
Arba Minch University College of Business and Economics Department of Economics



Development Planning and Project Analysis II (Econ - 4012)

MODULE

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December, 2019

Preface

Dear our learners and readers, we are so happy to carry on with our aspiration of producing properly educated economists throughout the country. As usual as it is, we have tried, to our best capacity, to produce classical reading material for our esteemed students and readers. This module is aimed at serving the needs of students who take the course **Development Planning and Project Analysis II**, Econ 4012, offered to upper level undergraduate students of economics. Development planning and project analysis is seen as an essential ingredient for rapid development in developing countries like Ethiopia. It is an integral part of the economic systems. The purpose of the course is to outline and present the general framework and the basic theories and methodologies for Project preparation, analysis, appraisal, implementation, and impact evaluations for different interventions.

The module is organized into six major chapters. The first chapter is devoted to the basic concepts and cycles of a project. Chapter two deal with aspects of project preparation and analysis. The third chapter focuses on financial analysis and appraisal of projects. The fourth chapter builds on the economic analysis of the project. Chapters five discuss the concepts of project implementation, monitoring and evaluation. Chapter six deal with some basics of impact evaluation. We use the term social benefit cost analysis to refer to appraisal of private or public project from a public interest view point. Sometimes the scope of the required analysis is broader than the evaluation of economic benefits and cost: and impact analysis may also be required to determine the effect of economic benefit and cost.

It has been tried to discuss the main principles of project appraisal, implementation and evaluation and to make the science of project analysis understandable. All possible efforts have been made to enhance the usefulness of the material. Further, the explanation of various economic theories has been supported by appropriate tables, figures and examples. In addition, adequate number of activities and exercises are included for further learning procedures.

Dear learners and readers! We hope that you will find this material worth reading. And finally we wish our readers all the best in their academic career.

Mulugeta Fekadu

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CHAPTER ONE

AN OVERVIEW OF PROJECT ANALYSIS

Introduction

Dear learner! In this chapter, we would like to familiarize you with some of the basic concepts in the whole project work. We start with concept definition and broaden our scope on gradual basis towards the discussion of activities involved in the whole project cycle. We hope you will enjoy the readings and exercises in this first chapter and in the subsequent chapters as well.

Learning Objectives:

Dear distance learner! After completing this chapter, you will be able to:

- Explain the concept and characteristics of a project;
- Identify the link between policy, development plan, programs and projects;
- Discuss stages of project planning;
- Realize aspects of project analysis;
- Understand the concept of project appraisal and its principles;

1.1. The Project Concept

1.1.1. Definition: What is A 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). It is complex set of activities where resources are used in expectation of return and which lends itself to planning, financing and implementing as a unit. A project can alternatively be defined as a group of tasks performed in a definable time period in order to meet a specific set of objectives. A project usually has a specific starting and ending point intending to accomplish specific objectives. Projects usually have well defined sequence of investment and production activities and a specific group of benefits that can be identified.



Dear distance learner! Can you describe the concept of a project in your own word with providing practical examples?

1.1.2. The Basic Characteristics of a Project

In all project types there are basic characteristics of capital expenditure (also referred to as a capital investment or capital project). Another way of defining a project is to outline these basic characteristics that a project exhibits, which include the following.

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

There are measurable Objectives of a project. Projects have specific of benefits that can be identified, quantified and valued, either socially or monetarily/commercially/. Related to the specificity of objectives, is the fact that projects have specific beneficiaries or clientele group, which needs to be specifically spelt out during project planning studies.

A project is the smallest operational element unit. A project can be planned, financed and implemented as a unit. Often projects are the subject of special financial arrangements and have their own management. Despite the fact that a project constitutes many activities and tasks, it is defined as the smallest operational unit. The major reasons why a project is defined as the smallest operational unit are the fact that a project is bounded by different factors. The boundaries of projects make them distinguishable from each other.

Projects are conceptually bounded. The problem and specific objective or needs that justify the project involves conceptual delimitations.

Projects are geographically bounded. Projects exist in space and we say that projects are geographically/location bounded.

Projects are organizationally bounded. Projects require the establishment of a special organization or the crossing of traditional organizational boundaries. i.e. there should be certain organizational unit responsible for project implementation.

Projects are time bounded. One factor that makes projects bounded is the time/life cycle/ of a project. Projects have specific lifetime, with a specific start and end time in which clearly defined set of objectives are expected to be achieved. It is a unique, one-time investment scheme.

Uncertainty and risks is inherent in any project. Achieving project objectives cannot be predicted in advance with accuracy. The factors that make project risk are:

Significant and multiple types of scarce resources committed today expecting outcome in the future; Benefits are expected to be generated in the future, which is less predictable;

Capital investments are irreversible, i.e. the assumption of perfect exit assumption of the perfect competition model is refuted.

It has a scope that can be categorized into definable tasks. Projects usually have well defined sequence of investment and production activities.

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. Unmanaged resource can contribute more to cost than to benefit.

1.1.3. Additional Descriptions/Features of Projects

The following features of a particular project can help us understand more about what a project should include.

Scope: A project should be neither too small nor too large; it has to have an optimal and reasonable scope. For instance, a plan of action that deals with the agricultural sector can't be called a project. Dear student! You can imagine how big it would be to consider an economy's sector as a project. On the other hand, the decision whether to employ or reject an extension agent in a given government office can't be project or a project concept; such a single activity can never be considered as a project.

Size: Size of a project is a function of capital invested, human labor requirement (skilled or unskilled), coverage of beneficiaries, total value of inputs used and total value of goods and services produced by the project.

Duration: A project has a limited duration. We can find projects of long and short duration. Project duration refers to the number of years required to complete the project.

Example: Hydroelectric project, coffee plant, annual crop projects (say bean exporting agricultural project), or seed distribution projects- all these have their own varying project duration. Economic life of the project (the number of years the project remains economically productive) is different from the duration of the project. Suppose the duration of project is 10 years, this doesn't necessarily mean that the economic life of the project is 10 years.

Outcome (output): The outputs of projects may be goods (e.g. machineries and clothing), services (e.g. education and health), knowledge and information (e.g. research) or information. Thus, outcome of a project can take various forms.

Coverage: A project can be regional, national, international, urban, or rural.

Type: As to their type, projects may be agricultural, industrial, transportation, commerce etc.

Input use: In relation to input use, projects may be capital intensive, labor intensive, and/or energy intensive.

Budget: A project should have its own budget and should be self-contained i.e. it should include all the necessary elements to achieve its goal (s). For example; construction of school building is not a project unless teachers, educational material and students are available.

Boundary: It is extremely important to properly establish the boundaries of a project. Boundary of a project is conceptually simple but in practice it is extremely difficult as it is not simple where to delineate its boundary. For instance, irrigation project vs. agricultural research project. How the boundary is drawn will depend upon the point of view (financial, economic, and social) from which the project is being appraised. As we move down to the different levels of Cost Benefit Analysis (CBA), which may take financial, economic, or social form, the project boundary gets wider.

The absence of effective and well defined project preparation is one major problem in developing countries. Economic planners often give little time to the preparation of suitable development projects. Public projects, which are not profit oriented, are the main targets of

aid-flows coming to developing countries (which have their origin in government plans, make demands on government resources and institutions, even though the private sector may be involved in the implementation phase.) Good examples may include road construction projects and power generating projects. Given all the above discussions, one can derive the following dynamic and comprehensive definitions for a project.

A project is an instrument of change. It is a coordinated series of actions resulting from a policy decision to change resource combinations so as to contribute to the realization of the country's development objectives. Projects should, according to this definition, be formulated within the framework of the country's development priorities which may include agricultural production growth, improving income distribution, eradicating poverty and malnutrition, promoting larger public involvement in producing goods and services.

A project is people-oriented. It responds to people's actions. Projects should forecast the response of their ultimate beneficiaries. A project within the framework of a national development changes plan into action at a micro-level. Hence, a project is undertaken, among other things, for development reasons (executing national objectives at the micro level) and may include:

- Promoting exports,
- Employment creation,
- Utilizing non-utilized and under-utilized resources, etc....



Dear learners! Would you mention the basic characteristics and features of a project?

1.1.4. Classification of Project

In general every project is unique in the sense that there are factors that distinguish projects from others. Some of the main factors which bring about differences in the nature of projects and that determine the breadth and depth of project studies include:

- Size/scale/, small-, medium- and large- scales of projects;
- Markets; projects catering to regional, national or international markets,
- Technologies, heavy, light, mature or newly evolving technology, factor intensity, etc.
- Economic and location context: Rural and urban projects, projects in LDCs and DCs, etc.
- Financial and other resources availability,
- The macro economic situation at which the particular project is being considered,
- The level of competition, high or low competition, local or global competition,
- The type of sector/industry of a project eg. Good or service (education, health, banking, insurance), public good or private good, industrial or agricultural project, etc.
- Ownership (private and public projects) which has wider implication on the breadth and depth of coverage.
- Impact/outcome: Projects could be different because of their major impacts. There are differences in projects in terms of their social and environmental impacts, which may be (and

are gaining importance since the recent past decades) important variables that determine the level and type of studies required.

It has to be noted that the exercise of identifying the factors that distinguish a project from another one is not by itself an end in the practical world. Rather the concern is in identifying the variables that have significant implication on the viability of a project and the need for explicit consideration of the same in the same study. So apart from discussing the principles and major procedures that need to be adhered to, one cannot reflect the specific behaviors of different projects, be agricultural, manufacturing, industrial projects in such level of treatment. It is therefore the task of the project analyst to decide which characteristic of the project must be underlined. One can classify projects into:

Agricultural project: Agriculture project is focused on five areas: raising productivity; helping farmers reach markets; reducing risk, vulnerability and inequality; improving incomes off the farm; and making agriculture more environmentally sustainable. Moreover the Agricultural Development Project aims to reduce rural poverty by improving and increasing agricultural production through a community-based approach in designing and implementing components which directly impact the lives of the poor in the participating provinces and districts.

Industrial Project: Industry is one of the fields of human activity where through processing of raw materials more valuable goods are manufactured with the purpose of satisfying society's material needs and creating wealth. Industrial Development is the synthesis of contributions from four major factors, namely, Business, Technology, Government and Labour and successful industrial projects can be achieved only through a close co-operation and mutual understanding between these contributors. The concept of integration in industrial development is based on the creation of integrated organizational structures, including all main contributors acting as a team, their objective being the successful completion of the project.

Construction project: A construction project, sometimes just referred to as a 'project', is the organized process of constructing, renovating, refurbishing, etc a building, structure or infrastructure. The project process typically starts with an overarching requirement which is developed through the creation of a brief, feasibility studies, option studies, design, financing and construction. Construction projects are typically one off's. That is, a project team, brief and financing are put together to produce a unique design that delivers a single project. Once the project is complete the team is disbanded and sometimes will not work together again. This can make it difficult to develop ideas or relationships, and so lessons learned are often not carried forward to the next project. These projects incur special risks and problems of organization and communication. They require massive capital investment and they require rigorous management of progress, finance and quality.

Manufacturing project: It is an operation designed to produce large, expensive, specialized products such as custom homes, defense weapons such as aircraft carriers and submarines, and aerospace products such as passenger planes, and the space shuttle. Manufacturing project is highly flexible, because each project is usually significantly different from the one before it, even if the project's size and expense and high degree of customization, project manufacturing can take an extremely long time to complete. Manufacturing project is an operation designed to produce unique but similar products. It takes advantage of common manufacturing requirements (and therefore efficiencies), while allowing for customization into "unique" combinations. Unique orders may be managed like a project. The more components of that order that are common to other unique orders the more they may be manufactured taking advantage of manufacturing methodology. Manufacturing project then is the melding of Manufacturing and Project Management at a level where the most advantage may be gleaned from each to the financial advantage of the company.

