

DEVELOPMENT PLANNING AND PROJECT ANALYSIS -II

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LECTURE NOTE

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Chapter I: Basic Concepts

1.1. The Project Concept

Definition: What is a Project?

- ✓ Different organizations and authors provide different definitions for the concept *project*.
- A project is a proposal for an investment to create, expand and/or develop certain facilities in order to increase the production of goods/services/during a certain period of time in a community, region, country, market area and/or certain organization (firm, public organization, NGO, etc).
- A project is defined as a complex economic activity in which scarce resources are committed in the expectation of benefits that exceed these resources(costs).

- ✓ According to Little and Mirrlees, a project is a scheme, or part of scheme, for investing resources which can reasonably be analyzed and evaluated as an independent unit.
- ✓ A project is an investment activity upon which resources are expended to create capital assets that will produce benefits over an extended period of time and which logically lends itself to planning, financing and implementation as a unit. A specific activity, with specific starting point and specific ending point, intended to accomplish a specific objective.(Gittinger,1982)

Generally, a project is:-

- ❖ An investment activity which lends itself to planning, financing and implementation as a unit;
- ❖ Expressed in terms of definite location, time and target group or beneficiaries;
- ❖ Expected to generate specific output(benefit) after its completion;
- ❖ Managed by a separate administrative structure or operated through the existing structure

Basic characteristics of a project

1. A project involves the investment of scarce resources in the expectation of future benefits.

- Projects have specific benefits that can be identified, quantified and valued, either socially or monetarily/commercially/.

2. Projects have measurable objectives

- Projects have specific beneficiaries which needs to be specifically spelt out during project planning.

3. A project is the smallest operational unit.

- A project can be planned, financed and implemented as a unit.

- Despite the fact that a project constitutes many activities and tasks, it is defined as the smallest operational unit.
 - Because, it is bounded by different factors. These are:
 - **Projects are conceptually bounded.**
 - The problem and specific objective of a project involves conceptual delimitations.
 - **Projects are geographically bounded.**
 - **Projects are organizationally bounded.**
 - There should be certain organizational unit responsible
- 7 for project implementation.

- **Projects are time bounded.**
 - Projects have specific lifetime, with a specific start and end time.
- 4. Uncertainty and risks** is inherent in any project.
- Achieving project objectives can not be predicted in advance with accuracy.
 - **The factors that make project risk are:**
 - A.** Significant and multiple types of scarce resources are committed today expecting outcome in the future;
 - B.** Benefits are expected to be generated in the future, which is less predictable;
 - 8 C.** Capital investments are irreversible, i.e. exit has its own costs.

5. It has a scope that can be categorized into definable tasks.

- Projects usually have well defined sequence of investment and production activities

6. It may require the use of multiple resources.

- This has an implication on management of project implementation.
- The more diverse the types of resources are mobilized, the more complex will the management be.
- The outcome of project and hence development endeavor is sensitive to the management of each type of resources.
- Ill managed resource can contribute more to cost than to benefit.

Why Project Planning?

- There is basic economic problem of scarcity in the face of unlimited needs.
- This leads to make choices on the means and ends of development, which involves the rational use of limited resources to attain the economic ends.
- Thus, investment decisions are an essential part of the development process.
- The more sound the investment decision is, the more success will be in the development endeavor.

- The need for project planning, preparation and study emanates from:
 - A. The quest for change: dissatisfaction with the present and/or pressure or incentive for improvement in the future
 - B. Change involves investment/commitment of resources to realize the objectives.
 - C. The scarcity of investible resources and unlimited development/business needs;
 - D. Investment is all about resource commitment into the future, which is less predictable;

- E. An investment schemes have an inherent high risk
- F. The costs and benefits are temporally spread and particularly the large part of the costs are incurred earlier and the benefits are generated later on.
- ✓ This raises the question of comparing and equating the future and present values.

G. Decision-making is not simple and perfect as it is assumed in orthodox economics.

- These features of investment decisions constitute:
 - the reasons that justify the significance and relevance of project planning and
 - the major constraints and challenges faced by any project planner and decision maker in project viability studies.
- Thus, decision makers have to make every effort to systematically rationalize their decisions by undertaking rigorous viability studies.

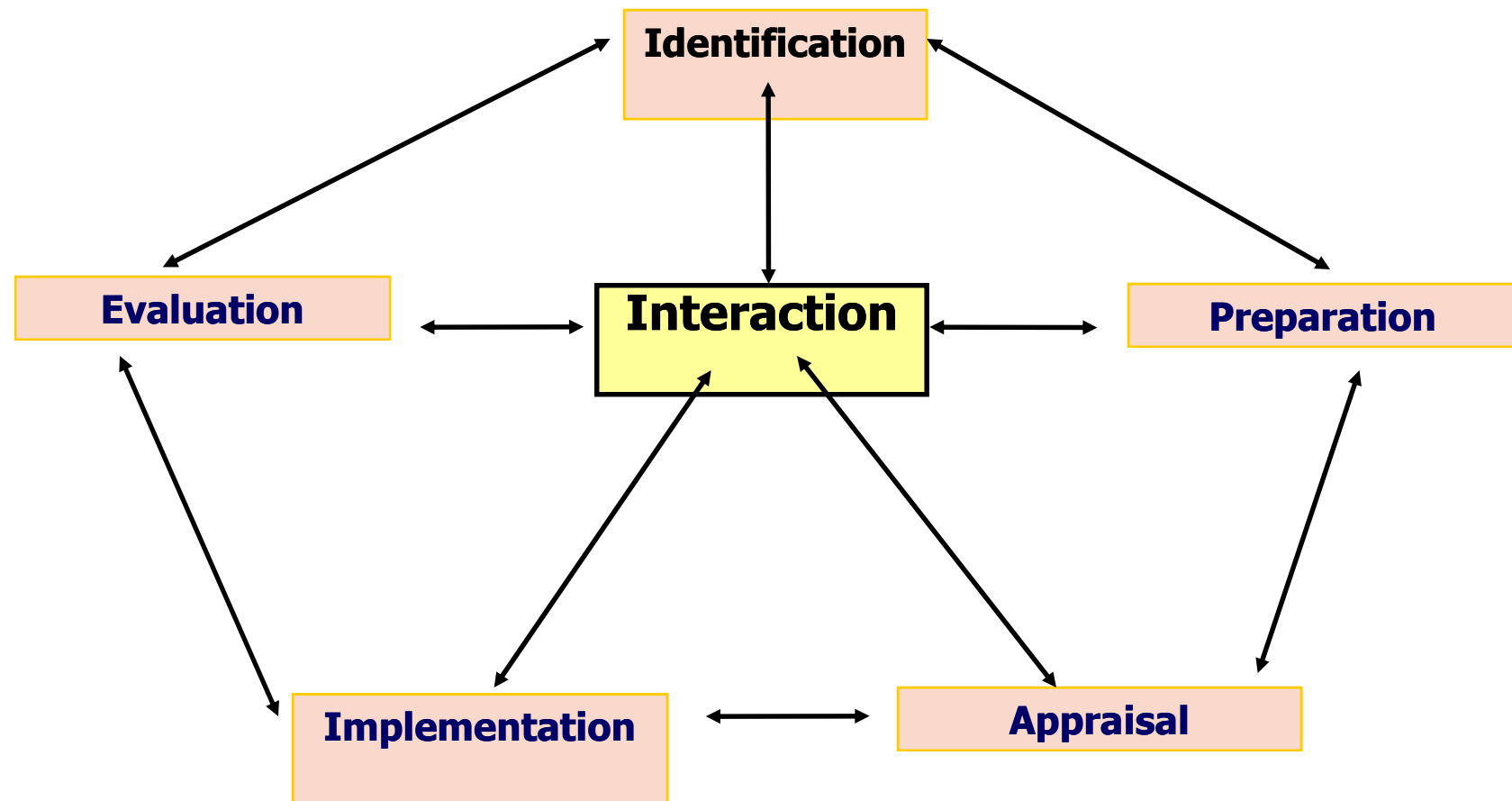
Types of Projects

- **There are different types of projects. That is; a project can be;**
 - **New, updating and / or expansion**
 - **Market based, Resource based, Felt need**
 - **Private, NGOs, and/or government/public**
 - **Industrial, Agricultural and Service**

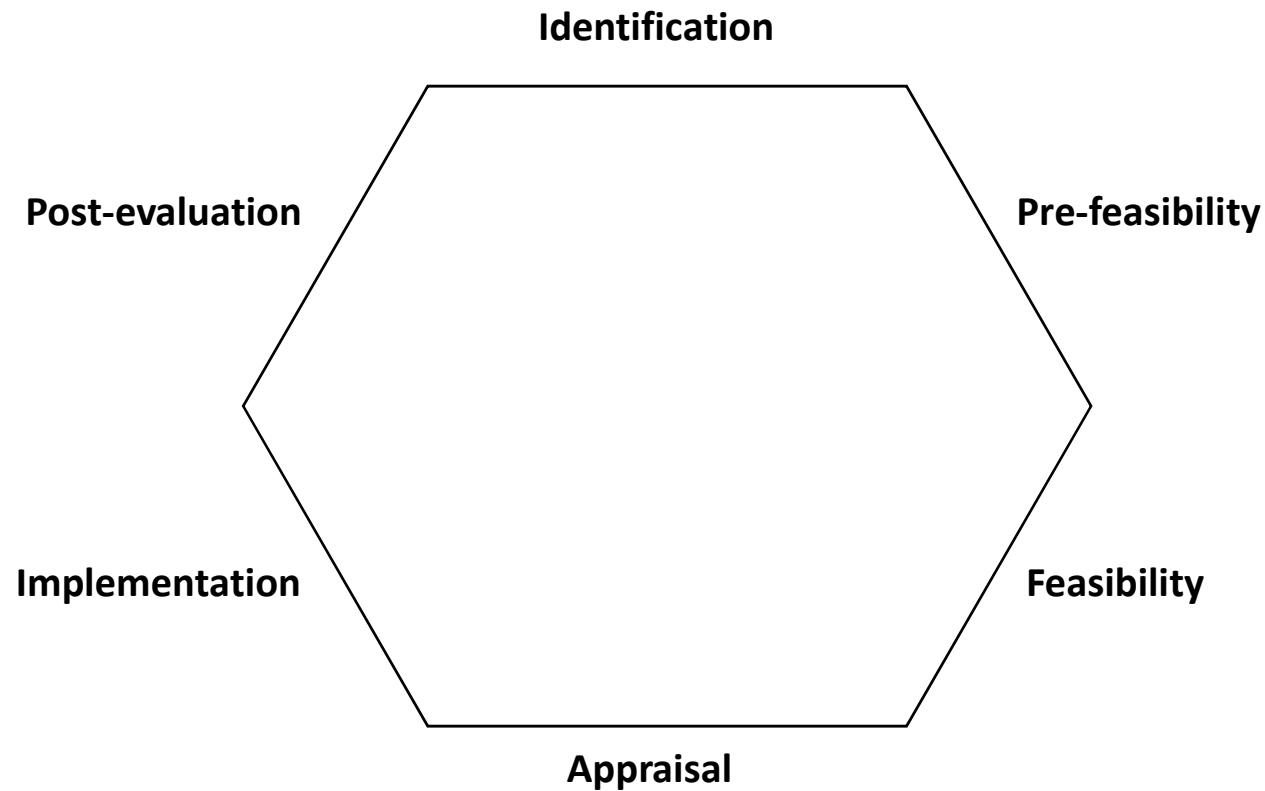
1.3. The Project Cycle

- Project cycle is the different stages, phases, levels, steps, events or sequences that a project follows.
- There are several models of project cycle but the most important ones are:
 - **Baum Project Cycle Model-** developed by WB
 - **The UNIDO project cycle model**

PROJECT CYCLE (W.C BAUM)



UNIDO P.C. Model



- Alternatively, we can categorize project cycle in to three main phases (UNIDO, 1991)

1. **Pre-investment phase**

- A. Identification/opportunity study/
- B. Pre-feasibility study/ pre-selection/
- C. Feasibility study
- D. Support study;
- E. Appraisal study

2. Investment phase

- A. Negotiating and contracting;
- B. Engineering design;
- C. Construction;
- D. Procurement
- E. Erection and installation
- F. Pre production marketing;
- G. Manning and training

3. Operation phase

- A. Commissioning and hand over and starting of operation
- B. Post project evaluation/appraisal/
- C. Replacement/rehabilitation
- D. Expansion/innovation

1. Identification (Opportunity studies)

- The first stage in the project cycle is to find potential projects.
- It is the identification of investment opportunities.
- Project ideas can emanate from a variety of sources.
- In general, one can distinguish two levels where project ideas are born: The **macro level** and the **micro level**.

- At the macro level, project ideas emerge from:
 1. National policies, strategies and priorities as may be initiated from time to time;
 2. National, sectoral, sub-sectoral or regional plans and strategies
 3. General surveys, resource potential surveys, regional studies, master plans, statistical publications which indicate directly or indirectly investment opportunities;

4. Constraints on the development process due to shortage of essential infrastructure facilities, problems in the balance of payments, etc.;
5. Government decisions to correct social and regional inequalities or to satisfy basic needs of the people through the developments of projects;

6. A possible external threat that necessitates projects aiming at achieving, for example, self sufficiency in basic materials, energy, transportation, etc;
7. Unusual events such as draughts, floods, earth-quake, hostilities, etc.;
8. Government decision to create project-implementing capacity-Example- in construction
9. Project ideas can also originate from multilateral or bilateral development agencies

- In addition individual/entrepreneurial/ inspiration, institutions, workshops, trade fairs, development experiences of other countries may point to some interesting project ideas.
- **At the micro-level-Project ideas may emanate from:**
 1. The identification of unsatisfied demand or needs
 2. The existence of unused or underutilized natural or human resources and the perception of opportunities for their efficient use
 3. The need to remove shortages in essential material services, or facilities that constrain development efforts

4. The initiative of private or public enterprises in response to incentives provided by the government.
 5. The necessity to complement or expand investments previously undertaken, and
 6. The desire of local groups or organizations to enhance their economic status and improve their welfare
- ✓ Project proposals can also originate from foreign firms seeking for their profit

2. Preparation and Analysis

- Once project ideas have been identified and selected, the process of project preparation and analysis starts.
- Project preparation must cover the full range of technical, institutional-organizational-managerial, social, commercial, financial, economic and environmental analysis which are necessary to achieve the project's objective.
- Critical element of project preparation is identifying and comparing technical and institutional alternatives for achieving the project's objectives.

