Financial and Economic Analysis of projects

Syllabus
Basic training

EcoFin Helpdesk
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I. Introduction

Structure of the document

This document is the support to the training « financial and economic analysis of projects », it is a supplementary tool to the manual and other EcoFin tools. It is structured according to the seven EcoFin guidelines (see annex). The parts « questions to ask yourself » at the end of every chapter refer to the questions in the checklist (see also annex).

Objectives of the training

At the end of the training, the participants will have a good understanding of the EcoFin tools, they will be able to write Terms of Reference including the EcoFin topics and will be able to understand and interpret the financial and economic analysis carried out by consultants.

History and role of the EcoFin manual (Financial and Economic analysis of projects)

History
Published in French and English in 1997 by the Evaluation unit of the DG DEV
Published on the intranet since 1999 by the Evaluation unit of AIDCO on the site www.cc.cec/europaid/ecofin/main/index_en.htm

Role
The manual is the reference book of the European Commission for what concerns financial and economic analysis of projects. The manual explains in simple terms the different analyses that can be applied. It shows through a case study what can bring a financial and economic analysis.

Framework of the training

Financial and Economic analysis of projects

Financial
From the point of view of one entity…

…and Economic…
…and from the point of view of the society…
...analysis...
“...technique to understand, explain, measure and calculate...flows...in terms of costs and benefits that we can value (as far as possible), that we compare and combine ».

...of projects
A number of activities aiming at achieving a project purpose thanks to:
• Means (costs) in order to carry out
• Activities that lead to
• Results (benefits) aiming at achieving the project purpose

Definition of the project according to Project Cycle Management (PCM)
A project is:
• A set of activities and interventions such as: infrastructures, equipment, services, personnel, etc.
• in a given location and over a set period of time following a calendar and a programme,
• calling on multiples operators, autonomous in relation to each others,
• aiming at objectives defined in relation with needs,
• through the obtaining of explicit results;
• carried out by an appropriately organised institution,
• on the basis of total project costs encompassing all expenses,
• with the break down of that project cost in a financing proposal showing the financial contributions of all participants and donors,
• whose advantages, measured up in financial terms or not, are considered greater than their costs (RETURN),

Definition of the project according to Ecofin
A project is a set of activities and operations consuming limited resources (factors of production, intermediate goods and services) = COSTS from which we expect income or BENEFITS valued in monetary terms or not

How to have a Financial Analysis\(^1\) done?
 a) Cost-benefit analysis
 b) Cost-effectiveness analysis (define an indicator)

How to have an Economic Analysis \(^1\) done?

\(^1\) See guidelines and checklist

EcoFin Helpdesk – Basic training syllabus
a) Effects method
b) Shadow – pricing method
II. 7 guidelines: how to prepare and interpret an EcoFin analysis

1. Links with the Project Cycle Management (PCM)
2. Analysis of the main Entities (Stakeholders)
3. With and Without Project Situation / Alternatives
4. Quantifying Benefits, and comparing them to Costs
5. Financial and Economic Analysis (Narrow or Wider Perspectives)
6. Assumptions and Risks
7. Overall Assessment of the Project
Guideline 1: Links with the Project Cycle Management (PCM)

1.1. Introduction

- The first step in Financial & Economic Analysis is to place it in context and in relation to the Logframe (the logical framework).
- F & E Analysis is only one of the relevant forms of analysis among others:
  - institutional
  - political
  - environmental
  - social
  - and gender issues
- It can be used to make project definition more precise
- It can define:
  - the problem to be solved
  - the necessary inputs
  - the expected results
  - the degree to which the specific objective ('project purpose') is expected to be achieved.
- It may also be useful to determine by how much the project will contribute to the achievement of the overall objective.

1.2. Links with the Project Cycle and the Logical Framework

- Place of EcoFin in the project cycle
- Projects with tangible and non – tangibles benefits
- Evaluation criteria
- Other decisional parameters
1.2.1. Some definitions

a) Ex-ante and ex-post

Ex-ante: before the implementation of the project
Ex-post: after the end of the project

b) Content of the identification phase

The identification includes:
- the analysis of the sector and the sector policy
- the analysis of the local context
- the insertion of the project in the sector policy
- the analysis of the partners
- the analysis, in a participative way, of the problem and the solution
- the first draft of the project
- the first draft of the logical framework (including means and costs)
- the costs - effectiveness analysis

---

2 Contenu provisoire en ligne avec l’exercice en cours des révisions du PCM
The identification report summarizes the analyses and provides the ToR for the feasibility study.

c) The feasibility study

The feasibility study includes:
- the feasibility studies: technical, social, organisational, institutional, environmental, financial and economic
- the description of all the activities of the project
- the organisation of the project
- the total cost on the project’s life
- the financing scheme (EU contribution, other donors, stakeholders)
- estimate of the sustainability, the financial and economic efficiency of the project and its insertion in the specific economic context
- verify that cross-cutting issues and EU policy were taken into account

1.2.2. The Logical Framework

Figure 2: The logical framework

<table>
<thead>
<tr>
<th>Overall objective</th>
<th>Intervention logic</th>
<th>Objectively verifiable indicators</th>
<th>Sources of verification</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Purpose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activities</td>
<td>Means</td>
<td>Costs</td>
<td></td>
<td>Pre-conditions</td>
</tr>
</tbody>
</table>
1.2.3. Projects with tangible products

Tangible products are products which can be valued in monetary terms. “Such projects aim to increase the production of goods and services:

- which are sold or not but for which a market exists;
- which are provided without direct payment by beneficiaries, or whose price is not determined by commercial considerations, but whose benefits can be “easily valued”. (see manual p.9)

1.2.4. Projects with non tangible products

“Non tangible products are 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 purpose.” (See manual p.9)

N.B.: What is not valuable today could be valued tomorrow. In a “historic” scale of time, everything should be valuable.

1.2.5. Criteria to apply in the Project Cycle Management

**Relevance**
The extent to which the aid intervention is suited to the priorities and policies of the target group, partner country and donor

**Effectiveness**
A measure of the extent to which the results contribute to the purpose

**Efficiency**
Efficiency measures the outputs – qualitative and quantitative – in relation to the inputs. It is a term which signifies that the aid uses the least costly resources in order to achieve the desired results. This generally requires comparing alternative approaches to achieving the same outputs, to see whether the most efficient process has been adopted

**Impact/Effects**
The positive and negative changes produced by an intervention, directly or indirectly, intended or unintended.

**Viability/Sustainability**
To what extent the production of the advantages produced by the project can continue beyond the external support in means and funding.

