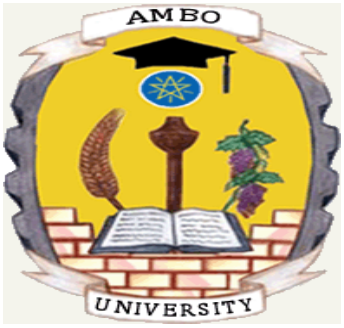
AMBO UNIVERSITY WOLISO CAMPUS

SHOOL OF BUSINESS AND ECONOMICS



DEPARTMENT OF AGRICULTURAL ECONOMICS

COURSE TILTLE: AGRICULTURAL PROJECT PLANNING AND ANALYSIS

COURSE CODE: AgEc3124

ECTS CREDITS (CP): 5

TARGET GROUP: III

INSTRUCTOR: LEMANE G. (MSc.)

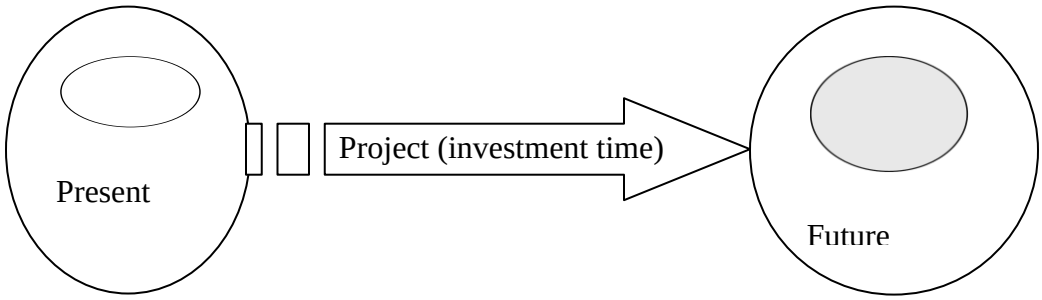
MAY, 2020

WOLISO, ETHIOPIA

1. THE PROJECT CONCEPT

Project planning and analysis has a long history in financial and business analysis. It has always been used as a means of checking the profitability of a particular investment by private firms. Recent experiences show that project analysis has attracted the attention of development economists. Projects are now assessed from the economy's viewpoint instead of only from the firm's perspective. The selection criteria have also included economic criteria on top of financial criteria. Project planning and analysis is essentially a process of "seeking alternative choices" to reach an agreed upon set of objectives in the most efficient manner.

Figure 1: The Project Concept



A project can also be viewed as a "Proposal for capital investment to create opportunities for producing goods and services". Recently defined a development project as follows:

- ✓ *"Project can be defined as an investment activity in which financial resources are expended to create capital assets that produce benefits over an extended period of time*.
- ✓ A project is a complex set of activities where resources are used in expectation of return and which lends itself to planning, financing and implementing as a unit.

The linkage between projects and programs

It is necessary to distinguish between projects and programs because there is sometimes a tendency to use them interchangeably. A project is an investment activity where resources are used to create capital assets, which produce benefits over time and has a beginning and an end with specific objectives. A program is an ongoing development effort or plan which may not necessarily be time bounded. E.g. *a road development program, a health improvement program, a nutritional improvement program, a rural electrification program, etc.*

A development plan is a general statement of economic policy. National development plans are further disaggregated into a set of sectoral plans. A development plan or a program is therefore a wider concept than a project. It may include one or several projects at various times whose specific objectives are linked to the achievement of higher level of common objectives. For instance, a health program may include a water project as well as a construction of health centers both aimed at improving the health of a given community, which previously lacked easy access

to these essential facilities. Projects, which are not linked with others to form a program, are sometimes referred to as "stand alone" projects.

Perhaps the distinction between projects and programs would be clear if we see the basic *characteristics* of projects. Projects in general need to be **SMART**.

S – Specific

- Specific in its objective.
- Specific activities.
- Specific group of benefits.
- Specific group of people.

M - Measurable

Projects are designed in such a way that investment and production activities and benefits expected should be identified and if possible be valued (expressed in monetary terms) in financial, economic and if possible social terms. Though it is sometimes difficult to value especially secondary costs and benefits of a project, attempt should be made to measure them. Measure costs and benefits must lend themselves for valuation and general projects are thought to be measurable.

A – Area bounded

As projects have specific and identifiable group of beneficiaries, so also have to have boundaries. In designing a project, its area of operation must clearly be identified and delineated. Though some secondary costs and benefits may go beyond the boundary, its major area of operation must be identified. Hence projects are said to be area bounded.

R – Real

Planning of a project and its analysis must be made based on real information. Planner must make sure whether the project fits with real social, economic political, technical, etc situations. This requires detail analysis of different aspects of a project.

T – Time bounded

A project has a clear starting and ending point. The overall life of the project must be determined. Moreover, investment and production activities have their own time sequence. Every cost and benefit streams must be identified, quantified and valued and be presented year-by-year.

Why do developmental projects fail?

The reasons for the failure of projects could be different. A comprehensive list of *"where things went wrong"* will include the following (see Gittinger, 1982; Tisdell, 1985; for more details):

1. A lack of local ownership and responsibility, i.e. participative planning and development.
2. Problems of project design and implementation.
3. The use of inappropriate technology, cropping systems and animal husbandry.

4. Inadequate or inappropriate infrastructure.
5. Failure to appreciate the social and political environment.
6. Administrative problems.
7. Changing economic situations and market conditions.
8. Externally driven project initiatives.
9. Problems related to poor project analysis.
10. Unrealistic expectations.
11. Unsupportive policy environment

Aspects of project preparation and analysis

Project analysis can be divided into seven major modules or elements:

- Technical
- Institutional
- Organisational
- Social
- Commercial
- Financial
- Economic
- Environmental aspects

These are all inter-related, and the importance of each varies from project to project, or design to design. This list, however, is a comprehensive attempt to identify relevant processes, data and information that determine benefits and costs. This list, therefore, is used to identify analytical elements for each stage in the project cycle, ie. during preparation, analysis, and subsequent evaluation, and impact assessment. Each aspect is discussed in detail in the following sections.

Technical Aspects: Technical aspects concern the physical inputs and outputs of real goods and services, and examine the technical relations in the project. These will vary from project to project. Experts need to provide information on all major elements that lead to the identification of supplies, production, productivity, and technical input/output coefficients. Project analysts have to make sure that technical estimates and projections relate to realistic conditions.

Institutional – Organizational – Managerial Aspects: Appropriateness of the institutional setting (ie. rules of conduct) is important for the success of the project. Customs and culture of participants have to be understood and accounted for to avoid disruptions in the way in which farmers are accustomed, and hence, increase the possibility of adoption and success. Some

important aspects include land tenure, indigenous farmer organisations, authority, and responsibility. The organisational structure, inter-organisational linkages and efficient management of the organisations are crucial for success.

Social Aspects: Broader social implications, particularly resource and income distribution impacts or potential impacts are important. Responsiveness to national objectives may be a consideration. Other aspects include employment opportunities, regional dimensions, losers and gainers in terms of social groups, gender issues, impact on social organizations, change in tenurial division of labour, quality of life improvement, ie. Water, health, education, etc.

Commercial And Business Aspects: Commercial aspects include market demand for the product, effects on prices, processing and value added effects, and effects on the domestic and/or export market, and quality of the product. Input supply and demand issues include: securing supplies (fertilizer, pesticides, seed) and financing etc.

Financial Aspects: The financial aspects are one of the most important areas in project analysis, and most data have to be translated into financial forms for comparability. Financial aspects include the financial effect of the project on participants, farmers' firms, public corporations, project agencies, and the national treasury. Financial aspects are dealt with at various levels, ie. firm farm, organization, or corporate. At the farm level, financial data is often handled in farm budgets. Organizations usually have formalized systems of financial accounting and reporting which may have to be further manipulated to fit into the project format. In financial analysis mostly market prices are used and profits are important.

Economic Aspects: The economic aspects are the most important in ultimately determining impact of any public sector investment in agriculture. Economic aspects lead to impact and economic efficiency of the project on development of the total economy, vis-à-vis the allocation of scarce resources, ie. economic efficiency. Economic aspects determine the value of the project from the viewpoint of society at large and also to determine the economic efficiency with which scarce resources are allocated. In economic analysis the concept of opportunity costs are used. Financial and economic aspects are complementary but different, especially when markets are distorted.

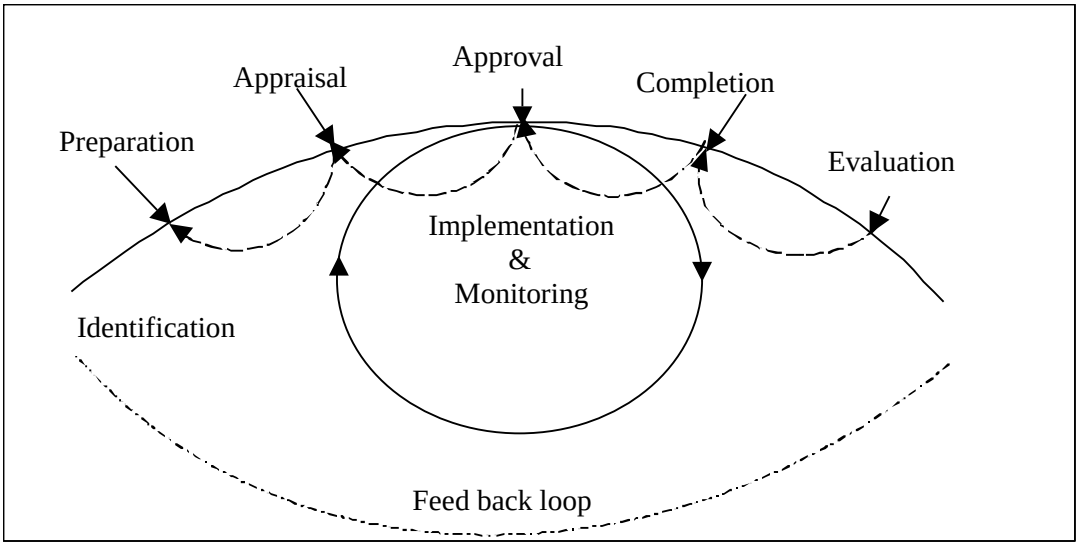
Environmental Aspects: Environmental aspects deal primarily with adverse biological and physical environmental impacts, ie. irrigation, bilharzia, notable scenic beauty, preserving unique plants and animals, etc. See the chapter on environmental impact assessment for further detail.

The project cycle

A project moves through stages. An idea germinates; then it passes through various steps which will clarify the concept; objectives and activities required to achieve the objectives; the appraisal of the alternative options and actions; decision making; implementation; monitoring; completion and final evaluation. The entire process from the first idea to the final evaluation is called a **project cycle**, to indicate the phased or cyclical nature of this process.