A. Technical Aspects

- Since a technically unfeasible project cannot be promoted, technical study of a project provides the technical basis for all other aspects of a project study.
- The main and challenging task in technical analysis is to identify the appropriate technology for the objective that the project is intended to meet.
- In general, this part of project study address issues related to:

A. Project design and processes: to ensure that there is appropriate technology and engineering work, the study should consider and evaluate alternative technologies and alternative machines and equipment;

B. The input – output relationship

- This aspect may include the works of engineers, soil scientists and agronomists in case of, say, agricultural projects.
- The technical analysis is concerned with the project's inputs (supplies) and outputs of real goods and services and the technology of production and processing.
- This is crucial because the rest of the project analysis cannot be conducted without information from the technical study.

- In general the technical analysis is primarily concerned with
 1. Material inputs and utilities
 2. Location, site and environment
 3. Manufacturing process/technology/ and engineering

B. Institutional-Organizational-Managerial Aspects

- This basically incorporates the socio-cultural patterns and institutions of the population that the project is believed to serve.
- Does the project takes into account the cultural setup and customs of the beneficiaries?
- Or will it disturb the accepted pattern?
- If so how should this be included as part of the project design?

- To have a chance of being carried out, a project must be related properly to the institutional structure of the country or region where the project is to be carried out.
- Examples include: the land tenure system, use of local institutions such as Idir etc.
- Similarly, managerial issues are critical for successful completion of projects.
- Thus, the project analyst must examine the ability of available staff to carry out the managerial needs of the project.

- **Organization and Manning**
- Dividing the project into organizational units in line with the marketing, supply, production and administrative functions is necessary not only from the operational point of view, but also during the planning phase, to allow the assessment and projection of overhead costs.
- The organizational set-up depends to a large extent on the size and type of the industrial enterprise and the strategies, policies and values of the organization.

Plant organization and management

- Organization is the means by which the operational functions and activities of the enterprise are structured and assigned to organizational units.
- This represents managerial staff, supervisors and workforce, with the objective of coordinating and controlling the performance of the enterprises and the achievement of its business targets.
- The organizational structure of an enterprise indicates the assignment of responsibilities and delegation of authorities to the various functional units of the company.
- The organizational functions are the building blocks of the company.

- They may be grouped into the following organizational units in line with the specific requirements of the individual company:
- ✓ General Management
- ✓ Finance, financial control and accounting
- ✓ Personnel administration
- ✓ Marketing, sales and distribution
- ✓ Supplies, transport, storage
- ✓ Production:
 - Main plant
 - Service plants
 - Quality assurance
 - Maintenance and repair

- The organizational structure of the company can also take a number of shapes, the most common being the pyramid shape, which has the following three organizational levels:
 - Top management
 - Middle management, and
 - Supervisory management

C. Social Aspects

- This aspect is more important to public projects.
- Project analysts are expected to examine the broader social implications of the proposed project.
- That is; sufficient attention should be given to the social soundness of a project.
- This is particularly related to:
 1. The attitude and the likely response of the beneficiary groups;
 2. The existence of potential implementation capacities or organization within communities;

3. The cultural factors related to the implementation and outcomes of the project;
4. The political factors;
5. Income distribution implications of the project,
6. Employment creation: income distribution could be related to employment creation.
7. Issues of balanced regional development,
8. The displacement impact of the project
9. The gender implication of the adopted technology;
10. Environmental impacts etc.

D. Commercial aspects

- The commercial aspects of a project include the arrangements for marketing the output produced by the project and the arrangements for the supply of inputs needed to build and operate the project.
- **On the output side**, careful analysis of the proposed market for the project's production is essential to ensure that there will be an effective demand at a remunerative price.

Questions that must be addressed include:

- Where will the products be sold?
- Is the market large enough to absorb the new production without affecting the price?

- If the price is likely to be affected, by how much?
- Will the project still be financially viable at the new price?
- What share of the total market will the proposed project supply?
- Are there suitable facilities for handling the new production?
- Is the product for domestic consumption or for export?
- Does the proposed project produce the grade or quality that the market demands?
- What financing arrangements will be necessary to market the output?
- What special provisions need to be made in the project to finance marketing?

- **On the input side**-appropriate arrangements must be made so as to create adequate input supply to the project.
- **Questions that must be addressed include:**
- Do market channels for inputs exist?
- Do market channels have enough capacity to supply new inputs on time?
- What about financing for the suppliers of inputs and credit for the farmers to purchase these supplies?
- Should new channels be established by the project or should special arrangements be made to provide marketing channels for new inputs?
- ❑ Commercial aspects of a project also include arrangements for the procurement of equipment and supplies.

E. Financial Aspects

- In the financial analysis part, analysts should try to identify and analyze the projects financial efficiency, incentive impact to the participants in the project, creditworthiness and liquidity.
- The aspects that should be considered during financial analysis include:
 1. Investment outlay and costs of the project
 2. Means of financing
 3. Cost of capital
 4. Projected profitability
 5. Break-even point
 6. Cash flows of the project
 7. Investment worthwhileness
 8. Projected financial position
 9. Level of financial risk

F. Economic Aspects

- The economic aspect of project preparation is primarily concerned with the impact/contribution of the project to the whole economy (the society as a whole).
- The focus is on the social costs and benefits of a project, which may often be different from its monetary costs, and benefits.
- The financial analysis views from the participants (or owners) point of view, while the economic analysis from the society's point of view.

- There are three important distinctions between the two types of analyses
- 1. **Treatments of taxes and subsidies:** these items are treated as transfers in the economic analysis while in financial analysis taxes are usually treated as cost and subsidies as a return/income.
- 2. **Use of Prices:** in the financial analysis we will use actual market prices.
- In economic analysis the market prices are adjusted to accurately reflect social and/or economic values.
- The latter prices are termed as ‘shadow prices’ or ‘economic accounting prices’.

3. Treatment of interest on capital: in economic analysis interest on capital is never separated and deducted from the gross return.

✓ Because, it is part of the return from capital which is available for the society as a whole.

- Such interest is deducted from benefit stream in financial analysis whose point of view is the firm and hence interest is a cost to the firm.

G. Environmental/Ecological/ analysis

- Ecological analysis should be done particularly for major projects, which have significant ecological implications like:
 - ✓ power plants
 - ✓ irrigation schemes
 - ✓ environmental polluting industries
 - ✓ etc.
- The key questions raised in ecological analysis are:
 1. What is the likely damage caused by the project to the environment?
 2. What is the cost of restoration measures required to ensure that the damage to the environment is contained within acceptable limits?

3. Appraisal

- After a project has been prepared, it is generally appropriate for a critical review or an independent appraisal to be conducted.
- This provides an opportunity to reexamine every aspect of the project plan to assess whether the proposal is appropriate and sound before large amount of resources are committed.
- The appraisal process builds on the project plan, but it may involve new information if the specialists on the appraisal team feel that some of the data are questionable or some of the assumptions are faulty.

- **Three decisions**

1. **Approve**-if the appraisal team concludes that the project plan is sound
2. **Amend**- appraisal team may request for amendments if there are some errors which can be corrected easily
3. **Reject**- appraisal team can reject project proposal if it finds serious errors or if the project is not worthy totally.

4. Implementation

- After approving a project proposal, the next step is changing into action/implementation/.
- Thus, implementation is the most important part of the project cycle.
- There are some aspects of implementation that are of particular relevance to project planning and analysis. These include:
 - **First**, the better and more realistic a project plan is, the more likely it is that the plan can be carried out and the expected benefit realized.

- **Second**, project implementation must be flexible.
- Circumstances can change, and project managers must be able to respond intelligently to these changes.
- Technical, economic, political etc. changes can change the way we should implement the project.
- The greater the uncertainty of various aspects of the project, or the more innovative and novel the project is, the greater the likelihood that changes will have to be made.

- Even as project implementation is under way, project managers will need to reshape and replan parts of the project, or the entire project.
- Implementation is a process of refinement, of learning from experience-in effect, it is a kind of “mini-cycle” within the larger project cycle we have outlined.
- Project analysts generally divide the implementation phase into three different time periods.
- **First-the investment period-** when the major project investments are undertaken.

- **Second- the development period**-it is when the project builds up its production.
- **Third- project life**- after full development is reached, it continues for the life of the project.
- Usually the project life is keyed to the normal life of the major asset.
- However, for practical reasons, a project life rarely exceeds 25-30 years.
- Both the financial and economic analyses of the project relate to this time horizon.

5. Evaluation

- The final phase in the project cycle is evaluation.
- The analyst looks systematically at the elements of success and failure in the project experience to learn how better to plan for the future.
- It is important managerial tool in ongoing projects, and rather formalized evaluation may take place at several times in the life of a project.
- Evaluation may be done by many different people or organizations.

- The extent to which the objectives of a project are being realized provides the primary criterion for an evaluation.
- The evaluators also evaluates the appropriateness of the objectives and the plan in light of the objectives.

❑ Evaluators try to evaluate:

- Was the technology proposed appropriate?
- Were the institutional, organizational, and managerial arrangements suited to the conditions?
- Were the commercial aspects properly considered?

- Were the financial aspects carefully worked out on the basis of realistic assumptions, and were the economic implications properly explored?
- How did the project in practice compared with each aspect of the project analysis?
- Did the institutional and organizational structure in the project permit a flexible response?
- Did management respond quickly enough to changes?
- Finally, evaluators will recommend for improvements for the future.

- **Review Questions**
- **Answer the following questions.**
 1. What is project?
 2. What is the importance of project plan?
 3. Explain the reasons that makes project risky.

CHAPTER -TWO

FINANCIAL ANALYSIS AND APPRAISAL OF PROJECTS

2.1. Scope and Rationale for Financial Analysis of Projects

2.1.1. What is financial analysis?

- It is concerned with assessing the feasibility of a new project from the point of view of its financial results.
- Financial analysis helps to determine the financial profitability of a project.
- It will be worthwhile to carry out a financial analysis if the output of the project can be sold in the market or can be valued using market prices.
- The project's direct benefits and costs are, therefore, calculated in financial terms at the prevailing (expected) market prices.

- ❖ This analysis is applied to appraise the soundness and acceptability of a single project as well as to rank projects on the basis of their profitability.
- ❖ In other words, financial analysis is all about the assessment, analysis and evaluation of the required project inputs, the outputs to be produced and the future net benefits, with the aim of determining the viability of a project to the private investor or the executing public body.
- ❖ The financial analysis deals with two issues:
 - 1. Investment profitability analysis, with different methods of analysis;**
 - a. Simple methods of analysis of rate of return/static methods/ non-discounted techniques/.

This include:

- Simple rate of return;
- Pay-back period;

b. Discounted-cash-flow methods/dynamic methods

- ✓ Net Present Value/NPV/;
- ✓ Internal Rate of Return/IRR/

2. Financial analysis/ ratio analysis/

a. Liquidity analysis;

b. Capital structure analysis (debt-equity ratio).

- The two types of analysis are complementary and not substitutable.

- The investment profitability analysis is an assessment of the potential earning power of the resources committed to a project without taking into account the financial transactions occurring during the project's life.
- On the other hand, financial analysis has to take into account the financial features of a project to ensure that the disposable finances shall permit the smooth implementation and operation of the project.

2.1.2 Why one undertakes Financial Analysis? or When to undertake financial analysis?

- Financial analysis applies to private and public investments.
- A private firm will primarily be interested in undertaking a financial analysis of any project it is considering and seldom will undertake an economic analysis.
- The issue of financial sustainability of a public project justifies the need for undertaking financial analysis.
- But commercially oriented government authorities that are selling output such as railway, electricity, telecommunications, etc., will usually undertake a financial and an economic analysis of any project that they are undertaking.

- ❖ Even non-commercially oriented government organizations may sometimes wish to choose between alternative facilities on the basis of essentially financial objectives.
- ❖ In the case of a hospital service, the management of the hospital maybe required to provide the cheapest services.
- ❖ Under such circumstances a cost minimization or cost effectiveness exercise will be undertaken.
- ❖ Financial profitability analysis is the first step in the economic appraisal of a project.
- ❖ A comprehensive financial analysis provides the basic data needed for the economic evaluation of the project and is the starting point for such evaluation.

- In fact, economic analysis mainly involves adjustments of the information used in financial analysis and of a few additional ones.
- The procedure and methodology in financial analysis is basically the same with that of economic analysis.
- Yet one has to recognize and realize the differences between the two.
- It has to be noted that the financial analyst should be able to communicate and know what to ask from the different team members to collect relevant information on:
 1. Revenue, both forecasted sales and selling price
 2. Initial investment costs distributed over the implementation of the project;
 3. Operating costs of the envisaged operational unit/firm/ over its operating life.

➤ The issues and concerns of financial analysis are:

1. Identification of required data;
2. Analysis of the reliability of data;
3. Analysis of the structure and significance of costs and benefits/incomes/;
4. Determination and evaluation of the annual and accumulated financial net benefits; expressed as profitability, efficiency or yield of the investment;
5. Consideration of the spread of flows of the costs and benefits over time, the economic life of the envisaged economic unit/firm/public entity/;
6. Costs of capital over time;

Planning Horizon and Project Life

- ❖ The project planning horizon of a decision maker can be defined as:
 - ✓ the period of time over which he/she decides to control and manage his/her project-related business activities, or for which he/she formulates his/her investment or business development plan.
- ❖ The planning horizon must consider the life time of a project.
- ❖ The economic life of a project is the period over which the project would generate net gains.
- ❖ The economic life of a project depends basically on:
 - ✓ the technological life cycle of the main plant items,
 - ✓ the life cycle of the product and of the industry involved, and
 - ✓ the flexibility of a firm in adapting its business activities to changes in the business environment.