1.2.6. Other criteria for decision making

EcoFin is only one criterion among others!
  - technical,
  - social,
  - environmental
  - institutional,
  - political...

1.3. Questions to ask yourself

- Can the key problem the project seeks to resolve be quantified / valued in monetary terms? Has it been?

- Does the Project Purpose (- see PCM Manual) correspond to the problem? Can it be quantified / valued in monetary terms? Has it been?

- Can the Overall Objective be reached by the project? By How much?
Guideline 2: Analysis of the main Entities (Stakeholders)

2.1. Introduction

- The second step of the Financial and Economic Analysis is to determine which are the entities or 'Stakeholders', and analyze their interests in the project.

- When should the entities / stakeholders be identified? Stakeholder’s analysis should be done during the identification of the project

- Which entities? A project may involve a vast number of entities whose interests cannot all be analysed. The beneficiaries should come first, followed by the other major entities (e.g. ministry, government…) significantly affected by the project. The main entities should be analysed separately. This means that separate cash flows need to be presented. Beneficiaries who behave very differently economically may have to be divided in groups.

- The project may have to be redesigned in order to avoid a blockage if one of the target groups may lose from the project.

- This analysis should make it clear if the project will face solvency problems during the financing period by the Donor, or sustainability problems once the financing has ceased

Briefing consultants on this before they undertake a feasibility study will definitely improve its quality.

2.2. Analysis of the main Entities

The implementation of projects is based on economic entities. Economic entities are either individuals (e.g. artisans, farmers, tradesmen, consumers) or legal entities (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 and the consumption of goods.

2.2.1. Entities

“Economic entities are either individuals, group of individuals (artisans, farmers, tradesmen, consumers, retailers, etc) or legal entities (industrial or commercial firm, banks, government agencies, development agencies, public institution, etc) 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”. (See manual p.18)
The stakeholders can modify or be modified by the process or the products of the projects or programmes, directly or indirectly, positively or negatively.

They develop their own strategy (convergent, divergent or contradictory)

2.2.2. Flow

The approach to project/programme analysis is based on the study of flows of goods, services and money among economic entities:

**Figure 3 : Exchanges of flows between an entity and its environment**

2.3. Questions to ask yourself

- Have all the main entities (stakeholders) significantly affected by the project been identified – i.e. the planned beneficiaries, as well as other groups which may be significantly affected?

- If doubts exist as to any stakeholders net benefits (that is do all entities benefit more from the project than it will have to contribute for?), have they been analysed separately (i.e. separate cash flows been prepared)?

- Is it clear that no stakeholders will face solvency problems during the funding period, and that the project benefits are sustainable in the long term? The issue at stake is ability to meet costs (in particular recurrent costs).
Guideline 3: With and Without Project Situation / Alternatives

3.1. Introduction

The third step of the EcoFin analysis is to define the “with project” and the “without project” situations.

Defining the “without” project situation involves a degree of arbitrary judgement, but helps to define what the additional benefit of the project is.

The “without project” situation is not the “before project” situation, because without EU financing, the situation would anyway change over time.

The logframe focuses on the “with project situation”, which is correct as one first has to check the internal logic of the project.

The “with project” and “without project” situations should be quantified over the full life of the project - which is not the duration of the project activities (inputs), but usually the expected “life” of the benefits generated by the project.

One should avoid presenting a picture of only one part of the project.

The “incremental situation” is the “with project” minus the “without project” situation. In the end the project should generate more net benefits (benefits minus costs) than without the project – i.e. the incremental situation should be positive.

The three situations (with, without and incremental) should be summarised in three cash flows. Consultants should not derive the incremental situation directly, as there is a risk of omitting some elements.

The ‘with project’ situation should be compared with relevant alternative options which should be adequately quantified. Justification should be given for the preferred option.

3.2. With and Without Project Situation

It is important to distinguish the « with-project » situation and the « without-project » situation.

The « without-project » situation is that which is most likely to occur if the project is not implemented.

The EcoFin analysis must be performed on the incremental situation that is the difference between the « with-project » situation and the « without-project » situation. This difference measures the real contribution of the project/programme.
In the EcoFin analysis, the « with-project » situation and the « without-project » situation have to be compared. NOT the “before-project” and “after-project” situations since the latter does not take account of evolution over time.

**Figure 4 : Benefits increasing independently from the project**

**Figure 5 : Benefits decreasing independently from the project**

**Figure 6 : Example A: Building of schools**
The financial analysis requires:
- Reviewing for every entity its flows resulting from activities « with » the project
- Reviewing for every entity its flows resulting from activities « without » the project
- Reviewing for every entity its incremental (or additional) flows (with – without)

Alternatives
Definition: An alternative to the project aims at the same project purpose like the initial project but uses other means and implements other activities than the initial project.

On should avoid reducing too quickly the number of potential alternatives to take into account while preparing a project.

Carry out an EcoFin analysis for every alternative taken into account.
According to the PCM phase, the level of alternative can be different as shown in the following table:

<table>
<thead>
<tr>
<th>Phase in the PCM</th>
<th>Level of alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming</td>
<td>Sector</td>
</tr>
<tr>
<td>Identification</td>
<td>Geographical area, target group, alternative</td>
</tr>
<tr>
<td>Formulation</td>
<td>Detailed concept</td>
</tr>
<tr>
<td>Financing</td>
<td>Financial scheme</td>
</tr>
</tbody>
</table>

3.3. Questions to ask yourself

- Have the without project, with project and incremental ('with project' minus 'without project') situations been summarised in 3 separate cash flows?
- Do alternatives exist and were they analysed in sufficient detail?
Guideline 4: Quantifying Benefits, and comparing them to Costs

4.1. Introduction

The core of financial and economic analysis is to put a monetary value on costs and benefits. Costs are usually known, but some benefits may not have a price, and can be difficult to value (= "non-tangible"). This is the case of many projects, notably in the social sectors.

4.1.1. Cost-benefit analysis

The Cost - Benefit analysis is used to value projects with tangible benefits; and Cost – Effectiveness analysis to analyse projects with non-tangible benefits.

Cost-Benefit or Cost-Effectiveness?

In no case should one assume that because some benefits are non-tangible, no financial and economic analysis is possible.

As most projects include a mixture of tangible and non-tangible benefits, both types of analyses should normally be done.

Even projects with tangible benefits should be submitted to cost - effectiveness analysis, to make sure that unit costs are reasonable compared to similar projects.

