. Specific reference should be made to the expressed views of the different affected parties consulted during the course of the environmental assessment.

- Measures included in the project to mitigate adverse impacts (e.g. resettlement of communities affected by major works, effluent treatment from agro-industries) or to enhance environmental benefits (e.g. training of staff in improved environmental management techniques, establishment of protected areas, etc.).

- Environmental monitoring arrangements, to assess whether the project is behaving as predicted.

Very closely related to a project's environmental impact is its technical sustainability. Impact evaluations by the World Bank some years after the end of the disbursement period have raised serious questions about the long-term performance of various projects vis-à-vis expectations at appraisal and the time of completion. This section should include an objective assessment of the likely sustainability of the technical solutions adopted in the design of the project, and point to any prerequisites for ensuring sustainability. This could review, for instance, the extent to which civil works have been designed to reduce maintenance requirements, or training has been planned to ensure the continued operation of project-funded equipment after the withdrawal of technical assistance. It would also be the place to highlight any concerns over the sustainability of the farming systems being promoted by the project, explaining how these have been addressed.

CHAPTER 10: COMMITMENTS, ISSUES AND FOLLOW-UP ACTIONS

(2 to 3 pages)

A. Government Commitments

Increasingly, projects are associated with, or at times predicated on, the introduction of changes in government policies. It is therefore important to explain any changes in policy which the Government is committed to introduce, either before the launching of the project or during its implementation. These changes may be aimed at addressing specific

problems (identified in the Background and Rationale chapters of the report) which would otherwise prevent the successful operation of the proposed project, in which case the interdependence of the project and the policy adjustments should be made explicit. In other cases adjustments may be of a broader sectoral or macro-economic nature and not specific to the project, but nonetheless essential prerequisites for its success.

Policy changes of direct relevance to projects typically concern such issues as:

- the level of cost recovery in public sector irrigation schemes or for other public services;

- the ownership of trees planted under social forestry programmes;

- the respective roles of the public and private sector in the provision of agricultural services;

- the role of non-governmental organizations (NGOs) in relation to public sector services.

For each main policy change of this sort, it is useful to explain:

- the nature of the intended reform and its objectives;

- the measures through which the policy change would be adopted: in some cases these might simply involve changes in procedures (for example, in approaches to consulting farmers on irrigation system design) while in others changes in legislation may be required. Draft legislation, if available, should be annexed to the report;

- the level of commitment to the proposed change, the intended timetable, and the organizational responsibility for bringing it about;

- possible side-effects of policy changes (e.g. redundancy in state enterprises, the functions of which have been privatized) and measures adopted to mitigate these.

Other commitments by government (for example to a timetable for introducing new legislation or changes in administrative procedures) should also be taken up in this section.

B. Issues

As a project moves forward from identification to preparation, appraisal and negotiation, various problems or issues usually arise which need to be taken up in a timely manner by the sponsoring agency or the prospective financing institution. All involved parties should be alerted to problems which - if not resolved in due time - would delay or materially influence the successful implementation of the project. It is most important to bring such issues out into the open as early as possible in the process of project design and to encourage their rapid resolution, especially if they could have a major bearing on the feasibility of the eventual project. To gloss over fundamental issues in the hope that they will disappear may simply raise false expectations about the project. It is equally important, however, not to overload this section with trivial matters which can be readily resolved in the normal course of appraisal and subsequent project processing.

At the early stages of identification such issues frequently concern choices - of scale, implementing agency, technology and so on - which have a fundamental bearing on the design of the project. Later in preparation, issues tend to be related either to preconditions for project success or to points of possible incompatibility between the project proposals and the funding policies of the financing agency. Thus, an issue of the former type might concern the need to endow an agency with the necessary powers to manage the project. Amongst the latter issues could be the requirement of the financing agency that full costs of operating and maintaining public irrigation systems be recovered from beneficiary farmers. Other issues of a similar nature which arise frequently in agricultural project design relate to pricing arrangements for farm outputs, levels of subsidy on inputs or soil conservation practices, interest rates on loans to farmers, and means of ensuring beneficiary involvement in project implementation.

Investment Centre missions, acting on behalf of governments, should be careful not to enter too far into conditionality issues, since handling these is a prerogative of the concerned financing institution.

In reporting on other sorts of issues which remain to be resolved at each stage of design, it is useful to:

- explain in simple, direct terms the substance of what is at issue;

- point out alternative solutions (to the extent that these exist) and outline the probable consequences of each course of action; if appropriate, the mission may indicate which it considers to be the most desirable solution.

- indicate the process by which the issue might be resolved - for example, by collecting and analysing additional pertinent information, through meetings between various involved parties etc. - and by whom a final decision would need to be made;

- propose a timetable for arriving at decisions on the issue.

C. Follow-Up

An outline should be given of the preparation team's perception of the schedule of events leading up to project appraisal and implementation, with a clear allocation of responsibilities for each component, a timetable and an explanation of the means by which any related costs would be funded. Even after a project preparation report has been completed, further studies may be necessary prior to appraisal, and these should be noted: typically they might involve the completion of land evaluation studies to confirm the extent of a potentially irrigable area, a continuation of environmental assessments or the classification of posts prior to a reorganization programme in a key government department. Terms of reference, cost estimates and schedules for such studies should be given in annexes.

Finally, this is the place to propose any follow-up orientation or workshops for government staff who will be further involved in processing the project proposal or in subsequent implementation, to increase their knowledge of, and commitment to, the project.

Annex 1

TYPICAL CONTENTS OF AN IDENTIFICATION REPORT

Chapter 1: Introduction

Origin and purpose of the report.
Note of work so far done, on which report is based, and of involved parties.

Chapter 2: Essential Background

This chapter should be essentially factual and comprise a summary of background information which has been taken into account in generating project ideas. Brief reference may be necessary to a wide range of relevant topics - for instance macro-economic or population trends; market demand or supply of food or other commodities; the natural resource base, trends in its exploitation and environmental concerns; socio-economic aspects of agricultural production or rural life in general which could impinge on the project; the policies, priorities or programmes of the government and financing agencies; lessons from experience or precedents arising from other development or technical assistance projects; institutional or manpower considerations, or the views of the formulation team itself. The key point, however, is to be highly selective, raising *only* those topics which are essential to underpin the project approach which is developed in the next chapter.

Chapter 3: Rationale and Concept

It will usually be advisable to start with an analytical discussion of the topics listed above, indicating in particular the relative weight given by the formulation team to each in arriving at the general investment/development objectives and approach on which a project design could be based.

A résumé can follow the technical or market opportunities which could be pursued under the indicated approach. This could focus on the commodity objectives or systems of production, or alternatively the forms of improved resource use or protection, which are considered feasible in the physical and socio-economic setting. A summary should be given of the evidence which shows why these opportunities could be of interest to those - mainly private decision-makers - who would have to respond to them. The possible economic, social and environmental consequences of alternative approaches should be indicated.

A summary should then be given of the constraints which would have to be overcome, for these opportunities to be exploited in reality by producers or resource users. It may then be appropriate to give a reasoned indication of the scale on which it would be realistic to tackle these constraints or opportunities, and of the considerations to be taken into account in the selection of areas of concentration if a national approach is not appropriate.

Finally, the role which the government could, or would need to, play in allowing these constraints to be overcome should be specified. Possible government actions raised here might include policy or legal changes, altered financial allocations or procedures, institutional changes, training, the provision or amplification of productive or social infrastructure, or the reinforcement of technical or social support services.

Chapter 4: Project Possibilities

Description of project possibilities, based on the approach and concepts raised above. The aim should not be to raise options for their own sake: the foregoing chapters may already have made it plain that there can be only one logical possibility, in which case the chapter title becomes "A Possible Project". Sometimes, however, there will be totally different ways of achieving the same development objective which need to be spelled out - for instance changes in price policy vs. access road construction vs. reinforced agricultural support services as the means to encourage increased cereal production. More often there are choices of lesser significance to discuss: alternative technical approaches tailored to different categories of producer or commodities, trade-offs between increases in farm production and environmental protection, alternative project locations or scales, inclusion or exclusion of certain components or areas, or the relative merits of different implementing arrangements.

Implications of the alternatives. Principal aspects to contrast between alternatives are implications for the government, in terms of its role, components to be financed, institutional/manpower requirements, and investment and recurrent costs; the nature, timing and scale of possible benefits; the distribution of these benefits, especially between richer and poorer producers; technical and fiscal sustainability; environmental impacts; and relative appeal to an external financing agency, for instance in terms of continuity from previous projects, consistency with the agency's policies or relative ease of preparation. Where costs or benefits are discussed, it is their relative rather than absolute values which are important. It is not desirable to aim for great precision or detailed analysis at the identification stage, even if only one possible project has been identified.