➤ When determining the economic life span of the project, various factors have to be assessed.

➤ Some of them are:

1. Duration of demand (position in the product life cycle);
2. Duration of raw material deposits and supply;
3. Rate of technical change;
4. Life cycle of the industry;
5. Duration of building and equipment;
6. Opportunities for alternative investment;
7. Administrative constraints (urban planning horizon).

➤ It is evident that the economic life of a project can never be longer than its technical life or its legal life.

2.3 Identification and Analysis of the Estimates of Costs and Benefits

- ❖ In project analysis, the identification of costs and benefits is the first step.
- ❖ This involves:
 - ✓ the specification of the costs and benefit variables for which data should be collected,
 - ✓ identification of the sources of information,
 - ✓ collection of the information and
 - ✓ assessment of the quality and reliability of the collected information.

Objectives and the Identification of Costs and Benefits

- The costs and benefits of a project depend on the objectives the project wants to achieve.
- So, the objectives of the analysis provide the standard against which costs and benefits are defined.
- A cost is anything that reduces an objective, and a benefit is anything that contributes to an objective.
- However, each participant in a project has many objectives.
- For a farmer, a major objective of participating may be to maximize family income.

- But this is only one of his/her objectives.
- She/He may also wish her/his children to be educated, which reduces the available labor force for farm work.
- Taste preferences may force the farmer to continue growing a traditional variety although a new and high yielding variety may be available.
- She/He may also wish to avoid risk and thus continue cropping a variety, which She/he knows well.

- For a private business firm or government corporations, a major objective is to maximize net income.
- However, both have significant objectives other than simply making the highest possible profit.
- Both will want to diversify their activities to reduce risk.
- A society as a whole will have as a major objective increased national income, but it clearly will have many significant, additional objectives.

➤ Example:

- ✓ income distribution,
 - ✓ creating employment opportunities,
 - ✓ increase the proportion of saving for future investment,
 - ✓ increasing regional integration,
 - ✓ raising the level of education,
 - ✓ improve rural health, or safeguard national security.
- Any of these may lead to the choice of a project that is not the alternative that would contribute most to national income which is narrowly defined.
- No formal analytical technique could possibly take into account all the various objectives of every participant in a project.
- Some selection will have to be made.

- Mostly, the **maximization of income** is taken as the dominant objective of the firm.
- Because, the single most important objective of an individual economic agent is to increase income and increased national income is the most important objective of national economic policy.
- Thus, anything that reduces national income is a cost and anything that increases national income is a benefit.

Quantification:

- ❖ Once costs and benefits are listed, the next step is accurate prediction of the future benefits and costs which then be quantified in monetary units/Birr/.
- ❖ Thus, quantification involves the quantitative assessment of both physical quantities and prices over the life span of the project.

2.4. Classification of Cost

- There are alternative ways of classifying costs and benefits of a project.
- One is to categorize both costs and benefits into:
 - ❖ Tangible and
 - ❖ Intangible once.
- Another classification is in terms of:
 1. Total investment costs;
 2. Operational/running costs;

Another classification:

1. Total investment costs including:
 - a. Initial investment costs;
 - Fixed investment costs;
 - Pre-Production expenditures;
 - b. Investment required during plant operation / rehabilitation and replacement investment costs/
 - c. Net working capital
2. Operating costs/costs of goods sold

Tangible costs of a project

- In almost all project analysis, costs are easier to identify (and value) than benefits.
- The prices that the project actually pays for inputs are the appropriate prices to use to estimate the project's financial costs.
- Some of the project costs are tangible and quantifiable while many more are intangible and non quantifiable.
- The costs of a project depend on the exact project formulation, location, resource availability, or objective of the project.
- In general, the cost of a project would be the sum of the total outlays.

• These include:

Initial Fixed Investment costs

- The initial fixed investments constitute the major resources required for constructing and equipping an investment project.
- These include the following tangible initial fixed investments.
 1. The cost of land and site development
 - Land charges
 - Payment for lease
 - Cost of leveling and development
 - Cost of laying approach roads and internal roads
 - Cost of gates
 - etc.

2. The cost of buildings and civil works

- ❖ Buildings for the main plant and equipments
- ❖ Buildings for auxiliary services (workshops, laboratory, water supply, etc.)
- ❖ Warehouses and show rooms
- ❖ Non factory buildings like guest house, canteens, residential quarters, staff rooms
- ❖ Garages and workshops
- ❖ Other civil engineering works

3. Plant and machinery

- ❖ Cost of imported machinery which might include the FOB value, shipping freight and insurance costs, import duty, clearing, loading, unloading, and transportation costs
- ❖ Cost of local or indigenous machinery
- ✓ Cost of stores and spares
- ❖ Foundation and installation charges

4. Miscellaneous fixed assets

- Expenses related to fixed assets such as furniture, office machines, tools, equipments, vehicles, laboratory equipments, workshop equipments

Pre-production Expenditures

- Another component of the initial investment cost which includes both tangible and intangible costs is the pre-production expenditures.
- In every project, certain expenditures are incurred prior to commercial production.
- This includes the following investment cost items.
- 1. **Intangible assets:** these assets represent expenditures which yield benefits extending over a long time period.
- These include:
 - a. Patents, licenses, lump sum payments for technology, engineering fees, copy rights, and goodwill.
 - b. Preparatory studies, like specific functional studies and investigations, consultant fees for preparing studies, supervision costs, project management services, etc.

2.Preliminary expenses: these costs include:

- ✓ preliminary establishment expenses, (registration and formation expenses),
- ✓ legal fees for preparation of memorandum and articles of associations and similar documents.
- In addition, it includes costs of advertisements, brokerage for mobilizing resources, shareholders, expenses for loan application and its processing.

3. Other Pre-operation expenses

- These include:
- Rents, taxes etc
- Trial runs, start-ups and commissioning expenditures(raw materials and other inputs consumed immediately before commercial operation);

- Salaries, fringe benefits and social security contributions of personnel engaged during the pre-production period;
- Pre-production marketing costs, promotional expenses, creation of sales network, etc;
- Training costs, including all fees, travel, living expenses etc;
- Insurance charges
- Miscellaneous expenses

Plant and Equipment Replacement Costs

- Every machinery and equipment does not have equal economic life.
- There are machineries and equipments that productively be operated for many years.
- On the other hand there are equipments, machinery components and parts which need to be regularly replaced for smooth operation of the same technology.
- So, sound project planning work should adequately provide for replacement of components and parts.
- Thus, it is necessary to identify such items and then estimate the costs for replacement and then the same should be reflected in the financial and economic analysis.

Terminal Values/End-of-Life Costs/Salvage Costs/

- Though firms may be institutionally organized to live and operate for unlimited period of time and hence unlimited age, technologies, machineries and equipment do have limited operational/economic/ life.
- During the end of the economic life of a good/machinery, equipment, building, etc) there is some salvaged value and the salvation may involve incurring of costs.
- The costs associated with the decommissioning of fixed assets at the end of the project life, minus any revenues from the sale of the assets, are end-of-life costs.
- Major costs are the costs of dismantling, disposal and land reclamation.

Net Working Capital

- Net working capital is part of the total investment outlays.
- It is defined as current assets (the sum of inventories, marketable securities, prepaid items, accounts receivable and cash) minus current liabilities (accounts payable).
- This investment is required for financing the operation of the plant.
- Working capital is generally categorized into gross working capital and net working capital (NWC).

- The gross working capital consists of all the current assets, including:
 - a. raw materials;
 - b. stores and spares;
 - c. work-in-process;
 - d. finished goods inventory;
 - e. Debtors/accounts receivable/;
 - f. Cash and bank balance.
- Net working capital is defined as gross working capital less current liabilities.
- For the purpose of financial analysis and even financial management of operational firms, it is net working capital which is the center of decision makers.

Costs of Goods Sold/Operating costs

- Once the project idea has been accepted and the project is being implemented, the cost of production may be worked out.
- For instance, for an agricultural project the following may be necessary:
- **Material cost-** this comprises the cost of raw materials, chemicals, components, fertilizer and pesticides for increasing agricultural production, concrete for irrigation canal construction, material for the construction of homes etc and consumable stores required for production.
- It is not the identification that is difficult in this case but the problem of finding out how much is needed from each.

- **Utilities-** consisting of power, water, and fuel are also important cost components.
- **Labor:** this is the cost of all manpower employed in the enterprise.
- **Factory Overhead:** the expense on repairs and maintenance, rent, taxes, insurance on factory assets, etc. are collectively referred to as factory overheads.
- **Land-**is the cost incurred for the land to be used for the project.

- **Contingency allowances-** are usually included as a regular part of the project cost.
- Sound project planning takes into consideration in advance for possible adverse changes in physical conditions or prices that would add to the baseline cost.
- Contingency allowances may be divided into physical contingencies and price contingencies.
- Price contingencies comprises two categories-relative changes in price and general inflation.
- Physical contingency allowances and price contingency allowances for relative changes in price are expected and form part of the cost base when measures of project worth are calculated.

- To avoid the problem of inflation on the other hand it is advisable to work with constant prices instead of current prices.
- This approach assumes that all prices will be affected equally by any rise in the general price level.
- So contingency allowances for inflation will not be included among the costs in project accounts other than the financing plan.
- **Taxes:** payment of taxes including tariffs and duties is treated as a cost to the project implementer in financial analysis.
- **Debt service:** the payment of interest and the repayment of capital.
- Both are treated as an outflow in financial analysis.

- **Sunk costs**
- Sunk costs are those incurred in the past and upon which the proposed new investment will be based.
- Such costs cannot be avoided.
- When we analyze a proposed investment, we consider only future returns to future costs; expenditures in the past, or sunk costs do not appear in our account.

Tangible Benefits

- Tangible benefits can arise either from increased production or from reduced costs.
- In general the following benefits can be expected:
 - Increased production
 - Quality improvement
 - Changes in time of sale
 - Changes in location of sale
 - Changes in product form (grading and processing)
 - Cost reduction through technological advancement
 - Reduced transport costs
 - Losses avoided
 - Other kinds of tangible benefits

Secondary Costs and Benefits

- ✓ Projects can lead to benefits created or costs incurred outside the project itself.
- ✓ Incorporating secondary costs or benefits in project analysis can be viewed as an analytical device to account for the value added that arises outside the project but is a result of the project investment.
- ✓ If a project has a substantial effect on the quantity other producers are able to sell in imperfect markets-and most markets are imperfect-there may be gains or losses not accurately accounted for.

Benefits:

- ✓ Reduction in cost of transport due to improved road/rail
- ✓ technological spillover or technological externalities
- ✓ Multiplier effect

Cost:

- ✓ Example: Adverse ecological effects
- ✓ pollution
- ✓ Irrigation development may reduce the catch of fish
- When these technological externalities are significant and can be identified and valued, they should be treated as a direct cost of the project (as might be the case for reduced fish catches), or the cost of avoiding them should be included among the project costs.

Intangible Costs and Benefits

- Almost every agricultural project has costs and benefits that are intangible.
- These may include creation of new job opportunities, better health and reduced infant mortality as a result of more rural clinics, better nutrition, reduced incidence of waterborne disease as a result of improved rural water supplies etc
- Such intangible benefits are real and reflect true values.
- They do not, however, lend themselves to valuation.
- But, since intangible benefits are a factor in project selection, it is important to carefully identify and, where at all possible, quantified, even though valuation is impossible.

- For example:
- How many children will enroll in new schools?
- How many homes will benefit from a better system of water supply?
- How many infants will be saved because of more rural clinics?
- **Intangible costs:**
- Such costs might be incurred if new projects disrupt traditional patterns of family life, if development leads to increased pollution, if the ecological balance is upset, or if scenic values are lost.

- Again, although valuation is impossible, intangible costs should be carefully identified and if possible quantified.
- In general, every project decision will have to take intangible factors into account through a subjective evaluation.
- Because, intangible costs can be significant and because intangible benefits can make an important contribution to many of the objectives of a project or beyond.

The valuation of financial costs and benefits

- This is an issue of pricing/valuing/ of the project's inputs and outputs.
- The inputs and outputs of a project appear in physical form and prices are used to express them in value terms in order to obtain common denominator.
- For the purpose of the feasibility study, **prices** should reflect the **real economic values** of project inputs and outputs for the entire planning horizon of the decision makers.
- The financial benefits of a project are the revenues received and the financial costs are the expenditures that are actually incurred.

- In financial analysis, all these receipts and expenditures are valued as they appear in the financial balance sheet of the project, and are therefore, **measured in market prices**.
- Market prices are just the prices in the local economy, and include all applicable taxes, tariffs, trade mark-ups and commissions.
- Since the project implementers will have to pay market prices for the inputs and will receive market prices for the outputs they produce, the financial costs and benefits of the project are measured in these market prices.
- The financial benefit from a project is measured in terms of the market value of the project's output, net of any sales taxes.

- Prices may be defined in various ways, depending on whether they are:

1. Market/explicit/ or shadow/imputed/ prices;
2. Absolute or relative prices;
3. Current or constant prices.

Market/Shadow prices:

- Market or explicit prices are those present in the market, no matter whether they are determined by supply and demand or by the government.
- They are the prices at which the firm will buy the inputs and sell the outputs.
- In financial analysis market prices are applied.

- In economic analysis we raise the question whether market prices reflect real economic value of project inputs and outputs.
- In economic analysis, if the market prices are distorted, then shadow or imputed prices will have to be used for economic analysis.

Absolute/relative prices:

- **Absolute prices-** reflect the value of a single product in an absolute amount of money
- **Relative prices-** express the value of one product in terms of another.
- For instance, the absolute price of 1 tone of coal may be 100 monetary units and an equivalent quantity of oil may be 300 monetary units.

- In this case the relative price of coal in terms of oil would be 0.33, meaning that the relative price of oil is three times the price of coal.
- The level of absolute prices may vary over the lifetime of the project because of inflation or productivity changes.
- This variation does not necessarily lead to a change in relative prices.
- In other words, relative prices may sometimes remain unchanged despite variations in absolute prices.
- Both absolute and relative prices can be used in financial analysis.

