INTRODUCTION

This manual is the outcome of a process of reflection by the Commission of the European Communities. It responds to the Commission's concern to analyse the results and the viability of development projects. The methodology adopted aims to highlight the financial and economic data most useful in analysing development projects and in assessing their impacts on the economy.

Projects financed by the Commission are of different kinds: e.g., educational projects, agricultural projects, urban projects, projects supporting small enterprises, health projects. The manual looks at all of these from an economist's perspective. Financial and economic analysis provides a partial view of projects which complements analyses by technical, social and environmental specialists and analyses on consistency with the sectoral policies.

The basic idea of the proposed methodology is that projects can be analysed from different points of view, each providing useful information: its budget, financial viability, impact on economic policy objectives, etc. These different points of view highlight the variety of incentives and constraints facing project participants and the stakes and risks for the national economy of undertaking the project.

The ultimate purpose of financial and economic analysis is to determine, as accurately as possible, the costs, efficiency of resource use (especially the financial and economic return on investments), and the relevance of projects to current economic policies and structural reforms.

This manual provides a comprehensive methodology. Should one systematically apply all the stages of analysis proposed in this manual for all projects?

Ideally, the answer is yes. One could then judge the project in a number of different and complimentary ways.

But in practice, the answer must be no. Analysts generally have insufficient time and resources. **Choices must thus be made depending on the specific questions raised by the project and the resources available.** Generally speaking:

- **A DETAILED FINANCIAL ANALYSIS** of the all participants involved (e.g., enterprises, artisans, public institutions, farmers... – Chapter 3) is essential when:
    - doubts exist as to the implications for key actors/entities of the project;
    - it is important to know the precise impact of the project on certain actors or entities;

  and (but in less detail) to prepare the data necessary for economic analysis.

- **A CONSOLIDATED ACCOUNT ANALYSIS** (Chapter 4) is needed only if the project involves a number of entities whose activities form an inseparable whole.

- ◆ **ANALYSIS OF THE PROJECTS'S EFFECT ON ECONOMIC OBJECTIVES** (Chapters 5 and 7) is necessary when:
  - project size is large relative to the national economy;
  - the project's foreign currency balance needs to be known (e.g., import substitution or export projects);
  - the project's impact on public finances needs to be known;
  - the distribution of income is an important part of the intended effects (e.g., in the case of projects in areas with a high level of unemployment, projects aimed at alleviating poverty, projects leading to changes in the consumer price of goods and services);
  - the project aims to support enterprises (e.g., credit-line projects or leading to changes in the prices of intermediary goods and services).

- ◆ **AN ANALYSIS OF THE PROJECTS'S VIABILITY WITHIN THE INTERNATIONAL ECONOMY** (Chapters 6 and 7) is necessary:
  - when project size is large relative to the national economy;
  - for projects directly linked to international markets and which need to be competitive (e.g., import substitution or export projects);
  - when the sector or subsector involved is subject to strong government intervention or non competitive practices (e.g., monopoly);
  - in economies where the exchange rate is maintained at "artificial levels";
  - in economies requiring major structural adjustment.

- ◆ **AN ANALYSIS OF PROJECTS WITH NON-TANGIBLE PRODUCTS** (Chapter 8) should be systematically undertaken and be as thorough as possible in respect of budgets and the efficiency with which material and human resources are used. On the other hand, the economic effect of the expenses incurred should only be analysed when:
  - the size of the project is very large;
  - one of the objectives is the distribution of incomes;
  - inputs have to be imported while foreign currency availability is a major constraint;
  - selection among alternatives with comparable costs must be made.

These are just examples. Policy makers and planners need to define what is expected in each case. Project analysts should then use their judgement on the specific types of analysis which they undertake, based on their own experience.

To the well informed reader:

The financial and economic analysis of development projects has, in the past, resulted in a wealth of publications and, sometimes, in controversies among specialists.

In the method proposed here, project analysis techniques are presented in a pragmatic way showing what information they can provide to decision makers. The desire to be practical has led to a simplified application of the following techniques:

- budgeting and the financial analysis of projects – i.e. simplified adaptations of *traditional accounting methods*;
- the ways of estimating the effects on growth, incomes and the main macro-economic balances (foreign exchange, public finances), known as the *Effects Method*;
- the widely applied calculations of the economic contribution of projects, based on the estimation of 'opportunity costs', from *Shadow Pricing Evaluation Methods*.

Several of the concepts used in this manual have had more than one definition or interpretation, depending on who is writing about them. The ways in which they are presented here correspond to decision makers' concerns, especially regarding operationality and homogeneity of studies. The more informed readers (including specialists) are thus encouraged to refer to the definitions and methodological presentations in Chapter 1 and Annexes B & C.

This manual describes the general approach of financial and economic analysis, applied to all types of development projects. To complement this manual, various sectoral applications will be produced, later, as case studies. Internal instructions relative to the main kinds of programmes and projects funded by the Directorate-General for Development (DG VIII) will also be produced.

TABLE OF CONTENTS

1. FINANCIAL AND ECONOMIC PROJECT ANALYSIS: A DECISION MAKING TOOL 1

ABBREVIATIONS

BCA	Balance of Current Accounts		GNP	Gross National Product
BOP	Balance of Payments		GOM	Gross Operating Margin
BOT	Balance of Trade		GOP	Gross Operating Profit
BTS	Before Taxes and Subsidies		GRII	Government Return on Investment Index
CB	Consumer Benefit		GVA	Gross Value Added
CF	Cash Flow		HD	High Density
CIF	Cost, Insurance, Freight		HDPE	High Density Polyethylene
CRCG	Coefficient of Real Cost for the Government		I	Imports
DAC	Development Assistance Committee		IC	Intermediate Consumption
DP	Domestic Perspective		IF	Inflows
DRC	Domestic Resource Cost		IGS	Intermediate Goods and Services
DSCR	Debt Service Coverage		IM	Inflows of Money
EB_{SP}	Economic Balance in Shadow Prices		IMF	International Monetary Fund
EP	Exchange Premium		INV.	Investment
EPC	Effective Protection Coefficient		INV. imp.	Foreign currency cost of investment
ESR	Effective Subsidy Rate		IOT	Input-Output Table
FAO	Food and Agriculture Organization of the United Nations		IRC	Internal Resource Cost
			IRR	Internal Rate of Return
FC	Financial Charges		IUT	Intermediate Uses Table
FCE	Foreign Currency Earnings		MF	Money Flow
FCf	Total Financial Charges paid to foreign banking institutions		MI	Money Inflow
			MO	Money Outflow
FCL	Foreign Currency Losses		MP	Market Price
FCn	Total Financial Charges paid to national banking institutions		NCU	National Currency Unit
			NMF	Non-Money Flows
FCp	Total financial charges paid by the government and public banking institutions		NMI	Non-Money Inflow
			NMO	Non-Money Outflows
			NMU	National Monetary Unit
FCR	Factor Cost Ratio		NOM	Net Operating Margin
FM	Flow of Money		NOP	Net Operating Profit
FOB	Free On Board		NP	National Perspective
GDP	Gross Domestic Product		NPC	Nominal Protection Coefficient

NPV	Net Present Value		RMUI	Return per Monetary Unit Invested
NTGS	Non Tradeable Goods and Services		RMUIG	Return per Monetary Unit Invested by th Government
OECD	Organization for Economic Cooperation and Development		RTTF	Rate of Total Taxation of Factors
OER	Official Exchange Rate		RTTP	Rate of Total Taxation of Production
OF	Outflows			
OP	Operating Profit		SCF	Standard Conversion Factor
OPf	Foreign firms Total Operating Profits		SER	Shadow Exchange Rate
			SME	Small and Medium Enterprises
OPn	National firms Total Operating Profits		SP	Shadow Price
			SRP	Subsidy Ratio to Producers
OPp	Public firms Total Operating Profits		T	Taxes
			Tn	Taxes net of subsidies
OS	Operating Subsidies		TGS	Tradeable Goods and Services
OVI	Objectively Verifiable Indicator		UNIDO	United Nations Industrial Development Organization
PAM	Policy Matrix Analysis			
PCR	Private Cost Ratio		VA	Value Added
PRF	Price Revision Factor		VC	Variation of Consumption
Px	Production exported		W	Wages
RAT	Rate of Apparent Taxation		WC	Working Capital
RCCG	Real Cost Coefficient for the Government		WCR	Working Capital Requirement
			Wf	Wages paid to foreign workers
RDTF	Rate of Direct Taxation of Factors		Wn	Wages paid to national workers
RFCO	Return on Foreign Currency Outlays			

USER'S GUIDE

OUTLINE OF THE MANUAL

This manual includes:

- this **User's guide**;
- the main body (**the chapters**) presenting the method in a progressive and practical way;
- a **case study** which illustrates the application of the approach on an actual project (viz. end of Chapters 2 to 7– with black page numbering);
- **annexes** which complement the main body, introduce the basic concepts of financial and economic analysis (Annexes A, B, C, D, E and H) and go further into areas of analysis or techniques of calculation (Annexes F and G);
- a selected and annotated **bibliography**;
- an **index-glossary**.

This book is aimed at a very wide public, including non-economists, economists with no training or experience in development projects, and financial and economic specialists. It is designed to be approached in different ways according to the reader's initial knowledge and objectives. For this purpose, the following reading aids have been included:

- a **chart of the approach's main stages**, presented at the beginning of the book;
- **pink boxes** providing, at a glance, the content of each chapter, section[1] or annexes;
- **diagrams of procedure** at the end of each chapter, summarising the approach;
- **"graphic markers"** indicating the nature of the text (see box below). These are placed in the margin:
  - of all paragraphs (3 digits numbering),
  - in front of selected passages,
  - for each annex (in the margin of the first page).

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(1) sections are introduced by two-digit titles.

THE SIX GRAPHIC MARKERS

= **INITIATION**   Fundamental elements

= **METHOD**   Practical description of the approach

= **POLICIES**   Links with economic policies and structural reforms

= **KEY-QUESTIONS**   Objectives of the approach and important questions

= **PROCEDURE**   Synthesis of steps to be followed (mostly expressed as diagrams)
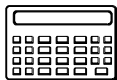
= **EXAMPLE**   Examples showing figures and case study

SUGGESTIONS FOR A FIRST READING…

- **The non-specialist** should read:
    - Chapters 1 and 2 straight away;
    - Annex B then Chapter 3 and, as the need arises, Annexes A, D and E;
    - Annex C, then Chapters 4 to 8.

  The reader will be able to keep in mind the overall methodology by referring to the chart or "tree" of the main stages of analysis (page XXVII).

  If the reader is only interested in projects with non-tangible products, he/she should read:
    - Chapters 1 and 2;
    - Chapter 8 and Annex H.

- **The economist not versed in project analysis** should study:
    - the Chart of the main stages of analysis (page XXVII);
    - Chapters 1 and 2;
    - Annexes B and C to become familiar with the approach and terminology adopted in this manual;
    - then Chapters 3 and 8, with the help of:
        - the pink boxes showing the content of sections in order to skip those he/she already knows,
        - the "graphic markers" referring to **method**, **procedures** and **key-questions**.

  The reader may study in depth financial analysis with the help of Annex F and complete his/her understanding of the backward linkages calculations with the help of Annex G.

- **The specialist well versed in project analysis and short of time** may:
    - get quickly acquainted with the suggested method by studying the Chart of the main stages of analysis (page XXVII);
    - become familiar with the approach and terminology by glancing at Annexes B and C: study simplified diagram of procedure and tables appearing in these annexes;
    - limit his/her reading to Chapters 1 to 8:
        - the pink boxes showing the content of chapters and sections
        - the passages indicated by the **procedures** and **key-questions** "graphic markers".

N.B.: Economists are likely to prefer starting with a practical view of the methodology by going through the case studies (graphic marker **example**).

TYPES OF PROJECT

The specific type of analysis undertaken will vary with the type of project. Because of this, the manual distinguishes:

- **projects with tangible products**, i.e. products which can be valued in monetary terms. Such projects generally aim to increase the production of goods and services:

    - which are sold or not sold but for which a market exists (such as food grown for home consumption);

        Examples: industrial or power development projects, projects in small industry, agricultural or tourist subsectors, or credit for firms projects.

    - which are provided without direct payment by beneficiaries, or whose price is not determined by commercial considerations, but whose benefits can be "easily valued";

        Examples: road infrastructure, professional training and agricultural extension projects.

    This manual is primarily concerned with these projects with tangible products. The methods used and procedures proposed for these projects are more complete and advanced than for other types of projects.

- **projects with non-tangible products**, i.e. products which cannot be accurately valued in monetary terms without either carrying out research which is likely to exceed the time and resources usually available to analysts, or making "major assumptions".

        Examples: projects dealing with health, education, urban development (e.g., sewerage), social services, institutional reform or environmental conservation.

    The final Chapter (8) explores the methodological differences between projects with non-tangible products and projects with tangible products.

CHART OF THE MAIN STAGES OF ANALYSIS

Nature of the project

☞ chapter 1, § 1.2.1.
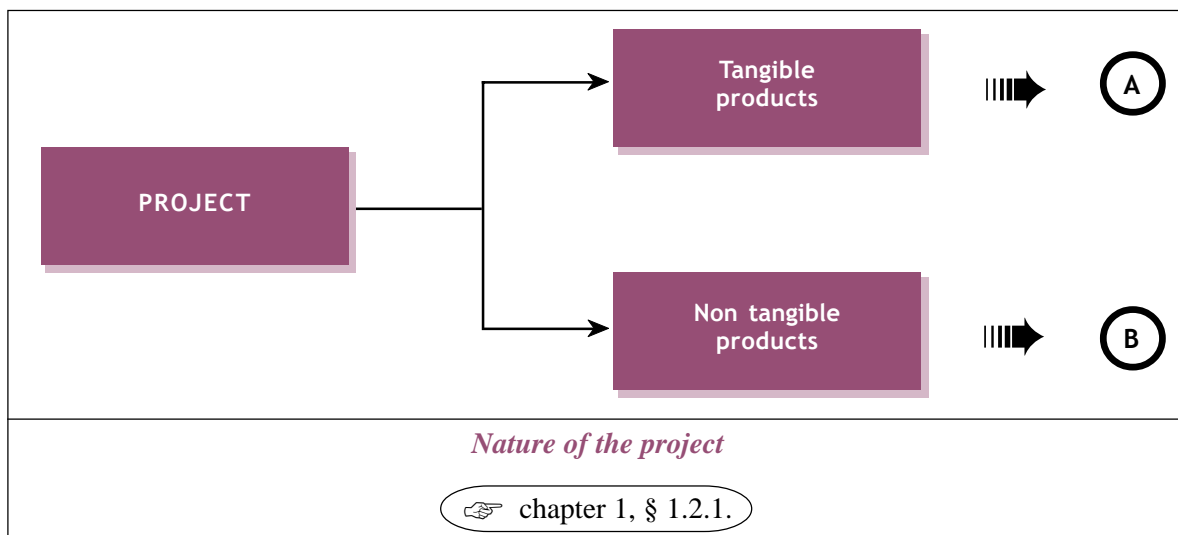
The diagrams on the following pages give a complete overview of the inter linked procedures suggested for analysing the two types of project.

Diagram 1

WITH PROJECT → Exports, Domestic consumption, Use of means production

WITHOUT PROJECT → Exports, Domestic consumption, Use of means of production

Which goods and services will be replaced by the projects products?

Will the implementation of the project lead to reduction in production in other entities?

Incremental exports

Same domestic consumption

Incremental domestic consumption

A / B → 2^A *Determination of alternative* ☞ chapter 2, § 2.1. → 3

Diagram 2

WITH PROJECT → Investing entities → Initial project investments, Related investments, Induced investments

WITHOUT PROJECT → Entities whose operations are modified → New activities, Sustainability modified activities, Slightly modified activities

Entities to be analysed

A / B → 2^B *Identification of the entities to be studied* ☞ chapter 2, § 2.2. → 3 Tangible products / 8^A Non-tangible products

```
┌─────────────────────────────────────────────────────────────────────┐
│  INFLOWS                           Operating                          │
│  (benefits) ─┐                     account ─┐      Financial          │
│              │    Financing ──┐             ├──→  sustainability      │
│  OUTFLOWS ───┤    plan        │    Flow     │     and profitability   │
│  operations  │                │    balance ─┘                         │
│  (costs) ────┤                │    account                            │
│              │                │                                       │
│  OUTFLOWS ───┘                └──→ Disbursement ──→  Foreign          │
│  investments                       schedule         contributions     │
│  (costs)                                                              │
├─────────────────────────────────────────────────────────────────────┤
```

2ᴬ ‖‖‖▶   ③   *Financial analysis*   ‖‖‖▶ ④
2ᴮ   ☞ chapter 3, § 3.1., 3.2., 3.3., 3.4.

```
┌─────────────────────────────────────────────────────────────────────┐
│  Accounts                          Consolidated                       │
│  entity 1 ──┐                      operating ─┐                        │
│             │    Consolidation ─┐  account    │    Global              │
│  Accounts ──┤                   │             ├──→ sustainability      │
│  entity 2 ──┤                   │  Consolidated│   and efficiency      │
│      ⋮      │                   │  flow balance┘                       │
│  Accounts ──┘                   │  account                            │
│  entity n                       └──→ Consolidated                      │
│                                      disbursement                      │
│                                      schedule                          │
├─────────────────────────────────────────────────────────────────────┤
```

③ ‖‖‖▶   ④   *Consolidation of accounts*   ‖‖‖▶ ⑤
                      ☞ chapter 4, § 4.1., 4.2., 4.3.   ⑥

Diagram 1

OPERATING ACCOUNT
→ Direct effects
→ Indirect effects (backward linkages)

- Total value added
- Total foreign currency earnings / losses
- Total taxes & subsidies
- Total income distribution

Incremental effects :
• growth
• foreign exchange
• public funds
• incomes

INVESTMENTS
→ Direct effects
→ Indirect effects (backward linkages)

- Total value added
- Total imports

Analysis of effects on economic objectives

④ ⫸ ⑤   ⫸ ⑦ᴬ

☞ chapter 5, § 5.1., 5.2., 5.3.

Diagram 2

FLOW BALANCE ACCOUNT
- Transfers taxes & subsidies debt service
- TGS in international parity prices
- NTGS in national market price
- Labour in national market price

→ Incremental economic balance
→ Policy analysis matrix

INVESTMENTS
- Calculations in international parity prices

TGS = (Internationally) Tradeable Goods and Services
NTGS = (Internationally) Non-Tradeable Goods and Services

Analysis of sustainability within the international economy

④ ⫸ ⑥   ⫸ ⑦ᴮ

☞ chapter 6, § 6.1., 6.2., 6.3.

```
INCREMENTAL          Perspective of          ΔVA                  Profitability
EFFECTS              domestic income         C B                  estimates for
(operations)                                                      the economy

                                             Total cost of the
                                             investments


                     Scarcity of foreign     ΔPx - ΔI             Profitability
                     currency constraint                          estimates for
INVESTMENTS                                                       the economy
EFFECTS                                       Imported cost of
                                              the investments
```

ΔVA : Incremental Value added
CB : Consumer Benefit
ΔPx : Incremental Export
ΔI :   Incremental Import

Economic profitabiliy at market prices

5 ‖▶   7ᴬ   ‖▶ 7ᶜ

☞ chapter 7, § 7.1.1., 7.1.2.

```
ADDITIONAL
ECONOMIC
BALANCE              Standpoint of the        ΔEB                  Profitability
                     international                                 estimates for
                     economy                                       the economy

INVESTMENTS                                    ΔINV.SP
IN SHADOW
PRICES
```

ΔEB :   Incremental Economic
         Balance in shadow prices
ΔINV.SP : Incremental Investment
         costs in shadow prices

Economic profitability at shadow prices

6 ‖▶   7ᴮ   ‖▶ 7ᶜ

☞ chapter 7, § 7.1.3.

FINANCIAL VIABILITY & PROFITABILITY

EFFECTS ON THE ECONOMY

VIABILITY WITHIN THE INTERNATIONAL ECONOMY

POLICIES & STRUCTURAL REFORMS

ECONOMIC PROFITABILITY

ECONOMIC RELEVANCE

5   7ᴬ

6   7ᴮ   7ᶜ

Analysis of relevance

☞ chapter 7, § 7.2.

Budget plan

INCREMENTAL COST

Operations

Investments

CONTRIBUTIONS

User fees

Subsidies
Contribution
of operating means

BUDGET k

BUDGET j

BUDGET i

4

CONSOLIDATED
BUDGET

2ᴬ

2ᴮ

8ᴬ

Budget plan

☞ chapter 8, § 8.2.1.

8ᴮ

Sustainability and efficiency analysis

RESULTS

Objectively
verifiable
indicators

Efficiency

(consolidated)
BUDGET
of implementing
organizations

Contributors'
financial
situation

Viability

Calculation
of effects

5

Incremental effects :
• Foreign exchange
• Public funds
• Incomes

8ᴬ

8ᴮ

Sustainability and efficiency analysis

☞ chapter 8, § 8.1, 8.2, 8.3, 8.4

8ᶜ

RESULTS

EFFICIENCY

VIABILITY

RELEVANCE

EFFECTS ON THE ECONOMY

- SECTORAL STRATEGY AND PROGRAMS
- STRUCTURAL REFORMS

8ᴮ ▐▐▐▶   8ᶜ

Analysis of relevance

☞ chapter 8, § 8.5

A   *Stages in the analysis of projects with tangible products*

Projects with tangible products → Alternative (2ᴬ) / Identification of entities (2ᴮ) → Financial analysis (3) → Consolidation (4) → Economic effects (5) / International viability (6) → Economic profitability (7ᴬ) / Economic profitability (7ᴮ) → Relevance (7ᶜ)

B   *Stages in the analysis of projects with non-tangible products*

Projects with non tangible products → Alternative (2ᴬ) / Identification of entities (2ᴮ) → Consolidated budget plan (8ᴬ) (4) → Viability Efficiency (8ᴮ) / Economic effects (8ᴮ) (5) → Relevance (8ᶜ)

Printed in Italy

1. FINANCIAL AND ECONOMIC PROJECT ANALYSIS: A DECISION MAKING TOOL

1 OVERALL APPROACH | ECONOMIC INTEGRATION | FINANCIAL ANALYSIS | CONSOLIDATION | ECONOMIC EFFECTS | INTERNATIONAL VIABILITY | EFFICIENCY RELEVANCE | NON-TANGIBLE PRODUCTS

3

O ver the last thirty years, there have been two distinct approaches to the planning and evaluation of development projects: one has used rigorous financial and economic analysis, the other almost totally ignored such methods. Moreover economic analysis has often been perceived – and may still be perceived – as a way of justifying decisions that have already been made.

In contrast to such criticisms, this manual seeks to demonstrate the utility of financial and economic analysis in the thorough and transparent planning, design, appraisal and evaluation of projects. Its basic premise is that such methods are indispensible to good project appraisal and provide decision-makers with a way of assessing the overall value of a project, including the project's likely contribution to the achievement of economic policy and structural adjustment objectives.

The manual presents a set of tools, which, it is hoped, will constantly challenge the analyst's judgement. It aims to give a basis for the analyst to improve his or her **understanding** in order to **predict**, **prepare** and **assess** 'what is to change' and, later, to **draw lessons** from the experience. Far from being 'a means to justify all decisions', financial and economic analysis provides a way of avoiding the irrational process by which a project is deemed to be worthwhile just because there has been an interest in it from the government and donors.

However, it should be emphasised that financial and economic analysis is just one of many different types of analysis which need be undertaken in project planning and evaluation. On its own, it provides only a partial view and needs to be complemented, as appropriate, by social, institutional, technical and environmental analyses. By using broad, inter-disciplinary analysis a socially useful project may well be undertaken, even if the economic returns are low. Similarly, a project with positive economic effects may not be implemented if it has adverse impact on health or the environment.

The proposed methodology aims at understanding the income generating mechanisms for a project's stakeholders as well as for the national economy. It also studies the extent to which project resources are efficiently utilised.

Given the limited data and time usually available to those preparing projects, a pragmatic approach has been taken in preference to a more academic one.

This first chapter briefly presents the methodology proposed for the financial and economic analysis of development projects, by outlining:

- ◆ **its use within the framework of the project cycle**
    - ➡ **WHAT IS A DEVELOPMENT PROJECT?** § 1.1.1
    - ➡ **AN AID TO DECISION MAKING** § 1.1.2
    - ➡ **DIFFERENT AREAS OF ANALYSIS** § 1.1.3

4

1.1. WHAT ARE FINANCIAL AND ECONOMIC PROJECT ANALYSES USED FOR?

Financial and economic analyses are carried out at different stages of the project cycle.

1.1.1. What is a development project?

The logical framework used in project cycle management[1] describes **all development projects** as having a hierarchy of objectives as follows:

◆ a specific objective to be achieved by the end of the project

➡ the *project purpose*

_____

(1) Commission of the European Communities, *Manual, project cycle management: integrated approach and logical framework*, 1993.

- ◆ ... which can be broken down into a series of outputs...
  - ➠ the *results*
- ◆ ... due to the combination of a wide range of *means* (e.g., studies, investments, training, institutional change):
  - ➠ the *activities*

All projects also contribute to the achievement of broader policy or sectoral objectives, known as the *overall objectives* of the project, and thus fit within a sectoral strategy.

High-level objectives to which the project contributes	**OVERALL OBJECTIVES**
Specific objectives of project	**PROJECT PURPOSE**
Outputs of activities that achieve the project purpose	**RESULTS**
Tasks executed as part of the project	**ACTIVITIES** ← **MEANS**

Physical and non-physical means necessary to undertake activities
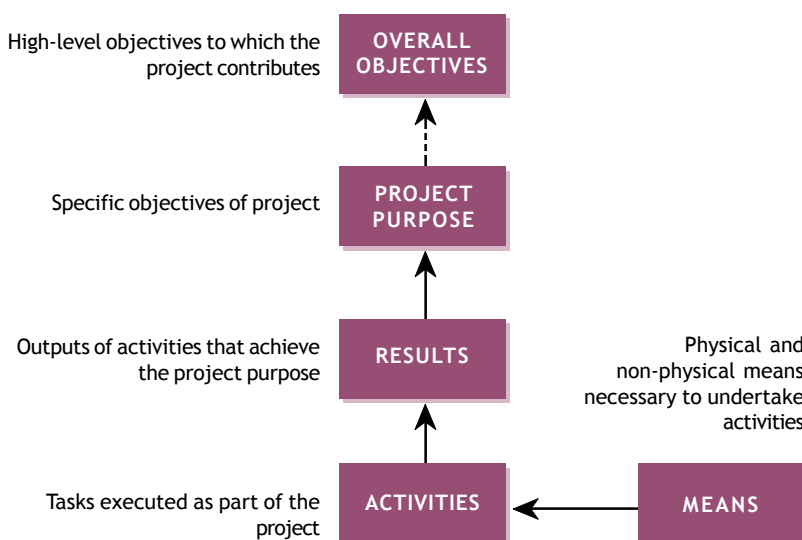
Figure 1.1. *The intervention logic of a project*

A *schedule* describes the progress over time in implementing the project's activities and achieving the results.

A project is a dynamic and multi-dimensional intervention which is intended to:

- ◆ remove or reduce the impact of certain constraints (e.g., constraints on urban waste management, rural transport, delivery of agricultural supplies, production of construction equipment, diet diversification, food production, scarcity of foreign currency);
- ◆ and/or develop human, physical and other potentials (labour, coastal zones, historic sites, hydraulic energy, etc.).

Projects are designed to bring about change. As such, because the future can never be predicted with certainty, they are subject to risks and uncertainties. In addition to their direct

results, they generally have wider impacts on the economy, environment, communities and institutions.

As far as the analyst is concerned, a project involves combining resources which are carefully defined and programmed over time:

⇒ **costs**

to bring about an improvement in the well-being of society.

⇒ **benefits**
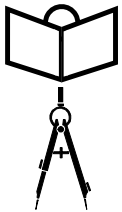
1.1.2. An aid to decision making

Basically, *the aim of financial and economic analysis is to determine and quantify the costs and benefits of development projects* in order to facilitate certain decisions which have to be made throughout the project cycle.

Note: Financial and economic analysis must be complemented by an assessment of the other **factors ensuring sustainability**[1]: policy support measures, appropriate technology, environmental protection, socio-cultural/women in development, institutional and management capacity.

☞   Table 1.1.

---

(1) *Manual, project cycle management..., op. cit.*

1 OVERALL APPROACH · ECONOMIC INTEGRATION · FINANCIAL ANALYSIS · CONSOLIDATION · ECONOMIC EFFECTS · INTERNATIONAL VIABILITY · EFFICIENCY RELEVANCE · NON-TANGIBLE PRODUCTS

7
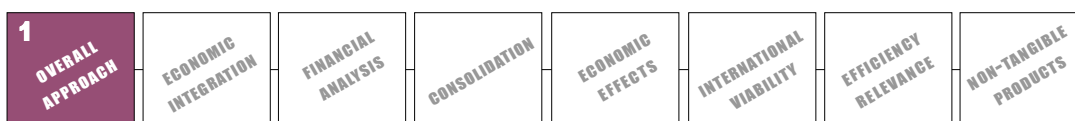
Table 1.1. *Financial and economic analysis: a decision-making tool*

PHASE	DECISION-MAKING HELP CONCERNING...
INDICATIVE PROGRAMMING	• definition of broad goals based, *inter alia,* on lessons learned during previous projects
IDENTIFICATION	• the broad feasibility of the project concept • the selection of possible project options • the decision to carry out a feasibility study
FORMULATION (APPRAISAL)	• the planning of a financially sustainable and economically profitable project (including decisions on location, technological alternatives and implementation methods) • financing methods
FINANCING	• the decision-makers' assessment of the project's real interest for each party concerned and for society as a whole
IMPLEMENTATION	• the management of the project in line with its objectives and the expected economic results
EVALUATION	• the assessment of the results achieved and the project's economic effect (e.g., as a basis for deciding on new project phases) • recommendations on the mechanisms used to reinforce positive effects and neutralise adverse ones for subsequent phases of the project or for similar projects.

1.1.3. Different areas of analysis

"Financial analysis" involves examining the activities and resource flows of individual entities (e.g., an industrial or commercial firm, public institution, etc.) or groups of entities (e.g., artisans, farmers, retailers):

➡ the **standpoint of the entity or entities** is adopted.

"Economic analysis" involves examining the flows of resources among groups of entities (e.g., entities involved in a project, subsectors, national or regional economy) and their impact on society as a whole.

➡ the **standpoint of society as a whole** is adopted

Financial and economic analysis is used to produce standardised information on projects and on the behaviour of key stakeholders, as a basis for making operational decisions.

Project analysis is primarily concerned with assessing project:

◆ **effectiveness**: by comparing the project results with its purpose;

- **efficiency**: by comparing the results obtained with the resources used (e.g., analysis of the return on investment);
- **viability**: by considering the extent to which the results (i.e. the benefits) will continue beyond the end of the project;
- **effects (impact)**: by identifying and measuring the consequences of the project for the national economy;
- **relevance**: by comparing the project purpose, results and effects with the overall objectives and major constraints of the economic environment.

BEYOND THE COMPUTATIONS... THE ANALYSIS

The drawing up of financial and economic accounts may take considerable time. However, their utility depends as much on the *analysis* carried out on the data as it does on the figures themselves.

Various tables (the "accounts") and indicators are used at each level of analysis. Indicators measure key aspects of the project's purpose or results.

N.B.: Too often, the analysis is limited to computing only one criteria: the Internal Rate of Return on the investment. However, in no case should a *judgement* on a project be made based on a single criterion. Rather, an overall understanding of the project's impact should be presented to decision-makers.

1.2. THE ANALYTIC APPROACH

The method used must be adapted to the type of project.

We distinguish two broad types of projects
➡ **DIFFERENT TYPES OF DEVELOPMENT PROJECT** § 1.2.1
entailing two types of analyses with specific information needs.
➡ **ANALYSIS OF PROJECTS WITH TANGIBLE PRODUCTS** § 1.2.2
➡ **ANALYSIS OF PROJECTS WITH NON-TANGIBLE PRODUCTS** § 1.2.3
➡ **USE IN THE PROJECT CYCLE** § 1.2.4

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1.2.1. Different types of development project

The development projects considered in this manual all aim to increase the production of goods and services (e.g., industrial, agricultural, mining products, health care, urban, transport, and socio-economic infrastructure and services). Other projects such as humanitarian and certain social development programmes may merit financial and even economic analyses; but whether this is so needs to be considered on a case-by-case basis.

In the logical framework, the results and project purpose are described operationally, (in terms of quantity, quality, target groups, time and place), using "Objectively Verifiable Indicators" (OVIs). These "should give an adequate picture of the situation and be measurable in a consistent way at an acceptable cost"[1]. In practice, however, three cases appear according to the nature of the project:

- the results can only be subjectively appraised instead of using OVIs (e.g., judging improvement of administrative services without measuring the results through objectives tests such as the time required to process a file, services or improvement of primary education without any measure of the test scores reached by the pupils...);
- OVIs can only be quantified in physical units (e.g., number of trained students or of kilometres of anti-erosion benches constructed);
- OVIs can be valued in monetary units (e.g., value of the incremental production of tins, operating cost savings or value of the production of rice).

In this work, a distinction is made between:
- **projects with tangible products**[2], i.e. products which can be valued in monetary terms. Such projects generally aim to increase the production of goods and services:
    - which are sold or not sold but for which a market exists (such as food grown for home consumption);

      Examples: industrial projects, power development projects, agricultural, tourism or small industry projects, or credit for firms projects.

    - which are provided without direct payment by beneficiaries, or whose price is not determined by commercial considerations, but whose benefits can be "easily valued". Examples include road projects, most of whose economic consequences concern transport costs and existing (or induced) traffic volumes or even savings in insurance costs, and can thus be calculated;

      Examples: road infrastructure, professional training and agricultural extension projects.

- **projects with non-tangible products**, i.e. products which cannot be accurately valued in monetary terms without carrying out research which exceed the time and resources usually available to analysts, making "major assumptions" or losing sight of the project

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(1) *Manual, project cycle management...*, *op. cit.*
(2) Benefits to society as a whole.

purpose. The "utility" of such projects need not necessarily be valued. Many social projects (the "products" of which are, e.g., numbers of students educated, patients cared for, lives saved), and environmental and cultural conservation projects fall into this category.

> Examples: projects dealing with health, education, urban development (e.g., sewerage), social services, institutional reform or environmental conservation.

The boundary between these two types of project is not always clear and depends on the judgement of the analyst. Sometimes, "experimental" evaluations, involving partial methods for valuing benefits, may be used. For example, in some cases, the incremental production resulting from an SME project (e.g., credit or training project) can be estimated and the project is thus analysed as "a project with tangible outputs". In other cases, it may not be possible, reasonably, to estimate incremental production and the project will be treated as a project with non-tangible products.

Notes: Some types of projects have components which belong to several categories: e.g., integrated rural development projects may have both production components (tangible) and social components (non-tangible); environmental projects may combine tangible products (resource exploitation) which are valued, and non-tangible products (resource preservation) often appraised as more important.

Methods of financial and economic analysis used depend on the type of project considered (Table 1.2).

Table 1.2. *Nature of the project and methods used*

	SUBJECTIVE APPRAISAL	OVI MEASURED IN PHYSICAL TERMS	OVI MEASURED IN MONETARY TERMS
NATURE OF THE PROJECT	Non -tangible products	Non- tangible products	Tangible products
METHODS USED	Cost-utility analysis[a]	– Budget analysis – Efficiency analysis[b] – Economic impact[c]	Cost-Benefit analysis

OVI = Objectively Verifiable Indicators.
(a) Cost-utility analysis aims to rank alternatives. It is not presented in this manual.
(b) Cost-effectiveness analysis is used to choose between variants of a project or between alternative projects whose purpose and results are either identical or comparable.
(c) If justified by the size of the project.

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1.2.2. Analysis of projects with tangible products

For these projects, the analyst uses different cost-benefit methods, leading to a specific definition of costs and benefits for each type of analysis

N.B.:   In this manual, "Cost-Benefit Analysis" has a broader meaning than is usual among English-speaking project economist.

COST-BENEFIT ANALYSIS

Financial and economic analysis uses cost-benefit methods which rely on:

- **analysis**... (understanding and explaining is as important as measuring and calculating);
- ...of the **flows** of goods and services (but not considering change in assets as such);
- in terms of **costs** and **benefits**... (carefully distinguishing between those flows which are costs and those which are benefits);
- ...which are **valued**... (expressing flows in common terms is a strong point of the method but may have disadvantages in that some flows – e.g., home consumption of agricultural products, informal exchanges, social services, use of the natural environment – may not lead to real monetary exchanges and actual prices may not represent true values);
- ...and are then **compared** and **combined**... (using mathematical methods to provide synthetic information and estimates of the project's return on investment. The most commonly used return on investment indicators are outlined in Annex E).

(a) Financial analysis

For each of the entities taking part in a project, financial analysis involves comparison of:

- **costs**: the operating and investment expenses (outlays and, possibly, non-monetary flows);
- **benefits**: the revenues (receipts and, possibly, non-monetary flows) resulting from the activity.

The exact value of the flows paid out or received is taken into account. Financial analysis involves:

- identifying and estimating all the flows of money, goods and services resulting from the activities of the entity in the with- and without-project situations, including investment costs, operating costs, and benefits which the entity earns from these activities;
- estimating the borrowing requirements for the with-project situation;

- assessing the impact of the project on the entity's overall financial situation, and thus the entity's **solvency** and **viability**;
- calculating the **return on invested capital**;
- estimating the **financial assistance** necessary.

The relationship between the major questions answered by financial analysis is presented in the diagram below (see also Annex B):
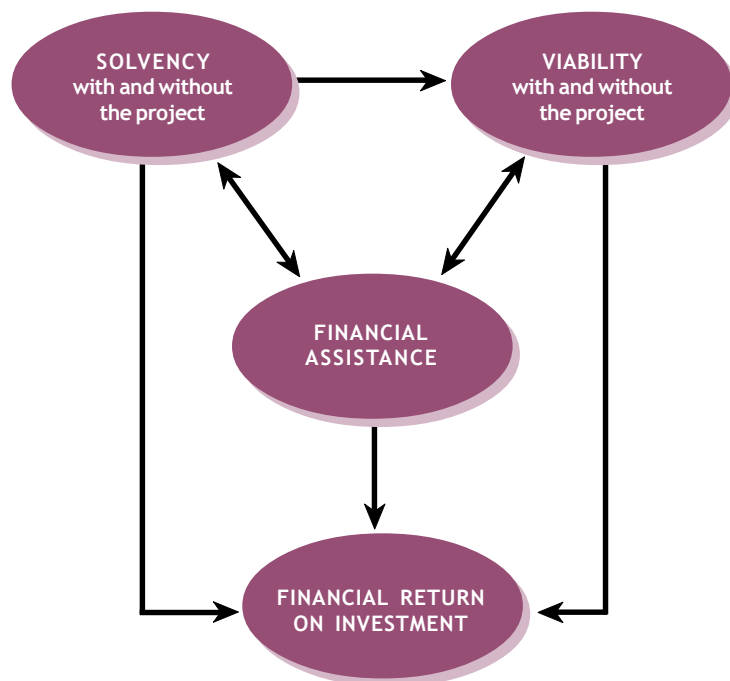
Figure 1.2. *The principle of financial analysis*

(b) Economic analysis

Economic analysis assesses projects from the view of society as a whole (the national economy). Two approaches may be adopted for projects with tangible products depending on whether the aim is:

- to estimate the effects of the project on the national economy:
- to assess the project's viability within the international economic environment.

Under the first (analysis of effects):

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- **costs** are defined as economic resources lost by the national economy: they are foreign currency losses[1];
- **benefits** are defined as the new incomes distributed to domestic entities (i.e. contributions to the growth of the economy), to which may be added increases in domestic consumption.

From this perspective, salaries, to give one example, which were considered to be costs in the financial analysis, are now considered as benefits (distribution of income) for the society as a whole.

Under the second approach (analysis of viability within the international economy) the possible recourse to world markets provides the *opportunity cost* of the goods and services produced and used:

- **costs** correspond to real consumption of economic resources, and are given the values they have on the international markets and not their local values (except if they cannot be traded on the international markets);
- **benefits** are made up of the project outputs, which also are given the value they have on the international markets.

From this perspective, the costs and benefits are similar to those of the financial analysis; only the prices assigned to them differ.

The method of project analysis proposed in this manual combines these different points of view.

A full economic analysis would involve:

- drawing up the consolidated account for the set of entities involved in the project;
- calculating all the **effects** induced in the economy;
- determining the project's **viability** within the framework of the international economy;
- calculating the **return on invested capital** (based on the total effective cost, the foreign exchange cost, and/or the international market cost);
- examining the project's **relevance** from the standpoint of the economic policies and any structural reforms being carried out.

The relationship between the main issues addressed in economic analysis is shown in the diagram below (see also Annex C):

☞ Figure 1.3.

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(1) Foreign currencies represent the wealth of the national economy vis-à-vis foreign countries.
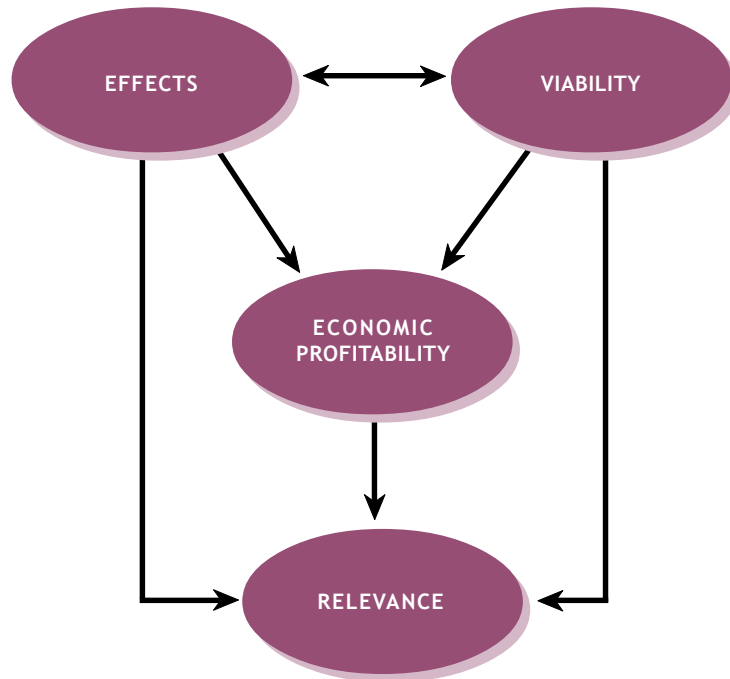
Figure 1.3. *The principle of economic analysis of projects with tangible products*

1.2.3. Analysis of projects with non-tangible products

For these projects, the analyst uses cost analysis (budget analysis), efficiency analysis and, possibly, economic effect analysis.

The approach adopted for such projects is limited in scope and aims just to minimise costs. It does not attempt to assess if the value of the costs is greater or less than the benefits:

- **costs**: the resources used by the project.
- **benefits**: estimated as the tangible "results" and expressed in physical quantities.

The analysis of projects with non-tangible products involves:

- describing the expected results of the project in simple, quantifiable terms (e.g., number of students educated, patients treated, areas protected, or households covered);
- calculating the project budget on the basis of the flows, including investment and operating costs;
- assessing the financial situation of the entities and thus their **solvency** and the **viability** of their activities;

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- estimating necessary **financial assistance** by accurately identifying those who contribute to it (e.g., users, governments, donors);
- estimating the project's **efficiency** by verifying that the resources used are both sufficient and necessary;
- determining the **viability** of the project;
- if necessary, measuring the project's **effects** on the country's major economic indicators: foreign exchange reserves, public funds, income distribution;
- examining the project's **relevance** from the standpoint of sectoral strategies and programmes as well as economic policies and structural reforms being carried out.

The relationship between the major questions addressed in cost-effectiveness analysis is shown in the diagram below:
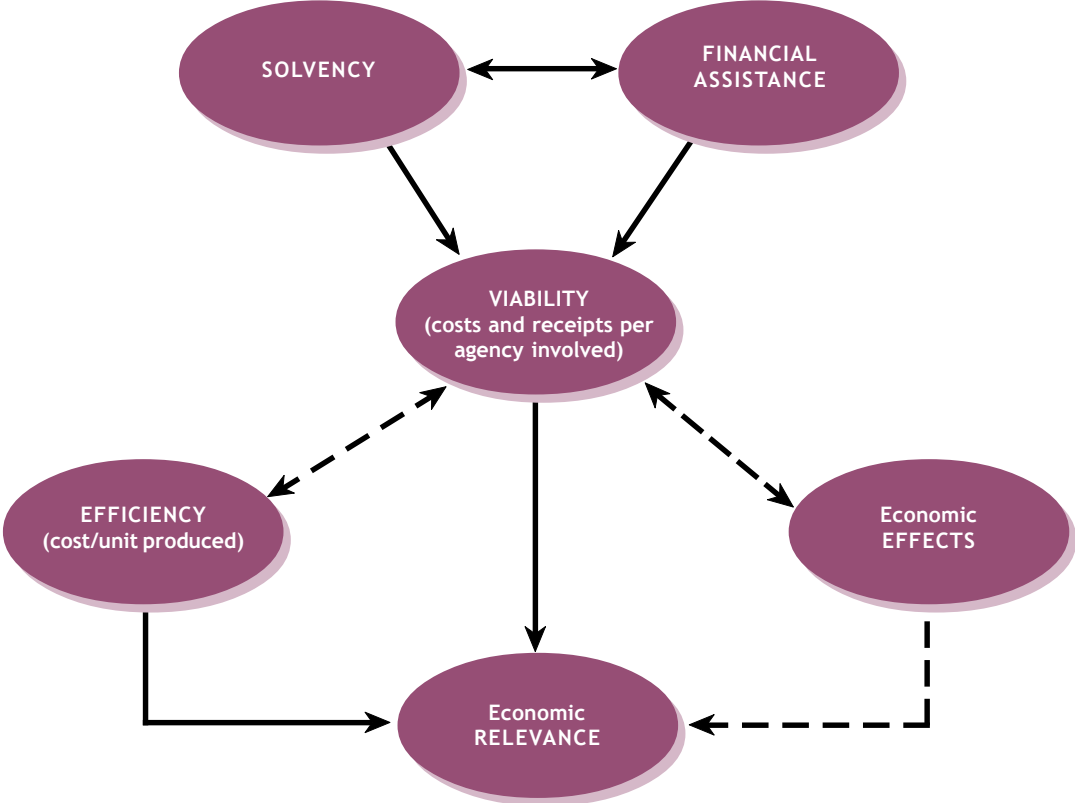
Figure 1.4. *The principle of analysis of projects with non-tangible products*

1.2.4. Use in the project cycle

Table 1.3 summarizes how these analyses contribute to inform decision makers.

Table 1.3. *Principal purposes of the financial and economic analyses*

	PRINCIPAL GOALS	PRINCIPAL OUTPUTS AND AREAS OF INFORMATION
PROJECTS WITH TANGIBLE PRODUCTS		
FINANCIAL ANALYSIS	• To estimate the financial feasibility for all stakeholders • To inform the operators involved • To inform donors and public agencies	• Incomes of entities • Return on invested capital • Operating budgets of entities • Estimates of foreign contributions needed.
ECONOMIC ANALYSIS	• To estimate the efficiency of resource use in national terms • To inform donors and public agencies	• Incremental net income • Macro-economic impacts • Viability in the world economy • Return on investment for society as a whole • Relevance to policies
PROJECTS WITH NON-TANGIBLE PRODUCTS		
BUDGET ANALYSIS (financial analysis)	• To estimate the financial feasibility for all stakeholders • To inform the operators involved • To inform donors and public agencies	• Operating budgets • Estimates of foreign contributions needed. • Financial viability for entities
EFFICIENCY ANALYSIS (least cost)	• To estimate the efficiency of the invested and operating resources • To inform donors and public agencies	• Minimisation of costs
ECONOMIC IMPACT ANALYSIS	• To estimate the impact of the resources used in the project • To inform donors and public agencies	• Distribution of income • Impact on foreign exchange • Impact on public funds • Relevance to policies

The aim of financial and economic analysis is **to aid decision-making** at various stages of the project cycle. The three main stages when the techniques are used are:

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- identification: outline financial analysis, which may become more detailed as the project concept is refined;
- formulation (or appraisal): detailed financial and economic analyses to compare alternative project designs, culminating in a comprehensive analysis of the project (*ex-ante* evaluation), as a basis of the financing decision;
- evaluation: financial and economic analyses in both ongoing evaluations (during project implementation) and *ex-post* evaluations. Financial analysis is often more developed in on-going evaluations and economic analysis in *ex-post* evaluations.

Table 1.4. *Financial and economic analysis in the three key phases of the project cycle*

PHASE	GOAL AND UNCERTAINTY	CENTRAL QUESTIONS
IDENTIFICATION	• Basic computation and analysis • High uncertainty of data ($\approx 30\%$) • Increase interest of stakeholders in project and minimise risks of loss of interest	• Does the project merit a full feasibility study (i.e. Formulation)?
FORMULATION (appraisal)	• Detailed financial and economic analyses • Uncertainty about technical data is reduced to the minimum (=10%)	• Is the project viable for all the entities participating in it? and for the national economy? • Will its benefits for society as a whole outweigh its costs? • Will the resources devoted to it be used effectively?
EVALUATION	• Detailed financial and economic analysis, though sometimes for only a limited period • Uncertainty as to what would actually have transpired had the project not been implemented	• How has the project deviated from its initial plan? • Is the balance between the resources devoted to the project and the benefits resulting from it, positive?

1.3. SOME KEY CONCEPTS

Financial and economic analysis is based on a few key elements appertaining to the computational technique or depending on the type of development project dealt with.

The purpose of the analyses must be defined:	
➡ ENTITIES AND FLOWS	§ 1.3.1
➡ THE PROJECT'S INCREMENTAL CONTRIBUTION	§ 1.3.2

Two essential factors in the implementation of any project must also be considered:

➡ TAKING TIME INTO ACCOUNT	§ 1.3.3
➡ RISK AND UNCERTAINTY	§ 1.3.4

1.3.1. Entities and flows

Economic entities are either individuals, groups of individuals (e.g., artisans, farmers, tradesmen, consumers) or legal entities (e.g., enterprises, banks, government agencies, development agencies) whose economic functions, for the most part, consist of the production and/or sale of goods and services, the distribution of income, the financing of activities and the consumption of goods.

The approach to project analysis described in this manual is based on the study of flows of goods, services and money among **economic entities**. This is traditionally represented in a flow-chart as follows:

Figure 1.5. *Exchanges of flows between an entity and its environment*

Entities use resources called **factors of production** in order to transform existing goods and services called **intermediate goods and services** or goods (raw materials, semi-finished and finished products and integrated services) into new outputs. Three types of factors of production are usually identified: labour, capital, and natural resources.

Factors of production and intermediate goods and services in this manual are more generally referred to as "inputs"; and the products of economic activity as "outputs".

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Factors of production
(labour capital natural factors)

Intermediate goods and services

(goods and services to be transformed)

PRODUCTIVE ENTITY

Outputs
(goods and services)

Figure 1.6. *Exchange of material flows by productive entities*

1.3.2. The project's incremental contribution

Not all the flow of costs and benefits existing with the project area are due to the project; even without the project a certain level of production and of service would have been achieved.

The project's incremental impact is the difference between the flows of costs and benefits in the with-project situation and those in the without-project situation. In general:

Project contribution = Flows with project – Flows without project

So:

Incremental benefits = Benefits$_{\text{with project}}$ – Benefits$_{\text{without project}}$

and

Incremental costs = Costs$_{\text{with project}}$ – Costs$_{\text{without project}}$

Care should be taken not to confuse the without-project situation with the before-project situation. All economic activities are likely to change over time and estimation of the "without project" situation should take this into account. For example, over time, agricultural yields may increase due to the "spontaneous" adoption of more intensive cultivation techniques, population growth may lead to the cultivation of new land, there may be increases in informal artisanal production, and the condition of infrastructure may deteriorate. The careful forecasting of the without-project situation, while difficult, is essential in estimating the project's real contribution.

1.3.3. Taking time into account

N.B.: Concepts introduced in this paragraph are further developed in Annex A.

The flows of net benefits resulting from productive investment normally follows an "S-shaped" curve. Flows are strongly negative during the first year(s) due to start-up investments, then rise as output commences until they reach a plateau.
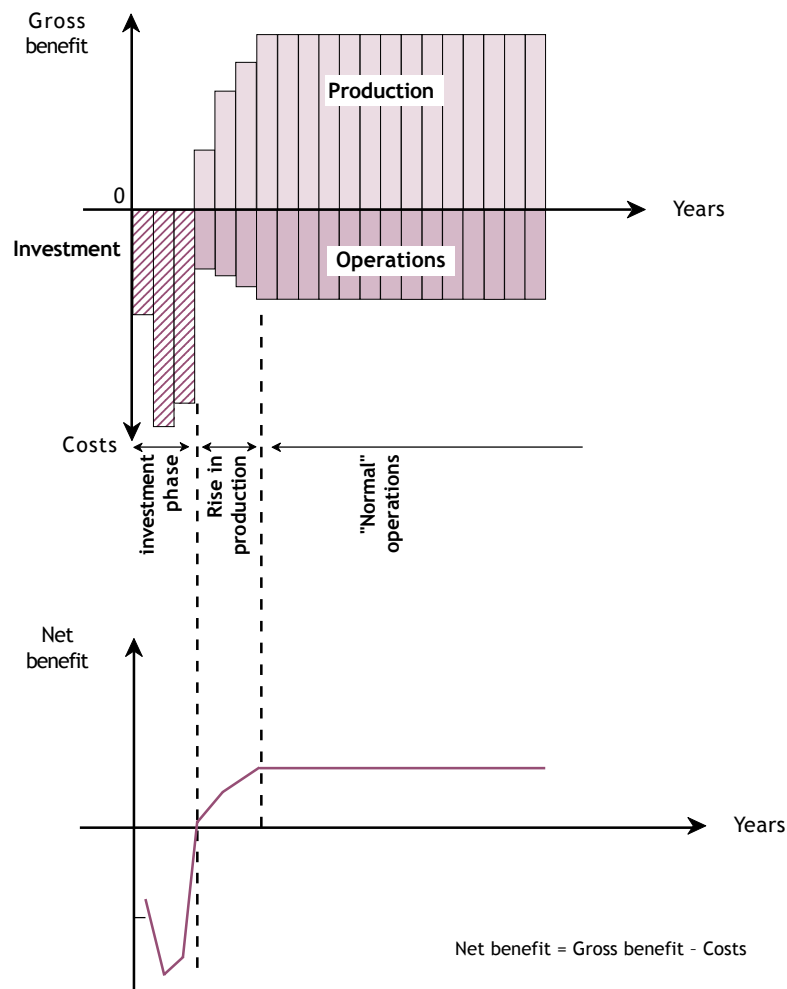
Figure 1.7. *Profile of flows for a productive project*

Time has to be taken into account in project analysis since making an investment involves incurring costs in anticipation of future benefits. It is thus important to compare costs and benefits occurring at different times, sometimes separated by ten years, or more.

The value of a sum of money changes over time. An euro today is "worth" more than an euro in 2, 5 or 10 years, for three *totally independent* reasons:

(1)   The general rise in prices (inflation) reduces the **purchasing power of money**. Thus euros 100 today allows one to purchase more goods and services than euros 100 would in three years. In order to take account of this, most analyses

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are done in **constant prices** (i.e. assuming a constant purchasing power of money). This assumes that prices remain unchanged with regard to each other and that the impact of the rise in prices is identical for costs and benefits, and thus for the net balance.

Occasionally, calculations are done in **current prices**, (i.e. using the prices charged on the date when the transactions take place). Current prices can be used retrospectively or in estimating future borrowing requirements or government expenditures.

(2) The "preference for the present", which reduces the perceived value of future resources compared to present ones. Thus, a sum (cost or benefit) due in the future is seen as less valuable than the same amount due[1] today. **Discounting** is the computational technique that allows the analyst to take into account this preference for the present. It makes it possible to calculate the **present value** of a future sum. In practice, it reduces the importance of the sums due in the future, especially those that are further away in time.

However, the major shortcoming of this technique is that no objective procedure exists to determine a single discount rate (i.e. "the velocity of loss of value of money"). Its value has to be fixed through indirect approaches (e.g., opportunity costs) or according to economic policy decisions.

(3) The remunerative power of capital which creates a "loss of earning". Any project involves the use of resources (e.g., land, money, labour) which could be used elsewhere. For a given use, the benefit gained from the best alternative use measures the (theoretical) loss of earning, or the **opportunity cost** of using the resource. The opportunity cost of any resource thus represents the highest net income that it could earn elsewhere in the economy.

The **opportunity cost of capital** invested in the project is normally measured in the form of a constant interest rate over time by:

– the average market rate of interest, for financial analysis;

– the average (or marginal) rate of return on investments in the country (or in the subsector), for economic analysis.

1.3.4. Risk and uncertainty

All projects involve risk and uncertainty. For a variety of reasons, the costs, benefits and returns of a project usually differ from those planned. Some variation is to be expected because of the inherent uncertainty in estimating future costs and benefits, but the most important are unexpected changes in prices and ecological, political and social factors. It is during

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(1) In constant price, i.e. with the same purchasing power.

the identification and design phases that risks should be identified and their probabilities assessed.

Uncertainty means wrong estimates of:

- cost: e.g. over-runs which are allowed for by including **contingencies** in the accounts and by using **sensitivity analyses**;
- benefits: e.g. over estimation which can also be taken into account using **sensitivity analyses**.

(a) Contingencies

A **provision for contingencies** is often introduced in project planning. This is generally computed as a percentage (usually between 5 and 15%) of the base estimates. It should be made clear that these provisions should not be used as a way of reducing the thoroughness of work done by planners in formulating the project (cf. Table 1.4, § 1.2.4).

In practice, contingencies are generally only introduced for the investment phase, especially when it includes major civil engineering construction work. Contingencies relating to the operation phase are dealt with by the sensitivity analysis.

N.B.: The *technical* provisions do not take into account the effects of the general rise in prices due to future inflation. This phenomenon involves the passage from constant to current prices *(provisions for price increase – § A.1)*.

(b) Sensitivity analysis

During project planning, the costs and benefits used are only estimates. The actual costs and benefits will diverge from these estimates, as the project is implemented, for various reasons. The assessment of how changes in project costs and benefits will affect the economic and financial viability of the project is done using **sensitivity analysis**.

In both financial and economic analyses, the final stage involves:

- identifying the variables whose values are most uncertain;
- estimating the likely range of these values;
- evaluating how sensitive the results of the economic and financial analysis are to these:
  - either through computations based on a *range* of values;
  - or by computing the *switching values* of these variables (i.e. their values which reduce the net benefit to an unacceptable level).

Traditionally, sensitivity analysis is done on the following variables:

- implementation delays,

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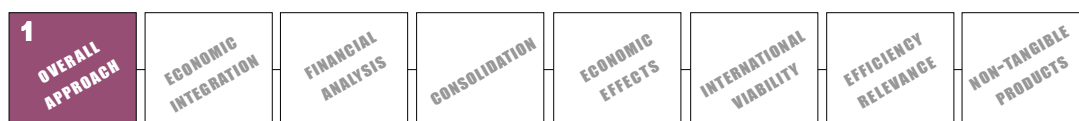
- ◆ and/or delays in the rise in production until full production is achieved,
- ◆ and/or the increase in investment costs,
- ◆ and/or the increase in operating costs, (based on particular project specific parameters such as price of energy or of fertilizers, or on macro-economic parameters such as exchange rate, taxes or subsidies),
- ◆ and/or the reduction in gross prospective benefits (quantity or price),
- ◆ and/or the reduction of the project's life span.

The results of sensitivity analysis may greatly modify the overall assessment of the project. It highlights those variables which have the greatest potential impact on the economic and financial viability of the project, and gives a measure of the overall robustness of the economic and financial analyses[1]. It is therefore a *fundamental element* of project analysis.

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(1) The experience of various donors seems to demonstrate that project fragility has been insufficiently taken into account in the past.

1.4. SUMMARY OF FINANCIAL AND ECONOMIC PROJECT ANALYSIS

The diagrams below present the stages in the financial and economic analyses of development projects.

(For an entity)

Revenues expenses & investments

Flows of money= FM

Non-money flows= NMF

Financial plan

Cash flow statement

Solvency Viability

Contributions (loans, grants)

FM, NMF and noncash expenses related to 1 year

Flows of money

Disbursement schedule

Operating account

Flow balance account

Budgetary impact

Return on investment Viability

Return on investment Viability

FM = Flows of Money
NMF = Non-Money Flows = Flows in kind

Figure 1.8. *General procedure for the financial analysis
of a project with tangible products*
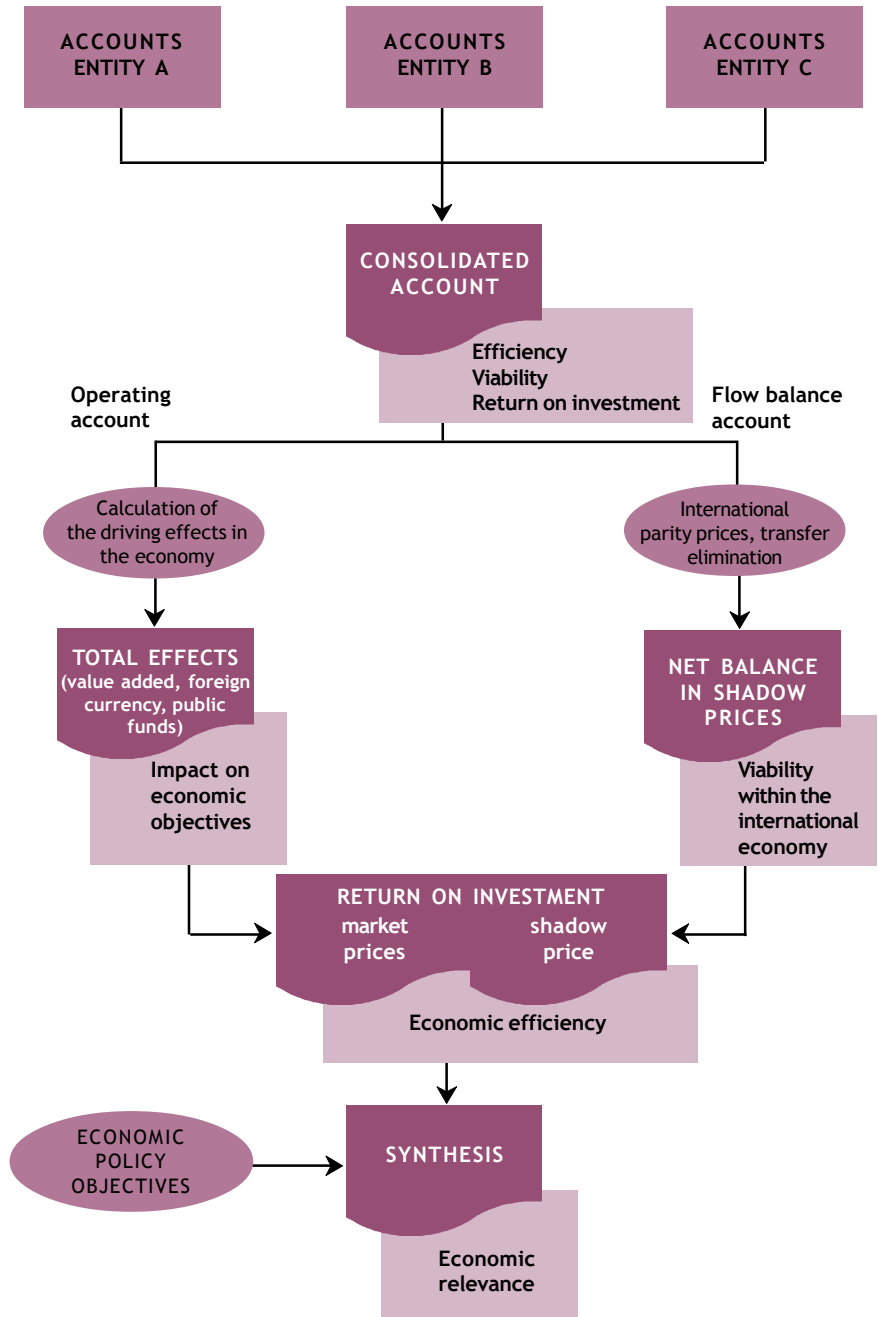
Figure 1.9. *General procedure for the economic analysis of a project with tangible products*
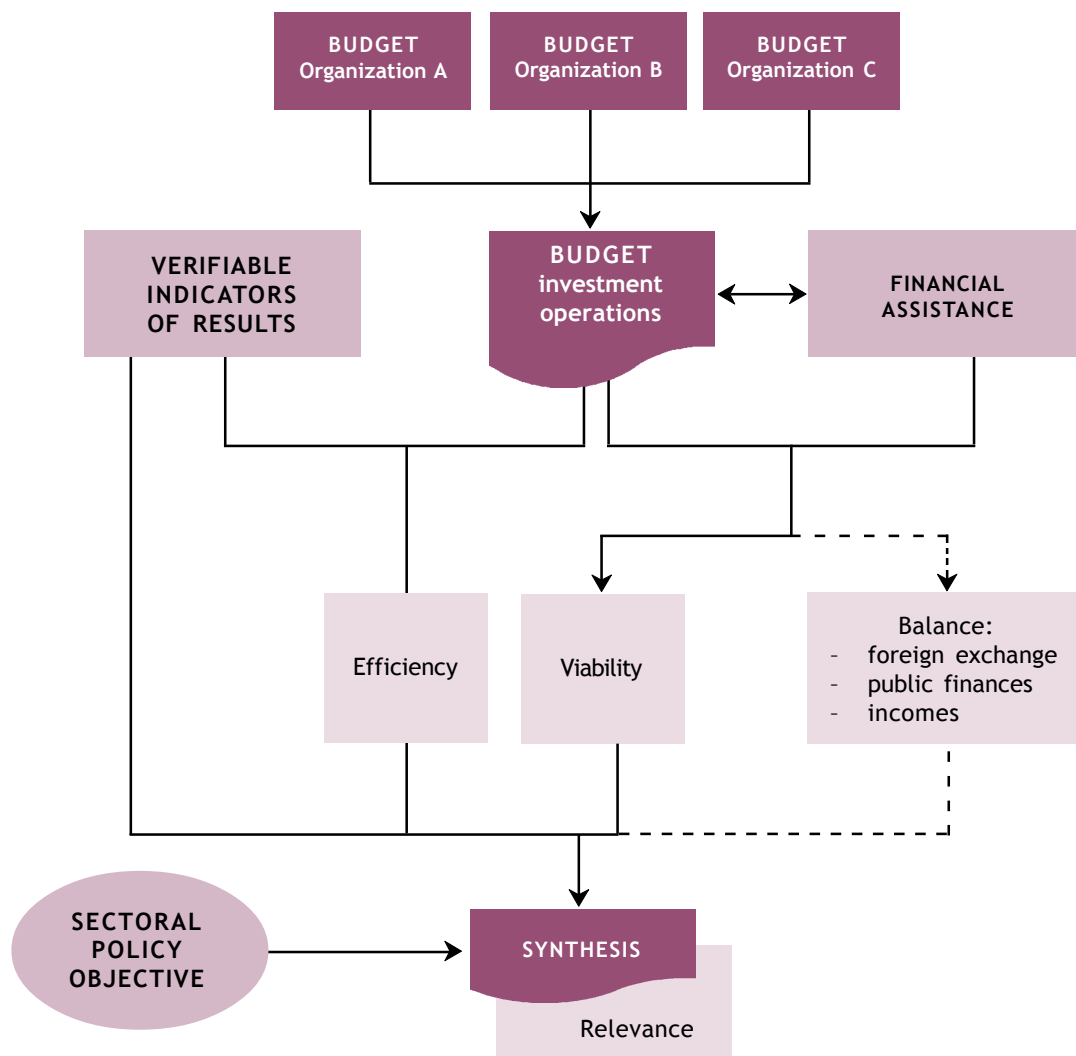
Figure 1.10. *General procedure for the analysis of a project
with non-tangible products*

2. INTEGRATION OF THE PROJECT WITHIN THE DOMESTIC ECONOMY

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The first stage of project analysis involves understanding the changes in the activities of economic entities in the national economy resulting from the project. Some of these changes can be quantified (e.g., sales, costs, incomes, investment returns), while others may only be described in qualitative terms (e.g., aspects of improved health care, education, environment). Such changes will influence the interests, strategies, and behaviour of project stakeholders in different ways. They must be identified and taken into account during planning, and monitored during implementation, to check that they are not likely adversely to affect the outcome of the project. It is especially important to identify the "victims" of the project (i.e. those entities whose situation may suffer as a result of implementation) as early as possible.