Research projects: Research comprises "creative and systematic work undertaken to increase the stock of knowledge, including knowledge of humans, culture and society, and the use of this stock of knowledge to devise new applications." It is used to establish or confirm facts, reaffirm the results of previous work, solve new or existing problems, support theorems, or develop new theories. A research project may also be an expansion on past work in the field. Research projects can be used to develop further knowledge on a topic, or in the example of a school research project, they can be used to further a student's research prowess to prepare them for future jobs or reports. To test the validity of instruments, procedures, or experiments, research may replicate elements of prior projects or the project as a whole. These projects can involve large sum of money, lasting form many years and yet the result is less predictable than the other types of projects. The end result could be surprising, pleasing, disappointing or producing nothing.

1.1.5. The Link Between Policy, Development Plan and Projects

In the context of the preceding introductory remarks, the policy framework defines the context for periodic development plans (short-, medium- and long-terms plans) which then require specific instruments for implementation. Projects are the policy and plan instruments, a particular decision scheme meant to convert policies and plans into reality. So we have this generic scheme:

Policy ⇒ Development Plans ⇒ Programs ⇒ Projects ⇒ Outcomes / impacts / changes

Governments and corporate entities considering their vision into the future, the external environment and the performance of competitors set up policies which serve as a basis for strategic /medium- and long-terms/ plans, which in turn serve as a basis for project identification and its selection. If there is no organic link between policies, plans and projects, then the

effectiveness and efficiency of investment decisions could be compromised. Accordingly, one has to ensure adequate and proper responses to the following questions.

- A. What is the major objective of the project? The actual aims / quotas / milestones to be reached within a specified time, according to client requirements specified.
What is the basis for the demand for the goods/services to be produced by the project?
What problem or opportunity is the project addressing?
How does the project contribute to the wider goals of the sector/organization/ region? i.e. whether the project is consistent with the priorities set in policy and development plan documents of a country, region, zone, woreda or a specific organization.
What alternative ways of addressing the problem/opportunity/ have been considered?
What Path (Strategy) to be followed and actions to be taken to reach the aims and objectives.
Why is the proposed project the most appropriate way of addressing the problem/opportunity;
What is the approximate cost and timescale Schedules of the project? This is a plan showing when individual / group activities will start and end and at what cost.
Who are the major stakeholders and beneficiaries of a project? In what ways are they expected to participate?
Which institution is the most appropriate for implementation? This is about organizing and Assigning specific people to a specific objective, as well as the specific responsibilities for each task.
Are there additional or special circumstances relevant to the project?
Standards and determining quality for each action

The decision making process could include both the public and the private sectors. In the public sector, there will be a political context in which policies and development plans are set. In the corporate decision-making, there are corporate strategic plans, which include the vision, major objectives, strategies and periodic plans. In both types of contexts of decision-making, there is a need for projects, as the cutting edges for converting ideas, intents, and plans into deeds, achieving objectives and bringing changes.

Project planning and evaluation has a long history in financial and business analysis. Project planning has always been used as a means of checking the profitability of a particular investment by private firms. Recent experiences show that project analysis has attracted the attention of development economists. But the inclusion of project analysis in development economics did not necessarily amount to a new analytical discovery, rather to a new approach. Projects are now assessed from the economy's viewpoint instead of only from the firm's perspective. The selection criteria have also included economic criteria on top of financial criteria. Promoting projects without having development policies and plans will lead to scattered/dispersed and unorganized development endeavors.

Policies and plans without projects mean non-implementation, paper tiger decision makers, having policy and plan documents for other purposes. Governments usually have plans and development plans for publicity and propaganda sake or to respond to external or internal pressures. Projects are the cutting edges of development plans. Development endeavor without projects is unperceivable.

In this line developing countries are negotiating, requesting, struggling with bilateral and multilateral donors and lenders for budget support instead of project financing. This is because project financing has been less effective to transform economies and bring about expected results. Multilateral institutions, though are accepting and appreciating the significance of budget support and limitations of project financing, they argue against budget support on the pretext that governments abuse donor's money. Governments can use donor's money for their specific political ends and abuse or they have weak implementation capacity and hence supervisory and monitoring capacity.

1.1.6. The Linkage Between Projects and Programs

Sometimes people perplex a project with a development program. Unlike a project, a program is an ongoing development effort or plan. A program may include various projects at various times as its constituent units. Hence a project is a specific activity (compared to a program), with a specific starting point and specific ending point intended to accomplish some specific objective. Most developing countries in general have some sort of national planning. Of course the degree and complexity of such development plans vary from country to country and even in a particular country from time to time. For instance in Ethiopia Planning was much centralized in the 1974-91 periods compared to either before or after this period. Project formulation is an integral part of a more broadly focused and continuous process of development planning.

Projects can also be understood as an activity for which more will be spent in expectation of returns and which logically seems to lend itself to planning, financing, and implementing as a unit. It is the smallest operational element prepared and implemented as a separate entity in a national plan or program. In general, thus, sound development plans require good and realistic projects for the latter are the concrete manifestation of the plan as noted above. Projects in such context are the concrete manifestations of the development plans and programs in a specific place and time. One can think of projects as subunits and bricks of programs, which constitute a component of or the entire national plan.

It is necessary to distinguish between **projects and programs** because there is sometimes a tendency to use them interchangeably. While a project refers to an investment activity where resources are used to create capital assets, which produce benefits over time and has a beginning and an end with specific objectives, a program is an ongoing development effort or plan involving a number of projects. Programs may or may not necessarily be time bounded. Yet programs cannot live forever, they have limited life cycle, which however, may or may not be explicitly stated. So in effect in terms of time delimitation, there is only relative difference

between programs and projects. A development plan is a statement of action meant to realize and implement economic policy.

National development plans are further disaggregated into a set of sectoral plans which involve a number of programs and projects. A development plan or a program is therefore a wider concept than a project. It may include one or several projects at various times whose specific objectives are linked to the achievement of **higher level of common objectives**. Note that projects can stand alone without being part of certain program. So, one can visualize the possibility of policies → development plans → projects. Projects, which are not linked with others to form a program, are sometimes referred to as “stand alone” projects. Program study that incorporates a multiple of projects requires three steps:

The analyst must appraise each project independently.

The analyst must appraise each possible combination of projects.

The analyst must appraise the entire program, including all the projects, as a package.

Examples could be a road development program, a health improvement program, a nutritional improvement program, a rural electrification program, institutional reform program, management system reform program, etc. A health program may include a water project as well as a construction of health centers both aimed at improving the health of a given community, which previously lacked easy access to these essential facilities.



Dear learners! Can you explain the relationship between development plans, programs and projects applied for different economic development interventions?

1.1.7. Development Planning Versus Project Planning

Development planning is an exercise of consideration in attempt to select the best policies to be implemented for the development of a nation over a planning period/planning horizon. There are a number of approaches to development planning, which have been evolved overtime. Until 1980,s developing country governments have implemented fixed period or term (five-year or short term) plans, which were intended to guide public investment. These plans were often too ambitious, become quickly outdated, and lacked the flexibility to respond to the changing economic conditions.

Today, development planning refers to a set of processes, which aim to take the needs of the poorest section of society into account (Sustainable Development and Poverty Reduction Program-SDPRP) whilst recognizing that positive changes are complex and multi-faceted. As a result, fixed term plans have been replaced by rolling plans and attempts have been made to integrate the planning of investment/capital and recurrent expenditure to that of development policy of countries. To this end, there are three generally accepted forms of development planning, which are commonly used, namely,

Indirect panning refers to planning where the government controls certain parameters (some prices, interest rates, taxes, exchange rates, and allocation of public resources) and uses these parameters to influence the decisions of enterprises/firms in the desired direction. The introduction of reforms has considerably reduced the range of prices that some governments try to control.

Regulative planning is used to allocate state resources and to coordinate public sector activities but also to influence the activity of the private sector through incentives and regulations to cooperate in plan implementation. This type of planning is mostly used in LDC and to some extent in developed countries, particularly in the area of environment protection/control and the regulation of natural monopoly.

Indicative planning involves forecasting the development of the economy and indicating expected government and state sector expenditure. This process provides information and creates an environment that influences the decision of the private sector, although there may be no attempt to govern those decisions directly. Indicative planning is the main form of planning in developed capitalist economies. It attempts to tackle directly the problem of imperfect information that contributes to the failure of markets to give an optimal outcome.

All the three forms of planning outlined above require a certain degree of decentralized decision-making by sectors if they are to work effectively. Most countries in particular rely on Public Investment Programs (PIPs) and use a combination of regulative and incentive measures to channel investments into priority areas. PIPs are usually drawn up on the basis of project proposals received from a variety of public sector organizations (micro-level).

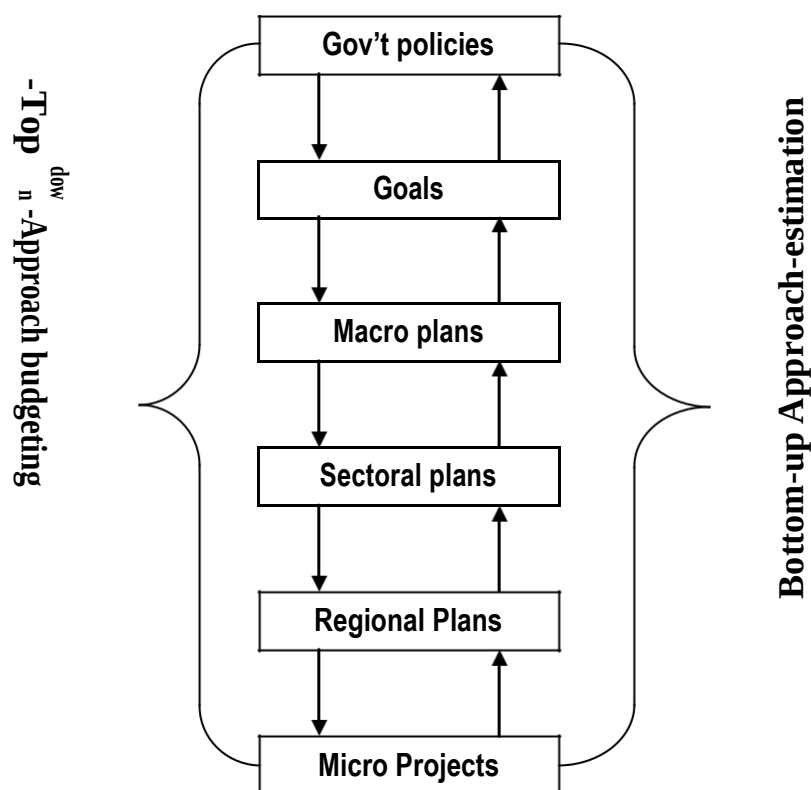
These proposals are then grouped on a sectoral basis to form a sectoral plan in which specific priorities are defined. These sectoral plans aim to provide the link between macro-level planning and project planning. These two ways of interaction (top-down and bottom-up relation) between development plans and micro projects, which he called the iterative (repetitive) planning process, are also known as the Reitbergen (1998) development planning process.

As can be understood from the hierarchical networking diagram below the Reitbergen (1998) development planning process starts with the policies of the government. These policies are further translated into different (long, medium, and short-term) national goals, macro plans, sectoral or ministerial (agricultural, industrial, and infrastructure-economic and social) plans, regional plans, and micro (zonal to district and company or institutional to department/unit level) projects.

The two ways relationship between plans and projects in the below diagram also indicates that:

Development plans require projects and projects require plans (as a reflection of one for the other).

Projects are considered as catalysts and pillars or building blocks of development, which constitute national/macro plan.