Constant Vs Current prices

- Current and constant prices differ over time due to inflation, which is understood as a general rise of a price levels in an economy.
- If inflation can have a significant impact on project inputs and output prices, such an impact must be dealt with in the financial analysis.
- Wherever relative input and output prices remain stable, it is sufficiently accurate to compute the profitability or yield of an investment at constant prices.
- Only when relative prices change and project input prices grow faster (or slower) than output prices, or vice versa, then the corresponding impacts on net cash flows and profits must be included in the financial analysis.
- If inflation impacts are negligible, the planner may use either current or constant prices.

The Treatment of Transfer Payments in Financial Analysis

- Some entries in financial accounts represent shifts in claims to goods and services from one entity in the society to another and do not reflect changes in national income.
- These payments are called direct transfer payments.
- These direct transfer payments include taxes, subsidies, loans, and debt services.
- **Taxes:** taxes that are treated as a direct transfer payment are those representing a diversion of net benefit to the society.

- A tax does not represent real resource flow; it represents only the transfer of a claim to real resource flows.
- In financial analysis a tax is clearly a cost.
- When a firm pays taxes its net income reduces.
- But, the payment of taxes does not reduce national income.
- As a result, in economic analysis, taxes will not be treated as a cost in project account.
- A tax can be a direct tax or an indirect taxes such as sales tax, an excise tax, or tariff or duty on an imported input for production.

Subsidies:

- Are simply direct transfer payments that flow in the opposite direction from taxes.
- Direct subsidies represent the transfer of a claim to real resources from one enterprise, sector or individual to another.
- Subsidies may be open or disguised and are provided on the input or output side.
- On the input side, subsidies reduce costs to the project, e.g. subsidies to fertilizers.
- If the subsidy is granted on the output side i.e., increase the revenue of the project; we should deduct the amount of the subsidy from the revenue that includes subsidy.

- If a firm is able to purchase an input at a subsidized price, it will reduce its costs and thereby increase its net benefit.
- But, the cost of the input in the use of the society's real resources remains the same.
- The resources needed to produce the input or to import it from abroad reduce the national income available to the society.
- Hence, for economic analysis of a project, we must enter the full cost of the input.
- Again it makes no difference what form the subsidy takes.
- One form is that which lowers the selling price of the input below what otherwise would be their market price.

- But a subsidy can also operate to increase the amount the owner receives for what he sells in the market, as in the case of a direct subsidy paid by the government that is added to what he receives in the market.
- A more common means to achieve the same result does not involve direct subsidy.
- The market price may be maintained at a level higher than it otherwise would be by, say levying an import duty on competing imports or forbidding competing imports altogether.
- Although it is not a direct subsidy, the difference between the competing imports that would prevail without such measure does represent an indirect transfer from the consumer to the producer.

Credit Transactions:

- These are the other major form of direct transfer payments.
- A loan represents the transfer of a claim to real resources from the lender to the borrower.
- When the borrower repays loans or pays interest he/she is transferring the claim to the real resource back to the lender.
- From the standpoint of a firm, receipt of a loan increases the production resources it has available.
- Whereas, payment of interest and repayment of principal reduces them.
- But from the standpoint of the national economy, loans do not reduce the national income available.
- It merely transfers the control over resources from the lender to the borrower.

2.5. Investment Profitability Analysis

2.5.1. Non-Discounted Measures of Project Worth

1. Ranking by Inspection

- It is possible, in certain cases, to determine by mere inspection which of two or more investment projects is more desirable.
- There are two cases under which this might be true.
 - I. Two investments have identical cash flows each year up to the final year of the short-lived investment, but one continues to earn profits in subsequent years.
- The investment with the longer life would be more desirable.
- Accordingly project B is better than investment A, since all things are equal except that B continues to earn proceeds after A has been retired.
- More analysis is required to decide between C and D.

Example: consider the following hypothetical irrigation project

Investment (project)	Initial cost	Net cash proceeds per year	
		Year I	Year II
A	10,000	10,000	---
B	10,000	10,000	1,100
C	10,000	3,762	7,762
D	10,000	5,762	5,762

II. Two investments may have the same initial outlay, the same earning life and earn the same total proceeds (profits), but one project has more of the flow earlier in the time sequence.

- ✓ In this situation, we choose the one for which the total proceeds is greater than the total proceeds for the other investment earlier.
- ✓ Thus investment D is more profitable than investment C, since D earns 2000 more in year 1 than investment C, which does not make up the difference until year 2.

2. The Payback Period

- The payback period is also called the payoff period.
- The payback period is defined as the length of time or the number of years it is expected to take from the beginning of the project until the sum of its net earnings (receipts minus operating costs) equals the project's initial capital investment cost.
- This criterion is most often used in the business enterprises.
- **Example:** if a project requires an original outlay of Birr 300 and is expected to produce a stream of cash proceeds of Birr 100 per year for 5 years, the payback period would be
- $300/100 = 3$ years.
- **Note:** if the expected proceeds are not constant from year to year, then the payback period must be calculated by adding up the proceeds expected in successive years until the total is equal to the original outlay.

- **Example:** consider project C. $10000 - 3762 = 6238$. then $6238/7762 = 0.8$ so 1.80 years.
- Example: consider the previous project

Investment	Payback period	Ranking
A	1	1
B	1	1
C	1.8	4
D	1.7	3

- Payback period has two important limitations:
 - A. It fails to give any considerations to cash proceeds earned after the payback date.
 - B. It fails to take into account differences in the timing of receipts and earned proceeds prior to the payback date.

Discounted measures of project worth

Read!!

Why we need to use discounted measures and how to discount costs and benefits in project profitability analysis.

$$NPV = \sum_{t=0}^N \frac{(B_t - C_t)}{(1+r)^t}$$

$$IRR = \sum_{t=0}^t \frac{(B_t - C_t)}{(1 + R)^t} = 0$$

$$IRR = I_1 + \frac{PV(I_2 - I_1)}{PV + NV}$$

Where: I_1 = the lower discount rate

I_2 = the upper discount rate

PV = NPV (positive) at the low discount rate of I_1

NV = NPV (negative) at the high discount rate of I_2

$$BCR = \frac{\sum_{t=0}^n \frac{B_t}{(1+r)^t}}{\sum_{t=0}^n \frac{C_t}{(1+r)^t}}$$

NPV and Decision Rule for Independent Projects

- **Independent projects** are projects that are not in any way substitutes for each other.
- In such cases the decision rule is to accept the project if the $NPV > 0$.
- If two projects have positive NPV and there is no budget constraint both should be accepted and you do not need to choose the one with higher NPV.
- For example, if two independent projects road and fisheries development projects in different locations are being considered and both have a positive NPV, then both should be undertaken.
- Both will increase community's welfare if they were undertaken and hence both should be undertaken.

Decision Rule for Mutually Exclusive Projects

- **A mutually exclusive project** is defined as a project that can only be implemented at the expense of an alternative project as they are in some sense substitutes for each other.
- **Example** of the mutually exclusive projects includes two versions of the same project, say with different technology, scale or time.
- **The decision rule for such projects is to accept the project with the highest NPV.**

Decision rule for independent projects

- According to the IRR version of economic criterion, we implement all projects that show an IRR greater than the predetermined discount rate.
- Once the IRR is identified, the decision rule is ‘accept the project if the IRR is greater than the cost of capital, say r .

The IRR and Mutually Exclusive Projects

- While the IRR cannot be directly used to choose between mutually exclusive projects, it can be employed for further manipulation.
- This manipulation entails the subtracting the cash flow of the smaller project from the cash flow of the larger one and calculating the internal rate of return of the residual cash flow.
- If the residual cash flow's internal rate of return exceeds the target discount rate, which could only occur if the larger project has a higher NPV, then the larger project should be undertaken.
- If the analyst encountered with mutually exclusive projects with IRR greater than the target interest rate, it **cannot** merely choose the project with the highest IRR.

Advantages of the IRR

- The IRR is used in many projects
- It is the only measure of project worth that takes account of the time profile of a project but can be calculated without reference to a predetermined discount rate. (Useful for international institutions like the WB since they cannot do with different discount rate for different countries.
- It is a measure that could be understood easily by non-economists since it is closely related to the concept of the return on investment.
- It is a pure number and hence allows projects of different size to be directly compared.

Problems with the IRR

- The IRR is inappropriate to use for mutually exclusive projects and independent projects when there is a single period budget constraint.
- A project must have at least one negative cash flow period before it is possible to calculate its internal rate of return.
- This is because the NPV will always be positive no matter how high the discount rate used to discount it, unless the project has at least one negative cash flow period.
- Another problem with the IRR is that in some cases it is possible to compute more than one IRR for a project. If a project has more than one IRR, it cannot be reliably used.
- Thus, another decision rule such as the NPV must be used rather than the IRR.

2.6. Sensitivity Analysis

- Another method popularly used for analysis of risk is what is called *sensitivity analysis*.
- This consists varying key parameters (individually or in a combination) and assessing the impact of such changes or manipulation on the project's net present value.
- It consists of testing the sensitivity of the NPV or IRR to changes of basic variables and parameters that enter the project's input and output streams.
- The common practice is to vary them by fixed percentage such as 10%.

Exercise

- Given $r=10\%$, find payback period, NPV, BCR and IRR of the hypothetical project(use three decimal number).

Description/years	0	1	2	3	4	5	6	7	8	9	10
Total Revenue	-	2,822,400	3,018,528	3,228,838	3,454,493	3,696,660	3,956,340	4,235,028	4,534,056	4,854,920	4,854,920
Inflow operation	-	2,822,400	3,018,528	3,228,838	3,454,493	3,696,660	3,956,340	4,235,028	4,534,056	4,854,920	4,854,920
Total Cost	3,040,000	2,310,183	2,468,898	2,638,570	2,820,084	3,014,327	3,243,064	3,465,430	3,703,437	3,958,224	3,973,819
Increase in fixed assets	3,040,000	-	-	-	-	-	-	-	-	-	-
Operating costs	-	2,195,912	2,330,174	2,473,657	2,627,094	2,791,224	2,966,685	3,154,415	3,355,258	3,570,157	3,589,841
Income(corporate)tax	-	114,271	138,724	164,913	192,989	223,102	276,379	311,015	348,179	388,067	383,978
Net cash flow(PROFIT)	(3,040,000)	512,217	549,630	590,267	634,409	682,333	713,276	769,598	830,619	896,696	881,101

CHAPTER – THREE

ECONOMIC ANALYSIS OF PROJECTS

- In financial analysis, the analyst is concerned with the profitability of the project from an individual point of view (firm's profitability).
- The main objective here is to maximize the income of the firm or to analyze the budgetary impacts.
- The financial analysis is done by applying market prices.
- In economic analysis, the objective is to maximize national income no matter who receives it.
- But financial analysis will rarely measure a project's contribution to the community's welfare.

- Thus, the project analyst must not only be sure that a proposed project will be profitable enough to attract investment interest but also that the project will contribute sufficiently to the growth of national income.
- The starting point for the economic analysis is the financial prices.
- They are adjusted as needed to reflect the value to the society as a whole of both the inputs and outputs of the project.

3.1. The Rationale for Economic Analysis

- The objective of any legitimate government is promotion of community welfare.
- Governments are more concerned with their public work programs to promote community welfare than they merely maximize financial profits at distorted local prices.
- Prices could be distorted because of failures of markets, the absence of perfect knowledge, and the existence of externalities, consumer and producers surplus, government and public goods, etc.
- As a result, it is not possible to use market prices to assess the economic worth of projects.
- So, governments must choose projects on the basis of an economic analysis if they wish to promote the community's welfare.

- The major conditions under which it is impossible to use market prices to assess the economic worth of projects can be grouped under the following major headings:
 1. Intervention in and failures of goods markets including the markets for internationally traded goods.
 2. Intervention in and failure of factor markets including the market for labor, capital, and foreign exchange.
 3. The existence of externalities, public goods and consumer and producers surplus.
 4. Imperfect knowledge, which the neoclassical model assumes that consumers and producers have full knowledge about all aspects of the economy relevant to their choice of operations.
- This is unrealistic because of poor transport and communication and low education levels.

Government Interventions and/or Failure of Goods Markets

A. Failure of domestic goods markets

- The true economic value of a good produced by a project, (marginal social benefit), is in general measured by what people are willing to pay for that good.
- Traditionally this is reflected by the market price of the commodity.
- But the market price of that commodity will not measure what people are willing to pay for it unless the following three conditions are met:
 1. There is no rationing of scales or price controls in the market for the good.
- That is, QD must equal QS and the price of the good must be its competitive demand price.

2. There is no consumer's surplus from the consumption of the good.

➤ If people are willing to pay more than they actually have to pay for a project output, then these market prices do not reflect the true value of the good produced by the project.

3. There is no monopsony buyer who is large enough to force the project to sell its output below the price that the monopsonist is really willing to pay.

- Unless these conditions are met, the good's market price will not reflect people's true willingness to pay for the good and will not be a good measure of the welfare or utility that people will obtain from consuming the project's output.
- If any of these market imperfections exist, it will be necessary to use corrective measures (shadow prices).
- Alternatively, governments may enforce compulsory deliveries of goods and services at artificially low controlled prices.

B. Trade protection and intervention in the markets for internationally traded goods

- Governments frequently intervene in import markets by imposing quotas and tariffs to protect infant industries or activities that are internationally competitive.
- Tariffs and quotas will cause a divergence between local market prices and the world prices of internationally traded goods.
- The extent of this divergence may vary from industry to industry.
- An import quota will push the domestic market cost of the input well above the foreign exchange cost to the economy of importing the input (world price).
- Such import quota overvalue the social cost of the traded input used by the project.

2. Failures of/or Intervention in Factor Markets

- The true economic cost to an economy of a project's input, its marginal social cost, will be measured by its economic opportunity cost to suppliers.
- The market price of an input will equal to its opportunity cost of production if the following conditions are met:
 1. There are no rationing, price controls or taxes in factor markets, such as fixed minimum wages, controlled interest rates, price controls on raw materials or taxes on labor, savings and profits, raw materials, equipment or other project inputs.
 2. There is no producer's surplus in the market price of the input
 3. There are no monopsony buyers who are in a position to force the factor's market price below their marginal revenue product and hence the price they would be willing to pay for it.