The mission may wish to conclude the chapter with a specific recommendation on project selection, in which case an expanded description of the preferred project and its likely components would be appropriate.

Chapter 5: Issues Raised and Decisions to be Taken

This should list and discuss each of the major issues raised by the project possibilities, or the decisions which would need to be taken to progress each possibility further. It is important to say clearly whether it is the government, financing agency or some other body which has to resolve each issue or make each decision. Where possible the report should also indicate the particular department or office-holder (minister, director of forestry etc.) who would be responsible. To

the extent possible or appropriate an identification report can specify the outcome or decision which is currently believed to be optimal, or discuss the pros and cons of alternative decisions.

Chapter 6: Next Steps for Preparation

The chapter should set out the proposed process and time-scale to resolve the issues or take the decisions listed above, stressing what needs to be done to reach a final choice of project from among alternatives discussed. It should list the data needs and technical and design tasks required either to finalize the above choice or, if a single design has already been chosen, to prepare a final feasibility study. Detailed specifications or terms-of-reference should be attached if necessary. It is important at this stage to advise as to whether or not an environmental assessment (EA) would also be required as part of project preparation.

Logistical needs for all this further processing or preparation should be estimated, including staff categories and man weeks from the government and the Investment Centre, any special facilities, purchased data (eg. satellite photography) or equipment which would be required, plus any separately commissioned consultant's studies or extra outside technical assistance which would be needed to complement that provided by the Investment Centre. Bar charts should be used to show timing of each task or study as well as synchronization with future missions. Where non-Investment Centre external support is called for (e.g. from consulting firms), costs should be estimated and an indication given of possible funding sources, and of the steps to be taken to mobilize these.

Annexes

Annexes to Identification Reports should generally be kept very brief, since most of the material will be superseded as the process of project formulation progresses. Typically it may be useful to provide:

- statistical material on the country, its population, area, economy, natural resources, land use etc., and similar material on any candidate project areas;

- brief reviews of any precedents for the proposed project - for example a summary evaluation of a pilot or first phase project which the proposed project is intended to follow;

- notes prepared by specialists on the identification team on technical issues relevant to later stages of project design;

- detailed terms-of-reference for follow-up studies;

- draft requests for funding project preparation;

- maps.

ANNEX 2

SUGGESTED FORMAT FOR A PROJECT BRIEF

Cover Page

Report No.: /PB

Date:

PROJECT BRIEF

Name of Country

Name of Project

Funding Institution: _____
Sector: _____
Project Code No.: _____
Project Cost: _____
Appraisal Date: _____
Related Documents: _____
_____
_____
_____
Reporting Officer: _____
Task Manager
(Financing Institution) _____

List of Working Papers, Maps etc.

1. _____
2. _____
3. _____
4. _____

Currency Equivalents

US$1.00 = ... (Local Currency)
Local Currency 1.00 = US$.....

CONTENTS

A. Project Origin and Status

Source of project proposal

for example: - Government request, sector study, identification mission, repeater project.

System of preparation

explain: - Division of responsibility between government departments, consulting firms, financing institutions and Investment Centre.

Status and timing of project preparation

indicate:
- The stage of project preparation at which the PB is being written/up-dated.
- Target dates for completion of preparation and appraisal.
- Related investigations (e.g. environmental assessment).

B. Sectoral Context

This section should be kept short, with ample reference to existing documents (eg. economic and sector reviews) and only information of direct relevance to the selection and scope of the proposed project should be given.

Key features of the agricultural sector

such as:
- Production trends;
- Role of agriculture in the economy (contribution to GDP, external trade, employment);
- Institutions.

Government strategies and policies

as appropriate refer to:
- Development plan goals and targets.
- Policies relevant to the project.
- Lending agency sector policies.
- Related projects, either on-going or in the pipeline: summary of main features and achievements.

Constraints and opportunities facing the agricultural sector

for example:
- Technical and environmental, socio-economic, financing, pricing, organizational, staffing, legislative problems.
- Market opportunities, comparative advantage.

C. The Project Area and its People

This section can frequently be omitted altogether, particularly if the proposed project is national or sectoral in scope. It may be necessary, however, to summarise the essential features of the project area, particularly for irrigation or rural development projects. Fuller details should be assigned to Working Papers.

Physical features

Location; access; natural resources relevant to the project (land, climate, water resources as they affect productive potential and risks); physical and environmental constraints to development.

The agricultural situation

Relative importance of agriculture in the local economy; productive infrastructure; agricultural situation (typical farming systems, technology performance); other economic activities; markets and prices; market access.

Social features

Population (density, growth rates, trends), cultural features, income levels and distribution, on- versus off-farm earnings, education, health, nutrition, land tenure, farm size distribution.

On-going projects (to the extent not already covered under B)

Description and evaluation of relevant projects and other development activities within the area.

Institutions

Summary description and assessment of performance of institutions relevant to the project.

D. Project Rationale and Concept

Reasons for according priority to the specific project

refer to: - Development policies and strategies (B, above).

list: - More project-specific reasons, such as proven potential of technology (e.g. success of pilot scheme); demand and the comparative advantage of area to produce and market a given commodity; concentration of poverty; precedents, such as successful NGO-run initiatives, etc.

Design considerations

review:
- Various options related, for example, to selection of area, target population, scale, components, disbursement period, choice of implementing institutions. Examine implications in terms of institutions, costs, benefits, environmental impact, risk and other relevant criteria. In the case of engineering projects, examine the comparative advantages of alternative design options/construction methods (e.g. labour-intensive versus mechanized road construction).

summarise:
- Proposed project strategy, indicating first what technical changes will be promoted in which production systems by which categories of producer, and then the role to be taken by the government in facilitating these changes.

E. Project Description

Objectives

Ultimate development aims of the project, and immediate goals expressed in terms of area affected (e.g. hectares to be irrigated), population affected, forecast increase in production, income and welfare goals, etc.

Components

Brief specification of components to be financed by the project, expressed in quantitative terms. Components should be grouped according to objective.

Costs and phasing

Summary estimate of costs by main component, which may be presented as a table if estimates are considered sufficiently accurate. Explain basis of costing, level of accuracy and assumptions on contingencies. Indicate proposed disbursement period, highlighting any particular phasing constraints.

Organization

Outline proposed organisational arrangements for the project, distinguishing, where appropriate, between the construction phase and the operational phase.

Indicate extent to which arrangements are already agreed or merely proposed.

Production and marketing

Summary of forecast increases in output, indicating basis for assumptions (e.g. changes in farming systems; crop/livestock production technology and related yields). Indicate

how this can be marketed.

Indicate risks of shortfalls in projected output or of producing goods for which there is insufficient demand.

Project impact

Summarise main project benefits (ideally in quantitative terms but, if this is not possible early in the project cycle, in qualitative terms).

Indicate *who* will benefit (and who may lose) from the project.

Explain the expected environmental impact of the project.

Discuss technical and fiscal sustainability.

F. Issues and Main Risks

General policy issues

Project related issues

- Technical
- Socio-cultural
- Environmental
- Other

For each category, outline the nature of the issue, suggest how it could be resolved (giving alternatives if appropriate), indicate the stage of the project cycle by which the issue should be resolved, and who or what institution would be responsible.

The main risks to which project outcome would be subject should be listed (see Part III, chapters 7 and 9 respectively for a discussion of risks at beneficiary and project level). Indicate what measures have or could be taken in project design to mitigate the main risks.

G. Follow-Up Action

Target dates for each main subsequent step in the project cycle.

Respective responsibilities (Investment Centre, government, consultants, financing agency) for completing each future element of preparation.

Investment Centre manpower requirements.

H. Maps, Charts, Diagrams and Working Papers

To be attached as relevant.

REFERENCES AND BIBLIOGRAPHY

Set out below is a list of readings and references which persons involved in preparing agricultural investment projects may find useful. The list includes all titles referred to in the text, as well as a number of documents on both economic and technical themes which are relevant to project preparation.