In operational terms each stage in the project cycle can be understood as leading to a decision point. The decision to be taken at the end of each stage is if the project should continue to the next stage, and when it should continue. The various elements or stages in the project cycle are shown in Figure 0.1 with feedback processes between each stage in the cycle. The project cycle is thus interactive in nature.

Figure 0.1: The Project Cycle



Elements of the Project Cycle:

- Identification
- Preparation
- Appraisal (*ex-ante* analysis)

- approval/rejection
- Implementation
  - investment period
  - development period
  - monitoring
  - completion
- Evaluation (*ex-post* analysis) including impact assessment

Identification: The identification stage involves finding potentially fundable projects. Sources include technical specialists, local leaders, proposals to extend existing projects, rise in market price for products, projection of future demand, economic development plans with priority areas, separate sector surveys of the current situation in agriculture, and so on. In the case of agricultural and natural resources projects, the diagnostic surveys and constraint analysis may result in the identification of priority problems and research themes, which may lead to project development.

Preparation: Preparation can be broken into two parts depending on size and complexity of the project. A *pre-feasibility* study focusing on qualitative and subjective analysis, could provide enough information for deciding to proceed with a more detailed analysis. During the pre-feasibility stage, the major objectives of the project are however clearly defined. The question of whether alternative ways to achieve the same objective may be preferable should explicitly be addressed and poor alternatives excluded. The analytical aspects come into play at this stage, but often relying on existing and secondary sources of data. Once the pre-feasibility study is done, detailed planning and analysis follows. With large projects, the project may be prepared by a special team to include experts from the analytical areas considered crucial. These steps involve lot of brainstorming and subjective judgment. The analysis will include aspects described in the section of project modules (see 2.2). A so-called "screening" exercise during planning ensure that the project identified is technically and economically viable, and compatible with the existing production systems, resource use patterns, as well as the social and cultural beliefs of the target group.

Appraisal: After the report on the detailed analysis of all relevant project modules is completed, a critical review and appraisal of all these aspects are conducted by an independent team. This team re-examines every aspect regarding feasibility, soundness and appropriateness.

The team may recommend further preparation work if some data are questionable or some of the assumptions are faulty.

Approval of a project triggers the required set of implementation actions.

Implementation: Implementation is a crucial part of the project cycle and, therefore, requires equally rigorous analysis and planning in order to develop a realistic project management plan.

The implementation is usually subdivided into the following stages:

- **Investment period** – in an agricultural project usually 2-5 years from the start of a project during which the major fixed investments are made, ie. dam and canal systems, most staff is engaged, equipment procured, etc. The major benefits are expected to flow after this stage.
- **Development period follows investment.**
- **Monitoring of project activities as per the approved project and adjustments as required keeping the project on tract.**
- **Completion or maturity of a project can be as long as 25 – 30 years from the start** during which periodic benefits and costs continue to accrue, and impacts are more apparent and measurable.

Evaluation (And Impact Assessment): Evaluation involves measuring elements of success and failure of the project. Evaluation can start from on-going monitoring, to after completion of the project. Evaluation is usually done by an independent evaluation team. Evaluation (*or ex-post analysis*) looks at the extent to which original objectives and specifications are met, in other words:

- Technical appropriateness.
- Organisation/institution/management.
- Commercial undertaking.
- Financial aspects.
- Soundness of assumptions.
- Economic implications.
- Social and distributional issues.

Impact assessment goes beyond direct evaluation to look at the results of projects, both intended and unintended, and the differences, positive and negative, on the position of society that has been affected.

The evaluation stage is usually used as “lessons-from-experience” for future project planning and analysis.

2. CRITERIA AND APPROACHES FOR PROJECT DEVELOPMENT

Introduction

- Project planning represents processes during the identification and preparation stages of the project cycle whereby the broad context in which a project will operate is clarified; where particular problem areas are identified and clear objectives are set to achieve the required changes; where alternatives are developed and choices are made; and where appropriate actions are prepared for implementation.
- Project planning also provides the framework for project management, implementation, monitoring and evaluation. To participate in and manage the planning process it is important to learn to work with uncertainty, subjective perceptions and values, and flexibility, openness and communication. Participation is a key to successful project planning. The Logical Framework Approach is very useful in effective participative project planning.

1. What is Logical Framework Analysis (LFA)?

- The log frame model was developed in the United States.
- A log frame (also known as a Project Framework) is a tool for planning and managing development projects.
- Logical Framework Analysis (LFA) is a way of describing a project in a logical way. Earlier it was called "Objective – Oriented Intervention Planning" (OOIP). Now, it is referred to 'Logical Framework Analysis'.
- A logical framework is also known as 'Project Framework'. It is widely being used by the funding agencies including Department for International Development (DFID).
- The LFA approach is a tool for planning, monitoring and evaluating projects. This is also a useful approach to link projects (at the micro level) to the broader context of regional development programs and national goals (ie. the macro level).
- LFA is essentially used as a tool to clarify cause-effect relationships and to clarify the logical link between project inputs and objectives; project activities and outputs; broader purposes; and the ultimate goals a project could serve. LFA is therefore a systematic planning process based on logical deductions. Experience and knowledge is important to apply LFA.
- Several organisations were involved in developing a scientific, standardised planning methodology such as; the EU, the World Bank, ADB and many donor governments.
- It aims to present information about the key components of a project in a clear, concise, logical and systematic way.
- DFID describes the Logical Framework as "a tool to help designers of projects think logically about what the project is trying to achieve **(the purpose),** what things the

project needs to do to bring that about **(the outputs)** and what needs to be done to produce these outputs **(the activities)**.

- The purpose of the project from the DFID viewpoint is to serve our higher level objectives **(the goal)"**.
- A log frame summarizes all the details of the project in a standard format:
  - What the project is going to achieve?
  - What activities will be carried out to achieve its outputs and purpose?
  - What resources (inputs) are required?
  - What are the potential problems which could affect the success of the project?
  - How the progress and ultimate success of the project will be measured and verified?

What do I need to make a logical framework?

- Supply of large sheets of paper, (preferably flip chart sheets).
- Pencil, eraser and 'Post-it' notes or cards, so you can adjust and amend as you go along.
- Somewhere to work without distractions.
- Ideally, someone to discuss and 'bounce' ideas around with.
- As much information about the planned project as possible - preferably do it 'on site'.

☐ **The LFA Process**

- LFA is simply a planning tool that provides a structure for specifying the components of an activity or activities, and the logical linkages between a set of means and a set of ends.
- It places a project in its larger framework of objectives. It serves as a useful tool for defining inputs, time tables, assumptions for success, outputs and measurable indicators or "milestones" for monitoring and evaluating performance. It is a highly effective planning tool.

☐ **The project context**

- Before beginning work on problem or opportunity identification, it must be clarified why we – individually or as a group – are going into the planning process, and what the task is. It is therefore important to clarify the context of the project by answering the following type of questions:
  - How can agricultural production be improved?
  - How can farm incomes be stabilised?
  - How can added value be generated?
  - Who are the major stakeholders and beneficiaries?
  - Who will benefit from the project and who will lose out?

☐ **The analytical phase**

- Analysis enables us to collect and profile the data needed to plan the intervention.

- A range of different groups (we) are involved in development issues, such as: the target group or groups, the national government, the regional authorities, the sponsor, the experts carrying out the surveys, the institution responsible for implementing the intervention, and so on.
- Each of these parties has its own angle on the situation or has some special contribution to make and they will all seek to put their point of view.
- The problems are written out on charts, which are then displayed. A check is made to see that all have understood them; if not, they are re-formulated.
- The charts (which include negative states perceived as problems) are displayed in such a way as to highlight the cause-and-effect linkages between the different problems; this exercise will result in a "problem tree"
- Dev**e**loping the Problem Tree
    - Problems
    - Causes
    - Effect
    - By changing the negative states into positive states and by arranging these in groups reflecting the activities-ends linkages, the problem tree turns into an "objective tree"
- Developing the Objective Tree
    - Objective
    - Activities
    - Ends
    - If the participants accept that the activities-ends linkages are correct and complete, they will then, using the criteria at hand, carry out a "strategy analysis" and select the objectives which will constitute the bounds of the planned intervention.
    - Strategy analysis

The planning phase: Completing the logframe matrix

Describing the matrix

- When we have analysed the situation, our next step is to plan the intervention. The **planning phase** aims at setting up a logical framework (logframe), in the form of a summary matrix showing four vertical columns and four horizontal ones:
- vertical columns
    - **Column one** shows the (project) **INTERVENTION LOGIC (IL)** which follows from the objectives tree. It is a narrative summarising:
        - **The goal:** The future state at a high level, to which several interventions will contribute.
        - **The purpose (or objective):** The future state targeted by the project intervention itself.

- **The intermediate results (or outputs):** The future intermediate states or outputs to be brought about **by the intervention** and which together aim at achieving the purpose. The (project) intervention leader is responsible for achieving intermediate results.
- **The activities: The work** which must be carried out as part of the intervention in order to achieve the intermediate result. The intervention leader is responsible for carrying out and managing these activities.

- **Column two** shows the **Objectively Verifiable Indicators (OVI)**. These describe the goal, the purpose and the intermediate results in operational terms, **ie. In terms of quality, quantity, place** and **time.** An indicator describes **"milestones"** of progress and enables detailed follow-up and monitoring.
- This column shows the **RESOURCES** needed to carry out the planned activities.
- **Column three** shows the **SOURCES OF VERIFICATION**. These indicate where and in what form information may be obtained in order to verify progress towards achieving the goal, the purpose and the intermediate results.
- This column also includes the **COST** of the resources needed to carry out the activities.
- **Column four** shows **ASSUMPTIONS**: External factors over which the intervention has no direct control but which are nevertheless important with a view of achieving the intermediate results, the purpose and the goal.

The logframe matrix summarises the intervention in one (full) page as follows:

- **What is the goal** of the (project) intervention being carried out?
- **What is the purpose** of the (project) intervention?
- **How** does the intervention contribute to this objective (intermediate results)?
- **What will** the intervention **do** (activities)?
- **Which** crucially important external factors will determine the success, or failure, of the intervention (assumptions)?
- **Where** can we find the data needed to administer, monitor and evaluate the intervention (sources of verification)?
- **What** resources – and their cost – are involved in the intervention?

Description of the intervention logic

- The intervention logic comprises all stages contained within the (project) intervention, which need to be completed in order to achieve the goal:
  - intermediate results are achieved through the activities,
  - the purpose is realised through the intermediate results,
  - the goal is reached via the purpose.

LOGFRAME

- The following sequence is adhered to:

Goal: high-level objective, to which the intervention contributes

Purpose (objective): objective pursued by the intervention itself

Results (outputs): products (or outputs) of the activities needed to achieve the purpose
Activities: tasks of the intervention

- **Objectively Verifiable Indicators (OVI):**

- OVI are measures designed to admit of (objective study) the goal, the purpose and the intermediate results.
- The key to the log frame in terms of effectiveness is the clear identification of indicators.
- Here an attempt is made to translate the general objectives, and attach one or more indicators to each specific objective, thus, transforming the general objectives of the project into measurable performance targets.
- Indicators are formulated to measure the achievements of the objectives for each output. Indicators are performance standards, and set the targets for a project.
- The indicators describe each objective precisely in terms of :
  - The quality to be reached;
  - The quantity which is set as target;
  - The target group which is affected by an objective or that benefits from these objectives;
  - The time at which the objective is supposed to be achieved; and
  - The location or region where the objective is supposed to be realised.