Cost - Benefit Analysis:

• values benefits by direct calculation e.g. extra production of rice X value per tonne (- extra production costs, + other benefits………….); or by proxies: i.e. indicators or representative factors which give a more or less reliable value e.g. in a road project, reduced vehicle operating costs (VOC) are relatively easy to estimate.
• includes 'Cost recovery' (contributions by users to pay for services) in calculating costs, cash flows, solvency and sustainability. It is important to compare such costs with household incomes or any similar statistics to verify affordability.
• allows calculating profitability criteria that show the proportion between costs and benefits, and can be used to choose between various possible projects or components.

4.1.2. Profitability Criteria

1. The **payback period** is the time needed to recover the investment (not discounted)

2. The **NPV** is the Net Present Value of the project, using a defined discount rate (rate of loss of value of money over time or opportunity cost of capital). It is an absolute figure,
an amount that can be compared to the return (NPV) of other investments of the same amount. If alternative projects require investments of different sizes, it is recommended to divide the NPV of each project by the discounted investment, so as to allow comparisons between these projects.

3. The **IRR** (Internal Rate of Return) is the discount rate that makes the NPV equal to zero. In other words, the IRR should at least be above the opportunity cost of capital in the country where the project takes place.

Both the IRR and the NPV should be calculated, as they do not provide the same information.

**Cost - Effectiveness Analysis:**

- analyses non-tangible benefits which cannot be valued in monetary terms by direct calculation or by proxies
- focuses on costs per unit of benefit, and compares them with comparable costs elsewhere - e.g. comparing the cost of vaccinating one person, or of one bed-night in hospital, or of a child’s schooling for one year, in the project area; with the costs elsewhere in the country, in neighbouring countries, or even, in certain cases, regionally or world-wide.
- is usually specific to a sector, since comparisons are normally only possible within a sector (health, education…) and not between sectors.

4.2. Quantifying Benefits: Cost-benefit and cost-effectiveness analysis

**4.2.1. Cost – Benefit Analysis**

*a) Introduction*

Analyse a project consist of comparing the use of resources (= costs) to the future income (= benefits) spread over time.

**Financial Analysis**
The financial analysis involves examining the activities and resource flows of entities (individual or group)
Comparison COSTS/ BENEFIT and COSTS/ EFFECTIVENESS from the standpoint of the agent

**Economic Analysis**
The economic analysis involves examining the activities and resource flows among group of entities and their impact on the society as a whole
Comparison COSTS/ BENEFIT and COSTS/ EFFECTIVENESS from the standpoint of the society as a whole

b) Financial Analysis

Objectives
• 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
• Provide a sustainable financing schedule and organize the financial contributions (sector approach)

The financial analysis requires:
• Reviewing for every entity its flows resulting from activities « with » the project
• Reviewing for every entity its flows resulting from activities « without » the project
• Reviewing for every entity its incremental (or additional) flows (with – without)

c) Methodology

The 8 steps of the methodology are:
1. period of analysis
2. investment costs
3. operating costs
4. recurrent costs
5. benefits
6. cash flow statement
7. taking time into account (discounting)
8. analysis of the internal efficiency of the project

Period of analysis

Criteria used to determine the period of analysis:
• technological obsolescence
• technical and economic lifetime for the most expensive items in the project
• biological life cycle
• market life cycle (or demand period, position in the product cycle)
• the possible use of raw materials
• the cycle in the sector
• the buildings’ and equipment’s lifetime
• the other possible investments
• the administrative constraints (urban planning)
It is fundamental that the chosen period of analysis of the project should be linked to the period of analysis of other similar projects.

**Why determine the period of analysis?**
- Because the choice of the period of analysis has an impact on the efficiency
- Because it determines the necessary resources for the investments that will be necessary at least during the period of analysis
2. Investment costs

Figure 9: Schedule of the initial investment for the farm (in thousands of NMU – in constant prices) (page 77 in the manual)

<table>
<thead>
<tr>
<th>Years</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feasibility studies</td>
<td>145</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical assistance, training</td>
<td>90</td>
<td>120</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal and project-management charges</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation, trials</td>
<td></td>
<td></td>
<td></td>
<td>585</td>
<td></td>
</tr>
<tr>
<td>Interest during construction</td>
<td>0</td>
<td>0</td>
<td>328</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed capital investments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sites</td>
<td>1200</td>
<td>1200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development (civil engineering)</td>
<td></td>
<td>2017</td>
<td>2017</td>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>3182</td>
<td>2832</td>
<td>2402</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicles and wheeled equipment</td>
<td></td>
<td>350</td>
<td>780</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planting</td>
<td>936</td>
<td>936</td>
<td>936</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total baseline cost*</td>
<td>1485</td>
<td>7455</td>
<td>7021</td>
<td>6135</td>
<td></td>
</tr>
<tr>
<td>Provisions for physical contingencies**</td>
<td>74</td>
<td>373</td>
<td>351</td>
<td>307</td>
<td></td>
</tr>
<tr>
<td>TOTAL COST***</td>
<td>1559</td>
<td>7828</td>
<td>7372</td>
<td>6442</td>
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</tbody>
</table>

* Not including WC and interest during construction
** Provision = 5%
*** Not including WC but including interest during construction

Investments
1) Start-up investments (pre-production charges)
2) Investments made during the course of operation of the project (fixed capital)

Investments are expresses in constant prices (i.e. eliminating the effects of inflation).

Provisions for contingencies
Two kinds of contingencies can be distinguished:
- Provision for physical contingencies
- Provision for financial contingencies

To allow for these physical and financial contingencies, a percentage of the initial total cost estimate, usually between 5 and 15% is generally used. Contingency provisions are
thus determined by the probable range of uncertainty. They should not be used as a substitute for inadequate technical preparation.

Generally, provisions apply only to investment costs and not operating costs. Provisions should be a specific item in the cash flow table.

« In kind » contribution
The in kind contributions are non-money flows which are recorded at their appropriate market value

Replacement of fixed capital
Depreciation comprises the non-cash expenses representing the loss in value over time of fixed investments as a result of wear and tear or obsolescence.

These non-cash (and not real) costs appear only in the operating account, never in the cash flow table or the flow balance account. As a consequence, depreciation are not included in the financial analysis.

Working capital
Working capital is another form of capital that comes from the « operating cycle », i.e. from the interval between outflows of money (input purchases) and inflows of money (product sales). Working capital (WC) is not Working Capital Requirement (WCR).