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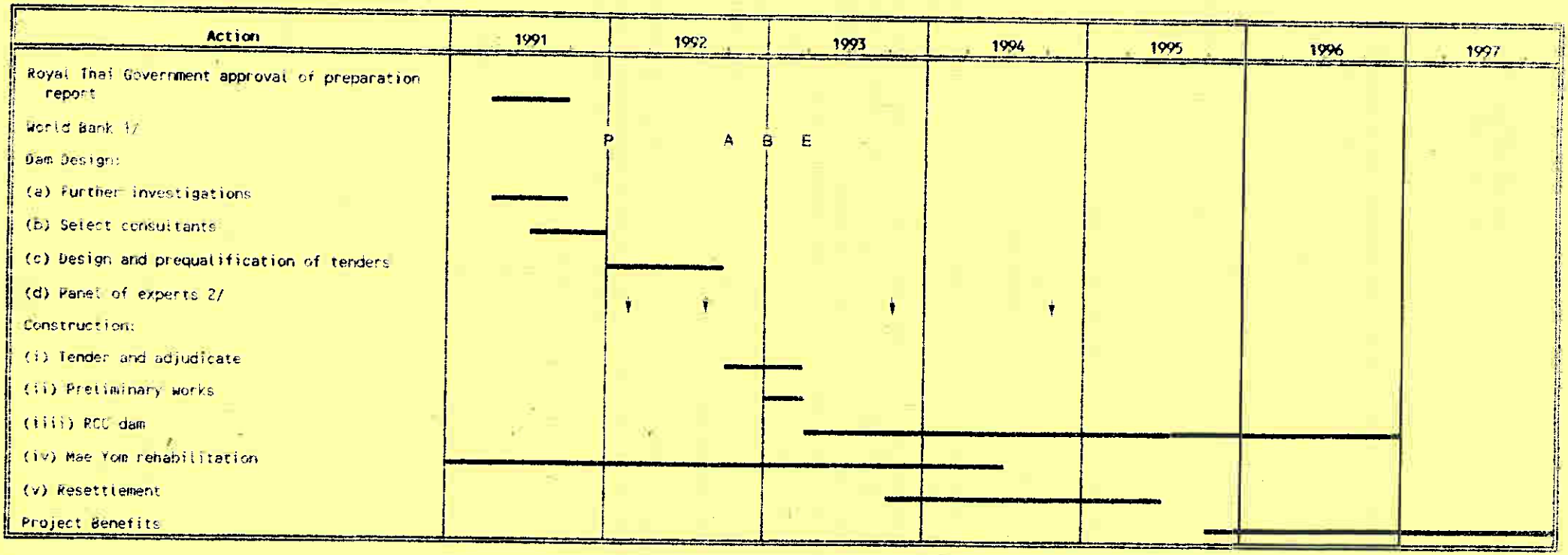
Example:

Figure 1. Bar Chart for Project Design and Implementation

THAILAND: Kaeng Sua Ten Agricultural Dam Project - Implementation Schedule



1/ P = approval of RTG request for appraisal and use of PPF for dam design. A = appraisal. B = Board approval. E = Loan effective.

2/ ↓ signifies input by panel of experts on dam safety.

Table 1. ACTIVITIES ACCORDING TO STAGES IN PROJECT PROCESSING

SUBJECT	RECONNAISSANCE 1	IDENTIFICATION 2	PREPARATION 3	DESIGN 4	CONSTRUCTION AND IMPLEMENTATION 5	MONITORING 6
A. Hydrology for major irrigation works	Assemble & collate data. Mean rain maps, mean & minimum recorded flows as far as available. Hence identify main water sources. Note tendency for swamps & floods. Round-figure estimates of: area each source will irrigate, power potential etc. Note recorded floods. Locate areas of swamps & seasonal inundation.	As 1 plus visits to selected data stations; assess data quality. Note high flood levels, damage, extent and durations of recorded inundations. Review data: recommend any needed improved obs. network/processing. Regional envelopes & frequency analysis of floods & droughts. Estimate sediment runoff & erosion. Preliminary basin water balance.	As 2, reworking data if necessary: check ratings, revise basin water balance, hydrological model for multipurpose projects. Generate critical sequences of flood & drought.	Updating of 3 including detailed flood/drought analysis, flood routing, sedimentation, water treatment for municipal/ industry.	Capacity of river diversion etc. during construction.	Ongoing data collection for project and national hydrology, future refining of estimates.
B. Hydrogeology for irrigation	Assemble & collate data on existing groundwater use. Identify regions having groundwater potential. On basis of air photographs & topo maps identify areas worth further study.	As 1 plus visits to selected sites to prepare prefeasibility study. Review well logs and existing pumping rates. Sample & test water chemicals. Outline karstic and sedimentary formations on map.	As 2 plus drilling test wells, pump tests, geophysical surveys, simple model of aquifer recharge, storage, transmissivity, yield.	As 3 refining aquifer model & yield estimates, design of wells, screens and pumps; specify drilling methods.	Supervise well construction and production tests. Revise aquifer yield estimates.	Well outputs, well drawdown, water table or piezometric level. Update model.
C. Topography for Irrigation Scheme Design	1: 250,000 maps, 50m contour intl. Main watersheds rivers, roads, towns.	Catchment area maps at 1:50,000, 10m contour intl. or largest scale available. Identify additional mapping needs. Maps: 1:10,000, 2 m c.i. of sites of major canals, structures reservoirs.	As 2 plus maps: 1:10,000, 1m contour intl. in irrigable areas: 1:2,000, 1 contour intl. for major canals and structures.	As 3 plus maps of larger scales for selected structures. Bench marks for setting out.	Setting out diagrams based on bench marks from 4.	

Table 1. ACTIVITIES ACCORDING TO STAGES IN PROJECT PROCESSING

SUBJECT	RECONNAISSANCE 1	IDENTIFICATION 2	PREPARATION 3	DESIGN 4	CONSTRUCTION AND IMPLEMENTATION 5	MONITORING 6
D. Geology and soil Mechanics for major irrigation works	On basis of air photographs & topo maps & seismic records, assess areas suitable for dams, canals, structures etc.	As 1 plus visits to selected sites. Field classification of soils and formations at a few key sites. Visit possible sites for structures, set preliminary criteria for dam and canal design, foundations, slope stability. Prepare program for 3.	Drilling investigations for dams, structures, borrow areas. Test soil strength & permeability of selected samples. Revise design criteria. Check reservoir watertightness.	Analysis of slope stability, foundations, percolation, seismicity, concrete aggregate.	Monitor strata and materials encountered and modify designs if necessary.	
E. Irrigation Engineering Designs	Outline main water sources, irrigable land and other demand areas. Outline areas of swamp or periodic inundation. Link present or potential demands with possible sources. Hence identify possible schemes. Identify areas for swamp reclamation, flood control.	As 1 plus visits to selected sites. Outline designs and alignments of major works. Define basin plan for optimum water use and/or inter-basin transfer.	Water management & irrig. efficiencies, canal capacities. Reservoir operation (with hydrol. models), sizes of dams, reservoirs, structures. Feasibility level designs based on sufficient surveys and investigations to ensure that no significant changes are expected.	Detailed designs, construction drawings, bills of quantities. Specifications & contract documents.	Analyse tenders, supervise constructions, prepare as-built drawings & report. Operation and maintenance manual.	Records of construction progress. Check performance and condition of structures.
F. Costs of irrigation systems	Classify project as low cost, medium or large according to current criteria.	Approx. costs (including operation & maintenance) of engineering works, supervision, layout, on farm development & any needed compensation. Quantities and costs would often be estimated by comparison with other projects, perhaps on a per ha basis for irrigation work.	Major quantities accurate to, say, 20%. For repetitive features, type designs are prepared. Foreign/local costs & programme of expenditure for engineering, land preparation, agric', compensation etc as 2.	Detailed costs and schedule of prices, including compensation & way leave.	Compare actual costs with estimates.	Records of capital and operating expenditure.