Fig 1: The Hierarchical Planning Structure

Usually linking policy, planning, and budgeting system enables investment decisions to be planned systematically, thus making the most efficient and effective use of available resources. Historically, in many instances this has not been the case and fragmented decision-making, unsystematic planning, and budgeting have often led insufficient funds to be allocated (committed) to the government's priority areas. The implementation of government policies in most LDCs, particularly in Africa, would not have been often failed to match that which is promised (achieve development objectives and goals) or would be possible if a more strategic and integrated approach had been taken. Hence, budgeting has to be treated as a strategic and long-term exercise rather than as an annual attempt to cover costs. In order to overcome this problem, the World Bank (WB) has recently recommended LDCs for the introduction of a comprehensive Medium-Term Expenditure Frameworks (MTEFs).

An MTEF is a strategic policy and expenditure framework, which covers all sectors of the government. It consists a top-down resource envelop (allocation), a bottom-up estimation of the current and medium-term costs of existing policies and attempts to match these costs with available resources. It also represents an attempt to move towards a coordinated system that involves stakeholders in genuine partnership (Tumusiime Mutebile, 2003). According to the WB (2003) the objectives of MTEF are to:

Improve the macroeconomic balance by developing a consistent and realistic resource framework;

Improve the allocation of resources to strategic priorities between and within sectors;

Increase commitment to predictability of both policy and funding so that ministries can plan ahead and programs can be sustained;

Provide line agencies and ministries with a hard budget constraint and increased autonomy, thereby increasing incentives for efficient and effective use of funds.

However, the successful creation and utilization of an MTEF requires a certain level of technical capacity at regional level. If this technical capacity does not exist, as in a country like Ethiopia, then it would be inadvisable to attempt implementing an MTEF. Hence, due to the absence of technical capacity Ethiopia demonstrates the ability to adhere to an annual budget before attempting to formulate an MTEF.

1.1.8. The Rationale for Planning

Planning is the making of major economic decisions, such as the national income, income distribution, the saving rate, the investment rate etc.

Planning is the coordination of economic activities via conscious effort. It is a supplement to market forces. In most cases price signals are misleading as a result of this there should be a certain particular apparatus that coordinates economic activities in the economy.

Planning is a process of cognition and compromise. The very aim of planning is to compromise the different conflicting interests and to understand the desire of the economy by singling out social needs.

Planning is an institutionalized activity by, or on behalf of a certain authority for:

- The preparation of decisions and actions to be taken by the central authority

- The coordination of decisions and actions by lower echelons of the economy and the central authority for governing the development of the entire economy.

Factors that have led to the adoption of planning profiled in to three broad heads.

Institutional requirements: In a number of countries planning has been made use of to meet the institutional needs of their people. And plan production accordingly.

Technological reasons: The rational use of a new technology should be first of all planned before its operation. The modern technologies are such that their proper use is dependent up on the adoption of planning. The other important point for planning requirement is that technologies constantly changing, these give raise two sorts of problems: Modifying, changing or replacing existing capital goods; and providing for their fast depreciation. To meet these problems with the least cost to society, planning is needed.

Economic considerations: Three kinds of arguments can be put forward.

- The integration of the various segments of a modern economy needs planning.

Example: To the effect of government policies both at the micro-level and the macro- level.

- The second set of arguments relates to the deficiencies of market. There are always ups and downs in the world market; because of this, nations or economies are obliged to use

planning. Why? Market Mechanism is not in a position to generate fair distribution of income this resulted in the use of planning.

The third set of reasons refers to the availability of useful economic knowledge as also planning techniques for a rational use of resources. These include the application of basic theoretical ideas to many fields. Generally, due to scarce resource.

1.1.9. Significance of Project Planning

There are different types of projects: public, private, private individual, small, large, agricultural, industrial, etc. All these decisions involve a capital expenditure decision. Each of them can be analyzed and appraised reasonably independently. The basic characteristics of capital expenditure also referred to as capital investment or capital project. Thus, project planning is inevitable so as to make a correct capital investment decisions. The following points can be taken as the importance of project planning.

- To eliminate uncertainties

- To increase the effectiveness and efficiency of the operations.

- To identify and work towards a common goal.

- To establish a means of project monitoring and control.

The quest for socio-economic development, inevitably involves the basic economic problem of scarcity in the face of unlimited needs and hence the need 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:

- The quest for change: dissatisfaction with the present and/or pressure or incentive for different tomorrow;

- Change involves investment/commitment of resources to realize the objectives. Investment may be defined as a long-term commitment of economic resources made with the objective of producing and obtaining net gains in the future. The main aspect of such commitment is the transformation of liquidity (the investor's own and borrowed funds) into productive assets, and the generation of liquidity again during the use of these assets. Yet once the resources are committed, there is no way of recovering it apart from conducting profitable operation. That is exit costs are not zero, as it is assumed in the perfect competition model.

- The scarcity of investible resources and unlimited development/business needs;

- Investment is all about resource commitment into the future, which is less predictable;

- Since investment schemes involve substantial resources commitment and are invested for the future, there is an inherent high risk involved.

- 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, 10-20 years for industrial projects and

20-50 years for infrastructural projects. Then the saying goes “ a bird at hand is better than two birds in the bush”. This raises the question of comparing and equating the future and present values.

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, which involve conducting studies and appraisal/evaluation of the same. This presupposes that the major decisions involving substantial resources and that have wider implications on the success of an operation are not instantaneous as the conventional assumption of rationality imply.

? *Dear learners! What is the basis for project planning? What benefits countries can generate from project planning?*

1.2. The Project Cycle: Stages of Project Planning

Project cycle means the various stages of information gathering and decision making which take place between a project's inception and completion. A project cycle is a sequence of events, which a project follows. These events, stages or phases can be divided into several equally valid ways, depending on the executing agency or parties involved. Some of these stages may overlap. Capital expenditure decision is a complex decision process, which may be divided into the following broad phases. The following points are worth mentioning while discussing on the activities accomplished within a given project.

The project cycle is not as such a sequential activity. In practice, many of the phases overlap.

An understanding of the project cycle would enable the project analyst to grasp the intricacies of bringing an investment project to the stage where it is ready for submission to an international financing institution.

All the stages of project cycle are equally valid, and the process is flexible and making a mistake at any stage is equally disastrous.

Project preparation, which involves all the above stages, is a group work involving peoples from different disciplines project; economists, engineers, livestock specialists, soil scientists, crop scientists, ecologists, and so on.

Throughout the project cycle, the primary preoccupation of the analyst is to consider alternatives, evaluate them, and to make decision as to which of them should be advanced to the next stage. If it is decided to proceed to the next stage, the results (out puts) of a given stage serve as the input or part of the input of the next sage.

? *Dear learner! Can you mention the idea of project cycle in your own word?*

1.2.1. Project Identification/Opportunity Study/ Stage

A. Project -Concept Definition Phase

This stage is possibly the most crucial in the project cycle, since ‘project ideas’ are first generated at this point. In practice, while this stage may frequently merge invisibly into the identification stage, it is important conceptually to separate the two stages. The project -concept definition is prerequisite to the decision to proceed to identification. The project-concept definition essentially aims at expressing the country’s development objectives in the form of projects. Ideally, this stage should be based on a thorough understanding of the country’s economic development objectives, its resource base, and an assessment of the options facing the country.

Here, there is a need for an intensive sector wide survey. These sector- wide surveys provide a more reasonable basis for the assessment of priorities and developing project ideas for the latter tasks. The survey examines the role of the project against the background of the country’s development objectives and the way they are being pursued. Project ideas can emanate from a variety of sources. Much depends on the experience, and even the imagination, of those entrusted with the task of initiating project ideas. 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:

- National policies, strategies and priorities as may be initiated from time to time;

- National, sectoral, sub-sectoral or regional plans and strategies supplemented by special studies, sometimes called opportunity studies, conducted with the aim of translating national and sectoral sub-sectoral and regional programs into specific projects;

- General surveys, resource potential surveys, regional studies, master plans, statistical publications which indicate directly or indirectly investment opportunities;

- Constraints on the development process due to shortage of essential infrastructure facilities, problems in the balance of payments, etc.;

- Government decisions to correct social and regional inequalities or to satisfy basic needs of the people through the developments of projects;

- A possible external threat that necessitates projects aiming at achieving, for example, self-sufficiency in basic materials, energy, transportation, etc.

- Unusual events such as draughts, floods, earth-quake, hostilities, etc.;

- Government decision to create project-implementing capacity in such areas as construction;

At the macro-level, Project ideas can also originate from multilateral or bilateral development agencies and as a result of regional or international agreements on which the country participates.

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, the variety of sources is equally broad. Project ideas may emanate from:

The identification of unsatisfied demand or needs

The existence of unused or underutilized natural or human resources and the perception of opportunities for their efficient use

The need to remove shortages in essential material services, or facilities that constrain development efforts.

The initiative of private or public enterprises in response to incentives provided by the government.

The necessity to complement or expand investments previously undertaken, and

The desire of local groups or organizations to enhance their economic status and improve their welfare

Project proposals could also originate from foreign firms either in response to government investment incentives or because they consider production within the country a better way to secure a substantial share of the domestic market for their products.

B. Project Identification / Investigation/ Phase

The next stage in the project cycle is to find potential projects. It is the identification of investment opportunities. The project identification stage develops the project idea to the point where a decision can be taken on whether resources should be committed for further action. Whereas the motive of the project concept is largely the justification of the project in the sectoral context, that of identification is to delineate the main outlines of the project and to establish the overall viability of the project proposal. This stage should identify a number of alternatives using the existing and new data in such away as to limit alternatives under consideration to those few which are most promising.

Hence, the project evaluation process is the essential way of eliminating relatively less worthy ones. In theory, the identification of project should be an integral function of the planning process. In practice, the projects suggested by plans are fairly unspecified- there will still be a number of alternatives to be examined before a final decision is reached. In some cases, projects will emerge for reasons which have little to do with the plan but which serve the interests of particular business groups and politicians. In practice, project ideas originate haphazardly, and are often politically inspired.

Any rural development project not integrating educational, transport, health and agricultural components, without the coordination between the various competent agencies, is notoriously bad. If the planning process is sophisticated, projects may emerge at a relatively high degree of definition with respect to scale, location, type of output, etc. One may hear that there is a lack of projects available for investment in developing countries. But usually there is no shortage of proposals for projects that have been identified. Rather there may be a shortage of project prepared in sufficient detail to permit implementation.

Identification involves listing potential projects. The most common sources of such information may include well-informed technical specialists and local leaders. The major steps in the identification process consist of the following:

Evaluation of the current situation (situational analysis): This diagnostic phase has the objective of establishing the development potential for the area or project proposal and identifies the constraints to the proposed development. For example, for an agricultural project it involves identifying the main physical features of the project soils, agronomic and cropping practices, and water resources, human resources, population and labor, institutional features (land tenure, credit, marketing, input supplies, research and extension, and the administrative structure).

Identifying relevant policy issues: Examining the current government policies (pricing policies, subsidies, taxation, irrigation schemes) and assessment of their impact on the proposed project. Projects do not operate in a vacuum; their performance is subject to a wide range of government policies covering such matters as taxation, subsidies, land reform and tenure, level of priority of foreign exchange allocations to various economic sectors, pricing policy, investment policy, and credit and so on. Hence, the project planner should attempt to understand and inculcate the effect of all these policy issues on the production, productivity and prices of project outputs.

Establishing the project's rationale: This provides the overall justification (absence of similar projects, demand conditions, production capacity increase, foreign exchange, and overall potential of the area for intervention) for the country to undertake the project and for the lending institution to support it. A reasoned analysis from the previous sections would provide the basis for marshaling the arguments here. Taking a fishery project as an illustration, the diagnosis should be based on issues such as the country's fish imports could be substituted with increases in the domestic catch; that fishing is or could become an important economic activity, and that the existing fishery resources are being exploited at levels far below their sustainable yield potential; but evidence should exist that a few entrepreneurs with access to credit, are carrying out a profitable operation.