Salvage value
The salvage value is the likely selling price of the equipment at the end of the project and is introduced into the cash flow table in the beginning of the year following the end of the project. The salvage value is often recorded negatively on the investments outlays line.

Sunk costs
These are the costs involved (e.g.: investment of a previous project) which disappear when comparing with and without situations.

3. Operating costs

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.

4. Recurrent costs

Recurrent costs are costs which occur through the project’s life, and which continue beyond the end of external financing.

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.

5. Benefits

Incoming flows/Benefits
Monetary benefits = Income (sales)
Non-monetary benefits = for projects with non-tangible products, the benefits can be expressed in quantitative terms

6. Cash flow statement

The cash flow statement is drawn up by recording all incoming flows (receipts/benefits) and outgoing flows (outlays/costs) in one table. Flows are classified by categories and by year.

- pre-financing cash flows
- post-financing cash flows
Figure 10: Pre-financing cash flow statement of the sugar farm (in thousands NMU in constant prices) (page 79 in the manual)

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</tbody>
</table>

* Not including interest during contribution
** Not including working capital

Payback period

- Time necessary to recover the investment (not discounted)
- Especially useful for an investor in the preliminary stages of project assessment
- Indicator of risk

Net Present Value (NPV)

The Net Present Value or total discounted net financial flows is the sum of all discounted flows during all project’s life.
- NPV = sum of present values of income less sum of present value of costs
- NPV measures in absolute term the profit generated by the investment
- Criteria for decision: accept projects with positive NPV
7. Taking time into account (Discounting)

« A bird in a hand is worth two in the bush ».
« A sum to hand today is worth more than the same sum available in the future ».

Why?

The time value of money in the financial analysis
The stakeholders prefer to receive the money today instead of receiving it tomorrow, even in a situation without inflation, because:

Risk:
- The future is uncertain
- Individuals have limited life expectancy

Opportunity cost of capital:
- Shareholders require profitability on their investments
- Interests are due on the bank loans
- The equity capital can be invested in a savings account in order to produce benefits

Discounting
Discounting is the computation technique that allows the analyst to take into account the preference for the present. It makes it possible to calculate the present value \( N_0 \) of a future sum \( N_t \) (and vice versa).

Present Value: \[ N_0 = N_t \times \frac{1}{(1+i)^t} \]

\( i \) = discount rate
\( t \) = the year

Discounting coefficient: \( \frac{1}{(1 + i)^t} \)
Figure 11: Calculation of present value from the consolidated cash flow (Table IV-I, see page 103 in the manual)

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<td>100,74</td>
<td></td>
<td>42,03</td>
<td></td>
<td>-0,12</td>
</tr>
</tbody>
</table>

Discount rate (i)

It is fundamental to discount at the SAME RATE the projects as well as the alternatives:

a) Private sector investments:
   = the cost of capital for a private company is usually the bank lending rate for private companies, if necessary increased by the “risk bonus”

b) Public sector investments
   • the average (or marginal) rate of return on the best possible alternative investments in the country (or in the sub sector), on financial savings abroad or the average not inflated cost on the national/foreign debt
   • real interest rate paid by the government on its national/foreign debt

This is the opportunity cost of capital for the public sector
Taking time into account

As a conclusion, discount rates are different from interest rates and from inflation rates: those are different concepts.

Interest rate
Bank interest rates are always nominal.
The real interest rates are nominal interest rates less inflation.
The real interest rates cannot be observed but can be calculated.

Nominal and real interest rate
We use the real interest rate that is the cost of money less the increase in price. Negative real interest rates are possible (see good governance)

Example in Vietnam (1995)
Nominal long-term interest rate = 18%
Inflation rate = 10%
Real interest rate = 8%

Example in the former-Zaire (1989)
Nominal long-term interest rate = 48%
Inflation rate = 69%
Real interest rate = -21%

Terminology
Reference Year
Possibilities: It is essential that the same reference year should be used for all the projects that have to be compared otherwise comparisons are not acceptable

First year of cash flow
• Use Year 0 if the incoming and outgoing flows of the first year do not need to be discounted (i.e. for flows of the beginning of the year)
• Use Year 1 if the incoming and outgoing flows of the first year need to be discounted (i.e. for flows of the end of the year)
• The manual always uses Year 0

8. Analysis of the internal efficiency of the project

Net Present Value (NPV)
Advantages:
• correct ranking of variants (alternatives)
• easy to understand
**Drawbacks:**
- there is no objective procedure to determine the discount rate
- does not take into account the size of the project
- does not rank correctly projects with budget constraints (use NPV / Discounted Investment as alternative tool for measuring)

**Internal Rate of Return (IRR)**

$$\text{IRR} = \text{discount rate for which NPV is equal to 0}$$

$$= \text{discount rate where the present values of income equal present values of outcome}$$

The « internal » rate of return means the intrinsic rate of the project, it means without any tax and financial considerations

There are three ways to calculate this rate:
- graphically
- arithmetically
- with the computer

**Arithmetically**

$$\sum \frac{Benefits}{(1+r)_t} =$$

$$\sum \frac{Investment costs + operating costs}{(1+r)_t}$$

Mathematically, the IRR is the square root of a N level equation hard to calculate. We proceed by trial and error.
Figure 12: Net Present Value (NPV) of two projects in relation with the discount rate

Net Present Value (NPV) of two projects in relation with the discount rate

Measures the efficiency of the capital used

Criterion:
- compare the IRR to the real interest rate
- accept projects for which the IRR is higher than opportunity coast of capital / reference discount rate

Advantages:
- no need to determine the discount rate exogenously
- easily understood and accepted

Drawbacks:
- does not measure the benefits in absolute terms
- favours project with quick payback (even they don’t last very long)
4.2.2. Cost-effectiveness analysis

a) When should we carry out a cost-effectiveness analysis?

Can all benefits be valued in monetary terms?
- Yes ⇒ Cost – Benefit analysis
- No ⇓

Can benefits partially be valued in monetary terms?
- Yes ⇒ Cost – Benefit analysis
- No ⇓

The benefits are provided for free but contribute to new income generating activities easy valued in monetary terms? (ex. roads: vehicle operating costs)?
- Yes ⇒ Cost – Benefit analysis
- No ⇓

Benefits cannot be valued in monetary terms but but can be quantified and summarised in one main relevant indicator for the whole project?
Yes ⇒ Cost – Effectiveness analysis

b) Definition

Cost-effectiveness analysis is used to analyse project with non-tangible products. It assesses the project with one measurement (quantitative) supposed to reflect the project purpose. This unique project measurement is called “indicator of benefit”

The main difference with cost-benefit analysis is that the benefit of the project is expressed in physical units and not in monetary terms.

c) Definition of an “indicator of benefit”

The approach illustrated in the case studies identifies on single indicator of benefit by project. This indicator of benefit is supposed to reflect the project globally.

