

OVERSEAS DEVELOPMENT ADMINISTRATION

APPRAISAL OF PROJECTS IN DEVELOPING COUNTRIES

A GUIDE FOR ECONOMISTS



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A GUIDE FOR ECONOMISTS

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Front Cover: Nursery workers tending seedlings in the Karnataka Social Forestry Project in India.

Preface

i. The purpose of this Guide is to provide practical assistance to economists assisting in the preparation and appraisal of projects to be submitted for public sector funding. The economic appraisal principles outlined are based on those developed by I. M. D. Little and J. A. Mirrlees (henceforth Little–Mirrlees) for OECD and aims to translate these into methods that can be used within the time constraints which invariably apply in the field. But the Guide aims to cover a somewhat wider area than the economic appraisal itself and therefore includes guidance on other areas of project preparation where the economist can contribute usefully.

ii. The Guide should therefore help economists working in ministries and public sector agencies in developing countries whose work includes advice on the design and acceptability of projects competing for investment funds. Its further purpose is to provide a standard for the Overseas Development Administration (ODA) itself. The Guide outlines the approach used by ODA economists and economic consultants commissioned by the ODA in their project work.

iii. This third edition of the Guide retains the same basic principles for economic appraisal as the second edition published in 1977. It assumes that public sector investment is aimed at the greatest possible increase in the standard of living of the population over time and that this objective is best furthered through the operation of competitive markets. The opportunity cost valuation principles therefore take full account of the advantages to be gained from trade. The numeraire – the unit of account – is expressed at world prices.

iv. ODA experience over the past ten years has resulted in changes of emphasis in this edition, however. It is now widely recognised that the success of a project depends on the economic environment in which it operates, the institutional arrangements for its operations and its financial viability. The chapter on financial planning has therefore been expanded and a new chapter added on institutional considerations.

v. Environmental and social issues – the latter including the role of women – are also given greater weight in considering development options now than they were in the mid-seventies, not least because of their effect on long-term economic prospects. Detailed treatment of these areas is outside the scope of this Guide but the measurement and valuation principles proposed allow for the inclusion of their effects.

vi. The investigations and analysis currently underway in these areas may result in changes in their treatment in project appraisal in the future. It was not possible to anticipate these in the Guide, which aims simply to reflect current best practice. The reader is advised to watch out for developments in technique.

vii. A further innovation is to draw widely from ODA experience in financing projects in developing countries by including, as Part II of the Guide, a range of case studies. These are in three categories: two detailed case studies

which provide precise illustration of how the principles of the Guide can be applied; fifteen briefer case studies which illustrate the different problems presented in different sectors; and four methodology studies which illustrate particular valuation issues. These case studies have been distilled from ODA records from the 1970s and early 1980s. They do not fully reflect current ODA practice – the newer preoccupations with environmental and social aspects are under-represented for example – but they show how economic appraisals were undertaken by ODA staff and consultants commissioned by ODA in real world situations, where approximations and short-cuts are usually necessary.

viii. The case studies in Part II are linked to the exposition in Part I through the device of *boxes*, each of which identify case studies illustrating particular aspects of appraisal. Space has been made for them by omitting the sector checklists which were annexed to the 1977 edition as similar (but improved) checklists were provided in 1983 in the ODA publication *Planning Development Projects* (see Selected Bibliography).

ix. The main author of this edition is John MacArthur, Deputy Director of the Project Planning Centre for Developing Countries of the University of Bradford. ODA advisers also contributed significantly to ideas, material and drafting of the text. Considerable benefit was gained from a seminar attended by about twenty development economists from British Universities, other institutions and consultancy firms in November 1986.

J. M Healey

Chief Economist

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PART I

PRINCIPLES AND METHODS

1

The Framework for the Economic Appraisal of Projects

The Role of Economists in Project Appraisal

1.1 The central role of the economist in project appraisal is to undertake the economic appraisal itself. But economic principles are relevant to other aspects of project appraisal also. The 'project cycle' runs through various stages – identification, feasibility study, design, commitment, implementation, operation and evaluation – and economic appraisal can contribute to every stage. It is as important to identification and design as it is to final decisions whether to implement, modify or cancel projects.