Example 1: For the purpose: **"Rice production increased"**

- Target group : The farmer (owning at least 0.5 hectares)
- Quantify : 10 000 farmers increase their output by 50%
- Qualify: 10 000 farmers increase rice production whilst maintaining 2007 crop quality
- Time : Before 2009
- Place : The district of Girar jarso

Example 2: For the purpose: "Quality of hospital services improved"

- Target group : Road casualties
- Quantify: 500 casualties
- Qualify: The death rate among casualties falls from 25% to 12.5%
- Time: 2008
- Place: Fitche Hospital

- **Sources of verification**

- Sources of verification are the results of surveys and/or findings which give us the data we need to use the OVI.
- What should we look out for when describing the sources of verification?. It is wise to specify:
  - Access: Where and when can we find the data?
  - Who is responsible for the data?
- Why do we describe the sources of verification?
  - To find out what the intervention should do to obtain the data and at what cost.

- The sources of verification must supply infallible, reliable and accessible data.

☐ **Resources (inputs)**

❖ **Resources comprise** the (human and physical) input thanks to which the intervention will be able to carry out its activities. kind of resources may be;

- **Human resources**: National staff, expatriate development worker and scholarship students.
- **Investment (or production) resources**: There are assets which cover several production cycles and for which a depreciation allowance must be made.
- **Operating resources** are resources which can be used only once, since they are destroyed (ie. seed) or transformed (ie. raw materials, fuel, incidental expenses) in the process

❖ **There are three possible sources of resource:**

- ❑ **The donor**
- ❑ **The developing country institutions**
- ❑ **The intervention itself**

☐ **The Advantages of LFA as a Planning Tool**

❖ It tries to make the project appraisal transparent by explicitly stating the assumptions underlying the analysis, and by allowing a check on the proposed hypotheses and expected results in an ex-post analysis;

❖ It deals explicitly with a multitude of social goals and does not require the reduction of the benefits into one figure;

❖ It is understandable to non-scientists. The logframe, therefore, can be used as a tool to clarify trade-offs, and thus, to ameliorate the decision-making process; and

❖ It is flexible with regard to information and skill requirements. It can incorporate social benefit – cost analysis, use input-output tables, and partial models. But it can also be used with rudimentary information skills, albeit of the cost of more hypothesis and uncertainties.

Thus, **a log frame** enables planners to:

- Set clear objectives.
- Define indicators of success:
- Performance standards.
- Incorporate change over time.
- Clarify logical linkages in the plan.
- Define critical assumptions underlying the project.
- Identify key activity groups.
- Identify means of verifying project accomplishments.
- Define resources required for implementation.
- Set up a need-based monitoring and evaluation system

2. SWOT analysis

- Strengths, Weaknesses, Opportunities, Threats. These aspects of a business are examined to assess its past and present performance and prospects.

Example:

- A SWOT analyses for establishing a dairy farm is given below.

Strengths

- Livestock products i.e. Milk & Meat are major source of food.
- Dairy sector is having enormous potential for sizeable earnings
- North Shawa is having wide scope of Milk Production, ranking 2rd at Oromia region level
- Dairy sector in Ethiopia is having low cost of production compare to competitive milk producing countries
- Ample human resource and manpower availability in dairy farming
- Ethiopian culture is having long tradition of cattle and livestock rearing
- Large base of cattle for milk production

Weaknesses

- Relatively small dairy cattle milk production market
- Chronic lack of improved, adapted dairy cows
- Unorganized sector, unaware of basic farm management practices including record keeping, farm/ market infrastructures & marketing information
- Nutrition is still a problem hampering the livestock productivity in general and milk production in particular
- Enormous production losses due to endemic diseases every year
- Poorly developed cold chain with inadequate number of milk chilling and processing centers
- Lack of education, technical skills, initiative and experience in modern dairy farming
- Adoption of traditional approach
- Post harvest milk losses are very high estimated at 40 kg per capita per year
- Obsolete equipment and technologies

Opportunities

- Increasing demand of value added dairy products
- Local and global dairy products needs are much higher than supply
- Govt. of Ethiopia & State Bank of Oromia priority sector
- Commercially viable sector with great credit potential and absorption capacity
- Cooperatives can play a big role for development of dairy sector in Ethiopia
- Dairy sector provides raw material for food & leather industry

Threats

- High risks of diseases in livestock
- Defective and unorganized markets

- Imbalance between prices of inputs & outputs
- Rising trend of cost of production with higher rate of interest as compared to profit ratio
- Lack of media projection, non-recognition of problems and monopoly of multinationals
- Lack of community organizations and out dated farm practices
- Lack of coordination towards common causes & goals
- Lack of awareness about economics, demand & supply in market
- Low saving, low holding capacity
- Non-availability of subsidy, tax holidays

3. PROJECT COSTS AND BENEFITS

We undertake economic analysis of projects to compare costs with benefits and determine which among alternatives project have an acceptable economic return and we do the same for financial analysis. The costs and benefits of a project therefore must be identified. Furthermore, once costs and benefits are known they must be priced and their economic value determined.

3.1. Objectives, cost and benefits

In project analysis, the *objectives* of the project provide the standard against which cost and benefits are defined. Simply put, a cost is anything that reduces an objective, and a benefit is anything that contributes to an objective. The problem with such simplicity, however, is that each participant in the project has many objectives.

For example - A private business firm can have objectives such as:

- Maximizing net income (profit)
- Increasing market share
- Improving customer satisfaction
- Reducing risk, etc.

A society or a nation as a whole may want to achieve the following objectives as:

- Increasing national income (growth objective)
- Ensuring equitable distribution between persons, regions, generations, etc. (distributional objective)
- Improving balance of payments
- Improving regional integrity
- Reducing inflation
- Reducing unemployment
- Maintaining environment …..etc

However, the problem with such a number of objectives is there is no formal analytical system for project analysis that could possibly take into account all the various objectives of the society or private business firm. Thus, we will take maximization of net incremental income (profit) for a private firm and maximization of national income for a nation as the *fundamental objectives* in the analysis of a project.

Therefore, when we come to identification of costs and benefits in economic analysis, anything that *reduces* national income is a *cost* and anything that *increases* national income is a *benefit*. Hence the analyst task in economic analysis is to estimates the amount of this increase in national income available to the society, i.e. to determine whether, and by how much, the benefits exceed the costs in terms of national income.

3.2. Costs & benefits: in financial and economic analysis

The projected financial revenues and cost are often a good starting point for identifying economic benefits and costs but two types of adjustments are necessary. First it is necessary to include (or exclude) some costs and benefits. Second it is necessary to revalue inputs and outputs at their opportunity cost.

Financial analysis which looks the project from the perspective of the implementing agency identifies the project's net money flows to the implementing entity and assesses the entities ability to meet its financial obligations and to finance future investments. Economic analysis, by contrast, looks at a project from the perspective of the entire economy ("society") and measures the effects of a project on the economy as a whole. These different viewpoints require that analysts take into consideration different items when looking at the costs of a project, use different valuations for the item considered, and in some cases, even use different rates to discount the streams of costs and benefits. In financial analysis we are interested in the items that entail monetary outlays. In economic analysis, we are interested in the opportunity costs for the country. Even if the project entity does not pay for the use of resources, this does not mean that the resource is free good. If a project diverts resources from other activities that produce goods or services, the value of what is given up represents an opportunity cost of the project to society.

The important difference between financial and economic analysis is in the price that the project entity uses to value the inputs and outputs. Financial analysis is simply based on the actual prices that the project entity pays for inputs and receives for outputs. The prices used for economic analysis, however, are based on the opportunity costs to the country.

The economic values of both inputs and outputs usually differ from their financial value (market prices) because:

- There are different market imperfections;
- There are government interventions of various kinds (taxes, subsidies, tariff, price control, etc, and;
- Some goods are public goods by their nature (may not totally have market or the price consumers are willing to pay are less).

The divergence between financial and economic prices and flows show the extent to which someone in society, other than the project entity, enjoys a benefit or pays a cost of the project. And hence enable the analyst to identify 'gainers' and 'losers'.

The magnitudes and incidence of transfers are important pieces of information that shed light on the project's fiscal impact, other distribution of costs and benefits and hence on its likely opponents and supporters. By identifying the groups that benefits from the project and groups that pay for its costs, the analyst can extract valuable information about the incentives that these groups have to see to it that the project implemented as designed.

3.3. Categories of Costs and Benefits

A. Direct transfer payments

Some entries in financial accounts really represents shifts in claims to goods and services from one entity in the society to another and do not reflect changes in national income. These are the so-called direct transfer payments, which are much easier to identify if our definition of costs and benefits is kept in mind. Common transfer payments in projects are: taxes, subsidies, loans, and debt services (the payment of interest and repayment of principal).

Taxes

Payment of taxes is clearly cost in financial analysis. When a firm pays a tax, its net benefit is reduced. But the firm's payment of tax doesn't reduce the national income. Rather it transfers income from the firm to the government so that this income can be used for social purposes presumed to be more important to the society than the increased individual consumption (or

investment) had the firm retained the amount of the tax. Thus, in economic analysis we would not treat the payment of taxes as a cost in project accounts.

Subsidies

Subsidies are simply direct transfer payment that flow in the opposite direction from taxes. If a farmer is able to purchase fertilizer at a subsidize price, that will reduce his costs and thereby increase his net benefits thus it is a benefit but the cost of the fertilizer in the use of the society's real resources remain the same. Again it makes no difference what form the subsidies takes.

Credit transactions

Credit transactions are the major form of direct transfer payment in projects. From the standpoint of the project owner, receipt of a loan increases the production resources he has; payment of interest and repayment of principal reduce them. But from the standpoint of the economy, these are merely transfers of control over resources from the lender to the borrower. The financial cost of the loan occurs when the loan is repaid, but the economic cost occurs when the loan is spent.

Depreciation allowances

Depreciation may not correspond to actual use of resources should therefore be excluded from the cost stream in economic analysis. The economic cost of using an asset is fully reflected in the initial investment cost less its discounted terminal value.

B. Costs of inputs

Physical goods: - construction materials, raw materials, etc. Here valuation is not a problem but the problem is associated with planning the required amount of input.

Labor: - skilled and unskilled. Here the problem of valuation may arise when the project uses family labor.

Land: - it is not difficult to identify. The problem is with valuation of land because of the very special kind of market conditions that exist when land is transferred from one owner to another.

In financial analysis, we directly take the market price if the use of these inputs involves cash outlays. If there are no cash payments for some of these inputs, it will not be considered as a cost. In economic analysis, however, since the use of these inputs is related with the use of real resources, they will be valued at their economic price and entered into economic accounts.