Table 1. ACTIVITIES ACCORDING TO STAGES IN PROJECT PROCESSING

SUBJECT	RECONNAISSANCE 1	IDENTIFICATION 2	PREPARATION 3	DESIGN 4	CONSTRUCTION AND IMPLEMENTATION 5	MONITORING 6
G. Benefits of irrigation	Qualitative (see under Master Planning)	Aprox. benefits from agricultural development, industry, municipality, hydropower, etc.	Itemized crop income increases; other benefits quantified where possible.			Farm and household income of irrigators.
H. Irrigation Master Planning (additional to A-G above)	Assemble information on population, food needs, water needs, infrastructure. Hence qualitative assement of needs & potential for development and adequacy of water resources. Note existing regional plans for food production, settlement industry etc., hence derive water demand, areas and list of possible projects. Quantify approx. total water demand and resources.	As 1 plus visits and assessment of socio-political background, and any non-technical constraints to development. Assign projects for: a) local study/ construction b) provincial study c) HQ/international development. Population forecasts, needs for industry power, towns. Assess environment & infrastructure. See also E above.	Refine master plans. Liaise with other agencies with plans in area, or affected by water projects. Assess labour supply & demand. Refine study of infrastructure, environment effects, institutions. See also E above.	Liaison with other agencies concerned with related aspects such as roads, settlement, volcanism, earthquakes etc.	Implementation of related aspects by other agencies.	Feedback to refine master plan.
I. Land Classification (general)	Review of following data: LANDSAT/SPOT imagery 1:1 million or larger; air photography 1:120,000 or larger; soil maps 1:250,000, or 1:50,000 land use maps. Review reports and maps of soil survey institutions, universities, consultants etc. Hence identify principal land systems.	As 1, plus maps up to 1:25,000 and air photographs up to 1:25,000. Photo-interpretation and field checks of soil and land capability with observations 1 per 200ha to 1 per 500ha, plus soil samples for chemical analysis. Hence better differentiation of land systems.	As 2 plus recent air photos 1:10,000 etc. Identify and quantify soils and land forms. Define crop-specific land utilization types. Observations 1 per 50ha or 1 per 25 ha. Study erosion, fertility, toxicity.	As 3 with larger scale and more detail. Site-specific tests of selected small areas at 1 or 2 obs/ha.	Implementation of services, training and organisation of farmers.	Fertility, soil conditions, drainage.

Table 1. ACTIVITIES ACCORDING TO STAGES IN PROJECT PROCESSING

SUBJECT	RECONNAISSANCE 1	IDENTIFICATION 2	PREPARATION 3	DESIGN 4	CONSTRUCTION AND IMPLEMENTATION 5	MONITORING 6
J. Environmental impact	Preliminary screening of project ideas according to whether: - potentially serious negative environmental impact; - minor negative environmental impact; - environmentally benign; to the extent that available information permits.	Initial assessment of possible environmental impacts of alternative project concepts. Adjust concepts where possible to mitigate negative impacts. Define scope of further environmental investigations, including full environmental assessment if this can be decided at this stage. Prepare terms-of-reference and identify sources of funding. Initiate investigations as appropriate.	Review environmental data gathered. If not already done, decide whether formal EA is needed; if so, prepare TOR/identify funding.	Ensure completion of EA is compatible with intended project appraisal date. If no EA is needed, update and finalize mitigation plan for final project design. Specify indicators, organization and responsibilities for environmental monitoring.	Install monitoring system, operate and maintain capability; upgrade mitigation measures as needed in response to monitoring feedback.	Measure key environmental indicators, as previously specified.
K. Institutions	Literature search to identify administrative structure of country. Discussions with persons who know the country/similar projects in that country. Information from trade organizations etc. Describe overall institutional strength. (Ability, capacity and funding).	As 1, but with some quantification; relate to possible project/s being identified. Suggestions for strengthening. Define institutions' goals and objectives, legislation. Assess need for institutions specialist at preparation stage.	Expansion of 1 and 2. Assemble full details of concerned departments/companies with staff numbers, organizational charts and, at project level, details of qualifications and experience of staff. Quantify staff: client ratios, facilities, capital versus operating budgets. Assess morale. Analyse performance of any similar projects.	Final arrangement of any organization initiatives/ changes needed for project. Design performance assessment surveys.	Implement any organizational changes necessary; establish "project office" if needed; carry out periodical assessment surveys (project office). Fine tune institutional arrangements as needed.	Analyse and evaluate performance via surveys; provide feedback to implementation.

Table 1. ACTIVITIES ACCORDING TO STAGES IN PROJECT PROCESSING

SUBJECT	RECONNAISSANCE 1	IDENTIFICATION 2	PREPARATION 3	DESIGN 4	CONSTRUCTION AND IMPLEMENTATION 5	MONITORING 6
L. Agriculture, Marketing, Extension etc.	List local crops. General policies for irrigated crops, rain-fed crops, food vs. industrial crops, livestock, forestry, aquaculture. General assumptions on crop or tree yields, cropping intensity, fish, aquaculture yields: approx crop/fish water use.	As 1 plus note on contraints on agricultural growth due to lack of seeds, water, O&M, extension, finance,etc. Recommendations on technical strategy: crop strains, patterns, intensity; fertilizers; crop protection; water application; farming practices; extension and other services.	As 2 plus estimates of yields with and without project, and consumptive use. Farm models and more detailed agronomic recommendations. Study needs for manpower, markets, storage, credit, technical support.	Detailed design of extension, agric. input, credit and marketing services, storage etc.		Actual crop yields, cropping patterns and intensity.
M. Economic & Financial Analysis		Ranking of alternatives according to economic returns - using simple rapid criteria, possibly computer programmed.	Economic & financial returns, financial schedules, subsidies, credits & repayment. Sensitivity study.	Financial requirements, loans and disbursements	Baseline monitoring and evaluation survey.	Repayments, farm and household incomes.

Example:

Table 2

Egypt
New Land Agricultural Services
Project Cost Summary

	'000 LE			'000 US$			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
A. Water Management	4391.3	2612.4	7003.6	1657.1	985.8	2642.9	37.3	13.7
B. Agriculture and Irrigation Extension								
1. Extension Office	2781.5	1379.3	4160.9	1049.6	520.5	1570.1	33.2	8.1
2. Area Extension Centres	1029.1	1231.3	2260.4	388.3	464.6	853.0	54.5	4.4
3. Extension Sub-Centres	1809.5	2345.5	4155.1	682.8	885.1	1568.0	56.4	8.1
Sub-Total	5620.2	4956.1	10576.3	2120.8	1870.2	3991.1	46.9	20.7
C. Cooperatives Development	1246.4	1123.3	2369.7	470.3	423.9	894.2	47.4	4.6
D. Applied Research	980.7	1886.7	2867.4	370.1	711.9	1082.0	65.8	5.6
E. Agricultural Development	17344.6	8172.6	25517.2	6545.1	3084.0	9629.1	32.0	49.9
F. Project Management	1447.8	1315.3	2763.1	546.3	496.3	1042.7	47.6	5.4
Total BASELINE COSTS	31031.0	20066.4	51097.4	11709.8	7572.2	19282.0	39.3	100.0
Physical Contingencies	3103.1	2006.6	5109.7	1171.0	757.2	1928.2	39.3	10.0
Price Contingencies	7923.6	4595.9	12519.5	2990.0	1734.3	4724.3	36.7	24.5
Total PROJECTS COSTS	42057.6	26669.0	68726.6	15870.8	10063.8	25934.6	38.8	134.5

Table 3

Example:

Egypt
New Land Agricultural Services
('000 LE)
Project Components by Year

	Base Costs					Total	
	01	02	03	04	05	LE'000	US$'000
A. Water Management	2534.6	928.3	1446.3	1286.3	807.9	7003.6	2642.9
B. Agriculture and Irrigation Extension							
1. Extension Office	1421.5	641.1	616.2	747.7	734.2	4160.9	1570.1
2. Area Extension Centres	695.4	403.5	293.5	574.5	293.5	2260.4	853.0
3. Extension Sub-Centres	1084.6	658.5	832.0	670.0	910.0	4155.1	1568.0
Sub-total	3201.4	1703.1	1741.7	1992.2	1937.7	10576.3	3991.1
C. Cooperatives Development	576.2	558.7	412.9	423.4	398.4	2369.7	894.2
D. Applied Research	750.1	680.4	693.9	418.9	323.9	2867.4	1082.0
E. Agricultural Development	0.0	4075.0	5333.3	7403.0	8705.9	25517.2	9629.1
F. Project Management	1165.3	376.4	380.9	411.4	428.9	2763.1	1042.7
Total BASELINE COSTS	8227.6	8322.1	10009.2	11935.4	12602.9	51097.4	19282.0
Physical Contingencies	822.8	832.2	1000.9	1193.5	1260.3	5109.7	1928.2
Price Contingencies	583.8	1435.7	2354.7	3593.5	4551.9	12519.5	4724.3
Total PROJECT COSTS	9634.1	10590.0	13364.8	16722.5	18415.2	68726.6	25934.6
Taxes	718.4	93.3	86.3	158.0	83.5	1139.6	430.0
Foreign Exchange	5097.4	4363.2	5123.4	6017.1	6067.9	26669.0	10063.8