A. Intervention in the market for labor

- Labor markets are frequently regulated with fixed minimum wage rates or centrally fixed wages rates for formal sector jobs.
- If these wage rates are set above the market clearing levels, there is likely to open unemployment or disguised unemployment.
- This is particularly true for unskilled labor.
- In the case of skilled labor, fixed wage rates may actually be set below market clearing levels causing an artificial shortage of skilled labor.
- In such situations, wage rate may not reflect the true social cost of labor.
- Thus, a project analyst should adjust wage rates until they reflect the true social cost of labor in the country, the **shadow wage rate**.

B. Intervention in/or failure of capital market

- In order to encourage investment, interest rates are often kept low.
- The interest rate paid for investible funds may be held well below the equilibrium interest rate.
- As more people wish to borrow than to save at this low interest rate, there will be an excess demand for capital funds.
- This will lead to ration the available credit to preferred borrowers.
- In addition government routinely tax both borrowers and lenders introducing further distortions into the capital market.
- For these reasons, market interest rates should not be used to discount future income streams in an economic analysis.
- The government will have to estimate the social discount rate that better reflects the opportunity cost of using investible funds in a project.

C. Intervention in foreign exchange markets

- Many countries often manage their foreign exchange rate.
- Often the exchange rate is set significantly above its free market level in terms of say a US dollar per unit of local currency.
- That is; overvaluation of local currency is a common practice in developing countries.
- Currency overvaluation creates an apparent shortage of foreign exchange.
- This happens because at the overvalued exchange rate imports appear cheap relative to locally produced goods unless tariffs are imposed, demand for imports will rise.
- On the other hand currency overvaluation makes exporting as compared with supplying the local market, financially unattractive to producers.

- This will result in excess demand for foreign exchange.
- In these circumstances, the official exchange rate will understate the true value of foreign exchange to the country concerned.
- This is given by the shadow exchange rate, SER, the amount residents are willing to pay for the fixed quantity of foreign exchange available.
- Use of the OER in project appraisal will have the effect of undervaluing projects that produce exportable outputs and overvaluing those that use imported inputs.
- The overvaluation of the exchange rate must be corrected in an economic analysis.
- One method of doing this is to employ a shadow exchange rate to convert foreign prices into local currency.

3. Externalities and public Goods

- Another reason why the perfect world of neoclassical theory fails to represent the real world is the existence of public goods and externalities.
- A financial analysis of a project that uses or produces public goods and externalities fails to capture the full impact of a project on the community's welfare.

A. The existence of externalities

- Externalities are created in the process of producing, distributing and consuming many goods and services.
- There are positive or negative attributes or effects of a good or service.

- Some costs and benefits do not appear among its inputs and outputs when it is analyzed from the enterprises or individual's viewpoint and thus do not enter into the financial NPV and IRR.
- These items are considered as external to the enterprise but are internal when they are considered from the economy's angle.
- Somebody pays for the external costs and someone receives these external benefits even if this is not the enterprise.

B. The existence of public goods

- Public goods are goods and services whose use by one person does not reduce their availability to others.
- That is; they are neither rival nor excludable.
- **Example:**
 - urban road networks
 - TV and radio signals
 - Disease eradication campaign
 - Defense forces
 - The legal system
- Public goods are usually provided free by governments and in a financial analysis would therefore, be priced at zero.

- However, they do have a beneficial impact on the welfare of those receiving them, most of whom will be willing to pay for such goods through taxation.
- But it costs the society significant sum of money to produce many of the public goods.
- This is a case where the market price of a good or service will not reflect its true cost or benefit to the society.
- If the project uses public goods as inputs or produces them as outputs it would be wrong to value them at their market price of zero in any economic analysis of the project.
- They have to be valued at the amount that it is estimated people will be willing to pay for them.

3.2. The Essential Elements of an Economic Analysis

- The economic analysis of a project has many features in common with financial analysis.
- These include:
 1. Both involve the estimation of a project's cost and benefits over the life of the project for inclusion in the project's cash flow.
 2. In both, the cash flow is discounted to determine the project's net present value, or other measures of project worth
 3. Both may also use sensitivity or probability analysis to assess the impact of uncertainty on the project's NPV.

- But an economic analysis goes beyond a financial analysis.
- That is; the essential elements of economic analysis include:
- **A. The elimination (deduction) of transfer payments within the economy from the project's cash flow.**
- **Examples:**
- Taxes-Personal and company income taxes, VAT, indirect taxes, excise and stamp duties.
- Subsidies ---- Including those given via price support schemes.
- Tariffs on imports and exports subsidies and taxes .
- Producer surplus - gains received by a supplier
- Credit transactions - loans received and repayment of Interest and principal

B. The estimation of economic or shadow prices for project outputs and produced inputs (including internationally traded and non-traded goods) to correct for any distortions in their market prices.

- Since we use different prices, different economic and financial NPV and IRR are obtained even if the inputs and outputs are identical in physical terms.

C. The estimation of economic prices for non produced project inputs (including labor, natural resources and land) to correct for any distortions in their market prices.

D. The valuation and inclusion of any externalities created by the project in economic analysis

E. The valuation and inclusion of any un-priced outputs or inputs such as public goods or social services.

3.3. Determining economic values

- Due to social, political, historical, and economic, etc reasons, markets are distorted.
- As a result, the market prices are also distorted and do not reflect marginal productivities and marginal utilities.
- Divergence between economic and market prices could be due to market failure, government interventions, externalities, public goods and distributional considerations.
- Hence serious distortions exist in the market for labor, capital, and foreign exchange and efforts are necessary to replace the signals from these markets by more appropriate measures.

- The key to understanding of economic analysis is the concept of **opportunity cost**.
- The opportunity cost is equal to the marginal value product and the market price of the item in a relatively competitive market.
- Economic pricing involves making adjustments to market prices to correct for distortions and to retake account of consumer and producers surplus.
- The adjusted price should then reflect the true opportunity cost of an input or people's willingness to pay for it.
- So, we use **Shadow Price** which is also called the accounting price.
- The shadow price is what we call the economic price.

3.3.1. Adjustment for Transfer Payments

- Transfer payments are defined as payments that are made without receiving any good or service.
 - They involve the transfer of claims over real resources from one person or entity in society to another, rather than payments made for the use of or received from the sale of any good or service.
 - So they do not reflect changes in the national economy.
 - Some examples of items that are considered as transfer payments are:
 - A. Taxes** - personal and company income taxes, value added taxes and other indirect taxes, excise taxes stamp duties, etc.
- In financial analysis a tax is clearly a cost.

- When an individual pays taxes his net benefit is reduced.
- But this payment does not reduce national income.
- Rather it is transfer from the individual to the government so that the income can be used for social purposes that are important to the society.
- Thus payments of taxes does not reduce national income, it is not a cost from the standpoint of the society as a whole.
- That is, taxes remain a part of the overall benefit stream of the project that contributes to the increase in national income.

B. Production Subsidies: are simply direct transfer payments that flow in the opposite direction from taxes.

- Subsidies do not increase or decrease national income.
- It merely transfers control over resources from a taxpayer to another individual.
- But, subsidy increases the individual's income, so it is revenue for the receiver.

C. Credit Transactions: Loans received and payment of interest and capital when these transactions occur between domestic borrower and lenders are examples of such credit transactions.

- The payment of interest and repayment of capital (debt service) is treated as an outflow in financial analysis but treated as transfer payments and are omitted from economic accounts.

D. Charitable gift or welfare support services: are also considered as transfer payments.

E. Producer surplus- gains received by an existing supplier of a factor as a result of an increase in the price of that factor.

❖ But in an economic analysis of a project, any change in consumer surplus as a result of the project should be included in the project's economic cash flow, because these changes represent real effects on peoples welfare.

3.3.2. Efficiency or Economic shadow Prices

- In economic analysis of projects, inputs and outputs should be valued at their contribution to the national economy, through efficiency or shadow prices.
- The application of shadow prices is based on the underlying notion of **opportunity cost**.
- From the national economic point of view, it is the alternative production foregone or the cost of alternative supplies that should be used to value project inputs and outputs.
- An economic or shadow price reflects the increase in welfare resulting from one more unit of an output or input being available.

Definition of shadow (accounting) prices

- Accounting or shadow prices are simply a set of prices that are believed to better reflect the opportunity cost, i.e. the cost in their best use, of goods and services.
- It represents all none market prices.
- It is the value used in economic analysis for a cost or a benefit in a project when the market price is left to be a poor estimate of economic value.
- It implies a price that has been derived from a complex mathematical model such as linear programming.
- Efficiency shadow prices are border prices determined by international trade.
- The project inputs and outputs are thus valued on the basis of international trade.

- The basic assumption here is that international market is less distorted than the domestic market and thus taking international price is more realistic to value the true cost of goods and services.
- It is an estimate of efficiency prices.
- **Example:** shadow wage rate set by estimating the marginal value product of labor.
- So shadow prices are used instead of domestic market prices in guiding the allocation of resources since the market prices are distorted and using them would lead to resource misallocation.
- In practice economic pricing involves making adjustments to market prices to correct for distortions and to take account of consumer and producer surplus.

Shadow pricing and the numeraire

- The implicit objective of project analysis when project items are valued at opportunity cost is to maximize the net resources available to the economy.
- For many project items the opportunity cost will be given directly by its **border prices**.
- **A numeraire is a unit of account.**
- Shadow prices can be expressed in two ways:
 - A. Directly in foreign exchange units - valuing all project effects at world prices termed as the world price numeraire.
 - B. In domestic price units using a domestic price numeraire.

- The use of different numeraire to express opportunity costs will not affect the relative value of project outputs and inputs.
- Shadow price estimates can be made at two levels:
 - ✓ Economic analysis
 - ✓ Social analysis
- Distinction stems from the objectives pursued in project appraisal.
- In economic analysis resource efficiency is also considered.
- In social analysis growth and income distribution objectives are pursued.

3.3. Traded and Non Traded Goods

- Goods and services produced by the project or that serves as project inputs can be classified as:
 - ❖ Non-traded goods
 - ❖ Traded goods or
 - ❖ Potentially traded goods
- **Non-Traded Goods**
 - Non-traded goods are goods that do not enter into the international trade because of their nature or physical characteristics.
 - So the non-traded inputs and outputs of a project cannot be valued directly at border or world prices.
 - Some also consider goods which do not enter into trade because of protection(trade barriers).

- **Example:** Electricity is only rarely transmitted across frontiers.
- Unskilled labor is also another example of non-traded commodity
- Inland transportation and cement.
- cement is usually considered as non-traded goods.
- When goods do not enter into trade by their very nature **decomposing** is a pre-requisite to their valuation in terms of world prices.
- For some non-traded goods no reference border prices are available. **Example:** Teff.
- For other commodities the local supply price is below the CIF price of potential imports but above the FOB price of potential exports.

- In both cases the non-traded inputs and outputs of the project cannot be valued directly at border or world prices.
- So the valuation of non traded goods at world prices consists of a number of steps.
 - A. Net out taxes from the domestic market price of the commodity.
 - B. The net of taxes price is decomposed into its traded and non-traded cost elements.
- For the traded components a border price is available by definition and they are valued at this price.
- The non -traded items are further decomposed into traded and non traded and the procedure continues until in successive rounds the original inputs or outputs is developed into traded components and labor.

- **Example:** consider the production of electricity from coal
- Major cost elements are
- Coal, transport of coal to its site, transmission costs, wages and salaries, etc.
- But this procedure is cumbersome if not difficult because it requires detailed production data and cost, which are not easily available and time consuming.
- Furthermore, the additional accuracy obtained in successive rounds of decomposition will diminish fast.
- Thus one or two rounds of decomposition might be sufficient.

- After one or two rounds the non-traded components will be valued at the domestic price and multiplied by a conversion factor.
- Traded components will be valued at border prices and labor at the shadow wage rate.
- If the output of a project is a non-traded good for which border prices are however, known and if its domestic supply price is below CIF but above the FOB, a convenient approximation is to value it at the average of the two.

Traded Goods

- Traded goods are defined as goods and services whose use or production causes a change in the country's net import or export position.
- Traded goods produced or used by a project do not actually need to be imported or exported themselves, but must be capable of being imported or exported.
- Examples:
 - ✓ All kinds of manufacturing
 - ✓ Most agricultural goods
 - ✓ Intermediate goods
 - ✓ Raw materials
 - ✓ Some services such as tourism and consultancy services

- Traded goods are either exportable or importable goods (or services).
- Exportable goods are those whose domestic cost of production is below the FOB export price that local producers can earn for the good on the international market.
- Importable goods are goods whose landed CIF import cost is less than the domestic cost of producing these goods.

3.3.4. Measurement of the economic value of tradeables (Valuation of Tradeables)

- In almost all cases, the economic benefits of producing tradeable **outputs** and costs of using tradeable **inputs** are measured by the **border price** of these inputs and outputs.
- An importable border price is its CIF import price - its price landed in the importing country before the effects of any tariffs or quantitative restrictions have been added to its price.
- The landed cost of an import on the port or other entry point in the receiving country includes the cost of international freight and insurance and often includes the cost of unloading in the port.

- But this excludes any charges after the import touches the port and excludes all domestic tariffs and other taxes or fees.
- The CIF price represents the direct foreign exchange cost of the input up to the port or the border.
- The reason for using border prices to measure the economic value of a project's tradeable inputs can be understood in terms of the assumption that the international markets are comparatively competitive and free of distortions.

- The international price paid for goods and services will be a good measure of the increase in welfare created from consuming the foreign exchange earned by producing a particular tradeable goods or service.
- Similarly an **exportable good** should be valued at a border price or **FOB export price**.
- The FOB price is the price that would be earned by the exporter after paying any costs to get the good to the border, but before any export subsidies or taxes were imposed.

- The border price (FOB price) should be netted from handling, transportation and marketing expenses to arrive at the project site price or farm/factory gate price.
- By subtracting these expenses one arrives at the factory or farm gate value of the exportable output at border prices.
- The FOB border price is the actual foreign exchange earned from exporting(the export price minus any marketing margins and transport costs to get the good from the project site to the border).