C. Contingency allowance

Contingency allowance may be divided into those that provide for physical contingencies and those for price contingencies. In turn, price contingency allowances comprise two categories, those for relative changes in price and those for general inflation.

Physical contingency allowance is a real cost & will reduce the final goods and services available for other purposes, i.e. it will reduce the national income and, hence, is a cost to the society. To the extent that physical contingency allowance is a part of the expected value of the project costs, it should be included in the economic analysis.

Price contingency *(Change in price)*

In most practical cases, in project cost estimation it is assumed that there will be no relative changes in domestic or international prices and no inflation during the investment period. It would clearly be unrealistic to rest project cost estimates only on the assumptions of stable price.

Relative changes in price - A rise in the relative cost of an item implies that its productivity elsewhere in the society has increased, that is, its potential contribution to national income has risen. Thus, costs that may be incurred due to possible relative changes in prices will be considered as a cost in both financial and economic analysis.

If the market is perfectly competitive, allocation of resources to alternative uses will be at a point where the MVP of that resource is equal in alternative uses.

$$MVP_X = MPV_Y = \text{-----}$$

Resources will then have been allocated through the price mechanism so that the last unit of every good and service in the economy is in its most productive use or best consumption use. No transfer of resources could result in greater output or more satisfaction. But if there are any changes in relative price, the value of commodities will change as the marginal utility in consumption changes. The same holds true for resources.

General change price (inflation), however, does not affect national income in real terms & in project analysis the most common means of dealing with it is to work in constant prices, on the assumption that all prices will be affected equally by any rise in the general price level. If inflation is expected to be significant, however, provision for its effects on project costs needs to be made in project financial plan so that an adequate budget is obtained.

D. Sunk costs

Sunk costs are those costs incurred in the past upon which a proposed new investment will be based. When we analyze a proposed investment, we consider only future returns to future costs; expenditure in the past, or sunk costs, do not appear in both financial and economic accounts. Money spent in the past is already gone; we do not have as one of our alternatives not to implement a competed project.

3.4. Tangible benefits of projects

Increased production: - increased physical production is the most common benefit of projects. Whether the increased output is marketed or consumed at home, it represents the benefit of a project.

Quality improvement: - to account as a benefit in both financial and economic analysis this must be reflected in the market price of the good.

Change in time of sale: - In some projects, especially in agriculture, benefits will arise from improved marketing facilities that allow the product to be sold at a time when prices are more favorable. The benefits of these projects arise out of the change in "temporal value".

Change in location of sale: - Such projects as investment on transport facilities to carry products from the local area where price are low to distant market where prices are higher. The benefits of such projects arise from the change in "location value".

Change in product form (grading & processing):- projects involving agricultural processing industries expect benefits to arise from a change in the form of the agricultural products.

Cost reduction (through mechanization):- The classical example of a benefit arising from cost reduction in projects is the gained by investment in agricultural machinery to reduce labor costs. In other industries also use of improved technologies that substitute labor could be an incremental benefit from the reduction in cost of labor as compared to the 'without' condition.

Losses avoided: - The 'with and' without' project analysis tends to point out such costs avoided by the project. Similarly risks avoided or reduced can be considered as benefits; sometimes such benefits are reflected by output increment through loss reduction.

Since all these benefits are real increase in value of commodities or reduction in costs, they will be considered in both analyses.

3.5. Externalities

1. Secondary costs and benefits

Projects can lead to benefits created or costs incurred outside the project itself. Economic analysis must take account of these external, or secondary, costs and benefits so they can be properly attributed to the project investment. It is not necessary to add on the secondary costs and benefits separately; to do so would constitute double counting. Thus, instead of adding on secondary costs and benefits, we have to adjust the market prices into 'economic' prices there by in effect converting them to direct costs and benefits.

Although using efficiency prices based on opportunity cost or willingness to pay greatly reduces the difficulty of dealing with secondary costs and benefits, there still remain many valuation problems related to goods and services not commonly traded in competitive markets.

Price effects caused by a project are also part of externalities. The project may lead to higher prices for inputs it requires and lower price for the outputs it produces. What are known as "forward linkages effects" thus may occur in industries that use or process a project's output, and backward linkages in industries that supply its inputs, in that such industries are encouraged or stimulated by increased demand and higher prices for their output or lower prices for their inputs. Conversely, other producers may lose because they now face increased competition, and other users of inputs required by the project may have to pay higher prices. The project may have wide-ranging repercussions on demands of inputs and outputs and cause gains and losses for producers and consumers and other than those involved in the project itself.

Examples of such costs and benefits are:

- Technological spill-over or technological externalities
- Negative or positive ecological effects in construction of dam: - it can increase spread of schistosomiasis and malaria, it can increase/decrease in fish catches, many down-stream effects, etc
- Multiplier effects of projects - if there had been excess capacity

2. Intangible costs and benefits

Almost all projects have costs and benefits that are intangible. These may include creation of job opportunities, better health and reduced infant mortality, better nutrition, reduced incidence of disease, national integration, national security, etc. These benefits do not, however, lend themselves to valuation.

Likewise in the cost side, a project may displace workers, it may increase disease incidences, it may increase regional income inequality, it may destroy or reduce the scenic beauty of an area, etc. All these are intangible costs of the project, which are not captured by or not reflected in the market prices. All these intangible benefits and costs must be carefully identified and where possible, be quantified although valuation is impossible.

These costs and benefits will not usually appear in financial accounts and are excluded from financial analysis. However, they should be included in the economic analysis at least in

qualitative terms if they are significant and measurable. Whether or not externalities are quantified, they should at least be discussed in qualitative terms.

In practice, it is not feasible to trace all externalities arising from such market imperfections: the analyst can only hope to capture the grosser distortions on more immediately affected changes in output. Externalities of various kinds are thus clearly troublesome, and there is no altogether satisfactory way in which to deal with them. There is no reason simply to ignore them and if they appear significant, to measure them. In some cases it is helpful to internalize externalities by considering a package of activities as one project.

International effects

Some external effects of projects may extend beyond the borders of the country concerned. Effects on world prices of traded goods (favorable or adverse), environmental effects, etc such external effects on other countries are similar in nature to the externalities within the country and raise similar problem. Whether accounts should be taken of these benefits accruing to, or of costs imposed on, other countries depend on value judgment.

3.6. With and without project comparison

Project analysis tries to identify and value the costs and benefits that will arise with the proposed project and compare them with the situation as it would be without project. The difference is the incremental net benefit arising from the project investment. This approach is not the same as comparing the situation "before" and "after" the project. The before-and-after comparison fails to account for changes in production that would occur without the project and thus leads to an erroneous statement of the benefit attributable to the project investment.

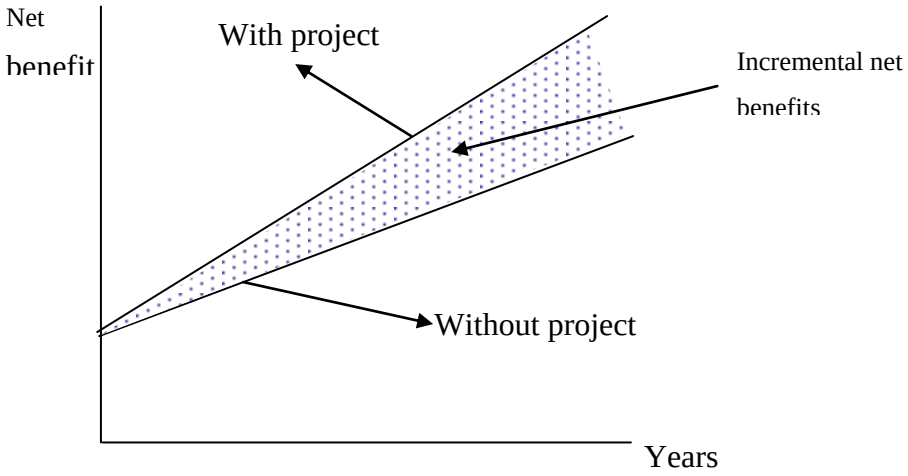


Fig. 1.1: The with/without project comparison

The above figure illustrates a change in output can take place if production is already increasing (decreasing) and would continue to increase (decrease) even without project. Thus, if production without the project were to increase at 3 percent per year and with the project at 5 percent per year, the project's contribution would be an increase of 2 percent per year. A before/after comparison would contribute the entire 5 percent increase in production, and not just the incremental benefits, to the project. Of course, if production were to remain stagnant, the before/after comparison would yield the same result as the with/without comparison.

In some cases, an investment to avoid a loss might also lead to an increase in production, so that the total benefit would arise partly from the loss avoided and partly from increased production. Again a simple before-after comparison would fail to account the benefits realized by avoiding the loss (Fig 1.2. depicts this situation).

.

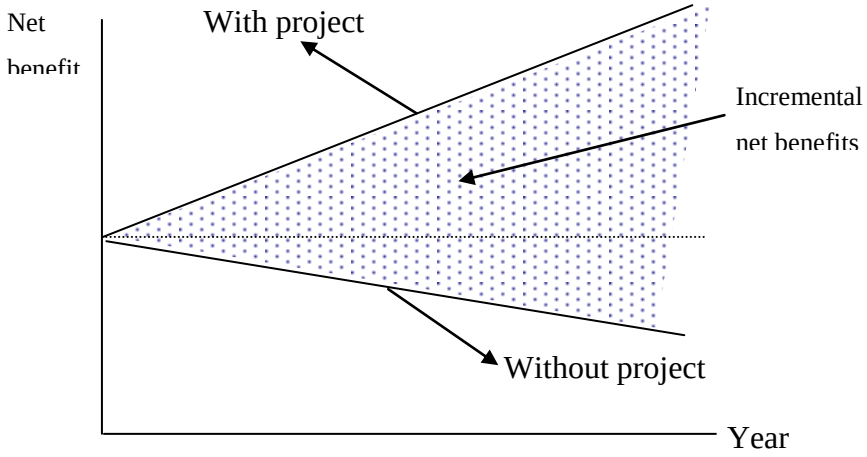


Fig. 1.2: With/without project comparison

3.7. Separable Components

Sometimes a project consists of several interrelated subprojects or components. When the components are independent of each other, each component must be treated as if it was a separate project and the analyst must determine whether each component increases or decreases the project's net total present value. Any component that has a negative net present value should be dropped, even if the total net present value of all the components is positive. In other words, each separable component must justify itself as a marginal part of the overall project.

Appraising such a project requires several steps. First, each separable component needs to be appraised independently. Second, each possible combination must be appraised. Finally, the entire project, comprising all of the separable components, must be appraised as a package.

4. FINANCIAL ANALYSIS

4.1. Objectives of Financial Analysis

- ***Assessment of financial impact***

The most important objective of financial analysis is to assess the financial effects the project will have on participants (farmer, firms, government, etc). This assessment is based on the comparison of each participant's current and future financial status with the project against the projection of his future financial performance as the project is implemented.