Table 4

Egypt
New Land Agricultural Services

Example: Summary Accounts Cost Summary

	'000 LE			'000 US$			% Foreign	% Total Base
	Local	Foreign	Total	Local	Foreign	Total	Exchange	Costs
I. INVESTMENT COSTS								
A. Civil works	1127.8	902.7	2030.5	425.6	340.7	766.2	44.5	4.0
B. Equipment								
1. Office equipment	419.5	442.2	861.7	158.3	166.9	325.2	51.3	1.7
2. Other equipment	374.0	1496.0	1870.0	141.1	564.5	705.7	80.0	3.7
Sub-Total	793.5	1938.2	2731.7	299.4	731.4	1030.8	71.0	5.3
C. Vehicles	793.3	2379.7	3173.0	299.3	898.0	1197.4	75.0	6.2
D. Survey and studies	790.0	0.0	790.0	298.1	0.0	298.1	0.0	1.5
E. Technical assistance	173.4	1560.6	1734.0	65.4	588.9	654.3	90.0	3.4
F. Farm inputs	18801.2	8172.6	26973.8	7094.8	3084.0	10178.8	30.3	52.8
Total INVESTMENT COSTS	22479.1	14953.9	37433.0	8482.7	5643.0	14125.7	39.9	73.3
II. RECURRENT COSTS								
A. Personnel	2650.3	2650.3	5300.6	1000.1	1000.1	2000.2	50.0	10.4
B. Office expenses	550.5	235.9	786.4	207.7	89.0	296.8	30.0	1.5
C. O&M vehicles	2508.8	1075.2	3584.0	946.7	405.7	1352.5	30.0	7.0
D. Communications materials	680.0	1.0	681.1	256.6	0.4	257.0	0.2	1.3
E. Staff training	1429.7	0.0	1429.7	539.5	0.0	539.5	0.0	2.8
F. Overseas training	0.0	534.5	534.5	0.0	201.7	201.7	100.0	1.0
G. Farmer training	204.8	87.7	292.5	77.3	33.1	110.4	30.0	0.6
H. Experimental farm operations	527.8	527.7	1055.5	199.2	199.2	398.3	50.0	2.1
Total RECURRENT COSTS	8551.8	5112.5	13664.3	3227.1	1929.2	5156.3	37.4	26.7
Total BASELINE COSTS	31031.0	20066.4	51097.4	11709.8	7572.2	19282.0	39.3	100.0
Physical Contingencies	3103.1	2006.6	5109.7	1171.0	757.2	1928.2	39.3	10.0
Price Contingencies	7923.6	4595.9	12519.5	2990.0	1734.3	4724.3	36.7	24.5
Total PROJECTS COSTS	42057.6	26669.0	68726.6	15870.8	10063.8	25934.6	38.8	134.5

Table 5

Egypt
New Land Agricultural Services
'000 LE

Example:

Summary Accounts by Year

	Base Costs						Foreign Exchange	
	01	02	03	04	05	Total	%	Amount
I. INVESTMENT COSTS								
A. Civil works	1764.0	155.5	111.0	0.0	0.0	2030.5	44.5	902.7
B. Equipment								
1. Office equipment	720.2	45.0	23.0	30.5	43.0	861.7	51.3	442.2
2. Other equipment	745.0	375.0	375.0	375.0	0.0	1870.0	80.0	1496.0
Sub-total	1465.2	420.0	398.0	405.5	43.0	2731.7	71.0	1938.2
C. Vehicles	2153.0	149.0	135.0	441.0	295.0	3173.0	75.0	2379.7
D. Survey and studies	790.0	0.0	0.0	0.0	0.0	790.0	0.0	0.0
E. Technical assistance	424.8	614.8	464.8	164.8	64.8	1734.0	90.0	1560.6
F. Farm inputs	0.0	4075.0	5853.3	7923.0	9122.5	26973.8	30.3	8172.6
Total INVESTMENT COSTS	6597.0	5414.3	6962.1	8934.3	9525.3	37433.0	39.9	14953.9
II. RECURRENT COSTS								
G. Personnel	615.4	1211.8	1157.8	1157.8	1157.8	5300.6	50.0	2650.3
H. Office expenses	110.7	161.3	170.8	171.8	171.8	786.4	30.0	235.9
I. O&M vehicles	379.5	753.2	811.7	819.7	819.7	3584.0	30.0	1075.2
J. Communications materials	103.2	129.1	149.2	149.7	149.7	681.1	0.2	1.0
K. Staff training	123.2	216.8	270.5	374.5	444.5	1429.7	0.0	0.0
L. Overseas training	0.0	91.0	120.0	158.5	165.0	534.5	100.0	534.5
M. Farmer training	27.0	58.5	81.0	63.0	63.0	292.5	30.0	87.7
N. Experimental farm operations	271.5	286.0	286.0	106.0	106.0	1055.5	50.0	527.7
Total RECURRENT COSTS	1630.6	2907.8	3047.1	3001.1	3077.6	13664.3	37.4	5112.5
Total BASELINE COSTS	8227.6	8322.1	10009.2	11935.4	12602.9	51097.4	39.3	20066.4
Physical Contingencies	822.8	832.2	1000.9	1193.5	1260.3	5109.7	39.3	2006.6
Price Contingencies	583.8	1435.7	2354.7	3593.5	4551.9	12519.5	36.7	4595.9
Total PROJECT COSTS	9634.1	10590.0	13364.8	16722.5	18415.2	68726.6	38.8	26669.0
Taxes	718.4	93.3	86.3	158.0	83.5	1139.6	0.0	0.0
Foreign Exchange	5097.4	4363.2	5123.4	6017.1	6067.9	26669.0	100.0	26669.0

Table 6

Example:

Egypt
New Land Agricultural Services
Summary Account by Project Component
'000 LE

	Water Management	Extension Office	Area Extension Centres	Extension Sub Centres	Cooperatives Development	Applied Research	Agricultural Development	Project Management	Total	Contingencies %	Contingencies Amount	Contingencies %	Contingencies Amount
I. INVESTMENT COSTS													
A. Civil works	340.0	225.0	177.5	740.0	45.0	100.0	0.0	403.0	2030.5	10.0	203.0	8.8	178.3
B. Equipment													
1. Office equipment	77.5	230.0	28.5	120.0	12.0	74.0	0.0	319.7	861.7	10.0	86.2	10.3	89.0
2. Other equipment	1780.0	0.0	90.0	0.0	0.0	0.0	0.0	0.0	1870.0	10.0	187.0	17.0	318.7
Sub-total	1857.5	230.0	118.5	120.0	12.0	74.0	0.0	319.7	2731.7	10.0	273.2	14.9	407.7
C. Vehicles	324.0	585.0	562.0	525.0	700.0	214.0	0.0	263.0	3173.0	10.0	317.3	14.2	449.5
D. Survey and studies	790.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	790.0	10.0	79.0	7.1	56.1
E. Technical assistance	0.0	444.0	0.0	0.0	0.0	1290.0	0.0	0.0	1734.0	10.0	173.4	18.4	318.6
F. Farm inputs	1456.6	0.0	0.0	0.0	0.0	0.0	25517.2	0.0	26973.8	10.0	2697.4	28.8	7760.3
Total INVESTMENT COSTS	4768.1	1484.0	858.0	1385.0	757.0	1678.0	25517.2	985.7	37433.0	10.0	3743.3	24.5	9170.2
II. RECURRENT COSTS													
A. Personnel	597.3	671.9	526.2	1522.6	480.7	532.8	0.0	969.1	5300.6	10.0	530.1	24.4	1291.8
B. Office expenses	138.0	55.4	36.3	42.2	6.5	150.0	0.0	358.0	786.4	10.0	78.6	24.1	189.6
C. O&M vehicles	370.2	628.0	324.4	633.7	1083.7	268.1	0.0	275.7	3584.0	10.0	358.4	24.9	890.7
D. Communications materials	0.0	677.6	0.0	0.0	0.0	0.0	0.0	3.5	681.1	10.0	68.1	24.1	163.9
E. Staff training	590.0	643.9	0.0	0.0	41.7	0.0	0.0	154.0	1429.7	10.0	143.0	26.8	383.1
F. Overseas training	0.0	0.0	0.0	517.5	0.0	0.0	0.0	17.0	534.5	10.0	53.4	28.3	151.2
G. Farmer training	0.0	0.0	0.0	54.0	0.0	238.5	0.0	0.0	292.5	10.0	29.2	24.9	72.8
H. Experimental farm operating costs	540.0	0.0	515.5	0.0	0.0	0.0	0.0	0.0	1055.5	10.0	105.5	19.5	206.1
Total RECURRENT COSTS	2235.5	2676.9	1402.4	2770.1	1612.7	1189.4	0.0	1777.3	13664.3	10.0	1366.4	24.5	3349.3
Total BASELINE COSTS	7003.6	4160.9	2260.4	4155.1	2369.7	2867.4	25517.2	2763.1	51097.4	10.0	5109.7	24.5	12519.5
Physical Contingencies	700.4	416.1	226.0	415.5	237.0	286.7	2551.7	276.3	5109.7				
Price Contingencies	1359.3	846.8	467.0	916.7	505.8	577.0	7330.9	516.0	12519.5	9.1	1138.1		
Total PROJECT COSTS	9063.4	5423.7	2953.4	5487.3	3112.5	3731.1	35399.8	3555.5	68726.6	9.1	6247.9	18.2	12519.5
Taxes	312.8	189.1	129.8	147.0	135.2	64.6	0.0	161.2	1139.6	9.1	103.6		
Foreign Exchange	3317.0	1739.1	1599.3	3106.8	1455.6	2438.9	11341.6	1670.6	26669.0	9.1	2424.5		