Import and Export substitutes

- If the project output substitutes for imports, the relevant accounting price is the CIF of the substituted import adjusted for marketing expenses.
- If a project uses as inputs a commodity that could otherwise have been exported, we should value this input at the FOB price adjusted for transportation cost, handling, marketing margins, etc.
- For traded goods shadow prices are based on prices on the world market, with no reference to value in domestic use or supply.
- With suitable adjustments world prices provide a norm against which to assess the costs of domestic production of traded goods.

- But finding an appropriate world price may be difficult since export may go to different countries or imports may come from many countries with differing imports or export prices.
- Under such circumstances one approach is to take the lowest import price and the highest export price (optimal approach).
- Another approach may be to take an average.
- But long run prices instead of temporary prices should be used in project appraisal.

3.3.5. Border Parity Pricing

- World prices are normally measured as border prices reflecting the value of a traded good at the border or port of entry of a country.
- Border price is the unit price of a traded good at a country's border (FOB for exports and CIF for imports).
- However, values in project financial statements will normally be at prices received by the project - ex - factory or farm gate prices or paid by the project for inputs.
- **To move from market to shadow price analysis, shadow prices must be in terms of prices to the project.**
- This means that for traded goods domestic margins, relating to transport and distribution (including port handling) will have to be added to prices at the border to obtain values at the project level.

- The decomposition of these margins is referred to as **border parity pricing**.
- A parity price or parity economic value is the price or value of a project input that is based on a border price adjusted for expenses between border and the project boundary.
- Assessing the full economic values of a traded good in a world price system requires both its foreign exchange worth at the border, plus the value at world price of the non-traded activities of transportation and distribution required per unit of output.

- Thus, for goods that are traded directly by a project, the border parity price for the project output is the FOB price minus the value of transport and distribution.
- Similarly where a project imports an input, its border parity price is the CIF price plus transport and distribution costs.

Importable Output

- If the project's output is an import substitute, it should be valued at the CIF border price of the imported good for which it is substituted.
- This represents the savings in foreign exchange and the economic value of the project to the country.
- This CIF import price will not include any import tariffs or the effect of quantitative restrictions such as quotas.
- The economic cost of any marketing and transport services necessary to get the imported good from the port to the local market should be added to this CIF value.
- In addition, the economic cost of any marketing and transport cost incurred in getting the project's locally produced output should be subtracted from these economic benefits.

Exported Output

- If a project produces goods for export, the economic benefit of this good is world demand price, which is the FOB border price that the project can earn for its export item.
- The FOB border price is the free on board price of the export at the port or airport.
- This is the actual foreign exchange earned from exporting, the export price minus any marketing margins and transport costs to get the export item from the project to the border.

Imported Inputs

- The full economic cost of an imported project input is the CIF import price at the border, including the insurance and freight costs to get the import to the project.
- These foreign exchange costs and domestic costs represent the true cost to the economy of using the imported input.
- Any mark up on the cost of using the imported input due to tariffs or quotas should not be included in the economic cost of using these inputs.

Exportable Inputs

- Exportable inputs that are inputs into the project are valued at their FOB price at the border.
- This is the foreign exchange that these goods could have earned if they had not been used in the project.
- This represents their opportunity cost, and hence their true economic costs to the economy.
- The economic cost of any marketing margin and transport costs to get the input from its source to the border are subtracted from this FOB price and the economic cost of any transport and handling in getting the exportable to the project should be added.
- Thus if an input is exportable the FOB price must be adjusted for the difference between transport and distribution costs in moving the input to the project and to the port for export.

Potentially Traded Commodities

- In some cases, the distortion in the trade regime is so great that they can actually prevent the trade of goods that would otherwise be tradeables.
- Potentially traded goods includes all those goods and services currently not traded by a country but would be traded if it pursued optimum trade policies.
- These are goods that would have been tradeables in the absence of trade restrictions.
- Many countries impose rigid import quotas, import embargos, prohibitive import tariffs or export embargoes on at least some imports and exports.

- The group of potentially traded goods falls between the traded and non-traded goods.

Potentially Traded Input

- When the price differential between importing and local supply is substantial, the project owner may ask the government to import.
- Thus, if this is done, the input should be treated as traded good and be valued at the CIF price.
- On the contrary, if the input is supplied by the local high cost industry, it should be treated as a non-traded good.

Potentially Traded Outputs

- If a project output is potentially importable but not imported at present because of high import tariffs and if the duties or quotas are to be removed, the output should be treated as traded.
- If such removal cannot be foreseen, then it should be treated as a non-traded commodity.
- The same principle applies to project outputs that could be exported if the trade barriers were removed.

Economic Export and Import Parity Price

Export Parity Price

CIF at point of import (example Canada port)

Deduct-unloading at point of import

Deduct-freight to point of import

Deduct-insurance

Equals- FOB at point of export (example A.A)

Convert foreign currency to domestic currency at official exchange rate(L-M approach) or shadow exchange rate(UNIDO approach)

Deduct-local port charges

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

Equals – Export Parity Price at project boundary

Contd---

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

Equals- economic export parity price at project location(farm gate)

Import Parity Price

FOB price at point of export

Add-freight charges to point of import

Add-insurance charges

Add-unloading from ship to pier at port

CIF price at the harbor of importing countries

Convert foreign currency to domestic currency(multiplied by OER) if we use L-M approach and SER if we use UNIDO approach

Add-local port charges

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

Equals- price at wholesale market

Cont...

Deduct-local storage and other marketing costs at market prices multiplied by SCF if the project produces import substitute product but add if the project uses imported input

Equals- economic import parity price at project location
(farm/project gate price)

Conversion Factors

- It has been already stated that all project inputs and outputs should be valued at the world prices(border prices).
- World prices are used to measure the opportunity cost to the economy of goods and services which can be bought and sold in the international market.
- However, in practice, there are significant number of commodities for which there will be no direct world price to use as a measure of economic value.
- **Example: Teff**
- These commodities fall under the general heading of non-traded goods.
- Even when non-traded goods are decomposed there always remain items that are non traded and for which there is only domestic market.

- Thus, some world price equivalent figure need to be derived for these non-traded goods.
- To estimate the accounting prices for all other non traded goods (inputs and outputs) we use **conversion factors**.
- A **conversion factor** is defined as the factor by which we multiply the actual price in the domestic market of an input or output to arrive at its accounting price.
- The conversion factor is simply the ratio of the shadow price of the item to its market price.
- A conversion factor is estimated simply by taking the ratio of border prices (world prices) to domestic market prices of the good.

- Since market distortions vary from commodity to commodity, the conversion needed varies from case to case.
- Therefore, it is possible to estimate commodity specific, service specific, or sector specific like electricity, transportation, construction etc., or for a basket of goods e.g. consumption goods for a particular income group conversion factors depending on the degree of aggregation desired.
- Thus conversion factors can be calculated at different levels:
- For individual commodities. **E.g.** coffee conversion factor
- For broad sector **example**: construction conversion factor
- For categories of expenditure. **Example** investment conversion factor
- For the economy as a whole **example** ACF.

- In all cases one is comparing a value at world price, which should reflect the shadow price, with the domestic price.
- In principle we should have one conversion factor for each non-traded commodity or for each group of commodities.
- Thus, the use of conversion factor is only the second best approach.
- The best approach is to use the accounting price.
- Thus, for homogenous groups of goods and services it is convenient to have readily available conversion factors to be used in all project, instead of decomposing them every time a project is analyzed.

- The question now is how many conversion factors do we need? There is no definite answer to the question.
- It all depends on the data availability, the variations of market distortions, the time it takes to estimate conversion factors ,etc.
- But at least we need one conversion factor to multiply all the domestic market prices of all non-traded components of the input and output of a project.
- **This parameter is called the standard conversion factor.**

The Standard Conversion Factor

- It is a summary measure to calculate accounting prices for non traded commodities.
- In the case of Ethiopia, the standard conversion factor is interpreted as a summary and approximate quantification of the distorted markets (domestic) as compared to the international market.
- Therefore, it is the ratio of the value of imports and exports of a country at border prices to their value at domestic prices.
- The formula for computing the standard conversion factor is give as:

$$SCF = \frac{M + X}{(M + T_m - S_m) + (X + S_x - T_x)}$$

- Where M and X are total imports and exports respectively at world prices converted at the official exchange rate.
- T_m and T_x are the total trade taxes on imports and exports respectively
- S_m and S_x are total trade subsidies on imports and exports respectively

- All values should refer to the same year or to an average over the same period.
- The SCF is a summary measure to calculate accounting prices for non traded goods.
- This is achieved by multiplying the net of taxes domestic price of the commodity by the SCF.
- The border price is obtained by multiplying the net of taxes domestic price of the commodity by the SCF.
- Thus, every effort must be made to decompose the non-traded goods into traded and non traded elements and apply the SCF only to the latter.
- The rule for the non-traded goods should be still decomposition and the SCF should be used only when this is impossible, very difficult or is not worth the effort.
- The SCF is revised from time to time by the central economic authorities and adopted by planning bodies.

National Parameters

- There are some important parameters that have general applicability in the sense that they are used in all projects.
- These parameters should take the same value in all projects although they can change from time to time.
- That is; such parameters are national so that they apply to all projects regardless of their sector, and they are economic because they reflect the shadow price of the items concerned.
- For instance, a typical list of national economic parameters may cover conversion factors for:
 - Unskilled and skilled labor
 - Some of the main non-traded sectors
 - Some aggregate conversion factors such as consumption conversion factor, a standard average conversion factor, the discount rate, etc.

- A project analyst can apply these parameters directly to the project under analysis.
- They are called national parameters to distinguish them from the project specific shadow prices.
- They are estimated by the central planners and are taken as given by the project analyst.
- Some of the important national parameters include:
 - The standard conversion factor
 - The shadow wage rate
 - The discount rate, and
 - The shadow exchange rate($SER = P_d/P_w$)
- P_d - domestic price, P_w - world price in foreign currency

3.4. Social Cost Benefit Analysis

The Purpose of Social Cost Benefit Analysis

- In financial and economic project appraisal, it is implicitly assumed that income distribution issues are beyond the concern of the project analyst or that the distribution of income in the country is considered appropriately.
- For a private commercial entrepreneur project choice is a rather simple exercise.
- If he/she knows his/her objectives, all he/she has to do is to ascertain which projects satisfy his/her objectives best.
- But in most countries, governments are not only interested in increasing efficiency but also in promoting greater equity.
- A financial objective is narrow one for a public agency to pursue and for public decisions; a broader social objective would be more appropriate.

- When a project is chosen from alternative projects, the choice has consequences for employment, output, consumption, savings, foreign exchange earnings, income distribution and other things of relevance to national objectives.
- The purpose of SCBA is to see whether these consequences taken together are desirable in the light of the objectives of national planning.
- Therefore, a social appraisal of projects goes beyond economic and financial appraisal to determine which project will increase welfare once distributional impact is considered.
- The project analysts will not be only concerned to determine the level of project's benefits and costs but who receives the benefit and pays the costs.

- In an economic analysis of a project, it is implicitly assumed that a dollar received by any individual will increase the community's welfare by the same amount as a dollar received by any other individual.
- But an extra dollar given to a very poor person will usually increase the person's welfare by much more than would a dollar given to a rich person.
- A rationale in welfare economics for the social analysis of projects is therefore, quite strong, the marginal utility of income of a person who receives a low income is expected to be greater than the marginal utility of income of the same person if he/she receives a high income.

Basic Arguments for the Application of Social Cost benefit Analysis

✓ The basic arguments include:

- Existence of market imperfection
- Existence of externalities
- Concern for savings
- Concern for redistribution
- Merit wants

3.5. Cost Effectiveness Analysis

- Both cost - benefit analysis (CBA) and cost - effectiveness analysis (CEA) are useful tools for program and project evaluation.
- Cost - effectiveness analysis is a technique that relates the costs of a program/project to its key outcomes or benefits.
- Cost - benefit analysis takes that process one step further, attempting to compare costs with the dollar value of all (or most) of a program ' s many benefits.
- These seemingly straightforward analyses can be applied anytime before, after, or during a project/program implementation, and they can greatly assist decision makers in assessing a projet ' s efficiency.
- However, the process of conducting a CBA or CEA is much more complicated than it may sound from a summary description.

- Cost - effectiveness analysis seeks to identify and place dollars on the costs of a project.
- It then relates these costs to specific measures of project effectiveness.
- Analysts can obtain a project 's cost - effectiveness (CE) ratio by dividing costs by what we term units of effectiveness:

$$\text{Cost-Effectiveness Ratio} = \frac{\text{Total Cost}}{\text{Units of Effectiveness}}$$

- Units of effectiveness are simply a measure of any quantifiable outcome central to the project's objectives.

- For example, a dropout prevention program in a high school would likely consider the number of dropouts prevented to be the most important outcome.
- For a policy mandating air bags in cars, the number of lives saved would be an obvious unit of effectiveness.
- Using the formula just given and dividing costs by the number of lives saved, you could calculate a cost - effectiveness ratio, interpreted as “dollars per life saved.”

- You could then compare this CE ratio to the CE ratios of other transportation safety policies to determine which policy costs less per unit of outcome (in this case lives saved).
- Although it is typical to focus on one primary outcome in CEA, an analyst could compute cost - effectiveness ratios for other outcomes of interest as well.
- Mutually exclusive programmes
 - Incremental cost-effectiveness ratios =

$$\frac{\Delta C}{\Delta E} = \frac{\text{Cost of new treatment} - \text{cost of current treatment}}{\text{Effect of new treatment} - \text{effect of current treatment}}$$

Steps in Cost - Effectiveness and Cost - Benefit Analysis

1. Set the framework for the analysis
2. Decide whose costs and benefits should be recognized
3. Identify and categorize costs and benefits
4. Project costs and benefits over the life of the program, if applicable
5. Monetize (place a dollar value on) costs
6. Quantify benefits in terms of units of effectiveness (for CEA), or monetize benefits (for CBA)
7. Discount costs and benefits to obtain present values
8. Compute a cost - effectiveness ratio (for CEA) or a net present value (for CBA)
9. Perform sensitivity analysis
10. Make a recommendation where appropriate

Review Questions

Answer the following questions in a precise way.