- ***Judgment of efficient resource use***

For management especially, overall return is important because managers must work within the market price framework they face. Investment analysis & financial ratio analysis provide the tool for this review.

- ***Assessment of Incentives***

The financial analysis is a critical importance in assessing the incentives for different participants of the project. Will participants have an incremental income large enough to compensate them for the additional effort and risk they will incur? Will private sector firms earn a sufficient return on their equity investment & borrowed resources to justify making the investment the project requires? For semipublic enterprises, will the return be sufficient for the enterprises to maintain a self-financing capability and to meet the financial objectives set out by the society?

- ***Provision of sound financial plan***

The financial plan provides a basis for determining the amount and timing of investment, debt repayment capacity, and also helps to coordinate financial contributions. Assessment of financial management competence especially for large projects, financial analysis will enable the analyst to judge the complexity of the financial management & the capability of managers so that he can judge what changes in organization and management may be necessary.

4.2. Pricing Project Costs and Benefits

Once costs and benefits have been identified, if they are to be compared, they must be valued. Since the only practical way to compare differing goods and services directly is to give each a money value, we must find the proper prices for the costs and benefits in our analysis.

4.2.1. Finding Market Prices

Project analysis characteristically are built first by identifying the technical inputs and output for a proposed investment, then by valuing the inputs and outputs at market prices to construct the financial accounts, and finally by adjusting the financial prices so they better reflect economic values. Thus, the first step in valuing costs and benefits is finding the market prices for the inputs and outputs. The project will have to consult many sources such as merchants, consumers, experts, published statistical bulletins, etc.

- ***Point of first sale and farm-gate price***

In project analysis, a good rule for determining a market price for agricultural commodities produced in the project is to seek the price at the "point of first sale". The increased value added of the product as it goes to higher markets in the channel arises as a payment for marketing services. Thus, if the project includes such marketing services in its design, we can take these higher prices. Even in this case, the analyst must make the project as small as possible and try to analyze the marketing service component independently of the production component. If the product is sold only in central markets, no local market, then the analyst must find out the value of marketing service to arrive at price at project site.

Prices for some products like agricultural products generally are subjected to substantial seasonal fluctuation. If this is the case as it may often is some decision must be made about the price in the seasonal cycle at which to choose the price to be used for the analysis. A good starting point is the farm-gate price at the peak of the harvest season. This is probably close to the lowest price in the cycle. The reasoning is that the rise in price is due to marketing services.

- ***Predicting Future Prices***

Since project analysis is about judging future returns from future investment, we have to judge what the future prices of inputs and outputs may be. The best starting point is to see the trend of these prices over the past few years. Having this data, the project analyst can forecast the price with certain degree of precision. However, even then judgment is important to arrive at what price we have to use to value inputs and outputs of the project. Moreover, we have to keep in mind that, as projects involve distant future, the prediction power of the model will decline as we go far from the present.

4.2.2. Change in prices

Change in prices could be general change in price or change in relative prices of goods.

- ***Change in relative price***

If relative price of inputs or outputs are variable over time,

$$\frac{P_{XO}}{P_{YO}} \neq \frac{P_{X1}}{P_{Y1}} \neq \frac{P_{X2}}{P_{Y2}} - - - -$$

These changes in relative price of items imply a change in marginal productivity of inputs in production or a change in marginal satisfaction (MU) in consumption.

$$\frac{MP_2}{MP_K} = \frac{w}{r} \quad \text{or} \quad \frac{mu_X}{mu_Y} = \frac{P_X}{P_Y}$$

Thus, changes in relative prices have a real effect on the project objective and must be reflected in project accounts in the years when such changes are expected. This can be judged from past trend. For instance, the price of agricultural products to price of inputs (manufactured) may rise over time. This would have a real effect on the net benefit of the firm.

- ***Inflation: an increase in general prices of goods***

Inflation is common for every country although the magnitude may vary between countries. However, the approach most often taken is to work the project analysis in constant price. It is assumed that inflation will affect most prices to the same extent so that prices retain their same general relations. The analyst then need only adjust future price estimates for anticipated relative changes, not for any change in the general price level.

It is quite possible, however, to work the whole project analysis in current (not constant) prices. Its advantage is it will reflect the true costs and benefits of the project. Moreover, it is possible to quantify the financial requirement of the project. The problem with this approach is it involves predicting inflation rates of both domestic and foreign countries that would have substantial impact.

4.2.3. Financial export and import parity price

As indicated earlier, financial analysis will be made base on market price. The project may use imported inputs and export its output, to foreign markets. If there are domestic markets for these inputs and outputs, and if the firm is free to sell or buy at the domestic or world market, we take the domestic price with appropriate adjustment to reflect the price at the project site. If, on the other hand, commodities of the project are produced only for foreign market or if the domestic demand cannot absorb the firm's output, we will take export-parity and import parity prices ever in financial analysis.

One common case for which an export parity price has to be calculated is that of a commodity produced for a foreign market. If for example, a project produces flower to export it to Canada or U.S.A., we start with the c.i.f. price at the harbor of importing country.

Export Parity Price

C.i.f. at point of import (say, Canada port)

Deduct- unloading at point of import

Deduct- freight to point of import (in this case air freight)

Deduct – insurance

Equals – *f.o.b.* at point of export (A.A)

Convert foreign currency to domestic currency at official exchange rate (OER)

Deduct –tariff (export duties)

Add - subsidy

Deduct - local port charges

Deduct - local transport & marketing (if not part of project)

Equals *export parity price* as project boundary

Deduct - local storage, transport & marketing costs (if not part of project cost)[1]

Equal export parity price at project location (farm gate)

A parallel computation leads to the import parity price. Here the issue can be finding the price of project's output that is intended to substitute previous imports. If this import substitute, we would have to compete with foreign products when it is sold in the domestic markets. In this case we need to determine the import parity price of the project's output. Similarly if a project uses an imported input in bulk, we may want to know the import parity price. In either case, the import parity price can be derived as follows.

Import Parity Price

F.O.B: price at point of export

Add-freight charges to point of import

Add-insurance charges

Add- unloading from ship to pier at port

C.I.F: Price at the harbor of importing countries

Convert foreign currency to domestic one (multiply by OER)

Add-tariffs (import duties)

Deduct-subsidies

Add-local port charges

Add-transport & marketing costs to relevant wholesale market

Equal price at wholesale market

Deduct-local storage & other marketing cost (if not part of project cost) -this is the marketing margin between central market and the project site.

Equals *import parity price* at project location (Farm/project gate price).

[1] If the commodity is exported, say via Djibuti port, we will deduct local transport costs from port to A.A. market

OER (official exchange rate) is the rate at which one currency (say, Birr) is exchanged for another currency (say, Dollar). It is official because it is the rate established by monetary authorities of a country not by the market mechanism. In financial analysis the OER would always be used.

Before calculating the export or import parity price at the project site, we need to forecast the future *c.i.f.* or *f.o.b*. price at the border. This may require assessment of the past trend of this border price. After we determined the future *c.i.f.* or *f.o.b.* price, we then continue to calculate export parity price.

4.3. Financial Ratios

From the projected financial statements for an enterprise, the financial analyst is able to calculate financial ratios that allow him to form a judgment about the efficiency of the enterprise, its return on key aggregates and its credit worthiness.

4.3.1. Efficiency Ratios

Inventory turnover

This measure the number of times that an enterprise turns over its stock each year and indicates the amount of inventory required to support a given level of sales. It can be computed as:

$$\text{Inventory turnover} = \frac{\text{cost of goods sold}}{\text{the inventory}}$$

The inventory turnover can also relate to the average length of time a firm keeps its inventory on hand.

A low ratio may mean that the company with large stocks on hand may find it difficult to sell its product, and this may be an indicator that the management is not able to control its inventory effectively. Thus a low ratio, though good, may indicate cash shortage & the firm might sometime be forced to sell by forgoing sales opportunities.

Operating ratio

This is obtained by dividing the operating expenses by the revenue.

$$\text{Operating ratio} = \frac{\text{Operating expense}}{revenue} (\text{cost of raw material, labor, etc.})$$

4.3.2. Income ratios

The long-term financial viability of an enterprise depends on the funds it can generate for reinvestment and growth and on its ability to provide a satisfactory return on investment.

Return on sales

This shows how large an operating margin the enterprise has on its sales.

$$\text{Return on sales} = \frac{Net\ income}{revenue}$$

Return on equity

It is an amount received by the owner of the equity. It is obtained by dividing the net income after taxes by the equity. Equity - an ownership right or risk interest in an enterprise. Equity capital is the residual amount left after deducting total liabilities (excluding stockholder's claim) from total assets.

$$\text{Return on equity} = \frac{\text{Net income}}{equity}$$

This ratio is frequently used because it is one of the main criteria by which owners are guided in their investment decisions.

Return on assets

$$\text{Return on assets} = \frac{\text{Operating income}}{\text{Assets}}$$

The earning power of the assets of an enterprise is viral to its success. The return on assets is the financial ratio that comes closest to the rate of return on all resources engaged. A crude rule of thumb is this value should exceed interest rate.

4.3.3. Credit-worthiness Ratios

The purpose of creditworthiness ratios is to enable a judgment about the degree of financial risk inherent in the enterprise before undertaking a project. It also helps to estimate the amount and terms finance needed.

Current ratio

This is computed by dividing the current assets by the current liabilities. Though it needs caution, as a rule of thumb, a current ratio of 2 is acceptable.

$$Current = \frac{\text{Current asset}}{\text{Current liability}}$$

Debt-equity ratio

This is an important ratio for credit agencies. It is calculated by dividing long-term liabilities by the sum of long-term liabilities plus equity to obtain the proportion that long-term liabilities are to total debt and equity, and then by dividing equity to obtain the proportion that equity is of the total debt and equity. These are then compared in the form of a ratio.

$$\text{Equity Ratio} = \frac{\text{Equity}}{\text{Equity} + \text{Long term liability}}$$

$$\text{Liability ratio} = \frac{\text{Long term liability}}{\text{Equity} + \text{Long term liability}}$$

$$\text{Debt - Equity Ratio} = \frac{LR}{ER}$$

It tells us, of the total capital, how much proportion is equity & how much is debt. If for example we have 40 to 60, it means that of the total capital 40% is debt and 60% is equity. In general strong equity base is good for a project to overcome risk & uncertainty. Especially in some risky projects, high ratio is a necessary condition.

Debt-service coverage ratio

The most comprehensive ratio of creditworthiness is the debt-service coverage ratio. This is calculated by dividing net income plus depreciation plus interest paid by interest paid plus repayment of long-term loans.

$$\text{Debt-service coverage ratio} = \frac{\text{Net income} + \text{Depr.} + \text{Interest}}{\text{Interest} + \text{repayment of loan (p)}}$$

It tells us how a project can absorb only shocks without impairing the firm's ability of meeting obligations. In contrary to this, it can also tell us how the firm chose an appropriate credit term.