Table 7

Example: Evolution of Area, Output and Inputs for Individual Crops Over Time

Egypt
New Land Agricultural Services Project
TABLE 1.1 Model 111 Farm Model
PRODUCTION AND INPUTS

		Crop year								
		Without	With Project							
	Unit	1 to 10	1	2	3	4	5	6	7	8	9 to 10
Cropping Intensity	Percent	-	80.0	80.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Cropping Pattern											
Existing Technology											
Wheat	Fd.	-	1.7	1.7	-	-	-	-	-	-	-
Fababeans	Fd.	-	2.0	2.0	-	-	-	-	-	-	-
Berseem	Fd.	-	1.1	1.1	-	-	-	-	-	-	-
Sub-Total Existing Technology Area		-	4.8	4.8	-	-	-	-	-	-	-
New Technology											
Wheat	Fd.	-	-	-	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Fababeans	Fd.	-	-	-	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Berseem	Fd.	-	-	-	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Sub-Total New Technology Area		-	-	-	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Cropped Area		-	4.8	4.8	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Main Production											
Wheat	tons	-	1.4	1.5	1.6	1.8	2.0	2.2	2.4	2.6	2.8
Fababeans	tons	-	0.8	0.9	1.1	1.4	1.6	1.8	2.1	2.3	2.5
Forage-Berseem green	ton	-	12.1	13.8	9.0	10.5	12.0	13.5	15.0	16.5	18.0
By Products											
Forage-Wheat straw	ton	-	4.8	5.1	6.0	6.9	7.8	8.7	9.6	10.5	11.4
Faba/pods	tons	-	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.8
Waste And Loss											
Wheat	tons	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Fababeans	tons	-	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Sales											
Wheat	tons	-	1.3	1.3	1.5	1.7	1.9	2.1	2.2	2.4	2.6
Fababeans	tons	-	0.8	0.9	1.0	1.3	1.5	1.7	1.9	2.2	2.4
Forage-Berseem green	ton	-	12.1	13.8	9.0	10.5	12.0	13.5	15.0	16.5	18.0
Forage-Wheat straw	ton	-	4.8	5.1	6.0	6.9	7.8	8.7	9.6	10.5	11.4
Faba/pods	tons	-	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.8
Operating Inputs											
Wheat/seeds	kg/fd	-	127.5	127.5	121.5	115.4	109.3	103.3	97.2	91.1	85.0
Superphos (15%)	kg/fd	-	700.0	723.4	636.2	714.3	792.5	870.6	948.8	1,026.9	1,105.0
Manure	m3	-	3.4	4.0	5.8	7.5	9.3	11.1	12.8	14.6	16.3
Harvesting	LE/fed	-	-	-	3.0	5.9	8.8	11.7	14.6	17.5	20.4
Transport	LE/fed	-	17.9	19.8	24.3	29.2	34.0	38.9	43.7	48.6	53.4
Fababeans/seed	kg/fd	-	200.0	200.0	184.6	179.2	173.8	168.3	162.9	157.5	152.0
Fungicide/pesticide	LE/fed	-	-	-	13.6	27.2	40.8	54.3	67.9	81.5	95.0
Soil preparation	LE/fed	-	102.3	102.3	82.5	82.5	82.5	82.5	82.5	82.5	82.5
Berseem/seed	kg/fd	-	22.0	22.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Labor											
January	m/days	-	9.1	9.5	7.6	6.7	5.8	4.9	4.0	3.1	2.2
February	m/days	-	10.2	10.6	9.5	9.1	8.8	8.4	8.1	7.7	7.3
March	m/days	-	14.4	14.9	12.4	11.7	11.0	10.3	9.6	8.9	8.2
April	m/days	-	28.4	29.4	24.7	22.6	20.5	18.4	16.3	14.2	12.0
May	m/days	-	23.0	23.8	20.9	18.3	15.7	13.1	10.5	7.9	5.3
June	m/days	-	5.1	5.3	4.8	4.3	3.8	3.3	2.8	2.3	1.7
September	m/days	-	8.2	8.5	6.5	5.9	5.2	4.5	3.9	3.2	2.5
October	m/days	-	18.2	18.9	16.0	14.3	12.6	10.9	9.2	7.5	5.8
November	m/days	-	19.6	20.3	18.6	18.7	18.8	18.9	19.0	19.1	19.2
December	m/days	-	16.2	16.8	14.3	12.9	11.4	10.0	8.5	7.1	5.6

Table 8

Example: Build-Up of Farm Cashflow Table

Egypt
New Land Agricultural Services Project
TABLE 1.2 Model III Farm Model
FINANCIAL BUDGET
(In LE)

	Crop year									
	Incremental									
	1	2	3	4	5	6	7	8	9	10
Main Production										
Wheat	633.8	660.2	747.0	833.7	920.5	1,007.3	1,094.0	1,180.8	1,267.6	1,267.6
Fababeans	490.4	551.7	665.6	807.0	948.4	1,089.9	1,231.3	1,372.7	1,514.2	1,514.2
Forage-Berseem green	302.5	343.8	225.0	262.5	300.0	337.5	375.0	412.5	450.0	450.0
Sub-Total Main Production	1,426.7	1,555.7	1,637.5	1,903.2	2,168.9	2,434.6	2,700.3	2,966.0	3,231.7	3,231.7
By Products										
Forage-Wheat straw	190.4	204.0	240.0	275.9	311.9	347.8	383.8	419.7	455.6	455.6
Faba/pods	18.0	20.0	24.5	29.9	35.3	40.8	46.2	51.6	57.0	57.0
Sub-Total By Products	208.4	224.0	264.4	305.8	347.2	388.5	429.9	471.3	512.6	512.6
Gross Value Of Production	1,635.1	1,779.7	1,901.9	2,209.0	2,516.0	2,823.1	3,130.1	3,437.2	3,744.3	3,744.3
Waste And Loss										
Wheat	63.4	60.6	64.1	66.5	68.0	68.4	67.8	66.1	63.4	63.4
Fababeans	49.1	50.6	57.1	64.4	70.0	74.0	76.3	76.9	75.8	75.8
Sub-Total Waste And Loss	112.5	111.1	121.1	130.9	138.0	142.3	144.0	142.9	139.1	139.1
Net Value Of Production	1,522.7	1,668.6	1,780.8	2,078.1	2,378.1	2,680.8	2,986.2	3,294.3	3,605.2	3,605.2
Other Inflows										
Off-farm income	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0
INFLOWS	1,282.7	1,428.6	1,540.8	1,838.1	2,138.1	2,440.8	2,746.2	3,054.3	3,365.2	3,365.2
Production Cost										
Operating										
Inputs										
Wheat/seeds	76.5	76.5	72.9	69.3	65.6	62.0	58.3	54.7	51.0	51.0
Superphos (15%)	94.2	97.3	85.6	96.1	106.6	117.1	127.6	138.2	148.7	148.7
Manure	40.8	47.6	68.8	89.9	111.1	132.2	153.4	174.5	195.6	195.6
Harvesting	-	-	3.0	5.9	8.8	11.7	14.6	17.5	20.4	20.4
Transport	17.9	19.8	24.3	29.2	34.0	38.9	43.7	48.6	53.4	53.4
Fababeans/seed	122.0	122.0	112.6	109.3	106.0	102.7	99.4	96.1	92.8	92.8
Fungicide/pesticide	-	-	13.6	27.2	40.8	54.3	67.9	81.5	95.0	95.0
Soil preparation	102.3	102.3	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5
Berseem/seed	24.2	24.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2
Sub-Total Inputs	477.9	489.7	476.2	522.3	568.3	614.4	660.4	706.4	752.5	752.5
Hired Labor										
April	56.4	62.1	34.0	21.3	8.7	-	-	-	-	-
May	24.0	28.6	11.2	-	-	-	-	-	-	-
November	3.0	6.3	-	-	-	-	-	0.5	1.0	1.0
Sub-Total Hired Labor	83.4	97.0	45.1	21.3	8.7	-	-	0.5	1.0	1.0
Sub-Total Operating	561.3	586.6	521.3	543.6	576.9	614.4	660.4	706.9	753.5	753.5
CASH FLOW BEFORE FINANCING	721.4	842.0	1,019.5	1,294.6	1,561.2	1,826.5	2,085.8	2,347.4	2,611.7	2,611.7
Sources Of Finance										
Disbursments On Short Term Loan	289.4	298.5	305.2	346.3	367.9	438.6	493.7	571.9	605.2	605.7
Sub-Total Sources Of Finance	289.4	298.5	305.2	346.3	367.9	438.6	493.7	571.9	605.2	605.7
Loan Repayments										
Short Term Principal	289.4	298.5	305.2	346.3	367.9	438.6	493.7	571.9	605.2	605.7
Short Term Interest	17.4	18.0	18.4	20.8	22.1	26.4	29.7	34.4	36.4	36.4
Sub-Total Loan Repayments	306.8	316.4	323.5	367.1	390.0	465.0	523.3	606.2	641.5	642.0
NET FINANCING	-17.4	-18.0	-18.4	-20.8	-22.1	-26.4	-29.7	-34.4	-36.4	-36.4
FARM FAMILY BENEFITS AFTER FINANCING	704.1	824.1	1,001.2	1,273.8	1,539.1	1,800.1	2,056.2	2,313.1	2,575.4	2,575.4
Returns per Family-Day of Labor	5.1	5.9	7.9	10.6	13.8	17.6	22.5	28.8	37.0	37.0