The aim of the analysis of the links between the project and the national economy is to:

- understand the with- and without-project situation;
- identify all those entities on which the project directly depends.

It lays the foundation for the financial and economic analysis by identifying:

- the main changes in the production and consumption of goods and services with and without the project, as a first step in estimating the incremental impact of the project[1];
- the entities involved in the project for which a financial analysis should be made and which will be included in the consolidated account for the economic analysis.

The analysis of the links between the project and the national economy is done in two ways:

- **by clarifying the impact of the project**
    - **THE DIRECT IMPACT ON PRODUCTION** § 2.1.1
    - **THE USE OF SCARCE MEANS OF PRODUCTION** § 2.1.2

in order to establish the "with" and "without" the project situations

- **DETERMINATION OF THE ALTERNATIVE** § 2.1.3
- **and by identifying all the entities affected by the implementation of the project and analysing how the project impacts on them.**
    - **PROBLEM POSITIONING** § 2.2.1
    - **IDENTIFICATION OF THE ENTITIES TO BE STUDIED** § 2.2.2

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(1) And thus (implicitly) to establish the opportunity cost of some non-tradeable goods and services (§ 6.2.4).

2.1. DEFINITION OF THE "WITH" AND "WITHOUT" PROJECT SITUATIONS

The "with-project" situation is that which will result from the implementation of the project. In an *ex-post* evaluation it already exists, whereas in an *ex-ante* planning study it is still in the future.

The "without-project" situation is that which is most likely to occur if the project is not implemented. This is not the same as the *"before-project* situation" since the latter does not take account of evolution over time. This difference is important. "Without-project" analysis allows the analyst to distinguish the changes due to the project from those which would have happened without it. For example: without any project intervention, the normal development of the existing livestock sector would be expected to lead to an increase in the supply of animal products (e.g., milk, meat, hides). In an *ex-post* analysis, the without-project situation must be reconstructed, whereas in an *ex-ante* evaluation the most likely future evolution must be forecast.

Finally, these two situations are characterized by the domestic consumption made possible (the "domestic demand"). Changes induced by the project come from:

- **changes in the production of the entities directly involved in the project:**
  - ➡ **THE DIRECT IMPACT ON PRODUCTION** § 2.1.1
- **the impact on the production of other entities of changes in the use of inputs**
  - ➡ **THE USE OF SCARCE MEANS OF PRODUCTION** § 2.1.2

By analysing these changes, the features of the "with" and "without" situations are defined:

- ➡ **DETERMINATION OF THE ALTERNATIVE** § 2.1.3

N.B.: In both situations, the measurement of the real contribution of the project requires the analyst to take into account the likely impact of new economic policies and structural reforms.

2.1.1. The direct impact on production

The comparison between the with- and without-project situations takes into account impacts on domestic consumption. **Do the project's products replace existing goods or services?** This question can be answered in a number of ways:

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- **Can the same level of domestic demand be satisfied with and without the project?**
  - Yes, if in the two situations the same quantity of goods and services[1] can be produced to meet domestic consumption, with only the "system of production" (economic entities, technologies, locations) changing[2];
  - Yes, if in one of the two situations fewer goods and services are provided, and that imports are used to fill in the gap;
  - No, if in one of the two situations, the domestic consumption is higher, thus improving welfare.
- Is it possible to **satisfy domestic demand at the same price** with and without the project?
  - Yes, if in both situations, the sale price to final consumers is identical for the same quantity of goods and services.
  - No, if in one of the two situations, the domestic price of the same goods and services is cut, giving additional consumers benefit[3].

☞   Figure 2.1.

_____

(1) The same goods and services, or goods and services considered "substitutable".
(2) The competition of a new substitutable product is comparable to this case; e.g., the installation of a plastic-wrapping unit competes with the local production of hand-crafted bags.
(3) This effect is different from the "consumers' surplus" of equilibrium models. See § 5.2.2.
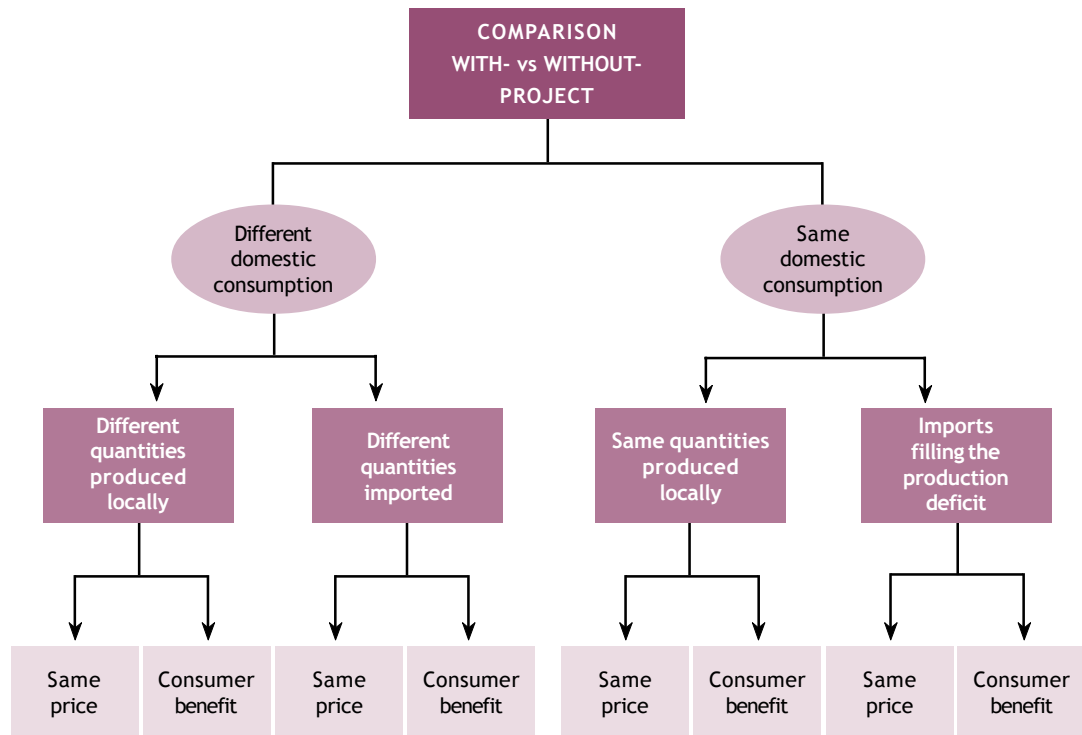
Figure 2.1. *Integration of the project into the economy: goods and services produced*

2.1.2. The use of scarce means of production

A project may compete with existing entities for scarce resources (e.g., land, labour, interme-
diate goods or consumption) and "disrupt" existing production. If this happens, ways need to
be identified to replace these resources (e.g., by relocation of factories, technological change
or reducing consumption).

A project may have adverse effects on local production if:

- **productive capacity for intermediate goods is fully utilised** and no increase in capac-
  ity is envisaged in the short or medium terms[1] (e.g., a fish can project may monopolise
  fishing products without there being a possibility of increasing catches, and thus cause
  artisanal drying/smoking facilities to be closed, or a new project in an isolated region
  monopolises scarce means of transport);

_____

(1) In the opposite case, the corresponding "related investment" is integrated into the economic entities consolidated unit
(§ 2.2.2).

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Special case: projects which add value to locally produced goods sometimes use raw or semi-finished products that would be exported in the without-project situation (e.g., a textile mill may use cotton fibre which would otherwise be exported).

◆ **the work force is fully employed** without the project and thus a new project may result in, for example, skilled workers, farmers or informal sector entrepreneurs giving up one activity for another.

◆ **other factors of production are fully utilised**, when, for example, in the without-project situation, land is fully cultivated for one crop but the project requires some of this to be used for another crop, or a tourist sea-park project is extended over an area previously devoted to fishing activities.

Special case: projects focusing on natural resource conservation may restrict the use of natural resources for productive activities (e.g., nature reserves where the people would otherwise engage in hunting and gathering).

As a result of competition for scarce resources, some production may be lost because of a new project. The analyst must take this into account[1].

☞ Figure 2.2.

_____
(1) Hence, the value of the additional output is an estimation of the opportunity cost of these scarce resources (§ 6.1.2 and 6.2.4).
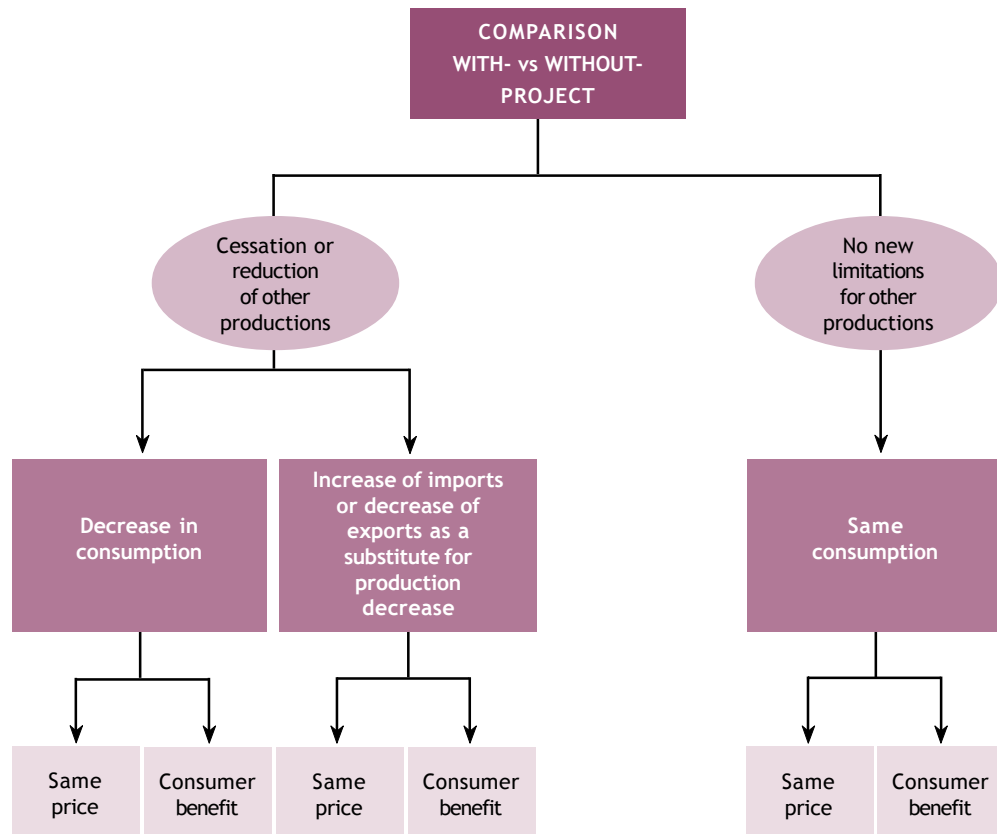
Figure 2.2. *Integration of the project into the economy: means of production used*

2.1.3. Determination of the alternative

The set of activities studied with and without the project thus comprises:

the production activities the project intends to develop

$+$

the production increased or decreased by the project

The evaluation of a tourist complex project may, for example, require the following studies:

- for the without-project situation: production of corn (for local consumption) cultivated on the site;
- for the with-project situation: activities of the tourist complex, plus corn imports resulting from lost production.

Thus, in order clearly to determine the with- and without-project situations, two key questions must be answered:

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⇒ Which goods and services will be replaced by the project's products?

⇒ Will the implementation of the project lead to other productive activities being excluded due to the use of scarce means of production?

In order accurately to identify the flows involved, these questions must be answered by analysing impacts on entities with and without the project.

(1) Which goods and services will be replaced by the project's products?

For a **project aiming to increase production** (e.g., by changes in the techniques, increases in productive capacity), the same quantities of goods and services are made available to meet domestic demand consumption (C_d). By marking C and C' respectively the production with and without the project, the alternative is presented in the form:

PRODUCTION WITH PROJECT	]	GROWTH OF PRODUCTION
		WITHOUT PROJECT
C_d	=	C'_d

Note: Some producers may have to stop their activities because the project changes in techniques or in competition conditions in favour of other (new) producers: e.g., small farm livestock breeders because of the introduction of new feedlot units or within agricultural mechanization projects. These cases are similar to project aiming to increase production, yet these effects are much more difficult to ascertain.

For an **import-substitution project**

| PRODUCTION WITH PROJECT |] | IMPORTS WITHOUT PROJECT |
| C_d | = | C'_d |

In the case of an **export-oriented project** of volume P_x, the alternative has no effect on levels of intermediate consumption:

EXPORTS WITH PROJECT	]	GROWTH OF EXPORTS
		WITHOUT PROJECT
P_x	$\neq$	P'_x

For **projects which change the level of domestic consumption** (generally to increase it: $C_d > C'_d$), the alternative is of the type:

PRODUCTION WITH PROJECT	]	GROWTH OF PRODUCTION
		WITHOUT PROJECT
C_d	$\neq$	C'_d

In this case, the increase of the domestic demand C_d should not be made at the expense of consumption; otherwise this other product would have to be included in the with/without project alternative.

N.B.: Projects sometimes combine several of these "pure cases". Thus the new activities created by an infrastructure project (e.g., the increase in the production of corn in a certain region because it is opened up by a road) can result from a combination of these situations: replacement of imports and/or increase of domestic consumption (e.g., due to additional quantities of corn available in urban areas), increase in exports, (e.g., since larger quantities reach port) and the replacement of the production of another region (e.g., reduction of the production of corn in a region less suited to its cultivation).

(2) Will the implementation of the project lead to cuts in other production due to the use of scarce means of production?

If so, the analyst must **consider ways of replacing the scarce resources used** and intended for domestic consumption or for export:

WITH PROJECT:	]	WITHOUT PROJECT:
IMPORTS TO REPLACE		GROWTH OF PRODUCTION
ELIMINATED PRODUCTION		(CONSUMED OR EXPORTED)
C_d	=	C'_d

... or else show clearly how domestic consumption will be reduced or exports lost.

WITH PROJECT	]	WITHOUT PROJECT:
REDUCED PRODUCTION		GROWTH OF PRODUCTION
		(CONSUMED OR EXPORTED)
C_d	$\neq$	$C'_d + P'_x$

N.B.:

(1) In the case of projects dealing with several products or with multiple outlets, the without-project situation can correspond to a combination of these "pure" cases.

(2) It is possible that several scenarios will exist for the situations with and without the project. In order to facilitate comparison, this manual assumes that there is just a single alternative.

(3) In practice, forecasts of demand and the growth of "systems of production" have a considerable influence on the results of the economic analysis. For this reason, they should be:

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- taken from official or other authoritative sources, or be brought into line with them, rather than being undertaken in an *ad hoc* manner by the analysts;

- both realistic and prudent: will the production really continue to unfold in the same way? Until what point will the conditions deteriorate without invoking reaction by the entities involved?

2.2. IDENTIFICATION OF THE ENTITIES INVOLVED IN THE PROJECT

Neither the with-project situation nor the without-project situation can be considered abstract realities; both involve real entities.

In practice, financial analysis is carried out on entities whose accounts are later combined and/or modified for the economic analysis.

- **The intervention logic of the project is often based on a careful analysis of the different entities involved:**
    - ➡ **PROBLEM POSITIONING**   **§ 2.2.1**
- **yet the selection of the entities requires a clear understanding of the differential impact of the project**
    - ➡ **IDENTIFICATION OF THE ENTITIES TO BE STUDIED**   **§ 2.2.2**

2.2.1. Problem positioning

Two types of entities can be distinguished according to the way they are related to the project:

- Entities which are "**involved**": i.e. they produce (directly or indirectly) and/or distribute the goods and services of the project, and/or they have important economic decision to make (e.g., investment, activity changes). They are sometimes known as "instrumental entities".

    In productive projects, the entities involved are generally those directly engaged in production (e.g., artisans, farmers, plantations, firms) and those immediately upstream or downstream (e.g., input supply firms, farmers supplying raw materials, marketing offices, tradespeople, hauliers, regional development companies). In social or infrastructure projects, the entities are those which supply services and/or make investments (e.g., hospitals, schools, community improvement services, technical road, rail and waterway services, including suppliers and service contractors).

- Entities which are "**affected**" are either direct beneficiaries of the project (sometimes called "target entities") or are affected by it indirectly. These include consumers, the users of social services and day labourers or unemployed workers for whom the project could have an important impact in terms of income or job possibilities.

2.2.2. Identification of the entities to be studied

The identification of the entities to be studied in both with- and without-project situations is done by examining the linkages among economic entities resulting from the project:

(1) Certain entities will make the investments planned and financed by the project.

➠ These agencies or firms are obviously the object of a financial analysis, and their activities are included in the consolidated accounts, which will serve as a base for the economic analysis.

(2) Other entities will be prompted to make investments which are *not recorded in the financing of the project*. These can be of two types:

- Entities making upstream and downstream investments in the plant and infrastructure necessary if the project is to achieve its objectives. These are known as *related investments*. For example, a mining project may require the construction of a railway linking it to a refining complex or to a port, an agricultural project may require investment in an on-site processing unit, or the construction of a hotel complex may only be carried out if an access road is built.[1]

  ➠ The financial and economic analysis should focus on

  "**initial project + related investments**"[2]

- Entities, often in large numbers, involving themselves in the project by making investments which are necessary to the success of the project. These investments are referred to as *induced*. Examples may be found in agricultural projects (e.g., purchase of bullocks or ploughs, building small irrigation infrastructures with purchase of pumps) or transport projects (e.g., small private hauliers buying new pick-ups).

  ➠ The financial and economic analysis should focus on

  "**initial project + induced investments**"

  in which, in the *ex-ante* situation, the induced investments can only be estimated by forecasts

---

(1) Reference is made to an *accelerator effect* when the related investment creates productive capacities which are greater than those necessary to satisfy only the project demand.
(2) Reference is often made to a "*cluster of investments*" or to a "*cluster of projects*".

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(3) Other entities will be led to modify – and even to re-orient – their productive activities without making new investments.

- The additional demand for intermediate goods and services created by the project may lead to an increase in production by existing entities[1]: thus electricity companies, bagmakers, petro-chemical companies, hauliers, certain service contractors or farmers, for example, may have to increase their production in order to meet new demands. In *ex-ante* analysis it is necessary to distinguish that part of the new demand which will be satisfied by new imports (or a drop in exports) from that which will be satisfied by increasing national production.

  ➠ The financial and economic analysis should concentrate only on those entities where such increases in production are substantial. The corresponding driving effects on the upstream or downstream production will be allowed for in the economic calculations.

- Certain producers may change their production without changing their equipment, for example in certain food-processing industries where substitutions are possible (e.g., fruit juices, extractions), or in many agricultural situations where equipment is not particularly specialised.

  ➠ The financial and economic analysis should focus on those entities which are re-orienting their activities.
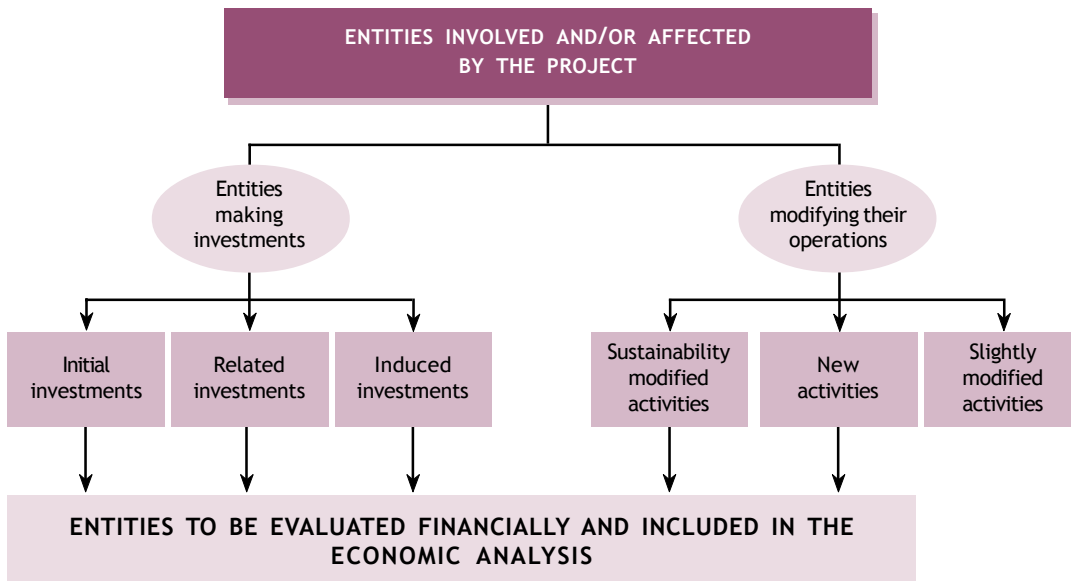
Figure 2.3. *Integration of the project into the economy: identifying entities for the financial and economic analyses*

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(1) Reference is often made to a "*cluster of activities*" to designate all the productions which the project thus calls for.

Finally, each time NEW INVESTMENTS (in productive capacity or infrastructure) or NEW ACTIVITIES are created by the project, it is advisable to:

- undertake a financial analyses of the entities involved,
- and take them into account in the economic analysis,

even if the entities which implement them receive no direct assistance from the project.

In spite of such clear selection criteria, it is up to the analyst to select the entities for financial analysis and to include the results in the consolidated account used as a basis for the economic analysis. Obviously, if fewer entities are studied, the analysis can be completed more quickly and more cheaply. However, where possible, incomplete or partial analyses should be avoided.

Table 2.1. *Identification of the entities to be included in the analyses*

ENTITIES...	FINANCIAL ANALYSIS	ECONOMIC ANALYSIS (consolidated account)
... whose investment is financed by the project	yes	yes
...whose investment is caused by the existence of the project	yes	yes
...undertaking new activities	yes/no[a]	yes/no[a][d]
...whose activity level is substantially modified[b]	yes	yes/no[c][d]
... whose activity level is slightly modified[b]	no	no[d]

(a) Depending on its relative importance for the entity and the project .
(b) Upward or downward.
(c) Depending on its relative importance in the project.
(d) If no: changes in activities are taken into account for economic analysis of effects through backward (or forward) linkages, see Chapter 7.

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2.3. SUMMARY OF PROCEDURE FOR THE ANALYSIS OF INTEGRATION OF THE PROJECT WITHIN THE DOMESTIC ECONOMY

The diagram below illustrates how the integration of a project into the national economy is analysed:

– definition of the with- and without-project situations;
– identification of the entities which should be subjected to a financial analysis and included in the economic analysis.
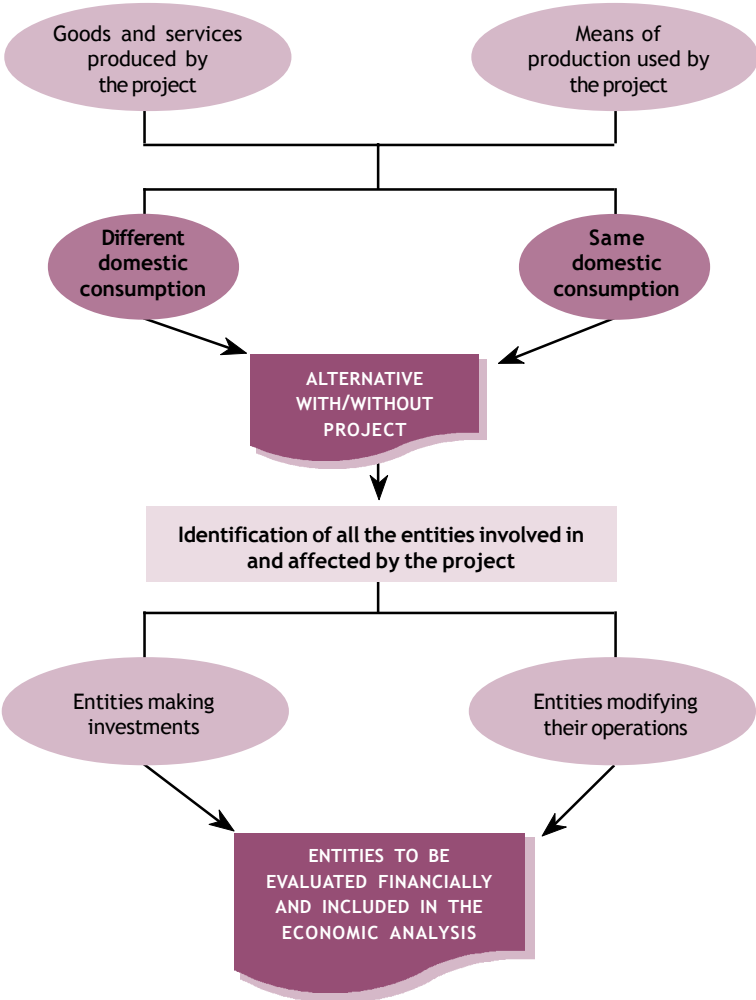
Figure 2.4. *General procedure for analysing a project's integration into the economy*

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CASE STUDY
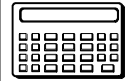
1. General project introduction

A project producing polyethylene at a sugar complex is constructed as part of an import-substitution policy.

The country's economic expansion has rapidly increased demand for plastic materials, particularly for urban sewerage. Currently, the basic raw material (high-density polyethylene – HDPE) must be imported. The government would like to see a project established, which would both diversify industrial activities and save foreign currency.

The solution chosen for the production of polyethylene is the fermentation and distillation of sugar cane juice, followed by a dehydration of the ethanol. This choice is based on the fact that the country has the ability to produce and process large amounts of sugar cane, in part due to an abundance of water.

The project's components will thus include:

- an irrigated tract of sugar cane covering 4,000 ha, producing 304,000 t of cane. This will be established in a previously unoccupied area. In view of the availability of manpower in the country, harvesting will be done manually;
- a unit producing 10,000 t of high-density polyethylene using the ethanol extracted from the sugar cane. Despite the fact that an industrial unit of this capacity seems very small (and thus has a potentially high investment per tonne), the availability of local cane leads to an examination of its financial and economic feasibility.

The project will be implemented by two private operators:

- the production of sugar cane will be handled by a firm already managing a similar area of sugar nearby. The advantage of this is that any surplus cane which cannot be absorbed by the polyethylene factory will be transferred to the sugar factory and any shortages can be met from the firm's other farm;
- a firm which will manage the polyethylene factory. Foreign technical assistance will be provided for the first two years to facilitate the training of local personnel.

The intervention logic underlying the implementation of this project is presented below using the first column of the logical framework:

☞ Figure II.1.
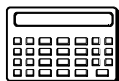
Figure II.1 - Intervention logic

OVERALL OBJECTIVES	Import substitution:
	   diversification
	   & foreign currency savings

SPECIFIC OBJECTIVE	Local HD polyethylene production
RESULTS	1. Irrigated cane-production tract
	2. Industrial unit processing the cane into HDPE
ACTIVITIES	1.1. Attract the interest of a operator in the irrigated tract 1.2. Implement an associated legal framework 1.3. Develop the financial package 1.4. Facilitate the cane production
	2.1. Implement an associative legal framework 2.2. Develop the financial package 2.3. Facilitate the HDPE production

The overall investment of approximately NMU 100 million[1] will be made during the first three years of the project for the polyethylene factory, with cane cultivation beginning one year later.

2. With- and without-project situations

In respect of domestic demand for plastic:

- The project involves import substitution to meet domestic demand. In the absence of local production, the polyethylene (HDPE) will be imported by a specialist company.
- The import and pricing of the HDPE is currently done freely. The market is considered to be more or less efficient. This would probably continue to be the case without the project.

Within the framework of its policy aimed at protecting national production and maintaining the trade balance, the government plans to limit HDPE imports so as to guarantee that the complex's production can be sold at a sale price 25% higher than that of imported HDPE.

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(1) NMU = The country's National Monetary Unit.

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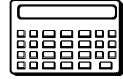
N.B.: The analysis will not address yeast production in the with-project situation, because it is insignificant (around 0.5% of the total production value).

The two situations thus make it possible to meet the same domestic demand in volume, but at different prices; hence the additional cost for HDPE users (negative consumer benefit) in the with-project situation.

In respect of the use of means of production:

- ◆ The project uses no scarce resources:
    - – the land used to cultivate the cane would be fallow in the without-project situation;
    - – due to existing unemployment, both qualified and unqualified jobs will be filled without disturbing the labour market;
    - – the productive capacity of the local intermediate goods (fertilizer, electricity, fuel, lubricants, etc.) is sufficient to meet the increased demand created by the project.
- ◆ In the without-project situation, the only economic activities are those of importing, operating the port and providing transport from the port to the capital market (near the project's industrial complex).

The implementation of the project will not lead to the reduction of other production.

The with- and without-project situations are presented in the following table:

☞ Table II.1
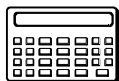
Table II.1 - *With- and without-project situations*

	WITH-PROJECT SITUATION	WITHOUT-PROJECT SITUATION
OPERATIONS	• Annual production of 304,000 t of sugar cane *[NMU 20/t]* • Production and sale of 10,000 t of HD polyethylene *[NMU 2,488/t]* • Production of 860 t of yeast (by-product of the cane processing) *[NMU 50/t]*	• Import of 10,000 t of HD polyethylene • Transport from port to market • Marketing activities *[NMU 1,990/t]*
DIRECT INVESTMENTS	• Setting up an irrigated tract of cane covering 4,000 ha • Construction and equipping of a HD polyethylene distillation-polymerisation plant with a 10,000 t capacity	• None
COMPLEMENTARY INVESTMENTS(*)	• None	• None

(*) By other entities: hangars, roads,…
[…] = sale price.

3. Entities which must be included in the financial analysis

Two entities will carry out the planned investments, a part of which (the sugar cane farm) will be financed by a loan[1] from the National Development Bank, and another part (the industrial plant) by a loan from an international development agency.

In order to simplify this case study, public agencies will be considered to be the only other players involved, and assumed to provide their normal support to this type of project. They thus do not need to be included in the financial and economic analysis.

➥ **The financial and economic analyses focus on two entities:**
  – **the agricultural operation (cane farm);**
  – **the cane processing company (industrial complex).**

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(1) In order to simplify this case study, and because this type of loan is not especially designed for the project, the real cost of the special conditions of this loan for the National Development Bank and the Government will not be considered.

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In both cases, the 'additional' return on investment will appear in the financial accounts of these entities, since they are engaged in no other activity in the without-project situation.
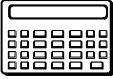
Neither the importer nor the transporter will benefit from the project, since their activities will be reduced due to its implementation. The project's impact on their activities and their financial earnings should be studied. Nonetheless, so as to simplify this case study, their financial losses will not be included (in the next chapter), although their activity will be considered during the estimation of economic effects.

3. BASIC TECHNIQUES FOR THE FINANCIAL ANALYSIS OF ENTITIES

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F inancial analysis should be carried out for every entity which was established by the project or whose activities are substantially modified by it. These entities were identified during the study of the project's integration in the economy (Table 2.1). The thoroughness of the analysis undertaken will depend on how important each entity is to the success of the project and/or the extent to which the project impacts on each entity.

In an *ex-ante* situation (i.e. before the project is inplemented), the following studies should precede the financial analysis:

- ◆ demand studies: market size, estimate of future demand (nature, quantities, growth, prices, structure), the likely market share of the project, marketing conditions, regulations, etc.;
- ◆ technical studies: selection of technology, scale of operation, input requirements, training requirements, location.

Financial analysis can only be done if the main technical solutions and market conditions have been identified, even if they are subsequently changed.

In an *ex-post* situation (i.e. after the end of the project), these studies may be undertaken simultaneously, although financial analysis may precede the others in order to determine what market and technical studies are needed.

The aim of financial analysis is to:
- ◆ understand the entity's operations by reviewing its physical and money flows;
- ◆ assess the entity's financial balance, and thus the viability of its operations;
- ◆ assess the entity's efficiency and estimate the likely financial return on investment.

This chapter gives a broad outline of financial analysis. Annex F gives a more detailed presentation for entities that employ standard business accounting.

Financial analysis involves studying:

- ◆ **the set of flows resulting from the activities "with" the project**
    - ➠ **INVESTMENT COSTS** § 3.1.1
    - ➠ **OPERATING COSTS AND BENEFITS** § 3.1.2
- **and "without" the project**
    - ➠ **FLOW FORECASTS** § 3.2.1
- ◆ **the resulting borrowing requirements in the with-project situation**
    - ➠ **FINANCING PLAN** § 3.1.3

- **the impact of the technical and financial choices on financial flows and the entity's viability**
  - ➡ **FINANCIAL STATEMENTS AND INDICATORS** § 3.1.4
  - ➡ **SOLVENCY AND VIABILITY** § 3.1.5

  and for the without-project financial situation
  - ➡ **FINANCIAL STATEMENTS** § 3.2.2
- **the impact of the project on the investment returns generated**
  - ➡ **INVESTMENT RETURNS BEFORE FINANCING** § 3.3.1
  - ➡ **INVESTMENT RETURNS AFTER FINANCING** § 3.3.2
- **and any foreign assistance needed to carry out the project**
  - ➡ **DISBURSEMENT SCHEDULE** § 3.4

3.1. WITH-PROJECT SITUATION

The financial study is divided into three stages:
- **the identification and valuation of all the flows resulting from the project**
  - ➡ **INVESTMENT COSTS** § 3.1.1
  - ➡ **OPERATING COSTS AND BENEFITS** § 3.1.2
- **the development of a financing plan which enables entities to meet their needs and the financial obligations created by loans**
  - ➡ **FINANCING PLAN** § 3.1.3
- **the analysis of the entity's financial situation, based on appropriate accounts and indicators**
  - ➡ **FINANCIAL STATEMENTS AND INDICATORS** § 3.1.4
  - ➡ **SOLVENCY AND VIABILITY** § 3.1.5

3.1.1. Investment costs

From an accounting standpoint, investment capital can be defined as the means of production whose use extends over several years (§ B.4). In a broader sense, investments involve the medium- or long-term use of resources, to obtain future net benefits.

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(a) Investments

The start-up investments made in establishing productive capacity are of two kinds:

- those linked to the actual investment: studies and research, land purchase, buildings, equipment;
- those linked to the start-up of the project: initial expenses, personnel training, working capital requirements.

Other investments will be made during the course of the operation, so as to:

- maintain productive capacity: e.g., replace worn out plant and equipment;
- increase (or diversify) productive capacity: purchase new equipment, increase working capital.

Finally, **interest payments during construction** are sometimes added to the total investments. This interest is incurred on the borrowed capital paid during the initial investment phase, before the start of production operations.

Table 3.1. *Investment table*
(in constant prices)

INVESTMENT ITEMS	UNIT(*)	QUANTITY	UNIT COST	TOTAL COST	FOREIGN EXCHANGE COSTS
< **Fixed capital** Land and site development Civil engineering, buildings Machines and equipment Rolling stock and vehicles		$[Q_i]$	$[P_i]$	$[Q_i \times P_i]$	[Forex]
< **Pre-production charges** Studies, research Legal fees Technological acquisitions Start up, training					
< **Working capital**					

(*) litres, m, m^2, m^3, kg., crates, bags,…

N.B.: In an *ex-ante* situation working capital requirements must appear in this table. Its calculation, based on operating forecasts, is presented in § 3.1.3.

"In kind" contributions (e.g., beneficiary contributions of labour for the construction of an irrigation system) are non-money flows which are recorded at their appropriate market value (e.g., daily wages, cost of comparable works).

A schedule of the investments, including those made in the course of the operation, is established in constant prices. **Provisions for contingencies** are included in it (§ (b) under). Nonetheless, for those projects whose investment phase is spread out over more than one year, or in countries where inflation is especially high, an **investment budget** in current prices should also be established, so as to enable the project managers to correctly guide this phase.

Table 3.2. *Investment schedule*
(in current prices)

YEAR	0	1	2	...	N

< **Fixed capital**
  Land and site development
  Capital works, civil engineering,
  buildings
  Machines and equipment
  Rolling stock and vehicles
 	
< **Pre-production charges**
  Studies, research
  Legal fees
  Technological acquisitions
  Start up, training
 	
< **Provision for contingencies**
 	
      Total					

< **Working capital requirements** **(increases)**					
TOTAL COST					

As a result of wear and tear, and obsolescence, productive capital loses its value over time. From the perspective of cash flow and the flow balance, if assets are considered to have a market value (resale value) at the end of the project period, this is incorporated into the receipts of the final year (thus simulating a resale of the assets). This **salvage value** is introduced into the final period although, in reality, it is unknown whether or not the operation will continue with the same equipment: it may be sold, or even abandoned. The salvage value[1] is often recorded *negatively* on the investment *outlays* line.

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(1) When equipment has no more "productive value", its possible scrap value is known as its "salvage value".

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Depreciation

Depreciation comprises the non-cash expenses representing the *annual* loss in value of fixed investments (§ B.4). These non-cash (and not real) costs appear only in the operating account (where investment outlays do not appear as such), *never* in the cash flow table or the flow balance account. Depreciation is calculated on the basis of *past*[1] outlays.

(b) Provisions for contingencies

Two types of contingencies can be distinguished:

- the **provision for physical contingencies**. These enable the analyst to take into account the uncertainty inherent in technical forecasts and cost estimates (in constant prices). For example, based on the data available at the time of planning, the depth of foundations required for a dam or a school may be underestimated thus increasing expected costs; poor weather conditions may make additional pumping operations at the construction site necessary thus creating new costs;

- the **provisions for financial contingencies** resulting from relative variations in prices of key inputs (in constant prices). These are independent of the general rise in prices (thus distinct from the "provision for price increase" – see § A.1). Raw materials or spare parts are especially subject to such rises, which are difficult to predict. Similarly, the prices of some goods, for which substitutes are not easily obtained, can vary as a result of production difficulties, new government regulations, or because the project suddenly creates an increase in demand.

To allow for these physical and financial contingencies, a percentage of the initial total cost estimate, usually between 5 and 15% is generally used. However, for major investment items, it is best to determine:

- the items subject to the greatest uncertainty;
- the most probable variations in price, so as to justify the size of the "contingencies" provision.

Contingency provisions are thus determined by the probable range of uncertainty. They should not be used as a substitute for inadequate technical preparation.

Note: "Provisions for price increase" may be used to convert constant prices into current ones – see § A.1.

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(1) Which distinguishes it from replacement provisions, which enable one to include future outlays in the current accounts.

3.1.2. Operating costs and benefits

The set of inflows and outflows is identified as:

- output volume and value;
- input value (raw materials, transportation, other services and products consumed, management charges), labour charges and taxes.

In an *ex-ante* analysis, it is customary to analyse both the cash flow statement (receipts and outlays) and a flow balance account (revenues and expenses, with flows which do not give rise to actual monetary compensation being valued at market prices). In an *ex-post* situation, a lack of information often means that data are available for only a fraction of the operating period (one or two years) and an operating account is thus used (revenues and expenses). These different accounts are presented in Annex D.

For the cash flow table, only those flows which actually take place during the year are taken into account. For the operating and flow balance accounts, those flows which do not give rise to monetary compensation must also be taken into account, as must stock variations. Thus, in the case of a farmer consuming at home a portion of his harvest, selling another part, producing his own seed and storing the rest of his crops, the product is:

Product = Sales + Self-supply + Closing stock – Opening stock

The same is true for inflows:

Input consumed = Purchases + Self-supply + Closing stock – Opening stock

3.1.3. Financing plan

After establishing the broad financial and technical aspects of the project (investment costs and operating flows), the next stage in the financial analysis of an entity involves:

- determining the working capital needed for continuous and regular operations;
- working out the financing plan to allow the planned investments to be made without solvency problems.

The aim is to:

- enable the entity to meet its borrowing requirements by ensuring its solvency: making sure that working capital is sufficient and that the financing plan is adequate to meet repayment schedules, including interest;
- guarantee a minimum return on equity and, for family enterprises, ensure that basic needs can be met.

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In the *ex-ante* situation, in practice, the technical specifications, the corresponding costs and benefits, and the financing plan are balanced and rebalanced until the most satisfactory overall combination is achieved.
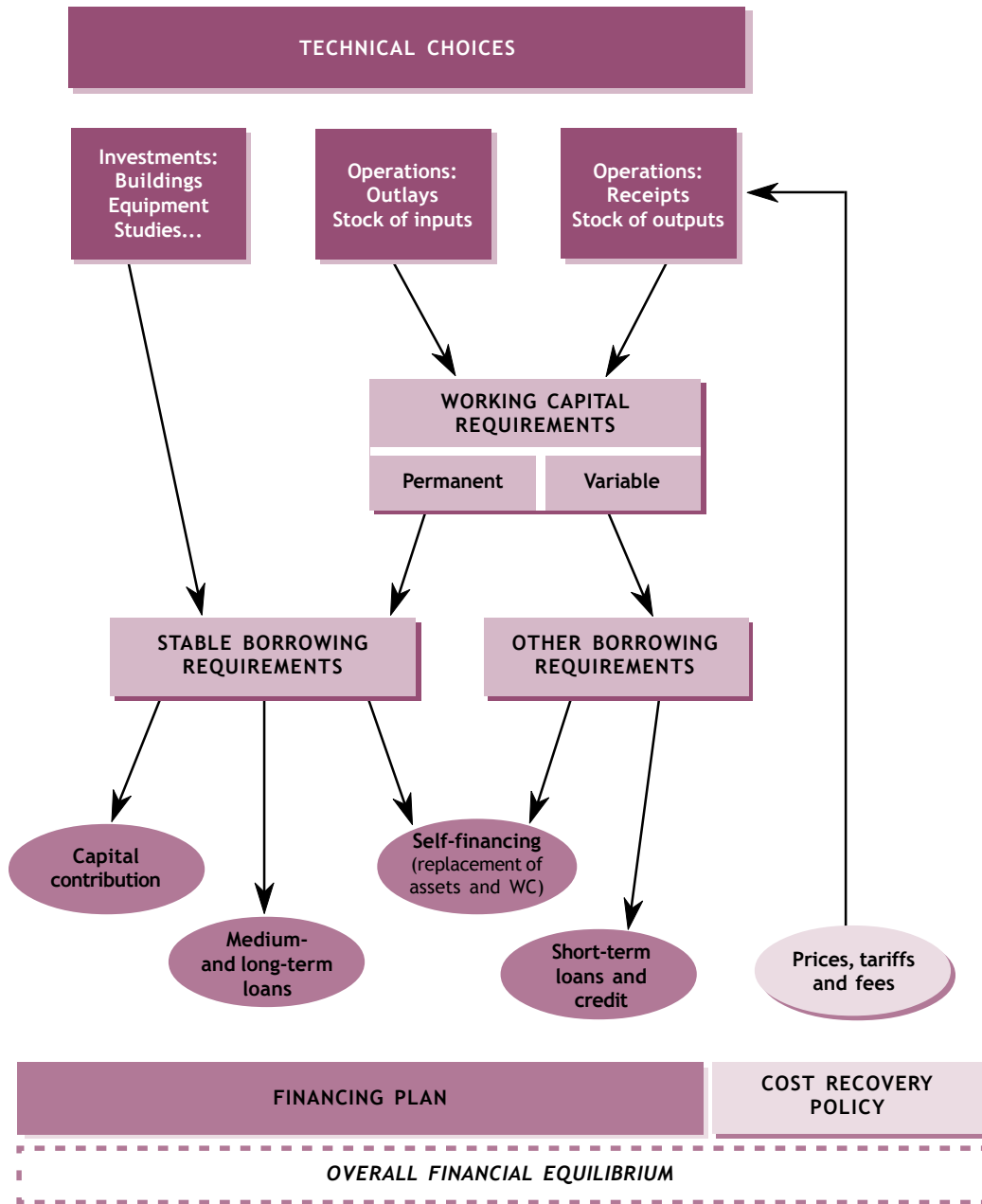
Figure 3.1. *Developing a financing plan*

(a) Working capital

Working capital is another form of investment: it is a part of the capital required by the project, just as buildings or equipment. It is an essential factor in ensuring viability.

Working capital requirements come from the "operating cycle". To achieve its goal, a productive entity purchases, transforms, then sells: this is the "**Purchase – Processing – Sale**" cycle. At the beginning of the cycle, the purchase of raw materials, the payment of salaries and commissions, storage, etc., create a demand for credit until the sale of the product at the end of the cycle. These borrowing requirements are repeated with each cycle. For the same product, such cycles are often continuous and overlapping, except in the case of highly seasonal activities (e.g., agriculture, certain food processing industries, tourism, toy factories).

This interval between outflows of money (input purchases) and inflows of money (product sales) obliges the entity to have sufficient funds to meet the surplus of what is due from past and current cycles less what was recovered (through sales) on past cycles. This requirement grows with the value of production.

In addition, suppliers often grant payment delays, and clients often benefit from payment delays.
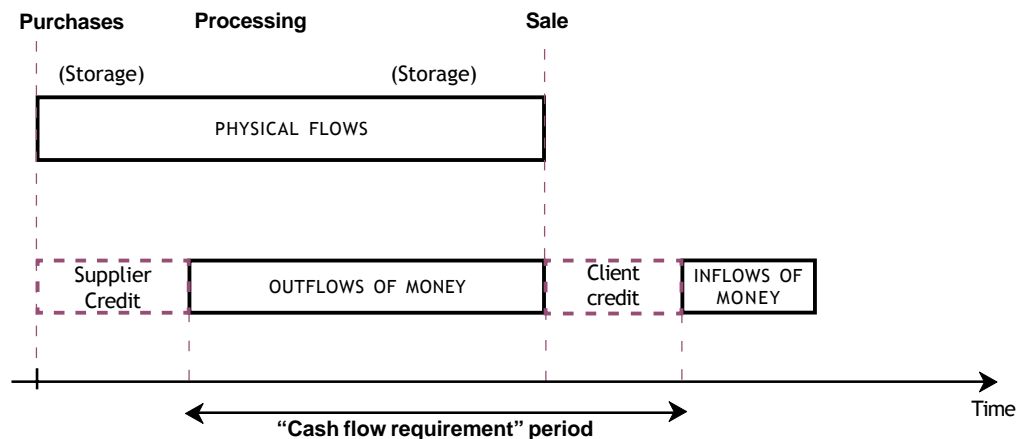
Figure 3.2. *Flow interval*

The activity cycle results in capital being tied up in the form of stock (of inputs and products). This requirement is reduced by delaying payment to suppliers (commercial debts), but prolonged by delays in receiving funds from clients. In accounting terms, working capital requirements (WCR) are thus equal to:

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$$\text{WCR} = \text{Output stocks} + \text{Input stocks} \quad + \text{ Sums due from clients}$$
$$- \text{ Sums due to suppliers}$$

Note: An amount of working capital higher than this operating WCR should usually be planned to meet the cash needs of the enterprise (e.g., cash needs resulting from the debt service).

Production increases during the first years, or later following new investments, result in an increase in the working capital used. These increases in working capital are recorded as investments.

At the end of the project's life, the sum total of the working capital constitutes a salvage value and must, as such, be included among the inflows: that is, the "recovery" of the working capital.

(b) Financing scheme

In an *ex-ante* situation, establishing a financing plan requires the analysis of a cash flow table, which involves:

- Estimating the entity's borrowing requirements

    ➠ PRE-FINANCING CASH FLOW ANALYSIS

- Evaluating the entity's ability to repay the received loans and to pay the interest accruing to them while maintaining a sufficient cash flow to meet its needs and objectives

    ➠ POST-FINANCING CASH FLOW ANALYSIS

In an *ex-post* situation, an analysis of the financing plan can also be carried out in a similar way so as to demonstrate the impact of the applied financing plan.

☞ Table 3.3.

Table 3.3. *Pre-financing cash flow statement*
covering the life span of the project

YEAR	0	1	2	...	N

RECEIPTS = R
< **Sales**
  . Revenue 1
  . Revenue 2
 					

OUTLAYS = O
< **Investments**
  . Land, equipment...
  . Replacement assets
  . Working capital[(*)]
< **Operating charges**
  . Inputs (materials and services)
  . Labour charges
  . Taxes					

PRE-FINANCING **CASH FLOW** PrFCF = R - O					
Cumulative balance $CPrFCF_t = CPrFCF_{t-1} + PrFCF_t$					

(*) Increases of the working capital, and salvage value in year N.

Pre-financing cash flow analysis:

Aim = to estimate the entity's borrowing requirements.

The pre-financing cash flow table is drawn up, with all flows of money due to investment and operating costs recorded for the year in which they actually take place. The contributing flows of shareholders' equity do not appear, as they themselves are a way of raising finance.[1]

- ◆ Long and medium-term borrowing requirements appear when the cumulative cash flow is negative.
- ◆ Short-term borrowing needs appear when the annual cash flow is negative.
- ◆ Long-term borrowing possibilities aimed at increasing the return on invested capital exist when the "gearing effect" is positive, that is, every time the equity investment return is superior to the cost of borrowed capital[2].

_____

(1) But they will appear in the Sources and Application of Funds Statement (§ F.2.5) of business accounting.

(2) When the gearing effect is negative, that is, when the profitability of shareholders' equity is inferior to the interest on borrowed capital; this is sometimes referred to as the "clubbing effect".

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When the entity is a family enterprise and the family's subsistence depends upon the activity: (e.g., farming families, small industry enterpreneurs, informal sector firms):

- short-term borrowing requirements appear as soon as the annual cash flow falls below monetary requirements;
- medium or long-term borrowing requirements appear when this cash flow deficiency is repeated over several years, whether they are consecutive or not.

Traditionally, cash flow during the early years of a project is negative or insufficient. It then becomes positive, but may become negative from time to time if replacement assets have to be purchased.

Based on the pre-financing requirements identified, assumptions are made about the amounts of shareholders' equity, capital contributions (from shareholders) and long and medium-term loans to be raised. Short-term loans can also be used (i.e. totally repaid during the period) for the financing of one or two particular years, or else to finance a portion of the working capital. This financing plan is subsequently tested during the second stage.

Post-financing cash flow analysis:

Aim = assess whether the entity receiving the planned loans will be able to make capital and interest repayments, while still maintaining a sufficient cash flow to meet its needs and objectives.

The possible sources of financing are listed:

Table 3.4. *Sources of financing*

SOURCES OF FINANCING	AMOUNT	DATE OF AVAILABILITY	DEFERRED	REPAYMENT DURATION	INTEREST RATE	CHARGES: COMMISSION INSURANCE...	ANNUITY COMPUTATION MODE
EQUITY CAPITAL . Entrepreneur . Shareholders(*)							
LOANS . Loan 1 . Loan 2							
EQUIPMENT SUBSIDIES							

(*) Contribution of other shareholders.

DEBT SERVICING

There are two elements to debt servicing:

- the **repayment of the principal** (i.e. the borrowed funds);
- the **interest charges** on the outstanding capital.

Every loan has four characteristics:

- the amount of capital loaned;
- the interest rate at which the loan is granted;
- the repayment period; which is defined by its length from the date on which the first repayments and the first interest payments are made. There is often a grace period between loan draw down and the start of principal repayment;
- the debt servicing method: constant annual repayment of principal, constant annual repayment and interest payment, graduated repayment, etc.

N.B.:

(1) Capitalisation of interest payments (i.e. adding the amount of interests due to the principal) may occur before the repayment period starts – especially during the construction period.

(2) When computing the debt service, it is important to respect the accounting convention adopted: all of the flows registered in a period are considered due on the final day of that period.

The financial conditions of loans are almost always stipulated in current prices, which means that, at this stage, the computed repayments of principal and interest payments are those which will be actually paid by the borrower on the set dates. The financial investment return analysis, however, is usually based on constant prices and thus the debt service outlays must be reduced to constant prices by "deflating" (§ A.1) the repayments and interests paid.

The main difficulty is in forecasting future inflation rates. Simple assumptions are generally made based on guidelines provided by the Ministry of Finance or international institutions (e.g., IMF, World Bank) in the country concerned.

N.B.: Deflating debt servicing payments is an *indispensable* computation which, if it is not made, introduces a negative bias into the analysis.

☞ Table 3.5.

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Table 3.5. *Debt service calculation*

YEAR	0	1	2	...	N
CURRENT PRICES — CAPITAL DUE (K_t)				$K_t = K_{t-1} - R_{t-1}$	
REPAYMENT OF PRINCIPAL (R_t)				R_t	
INTEREST PAYMENTS (FC_t)				$FC_t = K_t \times i$	
TOTAL ANNUITY				$R_t + FC_t$	
CONSTANT PRICES — DEFLATOR (δ_t)				$\delta_t = \dfrac{1}{(1+j)^t}$	
REPAYMENT OF PRINCIPAL (R_{cst})				$R_{cst} = R_t \times \delta_t$	
INTEREST PAYMENTS (FC_{cst})				$FC_{cst} = FC_t \times \delta_t$	
TOTAL ANNUITY				$R_{cst} + FC_{cst}$	

With: i = annual interest rate, j = annual inflation rate.
FC = Financial Charges = Interest payments.

The post-financing cash flow statement (Table 3.6) includes all the investment and operating flows of money, as well as the new financing flows (equity capital and other funds such as borrowings) resulting from the proposed plan. In order to estimate its balance, one need only add the new financial flows (inflows and outflows) to the annual pre-financing balance.

☞   Table 3.6.

Table 3.6. *Post-financing cash flow statement
covering the life span of the project*

YEAR	0	1	2	...	N
PRE-FINANCING **CASH FLOW** = PrFCF					
FINANCIAL INFLOWS = FIF <**Equity capital** <**Receipt of loans** (short, medium and long term) . Loan 1 . Loan 2 . ... <**Subsidies**					
FINANCIAL OUTFLOW = FOF <**Repayment of principal** . Loan 1 . Loan 2 . ... <**Interest payments** . Loan 1 . Loan 2					
POST-FINANCING **CASH FLOW** PoFCF = PrFCF + FIF – FOF					
Cumulative balance $CPoFCF_t = CPoFCF_{t-1} + PoFCF_t$					

The same criteria as those used before financing (see below) are used to study the sequences of both the annual and cumulative cash flows but, at this stage, the contributions of shareholders (equity), which should cover initial deficits, are also taken into account. In order to assess the financing plan, attention has to be paid to the changes in returns to equity capital between the pre- and post-financing situations.

If cash flow or profitability problems remain, a new financing plan must be tested, with new loan assumptions, until a satisfactory solution is obtained. Successive iterations (rebalancing) are thus needed in order to develop the best possible financing plan.

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3.1.4. Financial statements and indicators

(a) The accounts

The cash flows used to devise the financing plan may be completed using the operating account and the flow balance account:

- in *ex-ante* evaluation, the flow balance account enables the analyst to assess the entity's viability and to compute the main profitability criteria (Annex E). Note that for an entity, all of whose flows are monetised, this account is identical to the cash flow table, except for stock variations;

- during project implementation and in *ex-post* or ongoing evaluation, data limitations may make it impossible to recreate the flow balance account for the early years of the project. In this case, only the operating account is established, and profitability criteria, such as benefit-cost ratios (§ E.2), are computed for only one or two years.

ALLOWING FOR FACTORS ENSURING VIABILITY

The investment and operating costs which result from the factors ensuring viability[1] are:

- appropriate technologies: costs of studies and research, materials and equipment, training;

- environmental protection: e.g., costs of studies, site development, machines and equipment, specific activities;

- socio-cultural aspects/women and development: e.g., costs of studies, specially committed buildings and equipment, specific activities;

- managerial and institutional capabilities: e.g., costs of studies, building, and specially designed equipment, specific activities.

(b) Indicators of financial efficiency

Depending on the nature of the activity, different indicators may be used to assess the entity's financial situation and the productivity of the means employed. These efficiency indicators are generally computed for one year. The following indicators are examples. Others may be used, depending on the activity:

N.B.:   –   "Output value" is used instead of the more common "turnover", in order to eliminate the effects of stock changes, and to highlight that some activities involve non-cash outputs.

           –   Gross operating margin: see Annex B.

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(1) See *Manual, Project Cycle Management...*, *op. cit.*

- Indicators of general financial characteristics, such as:

$$\text{Interest cover} = \frac{\text{Profit before interest and tax}}{\text{Interest payments}} = \frac{\text{Gross operating margin}}{\text{Financial charges}}$$

- Indicators of economic productivity, for instance for labour:

$$\text{Apparent return on labour} = \frac{\text{Output value}}{\text{Workforce}}$$

- Return on investment indicators, such as:

$$\text{Profit margin before interest and tax} = \frac{\text{Profit before interest \& tax}}{\text{Output value}} = \frac{\text{GOM}}{\text{Output value}}$$

Every economic subsector has it own particular set of costs and productivity indicator (§ 4.2.2 and 8.3.1).

All of the efficiency indicators must be submitted to **sensitivity analysis** in order to assess the robustness of the estimates with less favourable assumptions.

(c) The break-even point

The breakdown of expenses into fixed expenses (including depreciation) and variable expenses (§ D.3) reveals a level of production Qm for which there is a balance between expenses and revenues. The fees representing the revenues and expenses functions intersect at point M, known as the "break-even point". Above this level of production, a surplus appears, whereas below it, the firm is in deficit. In this way, it is possible to determine the minimal level of production needed to guarantee the entity's financial viability.

☞   Figure 3.3.

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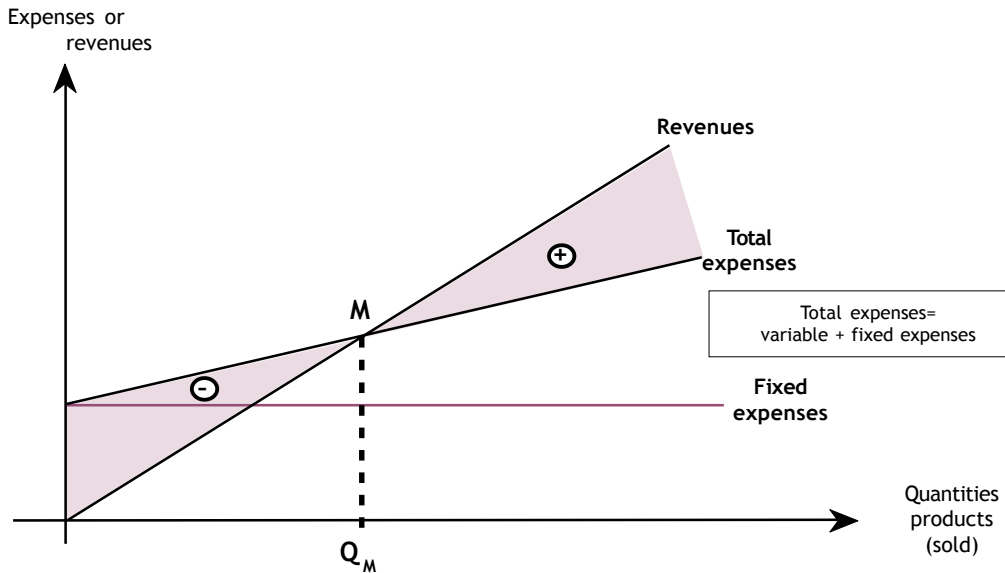
Figure 3.3. *Break-even calculation*

N.B.:   To simplify matters, the expenses and revenues functions are presented as being linear functions.

3.1.5. Solvency and viability

The financial viability of an entity's activities results from its ability to:

- ◆ meet its financial commitments *(solvency)*;
- ◆ enter into a competitive market (or be protected because of an accepted economic or social policy priority);
- ◆ guarantee that its recurrent costs will be covered by its supervising agencies (e.g., social or infrastructure projects).

Financial viability is studied, combining various analyses and criteria:

< THE ENTITY'S ABILITY TO MEET ITS COMMITMENTS:

- ◆ The liquid assets necessary for the operation: the financing plan is entirely oriented toward the viability of the firm being studied.
- ◆ Break-even point: determination of the minimal production level at which the entity can meet all its expenses.
- ◆ The financial performance: the negative or positive amounts of the different balances (e.g., cumulative cash flow, net operating profit, benefits) indicate if the entity's activity:
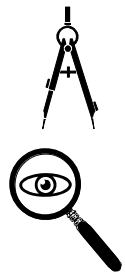
- is viable, because its operating profit is sufficient to maintain the capital base and, possibly, finance expansion;
- is not viable, because it cannot maintain its capital base and/or meet its needs and/or its revenue objectives.

< THE ABILITY TO ENTER INTO A COMPETITIVE MARKET:

- ◆ the preliminary market study should in large part answer this question;
- ◆ the productivity indicators are used in appraising the entity's competitiveness.

Key assumptions should be submitted to **sensitivity analysis** in order to measure their impact in situations which diverge from the basic project scenario, but which are nonetheless possible: e.g., the lowering of the product price, lower than expected returns, increases in the cost of certain inputs or investments.

< FINANCING OF RECURRENT COSTS (e.g., social or infrastructure projects):

Financial viability is reviewed in detail in § 8.2.2.

3.2. WITHOUT-PROJECT SITUATION

The same type of analyses are made for the without-project situation, on the basis of the "most probable scenario" for the changes that would take place if the project is not implemented.

If the entity is newly created by the project, this phase clearly need not take place. If the project modifies the economic activities of an existing entity, a forecasting exercise showing what would happen – or what would have happened – without the project must be done.

Often, the without-project situation is estimated by projecting past trends in the market, without considering any new investments that could occur. However, such forecasts should not be used as a way of avoiding a real, but complex, analysis of the investment trends.

3.2.1. Flow forecasts

The first step in the financial analysis of the without-project situation involves forecasting how the activity will evolve over the period of the project. These projections may include future borrowing requirements:

- ◆ increase in the need for working capital because of the predicted increase in production;
- ◆ investments for the replacement, modernisation or expansion of existing plant and equipment.

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3.2.2. Financial statements

As for the with-project situation (§ 3.1.4) the operating account and the flow balance account are drawn up for the without-project situation.

3.3. INVESTMENT RETURNS ON INCREMENTAL FLOWS

The real impact of the project is measured by the incremental flows (§ 1.3.2):

Project impact = Net benefit with the project – Net benefit without the project

For an overall assessment, the analyst need only compute the difference in operating profits or the flow balances. A more exact financial and economic analysis, however, requires the drawing up of "incremental accounts", all of whose items are made up of differences between the two situations: e.g., the "incremental operating account" and the "incremental flow balance account". Pre- and post-financing profitability are computed from the incremental flows.

By comparing the capital invested in the project with the net benefits it generates, the *return on investment* for the entity can be measured:

- **without allowing for the financing plan**

    ➡ **INVESTMENT RETURNS BEFORE FINANCING**   **§ 3.3.1**

- **then by measuring the impact of the financing plan for the entity (return on its own invested capital)**

    ➡ **INVESTMENT RETURNS AFTER FINANCING**   **§ 3.3.2**

3.3.1. Investment returns before financing

(a) Purpose

The return on investment is measured by comparing the incremental investment costs of the project with the net incremental benefits, excluding financial charges and corporate income tax. It is computed by taking:

- as gross benefits: the incremental value of production;
- as costs: the incremental investments and operating expenses (excluding financial flows).

The investment return before financing characterises the attractiveness of the project for the entity, without considering the actual participants in the investment[1]. In addition, it facilitates the drawing up of the financing plan by indicating the possible limits of the cost of the capital borrowed ("leverage effect" – § 3.1.3).

(b) Criteria used

A variety of profitability criteria (Annex E) can be applied to the costs and benefits provided by the different accounts. The principal criteria used are:

< ON THE BASIS OF THE PRE-FINANCING FLOW BALANCE ACCOUNT:

- the **payback period**: this is especially useful for an investor in the preliminary stages of project assessment. It indicates the time needed for the firm to recover its investment.
- the non-discounted benefit-cost ratio **or annual return per monetary unit invested** (R_{BC2} according to the notation used in the § E.2): a simple, rapid way of estimating the investment returns before financing, but one which is only usable if the sequence of inflows and outflows is more or less constant, or for a single year of normal operation (by noting with Δ the incremental flows):

$$RMUI = \frac{\Delta \text{Output value} - \Delta \text{Operating expenses}}{\Delta \text{Investment}}$$

- the **net present value** (NPV), which is calculated by taking as the discount rate the opportunity cost of capital *in constant prices*. This criterion is used to identify projects whose NPV is negative[2] and, possibly, to decide between technical variants.

  The use of the discounted benefit-cost ratio, the **relative enrichment rate,** which compares the NPV to the discounted cost of the investments (noted R_{BC6} in the § E.3) makes it possible to take account of the constraint of capital scarcity.

- the **internal rate of return** (IRR), which is compared to the value of the opportunity cost of capital, *in constant prices*, in accordance with the "gearing" or "clubbing" effect referred to earlier (§ 3.1.3). This rate is *not* the same as the final return on shareholders' equity once the financing plan has been established .

< ON THE BASIS OF THE OPERATING ACCOUNT: essentially the benefit-cost ratio **annual return per monetary unit invested** (R_{BC2} according to the notation used in the § E.2), which simply and rapidly characterises the investment returns before financing, but which is only

_____
(1) Apart from profit taxes.
(2) Meaning that the return on invested capital is less than what it could be were this capital invested on the open market. There is thus little chance that a national savings bank (local capital) would invest in the project.

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relevant if the sequence of inflows and outflows is more or less constant. For a year of normal operation:

$$RMUI = \frac{\Delta\text{Net Operating Margin}}{\Delta\text{Investment}}$$

(c) Sensitivity analysis

Sensitivity analysis is used to test the stability of project returns as different assumptions are made about future planning scenarios. It enables the analyst to assess the risk run by the entity if things do not happen exactly as planned, which is almost always the case.

3.3.2. Investment returns after financing

(a) Purpose

The profitability of the project for the entity is estimated by comparing the incremental investment with the net incremental benefits which are realised from the project. The real return on the entity's equity depends on the financing that it has been able to mobilise.

The estimation of the profitability to the entity concludes the analysis of the financing plan by ensuring that the proposed plan will allow the entity to obtain a sufficient return on its capital.

In practice:

- if the computation is made using a flow balance account:
    - it starts by taking the pre-financing flow balance (the "profit");
    - to this is added the financing inflows: receipt of loans and subsidies;
    - the financial outflows are then subtracted from it: capital repayment, interest payments;
- if the computation is made using an operating account:
    - it starts by taking the pre-financing gross (or net) operating margin;
    - the financial charges – i.e. the interest payment flows – are subtracted from it.

The return thus computed indicates the financial interest that the investing entity will have in the project (i.e. the return on equity). In an *ex-ante* situation, this should be considered in "validating" the financing plan.

(b) Criteria used

All of the criteria for assessing returns (Annex E) can be applied to the sequences of costs and benefits provided by the different accounts. As a general rule, the main criteria used are the same as those presented above, for the study of returns at the pre-financing stage.

< ON THE BASIS OF THE POST FINANCING FLOW BALANCE ACCOUNT[1]:

- the **payback period**: this indicates to an investor the time it will take him to recover his investment cost in equity capital (but without having met all his future debt-servicing obligations);
- the non-discounted benefit-cost ratio or **return per monetary unit invested** (RMUI):

$$\text{RMUI} = \frac{\Delta\text{Output value} + \Delta\text{Loan receipts} - \Delta\text{Operating expenses} - \Delta\text{Debt servicing}}{\Delta\text{Equity capital}}$$

- the **net present value** (NPV) and the discounted benefit-cost ratio, the relative enrichment rate;
- the **internal rate of return** (IRR), which is compared with the opportunity cost of capital *in constant prices*, is the criterion most often used. It is, nonetheless, not advisable to rank variants (alternatives) by the size of their IRR.

< ON THE BASIS OF THE OPERATING ACCOUNT:

- essentially the benefit-cost ratio or **annual return per monetary unit invested** (RMUI).

$$\text{RMUI} = \frac{\Delta\text{Net Operating Profit}}{\Delta\text{Equity capital}}$$

(c) Sensitivity analysis

Sensitivity analysis is again used to test the stability of project returns, if planning assumptions are changed. It enables the analyst to assess the risk run by the entity if things do not go exactly as planned, which is almost always the case.

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(1) Identical to the cash flow table for totally monetised projects (apart from stock variations – rarely considered at this stage of the analysis).

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3.4. DISBURSEMENT SCHEDULE

All the various forms of financing from donors and financing agencies which contribute to establishing project activities, are dealt with in the disbursement schedule programming. They may include:

- long term investment financing or short term operations financing;
- grants, loans made on a commercial basis and interest free loans;
- funds paid directly to the project manager or aid granted in kind.

Each of these types of financing has a schedule of fund mobilisation and repayment needed for the smooth operation of the project. This financing programme is an integral part of the agreement between the parties.

This schedule records all the disbursements listed during the financial analysis of the entity. But, the chosen financing plan was computed in *constant prices,* whereas the actual financing pertaining to the project will obviously be made in *current prices.* These flows are thus adjusted by making allowances for monetary erosion. To do this, the procedure indicated in § A.1 is followed, using a price revision factor (PRF).

In the case where a constant estimate of annual inflation "i" is used, the analyst goes from financing F_t planned for year t in constant prices to the value of the disbursement D_t in current prices for this same year by using the formula:

$$D_t = F_t H (1 + i)^t$$

☞ Table 3.7.