5. ECONOMIC AND SOCIAL COST-BENEFIT ANALYSIS

5.1 Determining Economic and social Values

- Once financial prices or costs and benefits have been determined and entered in the project accounts, the analyst estimates the economic value of a proposed project to the nation as a whole.
- The financial prices are the starting point for the economic analysis; they are adjusted as needed to reflect the value to the society as a whole of both the inputs and outputs of the project.
- Economic analysis – analysis done using economic values.
- In general, economic analysis omits transfer payments (including credit transactions) and values all items at their value in use or their opportunity cost to the society (often a border price for traded items).
- When the market price of any good or service is changed to make it more closely represent the opportunity cost (the value of a good or service in its next best alternative use) to the society, the new value assigned becomes the "shadow price" (sometimes referred to as an "accounting price").
- In economic analysis the most important question is whether or not the project under study is beneficial to the national economy.
- Economic analysis is, therefore, conducted to identify costs and benefits where there is a significant divergence between market prices and economic costs or values, and its application is important in the selection of economically viable projects for Public Investment Program (PIPs) or Public Expenditure Program (PEP).

5.1.1 Purpose of economic analysis

- To ensure that public investment funds are used only for economically viable projects.

- To ensure that a convincing economic case can be made for PIP or PEP projects to benefit from external funding.

❖ Economic analysis is less likely to be needed when:

- The project is small (unless it is a pilot project likely to be replicated),
- The project is financially viable and although to producing primary for the local market, is receiving no significant protection and involves no significant negative externalities and no significant use of undervalued local resources.
- **What is opportunity cost?**

❖ The value of the alternative foregone by choosing a particular activity.

- For example, suppose a farmer produces both rice and maize hut applies all his available fertilizer to rice. If instead he transferred some of the fertilizer to his maize, he would reduce the value of his rice production somewhat, hut he might gain a much higher value of increased maize production. The value of his rice production forgone would be the opportunity cost of the fertilizer used for maize production.
- The opportunity cost of land can be investigated by asking what the alternative use of the land might be. Urban land can be used for houses, offices, shops, factories, and the like. Rural land is normally used for crops, pasture or forestry.

5.2 Economic Benefit and Cost Analyses

❖ A project will be profitable to society if the economic benefits of the project exceed the economic costs or to put in another way, if the net present value of the project to society is greater than zero.

❖ The question is, how should a projects economic benefits and costs be measured, and what common unit of account (or *numéraire*) should the benefits & cots be expressed in, given a societies objectives & the fact that it has trading opportunities with the rest of the world so that it can sell and buy outputs & inputs abroad (so that domestic & foreign goods will be made comparable).

- Broadly, there are two methods of measuring economic costs & benefits of a project: UNIDO approach and Little-Mirrlees approach.

UNIDO approach

- In this method economic benefits & costs may be measured at domestic prices using consumption as the *numiraire*, with adjustment made for divergence between market prices and economic values, and making domestic and foreign resources comparable using shadow exchange rate (SER).

- In this method, if commodities are traded, first all these traded goods will be adjusted for any distortions in the domestic markets.

- After this adjustment is made the adjusted domestic price will be multiplied by SER to make domestic resources be comparable with foreign resources.

- The easiest way for adjusting domestic market distortions is to use border prices, *c.i.f.*, for imports and *f.o.b.* for exports and then multiply this border price expressed in foreign currency by SER to arrive at economic border prices.

- But, if the commodities are non-traded, i.e. if *f.o.b.* prices are less than domestic prices & domestic prices less than *c.i.f.* prices and if the market prices are good estimates of opportunity cost or willingness to pay, we directly take the market price as economic value of the item.

- But if the prices of non-traded items (goods and services or factors of production) are distorted, we will adjust the market price to eliminate distortions and then use these estimates of opportunity cost as the shadow price to be entered in the economic analysis.
- This method can be summarized by the following example. Suppose we have a project producing export item that uses both foreign & domestic inputs. The net benefit (ignoring discounting) would be estimated as:
- Net benefit= SER(X-M)-D
- Where X - border price of exports in foreign currency

  M - Border price of imported goods in foreign currency

  D - Adjusted (economic) values of domestic goods in domestic currency

- SER - is the shadow exchange rate (assuming the official exchange rate does not accurately reflect the true value of foreign currencies to the economy).

- Where SER= DP (domestic price)
  WP (world price)

Little-Mirrlees approach

- The other method of adjusting market prices into economic prices is the Little-Mirrlees approach (see Little & Mirrlees, 1969, 1974).
- In this approach benefits and costs may be measured at world price to reflect the true opportunity cost of outputs and inputs using public saving measured in foreign exchange as the *numéraire* (that is, converting everything into its foreign exchange equivalent).
- The fact that foreign exchange is taken as a *numéraire* does not mean that project accounts are necessarily expressed in foreign currency.
- The above adjustment applies for traded goods (imported or exported goods). But if the goods or inputs in question are non-traded goods, the analyst needs to use conversion factor to translate domestic prices into their border price equivalent.

- A conversation factor (CF) is the ratio of the economic (shadow) price to the market price, that is:

$$CF = \frac{\text{Economic price}}{\text{Market price}}$$

- Taking the following example can summarize Little-Mirrlees approach of adjusting domestic prices into economic prices. A project that produces export goods can be assessed as follows.
- Net Present Value (NPV) = OER (X-M) - SCF.D

Where -OER- official exchange rate

X- Exported goods in foreign currency

M- Imported goods in foreign currency

SCF- standard conversation factor

D- price of non-traded goods in domestic currency

- To summarize, as long as SCF is the ratio of OER to SER, the two approaches - UNIDO and Little-Mirrless - differ only to the extent that SER is different from the actual exchange rate.

5.2.1 Economic Export and Import Parity Price

Export Parity Price

C.i.f. at point of import (say, Canada port)

Deduct- unloading at point of import

Deduct- freight to point of import (in this case air freight)

Deduct – insurance

Equals – *f.o.b.* at point of export (A.A)

Convert foreign currency to domestic currency at official exchange rate (OER) if you are using the L-M approach or shadow exchange rate (SER) if you are using UNIDO approach

Deduct - local port charges

Deduct - local transport & marketing (if not part of project) at their economic price and multiply it by SCF in L-M approach

Equals *export parity price* at project boundary

Deduct - local storage, transport & marketing costs (if not part of project cost) at their economic price and multiply it by SCF in L-M approach

Equal *economic export parity price at project location* (farm gate)

- A parallel computation leads to the economic import parity price. Here the issue can be finding the price of project's output that is intended to substitute previous imports or the project will use imported inputs. In either case, the import parity price can be derived as follows.

Import Parity Price

F.o.b. price at point of export

Add-freight charges to point of import

Add-insurance charges

Add- unloading from ship to pier at port

C.i.f. Price at the harbor of importing countries

- ❖ Convert foreign currency to domestic one (multiply by OER) if you use L-M approach and SER if you use UNIDO approach

Add-local port charges

Add-transport & marketing costs to relevant wholesale market at economic price and multiply it by SCF in L-M approach

Equal price at wholesale market

Deduct-local storage & other marketing costs at economic price and SCF in L-M approach (if not part of project cost) -this is the marketing margin between central market and the project site. If the project uses imported inputs, we have to add this cost to the project.

Equals *economic import parity price* at project location (Farm/project gate price)

- ❖ There is conceptual difference between social costs - benefits and economic cost - benefit analysis. The results of social cost-benefit analysis may diverge from the results of economic cost-benefit analysis.

- ❖ Economic costs and benefits when they are adjusted to consider other objectives of society as distributional consequences & other objectives, they become social costs & benefits of a project. This depends on the method used in the analysis. If the market prices are adjusted only for market distortions of various kinds; direct transfer payments & externalities, it is simply economic cost-benefit analysis.

- ❖ If on the other hand this adjustment process systematically considers other objectives as distributional aspects, it will become social cost-benefit analysis.

5.2.2 Adjusting Financial Prices to Economic Values

- ❖ We will divide these into three steps:

(1) Adjustment for direct transfer payments

- ❑ The first step in adjusting financial prices to economic values is to eliminate direct transfer payments.

(2) Adjustment for price distortions in traded items, and

- ❑ Traded items are those for which, if exports, f.o.b. price > domestic cost of production, or the items may be exported through government intervention by use of

export subsidies and the like, and, if imports , domestic cost of production > c.i.f. price.

- Conceptually-and usually in practice, too-prices for traded items in project analysis are more easily dealt with than those for non-traded items. We begin the valuation by determining the "border price." For imports, this normally will be the c.i.f. price and, for exports, normally the f.o.b. price.
- The border price is then adjusted to allow for domestic transport and marketing costs between the point of import or export and the project site; the result is the efficiency price to be used in the project account

(3) **Adjustment for price distortions in non-traded items**.

- The third step in adjusting financial prices to economic values is the adjustment for distortions in market prices of non-traded items. Non-traded items are those for which c.i.f. price > domestic cost of production > f.o.b. price, or the items are non-traded because of government intervention by means of import bans, quotas, and the like.
- Often, non-traded items will be bulky goods such as straw or bricks, which by their very nature tend to be cheaper to produce domestically than to import but for which the export price is lower than the domestic cost of production. In other instances, non-traded items are highly perishable goods such as fresh vegetables or fluid milk for direct consumption.

Summary

- In agricultural projects, the most common transfer payments are taxes, direct subsidies, and credit transactions that include loans, receipts, repayment of principal, and interest payments. Two credit transactions that might escape notice are accounts payable and accounts receivable. All these entries should be taken out before the financial accounts are adjusted to reflect economic
- A non-tradable good is defined as when:

c. i. f. ≥ Local Cost of Production > f.o.b.

- A tradable good would be subject to one of the following conditions:

Importable good: c.i.f. ≤ local production cost

Exportable good: f.o.b. ≥ local production cost

5.2.3 Social Aspect

- The process of development is inherently social, dealing as it does with the improvement of social conditions and working through social structures to achieve these objectives.
- It is, therefore, crucial to integrate comprehensive social assessment into the project formulation process.
- The precise role of social assessment can be defined as ensuring that people, their capacities, values and needs are put at the center of the development process.
- Project planners must make careful consideration of social factors when formulating projects. Experience has shown that ignorance of these factors can lead to project failure.
- Project formulators who have designed projects by applying expert knowledge without stakeholder consultation have often failed to achieve positive results.
- If social assessment is primarily concerned with ensuring that projects, and consequently the development process, are 'people- centered' then the following points must be taken into account in any project formulation exercises. These are:
    - Identifying of stakeholders and target groups: people, groups, communities and institutions
    - Participation issues: create awareness
    - Social impact assessment (SIA):is a term used to classify the process of assessing how the benefits (and Costs) of a project are distributed amongst various stakeholders over time
    - Assessing of mitigation measures, strategies and costs of SIA.