Table 9

Example: Crop Budgets

Egypt
Agricultural Services Project
Wheat / Sugar-Beet Crop Model
YIELDS AND INPUTS
(PER Fd.)

		Crop year							Crop year							Crop year						
		Existing Technology							New Technology							Incremental						
	Unit	1	2	3	4	5	6	7 to 20	1	2	3	4	5	6	7 to 20	1	2	3	4	5	6	7 to 20
Yield	tons	0.8	1	1.6	1.6	1.6	1.6	1.6	0.8	1.2	2	2.5	2.5	2.5	2.5	-	0.2	0.4	0.9	0.9	0.9	0.9
By Products																						
Forage-Wheat straw	ton	2.8	3	3.2	3.4	3.6	3.8	4	2.8	3.5	4.1	4.8	5.4	6.1	6.7	-	0.5	0.9	1.4	1.8	2.3	2.7
Operating																						
Inputs																						
Wheat/seeds	kg/fd	75	75	75	75	75	75	75	75	70.9	66.7	62.5	58.4	54.2	50	-	-4.2	-8.4	-12.5	-16.7	-20.9	-25
Amm. Nitrate (31%)	kg/fd	100	108.4	116.7	125	133.4	141.7	150	100	116.7	133.4	150	166.7	183.4	200	-	8.4	16.7	25	33.4	41.7	50
Potash sulf	kg/fd	30	33.4	36.7	40	43.4	46.7	50	30	36.7	43.4	50	56.7	63.4	70	-	3.4	6.7	10	13.4	16.7	20
Manure	m3	2	2.4	2.7	3	3.4	3.7	4	2	2.7	3.4	4	4.7	5.4	6	-	0.4	0.7	1	1.4	1.7	2
Pesticides	value	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.3	-	0.1	0.1	0.1	0.1	0.1	0.1
Harvest/bags	No.	5	5.5	6	6.5	7	7.5	8	5	6.2	7.4	8.5	9.7	10.9	12	-	0.7	1.4	2	2.7	3.6	4
Planting	value	5	4.2	3.4	2.5	1.7	0.9	0	5	6.7	8.4	10	11.7	13.4	15	-	2.5	5	7.5	10	12.5	15
Manuring	value	1	0.9	0.7	0.5	0.4	0.2	0	1	1.7	2.4	3	3.7	4.4	5	-	0.9	1.7	2.5	3.4	4.2	5
Harvesting	value	10	8.4	6.7	5	3.4	1.7	0	10	10.4	10.7	11	11.4	11.7	12	-	2	4	6	8	10	12
Transport	value	7	7.5	8	8.5	9	9.5	10	7	8.9	10.7	12.5	14.4	16.2	18	-	1.4	2.7	4	5.4	6.7	8
Labor																						
February	m/days	3	3.1	3.2	3.3	3.4	3.5	3.6	3	3	3	3	3	3	3	-	-0.1	-0.2	-0.3	-0.4	-0.5	-0.6
March	m/days	3	3.1	3.2	3.3	3.4	3.5	3.6	3	3	3	3	3	3	3	-	-0.1	-0.2	-0.3	-0.4	-0.5	-0.6
April	m/days	3	3.1	3.2	3.3	3.4	3.5	3.6	3	3	3	3	3	3	3	-	-0.1	-0.2	-0.3	-0.4	-0.5	-0.6
May	m/days	10	10.4	10.7	11	11.4	11.7	12	10	8.7	7.4	6	4.7	3.4	2	-	-1.7	-3.4	-5	-6.7	-8.4	-10
June	m/days	3	3.1	3.2	3.3	3.4	3.5	3.6	3	2.7	2.4	2	1.7	1.4	1	-	-0.5	-0.9	-1.3	-1.8	-2.2	-2.6
October	m/days	3	3.1	3.2	3.3	3.4	3.5	3.6	3	2.7	2.4	2	1.7	1.4	1	-	-0.5	-0.9	-1.3	-1.8	-2.2	-2.6
November	m/days	2	2.1	2.2	2.2	2.3	2.4	2.4	2	2	2	2	2	2	2	-	-0.1	-0.2	-0.2	-0.3	-0.4	-0.4
December	m/days	3	3.1	3.2	3.3	3.4	3.5	3.6	3	2.9	2.7	2.5	2.4	2.2	2	-	-0.3	-0.6	-0.8	-1.1	-1.4	-1.6

Table 10

Example: Livestock Herd Projection

ARGENTINA - SERVICIOS AGRICOLAS
SENASA - TAMBO

HERD DEVELOPMENT COMPOSITION TOTALS --- (WITHOUT PROJECT)

Scale = Years	0	1	2	3	4	5	6	7	8	9	10
NUMBER OF MALE ANIMALS WHOLE YEAR	24	24	24	24	24	24	24	24	24	24	24
NUMBER OF FEMALE ANIMALS WHOLE YEAR	100	100	100	100	100	100	100	100	100	100	100
NUMBER BREEDING FEMALES WHOLE YEAR	59	59	59	59	59	59	59	59	59	59	59
TOTAL NUMBER OF ANIMALS WHOLE YEAR	124	124	124	124	124	124	124	124	124	124	124
NUMBER OF ANIMAL UNITS WHOLE YEAR	106	106	106	106	106	106	106	106	106	106	106
GROWTH RATE OF THE HERD WHOLE YEAR %	0	-0	-0	0	-0	0	-0	0	-0	0	0
NUMBER OF MORTALITIES WHOLE YEAR	8	8	8	8	8	8	8	8	8	8	8
HERD MORTALITY RATE WHOLE YEAR %	6	6	6	6	6	6	6	6	6	6	6
NUMBER OF CULLING-SALES WHOLE YEAR	36	36	36	36	36	36	36	36	36	36	37
OFF-TAKE RATE WHOLE YEAR %	29	29	29	29	29	29	29	29	29	29	30
MILK PRODUCTION QUANTITY WHOLE YEAR LITERS	108300	108416	108428	108428	108428	108428	108428	108428	108428	108428	108428

HERD DEVELOPMENT COMPOSITION TOTALS --- (WITH PROJECT)