Table 3.7. *Disbursement schedule*
(covering the life span of the project – in current prices)

YEAR	0	1	2	...	N

DONOR Nº1:
  < **Grants**
    . Monetary
    . In kind
  < **Balancing subsidies**
  < **Loans**
    . Monetary
    . In kind					

TOTAL = D1					

DONOR Nº2:
  < **Grants**
    . Monetary
    . In kind
  < **Balancing subsidies**
  < **Loans**
    . Monetary
    . In kind					

TOTAL = D2					

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3.5. SUMMARY OF FINANCIAL ANALYSIS PROCEDURE

The diagram below illustrates how the financial analysis of an entity is carried out.
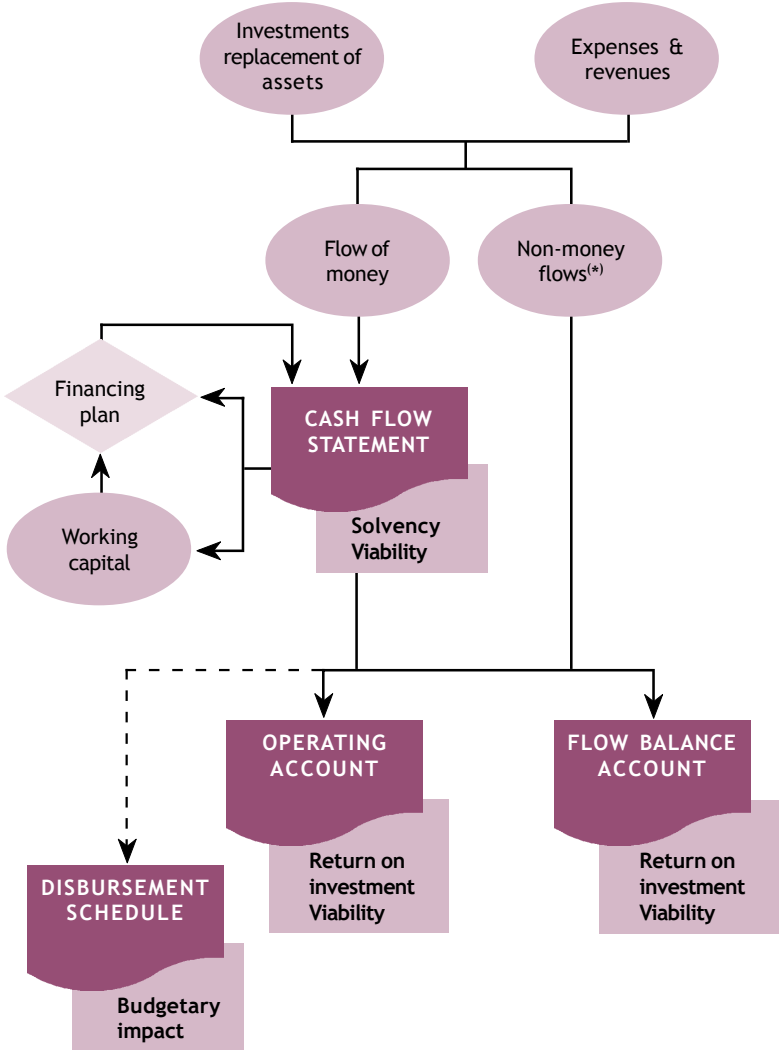
(*) Flows in kind.

Figure 3.4. *General procedure for financial analysis of an entity*

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CASE STUDY

N.B.: In order to simplify the presentation, only the financial analysis of the sugar farm is included below. The main conclusions pertaining to the industrial complex are mentioned at the end.

1. Investments

Using the technical feasibility dossier, investment budgets are drawn up for the farm and the industrial complex.

Table III.1 - *Schedule of the initial investment for the farm*
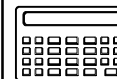*(in thousands of NMU – in constant prices)*

Year	0	1	2	3	4
Pre-production					
Feasibility studies	145				
Technical assistance, training	90	120	300		
Legal and project-management charges	50				
Implementation, trials			585		
Interest during construction	0	0	328		
Fixed capital investments					
Sites	1200	1200			
Development (civil engineering)		2017	2017	2017	
Equipment		3182	2832	2402	
Vehicles and wheeled equipment			350	780	
Planting		936	936	936	
Total baseline cost[(*)]	1485	7456	7021	6136	0
Provisions for physical contingencies[(**)]	74	373	351	307	0
TOTAL COST[(***)]	1559	7828	7699	6442	0
Working capital requirements					
WCR Increase				970	230
TOTAL INITIAL INVESTMENT	1559	7828	7699	7412	230

(*) Not including WC and interest during construction.
(**) Provision = 5%.
(***) Not including WC but including interest during construction.
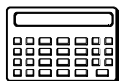
Equipment and vehicle replacement costing 293.10^3 and NMU 683.10^3 respectively (prior to provisions of 5% for physical contingencies) will be made in the eleventh year. One third of the farm will be replanted each of the tenth, eleventh and twelfth year at an annual cost of NMU 936.10^3 (prior to provision of 5%).

N.B.: The working capital and the interest during construction included in this table come from subsequent calculation (financial package).

Depreciation is calculated linearly. In the interest of simplification, it is assumed:

- – that the irrigation equipment and vehicles have a life span of 9 years (they are replaced once during the eleventh year and their salvage value is considered to be nil by the eighteenth year);
- – that the cane plantation has a life span of ten years[1] (salvage value nil);
- – that the other investment items have a life span of eighteen years (no residual value – excepting soil).

2. Pre-financing cash flow statement

☞ Table III.2.

The negative cumulative balance during the first eleven years of operations reveals a heavy **borrowing requirement** so that investments can be made. Subsequent replacements are self-financed (since the annual cash flow balance remains largely positive during these years).

Prior to financing, the investment's **intrinsic profitability** is low:

- – at a financial discount rate of 5%[2] the net present value of the project is barely positive ($+ 417.10^3$);
- – the internal rate of return (in constant prices) is 5.2%, thus more or less the same as the opportunity cost of capital; and
- – the recovery period - calculated from the first year of operations - is long (13 years).

The profit margin before interest and tax[3] is high (39% in years of normal operation), but it is the size of the investments (the depreciation amounts to approximately three quarters of the Gross Operating Margin) which holds down the return on investment. A financing plan making it possible to meet the size of the total investment is thus needed. This is especially true because an indicative **sensitivity analysis** reveals a very fragile situation. A 1% reduction of

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(1) Actually between 9 and 11 years because of the staggering of planting and replanting by thirds.

(2) This opportunity cost of capital is roughly calculated by deflating the average rate of return of the financial investments (12% in current prices), based on estimated future inflation of 7%.
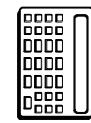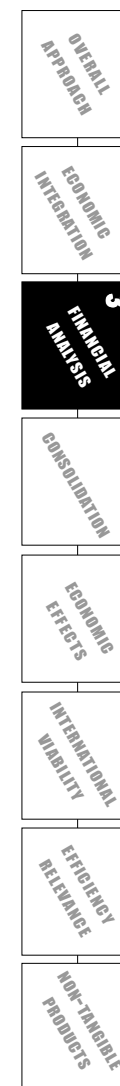
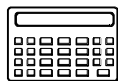(3) Calculated using the operating account (§ 3.1.4).

Table III.2 -*Pre-financing cash flow statement of the sugar farm (in thousands of NMU – in constant prices)*

Years	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
RECEIPTS																					
Cane sales				2432	4864	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080
Total receipts	**0**	**0**	**0**	**2432**	**4864**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**	**6080**
OUTLAYS																					
Investments																					
Pre-production[a] and fixed capital	1559	7828	7372	6442	0	0	0	0	0	0	983	2008	983	0	0	0	0	0	0	0	0
Salvage value[b]																					-2520
Working capital	0	0	0	970	230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1200
Total investments	**1559**	**7828**	**7372**	**7412**	**230**	**0**	**0**	**0**	**0**	**0**	**983**	**2008**	**983**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-3720**
Operation																					
Fertilizer				97	194	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243
Pesticides				13	26	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Fuels lubricants				282	563	704	704	704	704	704	704	704	704	704	704	704	704	704	704	704	704
Spare parts				65	196	326	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489
Equipment maintenance				10	21	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Miscellaneous parts and supp				123	246	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308
Salaries and social security contributions				742	1484	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855
Taxes				31	62	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
Total operation	**0**	**0**	**0**	**1364**	**2793**	**3573**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**
Total outlays	**1559**	**7828**	**7372**	**8776**	**3023**	**3573**	**3736**	**3736**	**3736**	**3736**	**4719**	**5744**	**4719**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**3736**	**16**
PRE-FINANCING CASH FLOW	**-1559**	**-7828**	**-7372**	**-6344**	**1841**	**2507**	**2344**	**2344**	**2344**	**2344**	**1361**	**336**	**1361**	**2344**	**2344**	**2344**	**2344**	**2344**	**2344**	**2344**	**6064**
Cumulative cash flow	-1559	-9388	-16759	-23104	-21263	-18756	-16412	-14068	-11724	-9380	-8019	-7683	-6322	-3978	-1634	710	3054	5398	7742	10086	16150

(a) Not including interest during contribution
(b) Not including working capital.

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the value of a product (e.g., drop in price, reduction of quantities sold) or a 2% increase of the planned cost of these investments could wipe out the return on investment[1].

3. Financing plan

The operator of the agricultural tract will thus take out a loan from the National Bank of Agricultural Development (NBAD) under the following conditions:

- a sum of NMU $15{,}000.10^3$, in two equal payments in years 1 and 2;
- repayment of the principal (by constant annuity) over a period of 15 years, beginning during the third year, with 5% interest.

The debt servicing calculation in constant prices is presented in the following table. It is based on a simplified inflation forecast of 7%, which remains stable throughout the life span of the project. This figure indicates that the NBAD loan includes a "grant" component as the interest rate is 2 points below it.

☞ Table III.3.

N.B.: The accounting convention that all flows of money for a year are due on the final day of the year can be seen clearly in this table.

4. Post-financing analysis

☞ Table III.4.

The **return on investment** of the agricultural operation is noticeably improved by the financing plan chosen[2], although it remains low:

- the recovery period is still very long: it takes nearly 12 years, which is considered mediocre but acceptable for an irrigation project;
- the project's net present value for the investor (equity share holder) is increased considerably $(4{,}566.10^3)$;
- the internal rate of return (in constant prices) for equity capital goes up to 9%, and is thus clearly higher than the opportunity cost of capital;
- the return per monetary unit invested remains roughly the same, going up to 9% from 8%.

---

(1) Respectively, NPV = - 158.10³, IRR = 4.9% et NPVA - 11.10³, IRR = 5.0%.
(2) This improvement is enhanced by the "lower than inflation" current interest rate (i.e. negative interest rate in constant prices), albeit not dependent on it. As a matter of fact an improvement would appear up to a 12% interest rate.

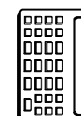Table III.3 - *Debt-servicing table (in thousands of NMU)*

Years	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
IN CURRENT PRICES																			
Loan payment		7500	7500																
Remainder to be repaid	0	0	7500	15000	14000	13000	12000	11000	10000	9000	8000	7000	6000	5000	4000	3000	2000	1000	0
Debt service:																			
Principal repayment	0	0	0(*)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Interest payment	0	0	375	750	700	650	600	550	500	450	400	350	300	250	200	150	100	50	0
Total annuity	**0**	**0**	**375**	**1750**	**1700**	**1650**	**1600**	**1550**	**1500**	**1450**	**1400**	**1350**	**1300**	**1250**	**1200**	**1150**	**1100**	**1050**	**0**
IN CONSTANT PRICES																			
Deflation coefficient	1.000	0.935	0.873	0.816	0.763	0.713	0.666	0.623	0.582	0.544	0.508	0.475	0.444	0.415	0.388	0.362	0.339	0.317	0.296
Loan payment	0	7009	6551	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Debt service:																			
Principal repayment	0	0	0	816	763	713	666	623	582	544	508	475	444	415	388	362	339	317	0
Interest payment	0	0	328(*)	612	534	463	400	343	291	245	203	166	133	104	78	54	34	16	0
Total annuity	**0**	**0**	**328**	**1429**	**1297**	**1176**	**1066**	**965**	**873**	**789**	**712**	**641**	**577**	**519**	**465**	**417**	**373**	**332**	**0**

(*) Payment integrated within the investments as "interest during construction".
N.B.: The shift to constant prices is based on an annual inflation assumptions of 7% throughout the period.
Deflation coefficients are calculated using the procedure outlined in § 2.2.1.
N.B.: This table illustrates the accounting convention which stipulates that all flows of money are due on the final day of the year.
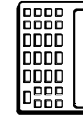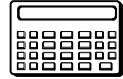
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Table III.4 - *Post-financing cash flow statement of the sugar farm (in thousands of NMU – in constant prices)*

Years	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PRE-FINANCING CASH FLOW	-1559	-7828	-7372	-6344	1841	2507	2344	2344	2344	2344	1361	336	1361	2344	2344	2344	2344	2344	2344	2344	6064
FINANCIAL INFLOWS																					
Equity capital	1559	819	1148	7773																	
Receipt of loans	0	7009	6551	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FINANCIAL OUTFLOWS																					
Repayment of the principal	0	0	0	816	763	713	666	623	582	544	508	475	444	415	388	362	339	317	0	0	0
Interest payments	0	0	328(*)	612	534	463	400	343	291	245	203	166	133	104	78	54	34	16	0	0	0
POST-FINANCING CASH FLOW	0	0	0	0	544	1331	1278	1379	1471	1555	649	-305	784	1825	1879	1927	1971	2012	2344	2344	6064
Cumulative cash flow	0	0	0	0	544	1875	3152	4531	6002	7557	8207	7901	8685	10510	12389	14316	16288	18299	20643	22987	29051

(*) Interest during construction.

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No problem of **solvency of the farm** is found over the period since the only year when the cash flow is negative (when investments have to be replaced - year 11), the cumulative balance is still highly positive. The overall financial situation of the farm is thus satisfactory, as is seen in the interest cover by the Gross Operating Margin, which is between 5 and 10 during the first years of normal operation, and thereafter largely above 10.

It should be noted that the guaranteed outlets for the farm's production – at market prices – make it possible favourably to assess the **financial viability** of the operation.

However, the **sensitivity analysis** carried out for the most uncertain parameters shows that, while the financial package improves the financial situation (return on investment and solvency) of the agricultural operation, the risks resulting from production and sales remain:

– a reduction of 8% in production as compared with forecasts (due to a falling market price, or to insufficient returns and/or fewer purchases by the industrial complex) can shift the NPV into the red and thus push the IRR below 5%, with the recovery period thus lasting longer than 15 years;

– on the other hand, it would take an increase of more than 20% in the cost of the investments to wipe out the return on investment;

– a delay in the second and third sets of works (only half of the investments having been made during years 2 and 3) leading to an interval of one year between the plantings, and thus to a rise in output of the project, would have only a minor effect on investment returns (NPV dropping slightly to $3,755.10^3$, the IRR being 9%); the recovery period would cover 13 years.

➥ **The growing of sugar cane, with its limited financial profitability, would thus seem to be of relatively little financial interest for the operator under foreseeable conditions. Ways of increasing financial efficiency (e.g., productivity increases, changes in production technology, securing of outlet) should be proposed.**

THE INDUSTRIAL COMPLEX

The installation of this complex requires a major initial investment (NMU 78 million, i.e. almost three times greater than the cost of the irrigated tract of sugar cane). The operator must thus take out a loan in foreign currency from an international financing agency.

The financial analysis of the industrial complex leads to the following conclusions:

➥ **With its excellent financial results (a short recovery period of 5 years, a strongly positive NPV, an IRR = 21%, net discounted return of each NMU in-**
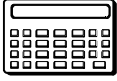
vested[1] = NMU 3.16 he industrial firm processing the cane into polyethylene would seem both highly profitable and able to handle most foreseeable risks (the critical values wiping out the return on investment are – 38% for the international prices of the HDPE and + 170% for the cost of the investments).

_____

(1) This is the 'relative enrichment rate', a benefit-cost ratio noted R_{BC6} in § E.3.

4. CONSOLIDATED ACCOUNT ANALYSIS

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Studying the integration of the project into the national economy enables the analyst to identify those entities which should be included in project analysis (Chapter 2). The accounts of these entities are consolidated prior to economic analysis.

The reason for drawing up the consolidated account is to:
- describe exchange flows between the entities as a group and the rest of the economy;
- verify the project's overall viability;
- calculate its effectiveness in terms of the productivity of the resources employed, and the overall return on invested capital.

The analysis of the consolidated account sets the stage for the three principal phases of the economic evaluation: the study of the impact of the project on the major national economic objectives, its viability within the international economy, and its economic effectiveness.

N.B.: In order to simplify the text, the series of activities grouped together in the with-project situation are simply referred to as the "project" in the following pages.

This first stage of economic analysis consists of:
- **consolidating the accounts of the entities involved in a single account**
  - ➡ **METHOD** § 4.1.1
  - ➡ **PROBLEMS AND PRECAUTIONS** § 4.1.2
- **studying the overall efficiency of the investments generated by the project**
  - ➡ **VIABILITY** § 4.2.1
  - ➡ **OVERALL EFFICIENCY** § 4.2.2
  - ➡ **SENSITIVITY ANALYSIS** § 4.2.3
- **assessing the results of all the forms of financing that will have to be mobilised in order to guarantee that the project is successfully carried out**
  - ➡ **FINANCING OF RECURRENT COSTS** § 4.3.1
  - ➡ **CONSOLIDATED DISBURSEMENT SCHEDULE** § 4.3.2
  - ➡ **SENSITIVITY ANALYSIS** § 4.3.3

4.1. BASIC TECHNIQUE

Consolidation is an accounting technique which is easy to understand. Over a given period, it allows the analyst to estimate the global activity of several entities, without any double counting.

The basic technique is simple. However, it should be applied accurately:
- ➡ **METHOD** § 4.1.1
- ➡ **PROBLEMS AND PRECAUTIONS** § 4.1.2

4.1.1. Method

The consolidation of the operating and flow balance accounts of a set of entities involves replacing the individual accounts of each entity with a single account, which traces the exchange of flows between this set and the rest of the economy.
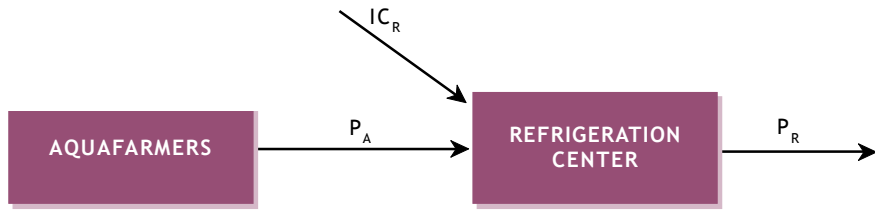
The consolidation involves:
- putting the set of inflows and outflows recorded in the accounts of the individual entities in a single table;
- eliminating the flows corresponding to transfers between these entities.

The consolidated account takes a form similar to the operating accounts or flow balance accounts. The inflow and outflow categories it includes cover all the categories which appear in the initial entity accounts, with the exception of the flows exchanged among them.

Let us take as an example a project to create a frozen shrimp unit. The entities involved include both industrialists and the aquafarmers, who have to make their own investments in order to meet the increase in the demand for shrimp. Although these latter investments are not financed internationally and depend on the initiative of the aquafarmers, financial accounts have to be drawn up for these farmers so as to establish the validity of the overall project[1], and to measure its return on investment from the point of view of society as a whole.

———————
(1) Will the aquafarmers actually make these investments? What types of incentives and constraints will they encounter? Etc.

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With IC = Intermediate Consumptions
      P = Production

Figure 4.1. *Flow diagram for entities involved in the project*

The operating accounts[1] of these entities are:

Aquafarmers   *Refrigeration centre*
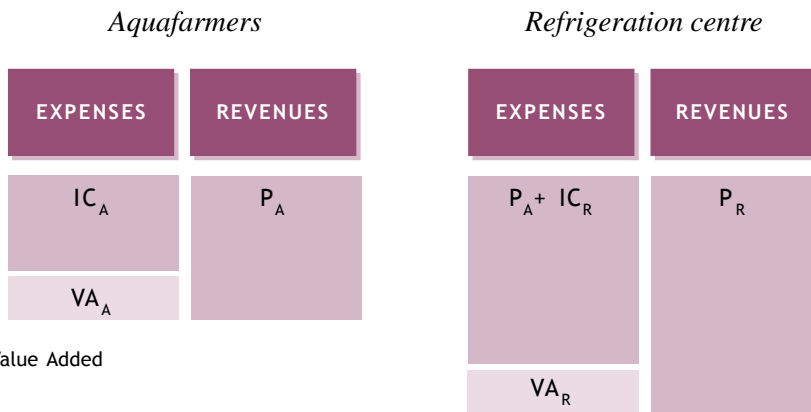
With VA = Value Added

Figure 4.2. *Entities' accounts*

_____
(1) Or the flow balances.

so it is possible to calculate the project's consolidated account:

EXPENSES	REVENUES

Aquafarmers: IC_A | P_A

Refrigeration centre: $P_A + IC_R$ | P_R

AquaFarmers + Refrigeration centre: $VA_A + VA_R$ |

Figure 4.3. *Calculation of the consolidated account*

Or, following the elimination of the flows, recorded both as revenues and expenses (and which thus have no effect on the overall result):

EXPENSES	REVENUES

$IC_A + IC_R$ | P_R

$VA_A + VA_R$ |

Figure 4.4. *Consolidated account*

N.B.:

(1) If a portion (P_A') of the aquafarmers' production is given to entities other than the refrigeration centre, the value of this production will appear in the revenues column of the consolidated account, the total of which will then add up to: $P_A' + P_R$.

(2) Note that the value added of this group is equal to the sum of the entities' values added taken individually:

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$$VA_{consolidated} = \Sigma\, VA_{economic\ entities}$$

By the same token, the NOP of the unit is equal to the NOP of the entities:

$$NOP_{consolidated} = \Sigma\, NOP_{economic\ entities}$$

The consolidation is done:

- ◆ either for each with- and without-project situation, which are later compared to calculate the incremental flows;
- ◆ or directly, based on the entities' "incremental accounts".

Note: One should nonetheless keep in mind that the consolidated balance sheets are different from the consolidated flow accounts (operating accounts, flow balance accounts) presented in this chapter. Both the set of entities with which they are concerned and the consolidation techniques used differ (§ F.1.2).

4.1.2. Problems and precautions

The quality of the information in the consolidated account obviously depends on the reliability and consistency of the individual entity accounts.

Reliability of information is a general problem in *ex-ante* analyses, and a more specific one in the *ex-post* analyses of the without-project situation.

In order to ensure *consistent* consolidated accounts, it is important that the entities' accounts are based on the same principles, e.g.:

- – care should be taken if the accounting periods of entities differ (e.g., if agricultural and project years are not the same);
- – the same method of depreciation should be used.

Using prices based on the same principles is also critical, all the more so in that the type of production considered is highly subject to both physical (climate, international supply...) and market (price variations,...) contingencies.

Entity accounts usually provide only a partial view of the entity's finances. They describe the activities of the project, but do not cover the other activities in which the entity is involved[1]. This is not a problem, since the consolidated accounts are only used to assess the results of those activities in which the project intervenes, and not to assess interests and particular strategies of the entities.

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(1) Reference is made to "partial budgeting" for this type of calculation.

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Finally, as with any aggregation, the consolidation of accounts provides new information, but also leads to loss of information, in this case on the individual entities. Consolidated account analysis can never completely replace the financial analysis of the entities involved.

4.2. OVERALL EVALUATION OF THE ACTIVITIES INDUCED BY THE PROJECT

The first global analyses of the project results can be elaborated on the basis of the consolidated account.

The study of the consolidated account encompasses:	
➡ **VIABILITY**	**§ 4.2.1**
➡ **OVERALL EFFICIENCY**	**§ 4.2.2**
➡ **SENSITIVITY ANALYSIS**	**§ 4.2.3**
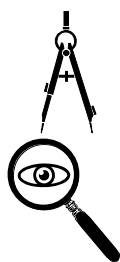
4.2.1. Viability

The viability of the activities created by the project is the same as the viability of the individual entities. The benefits of consolidation become evident if the financial analysis reveals that one of the entities will have difficulty meeting its financial obligations over time:

- ◆ if the consolidated account is also negative, changes in the project itself will generally have to be contemplated, at least for projects in the competitive sector;
- ◆ but, *insofar as the flows of the consolidated unit seem to make it possible overall to cover expenses* (consolidated account surplus), a study is made of the way in which the distribution of the value among the entities puts some of them in a difficult situation. The organisational features of revenue flows (e.g., disparities in "price negotiation" due to monopolies/oligopolies[1], or monopsonies/oligopsonies[2]), or the administrative fixing of prices or taxes, can, for example, concentrate the margins on certain entities and thus induce actual "income transfers[3] between entities.

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(1) The situation in which the "purchasers" of a product can only appeal to a single "seller" is called a monopoly; that in which the number of "sellers" is extremely limited is known as an oligopoly.

(2) The situation in which the "sellers" of a product have only one "purchaser" is called a monopsony; that in which the number of "purchasers" is extremely limited is known as an oligopsony.

(3) At the initial stages of the project cycle, it is thus possible to reflect on the new conditions of this division of the value, which would place all the entities in a "sustainable situation": information system facilitating market transparency, support for producers' organizations, dismantling of monopolies.

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4.2.2. Overall efficiency

Depending upon the nature of the activity, different indicators may be used to describe the economic situation and productivity of the consolidated unit. This is generally done for a ...gle year of normal operation.

...ral features

...ssessing the distribution of the overall value added, and thus of operating incomes, is one of the main tasks of this first step of economic analysis. To it are added questions concerning the creation of wealth facilitated by the project: What is the (incremental) Value Added? What is the relationship between the Value Added created by the different entities and the net benefits (Operating Profit) which they draw from it? Questions may also be asked concerning the fairness of the organisational set-up.

The Value Added and the Operating Profit (or the Benefit) of the consolidated account provide information about the overall efficiency of the project[1]. These profits are analysed using indicators such as:

$$\text{Rate of direct Value Added} = \frac{\text{Consolidated direct Value Added}}{\text{Consolidated output value}}$$

$$\text{Weight of the consolidated service of the debt} = \frac{\text{Consolidated financial charges}}{\text{Consolidated output value}}$$

$$\text{Importance of labour costs} = \frac{\text{Consolidated labour charges}}{\text{Consolidated output value}}$$

(b) Productivity and unit costs

What is the overall productivity of the different means of production used by the entities? Do the investment outlays match the usual expectations, considering the particular characteristics of the project? To answer these questions:

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(1) These are *incremental* flows. Thus, for an entity, a negative incremental operating profit can go hand in hand with a surplus from the point of view of the whole of the activities; the modification of the flows generated by the project thus reduces its net benefit: this entity is a *"victim"* of the project.

- Indicators of economic productivity of labour can be calculated, for example:

$$\text{Unit labour cost} = \frac{\text{Wages and social changes}}{\text{Quantities of output}}$$

$$\text{Apparent return on labour} = \frac{\text{Consolidated output value}}{\text{Total staff}}$$

$$\text{or} = \frac{\text{Consolidated Value Added}}{\text{Total staff}}$$

- Specific indicators can be estimated, for example:
  - for agriculture: the total cost of development per hectare (cost for the farmers + cost for the development company doing the mechanised work), Net Profit per hectare, production per workday;
  - for tourist industries: the consolidated amount of the investment per bed (or per room), consolidated turnover per night, cost or consolidated Net Profit per night – considering all the entities involved in the tourist project (hotel + restaurants + businesses + leisure centres + infrastructures such as access roads and service networks).

N.B.: Unit costs are presented in § 8.3.1.

(c) Overall return on investment

The calculation of the overall return on investment is made by comparing:

- the supplementary investments included in the financing of the project and those undertaken by the entities within the broad framework of the project;
- with the sequence of net consolidated benefits they generate: this is traditionally the "Profit" of the consolidated flow balance or the "Net Operating Profit" of the consolidated operating account.

All of the return on investment criteria (Annex E) are applicable[1]. The principal criteria used are the same as for financial analysis of a single entity:

< ON THE BASIS OF THE CONSOLIDATED FLOW BALANCE ACCOUNT:

- the non-discounted benefit-cost ratio, **or annual return per monetary unit invested** (R_{BC2} according to the notation utilised in the § E.2): a simple and rapid indication of

_____
(1) These sequences are all expressed in **constant prices,** and their interpretation must take this into account.

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overall return on investment, but one that can only be relevant if the sequence of inflows and outflows is more or less constant. So, for a year of normal operation, with Δ denoting incremental flows:

$$RMUI = \frac{\Delta \text{Output value} - \Delta \text{Operating expenses}}{\Delta \text{Consolidated Investments}}$$

- the **net present value** (NPV), which is calculated using the "economic" discount rate[1]. Those projects whose NPV is negative should be rejected, since they consume more incremental resources than they produce.

  The use of a benefit-cost ratio, such as the **relative enrichment rate** which compares the NPV with the discounted cost of the investments (R_{BC6} according to § E.3), makes it possible to take into account the general constraint of scarcity of capital;

- the **internal rate of return** (IRR), makes it possible to determine the return on the investment made. The IRR is compared to the value of the economic discount rate.

< ON THE BASIS OF THE OPERATING ACCOUNT:

- the **profit margin**, a non-discounted indicator that is relevant only if the sequence of inflows and outflows is more or less constant. This can be calculated before and after financial charges, so as to reveal the debt burden of the entities.

$$\text{Profit margin before interest and tax} = \frac{\text{Consolidated GOM}}{\text{Output value}}$$

$$\text{Profit margin after financial charges} = \frac{\text{Consolidated GOP}}{\text{Output value}}$$

- the benefit-cost ratio or **annual return per monetary unit invested** (R_{BC2} according to the notation used in the § E.2), a simple and rapid characterisation of return on investment, but one that can only be used if the sequence of inflows and outflows is more or less constant. So, for a year of normal operation:

$$RMUI = \frac{\Delta \text{Consolidated NOP}}{\Delta \text{Consolidated Investments}}$$

---

(1) Or, for a productive project, the opportunity cost of capital in *constant prices* (§ A.3).

4.2.3. Sensitivity analysis

Sensitivity analysis enables the analyst to test the robustness of the indicators (and the conclusions drawn from them). It also enables the analyst to assess the risks run if things do not go exactly as planned, which is the most likely situation.

4.3. RECURRENT COSTS AND DISBURSEMENT SCHEDULE

All the financing flows – whether for investment or operations – must be reconsidered in order to make sure that they will be disbursed on time, and to assess the robustness of the general financial balance.

Necessary financing is identified together with its source:
➡ **FINANCING OF RECURRENT COSTS** § 4.3.1
➡ **CONSOLIDATED DISBURSEMENT SCHEDULE** § 4.3.2
Consequences of possible changes in the financing needs are considered:
➡ **SENSITIVITY ANALYSIS** § 4.3.3

4.3.1. Financing of recurrent costs

Costs which occur throughout the project's life, and which continue beyond the end of external financing, are known as "recurrent costs". This term may be used in two ways:

- when operation and/or maintenance costs are not passed on to consumers, recurrent costs may be defined as operating expenses (e.g., the budget for maintaining a road system or a water conveyance system);
- recurrent costs may refer to the portion of outlays not covered by user payments: e.g., that part of the total cost of managing and operating an irrigation project not met by fees, or the structural deficit of urban transport companies.

In most cases, it is national, regional or local governments which assume responsibility for recurrent costs, although donors or non-government organisations can also do so. Recurrent costs are important for the viability of the project and care must be taken in estimating them. Inexact forecasts may result in insufficient finance being available for the project.

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Table 4.1. *Example of the table recapitulating recurrent expenses*
(in current prices)

YEAR	0	1	2	...	N
...NG n°1					
...ntenance					
. in kind					
< **Labour**					
. Handling					
. Diverse indemnities					
< **Debt servicing**					
. Repayment of capital					
. Interest					
TOTAL = SF1					
SOURCE OF FINANCING n°2					
< **Operations**					
. Materials, maintenance					
. In kind					
< **Labour**					
. Handling					
. Diverse indemnities					
< **Debt servicing**					
. Repayment of capital					
. Interest					
TOTAL = SF2					

Notes:

(1) Recurrent costs do not include investment outlays. In budgetary terms, they normally pertain to operations and labour budgets, and not to capital outlay budgets.

(2) A special form of recurrent costs is often "forgotten" in project analyses: the servicing of loans, especially soft loans made by international donors, which have a grace period of several years and low interest rates. In order to take these costs into account "government" may have to be specifically included as a supplementary entity of the consolidated unit.

In an *ex-ante* situation, in order to guarantee the **viability** of the project, and because of budgetary constraints, it is *essential* to:

- document all the recurrent costs by recording both their amounts and their sources of financing;
- identify all potential sources of unplanned recurrent expenses (e.g., low tariffs or fee levels), and do sensitivity analyses to assess their potential consequences for the budget). If necessary, the project should be modified in light of the results obtained.

Consolidating all recurrent costs in one budget contributes to project viability by ensuring that all entities financing these costs commit themselves to meet the expenses and plan how to do so. By computing the budget in constant prices, it is possible to compare these outlays to the current (and/or projected) budget, whereas computing in current prices enables one to prepare the budgets and the real outlays.

4.3.2. Consolidated disbursement schedule

During financial analysis, the disbursement schedule should be prepared for each economic entity (§ 3.4). The consolidated disbursement schedule – the sum of the schedules for each entity – makes it possible both to record the participation of each funding agency and **to ensure the coordination of the overall financing package**.

This schedule is established in current prices, according to the calculation procedure presented in § A.1.

☞ Table 4.2.

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Table 4.2. *Consolidated disbursement schedule*
(in current prices)

YEAR	0	1	2	...	N
FUNDING AGENCY nº1					
< **Grants**					
. Monetary					
. In kind					
< **Balancing subsidies**					
< **Loans**					
. Monetary					
. In kind					
TOTAL = D1					
FUNDING AGENCY nº2					
< **Grants**					
. Monetary					
. In kind					
< **Balancing subsidies**					
< **Loans**					
. Monetary					
. In kind					
TOTAL = D2					

4.3.3. Sensitivity analysis

Sensitivity analysis of the disbursement schedule enables the analyst to assess the consequences of changes from the planned scenario for either partner:

- the entities which are financed: what would be the consequences of cost variations without changes in the financing plan?
- the financing agencies: to what extent is there a risk that recurrent costs will exceed the forecasts? What are the implications for the viability of the project?

4.4. SUMMARY OF PROCEDURE FOR CONSOLIDATED ACCOUNT ANALYSIS

The diagram below illustrates how the consolidated account analysis is carried out.

ACCOUNT entity A (IF_A & OF_A)

ACCOUNT entity B (IF_B et OF_B)

Identification of flows exchanged

$IF_A + IF_B$ – Flows exchanged between A and B

$OF_A + OF_B$ – Flows exchanged between A and B

CONSOLIDATED ACCOUNT

Viability
Productivity
Return on investment

DISBURSEMENT SCHEDULE

Budgetary impact

N.B.: IF_i = entity i inflows
OF_i = entity i outflows
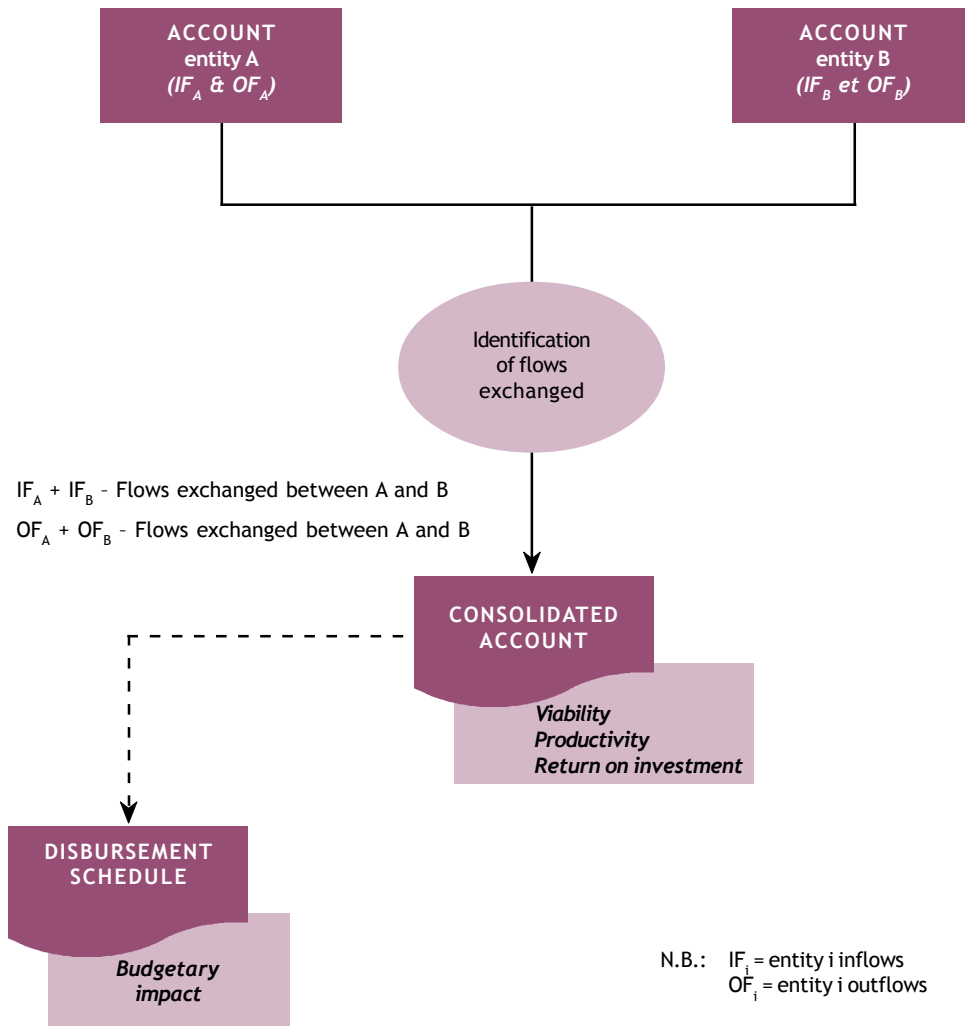
Figure 4.5. *General consolidation procedure for two entities*

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CASE STUDY
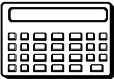
1. Consolidated accounts

The consolidation of the accounts leads to a reconsideration of the "cluster of projects" presented in Figure VI.1.
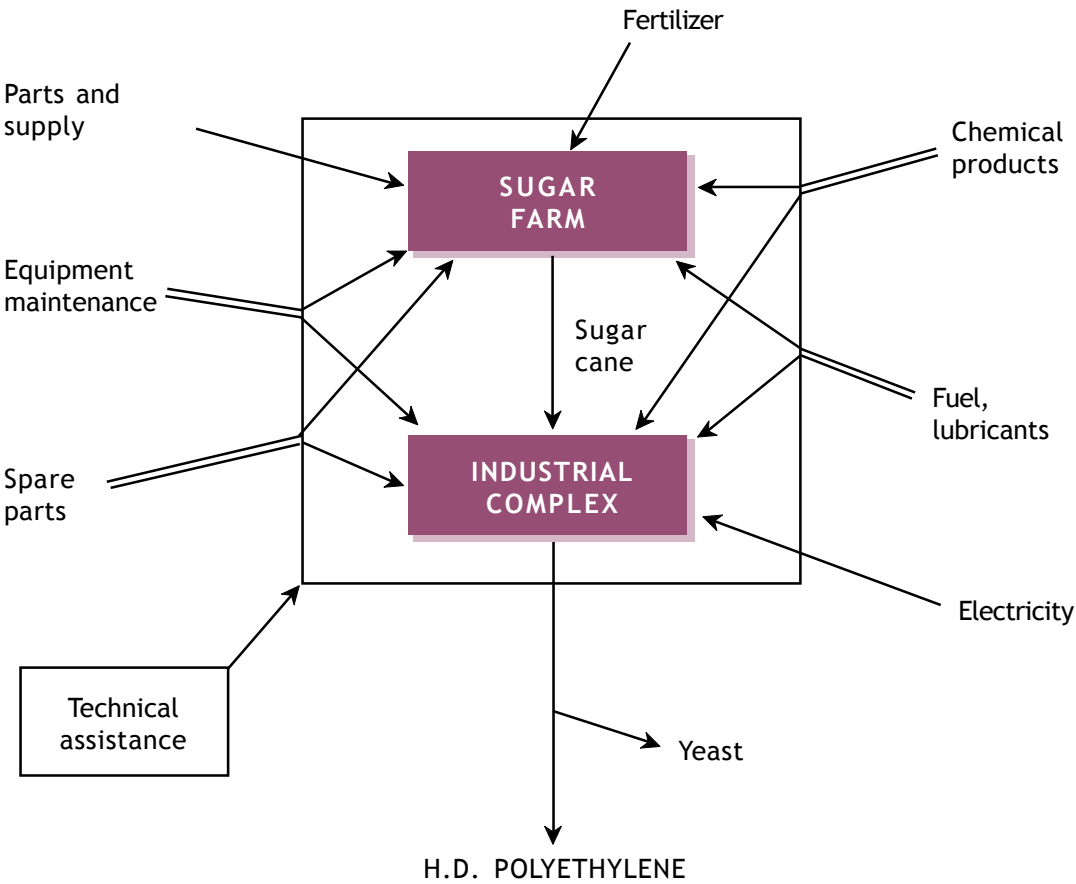
Figure IV.1 - *Consolidated entity*

The consolidated accounts are drawn up by adding the inputs and outputs of the two entities and eliminating the flow of sugar cane, within the consolidated unit, between the farm and the industrial complex.
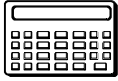
Note: As all the transactions between the two entities are monetised, the flow balance account is the same as the cash flow table.

With a largely positive (55 421.10³) net present value[1], a high internal rate of return (19%) and a recovery period of less than 6 years, the project appears to be highly profitable. According to the relative enrichment rate[2], each NMU invested in the project will earn, on average, a net benefit of NMU 1.55 over the life span of the project.

Overall, the project would seem to create a large amount of value added, in that the rate of direct value added reaches 83% in a year of normal operation. This figure should nonetheless be put into perspective by considering the fact that a fifth of this value added is accounted for by depreciation of investments. The influence of the interest is important at the start of production, and represents 14% of costs in the first year of normal operation. It then drops in the 5 following years to less than 5%.

Both entities create large amounts of value added: the yearly rate of direct net value added is approximately 42% for the farm and 56% for the industrial complex. However, the amount of net (i.e. after deduction of depreciation) value added is five times larger in the case of the industrial complex than for the farm. Thus the relative price sugar cane/HDPE appears to be in favour of the industrial activities (whose output is protected by importation barriers), which is reflected by its high profitability.

Representing only 10% of the value of the production, labour costs are low, indicating good overall work productivity, though they represent 28% of the value of production for the agricultural part of the project.

The excellent financial results of the industrial firm are clear from the financial analysis of the consolidated accounts. **Sensitivity** analyses show them to be robust:

– the critical value of the investments (which wipe out the return on investment of the consolidated unit) would have to reach + 73% of the initially projected value, which is unlikely;

– likewise, to eliminate the return on investment would require the actual cost all the inputs to be 110% higher than forecasts;

– the absence of protection of the price of HDPE (corresponding to a drop of 20% in the price to NMU 1,990/t) still makes it possible to maintain a satisfactory overall return on investment: the NPV is still positive (21,272.10³), the IRR amount to 12%, the relative enrichment rate of reaches 0.60 and the recovery period is limited to 8 years. The critical value of the price of the HDPE is NMU 1,667/t, i.e. lower by a third in relation to the projected price and 16% lower in relation to the current price on the international market;
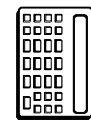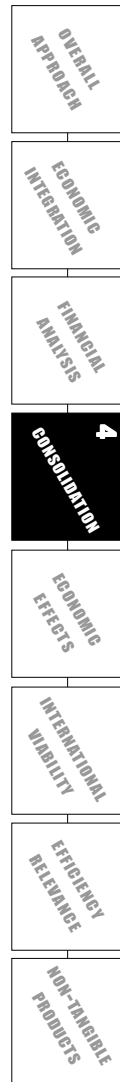
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(1) Calculated on the basis of an economic discount rate of 8%.
(2) Benefit-cost ratio noted R_{BC6} in § E.3:

$$R_{BC6} = \text{Net present value/Discounted investment value.}$$

Table IV.1 - *Consolidated cash flow*
### *(in thousands of NMU - in constant prices)*

Years	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
INFLOWS																					
Sales																					
H.D. polyethylene	0	0	0	9952	19905	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881
Yeast	0	0	0	52	103	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
Total sales	0	0	0	10004	20008	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010
Receipt of loans																					
Farm loan	0	7009	6551	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial complex loan	0	28037	17469	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total loans	0	35047	24020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total IF	0	35047	24020	10004	20008	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010	25010
OUTFLOWS																					
Investments																					
Pre-production and fixed capital	17849	36755	32610	6442	0	0	0	0	0	0	983	2538	983	0	0	0	0	0	0	0	0
Interest during construction	0	0	3472	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewal (cf lg below)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Working capital	0	0	0	4417	245	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4703
Salvage value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31984
Total investments	17849	36755	36082	10859	245	41	0	0	0	0	983	2538	983	0	0	0	0	0	0	0	-36687
Operation																					
Fertilizer	0	0	0	97	194	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243
Chemical products	0	0	0	259	518	647	647	647	647	647	647	647	647	647	647	647	647	647	647	647	647
Electricity	0	0	0	257	514	642	642	642	642	642	642	642	642	642	642	642	642	642	642	642	642
Fuel, lubricants	0	0	0	362	723	904	904	904	904	904	904	904	904	904	904	904	904	904	904	904	904
Spare parts	0	0	0	65	739	1005	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168
Equipment maintenance	0	0	0	10	21	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326
Supply and miscellaneous services	0	0	0	123	246	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308
Salaries and social security contributions	0	0	0	1178	2065	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581
Technical assistance	0	0	0	711	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taxes	0	0	0	203	406	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508
Total operation	0	0	0	3265	5528	7164	7327	7327	7327	7327	7327	7327	7327	7327	7327	7327	7327	7327	7327	7327	7327
Financial expenses																					
Repayment	0	0	0	3537	3306	3090	2887	2699	2522	2357	2203	2059	1924	1798	1681	1571	1468	1372	0	0	0
Interest (excel. during construc.)	0	0	0	5510	4806	4171	3598	3083	2619	2203	1830	1497	1199	934	698	489	305	142	-0	-0	-0
Total financial expenses	0	0	0	9047	8112	7261	6486	5781	5141	4560	4033	3555	3123	2732	2379	2060	1773	1514	-0	-0	-0
Total OF	17849	36755	36082	23172	13885	14466	13813	13108	12468	11887	12343	13420	11433	10059	9706	9387	9100	8841	7327	7327	-29360
CONSOLIDATED PROFITS	-17849	-1709	-12062	-13168	6123	10544	11197	11901	12542	13123	12667	11589	13577	14951	15304	15623	15910	16168	17683	17683	54370

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Table IV.2 - *Consolidated operating account*
(in thousands of NMU - in constant prices)

Years	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PRODUCTS																					
HDPE production																					
Local market	0	0	0	9952	19905	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881	24881
Yeast production	0	0	0	52	103	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
Total products	**0**	**0**	**0**	**10004**	**20008**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**
EXPENSES																					
Intermediate goods and services																					
Fertilizer	0	0	0	97	194	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243
Chemical products	0	0	0	259	518	647	647	647	647	647	647	647	647	647	647	647	647	647	647	647	647
Electricity	0	0	0	257	514	642	642	642	642	642	642	642	642	642	642	642	642	642	642	642	642
Fuel, lubricants	0	0	0	362	723	904	904	904	904	904	904	904	904	904	904	904	904	904	904	904	904
Spare parts	0	0	0	65	739	1005	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168
Equipment maintenance	0	0	0	10	21	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326
Supply and miscellaneous services	0	0	0	123	246	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308
Total IGS	**0**	**0**	**0**	**1173**	**2955**	**4075**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**	**4238**
Value added																					
Salaries and social security contributions	0	0	0	1178	2065	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581
Technical assistance	0	0	0	711	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial charges				5510	4806	4171	3598	3083	2619	2203	1830	1497	1199	934	698	489	305	142	-0	-0	-0
Taxes	0	0	0	203	406	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508
GOP	0	0	0	1229	9673	13675	14084	14600	15064	15480	15853	16186	16484	16749	16985	17193	17378	17540	17683	17683	17683
Depreciation				4228	4228	4228	4228	4228	4228	4228	4228	4228	4228	4228	4228	4228	4228	4228	4228	4228	4228
NOP	0	0	0	-2999	5445	9446	9856	10372	10835	11252	11624	11958	12256	12521	12756	12965	13150	13312	13454	13454	13454
Total VA	**0**	**0**	**0**	**8831**	**17053**	**20935**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**	**20772**
Total expenses	**0**	**0**	**0**	**10004**	**20008**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**	**25010**

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– finally, as an example, the following events would have to take place in order to wipe out the project's return on investment: a 20% fall in the price of HDPE (i.e. down to the actual market level), an increase of 20% in the cost of the investments and an interval of 1.5 years in the making of a portion of the investments (rising to a third of the total amount), leading to a one year delay in production.
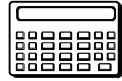
Overall, the project is financially viable and estimates are robust enough for any hazards which may arise during the project (including a change in national protection policy) to be overcome.

5. THE ANALYSIS OF EFFECTS
ON MAJOR ECONOMIC POLICY OBJECTIVES

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This chapter describes how the analysis of the impact or "effects" of the project on the economy as a whole is carried out. The emphasis is on the effects on the major objectives of economic policy (economic growth, reduction of structural imbalances affecting the balance of payments and the government budget, social and regional income distribution).

For all projects:

- the flows of resources in the form of investments and project inputs have effects elsewhere in the economy through:

    - wages;
    - new demand for intermediate goods and services:
        - which generate incremental flows of income to labour, firms, and banks when they result from local production;
        - which require foreign exchange when they result from an increase in imports or a decrease of exports;
    - possible changes in consumption in terms of prices paid and/or quantities bought/consumed;

    ⟹ This *primary* impact of the project on the national economy is analysed in this chapter. It comprises direct and indirect effects.

- in time these incremental primary incomes are used either to satisfy immediate consumption needs, or will be saved or invested.

    ⟹ This *secondary* impact, which is important in many development contexts, but difficult to assess, is not considered within the framework of project analysis.

When analysing the flows created by the project, those which have the greatest impact on the major objectives of economic policy should be emphasised.

The analysis of the effects of the project on the national economy focuses on:

- economic growth;
- foreign exchange;
- public finances;
- distribution of income.

Using the consolidated account and the definition of the without-project situation, the analyst carries out a simple simulation of the effects on "upstream" production, including the prices and the quantities of the products. This task is relatively easy if the country has a solid statistical base. If this is not the case, the analyst will have to collect necessary data. This should be possible within the resources available to most project evaluation teams (*ex-ante* or *ex-post*).

The evaluation of the effects of the project in market prices consists of:

- **estimating the project's total effects**
- **estimating the incremental effects of the project, given assumptions about the without-project situation:**

- **studying the impact of the project on the national economy**
- **examining the economic efficiency and relevance of the project**

METHODS...[1]

The methodology presented in this chapter (and partially in Chapter 7) is a direct offshoot of the "Effects Method" for the economic evaluation of development projects, and, more generally, of the "input-output" analysis methods developed by W. LÉONTIEF.

The Effects Method was first developed by M. CHERVEL, C. PROU and M. LE GALL for use in national planning. It:

- offers a method for selecting projects which is based on an overall assessment criterion;
- requires continual and iterative discussions between the decision-making authorities and the evaluators;
- is limited to projects for which the with- and without-project situations satisfy the same level of domestic demand.

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The method proposed here differs in three ways from the effects method:

◆ it uses a variety of different criteria in appraising projects;

◆ it is designed for use in the analysis of individual projects by development agencies, which are not normally involved in global or national planning;

◆ it contributes to the analysis of projects of all types, which aim to provide new services and/or increase the availability of goods for local consumption.

REFERENCE WORKS:

◆ CHERVEL Marc, and LE GALL Michel. 1978. *Manual of Economic Evaluation of Projects: the Effects Method*. Collection Méthodologie n°10. Paris: Ministère de la Coopération et du Développement.

◆ Various sectoral application manuals.

5.1. TOTAL EFFECTS CALCULATION

A formal presentation of these calculations is done in § C.3 and in particular in the Figures C.3 and C.4.

The effects on the national economy are measured in terms of the flows generated by the project:

◆ **which are summarised in the consolidated account: imports, intermediate goods and services (IGS), value added and subsidies**

    ➡ **DIRECT EFFECTS**   **§ 5.1.1**

◆ **which are induced changes in the rest of the economy through the successive supply of intermediate goods and services**

    ➡ **INDIRECT EFFECTS**   **§ 5.1.2**

◆ **and which, added together, comprise the**

    ➡ **TOTAL EFFECTS**   **§ 5.1.3**

5.1.1. Direct effects

The direct effects can be taken from the consolidated operating account (Figure C.3), after distinguishing:

- the intermediate goods and services imported by the entities in the consolidated account and the intermediate goods and services locally purchased. The total of the intermediate goods and services (imported and local) is described as "rank 1" consumption;
- the CIF[1] cost in foreign currency and the taxes and customs tariffs relating to imported intermediate goods and services.

Hence:

$$P \text{ consolidated} = \text{Imports}_{CIF} + \text{IGS local direct} + \text{VA direct}$$

With:

P = Output value
VA direct = Value added including taxes and customs tariffs on imports

So, with the notations of § B.4:

$$\text{VA direct} = \text{W direct} + \text{T direct} + \text{FC direct} + \text{OP direct}$$

With:

W = Wages
T = Taxes
FC = Financial Charges
OP = Operating Profit

In practice, this consists of completing the following table:

—————
(1) CIF = Cost, Insurance, Freight. The CIF cost measures the border price of an import, i.e. its price at the entry point into the national economy.

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Table 5.1. *Direct effects calculation table*
(covering one year)

| ITEMS | AMOUNT | LOCAL IGS | IMPORTS | |
			Foreign currency (CIF)	Taxes, customs tariffs
< **Intermediate goods and services** . Raw materials . Parts and supplies . Maintenance, repair . Services . Overheads				
TOTAL IGS	IGS	IGS loc. dir.	Import dir.	TCT
< **Value added** . Wages . Taxes (and subsidies) . Financial charges . Gross Operating Profit				
TOTAL VA	VA fin.			
TOTAL	consolidated P			

With:

$$\text{VAdirect} = \text{VAfin}_{.} + \text{TCT}$$

☞ Figure 5.1.
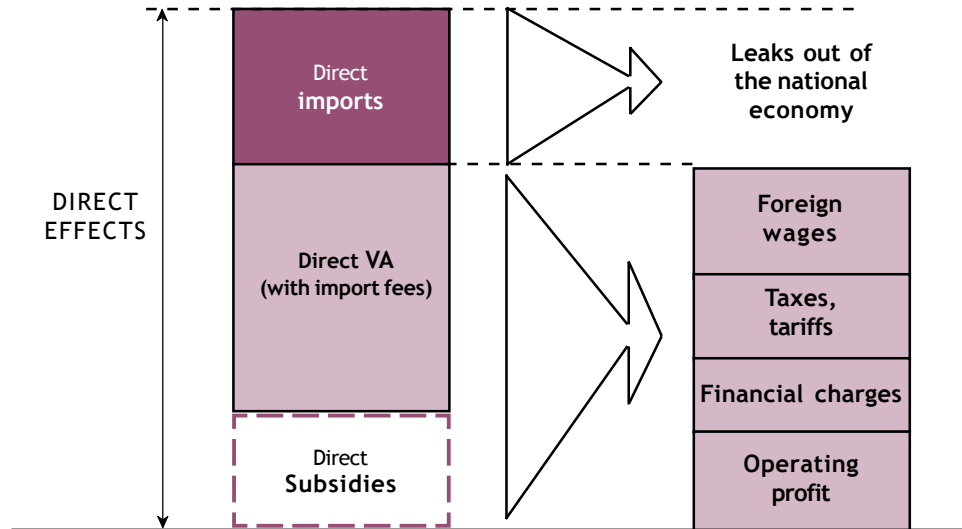
Figure 5.1. *Direct effects*

DIRECT AND INDIRECT TAXES

In effects analysis, the meanings of terms "direct" and "indirect" are different from those in business or national accounts.

Effects analysis defines those flows involving entities included in the consolidated account as direct and those produced by upstream enterprises as indirect.

In business accounting, direct taxes are levied on a firm's income, whereas other taxes, generally based on outlays or on the activity itself, are considered indirect.

In national accounts, obligatory levies on incomes and assets are considered direct. Those affecting production (independent of the earning of operating profits), the sale or purchase of goods or services, or imports and exports, are considered indirect.

5.1.2. Indirect effects

Indirect effects measure the ways and extent in which the project is integrated into the national economy. They result from the demand for intermediate goods and services created by the project and met by available local productive capacity[1].

_____
(1) When maximum local production capacity is reached, the additional demand can be met either by imports or by new investment (included in the consolidated unit "project + related investments" – § 2.2.).

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In practice, two methods of calculating indirect effects exist**:**

- ◆ For important local intermediate goods and services (and whenever the necessary information is easily obtained)
  - ⇒ A "manual calculation backward linkage" in the production chains is carried out using the operating accounts of suppliers or the accounts of the corresponding sectors or subsectors[1] [§ (a)]
- ◆ For all other intermediate goods and services (and when detailed information concerning the most important intermediate goods and services is lacking)
  - ⇒ The average "total coefficients" of the relevant subsectors are used [§ (b)]

These two methods are applied simultaneously, and the results obtained are then combined:

- ⇒ The amounts of indirect value added and indirect imports are added together.

(a) Manual calculation of backward linkages

The estimation of backward linkages is carried out for the local rank 1 intermediate goods and services (IGS), and only when the amounts involved are substantial. It involves breaking them down in proportion to the items in the supplier's operating account, or in the operating account of the suppliers' subsector. These indirect effects comprise:

- ◆ foreign currency outlays (CIF) on supplier imports;
- ◆ new "rank 2" local intermediate goods and services which it uses;
- ◆ possibly a subsidy element (subsidies given directly to the supply agency providing farmers with fertilizer, for example);
- ◆ and an amount of value added, which is itself divided into its different components – Wages (W), Financial Charges (FC), Taxes (T) and Operating Profit (OP) – including taxes and fees on imports.

If "rank 2" IGS amounts are high *compared to the value of the initial consolidated production*, the process is repeated – but this is rarely the case. Other rank 2 intermediate goods and services are dealt with statistically [§ (b) below].

Rapid convergence in backward linkages:

Theoretically, the process of backward linkages is infinite since there is always a rank n+1st of local IGS. However, in reality, the process of tracing backward linkages leads rapidly to very small amounts of local IGS relative to the value of the direct effects. The backward links are

———————
(1) A *subsector* brings together all the companies having the same principal revenue. An international Classification of All Economic Activities serves as a reference for national accounts systems.

said to *converge*. This convergence is all the more rapid in less developed, poorly integrated economies[1]. As a general rule, the process of tracing backward linkages stops at rank 2.

CIF Imports:

The imported intermediate goods and services found in the accounts may include:

- the CIF value of imports, that is, their real foreign currency cost (if the transporter is foreign);
- corresponding taxes and customs tariffs;
- and, sometimes, port costs (e.g., customs and forwarding entities), and transport charges from the port of entry.

Only the CIF foreign currency value should be included in the indirect imports. The taxes and customs tariffs are incorporated into the value added. Port costs are part of local intermediate goods and services (or elements of value added for parafiscal taxes).

Information sources:

The operating accounts of supplier firms are sometimes published or made available to supervising ministries (in the case of public entities), tax departments, chambers of commerce and industry, and economic information centres. However, direct inquiries are preferable whenever possible (e.g., requests made to firms, surveys to establish the average accounts of village artisans). It may also be useful to seek out incremental information in customs statistics or customs services, and in existing studies.

(b) The statistical calculation

It has been established (§ C.3) that by the mechanism of backward linkages, the value of a subsector's production can be broken down – *on average* – into:

- an element of foreign currency costs: total imports I;
- and an element of total value added, to be subdivided into its components W, T and GOM (or FC and GOP).

Those proportions of imports and of value added "incorporated" into the subsector's output are called **total subsector coefficients (or rates)**. For example, in the "paper/cardboard" subsector, total coefficients of 0,40 and 0,60, respectively mean that, *on average*, a production of cardboard having a value of euro 1 induces a series of economic effects leading to a loss of euro 0,40 in foreign currency (imports) and a creation of euro 0,60 of value added, by the different enterprises of the subsector and those **linked backwards**.

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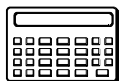
(1) And thus the "leaks" resulting from imports are considerable.

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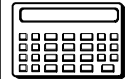
In general, the "total coefficients" enable the analyst to calculate, by simple multiplication, the *average* content of imports and value added "incorporated" in any good or service. It is thus possible to calculate the import and value added contents of the local IGS appearing in the consolidated account by assuming that they have the same average upstream effects as the subsectors from which they derive.

For example, if a consolidated account contains an item of packaging costing euros 2,000, this could be assigned to the paper and cardboard subsector and its indirect effects estimated as follows:

$$\text{I indirect} = 2,000 \times 0,40 = \text{euros } 800$$

$$\text{VA indirect} = 2,000 \times 0,60 = \text{euros } 1,200$$

Or:

$$\text{I indirect}_i = \text{Cm total}_i \times \text{IGS local}_i$$

With:

I indirect$_i$ = Indirect imports generated by the production of IGS local$_i$

IGS local$_i$ = Local IGS pertaining to the subsector i

Cm total$_i$ = Coefficient of total imports of the subsector i

And

$$\text{VA indirect}_i = \text{Cva total}_i \times \text{IGS local}_i$$

With:

VA indirect$_i$ = Value Added generated by the production of the local IGS$_i$

Cva total$_i$ = Coefficient of total value added of the subsector i

And, in detail for the components of the value added:

$$\text{W indirect}_i = \text{Cw total}_i \times \text{IGS local}_i$$
$$\text{T indirect}_i = \text{Ct total}_i \times \text{IGS local}_i$$
$$\text{GOM indirect}_i = \text{Cgom total}_i \times \text{IGS local}_i$$

Thus, the breakdown of the local intermediate goods and services in foreign currency costs and value added is obtained by multiplying their amount by the total coefficients of the subsectors from which they derive.

Information sources:

The "subsector total coefficients" or "subsector total rates" can come from:
- subsector or subsector studies, which may provide more precise and recent data than national accounts, and may turn out to be the only available data if no recent Input-Output Tables have been produced;
- national accounts, which provide the "total rates" for all the subsectors of the economy.

These rates can be calculated using two source documents: the Input-Output Table (IOT) or the Social Accounting Matrix. Annex G describes the use of these tables.

(c) The calculation of indirect effects in practice

The two methods of calculating indirect effects are complementary:

- ◆ the most accurate method is to use "manual" calculation of backward linkages together with analysis of the operating accounts of suppliers[1]. This requires considerable amounts of data and complex calculations.

    ➠ This method is used for the items of local intermediate goods and services (of rank 1, sometimes rank 2) whose relative importance is considerable[2].

- ◆ the alternative method is to use "subsector total coefficients", which is extremely rapid, though less precise because global rates are used. If these total rates are not available, they can only be estimated within the framework of project assessment if an import-based IOT exists.

    ➠ This method is used for the items of direct local IGS (of rank 1) of lesser importance, and for items of indirect local IGS (rank 2 and higher). In this way, the work of the analyst is kept within reasonable time and information limits.

Note: In the absence of total rates, it may be possible to make the backward linkages using subsector accounts until the point where the remaining local intermediate goods and services becomes negligible. In practice, a simple table reproduced two or three times on a spread sheet is all that is needed.

Finally, the results obtained through the different calculations carried out are added up: firstly, all the indirect imports, and, secondly, all the value added (and its components). The sum of these two elements is the initial amount of the local intermediate goods and services of rank 1 ("direct" IGS)

$$\text{IGS local direct} = \text{I indirect} + \text{VA indirect}$$

In practice, this involves completing the table below:

----

(1) Or of firms whose features are considered similar, or else using activities' account structures resulting from specific studies.
(2) As a rough guide, depending on the nature of the activities and the account structure, the "threshold" of importance can be empirically estimated at about 5% of the value of the consolidated production.

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Table 5.2. *Indirect effects calculation table*
(covering one year)

LOCAL IGS		TOTAL RATES					INDIRECT EFFECTS				
Item	Amount	I	W	T	FC	GOP	I	W	T	FC	GOP
- i	Xi	Ai	Bi	Ci	Di	Ei	Ai.Xi	Bi.Xi	Ci.Xi	Di.Xi	Ei.Xi
- j*	Xj						Ij*	Wj*	Tj*	FCj*	GOPj*
- ...											
- ...											
TOTAL	IGS local						I indir	W indir	T indir	FC indir	GOP indir

* local IGSj=manual calculation of backward linkages.

With: VA indirect = W indir + T indir + FC indir + GOP indir
and   IGS local = ICIF indirect + VA indirect

Accounting categories:

Certain items of IGS fall outside the standard categories of the national accounts and cannot be analysed without an inordinate amount of work. Because of this, approximations have to be made. The items most often involved include "diverse overheads", "administrative charges", "maintenance" and even, in the calculation of the indirect effects of investments' , "start-up costs".

The decision on whether or not to calculate the indirect effects of depreciation costs rests with the analyst. However, this is generally not done because such indirect effects are more hypothetical than real, in that the flows of foreign currency losses and income distribution thus calculated, year after year, do not actually take place. Moreover, the analyst cannot take account of depreciation in all the upstream intermediate goods and services. The effects of the investment is allowed for through efficiency calculations (§ 7.1).

5.1.3. Total effects

The total effects are equal to the sum of the direct and indirect effects:

Total effects = direct effects + indirect effects

Hence:
$$\text{I CIF total} = \text{I CIF direct} + \text{I CIF indirect}$$
and
$$\text{VA total} = \text{VA direct} + \text{VA indirect}$$

Therefore the value of the consolidated output of the project is broken down into two elements:
$$\text{P consolidated} = \text{I CIF total} + \text{VA total}$$

The total value added, to which possible operating subsidies received by certain entities are added, is divided into wages (W), taxes (T), financial charges (FC) and operating profit (OP)[1]:
$$\text{VA total} + \text{Subsidies total} = \text{W total} + \text{T total} + \text{FC total} + \text{OP total}$$

It is possible to break these categories down further (e.g., salaries and wages, day-labourer income, farmer income, income of informal sector enterprises and possibly to subdivide them on a regional basis).

In practice, this involves completing the table below:

Table 5.3. *Total effects calculation table*
(covering one year)

ITEMS	AMOUNT	ORIGIN	IMPORT (CIF)	VA W	VA T	VA FC	VA GOP
< **Intermediate goods and services**							
. Raw materials		Imp/loc					
. Parts and supply		Imp/loc					
. Maintenance and repair		Imp/loc					
. Outreach activities		Imp/loc					
. Overheads		Imp/loc					
. ...							
TOTAL IGS	IGS	-	I indir	W indir	Tn indir	FC indir	GOP indir
< **Value added**							
. Wages				W dir			
. Taxes (and subsidies)					Tn dir		
. Financial charges			*FCfx*			FC dir	
. Gross Operating Profit							GOP dir
TOTAL VA	VA fin.						
TOTAL	P consol.		I incl	W incl	Tn incl	FC incl	GOP incl

FCfx: Direct Financial charges paid in foreign currency (§ 5.3.1).
Tn = Taxes net of subsidies.

_____
(1) Or else in W, T and GOM (Gross Operating Margin). "Indistinct value added", resulting from calculations or estimates for which no precise breakdown was obtainable, and even an item of residual local intermediate goods and services can sometimes be added to these categories.

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5.2. INCREMENTAL EFFECTS CALCULATION

In keeping with the general approach of cost-benefit analysis, the real (incremental) impact of the project is measured by comparing the characteristics of with and without-project situations (§ 1.3.2).

> **Comparison of the with- and without- project situations highlights two types of impact:**
>
> - **the linked effects on the national economy through chains of production**
>   - ➡ **INCREMENTAL EFFECTS LINKED TO PRODUCTION**   § 5.2.1
> - **changes in the consumption of the goods and services**
>   - ➡ **INCREMENTAL EFFECTS LINKED TO CONSUMPTION**   § 5.2.2
>
> **The project's overall incremental effects are produced by the combination of these to effects.**
>
> - ➡ **OVERALL INCREMENTAL EFFECTS**   § 5.2.3
>
> **The consistency of calculations should be adapted to each situation**
>
> - ➡ **UNDERLYING ASSUMPTIONS**   § 5.2.4

5.2.1. Incremental effects linked to production

The effects resulting from production activities can be seen clearly from the two cases when the project does not modify the level of domestic consumption:

- projects satisfying the same domestic demand (same production of goods or services with and without the project);
- export projects.