---

3 One can nevertheless implement as many cost-effectiveness analyses as there are identified indicators, and even carry out a multi-criteria analysis, limited only by time and budgetary constraints.
The identification of a relevant indicator of benefit for the whole project is a hard but crucial task. These indicators are specific to every sector. One can compare only projects in the same sector. (See also the manual p.224-225)

d) Calculation of the costs by indicator of benefit

The tools used are the same than in the cost-benefit analysis:

- Preparation of a « cash-flow » table
- Discounting
- Sensitivity analysis

The difference with projects with tangible products is that the benefit is described in quantitative terms in the cash-flow table. The cost by unit of benefit can then be calculated.

Be careful; discounting of benefits can be argued. Example: Health Case study

Cost-effectiveness can be used only to compare projects of the same kind. It cannot be used as such to programmes with multiple goals.

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.

One can assess the project’s efficiency by comparing the costs and benefits with:

- standard indicators if they exist,
- results of similar projects in the same country, closed or still implemented, (database under construction)
- results of similar projects in other countries of the same sub-region, comparable to the ones of the country studied (database under construction)

e) Analysis of the sustainability and efficiency of projects with non-tangible products

Is the project sustainable?
- budget plan (cash-flow statement for each economic entity taking part in the project);
- tariffs and charges ;
- financing of recurrent costs (Is the financing of the project’s new activities really assured for the entire project duration and beyond ?)

Is the project efficient?
the resources employed by the project produce the benefits desired at the least possible cost?
- examination of unit costs (see p. 234 database under construction)

Figure 13: Financial Analysis of Consolidated Entity Flows: Discounting of the Incremental Costs and Population Covered

<table>
<thead>
<tr>
<th>Project Years</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TOTAL INCREMENTAL COSTS '000 Euros</td>
<td>677</td>
<td>816</td>
<td>559</td>
<td>313</td>
<td>386</td>
<td>279</td>
<td>201</td>
<td>164</td>
<td>253</td>
<td>125</td>
<td>46</td>
<td>2</td>
</tr>
<tr>
<td>2. DISCOUNTING TOTAL INCREMENTAL COSTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discount Factors 8%</td>
<td>1.000</td>
<td>0.926</td>
<td>0.857</td>
<td>0.794</td>
<td>0.735</td>
<td>0.681</td>
<td>0.630</td>
<td>0.583</td>
<td>0.540</td>
<td>0.500</td>
<td>0.463</td>
<td>0.429</td>
</tr>
<tr>
<td>Discounted Value 8% '000 Euros</td>
<td>677</td>
<td>756</td>
<td>480</td>
<td>249</td>
<td>284</td>
<td>190</td>
<td>127</td>
<td>96</td>
<td>137</td>
<td>62</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>Total Discounted Value 8% '000 Euros</td>
<td>3,078</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. ADDITIONAL POPULATION COVERED</td>
<td>114</td>
<td>587</td>
<td>810</td>
<td>788</td>
<td>677</td>
<td>617</td>
<td>490</td>
<td>415</td>
<td>272</td>
<td>130</td>
<td>48</td>
<td>0</td>
</tr>
<tr>
<td>Discounted at 8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discount Factors 8%</td>
<td>1.000</td>
<td>0.926</td>
<td>0.857</td>
<td>0.794</td>
<td>0.735</td>
<td>0.681</td>
<td>0.630</td>
<td>0.583</td>
<td>0.540</td>
<td>0.500</td>
<td>0.463</td>
<td>0.429</td>
</tr>
<tr>
<td>Discounted Value 8% '000 persons</td>
<td>114</td>
<td>543</td>
<td>695</td>
<td>625</td>
<td>497</td>
<td>420</td>
<td>309</td>
<td>242</td>
<td>147</td>
<td>65</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Total Discounted Value 8% '000 persons</td>
<td>3,680</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cost / Additional person-year covered (Euro)</td>
<td>0.836</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analysis of unit costs of projects with tangible products

Projects with tangible products (entirely or partially) must of course also analysed in a cost-effectiveness analysis

Except from the cost-benefit analysis, one should check the unit costs for investments and operating costs.

Analysis of unit costs of projects with non-tangible products

How to proceed? Establish unit costs of the main cost categories and compare them to similar projects located in comparable regions.

Example: cost/km of rehabilitated road, cost/ha converted etc. (see also page 234).

While comparing, one should check the coherence of the data: are the projects really similar (i.e. type of surface, width of the road…).
4.3. Questions to ask yourself

• Have the cash flows been done in constant, market prices (= without inflation)?

• Have the cash flows been established for the full estimated duration of the benefits, and not only for the period of project financing?

• Have all costs been included in the cash flows? - including recurrent costs, cost recovery mechanisms, in kind contributions, working capital requirements?

• Can some or all benefits be quantified / valued in monetary terms?

• If some benefits cannot be directly valued in monetary terms, can proxies be used (e.g. vehicle operating cost savings or willingness to pay)? If so, has a cost/benefit analysis been performed?

• If yes, have the usual profitability criteria been calculated through a Cost/Benefit analysis (NPV, IRR, payback period,…)?

• If most benefits cannot be valued either directly or using proxies, what indicator of benefit can be defined (OVI) to compare with costs (Cost Effectiveness analysis)? Are such ratios reasonable in comparison with similar projects elsewhere?

• Have the main unit costs been assessed for all projects (be they tangible or not)?
Guideline 5: Financial and Economic Analysis (Narrow or Wider Perspectives)

5.1. Introduction

Financial and Economic analyses have different perspectives or points of view: Financial analysis involves examining the activities and resource flows of the main entities (Stakeholders) or groups of entities separately. Economic analysis involves examining the impact on society (the economy) as a whole.

Financial Analysis calculates the incentives for the main stakeholders, checks the solvency and longer-term sustainability of the project, and helps to design possible cost recovery mechanisms. It prepares the ground for an Economic Analysis, when the cash flows of the stakeholders are consolidated into a single cash flow.

Economic Analysis also provides valuable information on the contribution of the project in the international context as well as domestic effects in the economy.

Before conducting such Economic analyses, one should think on which issues are crucial for the success of the project.

Before asking for an economic analysis, especially for the application of the effects method, one should first try to determine what data is available as well as how much time and funding such an analysis would require.