Scale = Years	1	2	3	4	5	6	7	8	9	10
NUMBER OF MALE ANIMALS WHOLE YEAR	24	25	26	29	30	30	30	30	30	30
NUMBER OF FEMALE ANIMALS WHOLE YEAR	100	110	113	119	123	123	123	123	123	123
NUMBER BREEDING FEMALES WHOLE YEAR	59	69	70	70	70	70	70	70	70	70
TOTAL NUMBER OF ANIMALS WHOLE YEAR	124	135	140	149	153	154	154	154	154	154
NUMBER OF ANIMAL UNITS WHOLE YEAR	132	127	130	125	127	127	127	127	127	127
GROWTH RATE OF THE HERD WHOLE YEAR %	9	4	7	2	0	0	-0	0	-0	0
NUMBER OF MORTALITIES WHOLE YEAR	7	7	6	7	7	7	7	7	7	7
HERD MORTALITY RATE WHOLE YEAR %	6	5	4	4	4	4	4	4	4	4
NUMBER OF CULLING-SALES WHOLE YEAR	27	36	40	45	49	49	49	49	49	53
OFF-TAKE RATE WHOLE YEAR %	22	27	28	30	32	32	32	32	32	33
MILK PRODUCTION QUANTITY WHOLE YEAR	109546	119748	137074	139065	139516	139495	139498	139497	139497	139497

Table 11

Example: Sierra Leone - Calculation of Import Parity Price

	Projection 1995	Projection 2000
	..... US$/Mt	
Rice (Thai), white, milled, 5% broken FOB, Bangkok in 1985 constant terms [a/]	168	166
Rice (Thai), white, milled, 5% broken FOB, Bangkok in 1990 constant terms [b/]	243	240
Allowance for adjusted quality (15%)	(36)	(36)
Ocean freight and insurance	60	60
CIF Freetown	267	264
	..... LE '000/Mt	
CIF Freetown (LE 6,250 = US$1)	42.7	42.2
Handling and port charges [c/]	2.4	2.4
Landed cost of rice at Freetown	45.1	44.6
Transport Moyamba-Freetown [c/]	(4.0)	(4.0)
Price of rice at Moyamba market	41.1	40.6
Moyamba price paddy equivalent (65% yield)	26.7	26.4
Value of by-products less milling charges [c/]	0.3	0.3
Transport farm to Moyamba [c/]	(2.1)	(2.1)
Farmgate economic price for paddy	24.9	24.6
Farmgate financial price for paddy [d/]	40.0	40.0

[a/] Prices in 1985 constant dollars, derived from world Bank, Commodity Price Projections, February 1990.

[b/] Adjusted by MUV Index of 1.4439 for 1990 (1985 = 1.00).

[c/] Financial values have been converted to economic values using a SCF of 0.9.

[d/] Derived from farm survey data.

Table 12

Example: Egypt: Calculation of Export Parity Price for Cotton

	Projection 1995	2000
	..... US$/Mt.....	
Projected price of middling grade, CIF Europe in 1985 constant terms [a/]	1,110	1,210
Price in 1991 constant terms	1,650	1,799
Ocean freight and insurance	(35)	(35)
FOB Port Alexandria	1,615	1,764
FOB Port Alexandria (Le3.30=US$1.0)	5,331	5,822
	..... Le/Mt	
Quality Premium (10% for long staple)	533	582
Net value of cotton seed	107	116
FOB value	5,971	6,520
Port charges and handling	(100)	(100)
Exporter's charges (2% of FOB value)	(119)	(130)
Transport: Port - wholesaler	(50)	(50)
Wholesale market price	5,702	6,240
Ginning cost	(150)	(150)
Transport: Farm - wholesaler	(15)	(15)
Economic Farmgate Price	5,537	6,075
Financial Farmgate Price [b/]	1,590	1,590

a/ From World Bank Commodity Price Projections, October 1991.
b/ Mission estimate based on field investigations.

Table 13

Example: Cost and Benefit Streams for Economic Analysis

MADAGASCAR

Middle-West Region Development Project

Economic Analysis

million FMG

	1	2	3	4	5	6	7-09	10	11	12	13-14	15	16-19	20
Costs														
Investment	2357	3060	2399	2398	2874	-	-	-	-	-	-	-	-	-
Recurrent	538	584	612	635	659	659	659	659	659	659	659	659	659	659
Replacement	-	-	-	-	-	-	-	591	495	115	271	891	-	591
Farm Level Investment	-	50	590	1130	1620	1960	1960	1960	1960	1960	1960	1960	1960	1960
Total Costs	2895	3694	3601	4163	5153	2619	2619	3210	3114	2734	2890	3510	2619	3210
Benefits														
Rice	-	-	539	1078	1617	2156	2156	2156	2156	2156	2156	2156	2156	2156
Maize	-	-	101	202	303	404	404	404	404	404	404	404	404	404
Cassava	-	-	120	240	360	480	480	480	480	480	480	480	480	480
Vegetables	-	-	278	555	833	1110	1110	1110	1110	1110	1110	1110	1110	1110
Pork	-	-	290	580	870	1160	1450	1450	1450	1450	1450	1450	1450	1450
Total Benefits	-	-	1328	2655	3983	5310	5600	5600	5600	5600	5600	5600	5600	5600
Net Benefits														
Net Benefits	-2895	-3694	-2273	-1508	-1170	2691	2981	2390	2486	2866	2710	2090	2981	2390

Table 14

Example: Sensitivity Analysis and Switching Value Calculation

MADAGASCAR

Middle-West Region Development Project.

Economic Analysis

million FMG

Present Value of Net Streams at a Discount Rate of 12.0%

	BTOT 1/	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%
CTOT 2/	1900.2	4538.9	7177.7	15094.1	-738.6	-3377.4	-11293.8
UP 10%	-548.6	2090.2	4729.0	12645.3	-3187.4	-5826.2	-13742.5
UP 20%	-2997.4	-358.6	2280.2	10196.5	-5636.2	-8274.9	-16191.3
UP 50%	-10343.7	-7704.9	-5066.1	2850.2	-12982.5	-15621.2	-23537.6
DOWN 10%	4348.9	6987.7	9626.5	17542.8	1710.1	-928.6	-8845.0
DOWN 20%	6797.7	9436.5	12075.3	19991.6	4158.9	1520.1	-6396.2
DOWN 50%	14144.0	16782.8	19421.6	27337.9	11505.2	8866.4	950.1

	BTOT 1/	LAG 1	LAG 2	LAG 3
CTOT 2/	1900.2	-927.1	-3451.5	-5705.3
UP 10%	-548.6	-3375.9	-5900.2	-8154.1
UP 20%	-2997.4	-5824.6	-8349.0	-10602.9
UP 50%	-10343.7	-13170.9	-15695.3	-17949.2
DOWN 10%	4348.9	1521.7	-1002.7	-3256.6
DOWN 20%	6797.7	3970.4	1446.1	-807.8
DOWN 50%	14144.0	11316.7	8792.4	6538.5
LAG 1 3/		1696.6	-827.8	-3081.7
LAG 2			1514.8	-739.1
LAG 3				1352.5

Internal Rates of Returns of Net Streams

	BTOT 1/	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%
CTOT 2/	16.640	18.025	21.168	29.646	10.914	6.660	NONE
UP 10%	11.271	14.640	17.728	25.937	7.487	3.016	NONE
UP 20%	8.155	11.565	14.640	22.669	4.223	-0.648	NONE
UP 50%	-0.648	3.345	6.660	14.640	-6.030	-16.550	NONE
DOWN 10%	18.385	21.849	25.083	33.930	14.640	10.473	-11.663
DOWN 20%	22.669	26.254	29.646	38.982	18.839	14.640	-3.759
DOWN 50%	41.878	46.336	50.604	62.489	37.197	32.285	14.640

	BTOT 1/	LAG 1	LAG 2	LAG 3
CTOT 2/	16.640	10.962	8.709	7.199
UP 10%	11.271	8.389	6.636	5.669
UP 20%	8.155	6.009	4.725	3.880
UP 50%	-0.648	-0.447	-0.342	-0.277
DOWN 10%	18.385	13.797	10.991	9.196
DOWN 20%	22.669	16.988	13.547	11.236
DOWN 50%	41.878	30.502	24.094	19.924
LAG 1 3/		16.640	10.962	8.709
LAG 2			16.640	10.962
LAG 3				16.640

Switching Values at 12.0%

Stream	Appraisal Value	Switching Value	Percentage Change
BTOT 1/	26387.8	24487.7	-7.20%
CTOT 2/	24487.7	26387.8	7.80%

Net Present Value at OCC 12.0% = 1900.2
Internal Rate of Return = 16.6%
Coupon Equivalent Rate of Return = 13.2%

1/ BTOT = Total Benefits
2/ CTOT = Total Costs
3/ LAG 1-2-3 = Lagging Benefits and/or Costs 1-2-3 years