(a) Projects satisfying the same domestic demand

In the with- and without-project situations, the same quantities of the same goods and services, or of goods and services of substitutable qualities, are available to consumers.

$$\text{P consolidated}_{pjt} = \text{P consolidated}_{ref}$$

in noting with the index "pjt" the variables of the with-project situation, and with the index "ref" that of the without-project situation (or reference situation).

The backward linkages calculations made in the two situations make it possible to postulate the equation:

$$\text{I total}_{pjt} + \text{VA total}_{pjt} = \text{I total}_{ref} + \text{VA total}_{ref}$$

And so:

$$\text{VA total}_{pjt} - \text{VA total}_{ref} = -\text{I total}_{pjt} + \text{I total}_{ref}$$

Hence:

$$\Delta\text{VA total} = -\Delta\text{I total}$$

The supplementary total value added (ΔVA) created in the with-project situation is equal to the incremental foreign currency earnings (– ΔI). The Figure 5.2 shows the incremental overall effect of the project.
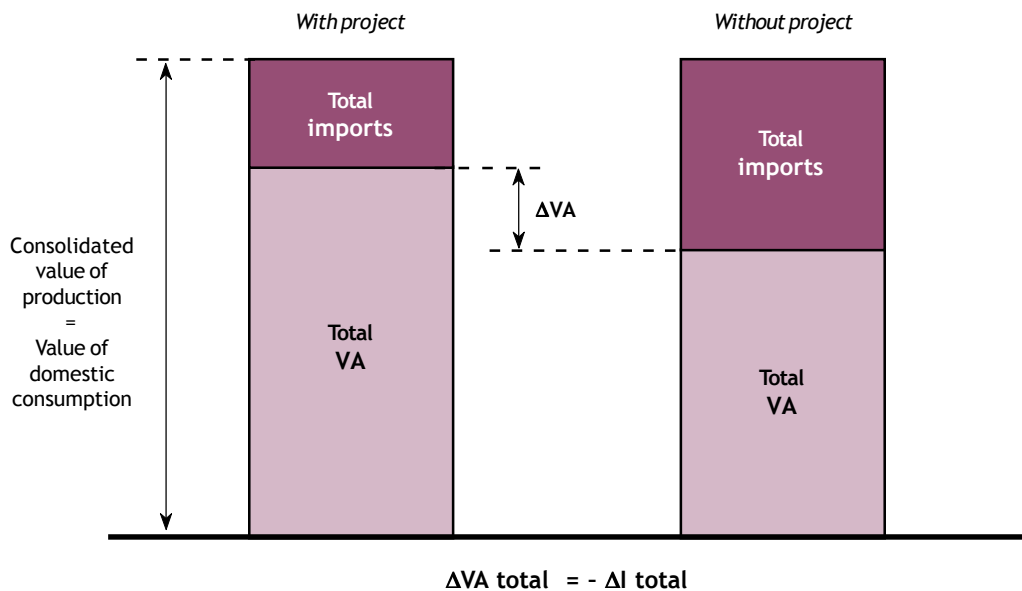
Figure 5.2. *Satisfaction of the same domestic demand (at the same price)*

Note: Import substitution projects are a special case, for the main part of the revenue in the without-project situation is composed, on one hand, of a CIF cost in foreign currency and, on the other hand, of taxes and customs tariffs (Figure 5.3).

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ΔVA total = - ΔI total
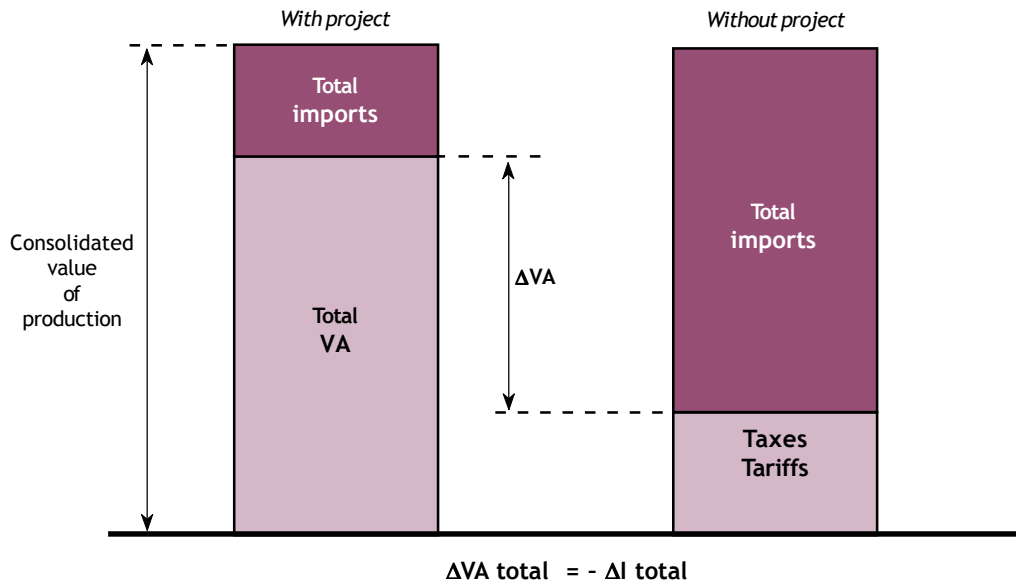
Figure 5.3. *An import substitution project satisfying the same domestic demand*

(b) Export projects

If the project replaces an existing export activity, the calculation of the effects in each situation will make possible the measurement of the net foreign currency contribution:

$$Px_{pjt} – I\ total_{pjt} = VA\ total_{pjt} = \text{net foreign currency earnings}$$

$$Px_{ref} – I\ total_{ref} = VA\ total_{ref} = \text{net foreign currency earnings}$$

with: Px = production exported

The incremental net contribution is then simply calculated by comparing the net earnings (and not the gross earnings Px):

$$\Delta VA\ total = VA\ total_{pjt} - VA\ total_{ref} = \text{net incremental foreign currency earnings}$$

equivalent to:

$$\Delta VA\ total = \Delta Px – \Delta I\ total$$

If the project involves launching new exports, which do not replace previous export activities, the amount Px_{ref} is nonexistent. The without-project situation consists of "doing nothing", since, logically, the determination of the with- and without-project situations does not allow for *domestic* consumption (§ 2.1).

There is thus no alternative to a new exports project[1], and the incremental contribution is directly measured by total VA_{pjt}:

$$\Delta VA\ total = VA\ total_{pjt} = Px_{pjt} - I\ total_{pjt} = \text{net incremental foreign currency earnings}$$
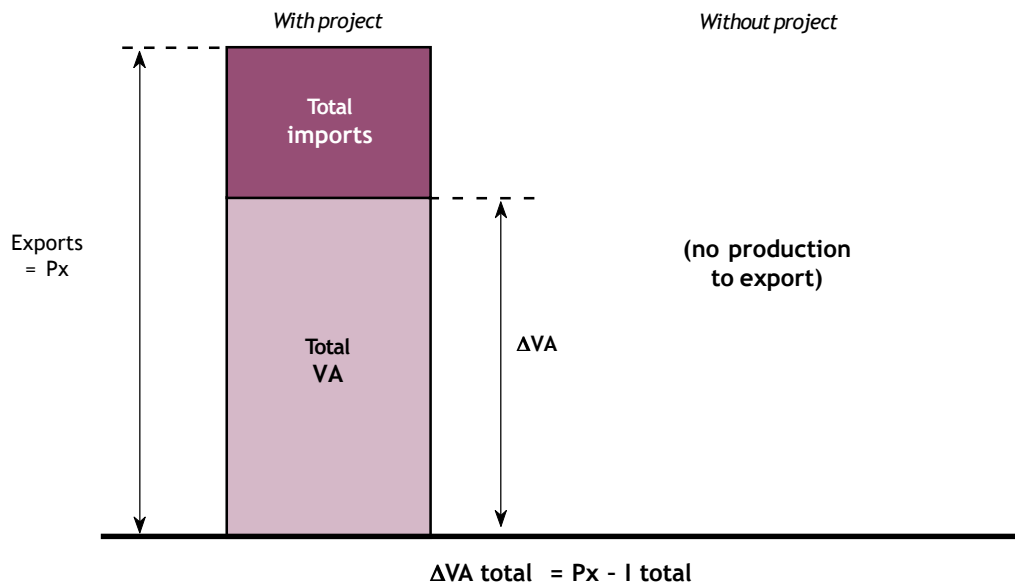
Figure 5.4. *New exports project*

5.2.2. Incremental effects linked to consumption

Effects on consumption are of two kinds: those relating to price variations and those involving changes in the quantities of goods and services consumed. These can arise:

- from changes in production: a new technology involving lower unit production costs, a larger plant bringing economies of scale, or new transport infrastructure, which lowers unit costs;
- from outlet competition: as in the case of a shrimp processing project aimed at urban customers which makes shrimps cheaper and more available on the local market, or the construction of a tourist complex which absorbs a large part of the local artisanal production capacity.

_____
(1) Unless it cuts off scarce factors of production from other activities (§ 2.1.2).

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However, assessing the dynamics of demand and supply (linking through price the quantities of a good or service produced and/or consumed), is not undertaken as part of the economic analysis of the project. If this question is important, it should already have been examined during project formulation (e.g., through a market study). Economic analysis thus uses estimated price parameters and flow quantities and ignores any estimation of a theoretical "satisfaction surplus"[1].

(a) Consumer benefit

The effects of changes in the prices of goods and services in turn affect consumer incomes. For a given quantity of a good or service:

- a drop in price will provoke a "spending-shortfall", which is equivalent to an income gain (positive consumer benefit);
- a rise in prices results in the need to spend more for the same consumption, and is equivalent to a drop in income (negative consumer benefit).

The savings made by users as a result of the project, called **the Consumer benefit (CB)**, is calculated as follows (keeping the symbol Δ to refer to the "with-project situation less the without-project situation"):

$$\mathbf{CB = (p_{ref} - p_{pjt})\ H\ Q_{ref} = -\ \Delta p\ HQ_{ref}}$$

With: p = price of the good or service considered

Q_{ref} = quantity consumed in the without-project situation.

If the volumes of goods and services consumed are the same in the two cases ($Q_{ref} = Q_{pjt}$, as shown in Figure 5.5), then:

$$\Delta VA + CB = -\ \Delta I$$

☞ Figure 5.5.

_____
(1) "Consumer surplus" such as J. DUPUIT, A. MARSHALL or J.R. HICKS have shown.
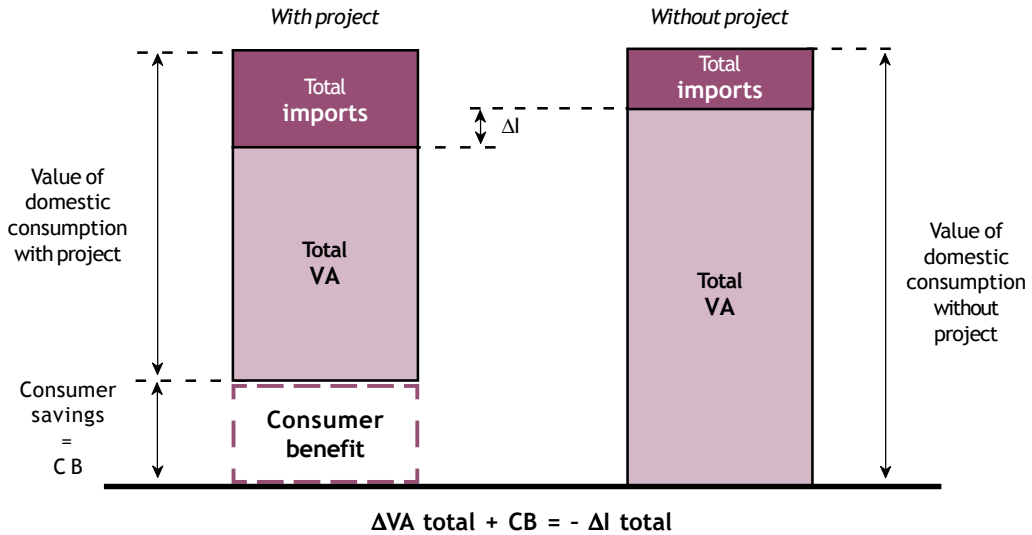
Figure 5.5. *Consumer benefit*
(with satisfaction of the same domestic demand)

(b) Quantitative changes in meeting domestic demand

In the case of projects which change the quantity of a good consumed, improved well-being due to the project is measured by the value of changes in consumption, calculated on the basis of the same (with-project) market price. However, the analyst must check that the new consumption does not occur at the expense of other consumption. If it does, the consumption transfers should be allowed for.

The variation of consumption (VC) is measured simply as follows:

$$VC = p_{pjt} \times (Q_{pjt} - Q_{ref}) = p_{pjt} \times \Delta Q$$

The incremental amount of consumption flows, if considered in isolation, makes it possible only imperfectly to assess the economic benefit of the project[1]. It is nonetheless an effective measure, at market prices, of the supplementary consumption generated by the project.

If the price p is the same in the two situations ($p_{pjt} = p_{ref}$, as shown in Figure 5.6), then:

$$\Delta VA = - \Delta I + VC$$

_____
(1) The question of the valuation of well-being is extremely complex (§ 5.3.1).

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With project   *Without project*

$$\Delta VA \text{ total } = -\Delta I \text{ total } + VC$$
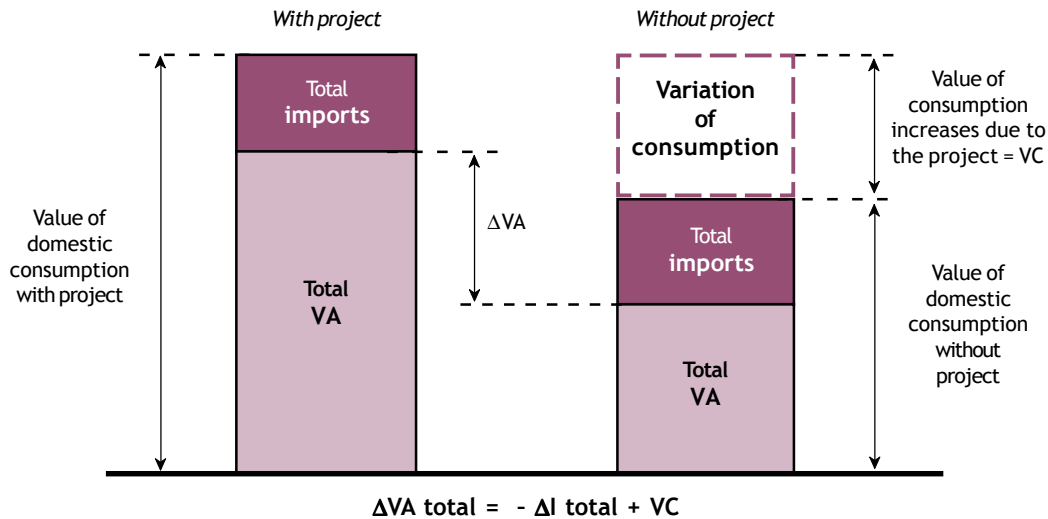
Figure 5.6. *Quantitative variations in consumption*
(at the same price)

5.2.3. Overall incremental effects

The project's incremental contribution is estimated by:

- ◆ the "double determination" of the "with and without-project" alternative which takes into account:
    - • the production of goods and services by the project (substitution, new introduction – § 2.1.1);
    - • the production of other goods and services, which change because the project uses scarce resources (§ 2.1.2). These are referred to as "altered productions" in the table below;
- ◆ and, on the quantity and price conditions at which the products are provided to the domestic market.

Note: Sometimes "downstream effects" must be added to "upstream effects" (i.e. backward linkages). For example, this happens when the increase in local production is distributed – downstream – through traders whose activity was not included in the consolidated account.

A distinction must thus be made between those situations providing the same domestic demand at the same conditions, those creating a net benefit for the consumer, and those resulting in changes in the quantities consumed. The overall incremental impact is given by the set of these comparisons for the different products and outlets.

☞   Table 5.4.

Table 5.4. *Determination of the overall incremental effects*

PROJECT PRODUCTION	"ALTERED" PRODUCTION
INTENDED FOR THE NATIONAL MARKET	
< Technical substitution $\rightarrow \quad \Delta VA = -\Delta I$	< Technical substitution $\rightarrow \quad \Delta VA = -\Delta I$
< Import substitution $\rightarrow \quad \Delta VA = -\Delta I$	< Recourse to imports $\rightarrow \quad \Delta VA = -\Delta I$
< Modification of consumption . prices $\rightarrow \quad CB = -\Delta p.Q$. quantities $\rightarrow \quad VC = p.\Delta Q$	< Modification of consumption . prices $\rightarrow \quad CB = -\Delta p.Q$. quantities $\rightarrow \quad VC = p.\Delta Q$
INTENDED FOR EXPORTATION	
< New exports $\rightarrow \quad \Delta VA = \Delta P_x - \Delta I$	< Reduction of exports $\rightarrow \quad \Delta VA = \Delta P_x - \Delta I$
< Technical substitution $\rightarrow \quad \Delta VA = \Delta P_x - \Delta I$	< Technical substitution $\rightarrow \quad \Delta VA = \Delta P_x - \Delta I$

INCREMENTAL OVERALL EFFECTS:

overall $\Delta VA = 3\ \Delta VA$ of the different production involved

And:

$$3\ [\Delta VA + CB] = 3\ [FCE + VC]$$

so:

$$3\ [\Delta VA + \Delta p.Q_{ref}] = 3\ [(\Delta P_x - \Delta I) + p_{pjt}.\Delta Q]$$

FCE = Incremental net Foreign Currency Earnings.

N.B.:

(1) Δ refers to " With project less Without project".

(2) All the data shown on this table can be either positive or negative.

(3) When there are no changes for exports ($\Delta P_x = 0$), the incremental net foreign currency earnings results from the savings in foreign currency (FCE $= -\Delta I$).

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5.2.4. Underlying assumptions

These calculations require the analyst to make assumptions, which must be borne in mind in interpreting the results obtained.

- **Generalised labour unemployment**: The *incremental* demand of the project for labour (ΔW total) can be met without diverting labour from other productive activities. This assumption is not as limiting as it would seem for two reasons: because of the widespread underemployment which exists in most developing countries, both of qualified[1] and non-qualified workers; and because, where diversion does take place, the production thus eliminated or "disrupted" has normally been identified and included in the analysis (§ 2.1).

- **Existence of spare production capacity in all subsectors:** the *incremental* demand of the project on the national economy does not require new investment or diversion of productive capacity. Any significant intermediate production which cannot be provided to the project using existing spare capacity should have been identified and associated investments included in the "consolidated unit initial project + related investments" (§ 2.2.2); or production eliminated or modified because of the "diversion" of intermediate goods and services by the project would have been taken into account for the definition of the with- and without-project situations.

  This assumption must be carefully checked in the case of large projects whose IGS demand (e.g., energy) may exceed available spare capacity. The possible use of "total rates" and of national accounts tools (e.g., IUT) naturally reinforces the "influence" of this assumption.

- **Stability of the input-output coefficients** (in volume) which link productive activities. In *ex-ante* analysis, links between subsectors are forecast assuming no product substitution. It is assumed that there is no change over time in the choices between local and imported intermediate goods and services, even though there is an increase in overall production.

- **Stability of the relative price system**, i.e. of the relative values of the prices of all final and intermediate products. In particular, this system of relative prices does not change despite variations in production due to the project. This assumption may introduce an error, and so should be assessed using sensitivity analyses.

The combination of the last two assumptions[2] leads one to postulate the *consistency of the input-output coefficients in value*. More generally, the fundamental assumption postulated is that of a proportional development of the economy apart from the production of the analysed investments. In economic terms, this is the same as postulating the equality of the average and marginal technical coefficients of the input-output matrix.

---

(1) *Domestic* labour is being addressed here.

(2) In theory the application of the methodology does not require these assumptions. However, they are systematically used when doing operational project analysis.

PRIMARY AND SECONDARY PHASES

The primary phase covers all the backward linkages resulting from productive activities and entails the distribution of *total* incomes (W, T, FC, OP). Subject to the assumption of spare capacities, these flows are obtained "automatically". They depend solely on the **technical coefficients,** which reflect the structure of the economy.

The secondary phase begins with the use of these total incomes by households, governments, and firms. Each of these entities earmarks its income either for consumption (purchases of goods and services), savings, or various transfers such as payment of taxes. Apart from these latter transfers, which are obligatory, the flows which result from the use of income are the result of *decisions* taken by each entity.

The new consumption of goods and services resulting from these flows creates an incremental demand for production and imports, a demand which spreads throughout the rest of the economy and, in so doing, creates value added. At the close of this second cycle, other decisions will be made by the entities concerning the use of the new incomes obtained. These decisions will in turn give rise to new economic activities (third cycle), and so on. The flows resulting from cycles thus depend on **behavioural parameters**. When totalled, they constitute the *multiplier effect*.

The economic evaluation of projects is strictly limited to the primary phase. The study of the second phase requires further assumptions (particularly on behavioural parameters, income elasticities, propensities to consume) and variables (in the course of cycles and time), and requires resources well beyond the scope of a project evaluation.

5.3. EFFECTS ANALYSIS

Effects analysis – as distinct from the effects calculation, above – involves selecting and interpreting indicators to answer key questions. Because of uncertainty about the accuracy of many data, **sensitivity analyses** should be carried out to check on the overall validity of the conclusions.

The analysis of the market price effects of projects is based on estimates of incremental effects and involves:

- ◆ **studying the project's contribution to:**
    - ➡ **GROWTH**   **§ 5.3.1**
    - ➡ **FOREIGN EXCHANGE BALANCE**   **§ 5.3.2**

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| ➠ **PUBLIC FUNDS BALANCE** | **§ 5.3.3** |
| ➠ **INCOME DISTRIBUTION** | **§ 5.3.4** |

◆ **examining the economic efficiency of the project as well as its contribution to major policy goals and structural reforms:**

| ➠ **ECONOMIC PROFITABILITY** | **§ 7.1** |
| ➠ **ECONOMIC RELEVANCE OF THE PROJECT** | **§ 7.2** |

Notes:

(1) The analysis of the incremental effects cannot be based solely on incremental flows. The order of magnitude influences the judgement: an incremental flow of 10 has not the same importance for flows of 100 (110 – 100) and of 1,000 (1,010 – 1,000).

(2) In this manual the index t denotes time.

5.3.1. Contribution to growth

Growth is a main objective of economic policy in all countries. It is measured by the **total value added, total VA$_t$**, which is equivalent to the contribution of the project to GNP.

The specific incremental contribution of the project is measured by the **incremental total value added, ΔVA total$_t$**.

The extent to which the project is integrated into the national economy is given by the **rate of integration**, which may be defined as:

$$\text{Rate of integration into the economy} = \frac{\text{VA total}_t}{\text{P consolidated}_t}$$

This rate represents the portion of the value of the production which actually remains within the national economy in the primary phase. It can be interpreted as an indication of the driving economic capacity of the project. It is specific both to the activity and to the national economy.

☞ Table 5.5.
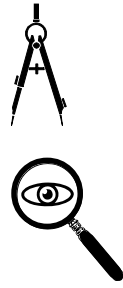
Table 5.5. *Effects on growth*

GROSS BENEFITS	Production$_t$
COSTS	total imports$_t$
NET BENEFIT	VA total$_t$
INCREMENTAL NET BENEFIT	ΔVA total$_t$ VC$_t$

VC = Variation of consumption.

Variation of consumption:

Certain projects modify the volume (Q) of goods and services' consumed:

$$\Delta VA \ total = - \Delta I \ total + VC$$

With: $VC = p.\Delta Q$

However, the value of the increase in domestic consumption (VC) is not of the same nature as the flows of income and foreign currency. It is unlikely, for example, that the nominal market price represents the real value of this incremental consumption for consumers or for society[1], especially in the case of projects providing vital commodities (e.g., subsistence products), or public or social services. Can the elimination of food shortages be measured by the yardstick of the price of harvested grain? Does improved public health as a result of a new type of diet correspond to the commercial value of new vegetable production? Does the sale price of new bicycles correspond to the increased well-being they make possible?

While in theory the answer, in a perfectly operating market economy, would be "yes", it is rarely the case. And yet, it is precisely this type of increased consumption which is one of the project's major objectives. Since it is not possible to make other estimates of the value of VC, the analyst is restricted to the market price. It is thus the other aspects of the analysis (e.g., social, technical, policy-oriented analysis) which must demonstrate "the true value of the project".

Domestic perspective and national perspective:

The total effects described so far relate to the income flows distributed within the domestic

_____
(1) In economics, the question which is posed is that of the correspondence between "utility" and market price.
(2) and to/from international banking institutions.

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economy[(2)]. The entities considered can be either national or foreign (e.g., expatriate workers, foreign-owned firms). Foreign entities involve "leaks" out of the national economy, because they lead to transfers to foreign countries and thus foreign currency losses.

It is possible to identify the respective shares of foreign and national incomes:

- total wages for expatriate workers (noted as Wf) and nationals (Wn);

$$W \text{ total} = Wf + Wn$$

- total financial charges paid to international banking institutions (FCf) and national banking institutions (FCn);

$$FC \text{ total} = FCf + FCn$$

- total operating profits of foreign firms (OPf) and national firms (OPn).

$$OP \text{ total} = OPf + OPn$$

Similarly, to the shift from Gross *Domestic* Product to Gross *National* Product, it is possible to deduct from the *domestic* total value added the income for foreign actors (e.g., enterprises, workers) in order to calculate the *national* total value added:

$$VA \text{ total}_{national} = VA \text{ total}_{domestic} - Wf - FCf - OPf$$

which is the value of the project's contribution to *national* growth.

It is relatively simple to determine the domestic and national shares of *direct* incomes, e.g.:

- use made of expatriate technical assistance;
- loans from foreign banks or international leading institutions.

By considering these elements, it is possible to estimate the amount of national total value added, especially since these "leaks" out of the economy are probably more important in the "*direct* stage". On the other hand, in calculating indirect effects, it is not always possible to maintain the distinction. Nevertheless, certain developing countries have national accounts which do distinguish the different elements of value added.

☞ Figure 5.7.
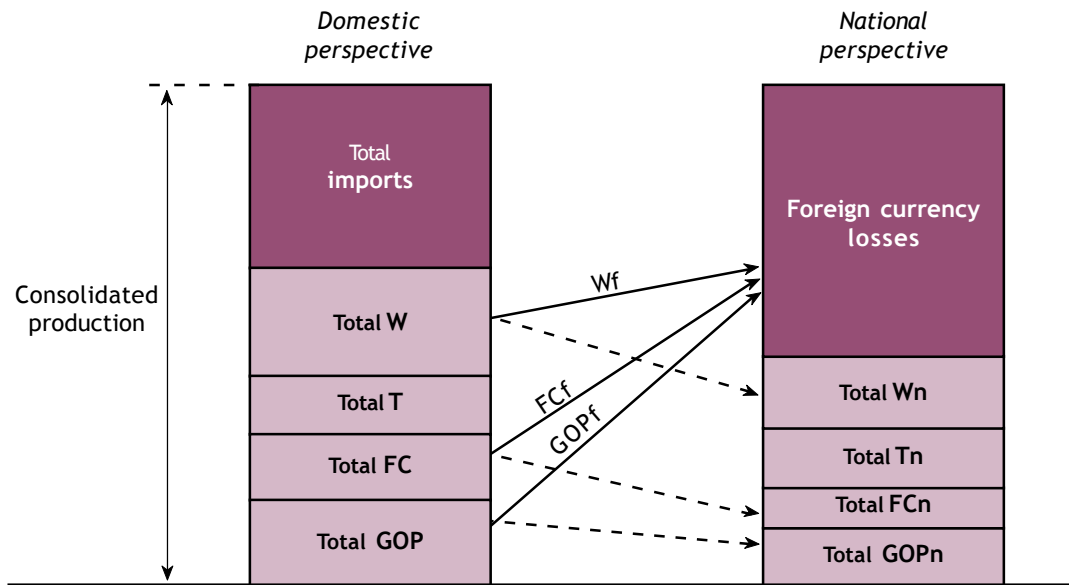
Figure 5.7. *Transition from domestic to national perspective*

N.B.:

(1) Operating profits of foreign firms should be calculated as "leaks" (OPf), taking into account any limits imposed on the repatriation of capital by national regulations. Note that a difficulty may exist for mixed-capital firms; a *pro rata* distribution is one simple solution.

(2) Direct financial charges paid in foreign currency to international credit institutions are analogous to a service import. They should thus be deducted from the amount of the total value added, because they constitute *immediate* leaks out of the economy, even when the analysis is limited to the domestic perspective.

5.3.2. Contribution to the foreign exchange balance

Cutting the foreign exchange deficit (or increasing the surplus) is another key objective of most countries' policies. The specific contribution of the project is measured by the net incremental balance between:

- foreign currency earnings: incremental exported production
- and the foreign currency losses: incremental imports of intermediate goods and services and incremental transfers of capital.

This impact can be described depending on the different balances of foreign exchange:

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- **Impact on the balance of trade**:

$$BOT_t = Px_t - I\,total_t$$

$$\Delta BOT_t = \Delta Px_t - \Delta I\,total_t$$

This is the balance between the exported products and the imported goods and services having contributed directly or indirectly to production.

- **Impact on the balance of current accounts:**

$$BCA_t = BOT_t - Wf_t - OPf_t$$

$$\Delta BCA_t = \Delta BOT_t - \Delta Wf_t - \Delta OPf_t$$

Foreign-labour wages and the profits of foreign firms are deducted from the balance of trade, thus beginning the calculation from "the national perspective".

- **Impact on the balance of payments:**

$$BOP_t = BCA_t - FCf_t$$

$$\Delta BOP_t = \Delta BCA_t - \Delta FCf_t$$

The shift to the national perspective is completed by the deduction of financial charges paid on loans from foreign banks.

☞ Table 5.6.

The true BCA and BOP impact only affects the flows actually repatriated outside the national economy.

Note: In accordance with the note of the preceding paragraph (§ 5.3.1), the interests directly paid by the project in foreign currency ($FCf\,direct_t$) are also deducted to calculate the effect on foreign exchange from the domestic perspective:

$$BOT_t - FCf\,direct_t$$

Beyond the annual financial charges flows, the project's impact on the composition of the external debt, and the external debt service, should be measured for all important projects.

The **return on foreign currency outlays (RFCO)** is an efficiency indicator which measures the amount of net foreign currency earnings per unit of foreign currency outlays (benefit-cost ratio R_{BC3} § E.2) for export projects:

$$\text{Return on foreign currency outlay}_t = \frac{\text{Net foreign currency balance}_t}{\text{Total foreign currency outlay}_t}$$

From a domestic perspective:

$$RFCO_t = \frac{Px_t - I\ total_t}{I\ total_t}$$

Or, from a national perspective:

$$RFCO_t = \frac{BOP_t}{I\ total_t} = \frac{(Px_t - I\ total) - (Wf_t + OPf_t + FCf_t)}{I\ total_t}$$

Table 5.6. *Effects on foreign exchange*

	BALANCE OF TRADE	BALANCE OF CURRENT ACCOUNTS	BALANCE OF PAYMENTS
GROSS BENEFITS	Export = Px_t	-	*(+ Foreign currency receipts for grants and loans)*
COSTS	Imports total$_t$	Wf_t OPf_t	FCf_t *(+Repayments in foreign currency)*
NET BENEFIT	$BOT_t = Px_t$ - total import$_t$	$BCA_t = BOT_t - Wf_t - OPf_t$	$BOP_t = BCA_t - FCf_t$
NET INCREMENTAL BENEFIT	ΔBOT_t	ΔBCA_t	ΔBOP_t

Sf, FCf and OPf: repatriated share of these flows.
Italics: these flows appear in the consolidated flow balance account, but not in the consolidated operating accounts.

A schedule of receipts and outlays from the point of view of foreign exchange management should be drawn up for the life span of the project.

For big projects, this schedule makes it possible to assess the viability of the overall "system" put in place by the project. The analysis of these flows – the probable limits of which may be tested by a **sensitivity analysis** focusing, in particular, on the exchange rate – gives an indication of the eventual viability of the project, when foreign exchange is a major constraint.

☞ Table 5.7.

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Table 5.7. *Schedule of foreign currency flows*
(covering the life span of the project – total debt-servicing period)
(in constant prices and at constant exchange rate)

YEAR	0	1	2	...	N
INFLOWS					
< **Exported production**					
. Revenue A					
. Revenue B					
. ...					
< **Receipt of international loans** (short, medium and long term)					
< **International grants**					
TOTAL FOREIGN CURRENCY EARNINGS = FCE					
OUTFLOWS					
< **Total imports**					
. Investments					
. Operations (total I)					
< **International debt servicing**					
. Repayment of capital					
. Interest on loans					
< **Other transfers**					
. Dividends and profits					
TOTAL FOREIGN CURRENCY LOSSES = FCL					
FOREIGN CURRENCY BALANCE = FCE – FCL Cumulative balance					

5.3.3. Contribution to the public funds balance

The reduction of the public fiscal deficit is also a central concern of development policies. In general, the impact of the project on public funds affects three types of flows:

- ◆ the receipts and outlays of the government budget measured by all the included flows of taxes, fiscal revenues and operating subsidies generated by the direct and indirect activities of the project;

  N.B.: Social security receipts (e.g., health, retirement, unemployment benefits) also

appear in this category, insofar as they have been identified separately from labour wages, and are managed by public agencies.

- the loan (and grant) flows from financing agencies and the corresponding debt servicing by the public sector (interests – FCp – and repayment of the principal)[1];
- the operating profit (surplus or deficits – OPp) of public entities[2].

In an operating year, the balance for the government is therefore:

Government Balance total$_t$ = T total$_t$ – Subsidies total$_t$ – FCp direct$_t$ + OPp total$_t$

The project's specific contribution is measured by the net incremental amounts.

Table 5.8. *Effects on public funds*

GROSS BENEFITS	Total Taxes (T total$_t$>0) Total Public Surplus (OPp$_t$>0)
COSTS	Total Subsidies (T total$_t$<0) Public Financial Charges (FCp$_t$) Total Public Deficits (OPp$_t$<0)
NET BENEFIT	Balance$_t$= (Taxes$_t$ – Subsidies$_t$) - Public financial charges$_t$ + (Public Surplus$_t$ – Public deficit$_t$) = Tn tot.$_t$ - FCp$_t$ + OPp tot.$_t$
NET INCREMENTAL BENEFIT	∆Balance$_t$

Tn = Taxes net of subsidy.

The importance of government levies is seen in several ways:

- the **rate of apparent** (or **nominal**) **taxation (RAT),** given by the relationship between the direct effects balance for the government and the project's production:

$$RAT_t = \frac{\text{Direct government balance}_t}{\text{consolidated P}_t}$$

$$= \frac{\text{Tn direct}_t - \text{FCp direct}_t + \text{OPp direct}_t}{\text{consolidated P}_t}$$

_____
(1) Usually only direct interests (FCp) are known.
(2) Taking care not to make a double account by adding the deficit of the firms and the subsidies provided to cover them.

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- the **rate of direct taxation of factors (RDTF)**, which measures the importance of transfers relative to the wealth created at the direct-effects stage:

$$RDTF_t = \frac{\text{Direct government balance}_t}{\text{VA direct}_t}$$

- the **rate of total taxation of production (RTTP)**, which, using total effects, gives an indication of the levy on all the activities involved in the project:

$$RTTP_t = \frac{\text{Total government balance}_t}{\text{consolidated P}_t}$$

$$= \frac{\text{Tn total}_t - \text{FCp total}_t + \text{OPp total}_t}{\text{consolidated P}_t}$$

- the **rate of total taxation of factors (RTTF)** which relates the government total balance to the overall wealth created:

$$RTTF = \frac{\text{Total government balance}_t}{\text{VA total}_t}$$

This indicator measures the content in net taxes (or net subsidies) of the value added created. A rate of + 0,10 thus signifies that 10% of the wealth created is monopolised by the government. A positive rate signifies that there is a net taxation, while a negative rate indicates that the project's operations are subsidised by the government.

- the **coefficient of real cost for the Government (CRCG)**, which relates the total balance to the apparent cost made up of the amount of operating subsidies directly given to the project (in absolute value):

$$CRCG_t = \frac{\text{Total government balance}_t}{\text{*Direct subsidies}_t\text{*}}$$

A negative CRCG indicates that, on the whole, the government is subsidising the project:

- CRCG < – 1: the direct subsidies are increased by other subsidies at the indirect activities level; the direct intervention of the government at the project level leads to other indirect support (costs);

- – 1 < CRCG < 0: the CRCG measures the proportion of direct subsidies that the Government does not recover through direct and indirect taxes.

A positive CRCG shows that the Government recovers the sums allocated to project operations for all its direct and indirect activities. The CRCG then measures the "return on the monetary subsidy unit" devoted to the project operations.

- The **return per monetary unit invested by the government (RMUIG)** is a non-discounted cost benefit ratio (R_{BC2} § E.2) which measures the amount of net receipts for the government added to the cost of the initial public investments (INV.p), for a year of normal operation (noted norm.):

$$\text{RMUIG}_{\text{norm.}} = \frac{\text{Total government balance}_{\text{norm.}}}{\text{INV. p}}$$

- It is possible to discount the formula so as to calculate the **government return on investment index (GRII)** for the life span of the project (R_{BC4}, § E.3):

$$\text{GRII} = \frac{\displaystyle\sum_{t=0}^{N} \frac{\text{Total government balance}_t}{(1+i)^t}}{\displaystyle\sum_{t=0}^{N} \frac{\text{INV.p}_t}{(1+i)^t}}$$

This ratio is useful in cases where the government is a major investor; however, it requires that the discount rate of the foreign-currency flows be determined.

From the standpoint of public fiscal management, a schedule of receipts and outlays should be drawn up for the life span of the project.

☞ Table 5.9.

OVERALL APPROACH	ECONOMIC INTEGRATION	FINANCIAL ANALYSIS	CONSOLIDATION	5 ECONOMIC EFFECTS	INTERNATIONAL VIABILITY	EFFICIENCY RELEVANCE	NON-TANGIBLE PRODUCTS

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Table 5.9. *Government receipts/outlays schedule*
(covering the life span of the project)

YEAR	0	1	2	...	N
RECEIPTS					
< **Taxation and duties**					
. on investments					
. on operations					
. imports					
. exports					
< **Public entities**					
. Budgeted operating margins (dividends,...)					
< **Grants and direct loans**					
. Receipts					
TOTAL RECEIPTS = R					
OUTLAYS					
< **Direct investments**					
< **Taxation, duties**					
. On lending, repayments					
< **Subsidies**					
. on goods and services					
. operating					
< **Public entities**					
. Budgeted operating deficits					
< **Public debt servicing**					
. Repayment of the principal					
. Interest					
TOTAL OUTLAYS = O					
GOVERNMENT BALANCE = R – O Cumulative balance					

This schedule, established in current prices, enables the analyst to forecast budgetary receipts and outlays.

It also makes it possible to assess the viability of the overall "system" put in place by the project. The analysis of the flows – the probable amounts of which may be tested by a **sensitivity analysis** – gives an indication of the eventual viability of the project within the framework of the country's budgetary constraints.
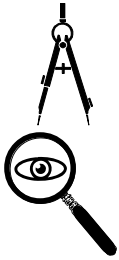
5.3.4. Balance of income distribution

The incremental value added corresponds to the incremental distribution of income to the different (direct and indirect) entities, but takes into account transfers such as subsidies. In all the cases where consumption is not modified (satisfaction of final domestic demand at the same quantity and price), it is possible to write in total terms:

$$\Delta VA_t + \Delta Subsidies_t = \Delta W_t + \Delta T_t + \Delta FC_t + \Delta OP_t$$

The interpretation of certain incremental effects linked to consumption has already been presented (§ 5.2.2):

- the consumer benefit is similar to a redistribution of income to households or firms which benefit from it;
- the variation of consumption is different and must be treated as a benefit of the project as such, and should not be added to the income of the entities involved (see also § 5.3.1 for a brief discussion of the real value of VC).

Other incomes are considered positively because of their expected impact on investments (e.g., corporate revenues or family entrepreneur incomes)

Moving beyond the standard categories of national accounting[1], the entities which the analyst selects to analyse income distribution effects will vary from project to project and may include industrial sector employees, rural day-labourers, family enterprises (farmers, artisans, informal sector), local and foreign credit institutions, "modern" private firms, and public entities. It is sometimes useful to distinguish, for households, between employee income (W) and family farming and informal enterprise income (OP).

The income categories selected can be used in assessing the regional distribution of income (domestic or national perspective – § 5.3.1).

A table of jobs created is useful in summarising the effects of the project on income distribution.

☞ Table 5.10.

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(1) Households, enterprises, administration.

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Table 5.10. *Effects on the income of the major entity categories*

GROSS BENEFITS	Distributed income (W, T, FC, OP)
COSTS	Subsidies and FCp
NET BENEFIT	Household balance Government balance Enterprise balance
NET INCREMENTAL BENEFIT	ΔBalances Consumer benefit Variation of consumption

5.4. SUMMARY OF PROCEDURE FOR THE ANALYSIS OF EFFECTS ON THE MAJOR ECONOMIC POLICY OBJECTIVES

The diagram below illustrates how the calculation of the project's effects on major national objectives is carried out.

☞ Figure 5.8.
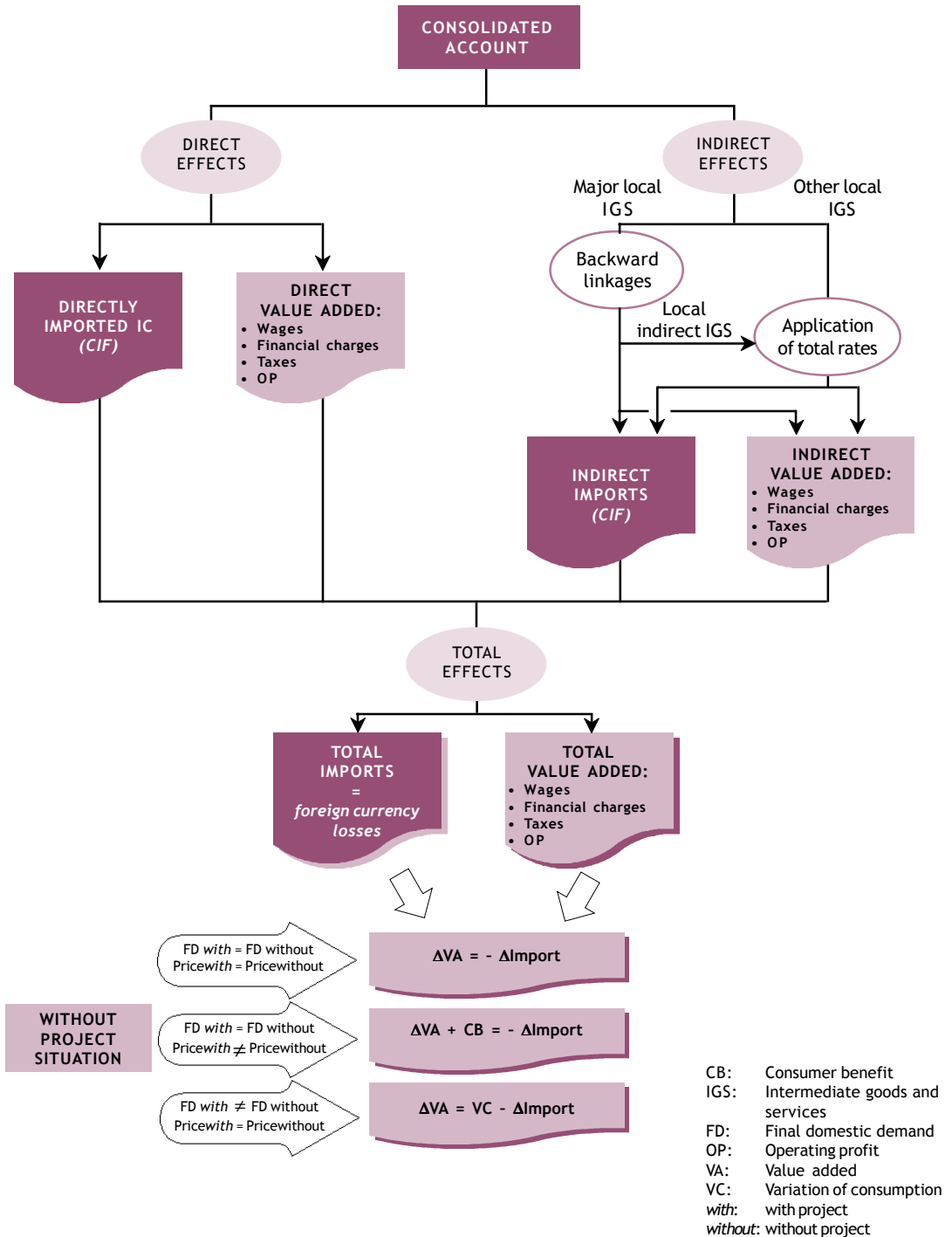
Figure 5.8. *General procedure for effects analysis*

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CASE STUDY
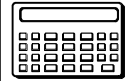
N.B.: In order to simplify the presentation, the following calculations are shown only for the first year of normal operation (year 6). Rounded figures may not add up exactly.

1. Total effects with the project

Direct effects: only chemical products and spare parts are directly imported by the project. Taxes and customs fees of 33% of the CIF value are charged on these.

Table V.1 - *Calculation of direct effects for year 6*
(thousands of NMU – constant prices)

	AMOUNT	Local IGS	Imports Foreign currency	Imports Custom tariffs
INTERMEDIATE GOODS AND SERVICES				
Fertilizer	243	243		
Chemical products	647		485	162
Electricity	642	642		
Fuel, lubricants	904	904		
Spare parts	1168		876	292
Equipment maintenance	326	326		
Supply and miscellaneous services	308	308		
Total IGS	**4238**	**2423**	**1361**	**454**
VALUE ADDED				
Salaries and social security contributions	2581			
Technical assistance	0			
Financial charges	3598			
Taxes	508			
GOP	14084			
of which Depreciation	4228			
NOP	9856			
Total financial VA	**20772**			
TOTAL	**25010**			
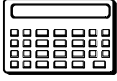
Hence:

$$\text{VA domestic direct} = 20{,}772 + 454 = 21{,}226$$

Taking into account the interest on the international loan taken out by the industrial entrepreneur and paid directly in foreign currency (national perspective):

$$\text{VA national direct} = 20{,}772 + 454 - 3{,}198 = 18{,}028$$

In the **indirect effects** calculations, two types of total coefficients are used:

– For the most important input item after directly imported spare parts – 'fuels and lubricants' – the analyst carries out a manual backward linkage analysis:

· in rank 2, three major items appear in the accounts of the suppliers of fuels and lubricants: refining, transport and a 'miscellaneous' item;

· in rank 3, the analyst uses the structure of the refining and transport subsector accounts and tries to find the best approximation of the 'miscellaneous' item.[1]

– The analyst may use national accounts and existing studies to determine the *total coefficients* relating to the other intermediate goods and services.

In such a way that calculation of the **total effects** is organized as follows:

Table V.2 - *Table showing the calculation of indirect effects covering year 6 (thousands of NMU – constant prices)*

LOCAL IGS	AMOUNT	TOTAL COEFFICIENTS				INDIRECT EFFECTS				
		Imports	Salaries	Taxes	GOM	Imports	Salaries	Taxes	GOM	TOTAL
Fertilizer	243	0.22	0.28	0.25	0.25	53	68	61	61	243
Electricity	642	0.50	0.13	0.27	0.10	321	83	173	64	642
Fuel, lubricant(*)	904	0.47	0.05	0.33	0.11	421	47	300	103	870
Equipment maintenance	326	0.33	0.28	0.22	0.17	108	91	72	55	326
Supply and miscellaneous services	308	0.25	0.19	0.27	0.29	77	59	83	89	308
Total IGS	**2423**					**980**	**348**	**689**	**373**	**2389**

(*) Total coefficients do not add up to 1.00, so a residual amount of NMU 34.10^3 is not broken down.

[1] By stopping at rank 3, the residual portion (not broken down into imports or VA) of this item reaches NMU 34.10^3, i.e. only 4% of the value of the fuels and lubricants item that is 0.1% of the amount of annual production. It is thus unimportant.

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Table V.3 - *Table showing the calculation of total effects in year 6*
(thousands of NMU – constant prices)
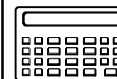
	AMOUNT	Origin	Imports (CIF)	VALUE ADDED		
				Salaries	Taxes	GOM.
INTERMEDIATE GOODS AND SERVICES						
Fertilizer	243	Local	53	68	61	61
Chemical products	647	Imported	485	0	162	0
Electricity	642	Local	321	83	173	64
Fuel, lubricants	904	Local	421	47	300	103
Spare parts	1168	Imported	876	0	292	0
Equipment maintenance	326	Local	108	91	72	55
Supply and miscellaneous services	308	Local	77	59	83	89
Total indirect effects	**4238**		**2341**	**348**	**1142**	**373**
VALUE ADDED						
Salaries and social security contributions	2581			2581		
Technical assistance	0			0		
Financial charges	3598					3598
Taxes	508				508	
GOP	14084					14084
TOTAL EFFECTS: DOMESTIC PERSPECTIVE(*)	**25010**		**2341**	**2929**	**1650**	**18055**
Technical assistance			*0*	*0*	*0*	
Financial charges (direct)			*3198*			*-3198*
TOTAL EFFECTS: NATIONAL PERSPECTIVE(*)	***25010***		***5540***	***2929***	***1650***	***14857***

(*) Addition of the elements of this line shows a missing 34 coming from the "Fuel, lubricant" line – see Table V.2.

N.B.: The shift from the domestic to the national perspectives is achieved by taking into account:

– the income paid in foreign currency to the technical assistance (i.e. 95% of the amount of this item) and the taxes pertaining to this item (5%). This item is nil in year 6;

– the financial charges paid in foreign currency (international loan taken out by the industrial complex).

2. Total effects without the project

In the absence of local production, the HD polyethylene is imported by a specialist company. The only economic activities linked to this are the activities of the importer, the forwarding entity at the port, and domestic transport. It is possible, by studying these activities, to estimate the total effects of the without-project situation.
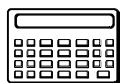
3. Incremental effects

The effects of the productive activities can be estimated by applying the definition of the incremental flows:

Incremental flows = flows with the project – flows without the project

Table V.4 - *Total incremental effects of production in year 6*
(thousands of NMU – constant prices)

	With project	Without project	Incremental
DOMESTIC PERSPECTIVE			
Import outlays	2 341	10 374	- 8 033
Total Foreign Currency outlays	**2 341**	**10 374**	**- 8 033**
Wages	2 929	2 329	600
Taxe	1 650	3 682	- 2 032
G O M	18 055	3 519	14 536
Total domestic VA	**22 635**	**9 531**	**13 104**
NATIONAL PERSPECTIVE			
Import outlays	2 341	10 374	- 8 033
Technical assistance (Foreign currency)	-	-	-
Interest paid in Foreign currency	3 198	-	3 198
Total Foreign currency outlays	**5 540**	**10 374**	**- 4 835**
Wages	2 929	2 329	600
Taxes	1 650	3 682	- 2 032
G O M	14 857	3 519	11 338
Total national VA	**19 436**	**9 531**	**9 906**

N.B.: With rounded Figures.

Negative incremental foreign currency outlays mean that the project makes foreign currency earnings.

Price differences of HD polyethylene between the with and without project situations indicate the existence of **consumer benefits**. So, in year 6:

$$CB = - \Delta p \text{ H } Q = (1,990 - 2,488) \text{ H } 10,000$$

$$CB = - NMU \ 4,976.10^3$$

The negative consumer benefit shows that HDPE purchasers spend more in the with the project situation.

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With project   *Without project*

VC = 129   **Variation of consumption**

Total imports = 5,540

Total imports = 10,374

$\Delta I = -4,835$

24,881$^{(*)}$

Total national VA = 19,436

Total national VA = 9,531

CB = – 4,976

Consumer benefit = - 4,976

(*) The sum I + VA is inferior to this Figure by 34: see Table V.2.

Figure V.1 - *Comparison of the situations with- and without- project in year 6 (National perspective)*

It should be noted that the existence of a by-product of the fabrication of the HDPE, yeast, which is used in land application for cultivation, leads to a final (but unimportant) **consumption variation of consumption** (VC) between the with- and without-project situations (see below: "Impact on consumption").

☞   Table V.5.

The size of the international financial charges paid in foreign currency by the industrial complex make the **national perspective** more relevant than the domestic perspective, when analysing the effects of the project.

4. Analysis of the project's effects

Contribution to growth:

The total amount of value added indicates the project's real contribution to national growth, which varies from 10 to NMU 13 million per year. This largely positive *incremental* value added indicates that the project will increase the GNP more than would have happened in the without-project situation.
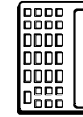
Table V.5 - *Overall total incremental effects from the national perspective*
(thousands of NMU – constant prices)

Years	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Incremental foreign currency earnings	0	0	0	-2019	2283	4447	4835	•5292	5705	6074	6406	6702	6967	7203	7412	7598	7762	7906	8033	8033	8033
Variation of consumption	0	0	0	52	103	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
INCREMENTAL TOTAL EFFECTS	0	0	0	-1968	2386	4576	4963	5421	5834	6203	6535	6831	7096	7332	7541	7727	7891	8035	8162	8162	8162
Incremental VA including:	0	0	0	9	6340	9519	9906	10364	10776	11146	11477	11774	12038	12274	12484	12669	12833	12977	13104	13104	13104
Wages	0	0	0	352	413	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
Taxes	0	0	0	-904	-1722	-2072	-2032	-2032	-2032	-2032	-2032	-2032	-2032	-2032	-2032	-2032	-2032	-2032	-2032	-2032	-2032
GOM	0	0	0	562	7649	10991	11337	11796	12208	12578	12909	13205	13470	13706	13915	14101	14265	14409	14536	14536	14536
Consumer benefit	0	0	0	-1990	-3981	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976	-4976
INCREMENTAL TOTAL EFFECTS	0	0	0	-1981	2359	4543	4929	5388	5800	6170	6501	6798	7062	7298	7507	7693	7857	8001	8128	8128	8128
Residual amount[(*)]	-	-	-	13	27	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34

(*) Unbroken down part of "Fuel, lubricant" item – see Table V.2.

OVERALL APPROACH ECONOMIC INTEGRATION FINANCIAL ANALYSIS CONSOLIDATION **5 ECONOMIC EFFECTS** INTERNATIONAL VIABILITY EFFICIENCY RELEVANCE NON-TANGIBLE PRODUCTS

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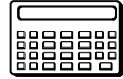
The project's rate of integration into the national economy is very high: 91% from the domestic perspective and between 80% and 91% from the national perspective (following the second year of full operation).

The rate of integration into the national economy must be adjusted to take into account the fixing of a guaranteed price for HDPE, which is equivalent to overvaluing the VA. By taking into account this negative consumer benefit[1], the rate of integration would go down to 88% in the domestic perspective and between 75 and 88% in the national perspective.

⟵ The project thus mobilises national economic resources more fully than importing would, which has a rate of integration into the economy of less than 50% (48% – nearly a third of which is the result just of taxes and import rights on HDPE). The project thus contributes strongly to growth.

Contribution to the foreign exchange balance:

❑ **Balance of trade**

In the absence of exports, the impact on the balance of trade is provided by the difference between total imports with and without the project, including foreign currency outlays for investment and renewal (and prior to the deduction of financial charges paid in foreign currency by the industrial plant). In a year of normal operation (with constant prices and exchange rates):

$$\Delta BOT = NMU\ 8,033.10^3$$

Or, 77% of the cost in foreign currency of the without-project situation.

❑ **Balance of current accounts**

The before tax salaries of the international technical assistance staff, which are paid in foreign currency, are deducted. Because this assistance is only provided in the first two years, the net foreign currency earnings ΔBOT are thus only reduced for that period.

❑ **Balance of payments**

The impact on the balance of payments is calculated by deducting the interest paid in foreign currency. So for year 6 (with constant prices and exchange rates):

$$\Delta BOP = 8,033.10^3 - 3,198.10^3 = NMU\ 4,835.10^3$$

Debt service is important in the first years of operation.

_____

(1) Or should this price not be fixed.
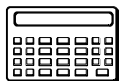
➥ **During the first years of normal operations, savings due to the project amount to 50-60% of the foreign currency outlays of the without-project situation, and to over three quarters (77%) after total repayment of the loan.**

Contribution to the balance of public funds:

Because there are no subsidies and outlays directly handled by the Government, or involving the public sector, the balance for the Government is limited to the taxes and fees it collects. Due to the exemption of taxes and fees on investments, receipts are limited to operating flows. Direct receipts reach almost a NMU million (NMU 962.10^3) while indirect ones amount to NMU 688.10^3 per year of full operation.

➥ **The apparent tax rate (4%) is relatively low. The incremental government earnings, which result from the wider effects in the economy, remain limited since the total rate of total taxation of production (RTTP) and the rate of total taxation of factors only reach approximately 7% (6.6 and 7.3%, respectively).**

In addition, comparison with the without-project situation reveals important losses for the Government: the implementation of the project results in a loss of NMU 2 million per year from tariffs on HDPE. The project thus has a destabilizing effect on the Government budget.

Income distribution:

❏ **Household balance**

Incremental wages reach NMU 600.10^3 per year of normal operation.

➥ **The incremental household income is equivalent to only one quarter of payroll costs in the import situation. This is because of the high wages paid in the marketing of imported HDPE, and of the capital-intensive technologies used by the project.**

❏ **Balance for the enterprises**

This is measured by the incremental Operating Margin of the firms (including financial charges), to which is added the consumer benefit[1]. In other words:

---

(1) Consumers are enterprises since the polythene is transformed into tubes. As a matter of fact, this is a subtraction, since CB is negative due to the increase in the HDPE price.

N.B.: This calculation assumes that these industries do not pass on the increase of the price of the HDPE component in the final price of the plastic tubes.

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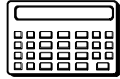
ΔGOM + CB. In a year of normal operation, total revenues of firms rises progressively from $14{,}511.10^3$ to NMU $18{,}055.10^3$ and the incremental balance from around $6{,}015.10^3$ to NMU $9{,}560.10^3$.

Nevertheless, by taking account of the depreciation of the investments, the balance is given by ΔNOM + CB[1]. It is held down by the high cost of investments: $10{,}282.10^3$ to NMU $13{,}827.10^3$ in global amount $1{,}787.10^3$ to NMU $5{,}331.10^3$ or the incremental balance.

The firms thus benefit most from this project (3 to 9 times as much as households), especially the operator of the industrial complex (who accounts for between 75 and 82% of the total amount).

❑ **Impact on consumption:**

The final difference in consumption between the with- and without-project situations concerns yeast, a by-product of the processing of the cane into HDPE. Used in irrigation farming, its value (around 0.5% of the total value of the production) is marginal.

_____

(1) NOM: Net Operating Margin (§ B.4)

$$NOM = GOM - depreciation$$

6. ANALYSIS OF THE VIABILITY OF THE PROJECT WITHIN THE INTERNATIONAL ECONOMY

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Development projects causes changes in the economic environment in which they are implemented. A project's impact on the economy can be analysed by assessing the effects[1] (Chapter 5). On the other hand, the impact of the economic environment (e.g., prices and availability of goods and services, seasonality, national policies and regulations, organisation of the sector, sub-sector or international market, regional agreements and regulations) on the project, must also be analysed to assess the project's **sustainability**, which is defined as **the ability of the project to generate an acceptable level of benefits over a period of sufficient length, once the financial and technical assistance of the donors is ended**[2]. This analysis of project **viability** enables the project analyst to measure the impact of constraints resulting from:

- the international economy into which the national economy is integrated and in relation to which the growth of national income is, in the final analysis, measured[3].

- the operation of local markets (e.g., market imperfections) and national policies (e.g., incentives to produce, protectionist measures, exchange policies).

The aim in analysing project viability is to estimate the constraints on a project due to its integration in the national, and international economy. To this end, two questions must be asked:

- within the framework of international prices[4], and taking into account national factors of production (e.g., wages), does the project produce more wealth than it consumes?

- how do the operations of national markets and the policies which apply to them affect these economic results?

In order to carry out such an analysis, the costs and benefits, estimated at market prices, must be evaluated by the analyst using "*shadow*" prices. To do this, new information concerning the international economy (e.g., prices, quality, international trade) must be collected. It is usually possible to carry out these tasks within the framework and resources of an appraisal or evaluation mission.

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(1) If necessary, economic impact analysis also includes an examination of the changes in sectoral structure and organizational environment.

(2) Definition of the OECD (DAC) (in *Manual, project cycle management..., op. cit)*. In this manual, financial and economic sustainability is referred to as "viability".

(3) Which is demonstrated, in the short run, by the calculation of the contribution of the project to growth, prior to effects linked to consumption (§ 5.2.1): $\Delta VA = - \Delta$ Import.

(4) Which constitutes the reference for measuring efficiency.

The analysis of the viability of the project within the international economy requires:

METHODS... [2]

The methodology presented in this chapter is based on the approach to the economic evaluation of development projects known as "shadow price methods". These were developed at roughly the same time in different development organisations: the OECD (LITTLE and MIRRLEES, 1969), UNIDO (DASGUPTA *et al.*, 1972) and the World Bank (SQUIRE and VAN DER TAK, 1974, GITTINGER – 1972 and 1982).

Since then, they have been adopted by most multilateral or bilateral financing agencies. While the fundamental principles of this method have been established, there are differences among the agencies concerning the procedures (which may be quite simple or highly complex) to be used.

The approach presented here diverges from the standard approach in four main ways:

- it is concerned with operationality and takes into account the resource and other constraints faced by project appraisal/evaluation teams (time and human resource limitations, as well as the limitations of the available information base);

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- price adjustments are limited to parity prices for the internationally tradeable goods and, when necessary, at the shadow exchange rate;
- by integrating all the economic entities involved in the project into the analysis (consolidated account), thus taking certain externalities into account;
- by developing a set of indicators that addresses more than economic profitability.

REFERENCE WORKS:

< LITTLE I.M.D, and MIRRLEES J.A. 1969. *Manual of Industrial Project Analysis, Volume II*. Paris: OECD Development Centre.

< UNIDO. 1972. *Guidelines for Project Evaluation*. Prepared by P.S. DASGUPTA, S.A. MARGLIN and A.K. SEN. New York: United Nations.

< SQUIRE L., and VAN DER TAK H.G. 1975. *Economic Analysis of Projects*. World Bank. Baltimore: The Johns Hopkins University Press.

< GITTINGER J. PRICE. 1982 (2nd edition). *Economic Analysis of Agricultural projects*. Economic Development Institute (World Bank). Baltimore and London: The Johns Hopkins University Press.

< MONKE E.A., and PEARSON S.R. 1989. *The Policy Analysis Matrix for Agricultural Development*. Ithaca and London: Cornell University Press.

< Various sectoral manuals.

6.1. PRESENTATION OF THE APPROACH

An outline of the approach is given at § C.4, and Figure C.5. With the study of the integration of the project into its national and international context, the evaluation ceases being a simple description of flows and becomes an approach which requires an overall view of the mechanisms regulating the economy. Some "theory" is thus necessary.

The constraints which affect the project are taken into account *by modifying the value of the flows*. A proper application of this approach thus demands:

- **an understanding of the importance of the price mechanism in the working of economies**

   ➡ **THEORETICAL FOUNDATIONS OF ANALYSIS BY PRICES** § 6.1.1

- **the basic principles of the procedure be clearly set out:**

   ➡ **THE APPLIED METHOD: INTERNATIONAL PARITY PRICES** § 6.1.2

The assumptions on which the calculations are based (§ 6.2.6) will be discussed after outlining the approach.

6.1.1. Theoretical foundation of analysis by prices

The value of a good or service to an economic entity is given by the *price* at which it can be bought or sold. However, these prices do not necessarily reflect the *value* of the good or service from the standpoint of society as a whole.

In order that prices and value coincide, economic theory stipulates that prices should be established by **the free play of supply** (the producers) **and demand** (the consumers), in an environment of "**free and equal competition**". Under these conditions[1], prices give "signals" to entities enabling them to allocate their scarce resources (goods and services, labour, capital, environment) in a way that permits them to maximise overall domestic income and spontaneously to regulate the economy. If, however, prices do not reflect real values, an entity's decisions will be distorted, which will make it impossible to maximise overall income.

There are two reasons why market prices and the actual value to society as a whole may diverge:

- ◆ market *distortions* hinder the free operation of markets;
    - ➠ Distortions mean that market prices do not reflect the value of the resource to society as they should.
- ◆ *externalities*: i.e. the changes caused by the project which do not appear in the economic accounts of the entities involved.
    - ➠ If externalities are not taken into account, the cost of the resources used in the project is reduced (or increased) by an amount equal to the negative (or positive) external effects.

Four main types of distortions exist:

    (1)   **Transfers**, i.e. the financial flows in an economy which are made without tangible compensation and/or without consuming economic resources. These transactions have no effects on domestic income[2]: property changes hands, but the total available wealth in society is not altered. While transfers are a cost for the entity paying for them, and a benefit for the entity which receives them, they are neither from the stand point of society as a whole. The two main types of transfers are:

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(1) And numerous parallel conditions, such as: the capacity of the players involved to interact, fairness in the initial distribution of resources, free market access, the economic rationality of the players, the clarity of the information, product homogeneity, factor mobility, the absence of government intervention, and the absence of external effects.
(2) Except when they concern a foreign entity not residing in the national economy.

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- government taxes and subsidies, which do not alter the total existing wealth, but only its distribution;

- financial transfers (e.g., taking loans, servicing of debts). These are merely transactions between entities (the borrower and the lender) and have no effect on the creation of wealth (and hence on national income), or the investment returns.

Another type of transfer is unilateral payments between entities within the economy (e.g., humanitarian grants, social welfare or religious payments).

(2)   **Government intervention** in the economy. Taxes and subsidies are an important form of intervention, which distorts market prices, because producers pass them on in their prices. Other ways in which government intervention affects the free operation of markets is through:

- the control of prices (which imposes limits to prices or dictates fares to be used). Holding down prices of key commodities in this way is often an aim of social policy and gives an incentive to consumer demand.

- the control of interest rates, for savings and loans, which affects the balance of supply and demand in the capital market. Some countries have negative interest rate policies (that is, lower than the rate of inflation) which tend to discourage local savings while encouraging investment;

- tariffs and quotas on internationally traded goods (and sometimes within the national economy), in order to protect certain activities. They often lead to prices higher than those of the free market. This stimulates supply but limits demand and imposes a "consumer disbenefit".

- direct production by public and parastatal firms, either in a competitive sector or in one protected by a public service monopoly, and in which the management rules of these firms are based on principles different from those governed by the market. A special case of this direct intervention is the control of capital markets by banks and state credit agencies;

- regulations and policy measures of all kinds influence the decisions of producers and consumers (e.g., quality, security, marketing regulations, investment codes, exchange rates), sometimes in a discriminatory manner.

Because of these government interventions, the prices of goods and services do not always reflect their scarcity and utility; the fact that water is provided free (or at low cost) to urban populations does not mean that its production is without cost, nor that its use value is nil.

(3)   **Market "imperfections"**. Some markets may be dominated by one or just a small number of buyers or sellers. In such cases one speaks respectively of monopoly, monopsony, oligopoly or oligopsony. These sellers or buyers may thus control certain market mecanisms such as price fixation, information flows or restriction at entrance to newcomers.

The lack of market "transparency", which gives certain operators important information denied to others, is a frequent cause of market dysfunction, and can even lead to the organisation of "artificial" shortages. In "formal" sectors of the economy, wage levels are often determined more by social factors (e.g., union demands, the existence of social security contributions and minimum wages) than by interaction of supply and demand in the labour market.

The prices resulting from these market imperfections contain excessive margins, "rent elements" or "excess profits".

(4) **The over-valuation (or under-valuation) of the exchange rate** of the national currency. The exchange rate is the "international price of the currency". The determination of the "correct" exchange rate is not a simple operation, but can be understood by noting that:

- the taxes and fees applied to imports and exports constitute an "implicit premium" increasing the nominal exchange rate;
- in theory, the exchange rate should result from the balance of receipts and foreign currency outlays of the country.

The over-valuation of exchange rates is commonly practised by governments[1] using a variety of means, including control of access to foreign currency, the imposition of tariffs (fees and taxes) on certain types of goods, and/or the administrative maintenance of parity in relation to selected other currencies.

The over-valuation of the national currency makes imported goods less expensive, while increasing the price of exports on international markets. Thus imports rise and exports fall, hampering national production. The reasons for over-valuation may be social (e.g., avoidance of price increases in essential imported products) or result from some broader policy concern.