1.2 At every one of these stages other kinds of appraisal must be undertaken in association with economic appraisal. Technical appraisal is an obvious pre-requisite to economic appraisal because the original ideas and estimates of engineers, natural resource specialists, doctors, public health experts, architects, educationalists and others provide the raw material for the economist's measurements of costs and benefits. Financial appraisal is also closely related to economic appraisal and the forecast accounts for an enterprise are another important source of data for the economist. What may be less apparent is that environmental and social analysis can also contribute to the economist's work, by drawing attention to wider project effects, non-financial issues and long-run sustainability.¹

1.3 The reason for this close relationship between economic and other forms of appraisal is that the distinctive feature of economic appraisal is its concern with national costs and benefits. Economists seek to identify and measure all the effects of a project and to value them in national resource terms. Their canvas is therefore wider than that of others involved in the project – sponsors, technical advisers, financiers, tax collectors, etc. – and there is a corresponding need for them to draw on the skills of others in undertaking economic appraisals. The counterpart of this is that economists can contribute usefully to the work of other specialists if they are concerned with national rather than particular interests.

1.4 Economic appraisal is most frequently applied to public sector projects and the reasons for using it in the private sector may not be fully appreciated. Private sponsors are mainly pre-occupied with their own interests and less concerned with national effects, but the principles and procedures set out here can be applied with equal validity to private sector projects. Where private sector investments need government support, either as financial contributions or through administrative procedures such as protective tariffs or restrictive licensing, economic appraisal to estimate national costs and benefits should be applied.

¹ The Overseas Development Administration is preparing an environmental assessment manual and a social appraisal guide. These will provide detailed guidance on these important areas of project appraisal.

Project Definition

1.5 The aim in economic appraisal of measuring national costs and benefits is normally approached by defining 'with' and 'without' project situations. This detaches the project definition in economic appraisal from the concepts of project sponsors and physical planners. For example, while they can confine their attention to the manufacturing plant or agricultural scheme, the economist must consider effects on imports and exports, other local production, social infrastructure, transport facilities, consumer prices, the government budget and so on. Gains to some members of the community can be losses to others and only net effects should be measured in estimates in national resource terms.

1.6 In principle the economist can 'internalise' all these wider aspects in the economic appraisal by simply defining the project along 'with/without' lines. However, conventional practice distinguishes between 'internal' and 'external' effects. Internal effects are those experienced by parties directly involved in the project. In most cases analysis can be simplified and improved by defining the project so that all major, direct effects are automatically included in the arithmetic of economic analysis with less direct or tenuous effects analysed separately as 'externalities'.

1.7 The definition of the project in this sense calls for skill and judgement. In many cases it will have significant effects on the appraisal but there are no simple rules of definition. The range and size of project effects will depend on the nature of the project and the economic and physical structure into which it is fitted. Situations in which a project is likely to have economic effects well beyond its physical boundaries include the following.

- a. The project is large in relation to the sector or economy in which it is located. It may therefore change trading and employment patterns as well as affecting economic (transport, power, water) and social (housing, schools, hospitals) infrastructure.
- b. It is part of an interconnected system (for example, electricity grid, railway network, telecommunications system).
- c. It will have significant off-site physical effects. Examples are a manufacturing plant with harmful effluent, a hydropower investment which will create a lake and therefore resettlement, a mining development with large transport requirements and landscape effects, etc.
- d. It will be a monopoly supplier or customer, therefore having widespread economic powers over consumers or producers.
- e. The project is new to the country or region in which it is located and may therefore affect technology, management, working practices and social habits in ways which are uncertain.