5.2. Differences between financial analysis and economic analysis

5.2.1. Consolidation of all stakeholders
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.

**a) Method**

- First of all, describe exchange flows between the entities as a group by eliminating the « double counting »,
- Then, check the financial equilibrium and the project’s overall viability,
- And finally, calculate its effectiveness in terms of the productivity of the resources employed, and the overall return on invested capital

**b) How to consolidate?**

To consolidate, one puts the set of inflows and outflows recorded in the accounts of the individual entities in a single table. Then, we eliminate the flows corresponding to transfers between these entities. And finally, we check the reliability of the information.
Figure 15: Consolidated account for the rice sector in 1996 (USD/ton of paddy)

<table>
<thead>
<tr>
<th>Uses</th>
<th>Resources</th>
<th>Uses Percentage</th>
<th>Resources Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilisers</td>
<td>Rice</td>
<td>20.14</td>
<td>135.73</td>
</tr>
<tr>
<td>Pesticides</td>
<td>By-products (reprocessing)</td>
<td>5.62</td>
<td>20.92</td>
</tr>
<tr>
<td>Energy</td>
<td>By-products (collectors 1)</td>
<td>6.16</td>
<td>17.43</td>
</tr>
<tr>
<td>Seeds</td>
<td>By-products (paddy fields)</td>
<td>7.58</td>
<td>0.45</td>
</tr>
<tr>
<td>Packaging</td>
<td>By-products (producers)</td>
<td>2.3</td>
<td>0.22</td>
</tr>
<tr>
<td>Abrasives</td>
<td></td>
<td>0.38</td>
<td>0.8%</td>
</tr>
<tr>
<td>Spare parts</td>
<td></td>
<td>0.18</td>
<td>0.4%</td>
</tr>
<tr>
<td>Ship maintenance</td>
<td></td>
<td>0.32</td>
<td>0.7%</td>
</tr>
<tr>
<td>Equipment maintenance</td>
<td></td>
<td>0.4</td>
<td>0.8%</td>
</tr>
<tr>
<td>Quality control</td>
<td></td>
<td>0.18</td>
<td>0.4%</td>
</tr>
<tr>
<td>Transport</td>
<td></td>
<td>2.13</td>
<td>4.4%</td>
</tr>
<tr>
<td>Stocking</td>
<td></td>
<td>0.59</td>
<td>1.2%</td>
</tr>
<tr>
<td>Transport costs</td>
<td></td>
<td>2.13</td>
<td>4.4%</td>
</tr>
<tr>
<td>IGS</td>
<td></td>
<td>48.11</td>
<td>100.0%</td>
</tr>
<tr>
<td>Salaries</td>
<td></td>
<td>24.09</td>
<td>19.0%</td>
</tr>
<tr>
<td>Financial charges</td>
<td></td>
<td>5.14</td>
<td>4.0%</td>
</tr>
<tr>
<td>Tax</td>
<td></td>
<td>7.89</td>
<td>6.2%</td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td>6.98</td>
<td>5.5%</td>
</tr>
<tr>
<td>NOP producers</td>
<td></td>
<td>69.36</td>
<td>54.6%</td>
</tr>
<tr>
<td>NOP collectors of paddy</td>
<td></td>
<td>4.71</td>
<td>3.7%</td>
</tr>
<tr>
<td>NOP village paddy field</td>
<td></td>
<td>2.18</td>
<td>1.7%</td>
</tr>
<tr>
<td>NOP raw rice collectors</td>
<td></td>
<td>1.54</td>
<td>1.2%</td>
</tr>
<tr>
<td>NOP reprocessing - export</td>
<td></td>
<td>5.08</td>
<td>4.0%</td>
</tr>
<tr>
<td>VA</td>
<td></td>
<td>126.97</td>
<td>100.0%</td>
</tr>
<tr>
<td>VA/Turnover</td>
<td></td>
<td>72.66%</td>
<td>Turnover 174.75</td>
</tr>
</tbody>
</table>
5.2.2. Economic analysis of projects

2 methods exist for the economic analysis of projects, from which one, the effects method will be only briefly explained in this syllabus:

- The effects method (see advanced course for more details)
- The shadow price method

5.2.3. Economic effects (summary)

a) Goal

The method aims at quantifying the real contribution of the project in the national economy or the sector of the national economy

b) Calculation of indirect effects

Figure 16: Calculation of indirect effects

EcoFin Helpdesk – Basic training syllabus 40
c) secondary effects

Direct and indirect effects are the primary phase of the project effects on the economy.

A secondary phase starts with the use of the total income generated directly or indirectly by the project.

Each of these entities earmarks its income either for consumption or savings. The new consumption of goods and services resulting from these flows create an incremental demand for production and imports (multiplier effect), savings allow an additional investment.

The secondary effects are hard to calculate and interpret. They will not be studied in this syllabus.
5.2.4. The shadow pricing method (International viability)

a) **Introduction**

The shadow price method evaluates if project costs are higher than benefits, just like in the financial analysis, but from the standpoint of the society.

The implementation of the project is simple but requires a strong macro-economic background.

The drawback is in fixing the shadow prices. Any adjustment must be economically justified.

b) **Theory**

In order that prices and value coincide; economic theory stipulates that prices should be established by the free play of supply and demand in an environment of free and equal competition.

In reality, prices do not necessarily reflect the value of the good or service from the standpoint of the society as a whole because of distortions and externalities.

c) **Approach**

The goal of the method is to determine a price system acceptable for the identified society. These shadow prices are adjusted, virtual or theoretical prices.

1. Theoretical background for a price analysis

(a) The price mechanism and the market

(b) Distortions to market prices (types of market distortions)

- Transfer payments: Government taxes and subsidies, financial transfers
- Government intervention:
  - Price controls
  - Control of interest rates
  - Tariffs and quotas on traded goods
  - State involvement in production
  - Regulation of various aspects of the economy
- Fixing of artificial wage rates

- Market imperfections
  - Lack of information and openness
  - Domination of markets by small number of buyers or sellers
  - Manipulation of information
  - Barriers to entry

- Currency exchange over/under evaluation
  - Keeps capital and major consumption items relatively cheap
  - Achieved through taxes and quotas on imports
  - Depresses exports

(c) Externalities
- Widens the analysis from the agent to the national economy
  - Direct impacts
  - Non-tangible impacts

2. Applied methodology: international parity prices

**Shadow prices**

Since the market prices of goods and services do not reflect their « real » value for the society as a whole, the shadow value is based on the notion of opportunity cost.