Developing the project's design and concept: This step consists of setting the project's objectives, measures proposed by the project to achieve these, and identifying the project's main components.

Setting the project's scale: Identification should establish the rough order of magnitude of the project, in respect of physical coordinates, such as the size of the irrigation command area and main project works involved; area to be cleared and planted and families settled in a land settlement project, number of farmers to be reached and crop rotations to be developed in a credit project.

Preparing preliminary cost and benefit estimates: Identification should establish rough estimates of the project's total costs and benefits, the major project components, and estimates of the foreign exchange component.

Proposing the organization and management structure: proposing the project staff and organizational structure is a vital one. Government's role in the project should also be explicitly sketched.

Spelling out the further work requirement: At identification, the studies and other requirements for the detailed project-preparation work should be spelled out, and specific responsibility assigned for various tasks. For example, detailed terms of reference should be drawn up, and estimates prepared of the cost of additional studies and the time schedule. The identification stage is the crucial one at which various alternatives must be explored as exhaustively as possible. However, no identification can be exhaustive. Even if objectives are agreed upon, several options may be open, depending on the technical possibilities.

In summary, a good identification should:

- Justify the project in a sectoral context;

- Highlight pertinent issues and propose solutions;

- Demonstrate that the alternative or alternatives proposed and that further resources should be devoted for preparation; and

- Establish clearly the follow-up steps for full preparation.

1.2.2. Project Preparation and Analysis Stage

Once project ideas have been identified and selected for further examination, the process of project preparation and analysis starts. Project preparation must cover the full range of technical, institutional, economic, and financial conditions 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. Different alternatives may be available and therefore, resource endowment (labor or capital) would have to be considered in the preparation of projects. Preparation thus require feasibility studies that identify and prepare preliminary designs of technical and institutional alternatives, compare their costs and benefits, and investigate in more details the more promising alternatives until the most satisfactory solution is finally worked out. It involves generally three steps: prefeasibility, feasibility and support study.

A. Pre-Feasibility Study / Preliminary Screening/ Phase

The identification process will give the background information for defining the basic concept project, which leads to the feasibility study stage. Once a project proposal is identified, it needs to be examined. Once some project ideas have been put forward, the first step is to select one or more of them as potentially promising. To begin with, a preliminary project analysis is done. A prelude to the full blown feasibility study, this exercise is meant to assess:

- Whether the project is *prima facie* worthwhile to justify a feasibility study and;

- What aspects of the project are critical to its variability and hence warrant an in depth investigation.

At this stage, the screening criteria are rough and vague, becoming specific and refined as project planning advances. During preliminary selection, the analyst should eliminate project proposals that are technically unsound and risky, have no market for their output, have inadequate supply of inputs, are very costly in relation to benefits, assume over ambitious sales and profitability, etc. Some kind of preliminary screening is required to eliminate ideas, which *prima facie*, are not promising. For this purpose the following aspects may be looked into:

- Compatibility with the promoter

- Consistency with government priorities

- Availability of inputs

- Adequacy of market

- Reasonableness of cost, and

- Acceptability of risk level

When a firm evaluates a large number of project ideas, it may be helpful to stream line the process of preliminary screening. For this purpose, a preliminary evaluation may be translated into project rating index. The steps involved in determining the project-rating index are as follows:

- Identify factors relevant for project rating

- Assign weights to these factors (the weights are supposed to reflect their relative importance)

- Rate the project proposal on various factors, selecting a suitable rating scale

- For each factor multiply the factor rating with the factors weight to get the factor score

- Add all the factor scores to get the overall project-rating index.

Once the project-rating index is determined, it is compared with a pre-determined hurdle value to judge whether the project is *prima facie* worthwhile or not. As a result of the preliminary screening exercise, a project profile, an opportunity study report, or an identification study report, as appropriate, is prepared showing which project alternatives should be rejected and which ones may be advanced to the next stage.

B. Feasibility Study Phase

The major difference between the pre-feasibility and feasibility studies is the amount of work required in order to determine whether a project is likely to be viable or not. If the preliminary screening suggests that the project is *prima facie* worthwhile, a detailed analysis of the marketing, technical, financial, economic, and ecological aspects is undertaken. Feasibility study provides a comprehensive review of all aspects of the project and lays the foundation for implementing the project and evaluating it when completed.

The focus of this phase of capital budgeting is on gathering, preparing, and summarizing relevant information about various project aspects, which are being considered for inclusion in the capital investment. Based on the information developed in this analysis, the stream of costs and benefits associated with the project can be defined. At this stage a team of specialists (Scientists,

engineers, economists, sociologists) will need to work together. At this stage more accurate data need to be obtained and if the project is viable it should proceed to the project design stage.

A large part of project analysis serves to establish a project's technical and institutional feasibility, whether it is fit with the strategy and the appropriateness of the socio-economic context for the project. The conventional cost-benefit-analysis-based economic analysis takes for granted that a project is technically sound and that its institutional arrangements will be effective during implementation. Appraisal should cover major aspects like technical, institutional, economic and financial. The final product of this stage is a feasibility report. The feasibility report should contain the following elements: market analysis, technical analysis, organizational analysis, financial analysis, economic analysis, social analysis, and environmental analysis. The feasibility study would enable the project analyst to select the most likely project out of several alternative projects. Selection follows, and often overlaps, analysis.

It addresses the question is the project worthwhile? Which of the projects is the best option from the existing competing once? Given that there are alternative projects, theoretically the owner is supposed to come up with alternative use of his/her money and hence the need to choose the best investment opportunity. Project selection involves different factors and forces. It involves political, social and economic variables. Essentially it is a political process in the sense that despite economic rationality, political forces could exert significant pressure on the decision making process on the selection of projects from available alternatives. In this regard, project appraisal study could be categorized in the selection criterion. After appraisal studies the decision maker will have to select one or a number of projects on the bases of pre-established evaluation/selection criteria.

C. Support Studies Phase

Support or functional studies cover specific aspects of an investment project, and are required as prerequisites for, or in support of, pre-feasibility and feasibility studies of particularly large-scale investment proposals, the viability of which critically depends upon the quantity and quality of certain input or aspect of that project. This type of study is justified when a detailed study required for a specific aspect/input/ is too involved to be undertaken as part of the feasibility study. Alternatively, the decision towards undertaking a feasibility study could be dependent upon the outcome of a support study.

Example: Cement processing is tied to the source of major raw materials, which are lime stone and sandstone. Since the requirement is bulky, one cannot think of a cement factory located at a distance from the source of these raw materials. So there is little room for outsourcing from distant locations or imports. Since cement production is critically dependent upon the availability of adequate quantity and the right quality of these raw materials, a support study is justified before commissioning a full-fledged feasibility study.



Dear learner! What are the three steps to be applied under project preparation and analysis stage? Which step is the most crucial for the success of a project?

1.2.3. Project Appraisal Stage

Thus project appraisal can be defined as a second look at the project report by a team of professionals, who were not participated in the preparation of the study but qualified and experienced to evaluate such studies. It is or should be an independent assessment of the project to identify the weaknesses and strengths of the study that have a bearing on the decision to invest, and/or to finance the project. Appraisal is the comprehensive and systematic assessment of all aspects of a project study, addressing particularly issues like: Specificity of objectives; Clarity of problems; appropriateness of data collection techniques and analysis techniques; and Project specific factors. When a feasibility study is completed the various parties involved in the project will carry out their own appraisal of the investment project in accordance with their individual objectives and evaluation of expected risks, costs and gains.

The prime objective of project appraisal should be to identify the weaknesses that have bearing on decision-making and identify means of strengthening it adequately to ensure final success of the project. The main objective is then to improve and revamp the project. The appraisal report concentrates on the health of the company to be financed, the returns obtained by equity holders and the protection of its creditors. The techniques applied to appraise the project in line with these criteria center around technical, commercial, market, managerial, organizational, and financial and possibly also economic aspects. The findings of this type of appraisal enter into the appraisal report.

Appraisals as a rule deal not only with the project but also with the industries in which it will be carried out and its implications for the economy as a whole. For large-scale projects, appraisal report will require field missions to verify the data collected and to review all those factors of a project that are conditioned by its business environment, location and markets and the availability of resources. A wide range of appraisal criteria have been developed to judge the worthwhile of a project. They are divided into two broad categories, viz., non-discounting criteria and discounting criteria. The principal non-discounting criteria are the payback period and the accounting rate of return. The key discounting criteria are the net present value, the internal rate of return, and the benefit cost ratio. To apply the various appraisal criteria suitable cut off values (hurdle rate, target rate, and cost of capital) have to be specified.

These are influenced by the level of risk pursued. Despite a wide range of tools and techniques for risk analysis (sensitivity analysis, scenario analysis, Monte carol simulation, decision tree analysis, portfolio theory, capital asset pricing model, and so on) risk analysis remains the most intractable part of the project evaluation exercise. This exercise also involves the undertaking of detailed engineering design, manpower and administration requirement as well as marketing procedures should be finalized. When the appraisal is completed, the findings and final recommendations are put together in the form of an appraisal report. The recommendation may be to approve, re-formulate, postpone, or abandon the project under review.

Comprehensive development plans are ultimately composed of a variety of projects that intends to address a problem or a need, which may be internal or external to an institution or a company. Accurate and consistent project appraisal is therefore a crucial factor in the success of development plans. These include technical, environmental, social, institutional, financial, and economic analysis. However, since conducting these analyses is costly in terms of both time and material resources it is important that all appraisal techniques, procedures, and information required for appraisal purpose are stated in the national project appraisal document (PDA) or guideline before the appraisal process began. The table below indicates summary of compressive appraisal techniques.

Table 1: Summary of Appraisal Techniques

N ^o	Appraisal	Techniques
1	Technical	• Problem Analysis • Demand Analysis • Logical Framework Analysis • Technical Feasibility Study
2	Environmental	• Environmental Screening • Preliminary Environmental Assessment • Environmental Impact Assessment
3	Social	• Stakeholders Analysis • Gender Analysis • Social Impact Analysis
4	Institutional	• Organizational Capacity Assessment • Work Breakdown Structure (WBS) • Activity Description Sheet
5	Financial	• Cash Flow • Trading, Profit and Loss Account • Balance Sheet • Cost Benefit Analysis • Cost Effectiveness Analysis
6	Economic	• Cost Benefit Analysis • Cost Effectiveness Analysis • Economic Analysis • Identification and removal of Transfer Payments • Inclusion of linkage effect and externalities • Use of shadow prices • Estimation of distributional effect
7	Risk Analysis and Mgt	• Risk Identification • Sensitivity Analysis • Risk Analysis • Risk Assessment matrix • Risk Mgt plan

A. Role of appraisal

For the success of national development plan it is thus vital that project at the micro-level are found to be suitable i.e. feasible and desirable. Ensuring this is the purpose of project appraisal. When appraising a project there are a number of issues looked into in terms of posed questions for ensuring its desirability and feasibility. Their implication and few of the questions are listed below.

I. Relevant or that which will be of the most benefit in a certain situation. This refers to the desirability, appropriateness, and significance of a project proposal in relation to the needs of the target group and to the goal of national development plan. Some of the questions proposed to ensure this criteria are

What do the problems consists of? (A thorough analysis of the causes of the problem and their effects/consequences not the symptoms of the problems on the target groups and other interested stakeholders/parties should have been made)

What are the development goals in the sector, which this project should contribute to achieving in the long term?