1.8 A special category covers projects which involve replication of a basic model. Cases include agricultural developments in which smallholders agree to follow a particular cropping pattern, installation of minor telecommunications exchanges, village water or power supplies and so on. The key characteristics of such developments are that each individual case will have relatively low costs and the pattern of supply and demand will be similar in all cases. In this situation the appraisal can be carried out for the model – the individual

smallholding or telephone exchange – and the results multiplied up to obtain total project costs and benefits.

1.9 Firm adherence to the with/without project discipline combined with a sense of what is practicable with the time and resources available for appraisal are essential. The case studies illustrate how economists chose to define projects with characteristics similar to those listed above in ways which allowed them to measure effects well enough to produce valid results.

The Broader Project Framework

1.10 How does the project appraisal fit in with the rest of economic management in the public sector? The national budget is a crucial element in economic policy. The ways in which it raises revenue often affect private incentives and allocation decisions; the deficit and its financing are important in determining inflation and thus the real exchange rate; and the pattern of public expenditures reflects the role which the government is intent on playing in the supply of goods and services in the economy. Expenditures are conventionally divided into recurrent and capital: capital expenditures are in theory defined as relating to the creation of physical assets which last at least one year; the rest are labelled recurrent. In practice recurrent expenditures in agricultural services, infrastructure maintenance, social services etc. may be bundled up into 'projects' to make them attractive to outside donors and financiers. Project appraisal is concerned with seeking to optimise the capital budget, including the choice of 'projectised' recurrent services: it helps in choosing the best project design, the best set of projects within the capital budgets of individual ministries and, in principle at least, the best set of projects among those proposed by different ministries. It can also be used to choose the level of maintenance expenditure to plan for and to decide on the timing of rehabilitation, replacement and expansion programmes.

1.11 Resources available to finance the capital budget are drawn from the surplus of revenue receipts over recurrent outlays, foreign grants and loans and such domestic borrowing as is compatible with macro-economic stabilisation objectives. Foreign borrowing may be limited by the need to avoid excessive external debt. Annual resources for the capital budget will therefore generally be limited. The public investment programming process allocates these resources between on-going and new projects.

1.12 In the budgetary process there is active competition between spending ministries for resources. Within spending ministries project ideas emanate from departments and sponsored outside bodies. The ideas are not always well thought through. Undertaking new projects is often regarded as more prestigious than devoting adequate resources to routine maintenance, even if the end result is a less cost-effective provision of public services. Project concepts are frequently advanced without adequate consideration for the means of meeting the consequential recurrent costs. Planning or Finance ministries are supposed to instil order, method and discipline into investment programming through the application of project appraisal techniques. The same techniques should be applied by the planning departments of spending ministries. It has to be recognised, however, that political pressures may override the application of these procedures. Many projects, moreover, have outcomes which are hard or impossible to measure in monetary terms. Such projects are difficult to rank in order of preference alongside the project ideas

of competing ministries. In these cases the potential role for project appraisal is more limited.

1.13 Governments which draw up multi-year (usually 3 year) public expenditure budgets are better able to clarify the trade-offs between capital and recurrent expenditure and between different project proposals. These budgets also help to determine the timing of project starts which is compatible with the overall policy requirement of respecting annual public expenditure limits. One procedure for reconciling the objectives of accelerated development expenditure and consistency with current annual expenditure limits and future recurrent budgetary capability is to divide projects into three categories:

- ✓ *Group 1:* projects which are on-going together with new projects which have been fully appraised and which are also guaranteed to receive full internal and external capital and recurrent funding. These projects should go into the multi-year budget.
- Group 2:* projects which have been fully appraised and meet the criteria of acceptance but which are not yet fully funded. These should remain on hold until funding is assured.
- Group 3:* projects which have been proposed but not yet appraised by all the relevant authorities.

If the status of project proposals is clear it is easier to make public investment budgeting more orderly.

1.14 In all cases economists will need to take account of the macro-economic management which actually exists and not what they would like it to be, recognising that in some cases a new project can itself help to correct economic distortions. Where projects are likely to perpetuate or extend macro-economic distortions – through pricing, monopoly, foreign exchange or other effects – these should be highlighted in the economic appraisal.