**Opportunity cost**

The opportunity cost of goods and services is measured by the value it would have in its best alternative use. Traditionally, the economic price for:

- the tradable **goods and services** is their international parity price (border price);
- the **factors of production** (wages, land) is their opportunity cost

3. Underlying assumptions

The approach relies on the assumption of the existence of spare production capacity for non-tradable goods and services. It also assumes the stability of the relative price system for non-tradable goods and services as well as the stability of the relative international price system for tradable goods and services.
d) Conversion to shadow prices: a six step process

1. Positive and negative externalities to integrate in the consolidated account;
2. Elimination of transfers (tax, subsidies): elimination of all flows which do not correspond to any production or real consumption of resources;
3. Breakdown of goods and services into "tradable" and "non-tradable;
4. Valuation of tradable goods and services": value at shadow price according to their import/export parity prices and applying a shadow exchange rate to the border price (see figures 6.1 to 6.4 p.169-171);
5. Valuation of non-tradable goods and services (p. 175): use market price before taxes and subsidies (choice of the manual) because they are supposed to reflect the opportunity cost on the real market;
6. Drawing up the accounts: calculation of the NPV and economic IRR

e) Analysis of the results

1. Income generation (economic NPV and economic IRR)
2. Competitiveness DRC (Domestic Resource Cost ratio): very important indicator for all sectors
Figure 18: Education and market openness in terms of economic profitability

World Bank, 2002 – Growth Quality - Page 86, figure 3.12
5.3. Questions to ask yourself

Has Financial Analysis been undertaken before the Economic Analysis?

1) Economic Analysis - Effects Method (if relevant)

What are the economic consequences in market prices of undertaking the project in the way proposed, especially on:

- economic growth?
- government budget?
- foreign exchange resources?
- income distribution?

2) Economic Analysis - Shadow Pricing

What are the macro-economic policy objectives that lead to the Shadow Prices used in the analysis (costs and maybe benefits)?

Have the method to convert market prices (financial prices) into Shadow Prices, the conversion factors and their source, the value given to possible positive or negative externalities been explained?

What are the results of the shadow pricing and how sensitive are they?

How well does the project compare with similar projects (taking account of price distortions):

- in the same country,
- in other countries/regions,
- that may be in competition for awarding funds (loan or grant)?
Guideline 6: Assumptions and Risks

6.1. Introduction

Financial and economic analysis is based on estimates, but the future cannot be predicted with certainty. Feasibility studies often do not sufficiently explain how the planned results were estimated: this makes it difficult both to assess how realistic the proposed scenario is, and to change the project if, for example, some costs change.

Assumptions should be clearly stated and realistic - as in the logical framework. Consultants must spell out clearly the underlying assumptions and provide the (Excel) spreadsheets used in the calculations of costs and benefits.

Sensitivity analyses must be made on each of the key risk factors to assess their possible effects on the expected benefits.

There should be, at least, an “optimistic”, an “average” and a “pessimistic” scenario.

6.2. Risks and uncertainties

All projects involve risk and uncertainty. 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 the identification and design phases that risks should be identified and their probabilities assessed.

Uncertainty means wrong estimates of cost or benefits.

We take into account possible over-runs which are allowed for by including contingencies.

The sensitivity analysis assesses the impact of a variation for the costs and/or benefits.

Uncertainty: sensitivity analysis

Usually, the sensitivity analysis evaluates how sensitive the results (NPV, IRR) are through variations in costs or benefits by +/- 10% or 20 %.

The sensitivity analysis identifies the variables whose values are most uncertain and the switching values which reduce the net benefit to an unacceptable level.
Traditionally, it is done on the implementation delays and measures the effect of variations in delays on the results.

The sensitivity is a fundamental element of project analysis.

NB: Other methods exist like using probabilities linked to the risks.

**Figure 19: Financial Analysis (cost-effectiveness method): sensitivity analysis of consolidated incremental flows**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Amount of variation</th>
<th>Change in value (000 Euros)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base scenario</td>
<td>0 %</td>
<td>3 078,0</td>
<td>0</td>
</tr>
<tr>
<td>Incremental Capital Costs</td>
<td>Additional 10 per cent</td>
<td>14,5</td>
<td>0,5</td>
</tr>
<tr>
<td>Incremental Cost of Drugs &amp; Medicines</td>
<td>Additional 10 per cent</td>
<td>117,9</td>
<td>3,83</td>
</tr>
<tr>
<td>Cost of Technical Assistance</td>
<td>Additional 10 per cent</td>
<td>114,8</td>
<td>3,73</td>
</tr>
<tr>
<td>Other Incremental Operating and Maintenance Costs</td>
<td>Additional 10 per cent</td>
<td>49,6</td>
<td>1,61</td>
</tr>
<tr>
<td>Incremental Vehicle Costs</td>
<td>Additional 10 per cent</td>
<td>10,9</td>
<td>0,35</td>
</tr>
</tbody>
</table>
Figure 20: Sensitivity Analysis on the financial IRR: Example of a sensitive project (Carbonization in Congo)

<table>
<thead>
<tr>
<th>Changes sales (%)</th>
<th>Costs (investments and operating) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-30</td>
<td>-20</td>
</tr>
<tr>
<td></td>
<td>-10</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>30</td>
</tr>
<tr>
<td>sales (%)</td>
<td>-30</td>
</tr>
<tr>
<td></td>
<td>30,8</td>
</tr>
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<td>37,4</td>
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<td>30,8</td>
</tr>
</tbody>
</table>

Figure 21: Sensitivity Analysis on the economic IRR: Example of a not-sensitive project (Irrigation in Mali)

<table>
<thead>
<tr>
<th>Benefits</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
<th>110%</th>
<th>120%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80%</td>
<td>23,14</td>
<td>25,66</td>
<td>27,98</td>
<td>30,13</td>
<td>32,12</td>
</tr>
<tr>
<td>90%</td>
<td>20,69</td>
<td>23,14</td>
<td>25,39</td>
<td>27,48</td>
<td>29,43</td>
</tr>
<tr>
<td>100%</td>
<td>18,58</td>
<td>20,95</td>
<td>23,14</td>
<td>25,17</td>
<td>27,08</td>
</tr>
<tr>
<td>110%</td>
<td>16,72</td>
<td>19,02</td>
<td>21,15</td>
<td>23,14</td>
<td>24,99</td>
</tr>
<tr>
<td>120%</td>
<td>15,08</td>
<td>17,32</td>
<td>19,39</td>
<td>21,32</td>
<td>23,14</td>
</tr>
</tbody>
</table>