1. Assume a project is expected to export its product. Write the procedures that we should follow so as to get economic export parity price at project location.
2. Explain the objective of undertaking social-cost benefit analysis of a project?
3. In economic analysis, the valuation of non-traded goods at world prices has a number of steps. Write the necessary valuation steps and procedures precisely.
4. How the existence of public good lead to market price distortion?

CHAPTER-FOUR

PROJECT MONITORING AND EVALUATION

Introduction: Monitoring and Evaluation- Some Basics

- Nowadays, Monitoring and Evaluation has been given high importance because:
 - Good governance is key to achieving sustainable socio-economic development
 - Governments are increasingly being called upon to demonstrate results
 - Stakeholders are no longer solely interested in organization activities and outputs rather interested in actual outcomes

- The results and sustainability of Program/project requires:
 - Collection of data/information and analysis in continuous fashion.
 - For this, there is a need to establish a Monitoring and Evaluation system.
 - That is; a system that
 - Establishes a data collection methods,
 - Defines data collection periods
 - Describes role of the actors in the system
 - Establishes accountability
 - Segregates report requirements of all the stakeholders
- Hence, we need to equip ourselves with the basic Knowledge, Skill and Attitude of M&E.

Traditional Implementation-focused Monitoring And Evaluation Systems Vs Result Based M&E

- **Traditional: implementation-focused M&E**
 - are designed to address compliance the "did they do it" question.
 - Did they mobilize the needed inputs?
 - Did they undertake and complete the agreed activities?
 - Did they deliver the intended outputs?

Shortcomings

- Completing all of the activities and outputs is not the same thing as achieving the desired outcomes.
- The sum of all activities may or may not mean that desired outcomes have resulted.
- A list of tasks and activities does not measure results.
- Even if all activities were completed within a given timeframe, the desired outcome may not necessarily been achieved.

- The implementation approach focuses on monitoring and assessing how well a project, program, or policy is being executed.
- This approach does not provide policy makers, managers, and stakeholders with an understanding of the **success or failure** of the project, program or policy.

Result –Based M&E system

- Results-based Monitoring and Evaluation systems are designed to address the "So what" question.
- So what about the fact outputs have been generated? So what that the outputs from these activities have been counted?
- A results-based system provides feedback to the stakeholders on the actual outcomes and goals.
- Results based systems help answer the following questions:
 - **What are the goals of the organization?**
 - **Are they being achieved?**
 - **How can achievement be proved?**

Participatory M & E

- It is a process in which primary and other stakeholders collaborate and take an active part in assessing & evaluating the performance and achievement of a development intervention.
- *Uses result based M & E system*

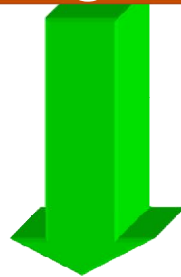
4.1. What is Monitoring and Evaluation?

- **Monitoring:** is a continuous process of gathering, analyzing and interpreting of information on the daily use of inputs and their conversion into outputs.
- This enables us to make timely adjustment or correction on the development program/project when necessary.

MONITORING

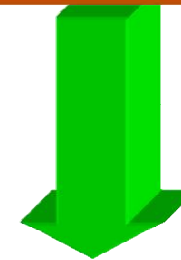


It is a review by management to:



- Assess progress
- Identify difficulties
- Ascertain problem areas
- Recommend remedial action(s)

It is concerned with:



- Ensuring that [inputs]
- Through [activities]
- Are transformed into [outputs]

Types of Monitoring (What to Monitor?)

1. Process monitoring and

2. Impact monitoring.

or

1. Physical progress monitoring

2. Financial expenditure

3. Project Quality

4. Project Assumption

Process Monitoring helps to assess:

- The progress of activities, the outputs/results achieved (quantity & quality) while the project is on progress
- The use of resources (Human resource, finance, material & equipments)
- The way the activities are carried out (management style)
- How critical assumptions are addressed

Impact monitoring helps to measure:

- Changes brought as a result of the project/program intervention while the project is still on progress.
- This might be:
 - ✓ Economic aspect,
 - ✓ Social Aspect,
 - ✓ organizational,
 - ✓ technological,
 - ✓ attitude, etc. or other intended and unintended results over a longer period.
- **Impact monitoring** is different from impact evaluation or assessment which is expected some time after the project is completed.

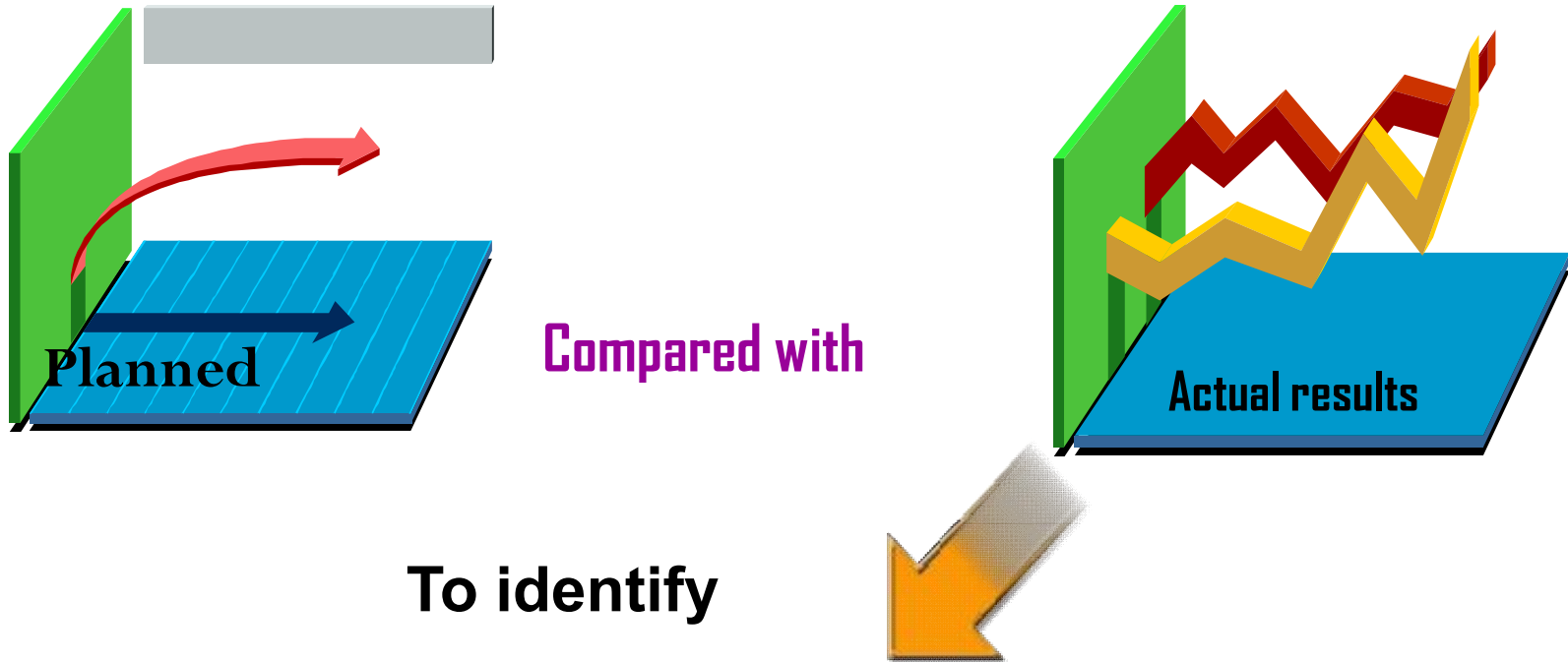
1. Project Physical Progress Monitoring

- It is checking of whether activities in the project & expected results are up to schedule or not.
- Activity Monitoring - Activity monitoring monitors what happens during the implementation of the project and whether those activities which were planned, were carried out.
- This information is often taken from the progress report.

○ Items to be considered during program/project physical monitoring are:-

- Activities executed & inputs utilization
- Results of activities/project outputs/
- Progress of project towards objectives
- The way the project is managed (quality style of work)
- Problems encountered (variance)
- Etc.

Progress Monitoring



Problems and opportunities



Deviations from plan



Corrective actions and alternatives

○ **Specific questions to be answered are:**

- Is the project physical progress as a whole and its individual components :
 - On schedule,
 - ahead of schedule, or
 - behind schedule?
 - If there is a variation, where did it occur, why did it occur, who is responsible for it, and what would be its implications?
 - What are the slipping tasks/activities?
- What is the trend of the performance?
- What would be the likely final output, cost and completion date of the project and its individual components?
- What action has to be taken?

- **Three situations may be considered in measuring/assessing physical progress**

1. **Quantifying Output** of the activity in absolute terms.

EX: number of wells constructed for a water supply project or number of houses constructed for housing development project

Work Performed x 100 (%)

Work Planned

2. **Valuing the output of the activity**

Value of work done x 100 (%)

Total Value of work planned

3. **Using time spent**

Time spent to date x 100 (%)

Total time to complete

2. Project Financial Progress Monitoring

➤ Managers are concerned to measure financial progress to ascertain:

- The cost of individual items and activities within the project and its comparison with the original estimate.
- This requires financial plan for the project.
- Once the budget has been prepared and the project is on progress, the project manager require:
 - A cost reporting system to provide information on:
 - actual costs incurred in relation to the activities performed and output attained.

Specific questions to be answered are:

- Has the cost of the project as a whole (and its individual component) been as per the estimated budget, less or more than the budget estimates?
- If there is a variation, where did it occur?, why did it occur?, who is responsible for it?, and what would be its implications?

- The following must be measured periodically (in most cases monthly & quarterly) for purposes of cost monitoring and control:
 - Costs incurred to date
 - Budgeted costs to date
 - Value of work done to date
 - Cost over–run (under–run) to date
- ❖ **Costs incurred to date:** this can be obtained by summing up costs incurred in accomplishing various project activities
- ❖ **Budgeted costs to date:** this can be readily obtained from the cost projections made at the beginning.

- **Value of work done to date:** when costs are measured, an estimate should be made of the extent of work accomplished.
- The **value of work done** can then be obtained as follows:

Budgeted costs X % of work accomplished

- **Example:** to construct a single block of condo has a budgeted cost of Birr 1.5ml and at the time of the periodic progress review it is estimated that 60% of the work has been accomplished.
- ✓ Hence, the value of work done is simply (1.5×0.6) Birr 900,000
- **Cost over-run /under-run to date:**
- ✓ There is cost over-run when the cost incurred is more than the value of work done and vice versa.

3. Project Quality Progress Monitoring

- Quality monitoring varies from project to project.
- In the case of physical construction there will be established system of supervision, testing and checking against the original/given specification.
- In projects with institutional outputs such as new service delivery systems, and the like;
 - there is a need to develop specific systems and specifications/indicators of quality checking.
- In all aspects, project managers are responsible to ensure that the outputs produced by the project are as per the quality standards or specifications established in the project design.

4. Project Assumption Monitoring

- **Assumption** is an event, a condition or a decision which is necessary for project success, but which is largely or completely beyond the control of project management.
 - Ex: Suitably qualified staff willing to work in rural areas
 - Mothers willing to attend clinics
 - Prices of project inputs and outputs
- Project managers should pay critical attention to elements that are outside the project during the monitoring process.

Evaluation

○ **Evaluation** is a systematical and periodical gathering, analyzing and interpreting of information on the operation as well as the impacts of a development program/project.

It is an assessment of:

- The overall project performance and objective achievement in light of relevance, efficiency, effectiveness, impact and sustainability
- Reasons contributing for success or failure
- An in-depth review of the strategy used
- Lessons learned both from on-going &/or completed project

When & What do we Evaluate?

- ✓ In addition to determined time, during project planning/design, evaluation may be carried when:
 - Monitoring report indicates an unexpected result which is positive or negative
 - Management requires additional information for decision-making
 - Key questions to be resolved are identified during monitoring process
 - The need to extract key lessons learned arises.

Evaluation criteria

- Most of the basic evaluation criteria and concepts are universally accepted and used by all the organisations as well as by the donors' community.
- The criteria for evaluation addresses five major sets of issues:
 1. Relevance
 2. Efficiency
 3. Effectiveness
 4. Impact
 5. Sustainability

- Although it varies on the type of evaluation carried among others, we have to assess:
 - **Relevance of the project**
 - Did the project address priority problems faced by the target areas and communities?
 - Was the project consistent with policies of both donors and recipient governments (or agencies)?
 - **Effectiveness**
 - Have outputs and outcomes been achieved?
 - **Efficiency of resources** (availability & utilization)
 - Were inputs (staff, time, money, equipment) used in the best possible way to achieve outputs? Could implementation been improved/ was there a better way of doing things?

- **Sustainability factors**

- Have the necessary systems been put in place to ensure the project itself and more particularly the project benefits continue once the project and its (foreign) funding has ended?

- **Impact**

- What has been the contribution of the project to the higher level development goals?
 - Did the project have any negative or unforeseen consequences?

Types of Evaluation

- ✓ It can be seen in two ways:
 1. In periods/time of evaluation and
 2. By persons involved in the evaluation process.

1 - Based on the Period / time

- i. Ex-ante / start-up/ evaluation,
- ii. On-going or mid-term /formative/ evaluation,
- iii. Terminal /summative/ evaluation; and
- iv. Ex-post/impact evaluation.

Ex-ante/start-up Evaluation:

- It is an evaluation carried out before the implementation of the program or project activity in order to determine:
 - The needs and potentials of the target group and its environment
 - Assess the feasibility and potential effects and impacts of proposed program or project
- ✓ It can be considered as a “baseline” study in which the situation of the project area , the target group and its environment is described.
- ✓ Hence, at a latter stage, the effects and impacts of the program or project can be compared with this situation.