Project Objectives

1.15 Project objectives are not always self-evident and they can evolve during the preparation process. But clear definition of the objective will help preparation and appraisal and the procedure adopted by the Overseas Development Administration (ODA) may be a useful guide in this respect.

1.16 Appendix 1.1 gives the format used for applications to the ODA committee which considers major project proposals, and attached to it is an outline of the 'project framework' used throughout project preparation. The format illustrates the breadth of the issues relevant to project preparation. The purpose of the project framework is to ensure that objectives are defined as clearly as possible at an early stage and that the link between inputs and outputs is registered.¹ As preparation proceeds the framework is revised and refined and it is a useful starting point for evaluation following project implementation.

¹ This concern with measurable, timebound objectives is a reflection of government policy throughout the public sector in Britain.

Valuation Principles

1.17 Where markets function in a relatively unrestricted fashion and the distribution of income is not considered to be unsatisfactory, the prices resulting from the interaction of supply and demand in those markets should be a good guide to resource costs. It will be necessary to eliminate transfers such as indirect taxes and subsidies but further adjustments to market prices will not generally be necessary. These conditions do not hold in many developing countries, however, and valuation issues are therefore a major concern in economic appraisal. The objective is to determine prices which reflect national costs and benefits and for this purpose the 'opportunity cost' principle is adopted. This is the value to society of the good or service in its best alternative use (other than the project under examination).

1.18 Detailed valuation principles are covered for three different situations in chapters 3, 4 and 5. Chapter 6 then explains how to extend the analysis to take account of risk and uncertainty. This further step should not be overlooked, because economic appraisal involves forecasting which is always uncertain. The results of an appraisal should never be presented as a single figure: a range should be shown reflecting the forecaster's best estimate of the errors attached to each component of the appraisal.

1.19 The numeraire used in this Guide is expressed in world prices and the separation of inputs and outputs into 'tradeables' (ie entering into international trade) and 'non-tradeables' is a fundamental analytical technique. This leads to three layers of valuation complexity: tradeables, where the principles are simple even if the practice may present problems; non-tradeables, where the difficulties multiply as the opportunity cost principle is traced through the domestic markets where the goods are exchanged; and the layer which poses maximum problems for the economist, non-tradeables which are not sold. This last group includes services such as primary health care and education, general government administration, roads, broadcasting and other components of the economic and social fabric. The inability of the economist to value the outputs of such sectors (which are sometimes the inputs of other sectors) does not rule out economic appraisal, however. The important point is that resources are needed to produce the service, that the normal valuation principles can be applied to these resources, and cost-effectiveness analysis will usually assist in design and decision.

Limitations of Economic Appraisal

1.20 The scope of economic appraisal and its relationship with other types of analysis make it difficult to limit the content of a manual on economic appraisal. A first step in preparing this Guide was to exclude any attempt to provide instruction on the enormous body of knowledge that contributes to technical appraisal. It assumes that engineers, agriculturalists, environmental specialists, sociologists and any other technical advisers will have drawn on their disciplines appropriately in detailing the technical parameters of project implementation and operation. The economist can question the standards and assumptions adopted by technical specialists but ultimate responsibility for them must rest with these specialists. For example, it is the engineer who must determine the maximum output of a manufacturing process, frequency of shut-downs and wastage rates; the agriculturalist (working with a sociologist) who forecasts the viability of new agricultural practices, rate of take-up and

yields; the public health expert who forecasts demand for domestic water supplies and effects on water-borne diseases.

1.21 Environmental questions also need to be addressed to technical specialists but their impact on economic results, defined widely and in national terms, require particular attention. This aspect is outlined in this Guide under the general heading of project externalities with the qualification that expert advice will be needed whenever a project seems likely to have significant environmental effects.