The distortions introduced into economies through these practices modify the general price system. Because of this, market prices only imperfectly measure the scarcity of goods or services for society (i.e. the costs and benefits of their production or their consumption).

Note: Project analysis does not require that the validity, relevance, effectiveness or general consequences of these interventions and policies are assessed. It should simply be noted that they change the behaviour of economic entities compared to the way in which they would act in a "free market".

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(1) However, structural adjustment policies have reduced the number of countries over-valuing their currencies over the last few years.

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EXTERNALITIES

The term "externality" or "external effect" comes from the fact that the operation of one entity may have consequences for other entities not included in the analysis. External effects can be broken down into two main categories:

- externalities with a short-term impact, which can be directly valued:
  - some of these may be taken into account in the evaluation: e.g., incorporating into the consolidated account those entities whose activities are connected to the project (incremental maintenance costs resulting from investments in roads, for example, – § 2.2), through the calculation of total effects, and through the calculation of consumer benefit (Chapter 5);
  - others, such as earnings from economies of scale for the upstream providers, or from the general development of an activity or a subsector (external effects in the sense of A. MARSHALL), are generally not taken into account;

- externalities with:
  - direct impacts which are theoretically possible to value, but where this is difficult because they will take place only in the distant future (e.g., due to exhaustion of key natural resources);
  - direct impacts whose value can only be estimated using numerous and/or broad assumptions[1], as in the case of the economic earnings resulting from the reduction of transport time, technological spin-off, and multiplier or accelerator effects;
  - non-tangible impacts, such as the effects on the environment, health, education, lifestyles, social roles and gender relationships.

Financial analysis, which focuses on an individual entity, does not take into account the external effects.

However, since the goal of economic analysis is to assess the costs and benefits for society as a whole, they should be taken into account. It is usual to limit consideration to the *short term* costs and benefits which can be *directly valued*. And yet, by nature, many external effects cannot be precisely valued, or even quantified. They thus will have to be left out of the calculations **but must absolutely be assessed by** other sociological, technological, environmental, health and education **analyses**.

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(1) But research is making progress in certain of those areas.

6.1.2. The applied method: international parity prices

Since the market prices of goods and services do not reflect their "real" economic value for society as a whole, the financial balances and the consolidated account only reflect the net balances *of entities* and not the "real" overall results of the project for society. The analyst thus has to attempt to establish the "true" economic results of the project by substituting **shadow prices** for the fixed market prices. These theoretical prices reflect the "real" value of resources for the national economy. Apart from this price adjustment, the definition of gross costs and benefits, and the method of calculating the net benefit, are similar to those of financial analysis.

SHADOW PRICES[1]

Two main categories of shadow prices exist:

- *Efficiency prices*, which should express:
    - in the case of inputs: their marginal cost of production or their opportunity cost;
    - in the case of outputs: their opportunity cost or the ability of consumers to pay.

- *Social prices*, which should express:
    - the estimation of the impact of the income of different entities on consumption and savings;
    - the economic policy objectives as concerns the distribution of income (in order, for example, to favour savings over consumption).

N.B.: The calculation of social prices is extremely complicated, and no universally agreed methodology exists. It is only done for certain studies.

In general, the estimation of the shadow value is based on the notion of **opportunity cost**. The opportunity cost of a good or service is measured by the value it would have in its best alternative use. Put another way, it is measured by the benefits it would have provided had it not been used by the project. However, this definition is not always easy to apply. For the national economy, exchanges with foreign countries constitute a systematic alternative to the production or consumption of most goods and services: should domestic entities neither produce nor

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(1) Also called "accounting "prices, "economic" prices, or "virtual" prices. The term "shadow price" was originally used only to refer to prices calculated using a planning model intended to calculate the optimal allocation of resources (dual mathematical program of a primal linear model).

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obtain them, they would be able to turn to international markets. It is for this reason that international prices accurately convey opportunity values[1].

In practice, the following terms are used:

- the shadow price of the flows being studied, expressed as **parity prices**, that is, the price of the possible alternative obtained by importing from or exporting to (or originating from) the same geographical point and in the same form;

  ➠ By applying international market prices the project may be analysed within the context of international exchanges.

- the shadow exchange rate, i.e. the shadow price of the national currency, used to convert international prices into prices expressed in national currency;

  ➠ In this way the analyst avoids introducing the economic cost of the over-evaluation of the currency into the project account.

- the local value of the factors of production and of intermediate goods and services which cannot be internationally marketed (e.g., wages, land).

  ➠ By conserving the value of these (internationally) non-tradeable goods and services, the existing system of relative remuneration between tradeable goods and services and domestic factors is maintained.

N.B.: Economists tend to refer to "tradeable goods" to refer to goods *and services* capable of being exported or imported, that is to say which can give rise to an *international* exchange – even if they are of local origin or destination for the project (and hence not *traded*).

SHADOW EXCHANGE RATE
OR STANDARD CONVERSION FACTOR?

Theoretically, the introduction of the shadow exchange rate (SER) into the calculations enables the analyst to relate all the various flows to a single "numeraire": the national currency. It thus becomes possible to conserve the face value of non-tradeable goods and domestic factors.

This method was chosen because it corresponds to a more intuitive approach for non-economists and promotes better undestanding.

Conversely, the application of a standard conversion factor (SCF) in order to adjust the value of non-tradeable goods and national factors would entail the retention of the official exchange rate for the international price exchange. The application of the SCF (the role

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(1) And not because their prices would be free of distortion... The structures of the international markets of a number of products often fall prey to imperfections (oligopolies or oligopsonies, state intervention, etc.).

of which is to "correct" the impact of foreign trade distortions) would be the same as reasoning in equivalent international prices.

There is no real difference between these two methods (i.e. using SER or SCF), as the two terms are joined in the equation:

$$\text{Standard Conversion Factor} = \frac{\text{Official Exchange Rate}}{\text{Shadow Exchange Rate}}$$

Therefore, in no instance can the SER and the SCF both be used.

6.2. METHOD OF CALCULATION

The method is based on the use of the *incremental consolidated account,* in:

- ◆ eliminating all the flows which do not represent a genuine consumption of re- sources: the *transfers*

  ➠ ELIMINATION OF TRANSFERS   § 6.2.1

- ◆ estimating the shadow prices based on the possible recourse to the international market: these are the *import/export parity prices*, which can be adjusted using the *shadow exchange rate*

  ➠ BREAKDOWN OF GOODS AND SERVICES INTO "TRADEABLES" AND "NON-TRADEABLES"   § 6.2.2

  ➠ VALUATION OF TRADEABLE GOODS AND SERVICES   § 6.2.3

- ◆ conserving the *local value* of all the other flows, or breaking it down into "trade- able" components

  ➠ VALUATION OF NON-TRADEABLE GOOD AND SERVICES   § 6.2.4

- ◆ modifying accordingly the value of the flows in the different accounts and tables used

  ➠ DRAWING UP THE ACCOUNTS   § 6.2.5

The consistency of calculations should be adapted to each situation

  ➠ UNDERLYING ASSUMPTIONS   § 6.2.6

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6.2.1. Elimination of transfers

All the transfer flows that appear in the consolidated account are eliminated.

Transfers are, by definition, flows which do not correspond to any production or real consumption of resources. Having no impact on domestic income, they should not appear in the overall results for society as a whole. Transfers are eliminated in practice by:

- reducing to zero the transfer items appearing explicitly in the consolidated account:
  - the taxes and subsidies paid to, or by, the Government, and which appear in the consolidated account (i.e. those which are paid to, or by, the entities directly involved);

    the fees paid to equalisation and stabilization funds from the prices and the payments made by these funds: by definition, the equalisation (in space) and the stabilization (in time) are financial transfers;

  - the financial flows linked to borrowing and credit operations: payment of the amount borrowed, service of the debt, accrued liabilities and accounts receivable. However, the financial flows in foreign currencies cannot be eliminated, since, from the standpoint of the national economy, they correspond to a use of scarce resources with an opportunity cost, and not to a simple internal transfer;

- substituting the total real cost (price actually paid + value of subsidy) of subsidised inputs. In the example of subsidised fertilizers, the price actually paid by farmers (appearing in the consolidated account) is substituted by the total real cost for society (price paid + value of subsidy). N.B.: when directly using the international market price, no subsidy is taken into account and, thus, it is not necessary to do this adjustment (subsidy calculation).

DIRECT AND INDIRECT TRANSFERS

Direct transfers are payments (flows of economic fees or shifts of claims on goods and services) taking place between two entities, with no compensation in goods or services (except the service of the transfer itself) and without the inducement of intermediaries.

Indirect transfers correspond to the analyses made by the economist of the flows between the two entities. There is an indirect transfer:

- when the actual prices diverge from the opportunity value of the good or service or from its marginal production value, or even its value in use;

- when "implicit" transfers take place (e.g., low prices given to farmers may inflate the trading margins of farmers).

In the method presented here, only direct transfers are eliminated.

6.2.2. Breakdown of goods and services into "tradeables" and "non-tradeables"

All goods and services (inputs and outputs) of the consolidated account are divided into tradeable or non-tradeable goods and services according to whether they are – *or could be –* traded on the international market.

Goods or services are considered tradeable when an international market exists for them in which the national economy could participate[1], in the absence of any restrictive policy concerning international trade. The tables 6.1 and 6.2 explain in detail the identification of tradeable and non-tradeable goods.

6.2.3. Valuation of tradeable goods and services

The basic principle of efficiency prices analysis is to value the flow of *tradeable* **goods and services according to their** *import/export parity prices* **and applying a shadow exchange rate to the border price.**

(a) Import/export parity prices

By definition, the option of resorting to the international market exists for tradeable goods. The international prices are thus really opportunity costs; they measure the value of goods to the national economy.

The parity price is a measure of the price that the good or service would have if it was provided *under the same conditions and location* by (or to) the international market. It is thus a foreign currency cost adjusted by taking into account all the costs occurring between the border point and the entity involved:

- the **import parity price** of a good is equal to its CIF[2] border price to which are added all the outlays (before taxes and subsidies, BTS) concerning delivery and possible processing and marketing occurring between the point of entry into the country and the place of consumption:

$$\text{Import parity price } = \text{ CIF Cost} + \text{Internal costs (BTS)}$$

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(1) This specification is necessary, because certain goods or services may only be the subject of international commerce in certain regions of the world. This is the case regarding electric energy, generally considered non-tradeable, but nonetheless sometimes exported from one country to another (by private companies or within the framework of multinational projects).

(2) Cost, Insurance, Freight.

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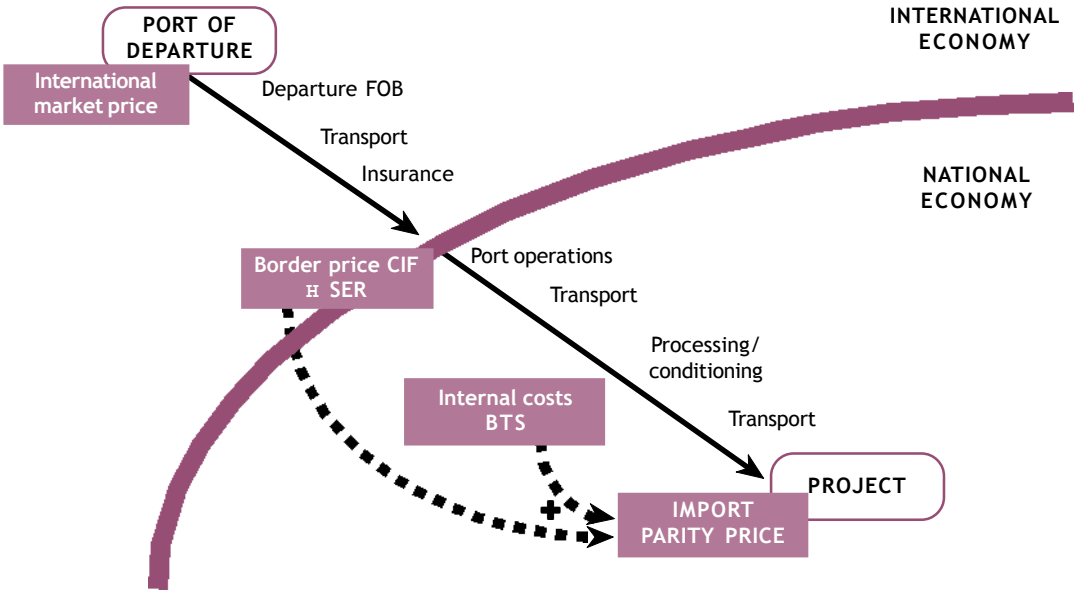
Figure 6.1. *Import parity prices*
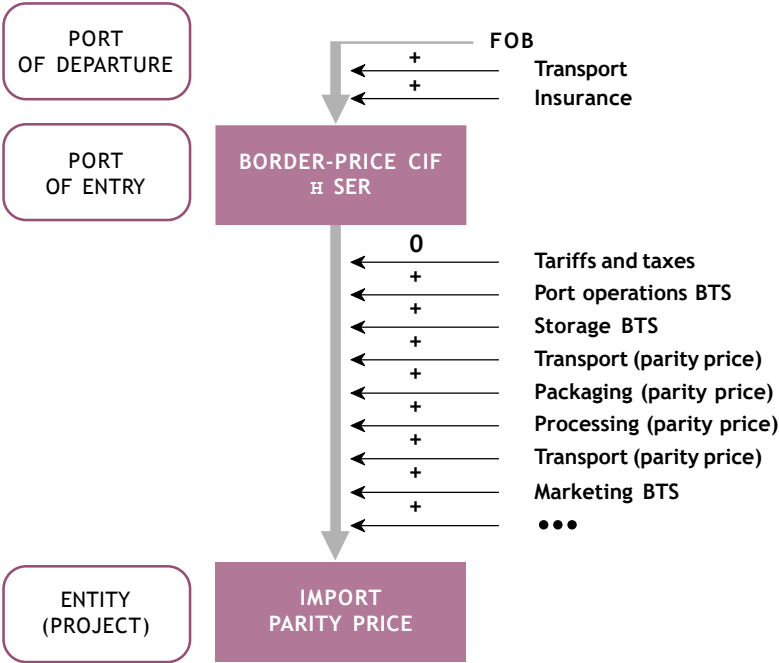
Figure 6.2. *Calculation of import parity prices*

Internal costs = port costs (e.g., transit, brokerage, deposit, approval), storage, transport, processing, packaging and marketing. All these costs are themselves calculated at their parity price (if they represent tradeable goods and services).

- the **export parity price** of a good is equal to its border price FOB[2] from which are subtracted all the outlays (before taxes and subsidies) concerning possible processing, commercialisation, and loading occurring between the place of production and the point of exit from the country:

$$\text{Export parity price} = \text{FOB Price} - \text{Internal costs (BTS)}$$

Internal costs = storage costs, transport costs, possible processing and marketing costs, port handling charges. All these costs are themselves calculated at their parity price (if they represent tradeable goods and services).

☞   Figure 6.3.

☞   Figure 6.4.

The recourse to export or import parity prices depends on the nature of the flows that the analyst wishes to estimate.

Table 6.1. *Tradeable goods and services produced or consumed by the project*

NATURE OF THE CONNECTION WITH THE INTERNATIONAL MARKET	direct	indirect	potential
PRODUCTS	Product actually exported	Products sold locally as import substitutes	Real possibility of importing products of equivalent quality
INPUTS	Inputs actually imported	Inputs purchased locally leading to a reduction in exports	Real possibility of importing inputs of equivalent quality
VALUATION METHOD	Face value (BTS) =	International opportunity value =	International opportunity value =
PRODUCTS	Export parity price	Import parity price	Import parity price
INPUTS	Import parity price	Export parity price	Import parity price

BTS = Before taxes and subsidies.

—————
(1) Free On Board.

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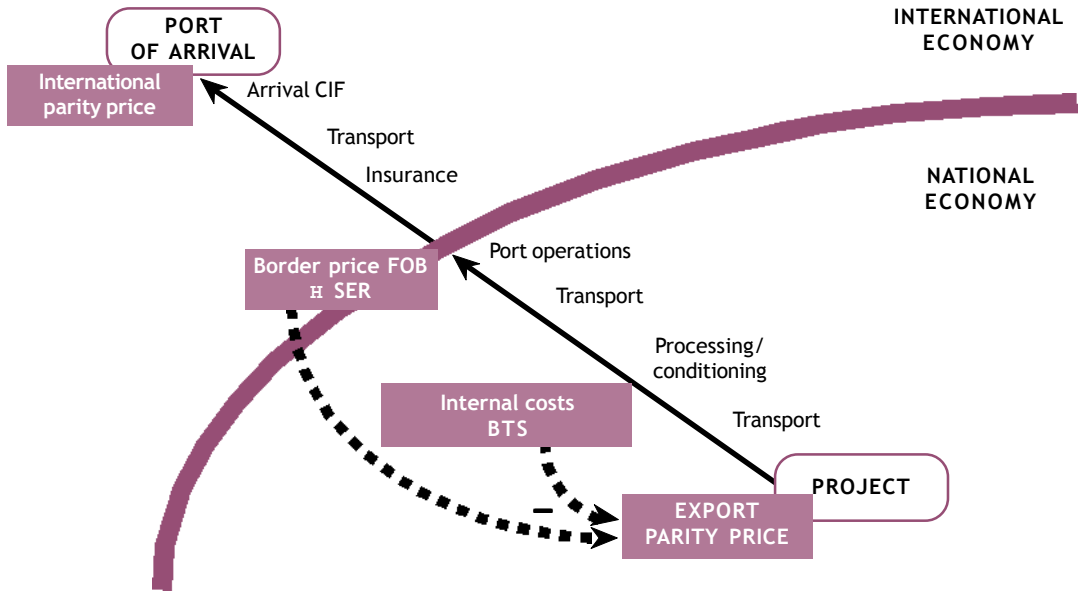
Figure 6.3. *Export parity prices*
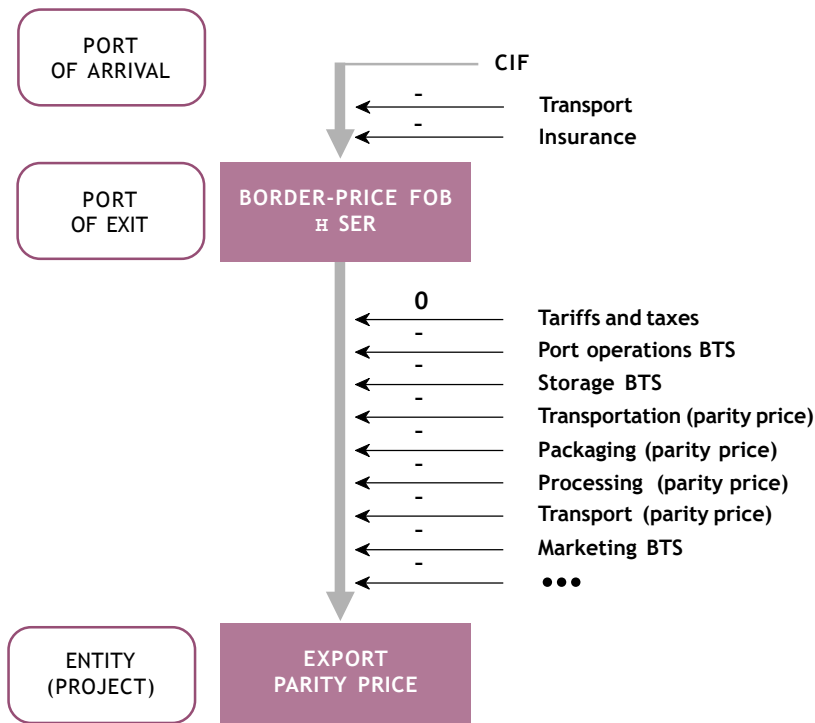
Figure 6.4. *Calculation of export parity price*

Practical notes:

(1) When dealing with actual imports or exports, the calculation of the parity price can usually be done simply by adjusting for taxes and subsidies.

(2) A more detailed calculation must nonetheless be done for relatively important intermediate goods and services (in relation to the total value of production) and if the internal costs include inputs whose price is significantly different from the parity prices (e.g., due to restrictions on imports of transport equipment).

(b) Projection of international prices

In appraisal analysis (*ex-ante*), the prices used in the calculations are often set according to the price levels of past years. The most reliable sources of information are those found within the country itself: e.g., national trade statistics and data provided by local traders and manufacturers. Other sources of information exist, including multilateral agencies such as the IMF, World Bank, FAO, and the Commonwealth Secretariat; recognized agencies such as the US Department of Agriculture; and international commodity-based organisations. It is sometimes possible to gauge the international price using statistics from other comparable countries. These latter sources of information enable useful comparisons and may highlight unusual factors (e.g., price variations due to differences in the quality of project outputs, to monopoly or oligopoly situations, or to restrictive government policies).

The analyst must make sure that the reference year (or years) selected was not an unusual one in the international market. This is especially the case with raw materials and agricultural products. As a result of unusual weather, prices may be higher or lower than usual, leading to under- or over-valuation.

It is also possible to use price forecasts of organisations such as the World Bank. Long-term projections of raw material prices should, however, be used with great caution; and it is **imperative that the results obtained be submitted to a sensitivity analysis**.

In order to use statistical data and forecasts, any differences between published prices of products and those in the project, which may be due to quality differences, must be known. Statistics deal with products of standardised quality, yet project outputs are often of varying quality. The problem which confronts the analyst is how to link the future prices of these products. Lacking more precise indications, the prices of the five preceding years may be used as a guide. In all these cases, discussions with traders and others will be indispensable.

(c) Shadow exchange rate

The over-valuation (more rarely the under-valuation) of the local currency is allowed for by substituting the shadow exchange rate (SER) for the official exchange rate (OER), in the border price calculations. The SER expresses the "economic value" of the currency for the

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country. It is usually established for the entire economy, but shadow exchange rates calculated specifically for certain goods and services sometimes exist.

$$\text{Parity prices} = (\text{Border price} \times \text{SER}) + \text{Internal Costs BTS}$$

The calculation of the shadow exchange rate is a complex operation which cannot be done within the framework of project analysis. The use of an SER can only be considered:

- when it is provided by prior studies or estimates made by key planning, financing or development agencies (e.g., the World Bank, the IMF, OECD);

- exceptionally, by a rough calculation, for relatively undiversified economies or for single subsectors, if a project has one main output for which tariffs vary widely from the rest of the economy (in such cases the formula presented below is used).

In all situations where two or more official exchange rates are applied to different markets, or exchange control has led to a black market, it is necessary to refer to prior macro-economic studies and to the opinion of experts, rather than applying one or the other of these rates.

N.B.: The SER is sometimes presented in the form of an "exchange premium" (EP – or exchange rate correction) which expresses the proportion in which the official exchange rate (OER) varies from the shadow value:

$$\text{SER} = \text{OER} \times (1 + \text{EP})$$

THE CALCULATION OF THE SHADOW EXCHANGE RATE

The calculation of the shadow exchange rate can be made in a simplified way just by taking into account the average customs duties applicable to foreign trade – as long as no significant gap exists between the subsectors. In this case, the analyst uses the following simplified formula:

$$\text{SER} = \text{OER} \times \frac{(\Sigma\text{Import}_{CIF} + \text{Entry fees}) + (\Sigma\text{Exports}_{FOB} - \text{Exit fees})}{\Sigma\text{Imports}_{CIF} + \Sigma\text{Exports}_{FOB}}$$

N.B.: The entry and exit fees are made up of customs duties, taxes and possible subsidies (counted negatively). As regards intermediate goods and services, it does not include taxes which can be recovered by the entities (such as the VAT). In this formula, the CIF value of imports and the FOB value of exports are expressed in national currency based on the OER.

Hence, for an economy that would be only importing goods, and whose average customs duties would be of 20%, and with an OER of NCU 100[1] = euro 1, the calculated SER would be NCU 120 = euro 1.
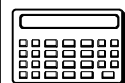
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(1) NCU = National Currency Unit.

Another possible calculation is based on "Purchasing Power Parity": the adjustment of the currency is then carried out according to the inflation differential which exists between the country and its principal economic partners. If inflation forecasts are 30% for the country and 5% overall for the "euro partners", the inflation differential is around 24% (1.30/1.05 = 1.24). With an initial OER rate of NCU 100 = euro 1, the depreciation of the national currency would lead, by the end of the year, to a rate of NCU 124 = euro 1. So, assuming that inflation progresses regularly throughout the year, an average exchange rate equal to the average rates at the beginning and end of the year would be: (100 + 124)/2 = NCU 112 for euro 1.

Finally, complex economic models (including those based on elasticities of supply and demand in foreign currencies, deficits) enable one to make a more elaborate estimate of the value of the national currency.

It is often useful to test the sensitivity of the economic results against the variations of the SER and thoroughly to examine the estimate, if it strongly influences the project's return on investment.

6.2.4. Valuation of non-tradeable goods and services

The value selected for the flows of *non-tradeable* goods and services is:

- generally *the market price before taxes and subsidies*;
- the weighted amount of the *international parity prices* and the local value of the domestic factors of production (labour and capital) when it is possible – and useful – to break these flows down into tradeable elements.

(a) The types of non-tradeable goods and services

Goods and services are deemed non-tradeable when they are not available on the international market. Although generally few in number, their value can be significant.

☞ Table 6.2.

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Table 6.2. *Tradeable goods and services produced or consumed by the project*

NATURE OF THE CONNECTION WITH THE INTERNATIONAL MARKET	potentially tradeable but never(*) traded	impossibility of international trade	non produced and non-tradeable
PRODUCTS AND INPUTS	Goods and services difficult to transport (due to size or excessive cost) or of a quality not demanded on the international markets, etc.	Goods and services that cannot be exported or imported	Factors of production and "environmental goods"
EXAMPLES	Firewood, straw, bricks, sand, maintenance of certain equipment, electricity, insurance.	Perishable products, transport, construction, administration, commerce, maintenance, health services, social services, water conveyance, education.	Labour, land, "environmental goods"
VALUATION METHOD	Local value or breakdown into tradeable goods	Local value or breakdown into tradeable goods	Local value
PRODUCTS	Market prices BTS	Market prices BTS	–
INPUTS	Market prices BTS or international parity prices	Market prices BTS or international parity prices	Market prices BTS

BTS = Before taxes and subsidies.
(*) or almost.

(b) Local value

In general, it is the value based on the **market price before taxes and subsidies** which is retained as the shadow value of the non-tradeable items of the consolidated account. Insofar as no international market exists, this price represents the value (in national currency) of the good or service within the national economy[1].

In every case where questions are raised as to the validity of taking the market price as shadow value, the **notion of opportunity cost** comes into play for the economy as a whole.

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(1) In the field of economic theory, if the local price is indeed an estimate of the ability of the consumer to pay, it is only similar to the marginal production cost to the extent that the market is "sufficiently competitive".

However, it may sometimes be preferable to accept the market price (BTS) rather than shadow prices, if the estimation of these requires over-sophisticated theories, which may result in price estimates that are no more reliable.

Note:

(1) Market prices often differ from *official* prices. Of course, prices used should be actual market prices.

(2) The analyst must be aware of the price variations that a project itself can create if the non-tradeable flow being studied is produced or consumed by the project in large quantities, compared to the national market.

(3) The proposed procedure does not make it possible to value, *in economic terms for society as a whole*, the use of environmental goods (e.g., use of water, deterioration of natural resources, depletion of non-renewable resources). The cost of these flows, just like the entire impact on the environment, results from these external effects, which are not dealt with.

As concerns the three main factors of production:

Labour:

It is the market price (including social security contributions) which will be accepted, both for skilled and unskilled labour. This topic has been the subject of much theoretical discussion between economists, particularly on the categories of jobs for which a situation of underemployment exists. The advantage of using the market price is its clarity and feasibility especially in the absence of a wide agreement on practical solutions. It is also consistent with the objective of studying the project's viability, by taking into account the level of income granted to local factors of production.

This option differs from the theoretical approaches traditionally used:

- in a situation of underemployment, the level of wages will probably not correspond to the opportunity cost of labour, because the labour market is non-competitive. Yet, actual wages have to be used as they will inform on the local labour cost relatively to the international prices;

- in a situation of full-employment, the opportunity cost of labour is represented by the other output which must be foregone due to the use of labour in the project. The method proposed in this manual allows for this opportunity cost by including the lost production in the without-project situation (§ 2.1). The possible wage difference which exists between the two situations thus reflects the country's "wage policy".

In both cases, the proposed method enables one to take into account the value of the lost production and the country' labour wages. The latter is characteristic of the national economy, and affects its international competitiveness, and thus the viability of the project.

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Capital:

In the flow balance account, capital formation is recorded as investment (and its salvage value). Their tradeable elements are valued at their parity price, and non-tradeable elements at local market value.

Land:

In agricultural projects, for which land constitutes an extremely important factor of production, two situations arise depending on whether a land market (sale or rental) exists. Should there be such a market, the annual cost of land rental for all the years of the project should be applied. If no rental land exists, the cost of the sale can be used (at the outset of the project) by re-recording its amount in salvage value terms at the close of the period of analysis.

Should there be neither land rental nor land sales, the value of land will be given by the without-project situation, that is, by the net economic earnings which are given up in implementing the project. In such a case the value of the net benefit of the without-project situation is assessed (Flows$_{SP}$– Outflows$_{SP}$[1]). **However, insofar as *incremental* flows are the object of study, the use of without-project land is already included in the consolidated account.**

Considering the potential complexity of the methods for estimating the value of land, the time and effort devoted to this task should take account of its relative importance in the total costs of production. The simplest and fastest solutions possible will be used.

(c) Breakdown into tradeable goods and services

Certain of the consolidated accounts' non-tradeable inputs can be valued by breaking them down into tradeable elements. An effort is made in this way to establish the opportunity cost for the national economy of the real resources which contribute to their production.

In practice, the breakdown is similar to the first stage of the manual backward linkages calculation (§ 5.1.2) which shows the rank 2 intermediate goods and services, which is classified as tradeable or non-tradeable. The initial price of the non-tradeable flows can hence be written:

$$\text{Market price} = \text{TGS content} + \text{NTGS content} + \text{labour} + \text{depreciation}$$

With:

TGS = Tradeable goods or services
NTGS = Non-tradeable goods or services

The tradeable elements are valued using their parity price, the non-tradeable elements at their

_____
(1) SP = Shadow Price.

market price before taxes and subsidies. The domestic factors of labour and capital (in the form of depreciation incorporated in the backward linkages) are also valued at their market

BTS: Before Taxes and Subsidies.
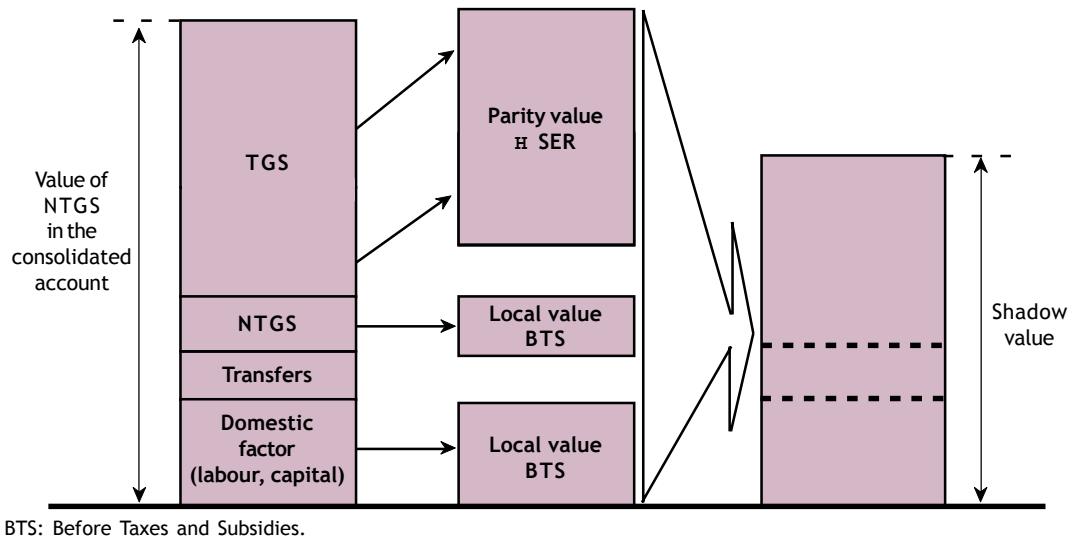
Figure 6.5. *Breakdown of a non-tradeable good or service*

price.

Note: If the depreciation incorporated in the goods and services of the backward linkages is substantial relative to the initial consolidated production, and if it is in large part made up of tradeable goods, it may be a good idea to recalculate the *parity value* using the initial cost of the investments. This rarely happens in practice, but it is possible (e.g., with products stemming from major irrigation development).

Considering the cumbersome nature of this procedure (the international price of each new tradeable intermediate goods and services must be obtained, as well as the amount of the internal costs), it should only be done for important intermediate goods and services[1]. Thus, although it is theoretically possible to use the same procedure to pass from rank 2 to rank 3, the increased precision given by further analysis would, in most cases, not be justified. A similar conclusion was reached in the manual backward linkages calculations of the effects analysis (§ 5.1.2).

_____

(1) As a rough guide, depending on the nature of the activities and the structure of the accounts, the "threshold" of importance may be empirically estimated as 5% of the value of the consolidated production.

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6.2.5. Drawing up the accounts

(a) Transforming of the consolidated account

Once the shadow prices of all the flows appearing in the consolidated account have been specified, a new flow balance account is calculated:

- for each flow of product i, of quantity Q_i and of market price P_{MPi}, the new shadow price P_{SPi} (parity price or local price) is applied:

  $Q_i \text{ H } P_{MPi}$ $\rightarrow$ $Q_i \text{ H } P_{SPi}$

- for each flow of intermediate goods and services j, of quantity Q_j and of market price P_{MPj}, the new shadow price P_{SPj} (parity price or local price) is applied:

  $Q_j \text{ H } P_{MPj}$ $\rightarrow$ $Q_j \text{ H } P_{SPj}$

- the cost of land capital is maintained at market prices, or introduced:

  Land cost$_{MP}$ $\rightarrow$ Land cost$_{MP}$

  0 $\rightarrow$ Land cost$_{MP}$

  or Net Benefit lost$_{SP}$

  (Any input used free of charge is also introduced.)

- the labour outlay items conserve their market value:

  Wages$_{MP}$ $\rightarrow$ Wages$_{MP}$

- the tax and subsidies items are eliminated:

  T $\rightarrow$ 0

  Subsidy $_{(if\ an\ item\ in\ the\ account)}$ $\rightarrow$ 0

  Subsidied inputs indirectly $\rightarrow$ Add the value of the subsidy

- the financial transfer items (receipt of loans and debt servicing) are eliminated if they are in national currency, and recalculated using the shadow exchange rate if they occur in foreign currency:

  Financial flows$_{national\ currency}$ $\rightarrow$ 0

  Financial flows$_{foreign\ currencies}$ H OER $\rightarrow$ Financial flows$_{foreign\ currencies}$ H SER

- the equity capital items are also eliminated (they are transfers):

> Equity capital$_{\text{(entrepreneur, shareholders)}}$ $\rightarrow$ 0

**Consolidated account
in market prices**

Years	0	1	2
INFLOWS			
Equity capital		K	
Output i		$Q_i \text{ и } P_{MPi}$	
Loan receipts		L	
OUTFLOWS			
IGS		$Q_j \text{ и } P_{MPj}$	
Wages		Wages$_{MP}$	
Taxes		L	
Debt service		FC	
Benefit		B_t	

**Consolidated account
in shadow prices**

Years	0	1	2
INFLOWS			
Equity capital		-	
Output		$Qi \text{ и } P_{SPi}$	
Loan receipts		-	
OUTFLOWS			
IGS		$Q_j \text{ и } P_{SPj}$	
Land		Rent	
Wages		Wages$_{MP}$	
Taxes		-	
Debt service		-	
Economic balance		EB_t	

Figure 6.6. *Transforming the consolidated account*

(b) The policy analysis matrix

The policy matrix analysis (PAM) is a simple tool used to evaluate policies in sector or subsector studies. It is often convenient to use this format to organise the data for major projects. The

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PAM enables the analyst to compare, in the same table, the principal items of the consolidated account at market prices and at shadow prices. It has 3 lines and 4 columns:

Table 6.3. *Policy Analysis Matrix (PAM)*

	PRODUCTION = OUTPUT	TRADEABLE GOODS AND SERVICES	FACTORS(*) & NON-TRADEABLE GOODS AND SERVICES	BALANCES
MARKET PRICES (entities)	A	B	C	D (= A - B - C)
SHADOW PRICES (society)	E	F	G	H (= E - F - G)
TRANSFERS	I (= A - E)	J (= B - F)	K (= C - G)	L (= D - H)

(*) Domestic factors of production = labour, capital, environmental goods.

In each cell, the sum of the amounts which correspond to the categories indicated are recorded, and a valuation (at market prices) of the work schedule of individual entrepreneurs (for the agricultural and informal sector for example) is included. The transfer line measures the gap between the values in market prices (real balance for the entities) and the values in shadow prices (the balance for the national economy in shadow prices):

Transfer = Value at market prices – Value at shadow prices

The transfers measure the impact, positive or negative, of the distortions resulting from market imperfections and economic policies.

It is possible to establish the PAM:

- either for a year of normal project operation – usually the case (*ex-ante* and *ex-post* assessments);
  - ➠ the consolidated operating account is used as a basis of study
- or for the life span of the project, by computing the discounted sum of the annual flows (by using the shadow price of capital as the discount rate – a situation which only appears in an *ex-ante* assessment).
  - ➠ the consolidated flow balance account is used as a basis of study.

6.2.6. Underlying assumptions

The approach relies on assumptions which must be kept in mind in carrying out the calculations and in interpreting the results obtained.

- **Existence of spare production capacity for non-tradeable goods and services**: The *incremental* demand of the project on the national economy must be capable of being supplied without requiring new investment (which would induce different costs) or without proportionately reducing other uses. The corollary of this assumption is that there exists an underemployment of capacity in all subsectors which are called upon and thus, in the final analysis, in all the sectors of the economy.

  In the opposite case, any non-tradeable good or service (of a large amount) which cannot be supplied to the project by existing capacity must have been identified, and the corresponding investments included in the "consolidated package initial project + related investments" (§ 2.2). Or, the production "disrupted" (eliminated or modified) by the transfer of these inputs to the project must have been allowed for in the definition of with- and without-project situations (§ 2.1). This represents the opportunity cost of the inputs in question.

  This assumption must be tested, especially in the case of large projects whose demand for inputs may turn out to be higher than the existing spare capacity.

- **Stability of the relative price system for non-tradeable goods and services**. While keeping the same local value for the non-tradeable products, inputs, and labour, it is implicitly assumed that the relationship between their prices does not vary during the project's life span. The relative price system is not brought into question by the changes due to the project.

- **Stability of the relative international price system for tradeable goods and services,** insofar as international prices are projected without modifying the relationship between them.

The last two assumptions[1] may introduce an error which should then be assessed through a sensitivity analysis.

The relationship between the prices of the non-tradeable flows (including labour) and those which are tradeable, depends on the assumption of the gradual evolution of the SER. In general, a constant SER is used. The implicit assumptions behind this choice and that of the consistency of the relative prices of non-tradeable goods and services is the **maintenance of the same policies and modes of operation of the market and of the same macro-economic environment** during the life span of the project.

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(1) In theory, the application of the methodology does not require these assumptions. However, they are systematically used when doing operational project analysis.

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N.B.: One result of assuming stable prices of non-tradeables, and of the SER, is that the labour wages are considered at the same level; the effect of an increase or decrease on underemployment on wages is thus unknown.

6.3. ANALYSIS OF THE PROJECT'S VIABILITY IN THE INTERNATIONAL ECONOMY

The change from market prices to efficiency prices entails drawing up a new consolidated account. In order to assess the economic viability of the project within the context of the international economy, the approach entails:

- ◆ adopting international parity prices for all the goods and services exchanged by the economy, or which could be exchanged, on the international market;
  - ⇒ The exchanges with the international economic system serve as a reference
- ◆ adjusting them according to the "real" value of the national currency (SER);
  - ⇒ The project's viability depends on the macro-economic situation
- ◆ taking into account the existing level of income of non-traded factors (labour, capital, environmental goods) existing in the economy.
  - ⇒ Local policies and the actual income paid to domestic factors (relative to the international prices) affect the viability of the project

Note: The need to adjust prices is strong if distortions are important. However, financial stabilization and structural adjustment programmes in many countries should diminish their importance.

As with any study which relies on uncertain quantitative data, **sensitivity analyses** on the values of the most uncertain or important variables should be carried out, so as to determine the validity of the conclusions reached, and to modify, where necessary, the appraisal of the project.

Using the consolidated account recalculated in efficiency prices and the policy analysis matrix, the analysis of the viability of a project in the international economy and within the framework of the current national economic policies, involves:

- ◆ **calculating the income generated by the project, in efficiency prices and the transfers of resources from which it benefits through market operations**

N.B.: References in [ ] indicate cells of the PAM.

6.3.1. Income generation

(a) The balances

The price adjustment leads in turn to the calculation of a new **"economic balance"**, which is an estimate of the "profit for society as a whole (in efficiency prices)".

◆ by using the notation of the consolidated flow balance account (§ D.2):

$$\text{Benefit}_{SP} = \text{Inflows}_{SP} - \text{Outflows}_{SP}$$

or, for the operating account:

$$\text{NOP}_{SP} = \text{Revenues}_{SP} - \text{Expenses}_{SP}$$

◆ by using the notation of the PAM (§ 6.2.5):

$$\text{Balance}_{SP} = \text{Profit}_{SP} = \text{Revenue}_{SP} - \text{TGS}_{SP} - \text{NTGS}_{SP}$$

or: $$H = E - F - G$$

A positive "economic balance" indicates that the project makes effective use of the economic resources at its disposal and leads to increases in national income, as measured in international prices. If it is negative, the project's activities consume more resources than they produce. In that case, the cost of producing the project's output is greater than the cost of importing it. In this case, whatever the "private balance" in market prices [cell D of the PAM], the project's activities will only be viable given a system of subsidies from other sectors of the economy: the project is a "burden" for the economy.

(b) The transfers

The difference [cell L] between the market prices surplus and the shadow prices surplus

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represents a **net transfer**, that is, the supplementary remuneration received by entities in relation to their real contribution to growth

$$\text{Net transfer} = \text{Private balance}_{MP} - \text{Balance for society as a whole}_{SP}$$

or:
$$L = D - H$$

This indicates whether the net overall transfer made to the entities involved in the project is positive [L > 0], or negative. In the simplest case, the net transfer may be in the form of a tax or subsidy on the product or an input. However, in most cases transfers are made in a diffuse manner as a result of various distortions that the analyst will not necessarily be able clearly to identify.

THE VARIOUS TRANSFERS

The structure of the PAM makes it possible to break the net overall transfer [L] down into three elements characteristic of the economic distortions in three areas, through a simple reading of the last line of the matrix:

- product transfers [I = A – E]. These result from the difference between the market prices and the international parity prices of these products;

- tradeable input transfers [J = B – F]. These result from the difference between the market prices and the international parity prices of these inputs;

- transfers of non-tradeable inputs and the income of the factors of production [K = C – G]. Considering the valuation rules used, these transfers result for the most part from the introduction of factors not remunerated by the entities involved (e.g., land cost)[1].

The examination of the policy affecting these transfers can then be undertaken, if necessary.

The net transfer [L = I + J + K] thus represents the overall impact of market imperfections and economic policies. The **profit ratio** renders the interpretation that much simpler.

$$\text{Profit ratio} = \frac{\text{Balance for all entities}_{MP}}{\text{Balance for society as a whole}_{SP}}$$

or:
$$\text{Profit ratio} = D / H$$

This ratio measures the extent to which entities' incomes exceed the economic surplus measured from the standpoint of the international economy. It is thus an indicator of the overall incentive entities have to participate in the project: if it is over 1, they receive a positive net transfer. The purpose of this ratio is to indicate the relative importance of the transfer, whereas the total amount of the net transfer [L] can be difficult to assess.

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(1) And from discrepancies between market prices and parity prices for the tradeable inputs of the non-tradeables.

The logical complement of the profit ratio is the **subsidy ratio to producers** (SRP), also called **effective subsidy rate**.

$$SRP = \frac{\text{Net transfer}}{\text{Output}_{SP}}$$

let: $$SRP = L \ / \ E$$

This rate measures the amount of the net transfer to the entities in proportion to the (international) value of the product for society as a whole.

In the final analysis, it is clear that, from the point of view of the integration of the project and the national economy into the world economy, the more the project is dependent on transfer mechanisms serving as incentives for the entities which are productive (but are costly in terms of real resources for the economy), the more its viability is uncertain, since it depends on the continuation of support policies and/or distortions (which the structural adjustment programs seek to eliminate).

6.3.2. Integration in the international market

The integration of the project in the international market may be taken further, especially in the case of export and import substitution projects. Two major features are analysed:

- the level of protection, which may be specific to the sector or which may result from the array of economic policies;
- the competitiveness of the project, which is a real viability indicator measured by the cost to society of producing one unit of foreign currency.

(a) Protection

The first stage of the analysis of the protection, which may affect the benefits of the project, is based on the **nominal protection coefficient** (NPC). This indicator describes the divergence which exists between the market price and the parity price of the product. It measures the protection (i.e. the over-valuation or, rarely, under-valuation) in relation to the international market which the product enjoys *de facto* on the local market.

$$\text{Nominal protection coefficient} = \frac{\text{Output}_{MP}}{\text{Output}_{SP}}$$

let: $$NPC = A \ / \ E$$

If NPC < 1, the market's domestic price is less than the international parity price. There is no protection for producers. The project thus generates less income than it could were interna-

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tional prices applied (with no economic distortions). If, on the contrary, the NPC > 1, then the entities receive a remuneration higher than the international opportunity cost of the product allows. They benefit – as does the project – from protection which gives gross receipt higher than the value of the goods produced.

This coefficient, which in practice can be applied only to the tradeable products, is an indicator of transfers resulting from the price policies and the alterations of market operation. However, it does not in itself indicate which measures are responsible for the degree of protection observed.

Notes:

(1) A high NPC should not be interpreted as a sign that there are definitely serious distortions. No generally applicable arithmetical link between the nature and impact of distortions on the prices and NPC values of exists.

(2) When calculating the NPC, the denominator represents the parity price of the product, that is the border price (converted into national currency using the SER) to which are added internal costs (e.g., shipping, marketing), making the data represented in the numerator and denominator comparable. A "rapid" calculation of the NPC should never be undertaken solely on the basis of the international price.

(3) It is possible to calculate an NPC for the set of tradeable inputs (= B / F). This will provide information about the input price policy: if it is lower than 1, the inputs have a market value lower than their international opportunity cost; hence they are "subsidised" by society as a whole.

Unlike the NPC, the **effective protection coefficient (EPC)** also takes into account the tradeable inputs used by the project. It combines the balance of the protection of the outputs and of the tradeable intermediate goods and services (TGS).

or:
$$\text{Effective protection coefficient} = \frac{(\text{Output} - \text{TGS})_{MP}}{(\text{Output} - \text{TGS})_{SP}}$$

$$EPC = (A - B) / (E - F)$$

In a certain sense, this "ratio of the values added by the project to the tradeable flows" indicates the impact of market imperfections and price policies. However, the transfers and incentives arising from the income of the factors of production are not included in it[1]. If EPC < 1, the combination of transfers on the products and on the tradeable intermediate goods and services leads to an effective distribution of income inferior to that which the international value of these resources would permit. If EPC > 1, the surplus income going to the entities will encourage them to participate in the project, but this incentive means a transfer of resources which could be costly for society as a whole and, in this case, can bring into question the viability of the project.

_____
(1) Unlike the *profit ratio*, the only criteria capable of integrating the impact of all the policies concerning the project.

The NPC does not take into account gross income (price effects); it measures the absolute incentive. The EPC, for its part, measures the relationship of the values added to the tradeable flows within the two valuation systems (market prices and international opportunity prices), and makes it possible to estimate the *relative* incentive (price effect and cost effect) which is a result of the compensations and /or the synergies between the different flows.

(b) Competitiveness

In the case of projects directly related to the international market (export or import substitution), it is useful to express the domestic resource costs of a unit of foreign currency earned. The criteria of the **domestic resource cost ratio (DRC)** thus indicates the cost of the production factors (and non-tradeable goods) necessary for the production of the equivalent of one foreign currency unit.

let:

$$DRC = \frac{\text{Factors of production}_{SP}}{\text{Output}_{SP} - TCS}$$

The DRC expresses the effective income (the cost) of the non-tradeable production factors (the "domestic resources" of the economy) devoted to the *potential* net earning of one currency unit of "tradeable resources":

- a DRC > 1 indicates that the actual cost of the domestic factors used is higher than the value created for the economy. There is thus a loss of wealth: the value added in tradeable goods and services is less than the cost of the inputs used;
- a DRC < 1 means, on the contrary, that after paying the production factors society as a whole still has at its disposal a "surplus" of wealth [measured by $H > 0$].

The income value of the factors for which DRC = 1 thus indicates the maximum possible income of the factors which enable the project to be competitive in the international economy.

Notes:

(1) Insofar as projects depend on *family* enterprises, the third column of the PAM [G] must include a valuation of family labour.

(2) The indicator equivalent to the DRC, estimated in market prices, is known as the **private cost ratio** (PCR) also called **factor cost ratio**.

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or:
$$PRC = \frac{\text{Factors of production}}{\text{Output income}} \qquad PCR = C/(A-B)_{MP}$$

The PCR expresses the effective income of the non-tradeable factors of production – i.e. their cost – devoted to the net earnings of a unit of "tradeable resource". PCR < 1 indicates a "surplus profit" for the entities involved, since it entails a profit margin [D > 0] on the cost of inputs, whereas PCR > 1 indicates, to the contrary, that the value of the tradeable goods created is less than the cost of the inputs.

These two indicators, DRC and PCR, are useful when comparing two projects (in the same country or between countries) by taking into account their efficiency. The DRC reveals the efficiency of the project operations, within the framework of the international prices. It provides information about the international competitiveness of the project, and thus about its viability and eventual viability.

The diagrams below illustrate how the analysis of shadow prices is carried out.

☞ Figures 6.7, 6.8.

(INCREMENTAL) FLOWS OF REVENUES

Elimination of transfers

Tradeable G & S

Non-tradeable G & S

Export

Local, imported without the project

Local market

Export parity price

Import parity price

Import parity price

Local value

SER

SER

SER

CONSOLIDATED ACCOUNT IN SHADOW PRICES

POLICY ANALYSIS MATRIX

SER Possible application of the shadow exchange rate
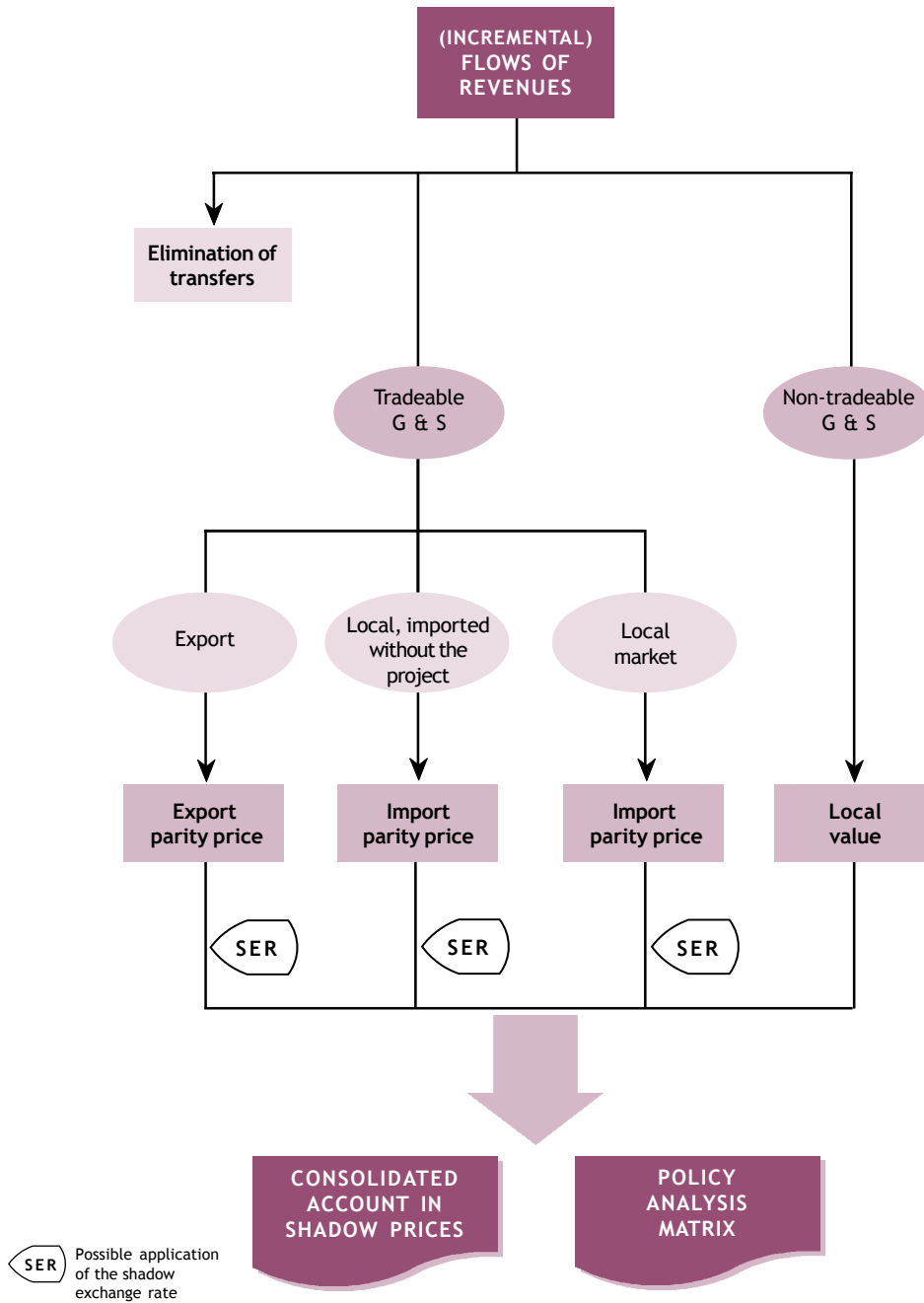
Figure 6.7. *General parity price analysis procedure: product valuation*

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(INCREMENTAL) FLOWS OF EXPENSES

Elimination of transfers

Breakdown into tradeable goods

Tradeable G & S

Non-tradeable G & S

Import

Local, exported without the project

Local (others)

Import parity price

Export parity price

Import parity price

Local value

SER

SER

SER

CONSOLIDATED ACCOUNT IN SHADOW PRICES

POLICY ANALYSIS MATRIX

SER) Possible application of the shadow exchange rate

Figure 6.8. *General parity price account procedure: valuation of expenses*

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CASE STUDY
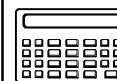
1. Shadow price calculation

Parity prices in the import of HDPE polyethylene:

The breakdown of the costs of importing HDPE is given in Table VI.1 below, from the point of entry into the country until its sale to industries which use HD polyethylene balls. One must take into account an overvaluation of the currency estimated at 25% by the international financial agencies (SER = 1.25 н TCO). Thus, in the following table, only the foreign exchange content of the items listed is adjusted.

Table VI.1 - *Calculation of the parity price of the HD polyethylene*
(in NMU/t)

	Effective market price	Parity price	
		Official exchange rate	Shadow exchange rate
BORDER PRICE (CIF)	**950**	**950**	**1188**
Customs fees	170	Omitted	Omitted
Port operations	9	9	9
Port taxes	13	Omitted	Omitted
Import charges	42	33	33
PORT DEPARTURE	**1184**	**992**	**1230**
Transport and handling	136	107	114
Commercialisation	670	523	538
CONSUMER DELIVERY PRICE	**1990**	**1622**	**1882**

Shadow prices of the other flows:

– **Goods and services directly imported by the project** (including technical assistance): the import parity price is calculated (omitting taxes and the adjustment of the foreign currency costs using the SER).

– **Other tradeable goods and services**: the import parity price is calculated, possibly just by taking account of direct taxes on revenue and adjusting known costs in foreign currency (neglecting the costs of port operations and of intermediate transactions).
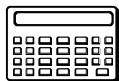
– **Non-tradeable goods and services** (electricity and equipment maintenance): results of the backward linkage made for the effects calculation are used, while eliminating total taxes and adjusting the cost of total imports using the SER.

– **Non-tradeable factors** (land and labour items): market prices are used. A land market does in fact exist in the project zone.

– **Financial flows** (receipt of loans, repayment of principal and interest payments, including interest during construction): the financial flows linked to the farm are eliminated because they represent transfers between entities within the economy. Those linked to the international loan of the industrial complex are adjusted using the SER (multiplied by 1.25).

2. Drawing up accounts in shadow prices

Consolidated account:

The new prices calculated are applied to all the items of the consolidated flow balance Table IV.1). The new account obtained is presented in Table VI.2.

Note: When applying the results of these calculations for all the years of the project, it is assumed that the national currency will not depreciate over time in relation to other currencies (there will thus be no inflation differential between the country and its main trading partners).

☞ Table VI.2.

N.B.: The calculation of the salvage value has been done by adjusting its market price value using the SER and assuming that the portion of the cost in foreign currency is the same as for the initial investments (not including interest during construction).

Policy analysis matrix:

This is calculated throughout the life of the project by totalling the discounted sum of the flows involved (the economic discount rate is fixed at 8%). It is thus assumed that the main economic policies will remain largely unchanged throughout the project, including protection of local HD polyethylene production by a price 25% higher than that of the international market.

Table VI.2 - *Consolidated account in shadow prices*
(thousands of NMU – constant prices)

Years	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
INFLOWS																					
Sales																					
HDPE local market	0	0	0	7526	15053	18816	18816	18816	18816	18816	18816	18816	18816	18816	18816	18816	18816	18816	18816	18816	18816
Yeast	0	0	0	52	103	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
Total sales	**0**	**0**	**0**	**7578**	**15156**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**
Receipt of loans																					
Agricultural tract loan	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
Industrial tract loan	0	35047	21836	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total loans	**0**	**35047**	**21836**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total inflows	**0**	**35047**	**21836**	**7578**	**15156**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**	**18945**
OUTFLOWS																					
Investments																					
Farm investments	1603	8631	8220	7155	0	0	0	0	0	0	983	2159	983	0	0	0	0	0	0	0	0
Industrial complex investments(*)	18630	32843	32569	0	0	0	0	0	0	0	0	596	0	0	0	0	0	0	0	0	0
Working capital	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
Salvage value																					-35915
Total investments	**20234**	**41474**	**40789**	**7155**	**0**	**0**	**0**	**0**	**0**	**0**	**983**	**2755**	**983**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-35915**
Operation																					
Fertilizer	0	0	0	78	156	196	196	196	196	196	196	196	196	196	196	196	196	196	196	196	196
Chemical products	0	0	0	243	485	607	607	607	607	607	607	607	607	607	607	607	607	607	607	607	607
Electricity	0	0	0	220	439	549	549	549	549	549	549	549	549	549	549	549	549	549	549	549	549
Fuel, lubricants	0	0	0	284	568	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710
Spare parts	0	0	0	61	693	942	1095	1095	1095	1095	1095	1095	1095	1095	1095	1095	1095	1095	1095	1095	1095
Equipment maintenance	0	0	0	9	18	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281
Supply and miscellaneous services	0	0	0	98	195	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
Salaries and social security contributions	0	0	0	1178	2065	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581	2581
Technical assistance	0	0	0	844	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taxes	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
Total operation	**0**	**0**	**0**	**3014**	**4740**	**6109**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**	**6262**
Financial expenses																					
Repayment (Foreign exchange)				3401	3179	2971	2776	2595	2425	2266	2118	1980	1850	1729	1616	1510	1411	1319	0	0	0
Interests (Foreign exchange)				6122	5340	4634	3998	3425	2910	2448	2033	1663	1332	1037	776	544	339	158	-0	-0	-0
Total financial expenses	**0**	**0**	**0**	**9523**	**8519**	**7605**	**6774**	**6020**	**5335**	**4714**	**4152**	**3642**	**3182**	**2766**	**2392**	**2054**	**1750**	**1477**	**-0**	**-0**	**-0**
Total outflows	**20234**	**41474**	**40789**	**19692**	**13259**	**13714**	**13036**	**12282**	**11597**	**10976**	**11396**	**12660**	**10427**	**9028**	**8653**	**8316**	**8012**	**7739**	**6262**	**6262**	**-29653**
ECONOMIC BALANCE	**-20234**	**-6427**	**-18953**	**-12115**	**1897**	**5231**	**5908**	**6663**	**7348**	**7969**	**7548**	**6285**	**8518**	**9917**	**10291**	**10629**	**10933**	**11206**	**12683**	**12683**	**48598**

(*) Including interest during construction.   N.B.: With rounded Figures.

OVERALL APPROACH

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FINANCIAL ANALYSIS

CONSOLIDATION

ECONOMIC EFFECTS

6 INTERNATIONAL VIABILITY

EFFICIENCY RELEVANCE

NON-TANGIBLE PRODUCTS
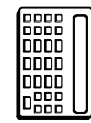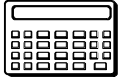
Table VI.3 - *Policy analysis matrix*
(in net present values)

	OUTPUTS	TGS	NTGS	BALANCES
MARKET PRICES	220745	28301	137023	55421
SHADOWS PRICES	177391	24545	142379	10468
TRANSFERS	43354	3756	-5356	44953

3. The project within the international economy

The consolidated account's economic balances are positive. The corresponding return on investment will be calculated in the next chapter.

There is a **favourable net transfer** of NMU 44,953.10^3 to the entities involved in the project throughout its life. The effective subsidy rate demonstrates that this transfer corresponds to 25% of the shadow value of the polyethylene. The fact that the profit ratio reaches 5.3 shows that the result of this transfer is to provide the entities involved with an incremental net income 5 times higher than they would have had were international prices systematically applied.

This transfer clearly comes from the protection granted by the fixing of the price of HD polyethylene, as it is equivalent to the transfer measured by the "outputs" column (NMU 43,354.10^3).

The **protection** from which the project benefits, and which clearly favours producers, is evidenced by the NPC (1.24). Nevertheless, the effective protection coefficient, which is of the same size (EPC = 1.26), indicates that, overall, it is the set of policies (and of the prices which result from them, both for the HDPE and for the inputs) which favours national production. Entity income is thus higher than it would be if international prices were applied to all the sectors of the national economy. The entities involved are thereby compelled to participate in the project because the value created – and, finally, their income measured in financial prices – is higher than it would be if measured in international opportunity prices.

As far as the project's **competitiveness** – and thus long-term viability – is concerned, the private cost ratio (PCR = 0.71) and the domestic resource cost (DRC = 0.93) indicate that the cost of the factors (land, labour, capital) is less than the value they create within the economy. The value produced is higher than that consumed. DRC < 1 indicates that the use of the resources produces a surplus if compared with international prices; production has a lower

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cost than the cost of trading the same resources on the international market. This productivity thus guarantees a certain room to manoeuvre.
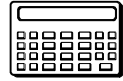
The **sensitivity analysis** enables the analyst to calculate the limits beyond which the DRC is greater than 1, meaning that the value of the inputs consumed is higher than that of the outputs produced:

– the critical value is down 13% for the international price of HD polyethylene, indicating that a certain fragility exists in view of the uncertainty about medium-term revenue forecasts;

– it is up 14% for the investment costs, a figure which seems unlikely;

– the fragility of the project's economic viability within the international economy clearly appears from the possible divergences from prior forecasts. Should the international price of HDPE drop 5% and the overall investment cost rise 7.5% the DRC will reach 1.

The consequence of these policies is that the entities involved in the project are favoured. The incentive takes the form of a net transfer of NMU $43{,}145.10^3$ throughout the project, corresponding to an effective subsidy rate (ESR) of 25%.

This protection does not result only from the domestic price applied for the project (CPN = 1.24), but also from all the policies applied to inputs (CPE = 1.26). It would not appear to result from a need for protection, since the production of HD polyethylene seems to be competitive internationally (DRC = 0.93).

The project thus offers the entities involved a strong incentive to implement activities which are economically sustainable within the international economy. However, this viability is highly sensitive to the risks involved, and the competitiveness of the project could quickly fade should the international price of the HDPE and/or the overall investment cost fall by a few points.

7. ANALYSIS OF THE ECONOMIC EFFICIENCY AND RELEVANCE OF THE PROJECT

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Economic analysis undertaken from the standpoint of society as a whole attempts to estimate the contribution of the project to the general well-being of the population. In order to do this, the analyst can adopt different approaches, according to the main constraints and objectives considered. He can either:

- calculate the *incremental* wealth created by the project in the economy (the value added) and its distribution, as well as the *incremental* leaks out of the national economy (foreign currency losses);

  ➡ The principal task consists of calculating the backward linkages in market prices (Chapter 5).

- or modify the value of the flows recorded in the consolidated account in order to reflect the values of production or consumption of resources for society as a whole.

  ➡ The principal task is to recalculate the items of the consolidated account based on a new price system (Chapter 6).

The **evaluation** method assesses the overall contribution of the project to the national economy:

- by comparing the resources used and the income generated;

  Various criteria are calculated which relate the flows of net benefits (due to the operations) to the flows of fixed resource costs (due to the investment). The **efficiency** with which the project uses the resources placed at its disposal is thus assessed.

- by comparing the results achieved and the objectives of the policies and structural reforms undertaken.

  The project's contribution in terms of flows (e.g., value added, foreign currency, income) are studied, as are its operating conditions within the national environment (e.g., transfers, price policies) and the international environment (e.g., protection, competitiveness) in order to assess its **relevance** vis-à-vis general constraints within the economy.

Do the overall net benefits of the project justify the resources used? In order to answer this question:

- the *economic efficiency* with which the resources are used is estimated by:
  - estimating the net benefits and the investment costs for society as a whole;
  - measuring their value in efficiency prices;
  - comparing the costs and benefits using various indicators.
- the *relevance* of the project is analysed in relation to development policies by studying:
  - its contribution to the achievement of major economic objectives;
  - its viability within the context of international trade.

Overall, the **profitability** of scarce resources invested measures project efficiency. The two approaches mentioned above are complementary. The first, in market prices, shows the economic profitability in terms of actual growth and foreign currency gains; while the second, in
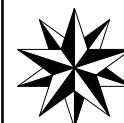
shadow prices, shows the economic profitability according to the scarcity of goods and services for the national economy.

The indicators resulting from these two types of calculation are combined, and used by the analyst to determine the relevance of the project in relation to the development strategy of the country.

The analysis of the economic efficiency and relevance of the project involves:
- **calculating the profitability of the incremental flows:**
  - ➡ **FROM THE PERSPECTIVE OF DOMESTIC INCOME** § 7.1.1
  - ➡ **UNDER FOREIGN CURRENCY CONSTRAINTS** § 7.1.2
  - ➡ **FROM THE STANDPOINT OF THE INTERNATIONAL ECONOMY** § 7.1.3
- **studying the project's consistency with the goals and major economic orientations of the country**
  - ➡ **ECONOMIC RELEVANCE** § 7.2

7.1. ECONOMIC PROFITABILITY

The profitability of an investment depends on what are considered as costs and benefits, i.e. what is considered as the most severe constraint on the economy.

The return on investment (on the basis of incremental flows) can be computed "under three types of constraints":
- ➡ **FROM THE PERSPECTIVE OF THE DOMESTIC INCOME** § 7.1.1
- ➡ **UNDER FOREIGN CURRENCY CONSTRAINTS** § 7.1.2
- ➡ **FROM THE STANDPOINT OF THE INTERNATIONAL ECONOMY** § 7.1.3

Economic analysis from the standpoint of society as a whole attempts to measure the incremental contribution of the project to national income, that is, its contribution to the growth of the national economy. This entails estimating its **efficiency** by comparing the **means** implemented with the **results** obtained.

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The measure of the overall economic efficiency of projects with tangible products is done by calculating the **economic profitability** of the project:

- ◆ The **means** are made up of **incremental investment flows**. They represent resources which are specifically devoted to the project in order to gain future benefits.

    ⇒ **cost** = investment of resources

- ◆ The **results** are made up of **incremental** *net* benefit **flows resulting from the operation** of the project (gross benefits less operating costs). In this chapter, net benefits are referred to as (economic) "profit". They cover:

    • the recovery flows of the invested capital

    • the supplementary income flows generated.