Are the projects goals describes as a future improvement of the situation in relation to the problem which the target group or society have at present? Does the project greatly reduce if possible eliminates the problem? Example, infant mortality rate, maternal mortality rate, low labour productivity, illiteracy, poverty, low level of infrastructure etc.

What results or services should the project provides for the target group or society? Are they specific, measurable, and concrete? Example improving access to employment, education, health etc.

Do the combined results leads to the attainment of the project goal? Is anything missing?

Are the activities (including the selection of technology and methods) appropriate and sufficient to achieve the planned results?

In what way (s) will target groups participate in the project? What role will the target groups play during planning and implementation of the project?

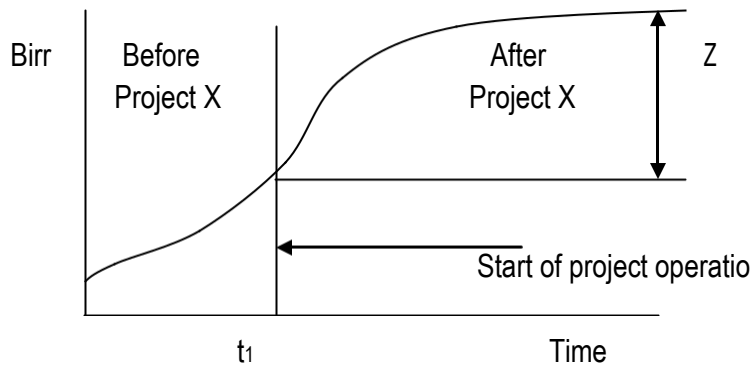
Have alternative ways of achieving the project goals been conducted?

In general appraising project's desirability/relevance or that which will be of the most benefit in a certain situation involves a comparison of the alternative costs and benefits generated or incurred by different project alternatives. Unlike feasibility, it involves the application of valuation techniques to decide which option will produce the greatest overall benefits. The issue of desirability is of particular importance when conducting financial and economic appraisals.

The fundamental basis for assessing project desirability is the supposition that the project will generate benefits, which would not have been existed if it had not been implemented. It would be

inaccurate to compare the situation before project implementation with the situation after implementation. This is because the general situation may have changed without the project. Consider how the desirability a hypothetical project that intends to increase the value of coffee export should be assessed.

Fig 2: Value of Coffee exports from Zone Y before and after project X



Clearly it would be inaccurate to suggest that project X has been responsible for the total increase in coffee production since the beginning of operations. As fig 2 illustrates, coffee exports were already rising before project X began operation at t_1 . There is therefore every chance that these exports would have continued to raise without the project. In this scenario value Z would be a drastic overestimate of the benefits accrued by the project. This whole scenario illustrates the inaccuracy of assessing the project benefits utilizing a before and after scenario (as depicted above). Project appraisal is therefore based around the principle of comparison of the situation 'with project' with the situation and 'without project'. The value of the project in the above situation would be the difference between the 'with' and 'without' values.

Feasible or that which is possible. This implies the project is realistically planned. The following questions will be considered as checklists.

What capacity and resources (personnel, financial, material) does the project owner possess to implement the project? Are there sufficient institutional/technical/administrative expertise and capacity in the project owner's organization (to implement the project, make procurements etc.)

Is the division of roles and responsibilities between parties participating in the project clearly defined?

In what way have the technical solutions/methods described been adopted to the level of skills and capacity in the organization?

Have time schedule been given for activities and is there a plan of phasing out of the project life?

How has the financing of the project been planned (project owner's contribution, government contribution, other financing-donors contribution)?

What is the estimated total budget for the project period? How have the costs been allocated to the planned activities? Is the budget for each activity of the project realistic and comprehensive (i.e. the project can be implemented at a reasonable cost be cost effective)?

Is the realization of the project output, outcome, and impact is practical within the proposed timeframe using the resources available and proposed (physical, technological, human, and financial)?

What negative effect can the project have on the environment? Is there a possibility of achieving socially and environmentally sustainable development?

Are key (killing) assumptions on the factors/constraints (both internal and external) that are likely (can) impede or delay the implementation of the project or in the extreme cases completely prevent the realization of the project ideas made?

Are mitigation measures to undertake or strategies to apply when adverse factors occur are designed (this refers to the risk and uncertainty analysis and management aspect of a project).

When appraising micro project proposals it must be remembered that government budgets are often limited and so the impact of proposed sectoral projects in terms of both actual (investment) and recurrent (operating) costs must be carefully assessed/examined. Hence, improving the application of appraisal techniques and methodology has the following benefits.

It allows for more efficient and effective utilization of scarce resources.

It assists the effective implementation of a coherent national development plan/program.

It increases the likelihood the projects will continue to reap (generate) sustainable benefits of development.

In the Ethiopian context, the methodology and application of project appraisal techniques has started when the Planning Commission Office initiated the practice of project appraisal in Ethiopian public sector in the late 1960's. The practice was not applied systematically until 1986 when the Development Project Studies Authority (DPSA) took responsibility for project appraisal. Repeated institutional restructuring meant that these efforts were largely unsuitable and inefficient.

Following the 1991 reform and consequent institutional restructuring the Ministry of Planning and Economic Development (MoPED) was mandated to appraise development projects. This mandate was then transferred to the Ministry of Economic Development and cooperation (MEDaC), which became the present day the Ministry of Finance and Economic Development (MoFED). Increasingly, project appraisal is being decentralized with the result that responsibility for appraisal decision is being transferred to regional and district levels.

The decentralization has the advantage of enabling a variety of primary stakeholders to be involved in the appraisal process. Overall technical responsibility for appraisal of public sector projects, however, lies with MoFED. It has developed standards and guidelines to improve the technical capacity of both regions and sector ministries and organizations to enable them coherent project appraisal decisions to be made.

B. Decision/selection criteria (accept, modify/revise, reject)

To enable a fair and accurate comparison of projects across sectors on a national level, it is necessary for the government to publish the essential elements of their appraisal and selection criteria. This enables projects to be appraised in a uniform and transparent manner. The appraisal team should study the published appraisal techniques and selection criteria in advance so that they have a general comprehension of the standards that should be met. All decisions should then be based on the suitability of various project components for reaching the standards set out in the appraisal and selection criteria (feasibility and desirability). Bearing these two forms of suitability in mind an overview of the selection criteria is given in the table below.

Table 2: Basic selection criteria in terms of feasibility and desirability

Nº	Project Aspect	Feasibility	Desirability
1	Technical	• Technical design criteria are satisfied • Technical capacity of the mgt and workforce adequate • Output targeted can be met	• Local resources/skills used are appropriate • Suitable technology/method used • Technical efficiency maximized
2	Environmental	• All negative effects are below legal/customary limit	• All negative effects are minimized • All positive effects maximized
3	Social	• Project acceptable in relation to existing law and social norms	• Target groups are involved in project design and implementation
4	Institutional	• Implementing agencies have autonomy and motivation to perform roles assumed.	• Preferred form of organization used • Implementing agency operation are suitable
5	Financial	• Cash balance is always positive (required finance is available and all financial commitments can be met) • All parties have adequate financial incentives	• Financial profitability measures are satisfactory to all parties • IRR to equity exceeds real interest rate • Uncertainty and risk associated with the project are minimized
6	Economic		• EIRR exceeds target rate • Economic cost effectiveness of noncommercial projects confirmed • Distribution of project cost and benefits contributes to government objectives • Risk that project failure will damage is minimized

In summary, the substances to aspects of a project contained in the above table indicate that when conducting project appraisal it is important the appraiser keeps in mind (give due emphasis to) the following basic principles in mind.

Ensure the selection criteria cover all potential aspects of project design and influence/impact. That is ensuring that objectives are clear and realistic or in short SMART. In other word,

statements of objectives should provide tangible and easy answer for such questions as what is intended to produce or provide. How much (to what standard/specification)? At what cost? When and Where? For example the objective of a project could be to build an Olympic stadium for 80,000 people, to an Olympic standard, to be complete six months before the start of the Olympic, at a cost of X million Birr in Beijing.

Ensure the selection criteria are applied consistently and fairly.

Ensure that stakeholders are involved in the process (in design, implementation, and monitoring and evaluation of the project) as much as possible. This will increase the sustainability of the project by enhancing ownership of the project by stakeholders.

C. Relative importance of criteria and trade-offs

In any appraisal process there are liable to be potential trade-offs to be made between desirability in various project aspects. For instance, increasing the environment desirability of a project may reduce its financial desirability and vice-versa. The appraiser therefore has a decision to make the relative importance attached to each assessment criteria. The rule for the appraisal in this situation is that all project aspects must meet the feasibility criteria outlined in table 2 above. After this the relative importance of project aspects criteria in terms of desirability is liable to vary from situation to situation.

Often the relative desirability of these criteria will be decided by political factors, such sectors objectives and the country's development policy or program. This implies that not considering the development goals of a government or requirements in the case of donors during the preparation of a project is a futile exercise. For example, the SDPRP sets out the importance of capacity building and participation in terms of national development. As a result, both the desirability of institutional and social aspects of a project is likely to highlight.

In principle, the economic IRR should take account of all those aspects of the project decision that can be measured and valued and so, other things being equal, it should be the main indicator of the desirability of a project. Nevertheless, there will be many project for which it is difficult to estimate an EIRR and there may be some cases where important factors that cannot be included in EIRR to be considered. In such a case, judgment must be made on the desirability based on an intelligent interpretation of all the available evidences. In most cases the rationale or justification for the project provides the basis what evidences to refer and interpret the magnitude of the project's desirability to the target groups.

Finally, the result of the entire appraisal process is reduced in a single sheet. Once an appraisal decision has been made it will be necessary to report the results to all interested parties (project designer/owner, responsible authorities, sponsor etc), providing feedback when necessary. An accurate and concise method of disseminating such information is through an overall project assessment form indicated below.



What is the ultimate goal of project appraisal? What are the most applicable criteria's of project appraisal?

TABLE 3: PROJECT ASSESSMENT FORM

Project name: _____		Project code: _____			
Responsible Authority: _____		Total budget: _____			
Scheduled start date: _____		Scheduled completion date: _____			
Summary of Appraisal Findings					
Aspects of a project	V. Good	Good	Satisfactory/fair	Unsatisfactory/poor	Comments
Technical Appraisal					
Environmental Appraisal					
Social Appraisal					
Institutional Appraisal					
Financial Appraisal					
Economic Appraisal					
Risk Analysis & Mgt procedure					
TOTAL SCORE					
Note: Since government budgets are often limited sometimes weights may be attached to aspects of a project and cut of point for total score above which to accept, recommend for modification/redesign, and reject a proposal may be set to allocate financial or physical resource (eg. Land) to government priorities.					

The form has room to list any comment or recommendations linked to each aspect of project appraisal. Once this information has been set out in its totality it will be possible to make **final decision** as to whether to accept, reject, or modify/redesign the project.

1.2.4. Project Implementation Stage

A. Pre-Investment Phase

This stage deals with all issues related to the financial package (mobilizing the financial resources, conditions of disbursement getting -paying out, loan negotiations, and mobilizing the expertise necessary for the successful construction and operation of the project. It is at this stage that loan negotiations are made. The financing package becomes more difficult to assemble in projects involving co-financing. Co-financing refers to cases where two or more lending agencies and/or donors join together in a coordinated way to undertake their loan activities and establish conditions for a particular project.

Broadly speaking, co-financing takes two forms, namely, joint financing and parallel financing. In joint financing, the funds of the co-lenders are blended together and there is no attempt separately to finance clearly identifiable components of the project. There is a common list of goods and services, and the financing of all or certain items is shared between the co-lenders in agreed proportions. In parallel financing, in contrast, the co-lenders deliberately would select certain project components, that is, they would finance development goods and service or parts of the project. For example, in a multi-purpose water development project, one agency might finance the electrical power-generation aspects; a second agency might finance the downstream

activities of land development and agriculture support services, while a third might finance the dam and irrigation network.