1.22 Gender factors also need special consideration. Gender bias has been eradicated from the text of this Guide as far as possible. It has been assumed that technical specialists will have taken account of the gender factor in their preparation work; for example, that agricultural advisers will realise that farmers are often women and that technical designs will take this into account. Neutral terms such as 'consumers', 'producers' and 'labourers' are intended to cover women and/or men as appropriate but specific reference is made to gender features where these seem to need particular consideration.

1.23 Financial, institutional and manpower (including women) questions are also given some attention here because of their important bearing on economic performance. Again the qualification should be noted that the economist cannot substitute for a specialist adviser in determining important aspects of project design in these fields, although he can contribute to the work.

1.24 The presentation of material in the Guide is geared to preparation of a cost-benefit analysis. This conventional tool of the economist provides a valuable framework for the analysis but it is frequently misunderstood. It will be apparent from this introduction that the narrow concept of a comparison between 'sales' and 'costs', with important externalities and non-quantifiable effects ignored, is not the approach adopted here. Cost-benefit analysis should incorporate all the national effects which can be identified, including the effects which can be quantified but not expressed in financial terms and those which cannot be quantified at all. In some cases international effects should also be measured. Often the appraisal will comprise a numerical, value-based cost-benefit analysis supplemented by qualitative description of those effects not captured in the basic calculation; in other cases the output will have to be expressed in physical terms and only the costs valued according to the principles set out here. The results will need to be presented and interpreted in different ways but the cost-benefit principle can be retained.

Appraisal in the Project Cycle

1.25 Project design is an iterative process involving initial concepts, examination and comparison with similar projects and alternative concepts, refinement, redesign and so on. In the natural resources sector a flexible approach is sometimes adopted, incorporating initial proposals, pilot projects and substantial redesign before full-scale implementation goes ahead in successive stages. The full project cycle in all sectors implies drawing on the post-implementation evaluations of previous projects as part of the iterative procedure.

1.26 Economic appraisal should be integral to all stages of the cycle because decisions are taken at every stage. Wherever possible the nature of

these decisions should be explicit and options should be kept open as long as possible. A common error is to settle for a particular design and level of service at an early stage because it is standard practice, and thereby exclude viable options from full appraisal. The value of technical standards should not be under-estimated – they are usually the result of rigorous testing and evaluation – but they cannot be expected to provide the correct solution in every set of circumstances. Non-standard solutions and non-conventional concepts should be sought and appraised whenever this is practical.

1.27 The terminology for the various stages of project preparation and implementation is not rigid but the following definitions may help in using this Guide.¹

Identification

The earliest phase, when a development opportunity is conceived (for example, available land with crop-bearing potential or a market for a particular product) or a problem requiring a solution arises (such as a traffic bottle-neck). Identification implies outline of an investment concept in a crude but reasonably comprehensive manner. Provisional objectives for the project should be established at this stage.

Feasibility

There are often several feasibility stages during which the initial concept is explored in various depths to determine its technical, economic, financial, etc. viability.

Commitments and Negotiation

There are often a series of commitments – particularly when projects are staged – and they are followed by invitations to tender and negotiations with contractors, potential financiers, suppliers, future customers and so on. At the early commitment stages there are still considerable uncertainties.

Design

Preliminary design and feasibility are often simultaneous but detailed design, which can be very costly (up to 15% of project costs) usually follows provisional commitment to the project. As noted above, numerous decisions which will affect economic performance are taken throughout design; and economic appraisal often results in redesign. ✓

Implementation

The stage when capital investment takes place, staff are appointed, trials are conducted and the plant is commissioned.

Operation

The period when the benefits are realised: production and sales occur, long-term employment is created and repair and maintenance undertaken.

Monitoring

Project sponsors and technical staff monitor progress during implementation. It requires the collection, analysis and utilisation by management of information to ensure that work plans are being achieved and objectives obtained as planned or that adjustments are made.

¹ An extensive glossary of the terminology in common usage and employed in this Guide is at page 229.