        ⇒ **profit** = contribution to domestic/national income

MEANS → RESULTS
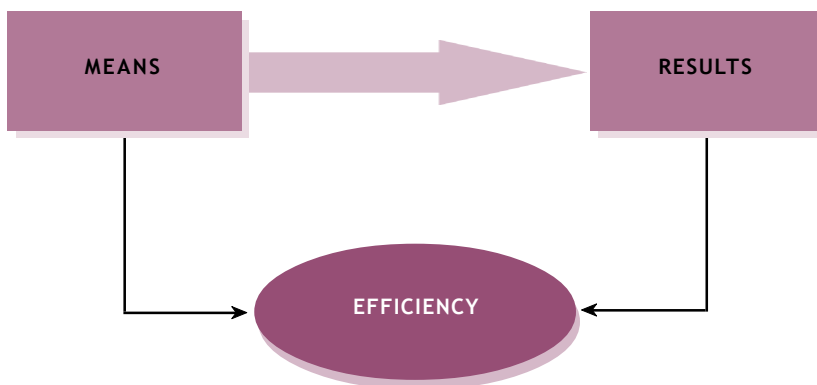
EFFICIENCY

Figure 7.1. *Principle of efficiency analysis*

Several calculations can be carried out depending on the constraints considered and the objectives assigned to the project.

☞ Figure 7.2.
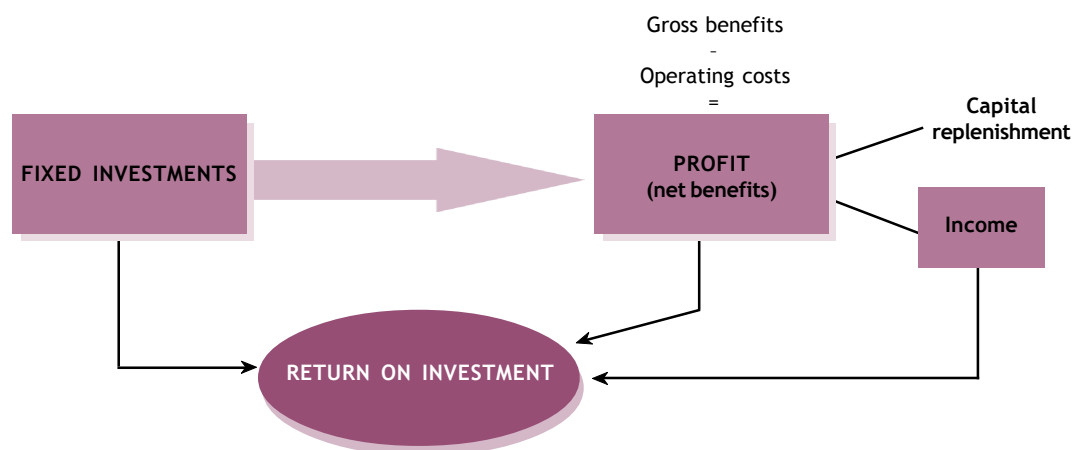
Figure 7.2. *Principle of return on investment analysis*

Table 7.1. *The main economic profitability calculations*

investment financing CONSTRAINTS	economic growth OBJECTIVES	PROFITABILITY calculated...
Total amount	Actual flow of incomes	...from the perspective of domestic income (§ 7.1.1)
foreign currency loss	Foreign currency gain	...under foreign currency constraints (§ 7.1.2)
total amount valued in shadow prices	Global net income valued in shadow price	...from the standpoint of the international economy (§ 7.1.3)

N.B.: A measurement is being made here of overall efficiency using synthetic indicators. Efficiency is also dealt with by partial **productivity** measures of factors of production (e.g., labour, land) and, more generally, by resources (productivity of foreign currencies measured by the return on foreign currency outlays – RFCO, § 5.3.2 – or the domestic resource cost – DRC, § 6.3.2).

The following table compares the definitions of (investment) costs and net (operating) benefits used in computing the project's overall economic profitability, according to these different perspectives.

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Table 7.2. *Cost and benefit definitions for calculating economic profitability*

ECONOMIC PROFITABILITY...	...from the perspective of domestic income	...under foreign currency constraints	...from the standpoint of the international economy
GROSS BENEFITS	Incremental production Incremental exports Consumer benefits Variation of domestic consumption	Incremental exports (or import cuts)	Incremental production
COSTS (OPERATING)	Incremental total imports	Incremental total imports	Incremental expenses
NET BENEFIT = PROFIT	Incremental total value added + consumer benefits & variation of domestic consumption	Incremental net foreign currency earnings	Incremental balance
COSTS (INVESTMENT)	Total incremental investment cost	Total incremental cost in foreign currencies of investments	Total incremental investment cost
PRICE SYSTEM	Market prices	Market prices	Shadow prices (international parity prices)

N.B.:   Certain criteria used to calculate economic profitability require that the discount rate be determined by assessing the opportunity cost of the capital in constant prices (§ A.2). This rate must be given to the analyst by the relevant authorities (e.g., planning unit) or by the donors involved in the project.

7.1.1. From the perspective of domestic income

The project's economic objective is to increase domestic income. The net benefit is provided by the amount of income created (excluding subsidies).

⇒   A situation in which only effects linked to the production are present (§ 5.2.1):

PROFIT   =Incremental total added value (ΔVA total)

=Net incremental foreign currency earnings ($\Delta Px - \Delta I$)

➭ A general situation in which effects linked to production and consumption are both present (§ 5.2.2 et 5.2.3):

PROFIT = ΔVA total + Consumer benefit (CB)

          =Incremental net foreign currency earnings (ΔPx – ΔI)

          + Variation of consumption (VC)[1]

The major economic constraint is the mobilisation of financing for the supplementary investments brought about by the project (on domestic savings or through international loans).

➭ COST =Total incremental investment costs (ΔINV.)

Return on investment = f (ΔVA total + CB, ΔINV.)
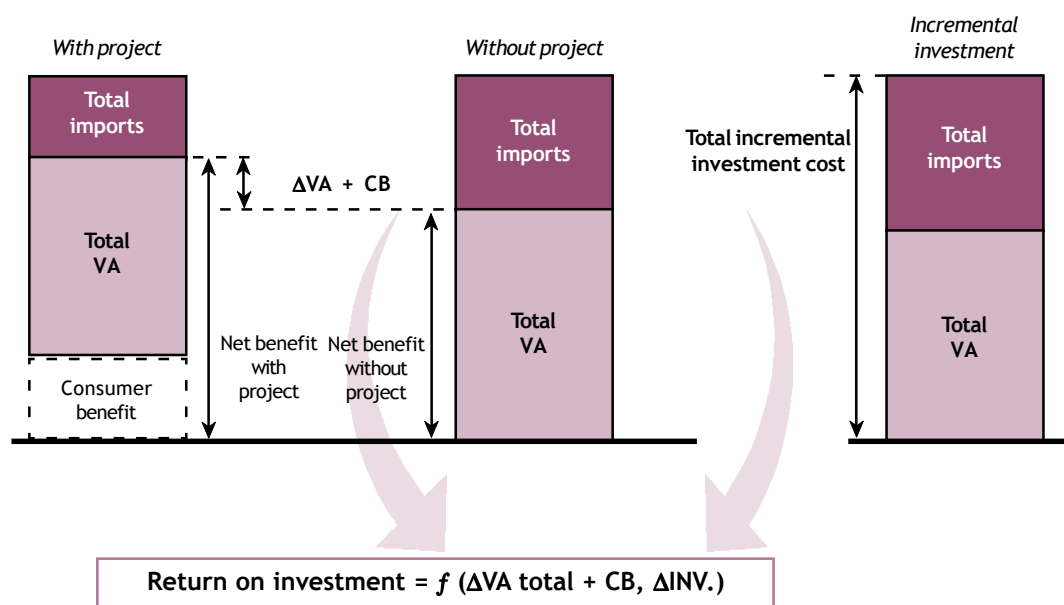
Figure 7.3. *Economic profitability from the perspective of domestic income (consumer benefit example)*

N.B.: Of course, efficiency can be calculated from the perspective of *national* income instead of *domestic* income (§ 5.3.1).

_____
(1) This is an accounting equation (§ 5.2.3).

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The different profitability criteria introduced in Annex E may be calculated. In general, the criteria which are most relevant are:

- the benefit-cost ratio or **return per monetary unit invested**, which is calculated for a year of normal operations (R_{BC2}, § E.2). This simple criterion can be used in the early phases of the project cycle (pre-feasibility);

$$\text{RMUI} = \frac{\Delta VA\ total_{normal} + CB_{normal}}{\sum_{t=0}^{N} \Delta INV_{t}}$$

and the **profitability index**, or discounted ratio can be calculated for the project's entire life span (R_{BC4}, § E.3). This criterion gives the "return in value added" of the unit of fixed capital according to the selected discount rate (i).

$$\text{Profitability index} = \frac{\sum_{t=0}^{N} \dfrac{\Delta VA\ total_{t} + CB_{t}}{(1+i)^{t}}}{\sum_{t=0}^{N} \dfrac{\Delta INV_{t}}{(1+i)^{t}}}$$

- the **net present value** of the project (NPV, § E.4). This criterion indicates the future contribution of the project to economic growth (G.N.P.), for the project's entire life span, in present values.

$$\text{NPV} = - \sum_{t=0}^{N} \frac{\Delta INV_{t}}{(1+i)^{t}} + \sum_{t=0}^{N} \frac{\Delta VA\ total_{t} + CB_{t}}{(1+i)^{t}}$$

- the economic **internal rate of return** (IRR, § E.5). The economic IRR is the most commonly used criterion. It can only be judged in relation to the assumed value of the discount rate.

$$- \sum_{t=0}^{N} \frac{\Delta INV_{t}}{(1+r)^{t}} + \sum_{t=0}^{N} \frac{\Delta VA\ total_{t} + CB_{t}}{(1+r)^{t}} = 0$$

7.1.2. Under foreign currency constraints

The project's economic objective is to increase national income. The net benefit is provided by the net foreign currency earnings (or the reduction of foreign currency losses).

⟹   PROFIT = Incremental net foreign currency earnings

$$(FCE = \Delta Px - \Delta I \text{ total})$$

In the frequent cases where effects on production and consumption have been noted

$$\Delta Px - \Delta I \text{ total} = \Delta VA \text{ total} + CB - VC$$

The major economic constraint is the availability of foreign currency for the investment.

⟹   COST   =   Total foreign currency costs of the incremental investment[1]

(noted ΔINV. imp.)

Return on investment = f (Δ Px - ΔI total, ΔINV. imp.)
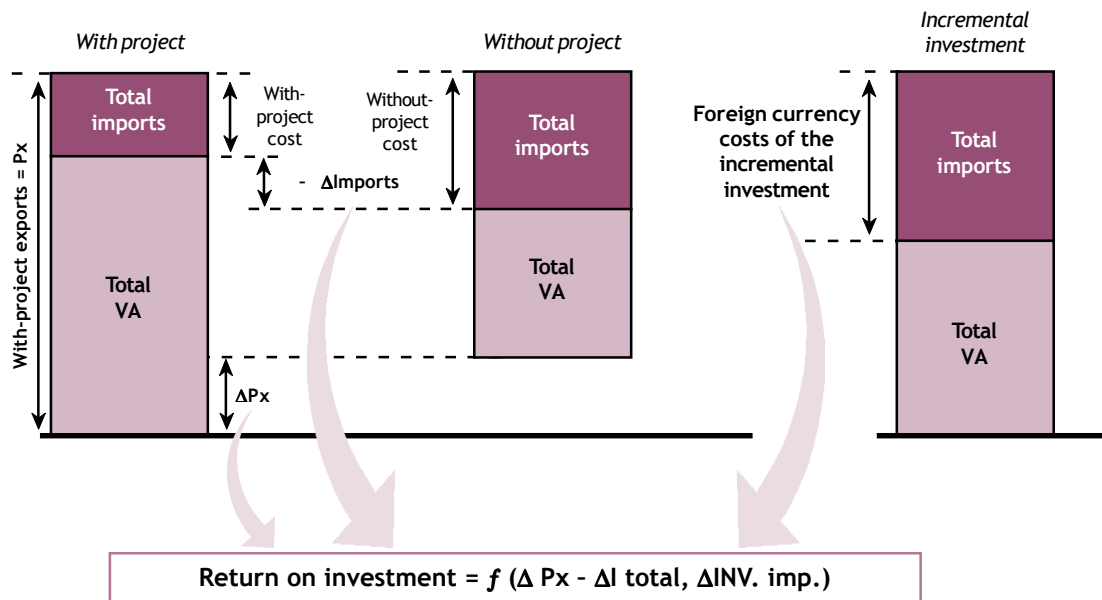
Figure 7.4. *Economic profitability under foreign currency constraints
(export project example)*

The different profitability criteria presented in Annex E may be calculated. In the most frequent cases, with $\Delta Px - \Delta I_{total}$ expressing the incremental net foreign currency earnings, the criteria which appear to be the most relevant are:

_____

(1) This is the *total* cost, i.e. the sum of the *direct and indirect* costs in foreign currency. It is thus necessary to carry out a backward linkage analysis for the investment outlays (manual linkage or statistical calculation – § 5.1.2).

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- the **payback period**, which indicates the time necessary for the economy to recover the initial foreign currency investment(§ E.1).

$$\sum_{t=0}^{d} (\Delta Px_t - \Delta I.\, total_t) = \sum_{t=0}^{d} \Delta INV.\, imp._t$$

with: d = Payback period

- the benefit-cost ratio or **return per monetary unit invested**, which is calculated for a year of normal operations (R_{BC2}, § E.2). This simple criterion can be used in the early phases of the project cycle (e.g., pre-feasibility);

$$RMUI = \frac{\Delta Px_{\,normal} - \Delta I\, total_{\,normal}}{\sum_{t=0}^{N} \Delta INV.\, imp._t}$$

and the **profitability index,** a discounted ratio calculated for the project's entire life span (R_{BC4}, § E.3). This criterion provides the "return in foreign currency" per invested foreign currency unit at the selected discount rate (i).

$$Profitability\ index = \frac{\displaystyle\sum_{t=0}^{N} \frac{\Delta Px_t - \Delta I\, total_t}{(1+i)^t}}{\displaystyle\sum_{t=0}^{N} \frac{\Delta INV.\, imp._t}{(1+i)^t}}$$

- the **net present value** of the project (NPV, § E.4). This criterion indicates the future contribution of the project to foreign exchange for the project's entire life span in present values subject to exchange rate consistency (§ 5.2.4).

$$NPV = -\sum_{t=0}^{N} \frac{\Delta INV.\, imp._t}{(1+i)^t} + \sum_{t=0}^{N} \frac{\Delta Px_t - \Delta I\, total_t}{(1+i)^t}$$

- the economic **internal rate of return** (IRR, § E.5). The economic IRR is the most frequently used criterion. It can only be judged in relation to the supposed value of the discount rate.

$$-\sum_{t=0}^{N} \frac{\Delta INV.\, imp._t}{(1+r)^t} + \sum_{t=0}^{N} \frac{\Delta Px_t + \Delta I\, total_t}{(1+r)^t} = 0$$

with: r = Economic IRR

The analysis of profitability under the constraint of foreign currency scarcity involves considering, in addition to these criteria, the effects and indicators of the project's contribution to the foreign exchange balance (§ 5.3.2): the impact of the project on the different balances, the ratio of return on foreign currency spent, as well as the relation between the cost of domestic factors and the balance of the production of tradeable goods and services (Private Cost Ratio in market prices and Domestic Resource Cost ratio in shadow prices – § 6.3.2).

Domestic and national perspective:

The national perspective can be distinguished from the domestic perspective (§ 5.3.1) by integrating (a portion of) the wages of foreign workers (W_f), the indirect financial charges[1] paid in foreign currency (FC_f), and the operating profits of foreign firms (OP_f) in the flows of foreign currency losses. Logically, the profitability under foreign currency constraints should be calculated from a national perspective.

7.1.3. From the standpoint of the international economy

The project's economic objective is to increase national income according to the efficiency model reflected by international market prices, and taking into account the domestic value of the factors of production.

⇒ PROFIT = Incremental "economic balance" of the flow balance account in shadow prices (international parity prices) (ΔEB_{SP})

The major economic constraint is the real mobilisation of resources for supplementary investments required by the project (concerning domestic savings or through international loans).

⇒ COST = International opportunity cost of the incremental investments ($\Delta INV._{SP}$)

☞ Figure 7.5.

—————
[1] The direct financial charges paid in foreign currency appear in the flow of direct foreign currency losses.

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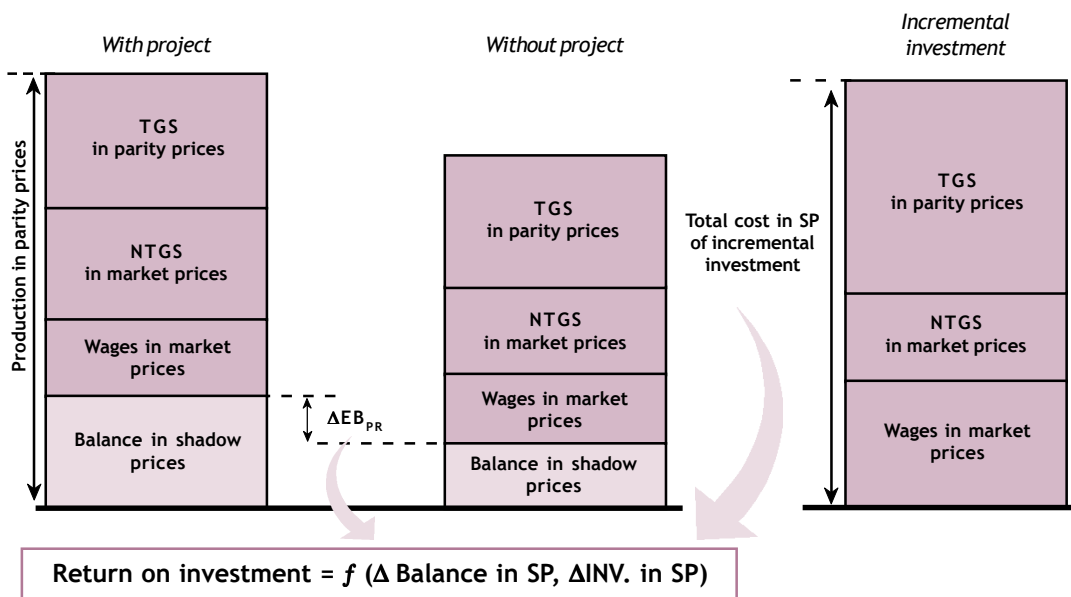
Figure 7.5. *Economic profitability from the standpoint of the international economy*

The different profitability criteria presented in Annex E may be calculated from the incremental flows of the consolidated account computed in shadow prices. In general, the most relevant are:

◆ the **payback period**, which indicates the time necessary for the economy to recover the amount of real resources devoted to the initial investment (§ E.1).

$$\sum_{t=0}^{d} (\Delta EB_{SP\,t}) = \sum_{t=0}^{d} \Delta INV._{SP\,t}$$

with: d = Payback period

◆ the benefit-cost ratio or **return per monetary unit invested**, which is calculated for a year of normal operation (R_{BC2}, § E.2). This simple criterion can be used in the early stages of the project cycle (e.g., pre-feasibility study) if the international prices of the principal items, as well as the shadow exchange rate, are available.

$$RMUI = \frac{\Delta EB_{SP\,normal}}{\sum_{t=0}^{N} \Delta INV._{SP\,t}}$$

and the **profitability index**, a discounted ratio calculated for the project's entire life span (R_{BC}, § E.3). This criteria provides the return per invested resource unit the opportunity cost of capital as the discount rate (i).

$$\text{Profitability index} = \frac{\sum\limits_{t=0}^{N} \dfrac{\Delta EB_{SP\,t}}{(1+i)^t}}{\sum\limits_{t=0}^{N} \dfrac{\Delta INV._{SP\,t}}{(1+i)^t}}$$

- the **net present value** of the project (NPV, § E.4). This criterion indicates the project's future contribution to domestic wealth expressed in shadow prices, taking into account the opportunity cost of capital (i), and subject to the consistency of the shadow exchange rate (§ 6.2.3).

$$NPV = \sum\limits_{t=0}^{N} \frac{\Delta EB_{SP\,t}}{(1+i)^t} = 0$$

- the economic **internal rate of return** (IRR, § E.5). The economic IRR is the most commonly used criterion. It can only be judged in relation to the value of the opportunity cost of capital (discount rate).

$$\sum\limits_{t=0}^{N} \frac{\Delta EB_{SP\,t}}{(1+r)^t} = 0$$

The analysis of economic profitability under global external constraints obviously indicates that the viability of the project should also be considered, independently of these criteria, within the framework of the international market (e.g., protection, competitiveness – § 6.3.2).

7.2. ECONOMIC RELEVANCE

In order to evaluate the project's relevance to the national economy, the relationship between the problems addressed and the project's "specific objectives" must be established.

☞ Figure 7.6.

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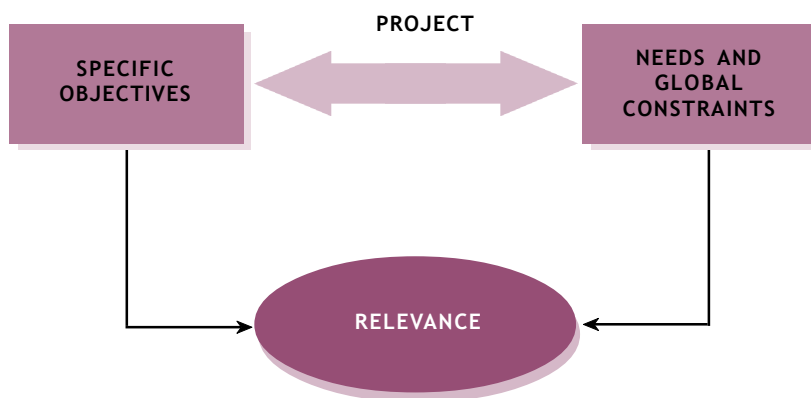
Figure 7.6. *Principle of relevance analysis*

For the analyst, relevance is assessed against the country's major economic policy objectives. These correspond to the "overall objectives" of the logical framework or to higher level goals (outside the logical framework). For projects with tangible products, the objectives are of two types:

- those concerning the flows of resources, that is, generally: economic growth, foreign currency earnings, government budgetary balances, increase and distribution of income;
- those concerning productive entities, for example: viability, financial autonomy, absence (or limitation) of transfers intended to support or protect these activities.

In practice, the **economic relevance of the project** can be assessed by comparing:

- the objectives of the development policies adopted and the structural reforms undertaken;
- and the results of the project, as revealed by the array of impact and viability indicators calculated in the preceding chapters.

It sometimes happens that isolated interpretation of certain indicators may lead to different assessments of the project. This is the reason why *analysis* is necessary: in order to outline the mechanisms which allow a project, for example, on one hand to seem competitive internationally (DRC < 1) but on the other hand to present a foreign currency balance ($\Delta Px - \Delta I$) unfavourable for the country, with an excellent economic profitability (IRR > i) from the standpoint of the international economy, but which is insufficient from the standpoint of scarcity of foreign currency (low RMUI and profitability index). How does such a project contribute to national economic goals? Should its impact be seen as negative or positive? **The *analysis* should give detailed responses to the following types of questions**:
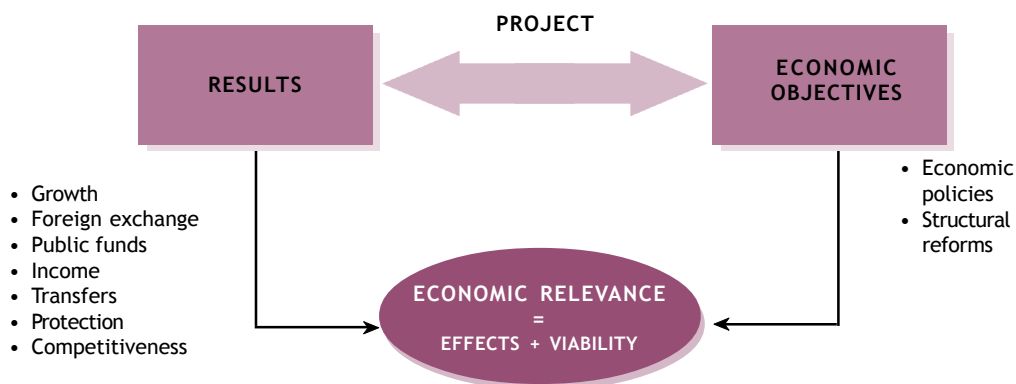
Figure 7.7. *Principle of economic relevance analysis*

- **In which areas does the project fit (or not fit) with the policies and reforms being carried out?**
- **In which areas does the project's impact contribute (or not contribute) to achieving the major objectives?**

Examples:

- Because it requires serious protection measures, which run contrary to the structural reforms in progress, part of the project's production cost is borne by consumers and taxpayers. Yet, the project supports economic activities in a region for which no alternative has yet been identified, which is capable of increasing income.

- Part of the project's solid international competitiveness, as evidenced by the EPC and the DRC, is in line with government efforts to promote private sector activities. Yet the low tax rate makes it impossible rapidly to recover the exemptions granted on customs duties. This measure is nonetheless justified in view of the fragile financial profitability of the economic entity.

In the final analysis, this step is more of a synthesis than a new undertaking. All the indicators are useful *a priori* and can provide enough information to carry out this exercise. It is useful to group them according to the major themes which concern the country's economic development. The elements presented in the table below provide only reference points in this respect.

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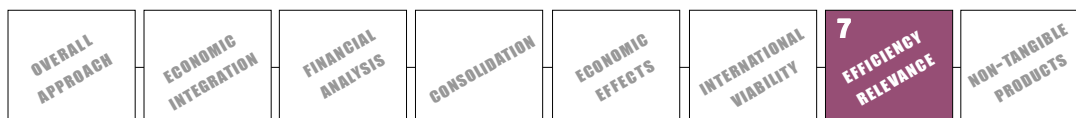
Table 7.3. *Elements for the analysis of the project's relevance to economic policies*

PRINCIPAL INDICATORS	THE MOST COMMON THEMES
GROWTH POLICY	
< Total Value added (incremental) [VA, ΔVA] < Rate of integration into the national economy [VA/P] < Net (incremental) foreign currency earnings [Px-I, ΔPx- I] < Wages of domestic entities [Wn, FC_n, OP_n] < Variation of consumption [VC] < Protection [NPC, EPC] < Domestic Resource Cost [DRC] < Project profitability [RMUI, Profitability index, NPV, IRR]	• Valuation of domestic resources • National independence • Sectoral strategies • Exchange rate • Consumption growth • Competitiveness in the international economy
FOREIGN EXCHANGE POLICY	
< Net (incremental) foreign currency earnings [Px-I, ΔPx- I] < Return on foreign currency outlay [Px-I/I] < Transfers of capital [Wf, FCf, OPf] < Project profitability [Payback period, Inv. imp., RMUI, Profitability index, NPV, IRR] < Domestic Resource Costs [DRC]	• Equilibrium of different balances and stabilisation • Exchange rate • Sustainability of the development actions undertaken • Efficiency in the use of scarce resources • Competitiveness in the international economy
BUDGET POLICY	
< Net (incremental) balance for the Government [Tn-FCp+OPp, Δ(Tn-FCp+OPp)] < Rate of total taxation of factors [Gov. balance/VA] < Coefficient of real cost for the Government [Balance/Dir. subsidies.] < Return per monetary unit invested, profitability index for the Government [Government Balance/INV.p]	• Budgetary equilibrium and stabilisation • Structural adjustment, Government divestiture and privatisation • Efficiency in the use of public funds • Efficiency of public firms • Sustainability of the development actions undertaken
INCOME POLICY	
< Table of (incremental) total income [S, Tn, FC, OP, ΔS, ΔTn, ΔFC, ΔOP] < Consumer benefit [CB] < Variation of quantities consumed [VC] < Society private transfers [net transfer, profits ratio, effective subsidy rate] < Table of jobs created	• Poverty reduction • Equity • Consumption policy • Employment • National and regional development

7.3. SUMMARY OF PROCEDURE FOR THE ANALYSIS OF A PROJECT'S EFFICIENCY AND ECONOMIC RELEVANCE

The diagram below illustrates how a project's return on investment, efficiency and economic relevance are analysed.

OPERATING COST

GROSS BENEFITS

FIXED INVESTMENT COST
- total investment MP
- imported investment
- total investment in SP

NET BENEFIT
- $\Delta VA + CB$
- ΔTotal importation
- ΔEB in SP

RETURN ON INVESTMENT
under constraints:
- domestic income
- foreign currency
- international economy

Economic policy OBJECTIVES

ECONOMIC RELEVANCE
- economic policy
- structural reforms

MP = Market price
SP = Shadow price

Figure 7.8. *General procedure for the analysis of economic efficiency and relevance*

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CASE STUDY
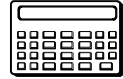
1. Economic profitability

If it is expected that the project will contribute to the national goal of **economic growth under the main constraint of mobilising capital for investment**, the return on investment appears to be insufficient[1]: for the selected discount rate (8%) with an IRR of 2.8% (5.0% from the domestic perspective) and a strongly negative NPV, the capital cost outweighs the benefits in terms of economic growth (VA) throughout the life span of the project.

If the project's main objective is to encourage **foreign currency earnings under scarcity of foreign currency constraints**, then the recovery period of the foreign currency invested is 11 years from the start-up of the operation, and the return on investment (from the national perspective) measured by the IRR (6.7%) and the NPV (– NMU 5,032.10^3) is insufficient. Considering the phasing over time of the flows (discounting), the net foreign currency balance thus appears to be negative. The sensitivity analysis demonstrates that the return on investment will only be positive if there is a rise of at least 7.5% in HDPE's international price.

If the objective is **economic growth according to the efficiency model, reflected by international prices** (but taking into account domestic labour wages), the project reveals a satisfactory return on investment even though the investment recovery period is rather long (about twelve years): the IRR reaches 9.9 whereas the NPV reaches NMU 10, 468.10^3. The profitability index shows that, overall, each NMU invested will have a net benefit of NMU 0.12 over the life span of the project. This is another indication of the project's solid "international profitability" (the project is competitive internationally). It is logical that the critical values of the sensitivity analysis come into play once again: the project's return on investment is wiped out by an international HDPE price of – 13% or by a rise of + 14% in the total cost of investments.

↩ **The project's return on investment varies depending on the economic objectives assigned to it:**

- ◆ **it is acceptable from the point of view of the project's integration in the international economy, but remains highly sensitive to international price variations of HD polyethylene and to the investment costs;**

- ◆ **it is insufficient in market prices, both from the perspective of overall economic growth and from that of foreign currency earnings (for which only a major, lasting rise in the international price would be able to guarantee the project's return on investment).**

_____

(1) Despite an annual return on the monetary unit invested (not including discounting) of more than 12%.
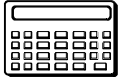
2. Summary of the project's economic relevance

➤ **The project is characterised by:**

- ◆ a strong incentive for the entities involved to participate (partly because of transfers), even though the financial situation of the operator of the sugar farm tract seems fragile, due mainly to the strong protection given to national production (NPC and EPC around 1.25);

- ◆ the implementation of economic activities which are both sustainable and competitive within the international economic system (IRR= 0.93), and generally profitable in international opportunity prices;

- ◆ a vigorous integration into the national economy (integration rate between 80 and 91%), but a return on investment which is insufficient in terms of value added due to the large scale of the investment;

- ◆ major foreign currency savings (up to 77% of the cost of HDPE imports); but the large investment may reduce this benefit by between 25 and 46% because of financial charges in foreign currency during half of the project's operating period, thereby wiping out the operation's return on foreign currency;

- ◆ major losses for the government budget (NMU 2 million per year), along with a limited tax rate (total tax rate of 7%), in line with the economic policy objectives;

- ◆ substantial overall earnings for the firms involved, but the industries using HDPE must shoulder an incremental 25% cost.

8. ANALYSIS OF PROJECTS WITH NON-TANGIBLE PRODUCTS

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Projects with non-tangible products (or with products which are difficult to value – see § 1.2.1 for definition) present the analyst with a special set of problems. The procedure presented in this chapter is an operational one suitable for use in *ex-ante* appraisal or on-going and *ex-post* evaluation missions. Although it is more descriptive and empirical than methods proposed by researchers, it aims to provide to analysts and decision-makers with a clear and detailed assessment of the project's financial and economic benefits and limits.

This analysis aims to assess whether the scarce resources devoted to the project are soundly utilized. It analyses costs in monetary terms, while benefits are expressed in descriptive terms (quantified material results, qualitative results).

The valuation of benefits of projects is often difficult, because:

- available resources do not permit the surveys and studies needed to value benefits (e.g., road projects);

- long-term, discounted benefits (e.g., over a human life span for education projects; long term environmental benefits) have little economic impact[1];

- user demand in projects involving free or highly subsidised public services is not determined by a market rationale. Attributing monetary value thus becomes extremely abstract;

- it is only possible to estimate the value of part of the project's results, e.g., for many environmental projects. It is then important to assess the value of these benefits, even though the main results of the project cannot be valued and, thus, the overall profitability estimated.

The main difference of approach with cost-benefit analysis is that, in using the method, **the analyst cannot assess whether or not costs are higher than benefits. Projects with non-tangible products are justified in terms of their purpose and overall objectives.** The analysis aims to assess how well the project's resources are used, i.e.:

- concerning benefits: economic development (in its various dimensions, not just economic growth);

- concerning costs: the minimization of outlays and the limiting of waste for a given result (rather than the return on the invested sums).

_____

(1) Would it then be necessary, for example, to use different discount rates for benefits (certain authors propose negative rates) and costs-for which the perception is more "commercial"?

The proposed method of analysis involves:

- defining the *results* of the project

- checking the project's eventual *viability*

- carrying out relative *efficiency* calculations

- calculating the *effects* on the economic objectives

- assessing economic and sectoral *relevance*

8.1. DEFINING THE RESULTS

The analysis of products with non-tangible products requires firstly:

- to define clearly the benefits brought about by the project

- to identify the activities generated by the projects and those which would be carried out without it

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8.1.1. Selection of indicators

Every project has a hierarchy of objectives (activities 6 results 6 purpose 6 overall objectives) (§ 1.1.1). The purpose is the true "centre of gravity" for the project management, allowing measurement of the project's success or failure in terms of sustainable benefits for the target group[1]. In the logical framework, the project purpose and the results are described operationally using **objectively verifiable indicators** (OVI's), expressed in terms of quantity, quality, target group, location and time.

The first stage of the analysis involves:

- clarifying the features of the project's specific objective and its results: what is the project expected to produce?
- determining the physical units in which they will be expressed: how many units of product does the output seek to produce?

The indicators used must be specific and independent of each other (in order to estimate the unit cost of the products without "double counting"). Hence, for a health project, the following may be considered important: the number of patients treated, the number of sick days avoided, the number of work days gained, health insurance savings, mortality rate. The main thing is that the indicators remain both *simple and descriptive*. Indicators which are too complex should be avoided (e.g., those which incorporate all sorts of benefits in a single unit and often require strong assumptions)[2].

The following table provides some examples of the expected results of various projects and the indicators that may be used to measure them.

☞   Table 8.1.

----

(1) *Manual, project cycle management...*, *op. cit.*
(2) This is the case, to take one example, for the assumptions according to which 1 year of incremental life as a disabled person would be equal to 0.8 years of life in perfect health, which enables one to create the indicator "quality-adjusted life year". Apart from the moral and practical problems of such a assumptions, it is not at all sure that decision-makers could easily apply it.

Table 8.1. *Examples of results and corresponding indicators*

SECTOR	INTERVENTION EXAMPLES	RESULTS	POSSIBLE INDICATORS
TRANSPORT INFRASTRUCTURE	• Rehabilitation of roads in rural areas • Construction of an asphalt road *[Road projects whose benefits are not valued]*	< Increased traffic < Improved contact with neighbouring countries < Lowering of transport costs < Time and comfort gains < Safer major highways < Creation of local jobs < Effect of regional development < Positive effects on the environment	◆ Number of km built or renovated ◆ Number of new users ◆ Tonnage induced ◆ Cost savings ◆ Number of accidents avoided ◆ Insurance savings ◆ Number of construction jobs created ◆ Number of maintenance jobs created
URBAN INFRASTRUCTURE	• Installation of a system for urban water supply	< Health improvement < Gain of time and comfort < Reduction of losses < Securing of supplies	◆ Number of m^3 of water produced ◆ Number of m^3 of water sold ◆ Population of the zone (overall) ◆ Population consuming (in relation to total population) ◆ Ratio of annual sales to quantity produced ◆ Reduction of the prevalence rate of "water-induced illnesses" ◆ Reduction of the cost of treatment for these illnesses
SOCIAL	• Direct food aid • High-intensity labour work • Financial grants for basic initiatives	< Reduction of under-nourishment in the region < Creation of temporary jobs < Reinforcement of community actions	◆ Number of meals served ◆ Quantities of subsistence crops distributed ◆ Number of temporary jobs created ◆ Reduction of the number of hospital visits ◆ Number of community buildings renovated

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Table 8.1.*Examples of results and corresponding indicators (following)*

SECTOR	INTERVENTION EXAMPLES	RESULTS	POSSIBLE INDICATORS
HEALTH	• Support to pharmaceutical policy	< Guidelines for National Drug policy < Availability of essential drugs in public health facilities	◆ Financial figures of the drug procurement agency ◆ Value of drugs used per capita ◆ Trends in prescription practices ◆ Trends in health centres attendance
	• Improvement of access to primary health care	< Number of health centres meeting official standards < Improvement of preventive, curative and health promotion activities	◆ Rate of health coverage (population per health centre, population per maternity beds, population per doctor, nurse, midwife ◆ Rate of delivering in health centres ◆ Number of consultations per capita and per year ◆ Immunisation coverage for women and children
SUPPORT TO SMEs	• Credit line • Assistance to promoters • Training	< Creation of new enterprises < Reinforcing/expansion of existing enterprises < Job creation	◆ Number of projects approved ◆ Number of projects implemented ◆ Percentage of the dossiers on time ◆ Number of jobs created ◆ Number of jobs secured ◆ Number of loans, average amounts and average durations ◆ Number of promoters assisted ◆ Breakdown of projects by sectors and branches

Project results and the nature of the indicators used to measure them vary. Some results can be valued directly in monetary terms, others can be quantified but not valued, while others can be neither valued nor quantified without an enormous effort, which would generally not be worth-while. Hence, the results of the project cannot be added up to assess the overall "benefit" of the project. Because of this, some analysts, when comparing different projects, ignore some of the effects and use a single *quantifiable* indicator, e.g., the length of road built (described by road category and type of traffic), or the number of persons trained (for a vocational training project).
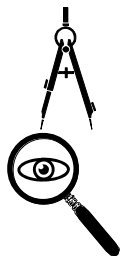
8.1.2. The project's real contribution

Do the activities attributed to the project actually result from it, or would they have been undertaken without it?

This question is valid for all types of project. It has been established that the true importance of the project is seen in the *incremental* benefits it contributes (§ 1.3.1):

Effects of the project = With-project situation – Without-project situation

It is thus the incremental value recorded by the "objectively verifiable indicators" which measures the project's contribution – and the incremental outlays, which measure its costs.

And yet, in the without-project situation, streets will be maintained, some schools will be renovated, classes will be held, anti-erosion walls will be built, mobile health teams will provide medical care, etc. When examining the without-project situation, it is important neither to attribute to the project benefits which would have occurred without it, nor to burden it with recurrent administrative or public service outlays. The weakness of the public services in the absence of external financing thus become evident.

Comparison with the without-project situation can also reveal the *negative effects* of the project, for example, the need to travel in order to benefit from a service which was initially made available in a decentralized manner (e.g., registry office formalities, medical services). To the extent possible, "disadvantages" (which appear by comparing the with- and without-project situations) should be identified and objectively verifiable indicators assigned to them (§ 8.1.1).

Finally, consideration of the without-project situation may reveal *cost savings*, for example the medical costs avoided due to a health project[1].

8.2. SUSTAINABILITY STUDY

When studying the sustainability of projects with non-tangible products, it is important to separate the activities which result strictly from the project from those already put in place by the public services of the state (or the local government). This distinction having been made, it becomes possible to ask questions concerning the long- and medium-term financing o*f new* activities promoted by the project.

———————
(1) Reduction of expenditures for the social security system and/or reduction of user outlays. Savings in foreign currency in terms of economic impact (§ 8.4.2).

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Will the project benefits be sustained after the foreign financing ends? In order to answer this question, the analyst:

- **estimates the investment and operating costs of the project**
    - ➡ **BUDGET PLAN** § 8.2.1
- **examines the likelihood of obtaining the necessary medium and long term funds**
    - ➡ **FINANCING OF RECURRENT COSTS** § 8.2.2
- **deducts from this the chances of retaining the project benefits over a long period of time**
    - ➡ **SUSTAINABILITY OF THE ACTIVITIES GENERATED BY THE PROJECT** § 8.2.3

8.2.1. Budget plan

(a) General approach

On the basis of the technical description of the project, the annual flows of investment and operating outlays (or ordinary outlays) are summarised in a **budget**, which is in fact a cash flow statement (§ D.1), for each economic entity taking part in the project. It includes (under receipts) the sales, fees and taxes paid directly by users to these entities.

A budget is drawn up for each participating agency, including the central or local governments responsible for monitoring. It is important to identify as accurately as possible *all* the flows – and *all* the entities – participating in the project:

- the provision of seconded staff and other free inputs to the project by other agencies, requires a specific budget to be drawn up for those agencies, which must be included in the project's overall consolidated budget;
- the public (and more rarely private) entities supervising the operation on behalf of local or central governments can sometimes find that their work increases sharply due to the implementation of the project, and that they have to bear incremental costs (e.g., salaries, vehicles and moving costs).

☞   Table 8.2.

Table 8.2. *Budget (prior to financing[1])*
(covering the life span of the project)

YEAR	0	1	2	...	N
RECEIPTS					
< **Sales and dues**					
< **Fees and taxes** (directly collected)					
TOTAL RECEIPTS = R					
OUTLAYS					
< **Investments** . Initial investment . Renewal . Working capital[(*)]					
< **Operating charges** . Raw materials . Parts and supply . Maintenance, repair . Outreach activities . Overheads . Royalties and fees . Labour costs . Direct and indirect taxes					
TOTAL OUTLAYS = O					
BALANCE = R – O					

(*) Increases of working capital requirement.

Should several entities (agencies, organizations) be involved, the **consolidated budget** of the whole operation is calculated simply by adding similar items and eliminating transfers between entities (§ 4.1.1).

Notes relating to *ex-ante* analysis:

(1)   In drawing up the budget, increases in production of services provided must be taken into account. Thus it is not enough simply to identify the same costs as for

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(1) The budget drawn up prior to borrowing and financing of recurrent expenses. Where borrowing is concerned, the receipt of credits and debt servicing flows should be included in the "post-financing budget".

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the first year of operation. Outlays forecast must be based on demand projections.

(2)   Costs must be calculated in a detailed manner, item by item, and not based on average coefficients linking, for example, investment costs and recurrent operating costs (of the "r coefficient" type – § 8.3.1).

Recurrent costs sometimes refer to operating outlays (the most common meaning in the case of non-productive projects), or the difference between the receipts collected from users and the total operating expenses. The "recurrent costs" do not include investment outlays. In the area of public funds, they normally refer to operating and labour budgets, and not to capital outlay budgets (although their actual forms are diverse: ordinary budgetary outlays, renewable annual subsidies, grants from various agencies, etc.).

(b) Estimation of the project cost

The total cost of the project is estimated on the basis of the technical description of the project and of the budgets of all entities involved. Examples of structures of project budgets are given in Annex H.

(c) Fees and cost recovery

The **cost recovery policy** adopted affects the project budget, both because of the "receipts" collected, but also because the demand may be reduced if the users are asked to pay a fee. The extent to which this is likely to occur should be examined during the feasibility study, using standard demand theories (e.g., price-elasticity[1] by income category, likely changes in elasticities over time) adapted to the subsector.

The following approach may be of use:

(1)   calculate the balancing tariff; in other words the tariff which would provide the entity concerned with the receipts necessary for it to pay its operating outlays and the depreciation of its investments;

(2)   then calculate the tariff to be applied, which will depend on the desired policy and the level of profit (cash flow) sought: e.g., the absolute limit of the deficit, maximum level of cost sharing by users'.

This tariff study must be reexamined *after establishing the financing plan* of the national and foreign funding agencies, so as to asses how this plan modifies the entity's financial position.

_____

(1) The elasticity price of demand, e, measures the changes of the demand in reaction to price variations:

$$e = \frac{\text{Relative change of demand in quantities (in \%)}}{\text{Relative price change (in \%)}} = \frac{dQ/Q}{dP/P}$$

The following examples illustrate different types of possible tariff policies:

- the fixing of a fee paid by villagers to a cooperative managing a drinking water pump, to provide for its timely replacement;
- the shouldering of 50% of the cost (investment and operating outlays for vehicles and infrastructures) of an urban transport system by a local government;
- the fixing of a tariff for the users of health services independent of the actual costs, the remaining deficit being handled by the Government (primacy of social policy);
- the indexing of tariffs on "long term marginal costs", mainly for large investments (such as in the electricity sector);
- the determination of fee levels using the average incremental cost, e.g., for water or sewerage projects.

User tariff rates are thus determined at the policy level on the basis of: sectoral specificities, equity considerations (e.g., equal access to the services provided regardless of income), effectiveness considerations (e.g., elimination of wasteful practices thanks to "commercial" management, elimination of possible overconsumption of free services), limitation of the public deficit, demand limitation (e.g., through price increases) and risk limitation (e.g., in the case of social projects, health projects, projects concerned with environmental conservation).

8.2.2. Financing of recurrent costs

Is the financing of the project's *new* activities really assured for the entire project duration and beyond?:

This is an important part of the analyst's *ex-ante* work on projects with non-tangible products. The effectiveness of new investments depends in large part on the ability to meet subsequent operating outlays. The freezing or deterioration of services and, in the end, the failure of many projects, often results from the fact that these recurrent costs were not allowed for in the project design.

All the planned initial investments should be made in line with the "intervention logic" in the logical framework. It is important to make sure that the national counterpart contributors' commitments will be honoured in the time allotted. This is especially so for recurrent costs, for which a realistic examination of the plausibility of medium- and long-term commitments should be made. The individual contributions of each agency taking part in the project must be determined and the likelihood of receipts covering outlays throughout the full period verified.

The initial estimation of the project budget in constant prices makes it possible to compare these outlays to the agency's current budget. The portion of investment or ordinary outlays in the agency budget is an early indication of plausibility. When dealing with large projects, covering long periods of time, it may be useful for the analyst to draw up budgetary forecasts

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using estimates of future economic growth, or national or urban demographic growth, as reference points.

A table should be prepared listing national or foreign contributions (Table 8.3). Recurrent expenses should be divided into their most common components, such as:

- operations: e.g., equipment operating charges, government service charges, rents, maintenance costs of buildings and equipment;
- labour costs: e.g., salaries, social security expenses, indemnities, including the budgetary costs of seconded officials;
- debt servicing of the loans taken for the implementation of the project.

Finally, a sensitivity analysis enables the analyst to foresee the consequences of any divergence from the "basic scenario":

Table 8.3. *Table of contributions to recurrent expenses*
(in constant prices)

YEAR	0	1	2	...	N
SOURCE OF FINANCING A <**Operation** . Equipment charges, maintenance,… . In kind <**Labour** . Handling . Various indemnities <**Debt service** . Repayment of capital . Interest					
TOTAL = SF_A					
SOURCE OF FINANCING B <**Operation** . Equipment charges, maintenance,… . In kind <**Labour** . Handling . Various indemnities <**Debt service** . Repayment of capital . Interest					
TOTAL = SF_B					
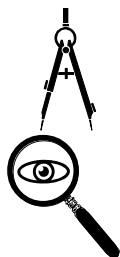
- for the entities whose costs are financed: what would be the consequences of variations of actual costs without a modification in the financing plan?

- for the financing agencies: to what extent is there a risk of the recurrent expenses to be covered surpassing the forecasts? Could such an eventuality be effectively dealt with?

8.2.3. Sustainability of the activities generated by the project

Are the activities and results generated by the project likely to be sustainable?

As shown in Figure 8.1, the analyst's answer is based on examining:

- whether the activities generated by the project are really incremental (§ 8.1.2);
- whether the allocated funds are sufficient and ascertained (§ 8.2).

Would the activities have been carried out without the project?

Is it certain that the new activities will be financed?

VIABILITY
Will the results sustain themselves following foreign financing?
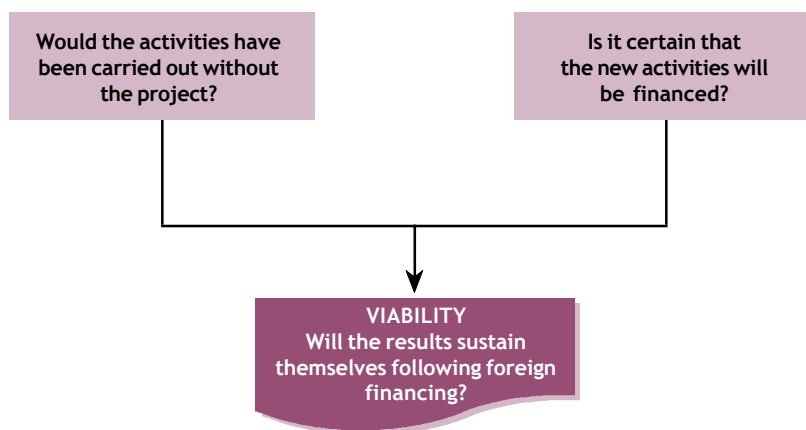
Figure 8.1. *Viability study*

8.3. EFFICIENCY ANALYSIS

Are the resources allotted to the project used efficiently? In order to answer this question, the analyst compares the costs which appear in the budget with the expected results.

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In order to assess the efficiency with which the project uses the means placed at its disposal, a check is made to confirm that:

- **the resources employed by the project produce the benefits desired at the least possible cost**

    ➡ **EXAMINATION OF UNIT COSTS** § 8.3.1

    ➡ **USE OF NECESSARY AND SUFFICIENT RESOURCES** § 8.3.2

8.3.1. Examination of unit costs

This job can only be done with the help of specialists well versed in the sector involved. It involves:

- making sure that the budget outlays are roughly of the usual amount, considering the scope of the project and its expected results,

- checking any unexpectedly high costs both in terms of the technical necessity of the outlays (quality, origin, quantities, price) and of the quantity of services produced.

In order to do this, the technical and economic indicators specific to each activity are used as reference points.

- Certain of these empirical indicators correspond to technical processes which are difficult to adapt to a "normal" operation or a "normal" use of equipment. They either affect inputs (e.g., the average percentage of salaries used in reforestation projects, the average share of technical assistance for certain kinds of institutional support projects) or are more global, as, for example, the "r-coefficient" which provides the average relationship between recurrent operating costs and the investment costs[1].

    Nonetheless, as their meaning is strictly dependent on both economic activities and the precise economic and technical context, they cannot be used automatically. Thus, in a given type of country, the average r-coefficient of the health projects is considered to be around 25%, ranging from 15% for hospitals to 60% for free clinics. The usefulness of these technical coefficients, which are used by the sector specialists, is that they make possible the rapid verification of the likelihood of the total outlays. A well-executed analysis must nonetheless include the detailed examination (done by a specialist) of all inputs.

- Other empirical indicators are expressed in relation to results. This is the typical approach used in cost-effectiveness analysis and involves estimating the investment or operating cost per hospital bed, per connection to a network, per kilometre of road, per

_____

(1) r = recurrent costs of operating at full capacity/investment.

linear meter of anti-erosion wall, per reforested hectare, etc. Experience and comparisons with similar situations may bring to light other differences, which have to be explained, justified, or modified (*ex-ante*).

These are the objectively verifiable indicators (defined in the § 8.1.1), which form the basis for **unit cost** calculation.

Table 8.4. *Examples of current unit cost indicators*

	INVESTMENT UNIT COST	OPERATING UNIT COST
TRANSPORT INFRASTRUCTURE	< Construction cost/km	< Recurrent maintenance cost/km < Periodic maintenance cost/km < Cost/tonne.km < Passenger cost/km < Operating costs/investment cost (= r coefficient)
URBAN INFRASTRUCTURE	< Average cost per metre of pipework put in < Cost of pumping stations	< Overall cost per m^3 of water produced < Cost of the M4 coefficient (m^3 x manometric pumping level) < Operating cost/investment cost (= r coefficient) < Salary cost per m^3 produced
HEALTH	< District investment cost per capita < Investment cost/hospital bed	< District running cost per capita < District running cost per year and per health centre < Average cost for a day of hospitalisation < Salary cost/hospital bed < Operating costs/investment cost (= r coefficient)
SUPPORT TO SMEs	< Average investment cost by job created (depends on the activity)	< Average cost for file handling < Average cost for annual follow up of a dossier < Average cost for litigation < Average annual assistance by promoter

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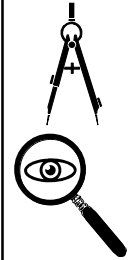
8.3.2. Use of necessary and sufficient resources

Efficiency may be defined as the creation of benefits using a minimum of resources. It involves producing at the least possible cost.

In practice, two questions should be asked:

- ◆ **Are the resources mobilised by the project *sufficient*?**

  Experience has shown that certain items tend to be underestimated:

  - the initial stocks of input and outputs;
  - the initial labour-training costs;
  - working capital requirements;
  - transport and petrol charges (including subsistence allowances);
  - maintenance, repair and replacement of vehicles;
  - building maintenance;
  - the supplementary benefits expected for certain categories of staff and professions (e.g., employer contributions to housing, school and security charges).

- ◆ **Are the resources mobilised by the project *necessary*?**

  In order to answer this question, one draws upon the knowledge of the sector taken into account in defining the technical-economic indicators and, especially, the unit costs.

  It is also necessary to review the general intervention logic and the relationship of all the means and activities with the results. To do so, the tools of the project cycle management's integrated approach are used, i.e. the logical framework, the algorithm to assess external factors, and the analysis of factors ensuring viability[1].

  This step is more technical than economic, but it is the analyst's job, with the help of specialists (e.g., engineers, medical doctors) to check that unnecessary means and activities have not been planned, and to identify areas where resources may be wasted[2].

☞   Figure 8.2.

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(1) *Manual, project cycle management..., op.cit.*
(2) N.B: This work is also done for projects with tangible products, by calculating various productivity indicators (§ 4.2.).
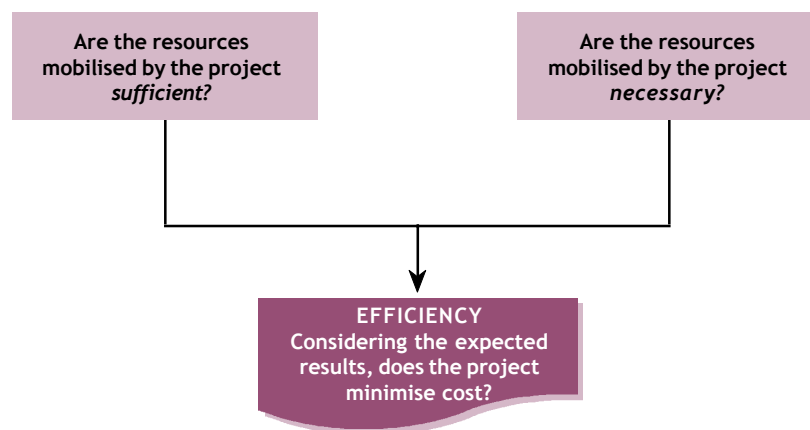
Figure 8.2. *Efficiency study*

8.4. ANALYSIS OF ECONOMIC EFFECTS

As with any activities, which mobilise resources in the form of goods, services, capital and labour, projects with non-tangible products lead to changes in the domestic economy. Although the main objectives of these projects are not often economic, these effects must be identified.

The analysis of the project's economic effects focuses on its *incremental* contribution:

- **to the principal macro-economic equilibria**

    ➧ **PUBLIC FUNDS** § 8.4.1

    ➧ **FOREIGN EXCHANGE** § 8.4.2

- **and to income distribution, which may be one of the project's specific objectives (e.g., poverty alleviation)**

    ➧ **INCOME DISTRIBUTION** § 8.4.3

The balances of the government budget, in foreign currency, and income distribution can be estimated, using the method given in Chapter 5, on the basis of:

- the direct effects, appearing in the project's consolidated budget;
- the total effect (comprising all the flows generated within the economy), if the size of the project justifies estimation of backward linkages § 5.1.2).

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Economic effects and efficient use of resources:

Knowing the likely effects on the economy may enable the analyst to choose between alternative versions of the same project:

- in a situation where foreign currency is scarce, the alternative requiring least foreign currency will be preferred;
- in a situation marked by serious fiscal constraints, the alternative with the best result for the Government budget will be the best;
- when poverty reduction is of primary importance, the alternative which best distributes income to poor people will be chosen.

The analysis of economic effects can be seen to be an integral part of cost-effectiveness analysis (§ 1.2.1, Table 1.2), as it enables the analyst to classify the alternatives in terms of least cost (e.g., foreign currency spent, the cost to public funds) and of optimal economic impact (e.g., in terms of income distribution).

8.4.1. Public funds

The impact on public funds is a critical aspect of these projects if, as is often the case, the fees paid by the users in different forms do not cover the total cost of providing the services. Projects with non-tangible products thus have a tendency, after the period of foreign financing is over, adversely to affect both government budget deficits and those of local governments:

$$\text{Public deficit}_{direct} = \text{Total project cost} - \text{User fees}$$

The public deficit thus corresponds to the total of the operating subsidies paid to the agencies managing the project. From this standpoint, these projects tend to have a negative influence on economic reform policies, which explains why, in the many structural reform programmes, the cost recovery by public services becomes a major issue.

However, the *indirect* effects of these activities usually include income for the Government in the form of taxes and various fees. Thus the operating profits of public entities can contribute to improving or aggravating public budgets. It is thus necessary to examine the total balance for the Government, as revealed through an analysis of backward linkages from the project's activities (§ 5.1.2 and 5.3.3):

> Total project cost
> – Fees
> + Total taxes
> – Indirect subsidies
> – Public financial charges
> + Public operating profits
> _____
> = Total balance for the government.

The coefficient of real cost for the Government (§ 5.3.3) indicates the extent to which the Government indirectly recovers its contribution to the operating outlays of the project during a year t:

$$\text{CRCG}_t = \frac{\text{Total balance for the Government}_t}{*\text{Operating subsidies}_t*}$$

N.B.:   The discounted sum of the total balances for the Government over the life span of the project (including investments) provides the net present value of the Government balance .

Regardless of the Government balance, its receipts and outlays schedule must be drawn up, as shown in the chapter addressing the effects on the economic objectives (§ 5.3.3).

☞   Table 8.5.

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Table 8.5. *Government receipts and outlays schedule*
(covering the life span of the project)

YEAR	0	1	2	...	N
RECEIPTS:					
< **Taxation and customs fees**					
. on investments					
. on operations					
. imports					
. exports					
< **Public entities**					
. Operating surplus budgetised (dividends,…)					
< **Grants and direct loans**					
. Receipts					
TOTAL RECEIPTS = R					
OUTLAYS:					
< **Direct investments**					
< **Taxation and customs fees**					
. Onlending, repayment					
< **Subsidies**					
. on goods and services					
. operations					
< **Public entities**					
. Operating deficits budgetised					
< **Public debt service**					
. Repayment of principal					
. Interest					
TOTAL OUTLAYS = O					
BALANCE FOR THE GOVERNMENT = R – O					

8.4.2. Foreign exchange

As in the case of projects with tangible products (§ 5.3.2), the foreign currency balance is equal to the sum:

- ◆ of the direct effects of the goods and services imported by the agencies managing the project; these effects can be "read" in the consolidated budget;

- and the indirect effects calculated by analysing the backward linkages to the intermediate goods and services used by the project.

The measure of the *incremental* effects can reveal situations in which a project with non-tangible products leads to foreign currency savings (e.g., in the area of medical imports).

The schedule of foreign currency flows (§ 5.3.2) is drawn up for the entire project (assuming a constant exchange rate). It includes the receipt of loans and debt-servicing relative to international borrowing.

Table 8.6. *The schedule of foreign currency flows*
(covering the life span of the project – total debt servicing period included)

YEAR	0	1	2	...	N
INFLOWS: < **International loans** (short, medium and long term) < **International grants**					
TOTAL FOREIGN CURRENCY EARNINGS = FCE					

OUTFLOWS:
  < **Total imports**
   . Investments
   . Operation (I total)
  < **International debt service**
   . Repayment of capital
   . Interest on loans
  < **Other transfers**
   . Dividends and profits					

TOTAL FOREIGN CURRENCY LOSSES = FCL					
BALANCE IN FOREIGN CURRENCY = FCE – FCL					

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8.4.3. Income distribution

Regardless of the financing method, projects with non-tangible products create jobs and distribute income:

- directly, by means of jobs created within the entities managing the project, which can be an important project objective;
- and, indirectly, by means of the intermediate goods and services they use.

Once again, it is the incremental amount of total income created which measures the real impact of the project. A negative consumer benefit (CB) thus appears when the project introduces cost recovery into a public service which was initially free, without there being a notable change in the *quality* of the services (§ 5.2.2).

Most of the analyses of the distribution of income, which were presented above (§ 5.3.4), can be carried out, although generally[1] no value added is created and a simple transfer takes place

"Government (subsidies) 6 enterprises/households"

$$\Delta \text{Distribution of income} = \Delta \text{Operating subsidies} + \Delta \text{User fees}$$
$$= \Delta W + \Delta T + \Delta FC + \Delta OP + CB$$

8.5. ANALYSIS OF RELEVANCE

In order to evaluate the relevance of a project, the relationship between the problems to be resolved ("the needs") and the "purpose" assigned to the project is defined (Figure 7.6).

As for other types of projects, the economic relevance of projects with non-tangible products is established on the basis of their contribution to the objectives of national development policies and structural reforms (Figure 7.7). Studies of financial viability (§ 8.2), of efficiency of resources used (§ 8.3) and of effects on the economy (§ 8.4) provide the necessary elements for such evaluation, following analytical methods similar to those presented in § 7.2.

However, it would be too simple to limit this analysis to such elements since, by definition, the true purposes of many such projects are not directly economic, but involve issues such as human, cultural or social development, environmental protection and the preservation of natural heritage.

The "global relevance" of the project is, therefore, mainly indicated by its coherence with the development *strategy* adopted for the sector concerned:

—————
(1) When user cost recovery is less than real cost.

- its results (measured by objectively verifiable indicators) and operating principles should be **consistent** with the main objectives and principles set;
- as resources are scarce, they should address the **priority** objectives.

Clearly, economic and sector-policy issues are not mutually independent, since each sector has its place in the economy. The nature of the links between sectoral development and economic development cannot be reduced to the calculation of a few indicators.

As in the case of projects with tangible products, evaluating project relevance is more a matter of synthesis than of original work. However, major financial and economic issues will normally arise and will require serious "strategic reflection".
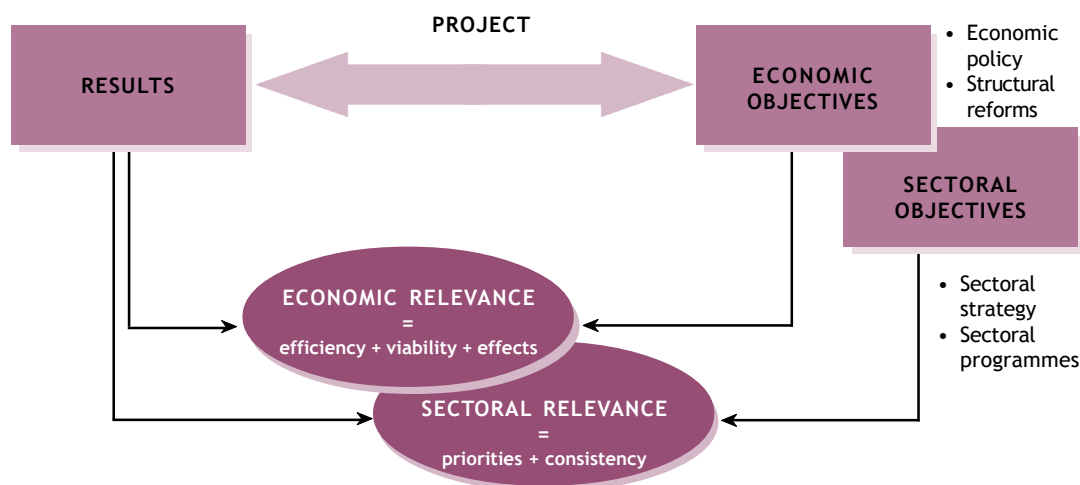
Figure 8.3. *Principle of the "global relevance" analysis*

8.6. SUMMARY OF PROCEDURE FOR ANALYSIS OF PROJECTS WITH NON-TANGIBLE PRODUCTS

The diagram below illustrates how budgets of the entities involved are validated.

☞ Figure 8.4.

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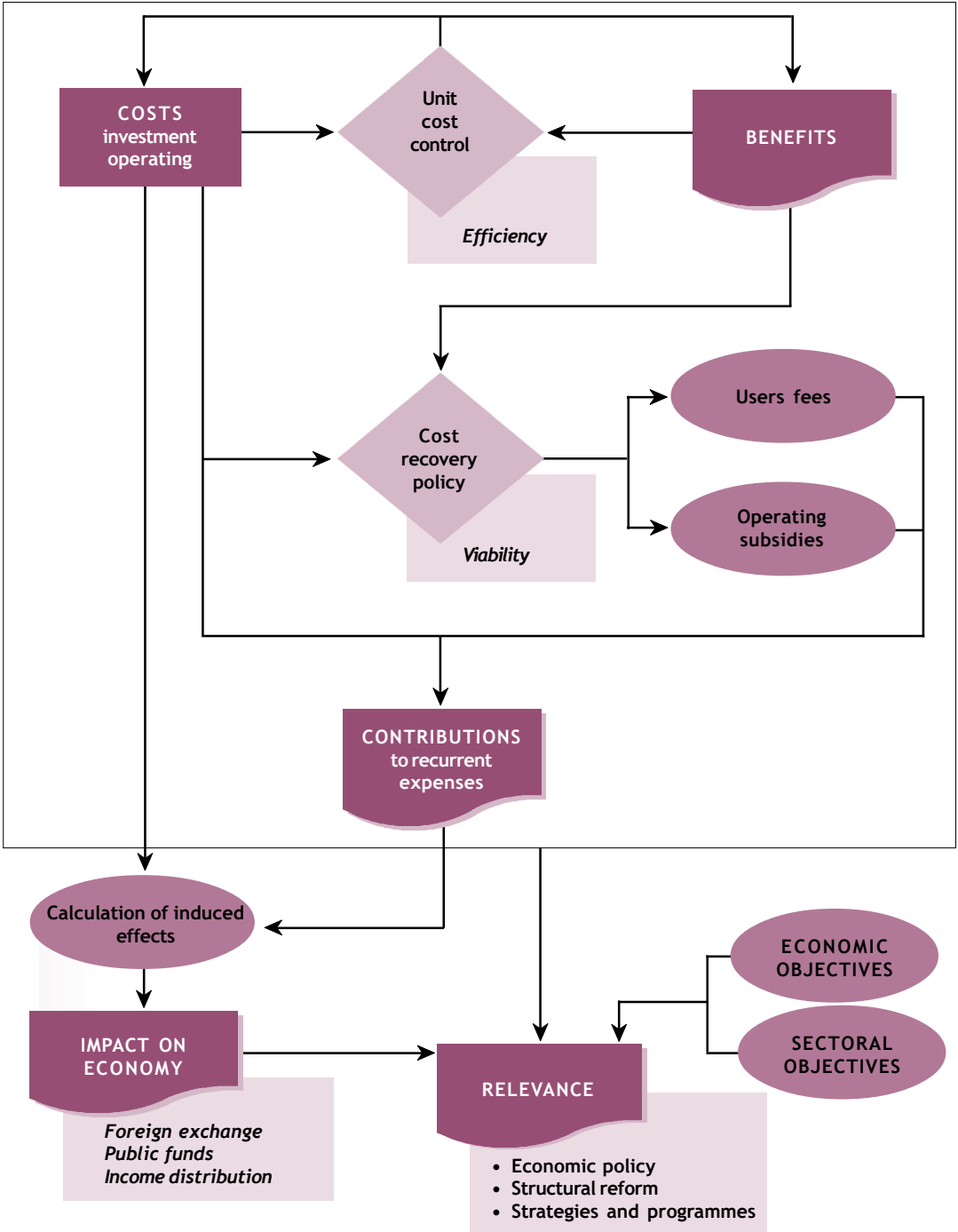
Figure 8.4. *General procedure of the analysis of non-commercial projects with non-tangible products*

ANNEX A

TAKING TIME INTO ACCOUNT

T he economic analysis of development projects must take account of time since invest
ing means incurring costs in the hope of drawing greater benefits in the future. How
is it possible to compare costs and benefits occurring at different times, sometimes
separated by ten years – or more?