Figure 22: Sensitivity Analysis: Example of a mistake (Roads in Haiti)

<table>
<thead>
<tr>
<th>Costs sensitivity</th>
<th>Basic costs</th>
<th>Costs increased by 20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic incr. 12%</td>
<td>10% A B A B 10% A B A B</td>
<td>10% A B A B 10% A B A B</td>
</tr>
<tr>
<td>Discount rate 8%</td>
<td>12% A B A B</td>
<td>12% A B A B</td>
</tr>
<tr>
<td>Level A B A B A B A B</td>
<td>Level A B A B A B A B</td>
<td></td>
</tr>
<tr>
<td>NPV (x 10^6) 1334</td>
<td>1274 989 946 662 640 462 448 1220 1170 882 847 549 537 355 350</td>
<td></td>
</tr>
<tr>
<td>IRR 28% 28% 28%</td>
<td>28% 28% 28% 21% 21% 21%</td>
<td>22% 22% 22% 24% 24% 25%</td>
</tr>
<tr>
<td>18% 18% 18%</td>
<td>19% 19% 19%</td>
<td>18% 18% 18%</td>
</tr>
</tbody>
</table>
Figure 23: Sensitivity Analysis on the wage according to the amount of living young ostriches at 3 months by female and per year
6.3. Questions to ask yourself

- Were the main assumptions clearly stated and realistic? - for both costs and benefits? - for discount rates? in international prices etc?

- Is the degree of risk assessed (sensitivity analysis) – for 3 scenarios: pessimistic, average and optimistic?

- Were the (Excel) spreadsheets used for the calculations, provided?
Guideline 7: Overall Assessment of the Project

The 5 analysis criteria of the project cycle are:

1. Relevance

<table>
<thead>
<tr>
<th>Questions to ask yourself</th>
<th>Relevant EcoFin Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the project address the real needs of the intended beneficiaries?</td>
<td>Financial Analysis of the intended beneficiaries (stakeholders)</td>
</tr>
<tr>
<td>How well does the project fit with national priorities and reforms undertaken by the government?</td>
<td>Economic Analysis (effects method and shadow pricing)</td>
</tr>
<tr>
<td>How well does the project match policies and priorities of the EU?</td>
<td>Economic Analysis (effects method and shadow pricing)</td>
</tr>
</tbody>
</table>

2. Effectiveness

<table>
<thead>
<tr>
<th>Questions to ask yourself</th>
<th>Relevant EcoFin Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the extent to which the project reaches its purpose?</td>
<td>Financial &amp; if necessary Economic Analysis, comparing results (cash flow) with project purpose</td>
</tr>
</tbody>
</table>

3. Efficiency

<table>
<thead>
<tr>
<th>Questions to ask yourself</th>
<th>Relevant EcoFin Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the project using a minimum of resources and are resources used efficiently?</td>
<td>Cost Effectiveness (financial and, if applicable, economical - i.e. using shadow prices)</td>
</tr>
<tr>
<td>Are the returns of the project adequate (only for projects with tangible benefits)?</td>
<td>Cost Benefit Analysis (financial and, if applicable, economical using shadow prices)</td>
</tr>
</tbody>
</table>
Figure 24: Economic efficiency: Economic cost-effectiveness analysis including the effects method: Health project in Uganda

Composition of total cost of 0.836 Euro per person and per year

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Exchange</td>
<td>0.384</td>
</tr>
<tr>
<td>Added Value</td>
<td>0.442</td>
</tr>
<tr>
<td>Salaries &amp; Wages</td>
<td>0.328</td>
</tr>
<tr>
<td>Taxes</td>
<td>0.081</td>
</tr>
<tr>
<td>Surplus</td>
<td>0.033</td>
</tr>
<tr>
<td>Total</td>
<td>0.836</td>
</tr>
</tbody>
</table>

Figure 25: Economic efficiency: Economic cost-effectiveness analysis including the effects method: Health project in Uganda

Disaggregated Incremental Costs, Discounted at 8 per cent (in '000 Euros)

<table>
<thead>
<tr>
<th></th>
<th>Constant Market prices</th>
<th>CF</th>
<th>Constant shadow prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Exchange</td>
<td>1 452</td>
<td>1,12</td>
<td>1 626</td>
</tr>
<tr>
<td>Salaries and wages</td>
<td>1 209</td>
<td>1,00</td>
<td>1 209</td>
</tr>
<tr>
<td>Taxes</td>
<td>298</td>
<td>0,00</td>
<td>0</td>
</tr>
<tr>
<td>Surplus</td>
<td>120</td>
<td>1,00</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>3 079</td>
<td>2 955</td>
<td></td>
</tr>
</tbody>
</table>

Cost per person / year: 0.803 (2955 divided by 3679 persons covered earlier)

Economic Efficiency

Economic cost-benefit analysis

a) from the perspective of domestic income (Effects method)

\[
NPV = -\sum \Delta INV_t/(1+i)_t + \sum \Delta VA_t + CB_t/(1+i)_t
\]

\[
NPV = -27,958 103 UMN
\]

IRR = 2.8%

b) under foreign currency constraints (Effects method)

\[
NPV = -\sum \Delta INV_{imported}/(1+i)_t + \sum \Delta Gain in currency_t/(1+i)_t
\]

\[
NPV = -5.032 103 UMN
\]

IRR = 6.8%
c) from the standpoint of the international economy (shadow price method)
   \[
   \text{NPV} = 10.648 \times 10^3 \ \text{UMN} \\
   \text{IRR} = 9.9\%
   \]

4. Impact

<table>
<thead>
<tr>
<th>Questions to ask yourself</th>
<th>Relevant EcoFin Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the effects of the project on the national economy (economic growth, government budget, foreign exchange, and income distribution)?</td>
<td>Economic Analysis: effects method</td>
</tr>
</tbody>
</table>

5. Sustainability

<table>
<thead>
<tr>
<th>Questions to ask yourself</th>
<th>Relevant EcoFin Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do the main stakeholders face solvency problems during the implementation of the project?</td>
<td>Financial Analysis of the main stakeholders’ interests</td>
</tr>
<tr>
<td>Can the main stakeholders meet the recurrent costs after the end of the project?</td>
<td>Financial Analysis of the main stakeholders’ interests</td>
</tr>
<tr>
<td>Is the project competitive (hence viable) internationally?</td>
<td>Economic Analysis: shadow pricing</td>
</tr>
</tbody>
</table>
III. Annexes