6. MEASURES OF PROJECT WORTH

When costs and benefits have been identified, quantified and priced (valued), the analyst is trying to determine which among various projects to accept, which to reject. There are two methods for measuring the worthiness of projects: undiscounted & discounted methods. The arithmetic of these discounted methods, and the way we interpret the measures and their limitations, is exactly the same whether we are using them for financial analysis or for economic analysis.

Before embarking on the methods, it is important to note two critical points. First, there is no one best technique for estimating project worth; each has its own strength & weakness. Second, these financial and economic measures of investment worth are only tools of decision-making, i.e., they are necessary conditions & are not sufficient condition for final decision. There are many other non- quantitative and non-economic criteria for making final decision of whether to accept or reject a project.

6.1. Undiscounted measures of project worth

6.1.1. Ranking by inspection

In some cases, we can tell by simply looking at the investment costs and the 'shape' of the stream for the net value of incremental production that one project should be accepted over another if we must choose. The analyst can sometimes simply choose one project among alternatives projects by examining the following:

- Total cost of investment and investment period;
- The structure, & amount of costs and benefits;
- The structure & total amount of the net incremental benefit;
- The lifetime of the project, etc.

The problem with this method is that the selection lacks objectivity.

6.1.2. Payback Period

The payback period is the length of time from the beginning of the project until the sum of net incremental benefits of the project equal to total capital investment. It is the length of time that the project requires to recover the investment cost.

The method is very simple. Moreover, it is a good measure when the project has problem of liquidity. The pay-back period is also a common, rough means of choosing among projects in business enterprise, especially when the choice entails high degree of risk. Since risk generally increases with futurity, the criterion seems to favor projects that are *prima facie* less risky.

This method has two important weaknesses: First, it fails to consider the time & amount of net benefits after the payback period. Second, it does not adequately take into account the time value of money even in the payable periods.

Consider the following alternative projects

Alternative projects	Year	Investment cost	Net incremental benefits	Commutation net incremental benefits
I	1	20000	-	
	2		2000	
	3		8000	
	4		10000	
	5		9000	29000
II	1	20000	-	
	2		200	
	3		12000	
	4		8000	
	5		12000	32000
III	1	20000	-	
	2		1000	
	3		5000	
	4		6000	
	5		8000	
	6		10000	
	7		5000	
	8		2000	37000

* Note that the incremental net benefit could be financial or economic incremental net benefits. Project I & II have a payback period of 4 year. But project III has a payback period of 5 years. Thus, based on this criterion, project I & II have equal higher rank than project III. Therefore, the method fails to consider the time & amount of net incremental benefit after the payback period-project III. In addition, the method results equal rank for both project I and II. Yet we know by inspection that we would choose project II over project I because more of the returns to project II are realized earlier. This method is a measure of cash recovery, not profitability.

6.1.3. Rate of return on investment

The rate of return, also referred to as the average rate of return, has many variants due to differences in how it is computed. All the variants, however, have two features in common; (i) use of accounting concepts in calculating benefits and (ii) no adjustment for time value of money.

6.1.3.1. Proceeds per unit of outlay

Investments are ranked by the proceeds (cumulative of net incremental benefits) per unit of outlay (investment cost). It is the total net value of incremental net benefits divided by the total amount of investment. In the previous example, project I, II & III have a proceeds per outlay of 1.45, 1.6 and 1.85, respectively. Hence, according to this criterion, project III will be ranked first.

6.1.3.2. Average annual proceeds per unit of outlay

To calculate this measure, first the total net incremental benefits will be divided by the time it will be realized to arrive at average annual net incremental benefits, and then this average value will be divided by total investment costs. In this method, project I, II & III will have average annual proceeds per unit of outlay of 0.36, 0.40 and 0.26, respectively. Hence, project II will be chosen. This criterion has serious flaws. By failing to take into consideration the length of time of the benefit stream, it automatically introduces a serious bias toward short-lived investments with high cash proceeds.

6.1.3.3. Average income on book value of the investment

This is the ratio of average income to the book value of the assets (i.e. the value after subtracting depreciation) stated in percentage terms. This measure is useful and commonly used way of assessing the performance of an individual firm. It is also sometimes used as an investment criterion. This measure, as the previous one, does not take into consideration the timing of the benefit stream. In the above example, assuming strait-line deprecation for all projects, average income on book value can be calculated as follows:

Project	Average net value of incremental benefit	Annual deprecation	Net average income	Average book value	Average income on book value
I	7050	5000	2250	10000	0.225
II	8000	5000	3000	10000	0.300
III	5285.7	2857.1	2428.6	10000	0.242

6.2. Discounted measure of project worth

Time value of money

Present values are better than the same values in the future and earlier returns are better than later. This shows that money has time value. Thus, to include the time dimension in our project evaluation, we have to use discounting methods. Discounting is essentially a technique that 'reduces' future benefits and costs to their 'present worth'. The rate used for discounting is called discount rate.

Suppose a bank lends 1567.05 Birr for a project at 5% interest rate. The project owner is supposed to repay the principal & interest rate after 5 years. How much the owner will have to pay at the end of 5 years?

A_t -= P $(1 + r)^t$

A_t = total amount after t years

r = interest rate

t = time

$A_5 = 1567.05\ (1 + 0.05)^5$

$\underline{\underline{= 2000\ B}}$

Suppose again a project is expected to obtain 2000 B after 5 years. Value of this money today can be calculated as:

$$P = \frac{At}{(1+r)^t} = \frac{2000}{(1+0.05)^5} = \underline{\underline{1567.05}}$$

The difference between this & the previous is only the viewpoint. The interest rate used for compounding assumes a viewpoint from here to the future, whereas discounting looks back ward form the future to the present.

6.2.1. Net present values

The net present value of an investment proposal is the present value of expected future net cash flows, discounted at the costs of capital, less the initial outlay.

$$NPV = \sum_{t-1}^{n} \frac{At}{(1+r)^t} - I$$

NPV- net present value

A_t = net cash flow for the year t, r - cost of capital, n- life of the project

- ***Choosing the discount rate***

To be able to use discounted measures of project worth we must decide upon the discount rate to be used for calculating the net present worth. For financial analysis, the discount rate is usually the marginal cost of money to the firm (project owner). This often will be the rate at which the enterprise is able to borrow money. If the incremental capital to be obtained is a mixture of equity and borrowed capital the discount rate will have to be weighted to take account of the return necessary to attract equity capital on the one hand and the borrowing rate on the other

$$r = \frac{Equity}{total\ \text{cap}}\ x\ \text{return needed to attract cap} + \frac{\text{borrowed cap}}{total\ \text{eaptial}}\ x\ \text{borrowry rate}$$

For economic analysis, there are different alternative ways. Probably the best discount rate to use is the opportunity cost of capital. It is the return on the last or marginal investment made. If set perfectly, the rate would reflect the choice made by the society as a whole between present and future returns, hence, the amount of total income the society is willing to save. In the net present value method, the higher the NPV, the more desirable the project is. All projects that have a positive NPV are accepted and projects that have a negative NPV are rejected.

However, in ranking mutually exclusive project (if one is chosen, the other cannot be undertaken), ranking based on NPV depends on the dissonant rate used. That is if we have two

mutually exclusive projects, projects project A and project B - project A may be ranked first in some ranges of discount rates but may turn out to be second in some other ranges. Assume these two projects have the following net financial or economic return.

Year	Project A	Project B
0	-100	-1000
1	200	600
2	400	400
3	500	400
4	700	200

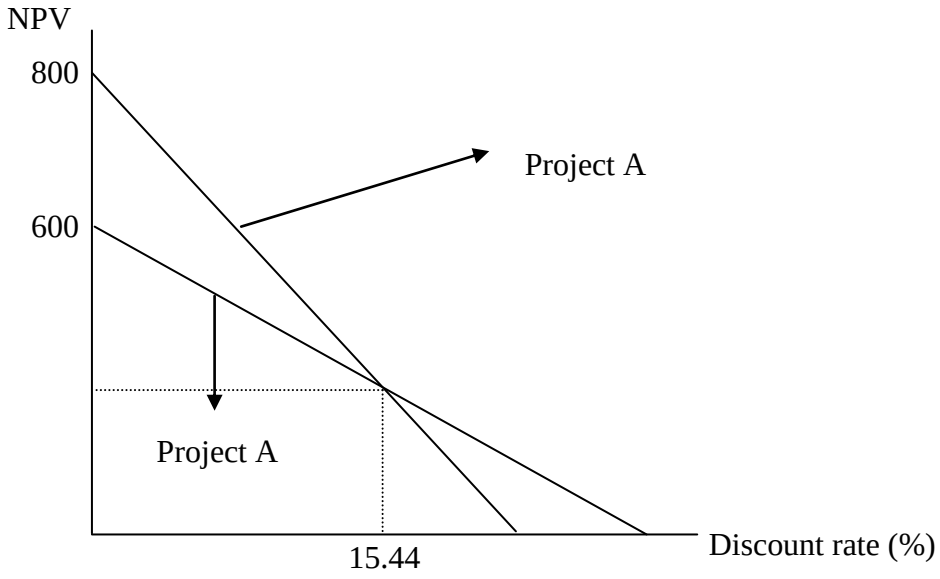
Calculate the NPV of project A and B for various discount rates, say discount rates of 0, 4, 8, 12, 15.44, 16, 20, and 24. The following table shows the NPV of these projects at various discount rates.

NPV and Discount rates

Discount rate	NPV of A	NPV of B
0	800.00	600.00
4	604.99	473.30
8	439.56	363.03
12	298.20	266.41
15.44	192.56	192.53
16	176.61	181.23
20	71.37	105.71
24	-20.24	38.41

From the above table it is clear that as long as the discount rate is lower than 15.44 % the NPV of project A is greater than project B, but if the discount rate is greater than 15.44% project B is preferred to project A. Discounted measure of project worth based on discounted NPV, though it accounts the time value of money and all flows in the lifetime of the project, it depends on the

value of discount rate (*r*). The discounted present value of the two projects and their relationship with discount rate can be depicted by the following graph.



6.2.2. Internal Rate of Return (IRR)

The internal rate of return is defined as the rate of discount, which brings about equality between the present value of future net benefits & initial investment. It is the value of *r* in the following equation.

$$I = \sum_{t=1}^{n} \frac{At}{(1+r)^t}$$

I – investment cost

A_t – Net benefit for year t

r - IRR

n - Life of the project

Illustration: For project A in the above table can be formulated as

$$1000 = \frac{200}{(1+r)^1} + \frac{400}{(1+r)^2} + \frac{500}{(1+r)^3} + \frac{700}{(1+r)^4}$$

r can be found through trial & error method.

When r = 23.068 percent the value in the above equation in the right hand side will be equal to 1000.0087 which is equal to the value in the left hand side. The problem with this method is that the value of r (IRR) can only be found by trial and error.