Today's euro is "worth" more than an euro in 2, 5 or 10 years, this for three reasons:

- **the general rise in prices, which reduces the value of money**
  - ➡ **a distinction is made between CURRENT PRICES and CONSTANT PRICES** § A.1
- **the time preference, which reduces the perception of future values:**
  - ➡ **DISCOUNTING is used** § A.2
- **the remunerative power of money, which creates a "loss of earnings"**
  - ➡ **OPPORTUNITY COST OF CAPITAL is specified** § A.3

N.B.: These three phenomena are independent of each other. The techniques used to calcu-
late them must be combined whenever the analyst wants to consider more than one of
them. It should be stressed that discounting *is not the same as allowing for inflation.*

In order to avoid errors, the usual accounting convention specifies that all operations recorded
(inflows or outflows) are recorded as due on the last day of the period to which they relate.

A.1. CURRENT PRICES AND CONSTANT PRICES

Inflation reduces the **purchasing power of money.** For example, if annual inflation is 10%,
and if euros 100 today allow one to purchase 10 sacks of plaster for euros 10, in one year the
same euros 100 will allow one to purchase only 9 sacks for 11 euro each. More precisely, in
one year the purchasing power of euros 100 will correspond to only euros 90.9 today. This
"erosion" of the value of money can be easily computed if the rate of price increase is known:
with:

$$\text{Constant value}^t_{t+1} = \frac{\text{Current value}_{t+1}}{(1+i)}$$

Constant value$^t_{t+1}$ = Value in price of year t of a sum due in year t + 1
Current value $_{t+1}$ = Face value in year t +1 of a sum due in year t + 1
i = rate of increase of prices between year t and year t + 1 (inflation rate)
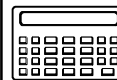
Or in the preceding example:

$$\text{Constant value}^1_2 = \frac{100}{(1 + 0.1)} = 90.9$$

In order to take into account the phenomenon of inflation, a distinction is made between analyses carried out:

- in **current prices**, i.e. prices measured over time, for which the effects of inflation are included. They are the actual prices charged on the date on which the transactions take place. These prices are recorded in business accounts and which are obtained in *ex-post* situations. In *ex-ante* situations, the analyst tries to anticipate these data in order to establish cash requirements and public outlay budgets. Current prices can be used in recording what has happened or in estimating future borrowing requirements, but cannot be used in comparing or totalling the costs and benefits for different years.

- in **constant prices**, i.e. prices measured over time for which the effects of inflation are eliminated. Using constant prices assumes that relative prices remain unchanged and that the price rise is identical for all items, and thus for the net balance. As the values for every year have the same base, it is possible to sum them in estimating returns on investment. *Ex-post*, the analyst is thus able to modify the monetary depreciation using the past inflation rates. *Ex-ante*, this method allows one to circumvent the thorny problem of forecasting future inflation.

In practice:

- When considering past data, current prices are generally used.

  Nonetheless, for certain comparisons and calculating indicators, the observed values (in current prices) are recalculated using the constant prices of a chosen base year. Thus, in the case of a retrospective analysis brought back to year 0:

$$P^{cst0}_t = \frac{P_t}{(1 + i_1)(1 + i_2)...(1 + i_t)}$$

  With:

  $P^{cst\ 0}_t$ = Constant price of year 0 of a sum due in year t

  P_t = Nominal (current) price in year t

  i_n = Annual inflation rate of year n

  If the base year of the constant values is a future year (N), the values of the previous years must be "increased" in order to allow for future inflation. So, in the case of a sum due in year 0:

$$P^{cst\ N}_0 = P_0 \ H \ (1 + i_1)(1 + i_2)...(1 + i_N)$$

With:

$P^{cst\,N}_{0}$ = Constant price of year N of a sum due in year 0

P_0 = Nominal (current) price in year 0

i_n = Annual inflation rate of year n

- For future data, constant prices are adopted. To do this, base year prices are usually applied to all future years.

  N.B.: It is possible to take into account the items whose prices follow substantially different trends from that of the general rise in prices[1]. This is necessary if the analyst anticipates an accelerated rise in prices due to growing scarcity (e.g., cost of land for future real estate investments, depletion of certain resources) or because of the devaluation of the national currency for imported inputs (e.g., irrigation pumps). In the opposite sense, certain items can be reduced to constant prices, e.g., electricity in the case of the development of an energy program, or for certain investments (data-processing material, certain new technologies).

- Finally, within the framework of constant price analysis, the projection of future **real outlays** demands a conversion to current prices. In project analysis, this is necessary when budgeting disbursements from donors or government. To do this, a uniform average rate of annual inflation is usually adopted for the life span of the project[2]. In such a case, the conversion from constant prices to current prices of a transaction which will take place in a year t is done using the formula:

$$P_t = P^{cst0}_{t} \, H \, (1 + i)^t$$

With:

P_t = Value in current prices in year t

$P^{cst\,0}_{t}$ = Value in constant prices of year 0 of the sum due in year t

i = Annual rate of constant inflation

It is thus necessary to show a nominal budget different from that calculated in constant present prices in order to meet future outlays.

---

(1) This differential rise in prices is often called "escalation".
(2) At least following the first two years for which more precise estimates sometimes exist.

PROVISION FOR PRICE INCREASE

When future price inflation is considered the same for all items, one can convert constant prices into current ones by directly applying to the total amount a **provision for price increase**[1], the calculation of which depends upon a price revision factor (a "prospective prices index") which sums inflation rates year after year according to the formula:

$$PRF_t = (1 + i_1)(1 + i_2) ... (1 + i_t)$$

or, if i_n = constant = i:

$$PRF_t = (1 + i)^t$$

With:

PRF_t = Price Revision Factor relative to year t

i_n = Annual rate of inflation predicted for year n

Note: Only this "compound interest" formula is valid. Adding inflation rates of a series of years is not.

Debt-servicing calculations:

The conditions of repayment and payment of interest on loans are always stated in current prices. It follows that, in *ex-ante* analysis in constant prices, these two elements of debt servicing *must be systematically "deflated"* (i.e. expressed in constant prices) to avoid giving them a value higher than their real value.

The reimbursement and interest payments are thus multiplied, year after year, by the deflator: in year t:

$$\frac{1}{(1 + i)^t}$$

The real expense of debt servicing thus proves to be less than that indicated by a calculation in nominal prices.

---

(1) Two types of provision allow for price changes over time: the "provision for financial contingencies": which makes an allowance for the **relative** increase in the prices of certain items and the "provisions for price increase" allowing for general inflation.

A.2. DISCOUNTING

The value of a sum of money, of goods or services varies according to when it is due or received. Hence, other things being equal, the estimated value of a resource today is higher than that of the same resource in the future. Perceptions of the future and the associated uncertainty, partly explain this "preference for the present". This time value is expressed *in constant prices*: one would choose to receive a sum of euros 1,000 today rather than a sum amounting to the same purchasing power in two years.

Discounting involves taking into account this preference for the present: **the present value of a sum due in the future is the equivalent value it would have if it came due for payment at the present date, in constant prices**.

Discounting is the mathematical technique which allows the **present value** of a future sum to be calculated[1]. It involves reducing the value of future sums. In order to discount a sum payable in the year t, this sum is multiplied by the discount factor, or by using the constant annual discount rate:

$$\frac{1}{(1 + i)^t}$$

With:

i = constant annual discount rate

In practice, the mathematical effect of the discount factor is to reduce the size of sums due in the future, especially if they are a long way in the future. In addition, Figure A.1 shows that present value declines progressively as the discount rate rises.

☞   Figure A.1.

_____

(1) And the **future value** of a present sum.

Amount

The present value of a sum due in year m reduces
as the discount rate rises.

i = 0%

no discounting

i = 8%

i = 15%

Years
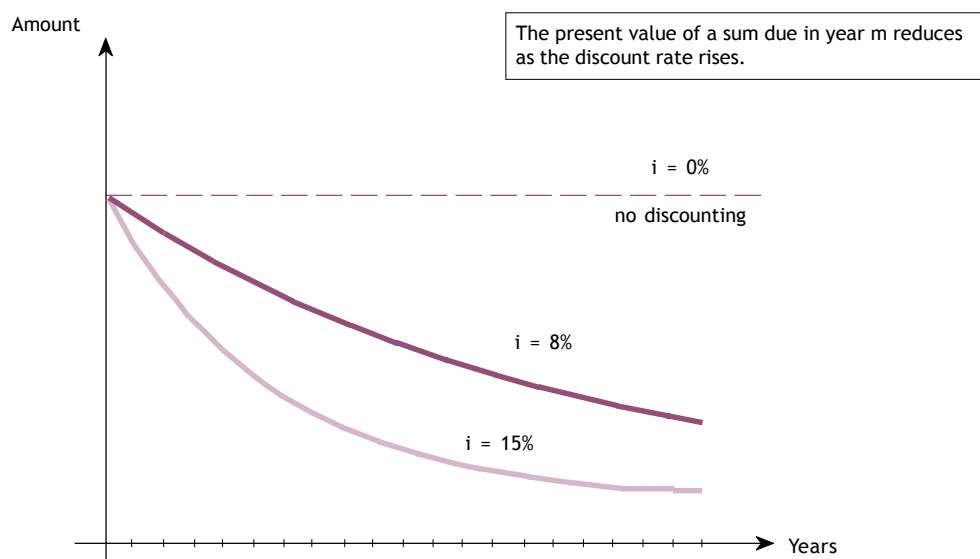
Figure A.1. *Effect of discounting of a future sum*

Discounting allows one to compare sums due on different dates (throughout the life span of the project) by reducing them to a single "unit of present value". It is then possible to engage in various types of calculation in "equivalent present value": e.g., computations of net present value, of benefit/cost ratios.

However, this technique has a major shortcoming in that no objective procedure exists to determine the discount rate. The fixing of a discount level thus appears as an instrument of economic policy: a low rate will favour those projects whose return on investment will come in the distant future, whereas a high rate would make those projects offering rapid income seem more attractive. Examples of the former include infrastructure projects and "heavy" projects (e.g., railways or large industrial units), of the latter projects characterised by a rapid initial rise in production (but whose life span is often shorter) and smaller investments (roads or reduced industrial units).

The opportunity cost of capital is often used (see below, § A.3). The discount rate to be used in economic analysis should be provided by the planning agency or donor. If this rate is given in current prices (a frequent case when it is fixed using an opportunity rate), it should be "deflated" (i.e. its equivalent in *constant* money should be calculated) and subsequent calculations made in constant prices.

Note:

(1)   To dispel frequent confusion on this point, it should be repeated that discounting is not the same as allowing for inflation.

(2)   There is always a risk that future benefits may not be realised for some reason. Discounting does not take account of these **risks** to investment.

(3)   The problem of determining discount rates can be partially avoided by using the Internal Rate of Return (§ E.5).

A.3. OPPORTUNITY COST OF CAPITAL

Any project involves the use of resources (e.g., land, money, labour) which could be used elsewhere. For a given project, the use of a resource in its next "best"[1] alternative use measures the loss of earnings or **opportunity cost** of using it.

The opportunity cost of a resource is thus the highest net income that this resource could bring elsewhere in the economy. Put another way, it is the value of the return sacrificed because it was not invested in the best alternative use. For example, the opportunity cost of land used as a site for a new steelworks could be the net value of the agricultural products that the land would produce if there was no steelworks.

In financial terms, if the money invested in a project today were to be placed in a savings account, it would earn interest. There will be a loss of profit if the future earnings of the investment turn out to be less than that which would have been earned in a savings account, while in the opposite case there would be a benefit.

This remunerative power of money leads to a specification of the **opportunity cost of capital** invested in the project. It is measured in the form of a constant interest rate over time by:

– the rate of the alternative return on financial capital, i.e. generally the average or marginal market rate, in financial analysis;

– the rate of average or marginal return on investments in the country (or in the subsector), in economic analysis[2].

---

(1) The one with the greatest net benefit.
(2) From the shadow prices perspective, it is sometimes suggested that the value of the inter-bank rate of the international financial markets be used.

ANNEX B

FINANCIAL COST-BENEFIT ANALYSES: AN OVERVIEW

Financial analysis is undertaken using a variety of linked techniques. It aims to understand, from a number of different perspectives, the constraints and potential incentives each entity may have to participate in the project. In keeping with the approach of cost-benefit analysis, financial analysis involves the definition and redefinition of costs and benefits at each stage of the process.

While the financial analysis of projects follows standard accounting procedures, certain aspects are specific to it, including the flow balance account. Moreover, some of the terms used have a specific meaning in the financial analysis of projects (e.g., the widely used concept of cash flow).

Three major perspectives in the financial analysis of an entity can be distinguished:

- **the balance of money flows**
  - ➡ **CASH FLOW ANALYSIS** § B.2
- **the balance of all the flows (money and non-money)**
  - ➡ **FLOW BALANCE ANALYSIS** § B.3
- **the balance of operations linked to production**
  - ➡ **OPERATIONS ANALYSIS** § B.4

B.1. GENERAL SIMPLIFIED PROCEDURE

Figure B.1. *General procedure for the financial analysis of an entity*
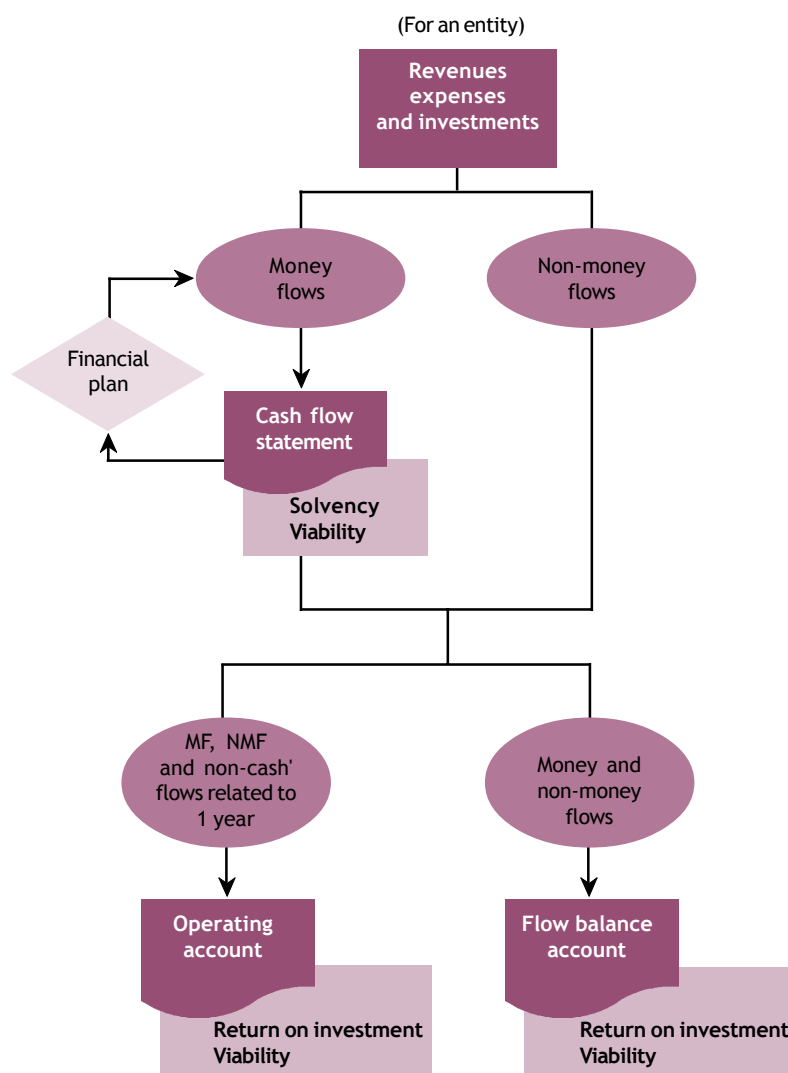
MF: Money flows.
NMF: Non-money flows = flows in kind.

B.2. CASH FLOW ANALYSIS

Cash flow analysis is concerned with money flows in and out of an entity during the period under study.

The main tool used is the **cash flow statement**. It is drawn up by recording *all* cash movements, and *only* those, when they actually occur[1]. Hence cash flow tables do not record all the flows (physical flows, labour flows, etc.) caused by the activity of the entity, but only those made in money form: "receipts" and "outlays".

Table B.1.

From the cash flow standpoint:		
GROSS BENEFITS	=	**receipts** *(monetary inflows)*
COSTS	=	**operating outlays** & **investment outlays** *(monetary outflows)*
NET BENEFIT (balance)	=	**cash balance** *(monetary profit)*

The aim of cash flow analysis is to assess whether the entity has sufficient financial resources to meet its money requirements and to provide basic data for the financial and subsequent economic analysis of the project. It allows especially assessment of the ability of the entity to pay back a loan and the loan's impact on the entity's cash situation.

N.B.:   In some countries (e.g., U.K.) the term cash flow analysis is used as a generic term covering discounting methods of project appraisal (calculating NPV, IRR, etc.).

CASH FLOW ANALYSIS aims to
estimate the SOLVENCY of the entity
and hence the VIABILITY of the activity.

More precisely, it involves:
- assessing the entity's monetary balance and its borrowing requirements;
- studying the nature of receipts and outlays, and their relevance;
- developing and/or appraising a financing plan;
- determining the impact of the constraints and incentives of the economic policy measures;
- assessing the existing financial risk.

---
(1) i.e., in the accounting period during which they take place.

B.3. FLOW BALANCE ANALYSIS

In development project analysis the scope of cash flow analysis is broadened to cover all flows of resources, whether monetised or not. This analysis is referred to by different authors:

- ◆ as investment analysis;
- ◆ or as cash flow analysis;
- ◆ or as **flow balance analysis**, the expression used in this book.

Flow balance analysis is undertaken for:

- ◆ entities producing marketable goods and services but whose production activities are not necessarily monetised, for the most part due to family home-consumption or informal exchanges;
- ◆ entities producing non-marketable goods and services, but whose production can nonetheless be valued in money terms, and, more generally, for projects with non - tangible products (e.g., road projects).

Flow balance analysis involves recording all of the flows in an account, regardless of their nature (monetary or non-monetary), at the moment (in the year) in which they actually took place in the form of a flow of the corresponding value:

- ◆ sales or purchase operations, appear in the form of actual flows of money;
- ◆ whereas home-consumption appears in the form of a theoretical flow of money whose value is given by that of an equivalent sale.

☞ Figure B.2.

This is a "reading" made as production operations occur, similar to that of the cash flow table. *Throughout the life span* of the project, it enables one to draw up a global balance taking into consideration all the flows of exchange between the entity and its environment, and in so doing to assess the contribution of the activities involved.

Note: In the case of entities whose activities are completely monetised, there is no difference between the cash flow table and the flow balance table (except for changes in stock levels).

☞ Table B.2.
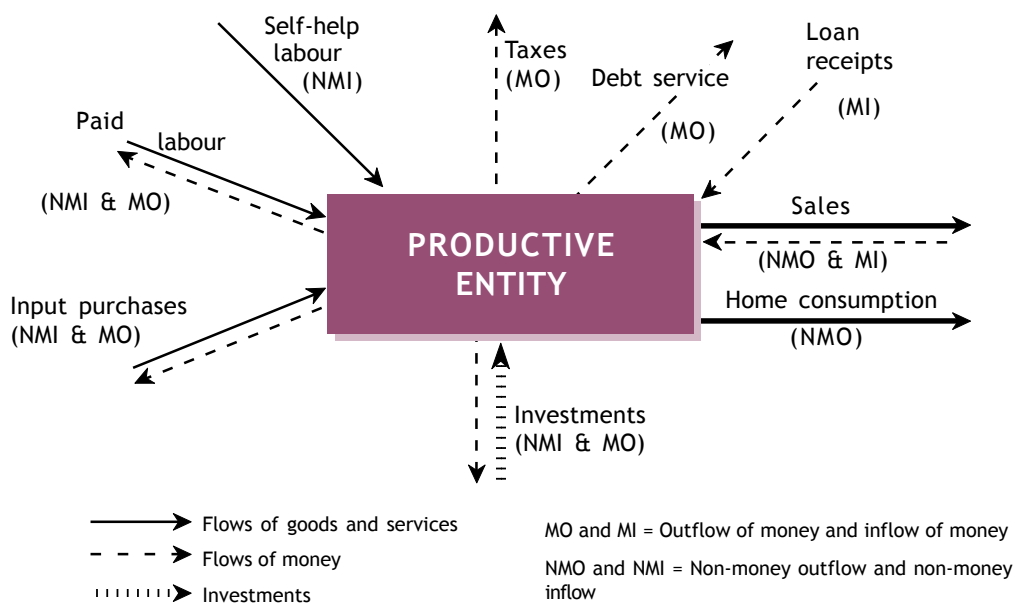
Figure B.2. *Example of flows for an entity (case of a farmer)*

Table B.2.

From the flow balance standpoint:		
GROSS BENEFITS	=	**output** or **resources** *(monetary inflows and outflows of goods and services)*
COSTS	=	**inputs** or **uses** & **investments** *(monetary outflows and inflows of goods and services)*
NET BENEFIT (balance)	=	**profit** or **inflows-outflows balance**[1] *(flow balance)*

_____

(1) Often called (ambiguously when non monetary flows exist) cash flow.

FLOW BALANCE ANALYSIS is aimed at
estimating the VIABILITY of the activity
and the RETURN ON INVESTMENT for the entity

More precisely, it involves:

- assessing the entity's economic results;
- studying the nature of resources, their uses and relevance;
- determining the impact of the constraints and incentives provided by economic policy measures;
- calculating the productivity of the factors of production and the return on investment;
- evaluating whether the entity is able to maintain its production activities in the long term;
- assessing the existing risk.

B.4. OPERATIONS ANALYSIS

Operations analysis deals with those activities related to the functioning of the entity over a given period. Its purpose is to study all of the production activities. The primary tool used is the **income and expenditure account**. It is prepared by recording *all* the operations and *not their actual settlements*, whatever the form and date of the latter. Its structure[1] varies depending on whether financial and/or economic analyses are to be undertaken (§ D.3). The presentation here is that used for the economic analysis operating account.

(a) Production and creation of wealth

Among various types of inputs, the following can be distinguished:

- those which are totally transformed ("consumed") by the production process during the accounting period: these are referred to as **intermediate goods and services**;
- those which are only partially utilised (used up) in the accounting period, their use in the production process continuing over the course of several accounting periods: these are the **investments**

Let IGS be the value of the intermediate goods and services and P the value of the product. The difference P-IGS represents the *value that the entity has added* to the initial value of the consumed inputs during the production process in that period.

––––––––––
(1) And its denomination: income statement, operating account profit and loss account...

PRODUCTIVE
ENTITY

Intermediate
goods and services
(IGS)

Products (P)
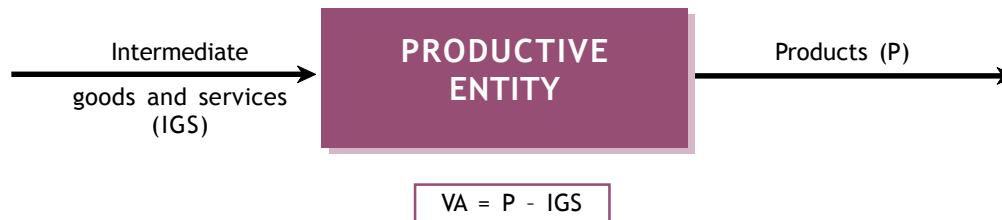
$$VA = P - IGS$$

Figure B.3. *Value added*

The **Value added (VA)** is therefore defined by the identity:

$$VA = P – IGS$$

So calculated, this is the gross value added (i.e., including depreciation – see below).

(b) Use and distribution of wealth

The value added includes the value of the factors of production which contributed towards its creation, beginning with **labour**. The creation of this new wealth was made possible by the legal existence of the entity[1], which has to pay **direct and indirect** taxes[2].

The **Gross Operating Margin (GOM)** is known as the balance:

$$GOM = VA – Wages –Taxes$$

So, by noting W the wages and T the indirect taxes:

$$GOM = VA – W – T$$

Notes:

  (1)   The wages which figure in this definition correspond to the external labour cost; this excludes the work force of the individual operator and his family (except if it is paid for in the form of a fixed salary).

  (2)   When the entity receives operating subsides (U.S.), the formula becomes:

$$GOM = VA + OS – W – T$$

―――――――
(1) Whatever its form.
(2) Compensation for the social and economic organisation services rendered by the government. Indirect taxes are made up of all the obligatory tax levies linked to the correct functioning of the firm independent of its operating profit: tax levies on production, sales, or export activities,...

The entity must also pay the cost of loans that it contracted for its investment or operations. This cost is made up of interest paid, with the exception of the *repayment of borrowed capital*, whose cost does not represent an operating cost but rather a refund. To this, various insurance expenses are added (e.g., against damages to the production or to the premises). All of these expenses correspond to financial services; and are called **financial charges**.

These charges are deducted from the GOM in order to give the **Gross Operating Profit (GOP)**:

$$\text{GOP} = \text{GOM} - \text{Interest} - \text{Insurance Premiums}$$

$$= \text{GOM} - \text{Financial charges}$$

(c) Taking investments into consideration

By definition, the "consumption" of investments in the productive process extends over several accounting periods. Thus, a fraction of the value of these investments is recorded in the operating account for the year studied, that is, the fraction which is considered to have been "used"[1] in the course of the year. This imputed cost is known as investment **depreciation**.

Note: Investments, as well as the use of stocks of raw materials for production, are introduced in the form of "imputed costs". Their value represents a measure of the consumption of means of production. However, they do not correspond to the *actual* trade flows during the period.

☞   Figure B.4.

_____
(1) Through use or obsolescence.
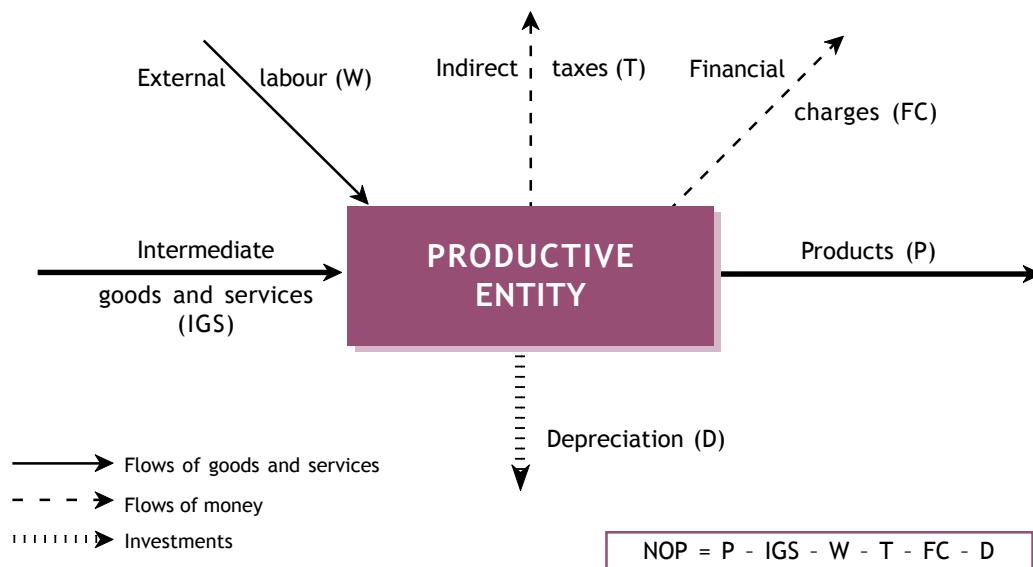
Figure B.4. *Net operating profit*

CALCULATING DEPRECIATION

Depreciation is generally calculated in three ways:

- straight line depreciation, the simplest to compute, involves depreciating the investment by the same amount each year. The annual depreciation charge of year t is thus:

$$\text{Depreciation}_t = \frac{\text{Initial investment cost}}{\text{Number of years of (anticipated) use}}$$

- the reducing balance method of depreciation, the most common form of which is constant rate depreciation:

$$\text{Depreciation}_t = \text{Residual value}_t \text{ H Rate of depreciation}$$

With: $\text{Residual value}_t = \text{Residual value}_{t-1} - \text{Depreciation}_{t-1}$

- depreciation by unit produced, which is computed based on the actual utilisation of the equipment:

$$\text{Depreciation}_t = \text{Number of units produced H} \frac{\text{Equipment cost}}{\text{Productive capacity}}$$

The nature of the activity and of investment, determines which method to use: per unit produced, when use is the main factor in the loss of equipment value (e.g., mileage

covered by trucks); the reducing balance method, when technical progress brings about the rapid obsolescence of equipment (e.g., in information technology); and straight line depreciation when loss of value can be considered constant through time (e.g., buildings), and in all other cases.
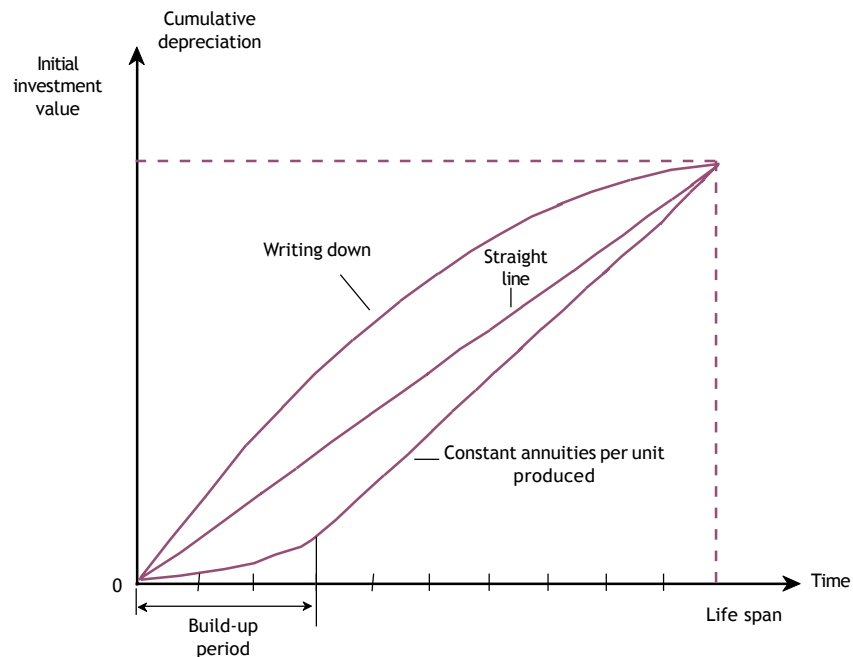
Figure B.5. *Different types of depreciation*

The term **Net Operating Profit (NOP)** is given to the balance of the GOP less the value of depreciation.

$$NOP = GOP - Depreciation$$

The Net Operating Profit measures the economic profit (or loss) of the entity once all operating costs have been paid, while taking into account investments made in previous years.

The use of the NOP depends on the type of entity: once tax has been levied on profits, it may go to the operator, in the case of family firms (e.g., farmers, artisans), to the firm (e.g., for self-financing) or be divided among shareholders (e.g., as in dividends).

N.B.: In the production analysis phase, the gross value added is contrasted in the same way with the net value added:

$$\text{Net VA} = \text{Gross VA} - \text{Depreciation}$$

GROSS OR NET...?

The terms "gross" and "net" are often used in accounting concepts: gross or net value added, gross or net operating margin, gross or net income. It is nonetheless prudent to check the exact definition of each balance calculated in this manner, for it may be:

- **gross (or net) of depreciation**
  - ⟹ often the case in economic project analyses: "Net" or "Gross" Value Added and Operating Profit.
- **gross (or net) of taxes (on profits)**
  - ⟹ common in financial firm analysis for intermediate management balances of profit and loss accounts (or operations accounts) or source and application of funds statements.
- **gross (or net) of financial expenses**
  - ⟹ common in financial firm analysis for the intermediate management balances of profit and loss accounts (or operations accounts) or source and application of funds statements.

Table B.3.

From the operating standpoint:		
GROSS BENEFITS	=	**revenues** or **resources** *(outflows of goods or services)*
COSTS	=	**expenses** or **uses** **& investments** *(inflows of goods or services)*
NET BENEFIT (balance)	=	**operating profit** (gross or net)

In the final analysis, operations analysis estimates whether the annual activity produces more wealth than it consumes. It reveals:

- the (net) value added, a measure of the overall creation of new wealth;

- the NOP, a measure of the enrichment of the entity itself[1].

The overall objectives of this analysis are similar to those of the flow balance analysis:

<div style="text-align:center">

OPERATIONS ANALYSIS is aimed at
estimating the VIABILITY of the activities
and the RETURN ON INVESTMENT for the entity

</div>

More precisely, it involves:

- assessing the entity's economic results;
- studying the nature of resources, their uses, and relevance;
- determining the impact of the constraints and incentives provided by economic policy measures;
- computing the productivity of factors of production and the return on investments;
- evaluating whether the entity is capable of maintaining its production activities in the long term;
- assessing the existing risk.

"HORIZONTAL" AND "VERTICAL" PERSPECTIVES

Cash flow and flow balance analyses, on the one hand, and operations analysis on the other, involve different time perspectives:

Cash flow analysis: corresponds to a "horizontal" reading of monetary activity over time. All flows, and especially those pertaining to investment, are recorded at the very moment they take place. *Throughout the life of the investment*, they allow one to determine the balance of costs (outlays) and benefits (receipts).
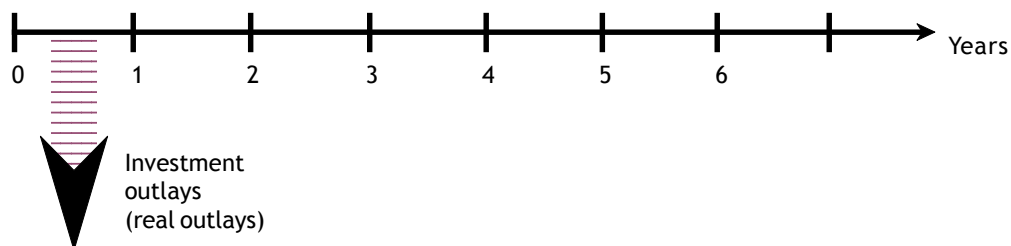
Figure B.6. *Yearly outlays record*

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(1) Subject to fiscal rules and to the division of this profit among the firm's holders.

Operations analysis: corresponds to a "vertical" reading of the activity, in which all the operations which have contributed to the production that year are considered. The end result of this is that all the information necessary for the evaluation of the return on investment must be assembled *for each year*.

The operations analysis leads:

- ◆ on the one hand, to introducing *estimated* costs and benefits which are not based on real money flows during the period: unsold products (stored or home-consumed), un-stocked inputs, investment depreciation; and,

- ◆ on the other hand, not to charge certain real money flows during this period (accumulation of input stocks, sales of products from previous periods).
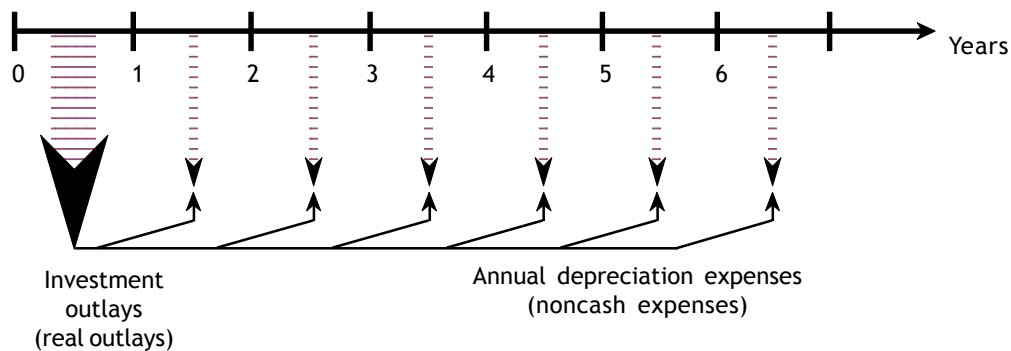
Figure B.7. *Investment breakdown throughout the life span of the project*

ANNEX C

ECONOMIC COST-BENEFIT ANALYSES:
AN OVERVIEW

Economic analysis of the project is undertaken using a variety of linked techniques. It aims to provide an overview of the stakes and risks for the national economy from a number of different standpoints. In keeping with the approach of cost-benefit analysis, project economic analysis, involves the definition and redefinition of costs and benefits at each stage of the process.

The economic analysis of a project involves the following four stages, each providing specific information about the economic impact of the project:

♦ **the overall results of the accounts of the entities taking part in the project**

➡ **CONSOLIDATED ACCOUNT ANALYSIS** **§ C.2**

♦ **the effects of the project on growth, on foreign exchange, on public funds and on income distribution**

➡ **ANALYSIS OF THE EFFECTS ON THE ECONOMIC OBJECTIVES** **§ C.3**

♦ **the integration of project into the world economy**

➡ **ANALYSIS OF VIABILITY WITHIN THE INTERNATIONAL ECONOMY** **§ C.4**

♦ **the project's economic efficiency from the standpoint of the use of scarce resources, and its opportunity in relation to overall economic requirements**

➡ **ANALYSIS OF ECONOMIC EFFICIENCY AND RELEVANCE** **§ C.5**

C.1. SIMPLIFIED GENERAL PROCEDURE
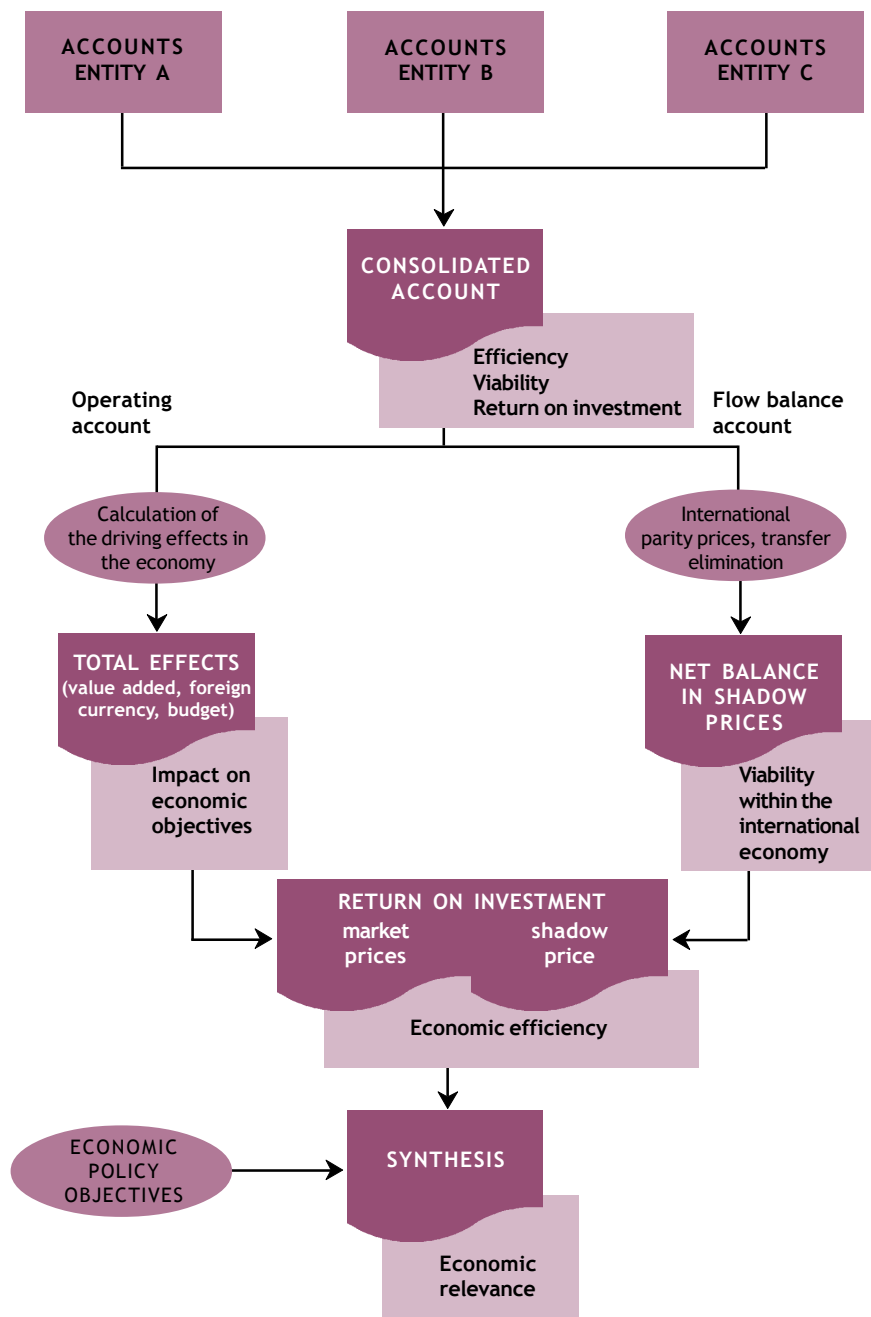
Figure C.1. *General economic analysis procedure*

C.2. CONSOLIDATED ACCOUNT ANALYSIS

It is possible to "total" the accounts of all the entities involved in the project[1] by creating a hypothetical entity whose "border" includes all the entities involved. This is done by:

- including all of the inflows and outflows recorded in individual entity accounts in a single table;
- eliminating the flows corresponding to transfers between these entities.

The consolidated account thus obtained has the usual form of operating accounts or flow balance accounts. The account balances (value added, operating profit) of this unit are equal to the sum of the corresponding balances of the entities considered individually:

$$VA_{consolidated} = 3 \ VA_{entities}$$
$$NOP_{consolidated} = 3 \ NOP_{entities}$$

The figure C.2 illustrates the definition of the costs and benefits applied to this "financial balance" of the entities taken as a whole.
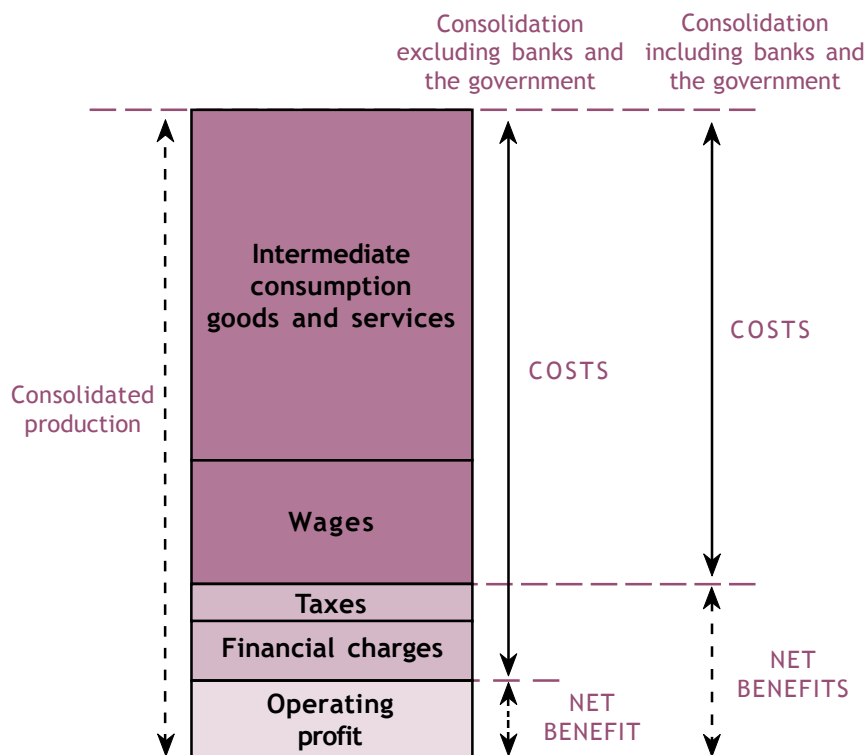
Figure C.2. *Consolidated account analysis*

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(1) Usually from one to three entities (e.g., project organisation + farmers, road services + hotel + crafts centre).

Table C.1.

From the standpoint of the project's consolidated accounts:		
GROSS BENEFITS	=	**revenues** or **outputs** or **resources** *(monetary inflows and outflows of goods and services)*
COSTS	=	**operating expenses** or **inputs** or **uses** & **investments** *(monetary outflows and inflows of goods and services)*
NET BENEFIT (balance)	=	**net benefit**[1] *(flow balance)*

Because of the tools (consolidated operating account and consolidated flow balance) and methods used, consolidated account analysis remains close to financial analysis.

CONSOLIDATED ACCOUNT ANALYSIS is aimed at
evaluating the VIABILITY and the
EFFICIENCY of the project
from the standpoint of the entities directly involved

More specifically, it involves:

- calculating the net economic benefit of the series of activities created by the project;
- estimating the division of the margins among the entities involved in the project;
- evaluating whether the set of entities is capable of maintaining the activities promoted by the project in the long term;
- evaluating the project's overall efficiency;
- assessing the existing economic risk;
- drawing up the total disbursement schedule of the financing agencies.

———

(1) Often (ambiguously) called cash flow in the flow balance account.

C.3. ANALYSIS OF THE EFFECTS ON THE ECONOMIC OBJECTIVES

The expenses of the consolidated account correspond:

- ◆ either to intermediate goods and services – which are produced by other firms;
- ◆ or to the distribution of income:
  - • to households (the sum of wages and operating profits of family enterprises),
  - • to financial institutions (the sum of insurance and financial charges),
  - • to the Government (the sum of taxes),
  - • to firms (the sum of operating profit).

Incremental intermediate flows of goods and services due to the project constitute new demands. These new demands can be satisfied either by an increase in the national production of the goods and services in question, or by imports. In the first case, the incremental production of these goods itself generates new demands which, if they are satisfied by an increase in local production, themselves produce new demand.

As this process – known as the **"backward linkages"** in the production chain – continues within the economy, the induced imports constitute "leaks" out of the national economy.

At all the different stages of the process, incremental income is distributed to households, to financial and non-financial entities, and to the Government. The process of backward linkages is illustrated in figure C.3.

☞   Figure C.3.

The **direct effects** are the characteristics which are shown in the consolidated operating account of the project:

$$\text{Production} = \text{IGS imported}_{direct} + \text{IGS local}_{direct} + \text{VAdirect}$$

The **indirect effects** correspond to the driving effects in national production:

$$\text{IGS local}_{direct} = \text{IGS imported}_{indirect} + \text{VA}_{indirect}$$

The **total effects** are equal to the sum of both direct and indirect effects:

$$\text{Effects total} = \text{Effects direct} + \text{Effects indirect}$$

Hence:

$$\text{IGS imported}_{total} = \text{IGS imported}_{direct} + \text{IGS imported}_{indirect}$$

$$\text{VA}_{total} = \text{VA}_{direct} + \text{VA}_{indirect}$$
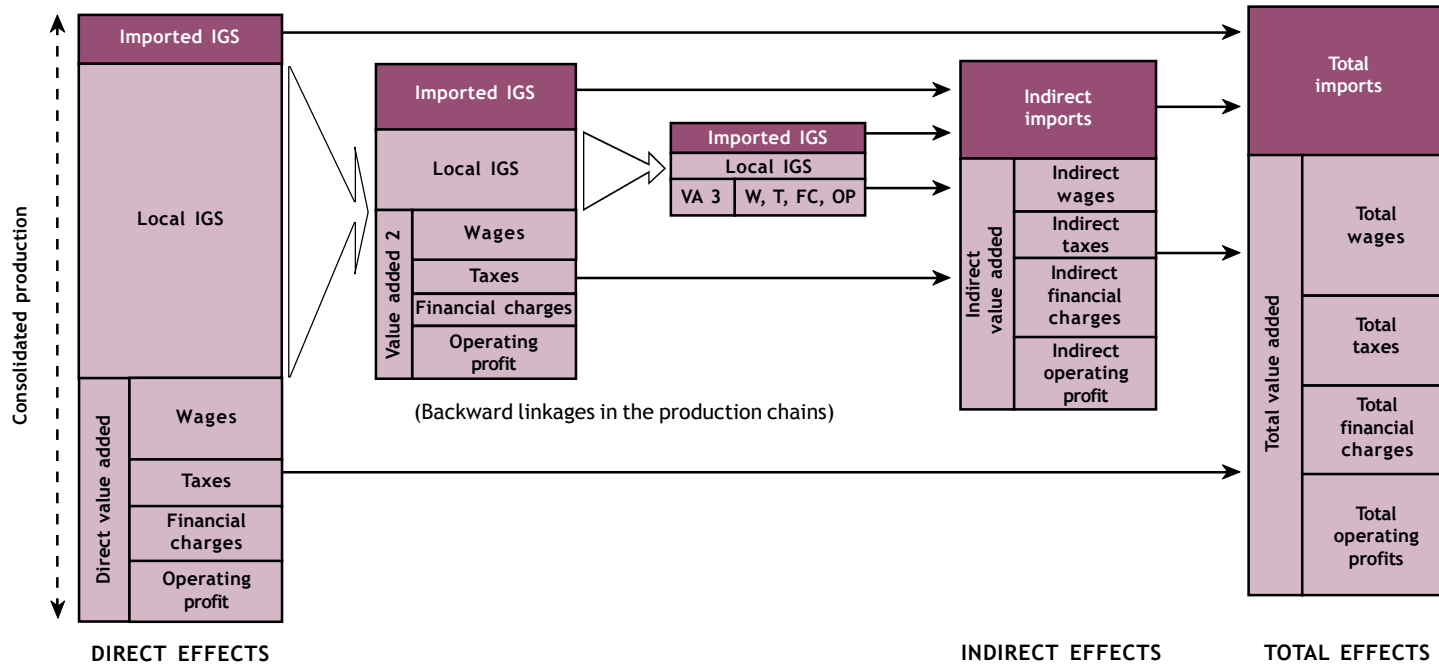
Figure C.3. *Diagram of backward linkages*

So, according to the preceding formulas:

$$\text{Production} = \text{IGS imported}_{total} + \text{VA}_{total}$$

It is possible to break down the total value added into these different wage components (W), financial charges (FC), taxes (T) and operating profits (OP).

$$\text{VA}_{total} = \text{W}_{total} + \text{T}_{total} + \text{FC}_{total} + \text{OP}_{total}$$

With:

$$\text{W}_{total} = \text{W}_{direct} + \text{W}_{indirect}$$
$$\text{FC}_{total} = \text{FC}_{direct} + \text{FC}_{indirect}$$

Etc.

So:

$$\text{Production} = \text{IGS imported}_{total} + \text{W}_{total} + \text{T}_{total} + \text{FC}_{total} + \text{OP}_{total}$$
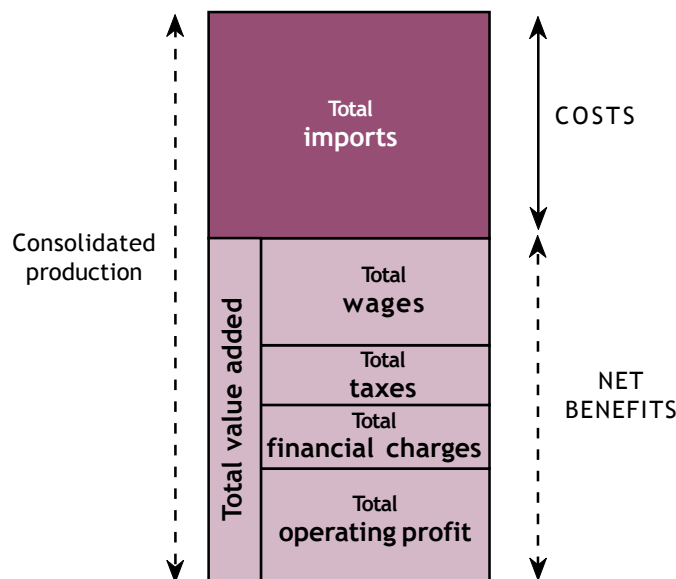
Figure C.4. *Analysis of the effects on economic objectives*

When comparing the with-and without-project situations, the *incremental* total effects are computed (marked Δ). The project sometimes induces changes in the local consumption of goods and services:

- through a modification of their prices; in which case consumer benefit (CB) is referred to;
- through a variation of consumption (VC).

THE GROSS DOMESTIC PRODUCT

Gross Domestic Product (GDP), which serves as a growth indicator, is equal to the sum of the (gross) value added (of investment) by all the entities of the economy and value of administration and household services:

$$GDP = 3\,VA + Services_{administration} + Services_{household}.$$

Table C.2.

From the standpoint of the analysis of the effects on the country's economic objectives:		
GROSS BENEFITS	=	**foreign currency earnings** *(exports)* **value added** *(income distribution)* **consumer benefit &** **variation of consumption**
COSTS	=	**foreign currency losses** *(imports)* **&** **fixed investments**
NET BENEFITS	=	**incremental net foreign currency earnings, incremental value added, consumer benefit** *(incremental income)* **& variation of consumption**

The calculation of the effects at market prices underscores both the project's impact on foreign currency balances, and the flows it induces within the national economy.

The ANALYSIS OF EFFECTS ON THE ECONOMIC OBJECTIVES is aimed at evaluating the IMPACT OF THE PROJECT AT MARKET PRICES on the OVERALL ECONOMY and on ENTITY TYPES

More precisely, it involves:
- measuring the project's effects on growth ($\Delta VAtotal$);
- measuring its effects on foreign exchange ($\Delta IGS\ imported_{total}$);

- measuring its effects on government income (ΔT_{total}, ΔOP_{total} for parastatals);
- measuring the effects of distribution of income to the different entities in the economy (ΔW_{total}, ΔFC_{total}, ΔOP_{total}, CB);
- estimating the importance of transfers between the entities involved in the project[1];
- determining the impact of the economic policy measures.

C.4. ANALYSIS OF VIABILITY WITHIN THE INTERNATIONAL ECONOMY

The revenues or expenses relating to a project do not necessarily reflect real costs or benefits for society as a whole.

Hence, the taxes and subsidies which correspond, respectively, to outlays and receipts from the standpoint of private entities (financial analysis) are, from the standpoint of the national economy, merely **transfers** of income between the private and the public sectors; they neither consume nor create any new value. From this standpoint, they thus have no influence on national income. The same holds true for all the transactions relating to loans (loan receipts, capital reimbursement and interest payments), which are simply transfers between entities, without real consumption of resources.

In addition, market prices do not necessarily reflect the *true economic value from the standpoint of society as a whole* of the goods and services in question. Price-control measures, import and export quotas, the existence of monopolies, the tax system and overvalued rates of exchange, all create **distortions** in the price of goods and services compared to what they would be if a free play of supply and demand, within the framework of a pure and perfect competition, could be achieved.

In such circumstances, market prices may not reflect the economic value of goods and services to society, thus affecting the production and management choices of all the entities. For example, farmers producing rice in a country where the local currency is overvalued may run into difficulties from rice imports. A different rate of exchange would allow farmers' rice to become competitive on the world market and in their own national market. In the same way, the protection of a national drinks firm by means of import controls could result in higher consumer costs and a waste of productive resources, due to a lack of competition.

Because of such factors, some prices do not fulfil their role in the "optimal" economy, since they fail to represent the true economic value of the use or production of the good or service to

---

(1) Direct transfers due to taxes and subsidies directly or indirectly paid or collected, price-formation mechanisms inducing implicit transfers...

which they apply. On the other hand, the prices offered by the international market constitute a possible alternative (in purchase or sale) for the national economy; hence these "opportunity costs" represent the real value of goods and services for the national economy.

The approach adopted involves replacing the market price with the **shadow price**[1] in the consolidated account. Within the practical framework of development project analysis, this involves:

- eliminating all transfer flows;
- estimating the shadow price based on possible recourse to the international market: the import and export **parity prices**;
- for goods and services which are not traded internationally:
    - estimating their value from the goods and services used for their production;
    - keeping the market value for the remaining ones;
- correcting where necessary the set of international prices used by a national currency shadow price: **the shadow exchange rate**.

The transformation of the consolidated account on this basis shows whether benefits are higher than costs and thus if the "benefit for society as a whole" is positive: should this be the case, it creates more value than it consumes. In the final analysis, it shows whether the project is sustainable within the international economy, considering current the wage level and other production factors (the cost of which remains the same). In addition, the effect of national policies, as well as the protection and competitiveness of the project are examined.

☞   Figure C.5.

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(1) Also known as: "accounting" price, "economic" price or "virtual" price. The french term is *prix de référence.*
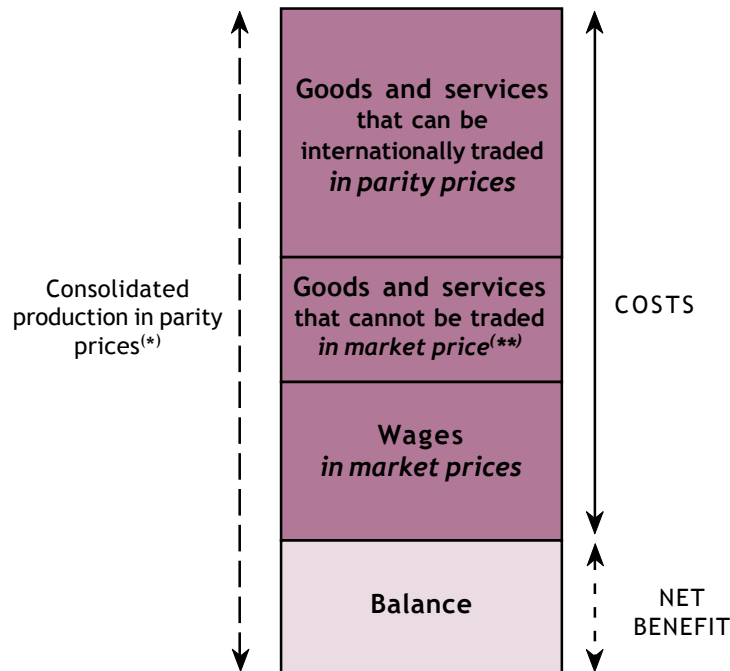
(*) Tradeable production.
(**) Or in parity price after breaking them down in tradeable goods and services.

Figure C.5. *Shadow price analysis*

THE ANALYSIS OF VIABILITY WITHIN THE INTERNATIONAL ECONOMY aims at
evaluating the project's ability to
BE INTEGRATED INTO THE WORLD ECONOMY

More specifically, it involves:

- estimating the net economic benefit of the project within the context of the international market and taking into account the local income level of the factors of production;
- evaluating the overall efficiency of the project;
- estimating the importance of the transfers resulting from economic policies;
- measuring the protection benefiting the project's activities as well as the project's competitiveness.

Table C.3.

From the standpoint of the analysis of viability within the international economy		
GROSS BENEFITS	=	**products measured in international parity prices** (TGS) **and in local prices** (NTGS)
COSTS	=	**expenses excluding transfers** (T, FC) **and measured in international parity prices** (TGS) **and in local prices** (NTGS, labour) **& fixed investments measured in parity prices**
NET BENEFIT (balance)	=	**net balance measured in shadow prices** *(flow balance)*

TGS = Goods and services which can be internationally traded
NTGS = Goods and services which cannot be internationally traded
T = Taxes (and subsidies)
FC = financial charges

C.5. ANALYSIS OF ECONOMIC EFFICIENCY AND RELEVANCE

Does the project's net overall profit – measured in different ways – justify the fixed resources placed at its disposal?

The project's interest and viability can be judged using the balances of net benefits in market and shadow prices. The analysis of the efficiency with which the project uses the resources devoted to it shows "at what cost" these net benefits are obtained:

- the cost of the project is given by the incremental scarce resources that it uses (investments);
- the net benefit of the project is given by the incremental creation of wealth (net operating benefit).

The estimation of the economic value of these flows depends on the major constraint considered.

Table C.4. *Definition of costs and benefits under constraints*

MAJOR CONSTRAINT FOR THE ECONOMY	FIXED INVESTMENT COST (INCREMENTAL)	NET BENEFIT FLOWS (INCREMENTAL)
DOMESTIC INCOME	Total cost of the investments in market prices $(\Delta INV.)$	Income created $(\Delta VA + CB)$
FOREIGN CURRENCY SCARCITY	Cost in foreign currency of total imports in the investments $(\Delta INV.\ imp)$	Net foreign currency earned $(\Delta Px - \Delta I\ total)$
INTEGRATION INTO WORLD MARKETS	Total cost of investments in international parity prices $(\Delta INV._{SP})$	Economic balance measured in international parity prices (ΔEB_{SP})

Elements between ( ) refer to Chapter 5 to 7.

On this basis, **profitability** computations are carried out which synthesise the sequence of costs and benefits in a single indicator.

Then, a general economic synthesis makes it possible to study the way in which the project's economic results contribute to the economic policies and structural reforms put in place by the country.

THE ANALYSIS OF ECONOMIC EFFICIENCY AND RELEVANCE is aimed at calculating the RETURN ON INVESTMENT OF THE PROJECT FOR SOCIETY AS A WHOLE and at evaluating its CONTRIBUTION TO THE ECONOMIC POLICIES carried out

More specifically, it involves:

- calculating the economic profitability of the project:
  - from the perspective of the domestic income,
  - under scarcity of foreign currency constraint,
  - from the standpoint of the international economy;
- assessing the economic risks incurred;
- examining the project's economic relevance for the policies and structural reforms.

ANNEX D

PRINCIPAL TABLES
OF FINANCIAL ANALYSIS

Tables and accounts, are the key tools of the project analyst. They enable the flows between the entity and the rest of the economy to be identified and quantified from various points of view. They thus always include (except in the case of the disbursement schedule, which only considers outlays):

- ◆ a portion of the "resources" – the entity's gross income (or benefits);
- ◆ a portion of the "uses" – the entity's resource allocations (or costs).

The balance between these two flows appears under "uses", because it is a resource allocation, with the result that the two portions "resources – uses" are always balanced by the equation:

$$Balance = Resources - Uses$$

The tables used for the financial and economic analysis deal with:

- ◆ **money flows**
    - ➡ **THE CASH FLOW STATEMENT**   **§ D.1**
- ◆ **all of the flows linked to the entity's activity**
    - ➡ **THE "FLOW BALANCE" ACCOUNT**   **§ D.2**
    - ➡ **INCOME AND EXPENDITURE ACCOUNTS**   **§ D.3**
- ◆ **the payments made by donors and supervising agencies**
    - ➡ **THE DISBURSEMENT SCHEDULE**   **§ D.4**

D.1. THE CASH FLOW STATEMENT

The cash flow statement sums up *all* the **inflows and outflows of cash and cash equivalents** which actually take place and only these flows throughout the life of the project[1]. It makes it possible to estimate the return on investment in the case of those entities whose trading is done in money.

In this account, resources/uses are called:

inflows of money/outflows of money
or   receipts/outlays
or   credits/debits

----

(1) Whenever they "cross the border" of the entity.

or   inputs/outputs
or   collections/disbursements
or   payments/withdrawals.

Table D.1. *Cash flow statement*
(covering one period)

OUTLAYS		RECEIPTS	

< **Investments**
   . Initial investment or replacement
   . Working capital requirement[(*)]
		< **Equity capital**
		   . Entrepreneur
		   . Shareholders	

< **Operating charges**
   . Raw materials
   . Parts and supplies
   . Maintenance, repair
   . Outreach activities
   . Overheads
   . Fees and royalties
   . Labour costs
   . Direct and indirect taxes
		< **Sales**
		   . Revenue A
		   . Revenue B
		  	

< **Financial expenses**
   . Insurance
   . Repayment of borrowed capital
   . Interest on loans
   [.Dividends]
		< **Receipt of loans**
		   (short, medium and long term)
		
		< **Subsidies**
		   and insurance indemnities	

TOTAL	= O		
Cash flow	= R – O	TOTAL	= R

(*) Increase of the working capital requirement.

Table D.2. *Cash flow statement*
(covering the life span of the project)

YEAR	0	1	2	...	N
RECEIPTS:					
< **Equity capital**					
. Entrepreneur					
. Shareholders					
< **Sales**					
. Revenue A					
. Revenue B					
. ...					
< **Receipt of loans**					
(short, medium and long term)					
< **Subsidies**					
and insurance indemnities					
TOTAL RECEIPTS = R					
OUTLAYS:					
< **Investments**					
. Initial investment					
. Replacement					
. Working capital requirement(*)					
< **Operating charges**					
. Raw materials					
. Parts and supplies					
. Maintenance, repair					
. Outreach activities					
. Overheads					
. Fees and royalties					
. Labour costs					
. Direct and indirect taxes					
< **Financial expenses**					
. Insurance					
. Repayment of borrowed capital					
. Interest on loans					
[.Dividends]					
TOTAL OUTLAYS = O					
CASH FLOW STATEMENT = R – O					
Cumulative balance					

(*) Increases of working capital requirement, and salvage value in year N.

D.2. THE "FLOW BALANCE" ACCOUNT

This account is specific to the analysis of development projects (where it is often referred to as cash flow statement).

The flow balance identifies *all the money and non-money flows* which actually take place between the entity and the rest of the economy, throughout the life of the project[1]. It can be drawn up for one year, but a full analysis covering the life of the project is needed to make a judgement on the return on investment.

This account records non-money flows, which is especially useful when dealing with rural development projects (agriculture, forestry, fishery, livestock breeding...) and informal sector projects – where home-consumption and barter trade may be important. When all productive activities are monetised, this account is identical to the cash flow statement.

In this account, resources/uses are called:

<div align="center">

inflows/outflows

or   inputs/outputs.

</div>

_____

(1) Whenever the flows "cross the border of the entity".

Table D.3. *Flow balance account*
(covering the life span of the project)

YEAR	0	1	2	...	N
INFLOWS:					
< **Equity capital**					
. Entrepreneur					
. Shareholders					
< **Sales**					
. Product A					
. Product B					
. ...					
< **Home-consumption** and self-supply					
< **Receipt of loans** (short, medium, and long term)					
< **Subsidies** and insurance indemnities					
TOTAL INFLOWS = IF					
OUTFLOWS:					
< **Investments**					
. Initial investment					
. Replacement					
. Working capital requirement[(*)]					
< **Operating expenses**					
. Raw materials					
. Parts and supplies					
. Maintenance, repair					
. Outreach activities					
. Overheads					
. Fees and royalties					
. Labour costs					
. Direct and indirect taxes					
< **Financial expenses**					
. Insurance					
. Repayment of borrowed capital					
. Interest on loans					
[.Dividends]					
TOTAL OUTFLOWS = OF					
PROFIT = IF – OF					

(*) Increases of working capital requirement, and salvage value in year N.

D.3. INCOME AND EXPENDITURE ACCOUNTS

In these operating accounts, resources/uses are called:

revenues/expenses

or resources/uses.

(a) The income statement[1]

This presentation is useful for financial analysis.

The income statement identifies all of the operations linked to production ("manufacturing"), operation (in the business accounting sense: overheads, rents, insurance, financial expenses) and marketing during a given period. Several ways of recording the items exist.

☞   Table D.4.

Another presentation is of more interest to the project analyst, for it enables him to understand the entity's financial logic. Various calculations and simulations are made using this division, among them the break-even analysis (§ 3.1.4).

☞   Table D.5.

_____

(1) The Profit and Loss Account (shown in § F.2.5) is a particular business accounting form of the Income statement.

Table D.4. *Income statement
Financial presentation nᵒ1
(covering one period)*

EXPENSES	REVENUES
< **Manufacturing**	< **Productions**(*)
. Raw materials(*)	. Revenue A
. Parts and supply(*)	. Revenue B
. Maintenance and repair	. ....
. Outreach activities	
. Production overheads	< **Work done by the firm for itself**
. Fees and royalties	
. Labour charges	
. Depreciation of productive	< **Subsidies**
equipment	and insurance indemnities
< **Operation**	
. Administrative overheads	
. Administrative personnel charges	
. Insurance	
. Interest on loans	
. Depreciation	
< **Commercialisation**	
. Direct charges	
. Overheads	
< **Taxes**	
TOTAL = E	
< **Net operating profit** = R – E	TOTAL = R

(*) Taking into account stock variations.

Table D.5. *Income statement*
Financial presentation nᵒ2
(covering one period)

EXPENSES	REVENUES
< **Variable costs** (or "proportionate") . Raw materials[*] . Parts and supply[*] . Maintenance, repair . Outreach activities . Direct overheads . Fees and royalties . Direct labour . Taxes	< **Productions**[*] . Revenue A . Revenue B . ...
< **Fixed costs** . Fixed overheads . Royalties,... . Indirect labour . Insurance . Indirect taxes . Depreciation	< **Work done by the firm for itself** < **Subsidies** and insurance indemnities
< **Financial costs** . Interest on loans	
TOTAL = E	
< **Net operating profit** = R – E	TOTAL = R

(*) Allowing for stock variations.

(b) The operating account

This presentation is useful for economic analysis, especially effects analysis.

The operating account records the *operations* (use of raw material in the production process or use of labour, for example) and not their actual settlement (e.g., actual payment to suppliers of raw materials used or payment of salaries). It can be calculated in two steps:

- ◆ estimation of domestic value added. Identifying *all* the goods and services used or produced during the period considered;

☞ Table D.6.

◆ breaking down the value added and transfers (subsidies and insurance indemnities): thus enabling to estimate the operating profit.