On-going/Mid-term/Formative Evaluation:

- ✓ It takes place while the implementation of the planned project is on-progress or in the mid of the project life.
- ✓ It primarily focuses on project performance and to see immediate and intermediate results.
- ✓ May help to analyze the relation between outputs and effects/outcome
- ✓ Help to modify the design and implementation strategies.

- **Major Issues To Be Seen During On-going Evaluation Include:**

- Efficiency in resource utilization
- Procurement of necessary goods and services from national and international sources (in many projects, procurement delays are a major obstacle to effective implementation)
- Progress in output or physical work (construction), including the quality of work
- Progress in financial expenditure
- Volume and quality of inputs and services made available
- Organization structure and management capacities of the project
- Progress and problems in staff recruitment and placement

Terminal [Summative] Evaluation

- ✓ Known as a project completion report
- ✓ Conducted when the funding for the project comes to an end or certain phase of the project is completed.
- ✓ The distinguishing features of terminal evaluation are:
 - It examines the initial outputs and effects
 - It undertakes a careful examination of implementation performance
 - It assess the sustainability of the benefits accruing to the target area/group from the project

Ex-post Evaluation

- Often called **impact** evaluation/ impact assessment
- Designed as **in-depth study** of the impact of a project that has been already executed or an intervention (support) given for certain development activities.
- Carried some time after the program/project activity has been terminated (usually 6 months to 3 years after project completion) in order to determine its impact on the target group and the local area.

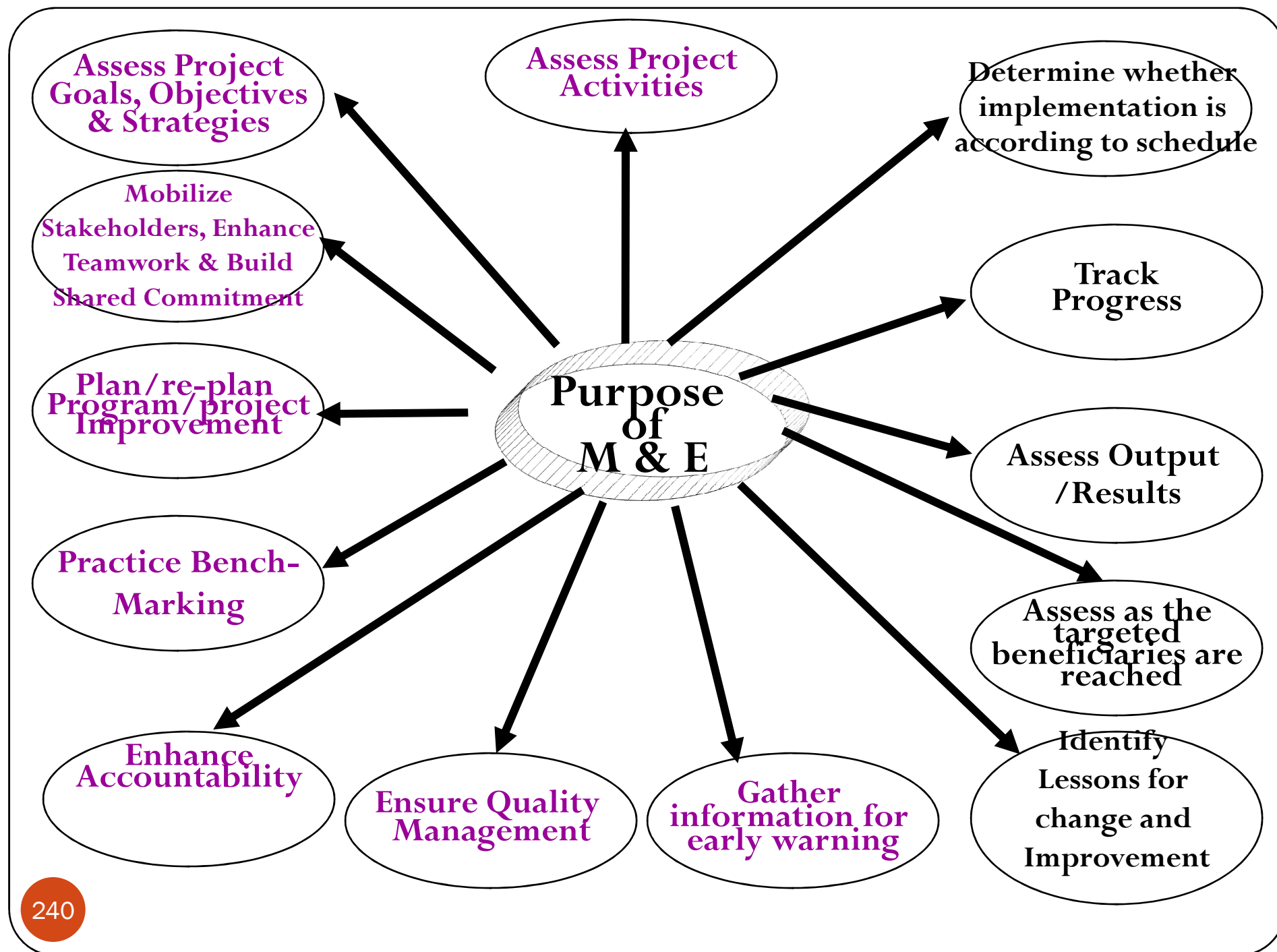
2. Evaluation Based on Evaluating Persons:

1. Internal Evaluation:

- Performed by persons who have a direct role in the program/project implementation
- Can be done by the management team or persons assigned from the implementing agency

2. External Evaluation:

- It is carried out by persons / institutions from outside the program/project implementers
- In most cases, it is conducted by the funding /sponsoring/ agencies with formally designated consultants/evaluators outside the project at fixed points in time
- Terminal and ex-post evaluation are often conducted by external evaluators



Distinction between M & E

Themes	Monitoring	Evaluation
Purpose/objective	Specific	Broad
Scope	Narrow	Broad
Frequency/Time	Continuous	Periodic
Data Gathered	Primarily Quantitative	Primarily Qualitative
Main Action	Oversight / supervision	In-depth analysis
Focus	Inputs/Outputs	Impact and Sustainability

Distinction Themes . . .

Themes	Monitoring	Evaluation
What does it answers? (objectives)	▪ Activities performed ▪ Outputs achieved ▪ Resources used ▪ Quality of work performed ▪ Problems encountered ▪ Rectifying measures ▪ (focuses on inputs, process, output and work plan)	▪ Why and how results were achieved or not ▪ Strategy and policy options ▪ (focus on effectiveness, and relevance or impact)
Actors	Mainly Internal	Internal/External
Analysis	Simple	Comparative Analytical tools
Primary Users	Small group/project Managers	Large group /Project Managers, planners, Financers, stakeholders etc.)

Setting-up Monitoring And Evaluation System

- ✓ Establishing M&E system is vital in order to:
 - collect data, analyze and interpret in a systematic way to see
 - The progress of the project
 - The achievements [output and outcome] and impact/sustainability of development program or project
- Establishing M&E system may differ from sector to sector and form project to project .
- However, having a designed system is required to provide information at different levels:
 - ✓ National level, line ministries, regional and local level agencies , project financer, project management and the like

Prerequisites for a Successful M & E System

- The data to be gathered need to be accurate, within the timeframe and should be collected by a reasonable cost.
- The system has to be designed at an early stage of project preparation & baseline data collected well in advance.
- Managers should develop and own the system & be committed to its use
- The system designed must ensure gathering of data both from internal & external sources:
 - In an appropriate forms and
 - Disseminate the information vertically and horizontally between the different levels of organizations units for timely and effective decision making.

- **Steps in developing M&E system**

1. Determine the objectives of M&E
2. Identify and involve the stakeholders
3. Define what should be monitored and evaluated
 - Ex: activities, inputs, outputs, results, critical assumption, impacts
4. Determine the priority areas to be monitored and evaluated
 - Determine the important issues to be considered for decision making
5. Identify and indicate key elements and indicators to be focused
6. Design and test M&E instrument

7. Plan how you will execute M&E

8. Determine how data will be collected, processed and analysed

- Progress report, progress review meeting, field visits, weekly or fortnightly, Survey, literature

9. Prepare, disseminate and use the M&E report

- determine type of information needed
- Identify who requires the information
- Know why the information is required
- Determine when and how it is needed
- Know how important the information is

Commonly Used M & E Tools

- 1. Logical Framework**
- 2. Report**
- 3. Questionnaires**
- 4. Interview**
- 5. Key Informant Interview**
- 6. Review of Documents**
- 7. Trend Analysis**
- 8. etc**

- **Review Questions**

- **Answer the following questions.**

1. Why we monitor and evaluate projects?
2. What is the importance of having a developed monitoring and evaluation system?
3. Why we include monitoring and evaluation tools in project proposals?

CHAPTER-FIVE

EVALUATION: SOME BASICS OF IMPACT EVALUATION

5.1. Impact Evaluation Basics

- **Impact evaluation** is an effort to understand whether the changes in well-being are indeed due to project or program intervention.
- Specifically, impact evaluation tries to determine whether it is possible to identify the program effect and to what extent the measured effect can be attributed to the program and not to some other causes.
- So, impact evaluation focuses on outcomes and impacts.

- Since impact evaluation is time and resource intensive, it should be applied selectively.
- Policy makers may decide whether to carry out an impact evaluation on the basis of the following criteria:
 - ✓ The program intervention is innovative and of strategic importance.
 - ✓ The impact evaluation exercise contributes to the knowledge gap of what works and what does not. (Data availability and quality are fundamental requirements for this exercise.)

Why Should We Do Impact Evaluation?

- The best way to undertake a particular impact evaluation depends in part on its purpose and who its primary intended users are.
- Some common reasons for doing impact evaluation include:
 1. To decide whether to fund an intervention— “ex-ante evaluation” is conducted before an intervention is implemented, to estimate its likely impacts and inform funding decisions.

2. To decide whether or not to continue or expand an intervention.
3. To learn how to replicate or scale up a pilot.
4. To learn how to successfully adapt a successful intervention to suit another context.
5. To reassure funders, including donors and taxpayers (upward accountability), that money is being wisely invested.
6. To inform intended beneficiaries and communities (downward accountability) about whether or not, and in what ways, a program is benefiting the community.

Quantitative versus Qualitative Impact Assessments

- Quantitative impact assessments use quantitative data and approaches to determine the effectiveness of programs with far-reaching goals such as lowering poverty or increasing employment.
- Qualitative impact assessments use qualitative information such as understanding the local socio-cultural and institutional context, as well as program and participant details which are essential to undertake sound quantitative assessment.

- But a qualitative assessment on its own cannot assess outcomes against relevant alternatives or counterfactual outcomes.
- That is, it cannot really indicate what might happen in the absence of the program.
- Quantitative analysis is also important in addressing potential statistical bias in program impacts.
- A mixture of qualitative and quantitative methods (a mixed-methods approach) might therefore be useful in gaining a comprehensive view of the program's effectiveness.

Quantitative Impact Assessment: Ex post versus Ex ante Impact Evaluation

- There are two types of quantitative impact evaluations: **ex post and ex ante**.
- An ex ante impact evaluation attempts to measure the intended impacts of future programs and policies, given a potentially targeted area's current situation.
- This may involve simulations based on assumptions about how the economy works.
- Many times, ex ante evaluations are based on structural models of the economic environment facing potential participants.
- That is, using the structural models we predict program impacts.

- **Ex post evaluations**, in contrast, measure **actual impacts** accrued by the beneficiaries that are attributable to program intervention.
- One form of this type of evaluation is the treatment effects model.
- Ex post evaluations have immediate benefits and reflect reality.
- These evaluations, however, sometimes miss the mechanisms underlying the program's impact on the population, which structural models aim to capture and which can be very important in understanding program effectiveness.

- Ex post evaluations can also be much more costly than ex ante evaluations because they require:
 - collecting data on actual outcomes for participant and nonparticipant groups and
 - other accompanying social and economic factors that may have determined the course of the intervention.
- An added cost in the ex post setting is the failure of the intervention, which might have been predicted through ex ante analysis.

The Problem of the Counterfactual

- The main challenge of an impact evaluation is to determine what would have happened to the beneficiaries if the program had not existed.
- That is, one has to determine the per capita household income of beneficiaries in the absence of the intervention.
- A beneficiary's outcome in the absence of the intervention would be its counterfactual.
- A program or policy intervention seeks to alter changes in the well-being of intended beneficiaries.

- Ex post, one observes outcomes of this intervention on intended beneficiaries, such as employment or expenditure.
- Now , we have to ask:
- Does this change relate directly to the intervention?
- Has this intervention caused expenditure or employment to grow? Not necessarily.
- In fact, with only a point observation after treatment, it is impossible to reach a conclusion about the impact.
- At best one can say whether the objective of the intervention was met.
- But the result after the intervention cannot be attributed to the program itself.

- The problem of evaluation is that while the program's impact (independent of other factors) can truly be assessed only by comparing actual and counterfactual outcomes, the counterfactual is not observed.
- So the challenge of an impact assessment is to create a convincing and reasonable comparison group for beneficiaries in light of this missing data.
- Ideally, one would like to compare how the same household or individual would have fared with and without an intervention or “treatment.”

- But one cannot do so because at a given point in time a household or an individual cannot have two simultaneous existences.
- That is; a household or an individual cannot be in the treated and the control groups at the same time.
- Finding an appropriate counterfactual constitutes the main challenge of an impact evaluation.

5.2 Methodologies in impact evaluation

The major impact evaluation methodologies include:

1. Randomized evaluations
2. Matching methods, specifically propensity score matching (PSM)
3. Double-difference (DD) methods
4. Instrumental variable (IV) methods
5. Distributional impacts
6. Structural and other modeling approaches

NB: Read more on these methodologies!

Review questions

Try to answer the following questions

1. What is the difference between evaluation and impact evaluation?
2. What is the advantage of undertaking impact evaluation?
3. What is counterfactual?

Assignment- this is a requirement to complete the course.

- Please identify any profit oriented project idea and prepare a complete project proposal. The project proposal should incorporate all aspects of project preparation as much as possible.
- NB: The life of the project should not be less than 7 years and the proposal should clearly show the payback period, NPV, BCR and IRR. (Use $r=14$)

END