Disbursement of the loans, recruitment of management and technicians, and supervision during construction and implementation of auxiliary programs necessary to ensure the supply of inputs are all the subordinate operational decisions taken during the pre-investment stage. Mobilizing the necessary financial resources for the project and mobilizing the expertise necessary for successful construction and operation of the project are all issues of pre-investment. The end result of loan negotiation is the drawing up of a set of loan documents, for example, loan agreement, or credit agreement, guarantee agreement, subsidiary loan agreement and/or joint project agreement which are legal instruments with covenants binding on both the lender and the borrower, and the guarantor, where applicable.

B. Investment Phase

If the preparatory work in the pre-investment is finished and the result of the appraisal is positive, the implementation or execution phase follows, in which first a detailed design of the technical components is made. In this stage discrepancies may exist between the costs estimated and the actual costs to be incurred. If these discrepancies are large, the appraisal may lose its validity and may need to be redone.

One of the objectives of any effort in project planning and analysis is to have a project that can be implemented to the benefit of the society. Thus, implementation is perhaps the most important part of the project cycle. 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. This emphasizes once again the need for careful attention to each aspect of project planning and analysis.

Project implementation must be flexible. Circumstances will change, and project managers must be able to respond intelligently to these changes. Technical changes are almost inevitable as the project proceeds. Price changes may necessitate different techniques of production or adjustments in inputs. Other changes in the project's economic or political environment will alter the way in which it should be implemented. 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 re-plan parts of the project, or perhaps the entire project.

Project analysts generally divide the implementation phase into three different time periods:

Investment period: the period when Project investments are undertaken. This usually extends 3-5 years in agricultural and high scale infrastructure construction projects.

Development period: As the production builds up, the project is spoken of as being in the development period (may be 3-5 years additional). This period ranges from starting production until full capacity production.

Full development period: Once the full development is reached, it continues for the economic life of the project. After the project design is prepared negotiations with the funding organization starts and once source of finance is secured implementation follows. Implementation is the most important part of the project cycle. The better and more realistic the project plan is the more likely it is that the plan can be carried out and the expected benefits realized.

Project implementation must be flexible since circumstances change frequently. Technical changes are almost inevitable as the project progresses; price changes may necessitate adjustments to input and output prices; political environment may change. Translating an investment proposal into a concrete operational unit is a complex, time consuming and risk fraught task. Delays in implementation, which are common, can lead to substantial cost overrun. For expeditious implementation at a reasonable cost, the following are helpful.

Adequate formulation of projects. A major reason for the delay is inadequate formulation of projects. Put differently if necessary homework in terms of preliminary studies and comprehensive and detailed formulation of projects is not done, many surprises and shocks are likely to spring on the way. Hence the need for adequate formulation of the project cannot be overemphasized.

Use of the principle of responsibility accounting. Assigning specific responsibilities to project managers for completing the project within the defined time frame and cost limits is helpful in expeditious execution and cost control.

Develop project management competence: Use of network techniques. For project planning and control two basic techniques are available - PERT (program evaluation Review Technique) and CPM (Critical Path Method). These techniques have lately merged and are being referred to by common terminology that is network techniques. With the help of these techniques, monitoring becomes easier.

The investment phase can be divided into the following steps:

Establish project management office which involve establishing of the legal, financial and organizational basis for the implementation of the project

Technology acquisition and transfer, including basic and detailed engineering

Engineering design and Construction work

Installation and erection;

Pre-production marketing, including securing of supplies and setting up the administration of the firm

Recruitment and training of personnel, and

Plant commissioning and start-up.

This implementation basically involves capability in project management. The function of project management is to foresee or predict as many of the dangers and problems as possible and to plan, organize and control activities so that the project is completed successfully in spite of the risks. Project management is the planning, organizing, directing, and controlling of resources for a specific time period to meet a specific set of one-time-objectives. This process starts before any resources are committed and must continue until all work is finished.

The aim is for the final result to satisfy the project sponsor or purchaser, within the promised timescale and without using more money and other resources than those, which were originally set aside or budgeted for. Since there are different types of projects, the management of these different types of projects is also different reflecting the peculiarity of the projects. Project management is a multifaceted process in which many different things get managed simultaneously. In managing projects we are normally involved in the following types of management:

- Scope management
- Time management
- Human resource management
- Cost management
- Quality management, and
- Communication management

For each of these activities it is necessary to plan, organize, direct, and control. Successful project management can then be defined as having achieved the project objectives: within efficient time & cost.

C. Operational Phase

Project operation involves the running and maintenance of new entity in accordance with set objectives and planned tasks. The problems of the operational phase need to be considered from both a short-and long-term viewpoint. The short-term view relates to the initial period after commencement of production when a number of problems may arise concerning such matters as the application of production techniques, operation of equipment or inadequate labour productivity owing to a lack of qualified staff.

Most of these problems have their origin in the implementation phase. The long-term view relates to chosen strategies and the associated production and marketing costs as well as sales revenues. These have a direct relationship with the projections made at the pre-investment phase. If such strategies and projections are proved faulty and remedial measures will not only be difficult but may prove to be highly expensive. The operational phase involves the following main functions.

Commissioning and starting of commercial production

Project commissioning: is the process of assuring that all systems and components of a building or industrial plant are designed, installed, tested, operated, and maintained according to the operational requirements of the owner or final client. A commissioning process may be applied not only to new projects but also to existing units and systems subject to expansion, renovation or revamping.

In practice, the commissioning process comprises the integrated application of a set of engineering techniques and procedures to check, inspect and test every operational component of the project, from individual functions, such as instruments and equipment, up to complex amalgamations such as modules, subsystems and systems. Commissioning activities, in the broader sense, are applicable to all phases of the project, from the basic and detailed design, procurement, construction and assembly, until the final handover of the unit to the owner, including sometimes an assisted operation phase.

Ex-post project evaluation

The final phase of the project is the evaluation phase. Many usually neglect this stage. The project analyst looks carefully at the successes and failures in the project experience to learn how better to plan for the future. In this stage it is important to examine the project plan and what really happened. Performance review should be done periodically to compare actual performance with projected performance.

A feedback device, it is useful in several ways: (i) it throws light on how realistic were the assumptions underlying the project; (ii) it provides a documented log of experience that is highly valuable in future decision making; (iii) it suggests corrective action to be taken in the light of actual performance; (iv) it helps in uncovering judgment biases; (v) it induces a desired caution among project sponsors. Weakness and strengths should carefully be noted so as to serve as important lessons for future project analysis undertaking. Evaluation is not limited only to completed projects. Ongoing projects could also be evaluated to rectify problems when the project is in trouble. The evaluation may be done by the project management, the sponsoring agency, or other bodies.

Replacements/ Rehabilitation

Replacement investment is usually neglected in conventional project studies. However, the economic life of involved machineries and equipment is different. In fact the economic life of the envisaged firm/plant is determined on the basis of the economic life of the 'core' technology. A number of other technologies, specifically the hard ware technologies do have different economic life. Normally the Rehabilitation works are usually undertaken as a project, because not only they involve substantial investment, but also they have to be rationalized as whether to

rehabilitate the existing facilities replace the entire plant or consider alternative ways of rehabilitation.

IV. Expansion/Innovation/

There are different economic forces that justify expansion and innovation. Given the nature of the technology is a matured one, without substantial change in the nature of the need and hence chance of proceeding with the same product, expansion may be a rational venture. On the other hand the industry could be dynamically changing. In such a state of changing industry, there is a need for at least keeping up with the truck of change or the firm may venture to be the setter of the competitive benchmarks of the industry.

1.2.5. Evaluation and Supervision

A. Supervision

The purpose of supervision is to ensure that the project's implementation is carried out to acceptable standards, and that the project's targets are being realized. Whereas in the previous stages of the project cycle, activities were considered to be the joint responsibility of the donor and the borrower, after the loan resources become effective, the execution of the project becomes the prime responsibility of the borrower, whereas supervision is that of the financing agency. The supervision process can be undertaken in terms reviewing the progress reports (required of the borrower), field visits to the country, and timely audits. Problem areas are identified and reports of the supervision teams form the basis on which the borrower may be requested to take certain corrective measures.

B. Evaluation

This is the last phase of the project cycle. Evaluation is a comparative analysis between what the project was intended to become, in terms of timing and quantity of costs and benefits, and what actually has happened. This phase is often omitted, and intentionally so, if there occur glaring discrepancies between what was to happen and what actually has happened. Yet, it is an important phase, not because it enables an accusing finger to be pointed at the real or seeming cause of the errors and misfortunes, but because it helps avoid similar mistakes being made in the future. Ex-evaluations are means of deriving lessons on a given project's undertaking. The analyst looks systematically at the elements of success and failure indicators in the project experience to learn how better to plan for the future.

Evaluation is not limited only to completed projects. Evaluation may be undertaken anytime when the project is in trouble as a first step in a re-planning effort (projects can be terminated based on evaluation reports). Evaluation may be undertaken by project management, sponsoring agency, external evaluators, separate monitoring unit of the project and/or any appropriate government planning unit. In any case, the project plan should be reviewed to see if it was an appropriate one in light of the objects set forth. Each objective should be examined to determine

whether it was considered carefully and whether appropriate provision was made. Evaluators look into the basic questions: Was the technology proposed appropriate? Were the institutional, organizational, and managerial arrangements suited to the conditions?

Were the financial aspects carefully worked out on the basis of realistic assumptions? Were the economic implications properly explored? And how did the project in practice compare with each aspect of the project planning? The evaluation should consider the response of project management and the sponsoring agencies to changing circumstances. Did management respond quickly enough to changes? Was its response carefully considered and appropriate? Did the institutional and organizational structure in the project permit a flexible response? How could a project's structure be altered to make the response to change more flexible and appropriate in the future? From the evaluation should come carefully considered recommendations about how to improve the appropriateness of each aspect of the project design so that plans for project implementation should be revised if the project ongoing.

Based on the evaluation report, a project has a chance of being rejected, accepted (implemented as it is), modified, or delayed for some years.

To sum up, preparing a project is anything but a neat, continuous process with well-defined steps, each of which is completed before the next and never retraced. Instead, the whole process is iterative; i.e., the project analyst must continuously go back and forth, and adjust earlier decisions in the light of what is learned from later analysis. In general, the process begins with an idea about the broad nature and objectives of a proposed project that has been supplied by the political or planning process and ends with deriving lessons for future projects.

Chapter- One: Review Questions

Part I: Read Each Expression and Choose the Most Appropriate Answer.

Which one of the following expression **is not** the characteristic of a project?

Projects have specific of benefits that can be identified, quantified and valued monetarily.

Projects use a multiple of resources and needs well planned resource management

A project is an intermediate operational element unit like public investment programs

Projects are organizationally, geographically and time bounded

Uncertainty and risks is inherent in any project which forces to change

Which one of the project **feature** is a function of capital investment, human labor requirement, coverage of beneficiaries, total value of inputs used and goods or service produced by the project?

A. Boundary of a project

D. Size of a project

B. Coverage of a project

E. Type of a project

Scope of a project

Among the following development concerns, which one **is not** agriculture project focus area?

Raising agricultural productivity

Reducing risk, vulnerability and inequality

Helping farmers reach markets and improving their incomes

Making agriculture more environmentally sustainable.

Transforming the agriculture sector to industrial sector

The following alternative reasons can be taken as the significance of project planning *except*?

To eliminate uncertainties

To receive loan or financial support from promoters

To increase the effectiveness and efficiency of the operations

To identify and work towards a common goal

To establish a means of project monitoring and control

Good project identification should incorporate the following activities *except*?