Table D.6. *Estimation of domestic value added*
(covering a period)

EXPENSES		REVENUES	
< **Intermediate goods and services**(*)		< **Productions**(*)	
. Raw materials		. Sales	
. Parts and supplies		. Home consumed production and self-supply	
. Maintenance, repairs			
. Outreach activities			
. Overheads			
TOTAL	= IGS		
< **Gross value added**	= P – IGS	TOTAL	= P

(*) Allowing for stock variations.

The value added computed in this table is a *gross* value added. Were the depreciation of the investments added to the charges, the value added would be *net*.

Table D.7. *Breakdown of value added and transfers*
(covering an exercise)

USES(*)		RESOURCES	
< **Wages**	W	< **Gross value added**	VA
. Salaries		< **Operating subsidies**	O S
. Social security contributions		and insurance indemnities…	
< **Financial charges**(**)	F C		
(interest, insurance)			
< **Taxes**	T.		
TOTAL	= W + FC + T		
< **Gross operating profit**			
= (VA + OS) – (W + FC+ T)		TOTAL	= VA + OS

(*) Royalties, land rents and other property incomes should be included here.
(**) N.B.: The financial charges do not include the repayment of loan principal.

The operating profit calculated in this table is a *gross* profit because the value added is gross; it would be a *net* profit had the value added been net or had a depreciation item been added to the uses.

Finally, it is possible to draw up the **operating account** by merging the two previous tables. The table below shows how the Net Operating Profit is calculated over the life span of a project.

☞ Table D.8.

Table D.8. *Operating account*
(covering the life span of the project)

YEAR	0	1	2	...	N

REVENUES: = P + OS
 	
< **Production**   = P
  . Sales
  . Home consumed production and
   self-supply
  . Stock variations
< **Operating subsidies**
  and insurance indemnities... = OS					

**INTERMEDIATE
GOODS AND SERVICES**   = IGS
 	
  . Raw materials
  . Parts and supplies
  . Stock variations
  . Maintenance, repairs
  . Outreach activities
  . Overheads					

VALUE ADDED: VA = P – IGS
 	
< **Wages**   = W
  . Salaries
  . Social security contributions
< **Financial charges(*)**   = FC
  (interest, insurance, royalties)
< **Levies and taxes** = T					

< **Gross Operating Profit**
    GOP = (VA + OS) – (W + FC + T)
 	
  . Depreciation = D					

< **Net Operating Profit** = GOP – D					

Row side labels: **REVENUES** / **INTERMEDIATE GOODS AND SERVICES** / **VALUE ADDED**

(*) The financial charges do not include the repayment of loan principal.

D.4. THE DISBURSEMENT SCHEDULE

The disbursement schedule identifies, year after year, *all* the disbursements which donors and other financial institutions must make to project entities, and the dates on which these disbursements (or in kind provisions) must take place. These disbursements are indicated in *current prices* on the date they are carried out.

Table D.9. *Disbursement schedule*
(covering the life span of the project – in current prices)

YEAR	0	1	2	...	N
DONORS nº 1:					
< **Gifts** . Monetary . In kind					
< **Balancing subsidies**					
< **Loans** . Monetary . In kind					
TOTAL = D1					
DONORS nº 2:					
< **Gifts** . Monetary . In kind					
< **Balancing subsidies**					
< **Loans** . Monetary . In kind					
TOTAL = D2					

ANNEX E

PRINCIPAL PROFITABILITY CRITERIA

Profitability criteria are indicators which enable costs and benefits to be compared. They are used at different stages of the project cycle in both financial and economic analysis.

Each criterion has a different meaning, which allows profitability to be described from various standpoints. This improves the analyst's understanding of the stakes and risks involved in the project, and guarantees a better decision.

The most common criteria used in project analyses are:

- **those not requiring discounting – easy to calculate, but of limited use**
    - ➠ **THE INVESTMENT'S PAYBACK PERIOD**   **§ E.1**
    - ➠ **NON-DISCOUNTED BENEFIT-COST RATIOS**   **§ E.2**
- **those requiring discounting – more complex to calculate, but more reliable**
    - ➠ **DISCOUNTED BENEFIT-COST RATIOS**   **§ E.3**
    - ➠ **NET PRESENT VALUE**   **§ E.4**
    - ➠ **INTERNAL RATE OF RETURN**   **§ E.5**

Notes:

(1) All these criteria can be calculated during *ex-ante* or *ex-post* evaluations, as long as the necessary data on costs and benefits are available.

(2) For both financial and economic analysis, *incremental* costs and benefit flows must be used in calculating these criteria.

(3) All these criteria, with the occasional exception of the payback period, are calculated using data in *constant prices*.

E.1. THE INVESTMENT'S PAYBACK PERIOD

(a) Definition

This is the period, d, after which net benefits balance investment costs, in other words the time needed for the cumulative total of gross benefits to equal the cumulative total of costs (the algebraic sum of these flows becomes positive):

$$\sum_{t=0}^{d} (\text{Gross } \mathbf{benefits}_t - \text{Operating } \mathbf{costs}_t) = \sum_{t=0}^{d} \text{Investment } \mathbf{costs}_t$$

$$\sum_{t=0}^{d} \text{Gross } \mathbf{benefits}_t = \sum_{t=0}^{d} (\text{Operating } \mathbf{costs}_t + \text{Investment } \mathbf{costs})$$

In financial analysis, for example, the payback period is taken as the year during which the cumulative cash flow (calculated without including equity in inflows) becomes positive.

☞ Figure E.1.

(b) Use

- The period calculated indicates how long it takes for investments to be recovered: the "financial" investment for the entity, or the "economic" fixed investments from the standpoint of society as a whole.

(c) Advantage

- Clear meaning.
- Simple to calculate.
- Useful when financing constraints dominate: in such a case, the investor needs a rapid payback of invested capital.
- An especially well adapted criterion for financial analysis from the standpoint of investors in projects with a high degree of risk.

(d) Limits

- This criterion does not indicate the period over which the benefits occur. For a given payback period, the payback rhythm does not appear: the payback might take place at the beginning or at the end of the period in question (which affects the return on investment for the investor).
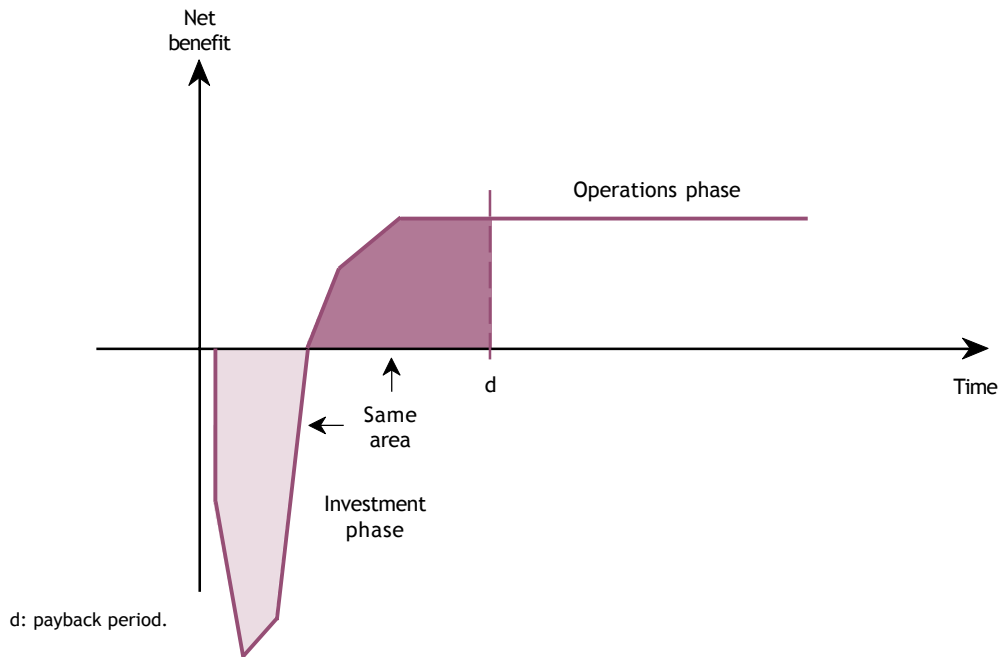
Figure E.1. *Graphical representation of the payback period*

- ◆ It does not include what happens after the payback period: the subsequent benefits might be high or low, cover a long or short period, etc.
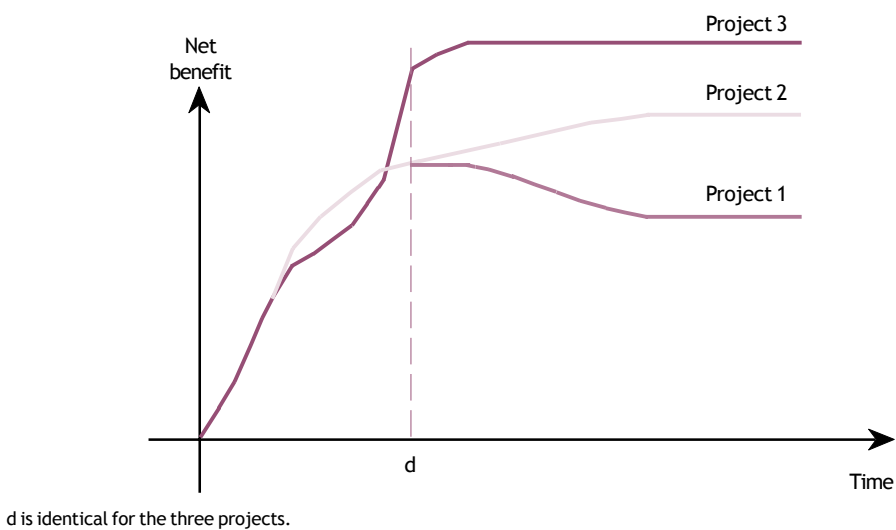
Figure E.2. *Different profiles for projects with the same payback period*

- This criteria is often estimated on the basis of constant prices, though the actual payback can only be calculated with current prices. This is particularly important when very high inflation exists.

E.2. NON-DISCOUNTED BENEFIT-COST RATIOS

(a) Definitions

Several types of benefit-cost ratio exist, each of which may be tailored to a project's specific information needs. The three examples given below are among the most common types.

The criterion of **return per monetary unit invested** is calculated by dividing the sum of net benefits by the total cost of investments and investment renewal:

$$R_{BC1} = \frac{\sum\limits_{t=0}^{N} (\text{Gross } \textbf{benefits}_t - \text{Operating } \textbf{costs}_t)}{\sum\limits_{t=0}^{N} \text{Investment } \textbf{costs}_t}$$

Or, for a year of normal operation (noted norm):

$$R_{BC2} = \frac{\text{Gross } \textbf{benefits}_{norm} - \text{Operating } \textbf{costs}_{norm}}{\sum\limits_{t=0}^{N} \text{Investment } \textbf{costs}_t}$$

Another ratio is sometimes calculated for a year of normal operation by dividing the net benefit by the operating expenses:

$$R_{BC3} = \frac{\text{Gross } \textbf{benefits}_{norm} - \text{Operating } \textbf{costs}_{norm}}{\text{Operating } \textbf{costs}_t}$$

(b) Use

- For the project to be shown to be viable using this criterion, R_{BC1} must be higher than 1, or else R_{BC2} must be higher than the inverse of the number of years of normal operation (N):

$$R_{BC1} > 1$$

$$R_{BC2} > \frac{1}{N}$$

- The interpretation of R_{BC3} depends on the context in which it is calculated. Certain studies suggest that farmers adopt technical innovations only if this criterion has a value of at least 2.

(c) Advantage

- R_{BC1} and R_{BC2} can be useful when serious financial constraints exist.
- R_{BC2} gives a quick idea of the *a priori* return on an investment beginning from the preliminary phases of the project cycle, or *a posteriori* when evaluating a project for which sufficient data is not available[1].
- R_{BC3} allows for the financial constraint at the "current expenses" level to be taken into account. This criterion can be a useful indicator of the difficulty which informal subsector firms or farmers might have in paying off new financial or input expenses.

(d) Limits

- The different definitions in use can create confusion.
- These three non-discounted criteria do not allow for the spreading of the costs and benefits over time, nor for the life span of the project which means that R_{BC1} and R_{BC2} can be used only as a rough indication.
- The use of R_{BC1} and R_{BC2} for the purpose of making a comparison runs the risk of favouring small projects with limited investment needs.
- R_{BC3} does not take into account the size of the investment, and is therefore not, strictly speaking, a measure of the project's return on investment.

E.3. DISCOUNTED BENEFIT-COST RATIOS

(a) Definitions

The ratio of the present value of net benefits and the present value of investments is widely used:

_____
(1) It is thus, in a way, a question of the opposite of the "output ratio" or "capital coefficient".

$$R_{BC4} = \frac{\displaystyle\sum_{t=0}^{N} \frac{\text{Gross } \mathbf{benefits}_t - \text{Operating } \mathbf{costs}_t}{(1 + i)^t}}{\displaystyle\sum_{t=0}^{N} \frac{\text{Investment } \mathbf{costs}_t}{(1 + i)^t}}$$

i = discount rate

The following type of ratio using the present value of fixed and operating costs is calculated:

$$R_{BC5} = \frac{\displaystyle\sum_{t=0}^{N} \frac{\text{Gross } \mathbf{benefits}_t}{(1 + i)^t}}{\displaystyle\sum_{t=0}^{N} \frac{\text{Investment } \mathbf{costs}_t + \text{Operating } \mathbf{costs}_t}{(1 + i)^t}}$$

Using the net present value (introduced in the following paragraph), the "Relative enrichment rate" is also calculated:

$$R_{BC6} = \frac{NPV}{\displaystyle\sum_{t=0}^{N} \frac{\text{Investment } \mathbf{costs}_t}{(1 + i)^t}}$$

(b) Use

- The project is acceptable as long as:

$$R_{BC4} > 1$$
$$R_{BC6} > 0$$

- The interpretation of R_{BC5} depend on the situation in which it is calculated.
- The higher R_{BC4} and R_{BC6} are, the better the project. They can thereby be used to compare different projects.

(c) Advantage

- "The profitability index" R_{BC4} gives the current return on the unit of capital invested. It takes into account the financing constraint of investments.
- R_{BC5} does the same but takes account of operating expenses constraints. In financial firm analysis, this means taking into account financial constraints on investments and cash flows.
- The relative capital enrichment rate R_{BC6} makes it possible to relate the current net value to the fixed investments. It takes account of the financing constraint by measuring relative capital enrichment throughout the life of the project.

(d) Limits

- The different definitions can cause confusion.
- The calculation of these criteria requires fixing a discount rate (§ A.2). In the usual sequence of flows, the higher the discount rate the smaller the ratio.

E.4. NET PRESENT VALUE

(a) Definition

The net present value, or total discounted profit, is equal to the sum of discounted flows throughout the life span of the project: the sum of gross annual discounted benefits less the sum of annual discounted costs. It is thus equal to the sum of the discounted net benefits:

$$NPV = \sum_{t=0}^{N} \frac{(\text{Gross } \mathbf{benefits}_t - \text{Operating } \mathbf{costs}_t - \text{Investment } \mathbf{costs}_t)}{(1+i)^t}$$

Or:

$$NPV = \sum_{t=0}^{N} \frac{\text{Gross } \mathbf{benefits}_t}{(1+i)^t} - \sum_{t=0}^{N} \frac{(\text{Operating } \mathbf{costs}_t + \text{Investment } \mathbf{costs}_t)}{(1+i)^t}$$

Or:

$$NPV = \sum_{t=0}^{N} \frac{(\text{Gross } \mathbf{benefits}_t - \text{Operating } \mathbf{costs}_t)}{(1+i)^t} - \sum_{t=0}^{N} \frac{\text{Investment } \mathbf{costs}_t}{(1+i)^t}$$

(b) Use

- The project is acceptable as long as: NPV > 0.

(c) Advantage

- In theory, this is the best indicator of the project's real value.

(d) Limits

- The major constraint in the use of this criteria is that the discount rate i must be fixed (§ A.2).
- The value of long-term future benefits is low[1] and thus the use of this criterion gives less importance to projects providing benefits over a long period, or after a rather long "rise in production" phase.
- The net present value gives no indication of financing constraints.
- Certain flow sequences may lead to reverse the ranking of projects based on the NPV (see Figure E.3).

☞   Figure E.3.

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(1) Especially if the discount rate chosen is high.
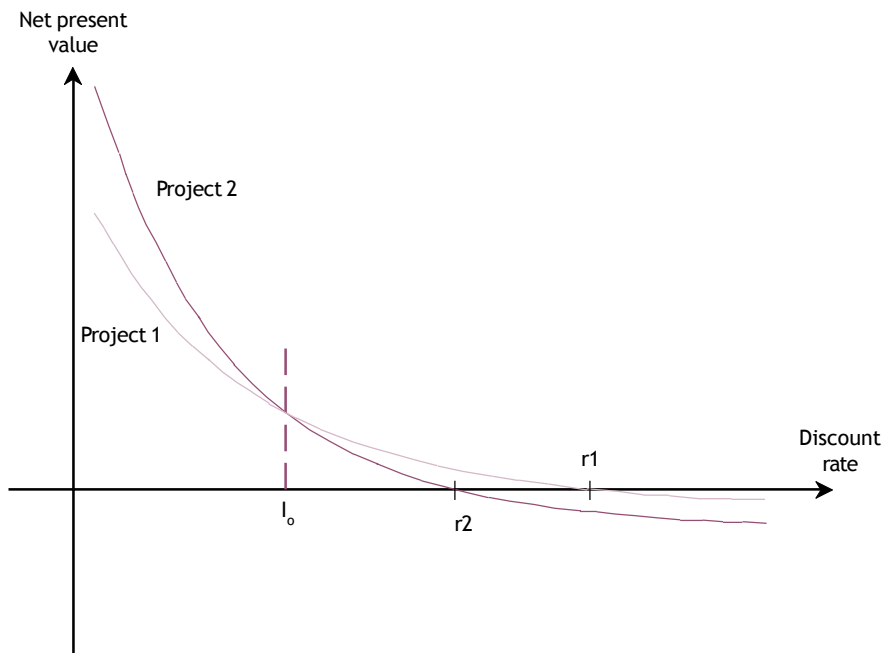
For   i > I_o project 1 seems better
      i < I_o project 2 seems better

Figure E.3. *The comparison of NPVs of two projects depends on the discount rate*

E.5. INTERNAL RATE OF RETURN

(a) Definition

The internal rate of return is the rate, *r*, which reduces the net present value to zero:

$$- \sum_{t=0}^{N} \frac{\text{Investment } \textbf{costs}_t}{(1 + r)^t} + \sum_{t=0}^{N} \frac{(\text{Gross } \textbf{benefits}_t - \text{Operating } \textbf{costs}_t)}{(1 + r)^t} = 0$$

Or else:

$$\sum_{t=0}^{N} \frac{\text{Gross } \textbf{benefits}_t - \text{Operating } \textbf{costs}_t - \text{Investment } \textbf{costs}_t}{(1 + r)^t} = 0$$

Figure E.4. *Graphical representation of the IRR*

(b) Use

- The only correct way to use this indicator is to compare it to the value (or range of values) of the discount rate i: the investment is acceptable if *r* > i, and "to be rejected" if this is not the case.

- In order to avoid misinterpretations, one should be careful whether the IRR is calculated in constant or current prices. In the case of a constant annual inflation, j, the existing relation between the IRR calculated in constant prices r_{cst}, and the IRR calculated in current prices, r_{cur}, is:

$$r_{cur} = [(1 + r_{cst}) \, H \, (1 + j)] - 1$$

- A high IRR does not mean that the project's return on investment is higher, but only that if the time preference were to greatly increase (thus increasing i), the project would continue to be acceptable.

- It is wrong (though not uncommon) to compare projects based on their IRRs. A high IRR does not necessarily indicate an increased return on investment (see Figure E.3).

(c) Advantage

- The calculation of the internal rate of return does not require precise estimation of the discount rate, as it is a data item "mathematically within" the flow sequence being studied. However, the order of magnitude of the discount rate must be known in order to appraise the value of IRR.

- In financial analysis, the internal rate of return can be interpreted as being the highest interest rate the entity can bear while still balancing its accounts, assuming all its investments were covered by a loan.

- The IRR is a measure of the "return" on the capital invested. This data can be compared to the average rate of the financial market (if it is the discount rate chosen for the entity) in the case of the financial analysis of a "modern sector" entity, or to the opportunity cost of capital (if it is the discount rate chosen for society as a whole) in the case of the economic analysis.

(d) Limits

- The IRR is difficult to calculate without a financial calculator or spreadsheet[1].

- Depending on the type of flow sequence, several IRR's may exist – or even none at all. However, any series of data initially negative then systematically positive allows only a single solution r.

- The use of this indicator tends to reduce the attractiveness of those projects having a major initial investment, or those which only attain their self-sustaining state following a long rise in production phase, even if these projects have greater advantages over a long subsequent period[2].

- Projects cannot be ranked according to their IRR (see Figure E.3).

THE MODIFIED INTERNAL RATE OF RETURN

If the entity's transactions are carried out in money, two elements can seriously limit the interpretation of the financial IRR (and sometimes the economic IRR):

- when the value of r diverges sharply from that of the possible reinvestment rates and/or from the discount rate;

- the number of times that the cash flow sequence changes its sign (which complicates the solution to the equation, adding to the number of potential solutions).

---

(1) But no mathematical method exists whereby a solution to this problem can be found (from degree "n" to an unknown). The resolution method is thus done by iterative tests and linear interpolations.
(2) This is due to the discounting effect, which reduces the effect of remote income.

In these circumstances, it is possible to calculate a modified IRR based on the following assumptions:

- all the positive annual cash flows (CF^+) are invested at a "reinvestment rate" v (generally reflecting the average return on investments of comparable risk);

- all the negative annual cash flows (CF^-) are covered by loans at an average rate of e.

N.B.: In reality, these two "assumptions" only express the mathematical meaning of the IRR formula.

For a project with a life span of N, the modified IRR (MIRR) is calculated in the following way:

Let:

$$S = \sum_{t=0}^{N} [CF_t^+ \, H \, (1 + v)^{N-t}]$$

and

$$D = \sum_{t=0}^{N} \frac{CF_t^-}{(1 + e)^t}$$

With:

$$MIRR = \left(\frac{S}{D} \right)^{\frac{1}{N}} - 1$$

S = Future value of positive cash flows (surpluses).

D = Present value of negative cash flows (deficits).

ANNEX F

FINANCIAL ANALYSIS OF FIRMS AND ORGANISATIONS USING ACCOUNTING

When the agent examined is a firm or organisation which uses business or public accounting, the analyst can use standard documents to carry out a more thorough examination. The advantage which business (or public) accounting has for the analyst comes from:

- its compulsory nature;
- the ways in which facts and information are recorded, which enables the analyst to gain a relatively rigorous view of the accounts of the organisation and its activities;
- its standardised nature, which facilitates comparative analyses.

There are two types of accounting documents:

- those which state the assets and liabilities of a firm or public organisation at a given moment;
- those which record the flows over a given period.

Project analysis is based on flow analysis. The existence of accounting nonetheless allows questions of financial structure and assets to be dealt with directly. The use of accounting leads to two modifications in the approach presented (Chapter 3):

- the study of flows is done by following a series of steps which, while more complete and standardised, is identical in principle to the general approach presented;
- it is completed by an examination of financial structure and of management, based for the most part on the "balance sheet".

Two essential questions are asked:

- Will the project guarantee the financial balance of the firm, or will it alter the firm's ability to meet its obligations?
  - ⟹ The first objective is to guarantee that the organisation is (or will be) well managed, that it is (or will be) financially solid and able effectively to use the incremental funds: *solvency, viability, economic efficiency*.
- Is the project likely to enrich the firm? If not, what types of compensation measures should be taken?
  - ⟹ The second objective is to evaluate the *return* generated by the investment for the organisation.

In order to answer these questions, the procedure involves studying, in turn:

- **the firm's past performance and current financial structure**

    ➡ **SOLVENCY, VIABILITY, AND RETURN ON INVESTMENT:
      EXAMINATION OF THE PROFIT AND LOSS ACCOUNT**   **§ F.1.1**

    ➡ **FINANCIAL STRUCTURE: EXAMINATION OF THE BALANCE
      SHEET**   **§ F.1.2**

    ➡ **RATIOS**   **§ F.1.3**

- **all of the flows resulting from the activity (in situations with and without the
  project)**

    ➡ **INVESTMENT COSTS**   **§ F.2.1**

    ➡ **CALCULATION OF THE FLOWS LINKED TO OPERATIONS**   **§ F.2.2**

    ➡ **ANALYSIS BEFORE FINANCING**   **§ F.2.3**

- **the resulting borrowing requirements and the financial obligations that they
  create**

    ➡ **DEVELOPMENT OF A FINANCING PLAN**   **§ F.2.4**

- **the different balances and the project's incremental impact on the entity's opera-
  tions in terms of financial viability, investment return for the participants, and
  financial structure**

    ➡ **FINANCIAL STATEMENTS**   **§ F.2.5**

    ➡ **EVALUATION OF THE RETURNS ON INVESTMENT**   **§ F.2.6**

- **and, the foreign assistance needed to carry out the project**

    ➡ **DISBURSEMENT SCHEDULE**   **§ 3.4**

It must be emphasised that the use of business accounting documents requires an exact knowl-
edge of the regulations which govern them in each country. Countries differ in their applica-
tion of definitions and rules, and do not always have the same requirements in fiscal matters.

N.B.:   Under commercial accounting, "adjustments" are made for monies receivable and
         payable, accruals, etc. However, many parastatals keep accounts on the basis of
         actual "receipts and payments", without any of these adjustments.

F.1. FINANCIAL REVIEW OF THE ORGANISATION

In an *ex-ante* analysis, this step is clearly superfluous unless the entity exists prior to the planned project. In an *ex-post* analysis, it forms an important part of the financial examination of the entity.

In general, the review focuses on past operations and current financial structure. The tools it uses call for the two types of accounting documents noted above: those which trace the flows and those which describe the firm's tangible assets. Considering the complexity of the analysis of this second type of document (particularly the balance sheet), it is best to turn to analysts who specialise in the field each time an in-depth analysis of an entity's financial statement must be made.

In financial and economic project analysis, a few simple notions enable one to understand the principal characteristics and utility of this in-depth analysis.

The review is centred around two series of general questions:

- **Is the firm *solvent*? Are its activities financially *sustainable*? What is its *return on investment*? To answer these questions, the profit and loss account, the working capital statement and the source and application of funds statement are the main objects of study**

  ➡ **SOLVENCY, VIABILITY, AND RETURN ON INVESTMENT: EXAMINATION OF THE PROFIT AND LOSS ACCOUNT**   § F.1.1

  ➡ **RATIOS**   § F.1.3

- **What is the firm's financial structure? What influence does this structure have on *solvency*, *viability* and *profitability*? To answer these questions, the balance sheet is the main object of study**

  ➡ **FINANCIAL STRUCTURE: EXAMINATION OF THE BALANCE SHEET**   § F.1.2

  ➡ **RATIOS**   § F.1.3

The first stage of the analysis involves examining the profit and loss account and the balance sheets for the three previous years, and, assuming they are available, the working capital statements and cash flows. The accounts relating to prior periods are of little use as the information is too old. If verified and reliable accounts are not available to the analyst, he should himself prepare an updated balance sheet and estimate the current return on investment. In every case, the results must be carefully interpreted if inflation has been high in previous years.

The second step extends the analysis of these accounts by calculating a number of ratios (§ F.1.3).

F.1.1. Solvency, viability, and return on investment: examination of the profit and loss account

The profit and loss account (§ D.3) is the central tool of this analysis. It enables one to analyse flows in the manner described in Chapter 3 and Annex B. It can be completed by information about the cash flow (taken from the source and application of funds statement or from the balance sheet).

F.1.2. Financial structure: examination of the balance sheet

The study of a firm's financial structure enables the analyst to increase his knowledge of the viability and the return on investment of the firm.

The balance sheet is an account which measures the state of a company's wealth (the "assets") and offers information concerning the financial sources of this wealth.

In presenting the balance sheet, a distinction is made between Assets and Liabilities. Very simply[1]:

- The **Assets** column covers:
  - **Fixed Assets**: tangible (e.g., land, buildings, machines), intangible (e.g., goodwill, installation costs) and financial (e.g., loans): in other words the assets that the firm cannot easily convert into cash without putting the future productive capacity of the firm in danger;
  - **Current Assets**: essentially the stocks, debtor balances (money owed by clients, less bad and doubtful claims), cash flow and short-term bank deposits, in other words assets the firm can easily convert into cash;
- The **Liabilities** column indicates how the assets have been financed:
  - the **Share capital and reserves**: shareholders' equity, reserves and retained profit;
  - the **Long term liabilities**: payments due after more than one year, such as long term loans or debentures;
  - **Current liabilities**: essentially payments due in less than one year and credit balances (money owed to suppliers), bank overdrafts, dividends, and taxes if the firm is subject to them.

---

(1) Significant variations can be found from one country to another, in both structure and, especially, in terminology.

Table F.1. *The balance sheet structure*

ASSETS		LIABILITIES	
Fixed assets	Tangible assets Intangible assets Investments	Creditors due after more than one year (long-term loans + (leases) Called up share capital Share premium account Reserves Profit + loss account	Long term liabilities Capital and reserves
Current assets	Stocks Debtors Cash Short-term deposits Prepayments	Creditors Loans, overdrafts Taxes Dividends (all due within 12 months)	Current liabilities
Equalisation account	Accruals	Accruals	Equalisation account

The following examples illustrate, in a simplified manner, the type of information and analysis gleaned from the balance sheet:

- major fixed assets are the sign of investments both numerous and/or high, whereas in the opposite case it is possible that one is dealing with old, obsolete equipment – except in the case of special activities such as trade or certain services;
- highly intangible fixed assets can result from large research outlays or from a high initial value of goodwill;
- portfolio investments in other companies result in high financial fixed assets.

CONSOLIDATED BALANCE SHEET

The logic of balance sheet consolidation is different from that used for consolidating operating accounts and flow-balance account. Consolidated balance sheets do not involve flows but they trace the financial structure of "groups" of companies which are legally autonomous but generally depend on a single decision-making body, and which are linked for the most part by multiple relations, be they financial, commercial, technical or individual (joint administrators): a parent company and its subsidiaries, a financial holding company and its acquisition of stakes in various firms.

The consolidation methods adopted are not a matter of simply adding items; they follow different principles:

- directly replacing equity shares with the share (depending on the percentage held) of the net worth of the corresponding companies; this is a concept pertaining to "financial assets";

- or proportionate integration of all the elements of assets and liabilities (debts and profit) of the companies involved in proportion to the capital percentage held; this is another concept pertaining to "financial assets";
- or overall integration, by replacing the equity shares with all the assets and debts, and the share of the profit of the companies possessed, and in entering among the liabilities the portion of the other shareholders of these companies; this is an "economic concept" giving a complete view of the unit formed by the group.

F.1.3. Ratios

There are various types of ratios. Three are considered here: financial status ratios, management ratios and return on investment ratios.

(a) Management ratios

Their interpretation is often strongly dependent on the nature of the activity (client turnover, supplier turnover, inventory turnover, etc.).

(b) Financial status ratios

The simplest of these give the structure of the balance sheet in percentage terms, thus enabling one to measure the major financial equilibria of the firm.

The **current ratio** indicates the amount of coverage possible for the repayment of short term liabilities, should these liabilities become immediately callable. Were the current assets not sufficient to cover short-term liabilities, it would be necessary to sell the fixed investments, which would compromise the firm's future capacity. A deteriorating ratio is a cause of concern. An acceptable ratio will fall in the range of 0.8 - 1.0 (for a retailer) to 1.5 - 2.0 (for general manufacturing), depending on the nature of the industry. Ratios under 1 should be closely scrutinised. Ratios in excess of 2 could indicate poor cash management.

$$\frac{\text{Current assets}}{\text{Current liabilities}}$$

The **quick ratio** – or "acid test ratio" – looks more strictly at liquidity and assesses whether current liabilities can be met when due, even when some assets (i.e. stocks) are not readily convertible to cash. It is less subject to industry characteristics (a ratio of 1 might be taken as an appropriate norm).

The **level of gearing** is an indicator of financial structure. For a successfully operating firm, this should fall during the period being analysed as debt is repaid and reserves accumulate. The amount of equity constitutes a security for any incremental proposed loan (see below).

Debt ratios are to be thoroughly analysed, as they convey the ability of the firm to meet its obligations, especially for loans:

- The **long term debt ratio** expresses long-term financial balance by showing the extent to which the firm makes use of its theoretical leverage capacity.

$$\frac{\text{Long term liabilities}}{\text{Equity}}$$

- The **debt equity ratio** evaluates the balance between debt and equity in the existing financial structure, and conveys the likely degree of the firm's independence in its dealings with banks.

$$\frac{\text{Share capital and reserves}}{\text{Long-term debt}}$$

- Ratios measuring the repayment ability of the firm are based on cash flow (CF). The CF is equal to the amount of the NOP less income taxes[1].

  The **debt service coverage** (DSCR) which can be calculated in two ways.

$$\frac{\text{Cash flow}}{\text{Debt service}}$$

Or

$$\frac{\text{Net profit after tax + Interest on long term debt + Depreciation}}{\text{Debt service}} = \frac{\text{GOM − Income tax}}{\text{Debt service}}$$

(c) Return on investment ratios

The most frequent are:

- Ratios to compare performance between companies in the same industries:
  - The **profit margin** (gross or net), sensitive to the return on investment variations of the operation.

$$\frac{\text{Operating profit}}{\text{Turnover}} = \frac{\text{Profit before income tax}}{\text{Sales}}$$

_____
(1) CF = GOP − Income taxes, or: CF = Depreciations + Provisions + Distributed profits and dividends.

- The **cash flow ratio**, which measures the ability of the firm to generate cash (and thus to develop through self-financing).

$$\frac{\text{Cash flow}}{\text{Turnover}}$$

- Ratios to compare returns on capital with alternative investment opportunities:
  - The **return on net assets** or return on capital employed

$$\frac{\text{Net operating margin}}{\text{Net assets}} = \frac{\text{Profit before interest and tax}}{\text{Net assets}}$$

  - The **return on equity** (capital and accumulated reserves).

$$\frac{\text{Net operating profit} - \text{Income tax}}{\text{Capital base}} = \frac{\text{Profit after tax}}{\text{Share capital and reserves}}$$

F.2. WITH- AND WITHOUT-PROJECT SITUATIONS

Several steps are needed to calculate the project's impact on the entity's financial situation and return on investment:

- **review of all the flows based on technical forecasts**
  - ➡ **INVESTMENT COSTS** § F.2.1
  - ➡ **CALCULATION OF THE FLOWS LINKED TO OPERATIONS** § F.2.2
  - ➡ **ANALYSIS BEFORE FINANCING** § F.2.3
- **drafting a financing plan**
  - ➡ **DEVELOPMENT OF A FINANCING PLAN** § F.2.4
- **drawing up the post-financing accounts and estimating the project's return on investment for the entity**
  - ➡ **FINANCIAL STATEMENTS** § F.2.5
  - ➡ **EVALUATION OF THE RETURNS ON INVESTMENT** § F.2.6

F.2.1. Investment costs

(a) Investment table

Investments are often listed in accounting terms as:

- **Fixed investments**:
  - cost of **investments in fixed capital**: resources necessary for the purchase of land and site development, buildings, construction and equipment. To this is added the acquisition costs of technology and certain fees linked to industrial or commercial property (e.g., patents, brands, purchase of goodwill);
  - **pre-production** outlays: cost of preliminary research and studies, legal charges linked to incorporation, start-up costs and tests, vocational costs for technical personnel;
- **Working capital requirements**: resources necessary to operations, aimed at avoiding any liquidity or insolvency problems. This investment is addressed in detail in § 3.1.3 and F.2.2.

Subsequent investments are made during the life of the project:

- new fixed investments designed to maintain productive capacity (replacement assets) or to increase – or diversify – production capacity;
- increases in working capital brought about by increased production.

An example of a detailed list of investment outlays appears in the following table.

☞ Table F.2.

Table F.2. *Investment table*
(covering the life span of the project)

YEAR	0	1	2	...	N
< **Fixed capital** . Land . Development, construction . Machines, equipment, materials . Technology, patents,... . Goodwill,... . ... . Provision for contingencies < **Pre-production** . Canvassing, studies and research . Production organisation . Commercial organisation . Pre-production supply . Vocational training . Starting up, tests . Incorporation charges . Interest during construction . ... . Provision for contingencies < **Working capital** (increases)					
TOTAL INVESTMENT					

Notes:

(1)   The columns in this table are approximate; other categories more relevant for the type of project studied can be used.

(2)   The following are recorded in this table:

  • the amount of the initial investments

  • the amount of replacements of investments and increases in capacity occurring during the period analysed,

  • and, negatively, at the end of the period, the amount of the salvage value of all the investments and of the recovery of the working capital.

(3)   In every case, it is useful to show the investment elements related to the factors guaranteeing the viability of the project (§ 3.1.1).

(b) Depreciation

As stated in § 3.1.1, companies generally adopt one of three methods for calculating depreciation for accounting purposes. The tax authorities in each country have their own methods of calculating the depreciation charge that they will permit for the calculation of a company's tax liability. While financial schedules should reflect the company's policy on depreciation, the tax charge should be estimated using the methodology used by the tax authorities. A separate schedule will often be required to calculate this.

FISCAL DEPRECIATION

Calculating fiscal depreciation is pivotal for firms, as it determines the base of the taxes on benefits:

$$GOP - Fiscal\ depreciation = NOP = Tax\ base$$

In business accounting, choices made concerning provisions also come into play (e.g., provisions for depreciation, for losses and expenses). The "shifting" nature of the net operating profit which results from all these *ad hoc* choices explains in large measure the fondness on the part of analysts for the notion of cash flow, or self-financing capacity[1], which gives a less ambiguous picture.

The calculation of the tax assessment on profits allows determination:

- of the return on equity (for the financial analysis);
- of the tax paid to the state (for the economic analysis, to see how income is distributed).

(c) Provision for contingencies

These must be calculated according to the criteria presented in § 3.1.1.

F.2.2. Calculation of the flows linked to operations

This job will lead the analyst to draw up the **receipts and outlays table** (§ F.2.3) for the project's entire life span. Included in it at this pre-financing stage are:

- as resources:
  - the sales resulting from the operation;
  - the salvage value of the investments and of the working capital, if it is decided to register them as resources in the last year;

---

(1) See footnote definition, § F 1.3.

- as uses:
  - operating outlays;
  - investment and replacement outlays, and, for the last year, if it is decided to register it negatively among uses, the salvage value of the investments;
  - the increases in working capital, and, for the last year, if it is decided to register it negatively among uses, the recovery of working capital.

This table is first filled out using previously calculated investment flows.

(a) Receipts and outlays linked to operations

Using the technical description of the project and the entity's activities, all the receipts resulting from operations (product sales), input outlays (including various management costs), labour costs and taxes, can be identified and calculated while making due allowances for stock variations.

The goods and services provided by productive entities in non-competitive sectors (public service or producers' associations, for example) demand that special care be taken when deciding on the tariff to be applied (§ 8.2.1). In every case, each entity showing an operating deficit resulting from tariff choices should be guaranteed financial compensation (operating subsidies). This is a *sine qua non* condition of **viability**. This financing should appear in the disbursement schedule.

Note: If the nominal tariffs are likely to remain set for more than a year, they should be "deflated" in all calculations expressed in constant prices.

(b) Working capital

Working capital should be calculated according to the rules presented in § 3.1.3.

In accounting terms, working capital requirements are equal to:

$$\text{WCR} = \text{Stocks} + \text{Commercial claims} - \text{Commercial liabilities}$$

Note: From the standpoint of the balance sheet, working capital represents the portion of invested capital which remains available to the firm after its fixed investments have been financed. It thus corresponds to the difference between current assets and short term liabilities:

$$\text{WCR} = \text{Current assets} - \text{Current liabilities}$$
$$= (\text{inventories} + \text{cash} + \text{debtors} + \text{prepayments}) - (\text{Creditors} + \text{short-term borrowings})$$

Depending on the nature of the activity and the phase of the project cycle at which one finds oneself, the evolution of the working capital requirements can be calculated using different, more or less precise methods:

- general methods:
    - proportional methods: working capital requirements thus represent a constant (and known) part of the volume of activity (most often represented by turnover);
    - underlying methods: based on extrapolation of earlier trends in the volume of activity and working capital;
- analytical methods:
    - time runoff method: the working capital requirement of each input or output is estimated on the basis of the average length of its turnover[1];
    - cash basis method: allowances are made for the effect of each operation on cash flow throughout the operation cycle.

In an *ex-ante* analysis, consultation with technicians is needed in order to choose between these two methods.

F.2.3. Analysis before financing

(a) Receipts and outlays table

The examination of investments and operating flows enables one to draw up the receipts and outlays table.

Possible variations in the quantities of receipts and outlays are allowed for in the sensitivity analysis. However, at this stage, the major items over which there is greater uncertainty are identified, as are most likely variations in value.

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(1) By valuing input stocks at their purchase price, and the stocks of intermediate products and of finished products at their production cost, for example.

Table F.3. *Receipts and outlays table*
(covering the life span of the project)

YEAR	0	1	2	...	N
RECEIPTS = R					
< Sales (turnover) < Salvage value < Recovery of working capital					
OUTLAYS = O					

< **Investment**
    . Initial
    . Replacement of assets
   < **Working capital**
 	
   < **Operating outlays**
    . Material and supply
    . Transportation and relocations
    . Other services
    . Labour costs
    . Taxes					

RECEIPTS – OUTLAYS BALANCE $ROB_t = R - O$					
Cumulative balance $CROB_t = CROB_{t-1} + ROB_t$					

(b) Investment returns before financing

The returns generated by the investment should be calculated using the incremental flows generated by the project. Should the organisation being studied carry out its activities in the absence of a project, a table of *incremental* receipts and outlays should be prepared. In the opposite case, the initial table already represents the incremental flows.

The criteria most frequently calculated are: the payback period, benefit-cost ratios (such as the return on the monetary unit invested and the relative enrichment rate), the net present value[1] and the internal rate of return.

_____
(1) As regards the discount rate, the return rate offered by the financial market reduced to *constant prices* is generally used; it expresses the opportunity cost of capital.

A **sensitivity analysis** enables one to measure the stability of the results obtained and thus to measure the risk run from the standpoint of the group of investors. If necessary, this analysis includes the sensitivity of the results to modifications in tariff policy.

F.2.4. Development of a financing plan

The steps taken are those indicated in the "financing plan" of the "basic technique" paragraph (§ 3.1.3):

Step 1: Estimate the entity's borrowing requirements; this is done using the "receipts – outlays balance" sequences and the accumulated balance of the receipts and outlays table.

Step 2: Draft a financing plan (with short-, medium- and long-term loans): the source of financing table (Table 3.4) is then made out, and debt service is calculated (in constant prices – Table 3.5).

Step 3: Establish the profit and loss account and the source and application of funds statement, which enables the analyst to judge to what extent the financing plan is adequate (*solvency, viability*) and compatible with the objectives of the investors *(return on investment)*.

Step 4: Should financing problems continue, or should the objectives of the investors prove incompatible, a new financing plan is drafted (step 2), the impact of which is again studied (step 3).

The profit and loss account and the source and application of funds statement are presented in § F.2.5

The development of the financing plan is negotiated with banking organisations. In making their decision, these organisations consider principally:

- the **credit standing** of the borrowing entity: various rules exist depending on the nature of the activities and the mandate of the lending organisation as to the maximum level of medium and long term debt with regard to shareholders' equity;

- **repayment capacity**: the connection between the level of debt and associated debt service with cash generated (typically, the plan should be prepared on the basis of a minimum debt service coverage ratio of 1.5 to 2.0).

In strictly financial logic, the appropriate capital structure[1] is developed by taking into account:

- the cost of capital: payment of interest in operating expenses, and dividends paid to shareholders out of profit after tax (NOP);

---

(1) That is, the relative amounts of shareholders' equity (including the equity contributed by other shareholders) and loan capital.

- the returns on investment: main objective of the investment. Room to manoeuvre is given by the "gearing effect" (see § 3.1.3);
- the financial risk (insolvency) or the strategic risk (dependence). A high business risk will usually be associated with a low risk capital structure (minimal debt).

F.2.5. Financial statements

(a) Profit and loss account

This is compiled using data taken from the receipts and outlays table, as well as from the debt servicing table. The presentation given here is slightly simplified; it closely follows the logic of the analysis presented in § B.4.

Table F.4. *Profit and loss account – simplified presentation*
(covering the life span of the project)

YEAR	0	1	2	...	N
< **Operating receipts** = R < **Operating outlays** = O					
GROSS OPERATING MARGIN GOM = R - O					
< **Interest** = I < **Depreciation** = D					
NET OPERATING PROFIT before taxes NOP = GOM - I - D					
< **Income tax** Tax = NOP × Rate					
NET PROFIT after taxes NP = GOM - I - D					
CASH FLOW CF = D + NP					

Note: The interest paid included in this table excludes the interest during construction which is a part of the investments. These are included in depreciation.

The cash flow represents what the entity retains for income distribution and self-financing.

To judge the real impact of the project, an *incremental* income statement should be used.

The examination of a profit and loss account by elaborating its first part so as to show the added value created enables one to calculate various indicators of **economic efficiency**, and to judge the financial aspects and viability of the entity's operation (§ 3.1.4).

(b) Source and application of funds statement

This table identifies all the real flows of money (operation and financing). It allows the analyst to calculate the firm's cash flow. It is also known as the "funds flow statement" in business accounting.

It provides information about the mobilisation of capital, the receipt of loans and the net operating benefit (cash flow) in resources, as well as about the investment outlays and the cost of the capital (loans and contributions from shareholders) in use.

Table F.5. *Source and application of funds statement*
(covering the life span of the project)

YEAR	0	1	2	...	N
RESOURCES = R < Shareholders' equity < Loans < Cash flow < Salvage value < Recovery of working capital					
USES = U < Investment(*) < Working capital < Repayment of the principal < Dividends					
CASH FLOW $CF_t = R - U$					
Accumulated cash flow $ACF_t = ACF_{t-1} + CF_t$					

(*) Including replacement of assets and interest during construction.

By displaying the (accumulated) cash flow, this table verifies if the working capital input and the financing plan are adequate. As it shows all of the financing flows as well, it is also used to calculate returns to the various investors.

(c) Balance sheet

At last, it is possible to draw up the balance sheet for all the years of the project. The information it provides concerning the evolution of the financial structure has been briefly described in the paragraph dealing with diagnosis (§ F.1).

F.2.6. Evaluation of the returns on investment

The procedures and criteria indicated in the chapter on "basic techniques" are also applicable, based on sequences provided by the profit and loss account and the source and application of funds statement.

The principal efficiency indicators deal with general economic characteristics (e.g., rate of added value) and with productivity (e.g., return on labour). The values of these indicators depend on the nature of the activities and are thus difficult to compare from one field to another.

Investment returns, which measure the project's impact, must be calculated using the *incremental flows* generated by the project. If the organisation studied pursues activities in the absence of the project, one should also draw up the *incremental* profit and loss account and the *incremental* statement of source and application of funds. In the opposite case, these accounts already represent the incremental flows.

The procedures and criteria indicated in the "basic technique" (§ 3.3.2) are also applicable to the profitability calculation of organisations using accounting. The favoured criteria are hence those of the payback period, the benefit-cost ratios (such as return on the monetary unit invested and the relative rate of enrichment), the net present value[1] and the internal rate of return.

Note: Financial return on investment can be more accurately evaluated when the value of the IRR diverges strongly from the opportunity cost of capital (financial market rate), or when the sequence of the annual balances changes signs several times, by computing a "modified rate of internal return" (§ E.5).

In the final analysis, it is possible to distinguish several types of investment returns depending on the partner involved:

_____

(1) For the discount rate, the return rate offered by the financial market reduced to *constant prices* is generally used; it expresses the opportunity cost of capital.

- **return on equity**:

  benefits = annual cash flow – taxes – profit attributable to shareholders

  costs   = equity invested

- **return to shareholders**:

  benefits = dividends collected annually + accumulated cash flow from
  the previous year (including salvage value of investments +
  recovery of working capital)

  costs   = capital contributions

A **sensitivity analysis** enables one measure the robustness of the results obtained and thus the risk run by the different contributors of capital. If necessary, it can include the sensitivity of the results to changes in tariff policy.

F.3. SUMMARY OF PROCEDURE FOR THE FINANCIAL ANALYSIS OF FIRMS AND AGENCIES USING ACCOUNTING

The diagram below illustrates the way in which the financial analysis of entities using traditional business accounting is carried out.
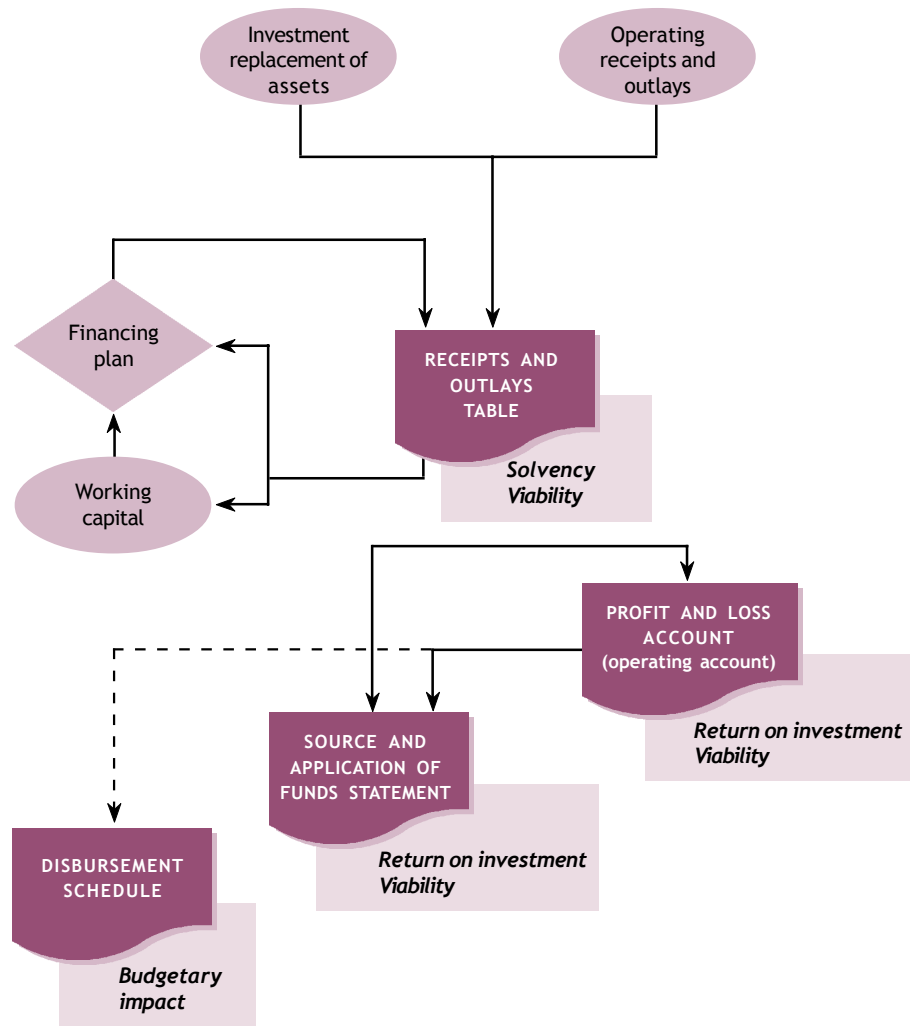
Figure F.1. *General procedure for the financial analysis of an entity using business accounting*

ANNEX G

USE OF NATIONAL ACCOUNTS TABLES
FOR THE BACKWARD LINKAGES
IN THE PRODUCTION CHAIN

G.1. USE OF THE INPUT-OUTPUT TABLE

The Input-Output Table (IOT) is a table describing the flows of resources and uses of all the revenues during the course of one year. The two main parts of the IOT from the standpoint of project evaluation are:

- the Intermediate Uses Table, IUT[1], in which the subsectors' are show in columns and their intermediate goods and services in lines. This table is thus read vertically. Considering that the names of the subsectors and those of the intermediate goods and services are identical, this table is "square";

- the breakdown of the Value Added created by the subsectors, situated "below the IUT".

The sum of the cells of each column is thus equal to the overall value of the subsector's production.

☞   Figure G.1.

The "input-output coefficient matrix" is obtained from the IUT, by expressing subsector values as percentages of the production value. These percentages give the "average content in intermediate goods and services" of a unit of output of the subsector – using actual prices.

In order to be able to use the IOT for the effects calculation, it is necessary to distinguish – within the IUT – between the local intermediate goods and services and those which are imported: an "import-based IOT" is thus constructed. For this, a line is added showing the foreign currency costs of the imported intermediate goods and services per subsector, as well as another line for related import taxes and customs tariffs.

Using matrix algebra it is then possible to calculate the total import and value added rates – as well as their components. In practice, in those countries where a recent import-based IOT exists, the total rates are generally available; should this not be the case, their calculation, while formally simple, should be done by a specialist.

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(1) Sometimes known as the Intersectoral Exchange Table or "Léontief Matrix".
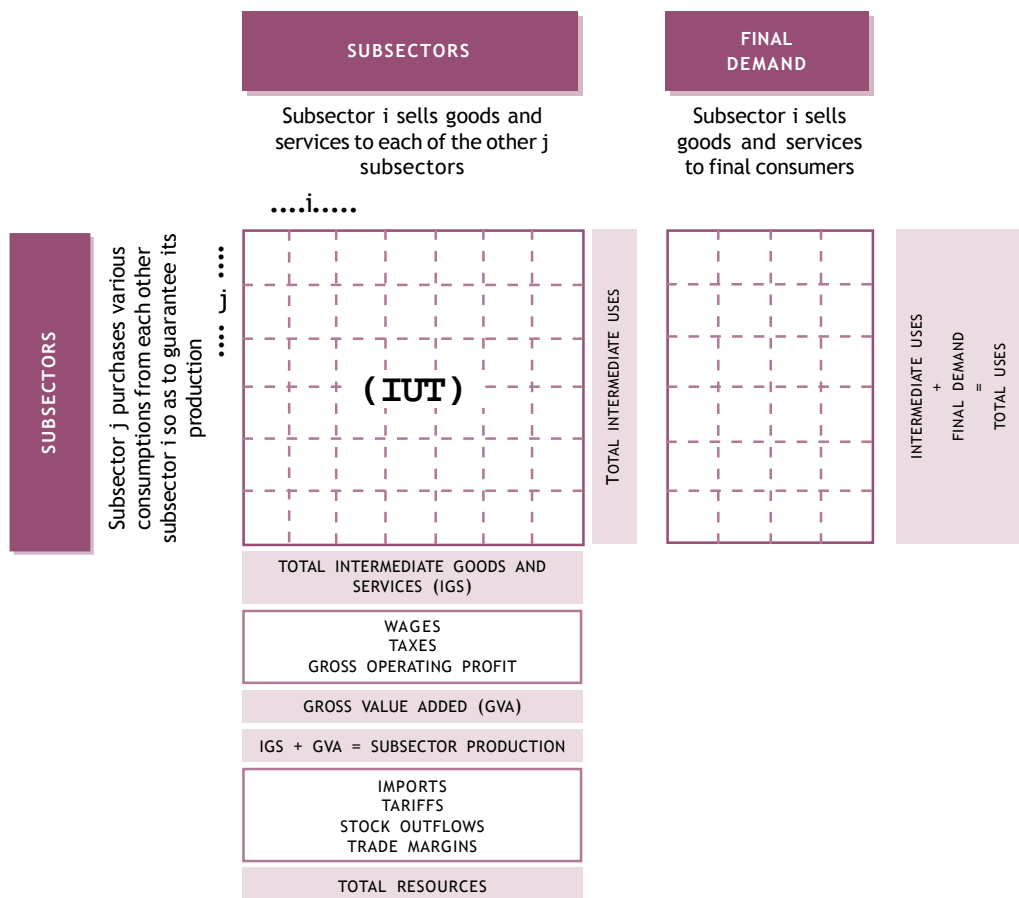
Figure G.1. *Structure of an Input-Output table*

THE MATRIX ALGEBRA OF THE TOTAL RATES

Let A be the input-output coefficient matrix obtained by dividing all the cells of each IUT column and of the lower table by the total production of the corresponding subsector.

The resource-use equilibrium conveyed by the "import-based IOT" can be written in the following form:

Domestic product = IGS + Final demands on domestic product

$$X = AX + Y$$

where: X is the vector column of the local productions of each good or service

Y is the vector column of the final demands in local goods and services.

$$\text{Let: } X = (I - A)^{-1}. \, Y$$

where: $(I - A)^{-1}$ designates the opposite of the matrix $(I - A)$, I being the unit matrix.

In an *ex-ante* analysis, this relation expresses the increase in local production X needed to satisfy a new local demand Y, assuming this new demand does not change the structure of the production. In an *ex-post* analysis, it expresses the average contribution of local production to the satisfaction of the local demand Y.

Put another way, the matrix $(I - A)^{-1}$ indicates per subsector (in columns), the average use of local intermediate goods and services per monetary unit of the subsector's revenue, taking into account all backward linkages.

Knowing the import rates of the direct value added in local production, it is possible to infer from them:

- the imports connected to the local production considered:

$$m.X = (I - A)^{-1}. \, Y$$

where: m is the vector-line of the direct import rates (the "imported IC" line added to the initial IUT);

- the creation of value added generated by this local production:

$$v.X = V \, (I - A)^{-1}.Y$$

where: v is the vector-line of the rates of direct value added (the line "Total VA" of the initial IOT).

The matrix multiplication:

$$m. \, (I - A)^{-1}$$

gives a vector-line of the "coefficient of total import" Cmi for each subsector i, in other words, of the direct and indirect imports generated on average by the production of a monetary unit from each subsector.

$$v. \, (I - A)^{-1}$$

gives a vector-line of the "coefficient of total value added" Cvaj for each subsector i, in other words, the sum of the values-added directly and indirectly created on average by the production of a monetary unit from each subsector.

G.2. USE OF THE SOCIAL ACCOUNTING MATRIX

This is another type of table which describes all the flows of an economy. In this square table, each line and column represents a particular account whose uses (in column form) balance its resources (in line form). The different accounts intersect with the following categories:

- ◆ production activities (or sectors);
- ◆ goods;
- ◆ factors of production (labour, capital, land);
- ◆ institutions (corresponding to major entity categories);
- ◆ capital (savings, investment);
- ◆ the rest of the world (balance of payments).

☞ Figure G.2.

The table [activities H goods] corresponds exactly to the IUT, whereas the operation accounts are again found in the tables [activities H factors] and [activities H institutions]. Nonetheless, in order to be useable, the social accounts matrixes must be modified so as to show the operation account of each subsector, as well as the import content of the IUT elements.

The steps used in the calculation of the included rates are thereby similar to those described for the use of an IOT.

	Outlays									
Receipts	1. Activities	2. Goods	3. Factors – Labour	3. Factors – Capital	4. Institutions – Households	4. Institutions – Firms	4. Institutions – Government	5. Capital account	6. Rest of the world	7. Total
1. Activities		Domestic sales					Exportation subsidies		Exportation	Production
2. Goods	Intermediate demand				Household consumption		Government consumption	Investment		Demand
3. Factors · labour · capital	Salaries Rents									Value added
4. Institutions · Households			Salaries	Distributed profits Non-distributed profit		Transfers	Transfers		Foreign income	Household income
4. Institutions · Firms							Transfers			Firm income
4. Institutions · Governments	Indirect taxes	Tariffs	Social security Taxes	Taxes on profits	Direct taxes	Taxes				Government income
5. Capital account					Household savings	Firm savings	Government savings		Capital transfer	Total savings
6. Rest of the world		Importation								Importation
7. Total	Production	Domestic supply	Factor income		Domestic expenses	Firm outlays	Government outlays	Total investment	Foreign currency receipts	

Figure G.2. *Structure of a social accounting matrix*

ANNEX H

EXAMPLES OF BUDGET STRUCTURES
FOR PROJECTS WITH NON-TANGIBLE PRODUCTS

Table H.1. *Support project to national road programme*

	CIVIL WORKS, BUILDINGS	EQUIPMENT	STUDIES	TRAINING	OPERATIONS	TECHNICAL ASSISTANCE	TOTAL
BUILDINGS • Workshop improvements • Building rehabilitation **EQUIPMENTS** • Material • Machines • Workshop equipment • General services equipment • Computer network, softwares **ROAD MAINTENANCE TEAMS** • Running costs of the teams • Spare parts • Technical assistance **TECHNICAL STUDIES** **INSTITUTIONAL SUPPORT** • Creation of National Road Maintenance Company • Working capital input • Training **PROVISIONS FOR CONTINGENCIES**							
TOTAL of which: National Investment Budget European Development Fund							

Urban infrastructures

Table H.2. *Electrification project*

	CIVIL WORKS, BUILDINGS	EQUIPMENT	STUDIES	TRAINING	OPERATIONS	TECHNICAL ASSISTANCE	TOTAL
ELECTRIFICATION • Diesel power station • Construction of medium voltage network • Construction of low voltage network • Upgrading of low voltage network **SUPPORTING MEASURES** • Project design • Electrical water pumps • Fixed price connections • Headquarter equipment **PROJECT OFFICE** • Investment • Operations • Technical assistance **FINAL APPRAISAL** **PROVISION FOR CONTINGENCIES**							
TOTAL of which: National Investment Budget European Development Fund							

Table H.3. *Support project to health sector*

	CIVIL WORKS, BUILDINGS	EQUIPMENT	STUDIES	TRAINING	OPERATIONS	TECHNICAL ASSISTANCE	TOTAL
PRIMARY HEALTH CARE PROGRAMME (NORTH AND CENTRAL REGIONS) • Regional directorates • General hospitals • Health centers, maternities • Social services • National Institute of Public Hygiene **SUPPORT TO ESSENTIAL DRUGS** • Central medical store headquater • District pharmacies • National direction of pharmaceutical services **TECHNICAL ASSISTANCE TO CENTRAL LEVEL** **PARTICULAR STUDIES** **PROVISION FOR CONTINGENCIES**							
TOTAL of which: National Investment Budget European Development Fund							

Support to small and medium enterprises

Table H.4. *SMEs Financing project*

	CREDIT FUND ALLOWANCE	EQUIPMENT	TRAINING	OPERATIONS	TECHNICAL ASSISTANCE	TOTAL
FUNDS FOR SMEs DEVELOPMENT • Credit line • Shareholding fund • Guaranty fund **LOGISTIC SUPPORT** • Vehicles • Office furniture • Generating unit • Data processing network **TECHNICAL ASSISTANCE** • Training • Short term advisory services **FUNCTIONING** • Local staff wages • Office rental • Transportation costs • Water, electricity • Telecommunication • Overheads **PROVISION FOR CONTINGENCIES**						
TOTAL						

SELECTIVE

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TABLES, FIGURES

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List of tables

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List of figures

N.B.: The first number indicates the chapter. Roman numerals indicate case study's figures.

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official exchange rate 166, 173, 186, 187
shadow exchange rate 65, 168, **172**, 183,
    190, 282

Export parity price **170**6**172**, 190, 191

> FOB border price less all the (before taxes
> and subsidies) internal costs (storage,
> processing, packaging, marketing, trans-
> port, loading) incurred between the place
> of production and the point of exit from
> the country.

Ex-post **situation**

> The situation after the end of the project.

Externalities 159, 160, **163**

> Consequences of all kinds of an entity's
> activities on other entities which are not
> included in the analysis.

F

Factor Cost Ratio (FCR) 188, *See Private cost
    ratio*

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Factors of production **18**, 176, 181, 263,
    342

Financial analysis 7, **11**, 24, Chapter 3 and
    Annex B, D, F

> Examination of activities and flows of
> resources of entities considered individu-
> ally (e.g., industrial or commercial firms,
> public institutions or family enterprises)
> or in groups (e.g., craftsmen, farmers,
> retailers).

Financial Charges (FC) 133, 135, 264, *See
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    rate of Return*

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Flow balance account 24, 56, 65, 70, 71,
    72, 94, 181, **292**6**293**

> Examination of all the flows, regardless
> of their nature (money or non money
> flows), at the moment (the year) in which
> they actually take place.

G

GDP *See Gross Domestic Product*

GNP 131

Government receipts and outlays schedule
    141, 239

Gross Domestic Product (GDP) 133, 280

Gross national product 133

Gross Operating Margin (GOM) XIX, 65,
    120, **263**, 332

> VALUE ADDED less external labour costs
> (wages) and taxes (except income tax). It
> includes the FINANCIAL CHARGES (inter-
> ests and insurance premiums, DEPRECIA-
> TION and the NET OPERATING PROFIT.

Gross Operating Profit (GOP) 113, **264**,
298, 327

> GROSS OPERATING MARGIN less FINAN-
> CIAL CHARGES (interests and insurance
> premiums. It includes DEPRECIATION and
> NET OPERATING PROFIT.

Gross value added **263**, 267, 297

I

IOT 118, 129, 342

Import 35, 134, 205, 208, *See also CIF*

Import parity price **168**6**170**, 190, 191

on all the operations involved, regardless of the date of their actual settlement.

Operating profit 112, 120, 133, 210, 297

Opportunity cost 13, **1646165**, 168, 175, 182, 253, 282

Value of a good or a service in its best alternative use.

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P

Parity price **164**, 173, 175, 179, 282, *See also Export parity price, Import parity price*

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Projects aiming to increase the production of goods and services for which a market exists (e.g., artisinal production) or whose price is not determined by commercial considerations but whose benefits can be "easiliy valued" (e.g., economic infrastructure projects).

Projects with tangible products 9, **11**

Projects whose "utility" cannot be valued in monetary terms without making 'major assumptions' or losing sight of their purpose (e.g., social projects).

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Operating costs not covered by users' payments.

Relative enrichment rate 70, 72, 95, **3086309**

Relevance 8, 14, 15, **212**, 241, 284

Review of the links between the project purpose, results and EFFECTS, on one

S

Price giving the real values of the goods and services for society as a whole, i.e. after adjusting market price for DISTORTIONS (and even taking into account some EXTERNALITIES). Shadow prices include EFFICIENCY PRICES and SOCIAL PRICES. Only the former are taken into account in this manual. They are measured by their OPPORTUNITY COSTS.

Shadow price of the national currency, i.e. measure of the real economic value of the currency for the national economy. Its calculation is complex thus estimates should be given to the analyst.

A general conversion factor used to adjust market price values of all NON-TRADEABLE GOODS AND SERVICES into international price equivalent. When FCS is used the OFFICIAL EXCHANGE RATE must be applied. It is estimated by dividing the latter by the SHADOW EXCHANGE RATE.

T

Sum of DIRECT EFFECTS and INDIRECT EFFECTS. *See also Analysis of effects*

Goods and services which could be traded on the international markets (exported or imported).

U

V

Value Added (VA) 90, 112, 115, **263**, 296

Value of output less the value of INTER-MEDIATE GOODS AND SERVICES. A measure of the wealth created by the productive process.

Variation of Consumption (VC) **126**, 132, 142, 206, 215, 279

Value of the variation of the quantities consumed between the WITH-PROJECT SITUATION and the WITHOUT-PROJECT SITUATION, without any price change.

Viability **8**, 157

The extent to which the results (i.e. the benefits) will continue beyond the end of the project.

Viability within the international economy
Chapter 6

Assessment of the VIABILITY taking into account the existing alternative of international markets, the actual return paid to domestic FACTORS OF PRODUCTION and national economic policies. *See also Analysis of the viability in the international economy*

W

With-project situation 19, **30**, 52, 121, 182, 226, 279

Situation resulting from the implementation of the project.

Without-project situation 19, **30**, 68, 121, 176, 177, 182, 226, 279

Situation most likely to occur if the project is not implemented. *See also Incremental effects*

Working capital **56**, 328, 333

Capital required as a result of the interval between the need for finance for production activities (e.g., raw material purchases, wages, stocks) and the receipts of revenues from sales. These funds are an INVESTMENT whose SALVAGE VALUE is completely recovered at the end of the life span of the enterprise.

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Manual —Financial and economic analysis of development projects: reference book for use in different ways according to the reader's initial knowledge and objectives. The methodology presented aims at providing decision-makers with essential financial and economic information on a project's effectiveness, efficiency, viability, effects and relevance. It starts with the identification of economic entities involved in the project and determination of the 'with' and 'without' project situations. For projects with tangible products, the analysis by entity (stake-holder) gives a picture of financing needs, returns on investment and financial viability. Economic analysis involves estimating a project's contribution to the achievement of major economic objectives through its effects on the national economy, and assessing its viability within the international economy. The profitability for society as whole, and a project's relevance to economic policy and structural reforms conclude this analysis. The last chapter deals with the analysis of projects with non-tangible products. Detailed annexes cover a number of fundamental concepts and methods.