The procedure can be described as follows:

1. Select an arbitrary value of r;
2. Calculate the value of the right hand side equation with this value of r.
3. If the RHS value is lesser than the value in the left hand reduce the value of r. If the RHS is greater than the LHS, increase the value of r; continue until this the RHS is very close to the LHS. When the RHS is more or less equal to LHS, it is that value of r, which is the IRR.

What does IRR really mean?

It is the maximum interest that a project could pay for the resources used if the project is to recover its investment and operating costs and still break even. In other words it is the maximum rate of interest that a project could pay if all resource were borrowed. The IRR is a very usefully measure of project worth. It is commonly used by most international financing ageneses.

1. IRR represents the rate of return on uncovered balance; and
2. IRR represents the command rate of return earned on initial investment for the life of the project.

The first interpretation can be seen by taking the previous project (project A). IRR can be calculated as:

$$1000 = \frac{200}{1+r} + \frac{400}{(1+r)^2} + \frac{500}{(1+r)^3} + \frac{700}{(1+r)^4}$$

IRR (r) was found to be 23. 06% as mentioned previously. This IRR may be regarded as the rate of return on the uncovered balance in the following manner.

How do we use IRR for selection criterion? Basically a project will be accepted if its IRR is equal to or greater than the opportunity cost of capital. In financial analysis the lending interest rate is usually taken for decision-making. But in economic analysis the IRR must be compared against rate is usually taken for decision-making. But in economic analysis the IRR must be compared against the social rate of discount (which is the opportunity cost of capital at the margin if saving is taken as an enumerative and the rate of decline in marginal utility of income if consumption taken as an enumerative).

A project may result more than one possible IRR though it is extremely rare. This can only occur when a project has negative net returns after successive positive returns. This can arise, for instance, when there is a replacement investment around the mid-way in the life of the project. In such instances, a project will have positive return then after. This condition may give rise to two IRR. This is one of the criticisms of IRR method since no similar problem exists with the other methods.

6.2.3. Benefit Cost Ratio

A third discounted measure of project worth is the benefit-cost ratio. This is the ratio obtained when the present worth of the benefit stream is divided by the present worth of the cost stream. The mathematical formula is given below.

$$B-C=\frac{\sum_{t=1}^{n}\frac{Bt}{(1+r)^t}}{\sum_{t=1}^{n}\frac{Ct}{(1+r)^t}}$$

Where - Bt - are the benefits in period t

Ct - are the costs in period t

n - project life

r - discount rate

The formal selection criterion for the benefit-cost ratio measure of project worth is to accept all independent projects with a benefit-cost ratio of 1 or greater

If such a case exists in a particular project, the analytical problem can be reserved by using either the extended yield method or the auxiliary interest rate method. For further readings when the cost and benefit streams are discounted at the discount rate. In the case of mutually exclusive projects, the benefit - cost ratio can lead to an erroneous investment choice. The danger can be avoided most easily by using the net present worth criterion for mutually exclusive projects. [2]

6.2.4. Net Benefit - investment Ratio

This criterion is suitable and convenient for ranking projects especially when sufficient budget is not available to implement all projects that satisfy other criteria. That is, two or more projects

may all have a positive NPV, IRR that exceeds the discount rate, both financial and economic discount rates, and a benefit-cost ratio of greater than one. In this case, ranking could be made using net Benefit - investment ratio. This can be calculated as:

$$\text{Net benefit - investment ratio} = \frac{\sum_{t=1}^{n} \frac{(Bt - Ct}{(1+r)t}}{\sum_{t=1}^{n} I/(1+r)^t}$$

Where - B_t Benefits, C_t - costs, I- investment, r-discount rate, I-investment cost

It is simply the present value of net benefits divided by the net present worth of the investment. The formal selection criterion for the net benefit - Investment ratio measure of project with is to accept all projects with a ratio of 1 or greater when they are discounted with appropriate rate - in order, beginning with the largest ratio value and preceding until available investment funds are exhausted.

This ratio determines if project will have a net benefit greater than the investment at some stated amount of return on capital. In the previous example, using 12% discount rate, project A & B result NB 1 ratio of 1.298 and 1.266, respectively.

6.3. Comparisons among Discounted Measures

The above measures of project worth may give different ranking if projects that are being comparing are different in their:

1. Cash flow structure
2. Magnitude of costs and benefits
3. Life time

1. Some projects may give high return in the early stage of the project & decline thereafter & some other projects may give lower return in the early stage & grow later in the life of the project. The former will be less sensitive to changes in discount factor as compared to the latter.
2. For some projects the costs & benefits could be large in magnitude than other projects. In this case ranking based on NPV & IRR may not give same result.
3. Some projects have shorter life than others. Here also the ranking could be different in different erasures.

If a firm or government has unlimited funds, which is rare in reality, these differences have no significant implication in the decision. In such cases, projects with a positive NPV, the IRR value of greater than opportunity cost of capital (discount rates), the B-C ratio & Net return-investment ratio of greater than one will all be chosen.

However, if there is a limited fund, as is often the case, and if different criterion gives rise to different results, a decision must be made as to which criterion to use for selection. Which criterion is hen more appropriate to select among such mutually exclusive projects?

Mutually exclusive projects

Two projects could be mutually exclusive (implementing one project necessarily precludes implementing another) for two reasons: one, if there is no enough capital funds, and second, if these two projects are technically contradicting (such as labor intensive or capital intensive techniques). In this case, one can calculate the IRR on the marginal flows and compare it against the cost of capital for the firm.

6.4. Capital rationing

If a firm has a number of proposals which have NPV>0 (IRR>K) but cannot undertake all these projects because of the limited availability of funds at present. Since the objective of investment decision making is to maximize the NPV of the chosen package of investments the following procedure may be followed for selection.

1. Consider all combinations which can be accommodated with in capital budget constraint.
2. Choose that feasible combination which has the highest NPV

This procedure may be illustrated with an example. A firm has a capital budget constraint of Birr 100,000 and six proposals with the following characteristics.

Proposal	Outlay required	NPV	IRR (%)
1	60000	25000	14
2	50000	20000	14.5
3	40000	18000	15.0
4	25000	10000	13.0
5	20000	10000	12.0
6	5000	6000	25.0

The set of proposals which can be accommodated within the budget of Birr 100,000 and their NPV are shown below

Set	Outlay required	NPV
1,3	100,000	43000
1,4,6	90,000	41000
1,5,6	85,000	41000
2,3,6	95,000	44000
2,4,5,6	100,000	46000
3,4,5,6	90,000	44000

The set consisting of proposals 2, 4, 5 and 6 is the most desirable set as it has the largest NPV.

The above problem can be translated into a mathematical programming model

Maximize $\sum_{j=1}^{r} NPV_j \; x_j$

Subjected to $\sum_{j=1}^{n} A_j \quad X_j \; = C_o$

NPU_j - net present value of project j

X_j - 1 if proposal j is selected

0 if proposal j is rejected

A_j - Outlay on project j

C_o - funds constraint in period 0

This particular formulation where X_j is constrained to be 1 or 0 can be solved with the technique of integer programming. If X_j can take a fractional value, the technique of linear programming is applicable.

One thing must not be forgotten in appraisal: that is the appraisal must be done for both financial and economic costs & benefits. The criterion in financial (which vireos the project from the viewpoint of the private owner) appraisal would be governed by the strategy of the firm, if systematically articulated. Moreover subjective, value judgment of managers about other objectives will play an important role in the final decision making process. Since a firm can be

having other objectives other than profit maximization, these objectives will be considered in the final decision-making.

In economic analysis, on the other hand, it is sufficient to establish a realistic opportunity cost of capital and accept for implementation those projects which meet such other criteria as regional a sect oral balance, effect on income distribution (if it not included in the calculation of wage rates or included independently in the farm of distributional weight in the final assessments), or administrative feasibility. That is the final decision will be made on the value judgment of the political body about the above national objectives just as managers do in financial analysis.

7. FOLLOW-UP, MONITORING AND EVALUATION OF PROJECTS

Introduction

- Monitoring your project activities is concerned mainly on a continuous and systematic collection of information to assess delivery, identify difficulties, ascertains problem areas, and finally recommended remedial actions.
- Whereas, evaluating your project output is a periodic assessment of relevance, performance, effectiveness, and impact of the project in the context of its states objectives.
- It is the process of converting monitoring data to information and the knowledge.
- Accordingly, in dealing with this final but relevant section, you should continuously monitor your project implementation phase and periodically evaluate both the relevance and impact of your project outputs.

❖ Project implementation involves various activities which are interrelated.
❖ Each of the numerous activities or tasks involved should take their right full place, chronologically and financially, because some activities, by write of their content and sequential relationships, determine the progress of project implementation.
❖ As a result, it is necessary to plan ahead and look into all that may be required, as well as problems to be faced.

☐ Follow-up

❖ Follow-up is a method by which a project promoter keeps a watch on the progress or project implementation.
❖ A project promoter could be an individual or an agency of P.L.C. etc.
❖ Although the follow-up is basically necessary, it is essential to establish and organize a management at the project level.
❖ In follow-up of project implementation, there is no need to hurry. What is required is diligence and caution, as well as to know and analyze the sequential relationship of activities and to identify the important and critical ones.

- **Monitoring**

- ‘Monitoring’ is an internal management activity undertaken during the progress of project implementation in order to promote its success.
- It enables a manager to identify and assess of a project. It also provides the basis for corrective actions.
- The monitoring system enables the easy identification of variances, which are deviations between the plan and the actual situation, the reason for deviations and implications for such variances.

Primary Questions of Monitoring

- Are the right inputs being supplied/delivered at the right time?
- Are the planned inputs producing the planned outputs?
- Are the outputs leading to the achievement of the planned objectives?
- Is the policy environment consistent with the design assumptions?
- Are the project objectives still valid?

- **Evaluation**

- Evaluation, in the context of project implementation, is an ongoing activity used to reassess components necessary to meet project objectives in the light of experience as implementation proceeds.
- Evaluation draws on information supplied through monitoring, as well as special studies to reconsider and adjust project components as required through such mechanisms as reformulation.
- As a tool, evaluation can be applied at different points in the project cycle to elicit information for project identification and, subsequently, project design (appraisal); for ongoing management (monitoring and reviews); or for future development activities (post-evaluation studies).

Primary Questions of Evaluation

- Were the commitments honored from all sides? Did the activities that were planned actually occur?

- What should have been planned (rather than what was actually planned) to reach the projects objectives more effectively/efficiently?
- This requires a critique of the planning process, and of the coherence between program and objectives. It may also extend to a critique of program objectives themselves.
- What could have been achieved with the same resources and in the same time if the project/program had been managed more efficiently and effectively?

Key Qualities Of Monitoring and Evaluation Mechanisms

- Timely - data is collected and fed back into the system in time for adjustment to be made
- Accessible - the right mechanism is available for the right task
- Simple user - friendly, and thus readily adapted to the project ongoing and systematic
- Data - produces a consistent flow of verifiable data
- Offer a variety of approaches - to meet the needs of different projects and cultures; and
- Promote follow-up - results encourage their use in follow-up activities.

_____///////_____