Justify the project in a sectoral context;

Highlight pertinent issues and propose solutions;

Demonstrate the alternative and that further resources should be devoted for preparation;

D. Establish clearly the follow -up steps for full preparation.

E. None

Part II: Read Each of the Following Expression & Determine Whether it is True or False.

Unlike feasibility, project appraisal involves the application of valuation techniques to decide which option will produce the greatest overall benefits.

Throughout the project cycle, the primary preoccupation of the analyst is to consider alternatives, evaluate them, and to make decision as to which of them should be advanced to the next stage.

In developing countries linking policy, planning, and budgeting system enables investment decisions to be planned systematically, thus making the most efficient and effective use of available resources at higher running cost.

Project supervision is a comparative analysis between what the project was intended to become, in terms of timing and quantity of costs and benefits, and what actually has happened.

Translating an investment proposal into a concrete operational unit is a complex, time consuming and risk fraught task.

CHAPTER TWO

ASPECTS OF PROJECT ANALYSIS

Introduction

Dear learner! In this chapter, we would like to familiarize you with some of the aspects of project analysis in the project work. Since project studies are a multi-disciplinary exercise, an exposure towards the different aspects of project studies is expedient. In addition to practical expediency, financial and economic analysis will essentially depend upon the outcomes from the chapters on market, technical and human resource aspects of a project. Governments and corporate entities considering their vision into the future, the external environment and the performance of competitors set up policies which serve as a basis for strategic /medium- and long-terms/ plans, which in turn serve as a basis for project identification and its selection.

Learning Objectives

Dear distance learner! After completing this chapter, you will be able to:

- Realize the significance of demand and market analysis in project preparation
- Understand the implication of technical analysis in project preparation
- Recognize the importance of organizational analysis in project preparation
- Know the merit of financial and economic analysis in project preparation
- Appreciate the value of social and environmental analysis in project preparation

If there is no organic link between policies, plans and projects, then the effectiveness and efficiency of investment decisions could be compromised. A large part of project analysis serves to establish a project's technical and institutional feasibility, whether it is fit with the strategy and the appropriateness of the socio-economic context for the project. The conventional cost-benefit-analysis-based economic analysis takes for granted that a project is technically sound and that its institutional arrangements will be effective during implementation. With this note the major questions that any economic analysis should address are:

- What is the objective of the project?
- What will happen if the project proceeds or not?
- Is the project the best alternative?
- Does the project have separable components?
- Winners and losers: who enjoys the music and who pays the piper?
- What is the project's fiscal impact?
- Is the project financially sustainable?
- What is the project's environmental impact?
- Techniques for assessment: is the project worthwhile?
- Is this a risky project?

The project analyst must consider several aspects when carrying project analysis. The major aspects of project preparation and analysis are outlined below:

2.1. Demand and Market Analysis

It is the first process of identification of the target beneficiary groups of a public projects. The primary task is to identify the need and estimate the nominal and effective demand of the envisaged product or service. This depends upon the nature of the particular product/service/under consideration. If the product is a public good, or publicly provided private good, the task may be to undertake social and institutional need assessment. If the product is private good, the first task is to determine whether there is sufficient market or not. The subsequent discussion of this section will be on market and demand analysis. The market study needs to ensure the existence of effective demand at remunerative price. Market analysis is basically concerned with the following questions:

What is the product/service to for which feasibility study is to be undertaken?

What is the specific need which is the basis for the product/service?

Are there alternative ways of satisfying the need?

Have there been noticeable changes in the nature and structure of needs?

Who should define the need and the corresponding product/service/?

What would be the aggregate demand of the proposed product/service in future?

What would be the market share of the project under appraisal?

What is the ongoing and competitive selling price?

Will the realization of the project affect the selling price(s) of the products/services? If yes what is the likely selling price? What is the implication of this price on the viability of the project?

What are the marketing strategies that enable the firm to enter into a market and capture adequate market size?

Example: Saying on perspectives on effective demand and market promotion.

A saying goes, “an economist and marketer were sent to make market study for shoes in an island. Immediately after their arrival, they observed that the people there were all barefoot. Both had to write independent reports. The economist reported that there is no market because there is no revealed demand for shoes as the entire population is barefoot. The market reported that there is big, untapped market, no has not entered into the market and hence he appreciated the possibility of taking the entire market. But he/she qualified the fact that there is a need for promotional work.”

To answer the above questions the project analyst requires a wide variety of information and appropriate forecasting methods. The kinds of information required include the following.

Consumption trends in the past and the present consumption levels

Past and present supply positions

Production possibilities and constraints

Imports and exports

Structure and competition

Cost structure

Elasticity of demand

Consumer behaviour, intentions, attitudes, preferences, and requirements

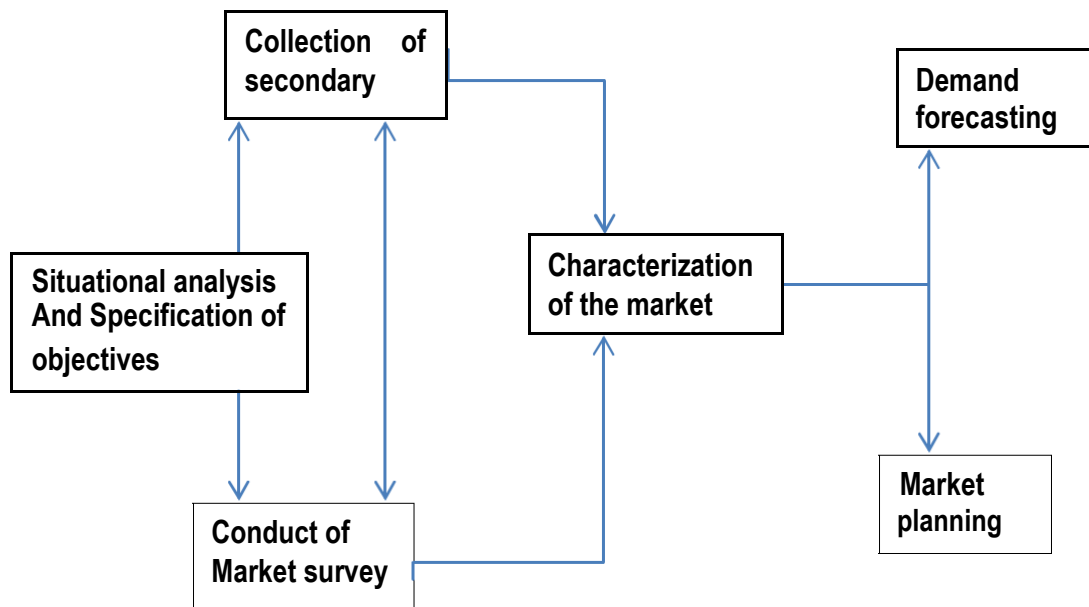
Distribution channels and marketing policies in use

Administrative, technical, and legal constraints.

The market analysis is also concerned with the arrangement for marketing the output to be produced and the arrangement for the supply of inputs needed to build and operate the project. Given the importance of market and demand analysis in project analysis it should be carried out in an orderly and systematic manner. The key steps in such analysis are as follows.

Situational analysis and specification of objectives

In order to get a feel for the relationship between the product and its market, the project analyst may talk to consumers, competitors, middlemen, and other in the industry. He/she may also look at the preferences and purchasing power of consumer's, actions and strategies of competitors and practices of the middlemen/distributors, whole sellers and retailers/. Key steps in market and demand analysis and their inter-relationships.



If such a situational analysis generates enough data to measure the market and get a reliable projection of the demand and revenues a formal study may not need to be undertaken. In order to carry out such a study it is necessary to spell out its objective clearly and comprehensively. A helpful way of spelling out the objectives would be to structure the objective in the form of questions.

Example: suppose a given project aims at producing wheat in a given locality. The project initiator and implementer need information about where and how to market their product. The objective of the market and demand analysis in this case may be to answer some of the following questions.

Who are the buyers of this product? (Consumers)

What is the total current demand for wheat?

How is the demand distributed temporally /pattern of sale over the year and geographically?

What price will the consumers be willing to pay for the product?

How can consumers be convinced that wheat could be substituted for other foodstuffs?

What channels of distributions are most suited for the product?

What trade margins will induce distributors to carry it out?

What are the possible immediate sales?

Methods of Data Collection

There are two principal sources of assembling market information: Secondary data sources; and Primary data sources. The secondary sources will include the analysis of regular statistics and the study of the published results of previous surveys. Demographic, economic, financial and commercial statistics can be collected from the following sources:

Official sources: customs statistics, various kinds of fiscal and monetary statistics, statistical abstracts, etc.

Trade groups: trade union and associations, chambers;

Enterprises and government organizations who possess statistics for their own use

In general there are several sources of information including census data, national sample survey reports, plan reports, statistical abstracts, industry specific sources of data etc. Special survey provides a very effective method of investigating a market. Their purpose will be either to obtain quantified data or to find out how people feel about a product.

Methods of Estimating Future Demand

There are many possible methods for estimating future demand for a product. In some cases a simple study of import statistics, possibly backed up by a survey among local consumers will give a fairly clear idea of the size of the future market. In other cases it may be necessary to pursue the investigation further, possibly using advanced econometric techniques. Between these two extremes there exists a whole range of methods from which to choose, depending on:

The nature of the market studies;

The quality and quantities of the data available;

The degree of accuracy to be achieved.

The most commonly used methods include:

- Projection of the trend
- Using technical coefficients
- International comparisons
- Possibilities for export or for import substitution
- Econometric models
- Utilization of the result of family budget surveys
- Forecasting without statistical data

It has to be noted that each of the above techniques are not mutually exclusive methods of projections. Rather if the case at hand and nature of data allows, one will have to adopt more than one technique. In fact, it is not unusual to find many studies which use simultaneously many techniques of estimating and forecasting.

Marketing Strategy: Feasibility studies need to incorporate the design of a marketing concept, which should be based on proper marketing research. Marketing can be characterized by the following elements:

Business philosophy: marketing is a business philosophy that doesn't focus on products or production, but puts the problems, needs and desires of existing or potential consumer groups at the center of the business activities of the firm.

Marketing Research: well-planned and systematic market and marketing related research is a precondition for market-oriented decision-making. On the basis of information obtained about the potential market as well as the human, production and financial resources available for the project, marketing strategies are to be developed to ensure the achievement of the project objectives.

Marketing Instruments: the successful implementation of marketing strategies requires shaping and influencing the market in a well-planned manner, using the necessary combination or mix of marketing instruments. The marketing mix includes the analysis of distribution channels, Analysis of the strength and weakness of competitors, pricing policy, and the identification of appropriate promotion mix.

Methods of Demand Forecasting

The various methods of demand forecasting may be classified into three broad categories as follows: Some of the most commonly forecasting methods are discussed here under.

Qualitative methods**Jury of executive opinion method:**

This method, which is very popular in practice, involves soliciting the opinions of a group of managers on expected future sales and combining them into a sales estimate. The advantages of this method are:

It is an expeditious method for developing a demand forecast

It permits consideration of a variety of factors like econometric climate, competitive environment, consumer preferences, technological developments, and so on. To be included in the subjective estimates provided by the experts.

It has immense appeal to managers who tend to prefer their judgment to mechanistic forecasting procedures.

Delphi method

This method is used for eliciting the opinions of a group of experts with the help of a mail survey. The steps involved in this method are:

A group of experts are sent a questionnaire by mail and asked to express their views.

The responses received from the experts are summarized without disclosing the identity of the experts, and sent back to the experts, along with a questionnaire meant to probe further the reasons for extreme views expressed in the first round

The process may be continued for one or more rounds till a reasonable agreement emerges in the views of experts

Delphi method appeals to many organizations for the following reasons

It is intelligible to users

It has a fancy name

It seems to be more accurate and less expensive than the traditional face-to-face group meetings.

Time Series Projection Method

Trend Projection Method

The trend projection method involves determining the trend of consumption by analyzing the past consumption statistics and projecting future consumption by extrapolating the trend. Various trend relationships could be identified including the following:

Linear relationship: $Y_t = a + bT$, Where Y is the variable to be forecasted and T is to be estimated.

Exponential (Semi-log) relationship: $Y_t = ae^{bT}$ Or $\ln Y = \ln a + bT$. This method assumes that there is a constant growth rate b within each period.

Polynomial relationship: $Y_t = a_0 + a_1t + a_2t^2$

Cobb Douglas Relationship: $Y_t = at^b$

Exponential Smoothing Method

In exponential smoothing forecast are modified on the light of observed errors. If the forecast value for year t, S_t , is less than the actual value for year t, the forecast for the year t+1, F_{t+1} , is set higher than F_t .

If $F_t > S_t$ is set lower than F_t . In general $F_{t+1} = F_t + ae_t$ Where:

F_t = forecast for year $t+1$

a = Smoothing parameter (which lies between 0 and 1)

e_t = error in the forecast for year $t = S_t - F_t$

Casual method **Consumption Level Method**

Consumption Level Method is useful for a product, which is directly consumed.

This method estimates consumption level on the basis of elasticity coefficients, the important ones being the income elasticity of demand and the price elasticity of demand.

End-Use Method

This method is suitable for estimating the demand for intermediate products, the end use method, also referred to as the consumption coefficient method, involves the following steps:

Identify the possible uses of the product

Define the consumption coefficient of the product for various uses

Project the output levels for the consuming industries

Drive the demand for the product



Dear learner! Would you please explain the significance of demand and market analysis in the fruitfulness of a project?

2.2. Technical Analysis

Technical study of a project provides the technical basis for all other aspects of a project study, since a technically unfeasible project cannot be promoted. The main and challenging task in this technical analysis is to identify the appropriate technology for the objective the project is intended to meet. Recall that problem identification leads to establish project objectives against which the appropriateness of a project and specifically the technology is evaluated. In general this part of project study address issues related to:

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;

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 projects inputs (supplies) and outputs of real goods and services and the technology of production and processing. Analysis of the technical and engineering aspects of a project should do continuously when a project is formulated.

Technical analysis seeks to determine whether the prerequisites for the successful commissioning of the project have been considered and reasonably good choices have been made with respect to **location, size, process, etc.** 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

- Material inputs and utilities
- Location and site
- Manufacturing process/technology/ and engineering

A. Materials and inputs Aspects

In the materials and inputs study part of the feasibility study, the experts assigned for the task have to:

- Identify the required types of inputs, their sources and brief assessment of alternative types of inputs, their relative merits in terms of quality of the product (and hence competitiveness in the market); and alternative sources of supply;
- Describe general availability of Raw materials, Auxiliary materials, Factory Supplies, and Utilities
- List annual supply requirements of material inputs;
- Summarize availability of critical inputs and possible strategies of acquiring these inputs;
- Determine the procurement period of each imported input, if any.
- Outline costs related to procurement and storage of inputs (stores, containers of required type; transport costs required e.g. forklifts etc.), and
- Identify the number of personnel required for this function giving due emphasis for quality of man power.

B. Location, Site and Environment Aspects

A feasibility study should determine the location and site suitable for an industrial project. The choice of a location should be made from a fairly wide geographical area, within which several alternative sites can be considered. The main criteria or key requirements for selecting proper locations should always be determined at an early stage of the study. The qualitative analysis of these key requirements would then allow the assessment of a number of potential locations and the rejection of those not fulfilling the key requirements. To this effect one has to identify the major variables that need to be taken into account when determining the location of a project under consideration. This involves the identification and analysis of:

- Access to raw material and the corresponding weight;
- Access to market and the corresponding weight;
- Access to basic infrastructure like power, water, communication, etc. and corresponding weights;
- The implication on labor supply and issue of residence;

Cultural considerations, etc.

However it should be noted that the choice of location is not always based on a systematic step-by-step analysis and assessment of gradually reduced number of possible locations, ending up with the optimum solution. The promoter of the project may suggest a location at an earlier stage without undertaking the above analysis. Once the location of the project is decided, alternative **sites** have to be analyzed and the final selection made. This will require an evaluation of the characteristics of each site, and the following requirements and conditions are to be assessed:

- Ecological conditions on site (soil, site hazards, climate etc)
- Environmental impact (restrictions, standards, guidelines)
- Socio-economic conditions (restrictions, incentives, requirements)
- Local infrastructure at site locations
- Strategic aspects (future expansion, supply and marketing policies)
- Cost of land
- Site preparation and development, requirements and costs

This task is followed by description of location and plant site selected, and the statement of significant costs.

C. Engineering and Technology Aspect

It is the task of the engineering to design the functional as well as the physical layout for the industrial plant necessary to produce the defined products (outputs), and to determine the corresponding investment expenditures as well as the costs arising during the operational phase. The scope of engineering also includes the plant site and all activities required to deliver both inputs and outputs and to provide the necessary ancillary infrastructure investments.

The initial task and scope of engineering is to define the whole range of project activities and requirements, including production levels to be achieved under the technical, ecological, social and economic constraints. This necessitates identifying the principal products or product range, including by-products, determining the volume of production, and relating production capacity to the flow of material and performance of services at the selected site.

The range and volume of products to be produced depends primarily on the market requirements and the proposed marketing strategies. The initial engineering work consists in designing a preliminary production layout suitable for manufacturing the products defined in accordance with the marketing concept, and in the qualities and quantities required. After the required sales program has been determined, the detailed production program should be designed in a feasibility study. The production program should define the levels of output to be achieved during specified periods and, from this viewpoint, should be directly related to the specific sales forecasts.

Once a production program defines the levels of outputs in terms of end products, and possibly of intermediate products and the interrelation between various production lines and processes, the specific requirements of materials and labour should be quantified for each stage. For this purpose, a material-flow diagram should be prepared, showing the material and utilities balance at various stages of production. The input requirements and costs have to be assessed for basic material such as raw material and semi-processed and bought-out items; major factory supplies (auxiliary materials and utilities); other factory supplies; and direct labour requirements. Under this sub topic the issues addressed include:

I. Plant Capacity

Plant capacity refers to the volume or number of units that can be produced during a given period. Plant capacity is expressed usually in terms of feasible capacity and nominal capacity. Feasible capacity refers to the attainable capacity under normal working conditions, taking into account not only the installed equipment and technical conditions of the plant, such as normal stoppages, down time, holidays, maintenance, tool changes, desired shift patterns and indivisibilities of major machines to be combined, but also the management system applied. Nominal capacity however refers to the technically feasible capacity, which frequently corresponds to the installed capacities as guaranteed by the supplier of the plant's machinery. In determining the capacity of a plant the following factors are taken into account:

The marketing concept and the volume of sales, and

The minimum available economic size of production technology and equipment

Technology

An integral part of engineering at the feasibility stage is the selection of an appropriate technology, as well as planning of the acquisition and absorption of this technology and the corresponding know-how. Technology is an important factor in determining the production program and plant capacity. The major issues addressed in the technological analysis include:

Brief review of the technology development history, focusing on the areas of change and the implications of these changes on the competitiveness of a business organization in terms of quality of product, cost leadership and other relevant areas of competitiveness;

Identification of alternative technologies and alternative scales under use and their relative merits and demerits in terms of the major areas that determine competitiveness of the product and the business organization;

Identification and analysis of the technology selection criteria and description of the selected one.

Engineering

■

Plant lay out

After selection of technology, the next task is to prepare the plant layout, drawings, basic design and engineering. These charts and drawings should adequately reflect the interrelationship

between environmental conditions and constraints, socioeconomic infrastructure, technology flow, constructions and material flow and inputs. The plant layout and basic engineering are prepared in accordance with the selected technology and know-how.

Selection of Machinery and equipment

The selection of machinery and equipment at the feasibility study stage should broadly define the optimum group of machinery and equipment necessary for a specific production capacity by using a specific production technique. This selection differs in emphasis with the type of project. Equipment can be variously categorized. One classification can take the form of the machinery requirements for each stage of the production processes. In other cases, the machinery can be listed under plant machinery, mechanical equipment, electrical equipment, instrumentation and control, transport and conveying equipment, testing and research equipment and other machinery items.

Civil engineering

The feasibility study should provide plans and estimates for the civil works related to the project. This should cover site preparation and development, factory and other buildings, civil engineering works relating to utilities, transport, emissions and effluent discharge, internal roads, fencing and security, and other facilities and requirements of the plant. Civil engineering works are fairly project-specific and have to be related to a particular plant site and the facilities that may be required. The plans and estimates for the civil engineering works should be detailed for cost estimates and implementation scheduling. The nature of each construction should be defined, including modular construction where appropriate, the quality of construction materials and the quantities and cost of materials required. Detailed civil engineering drawings are usually not required before the start of project implementation. The estimates for buildings and other constructions should be based on unit costs such as building costs per square meter in the plant surroundings.

IV. Maintenance and Replacement Requirements

An important aspect of project engineering is the determination of critical maintenance and replacement requirements for the project. Satisfactory maintenance of plant, buildings and various facilities is essential for efficient plant operations. Maintenance requirements should be assessed in terms of both the maintenance equipment that may be necessary for efficient maintenance of the plant and facilities, and the maintenance skills and capability that need to be developed.

Estimates of Overall cost

On the basis of the estimates from technology, machinery and equipment and civil engineering works, the feasibility study should provide an overall estimate of the capital costs of the project. Such an estimate will undergo modifications in accordance with the bids and offers received

from suppliers and the contractors but will nevertheless provide a fairly realistic estimate of capital costs.



What are the primary concerns of technical analysis in the project preparation?

2.3. Organizational Analysis

This basically incorporates the socio-cultural patterns and institutions or the population that the project is believed to serve. Does the project take 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. Examples include the land tenure system, use of local institutions such as Idir or Debbo. Similarly, managerial issues are critical for successful completion of projects. Thus, the project analyst must examine the ability of available staff to identify whether they have the capacity to carry out the managerial needs of the project.

Organization and Managing

A division of the company 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. It is also essential for the feasibility of a project that a proper organizational structure should be determined in accordance with the corporate strategies and policies. 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, represented by 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, and is normally shown in a diagram, often referred to as an organigram. The organizational functions are the building blocks of the company. There 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

Human Resources

The successful implementation of any operation of an industrial project needs different categories of human resources- management, staff and workers-with sufficient skills and experiences. The feasibility study should identify and describe such requirements and assess the availability of human resources as well as training needs. On the basis of the qualitative and quantitative human resources requirement of the project, the availability of personnel and training needs, the cost estimates of wages, salaries, other personnel-related expenses and training are prepared for the financial analysis of the project. In case an economic evaluation is intended, the costs of unskilled labor should be shown separately.

Human resources as required for the implementation and operation of industrial projects need to be defined by categories, such as management and supervision personnel and skilled and unskilled workers, and by functions, such as general management, production management and supervision, administration, production control, machine operation and transport. The numbers, skills, and experience required depend on the type of industry, the technology used, plant size, the cultural and socio-economic environment of the project location, as well as the proposed organization of the enterprise. Since the lack of experienced and skilled personnel can constitute a significant bottleneck for project implementation and operation, extensive training programs should be designed and carried out as part of the implementation process of investment projects.

Overhead Costs

Overhead costs could be categorized into the following:

Factory overheads: costs that accrue in conjunction with the transformation, fabrication or extraction of raw materials. Typical cost items include:

- Wages and salaries (including benefits and social security contributions) of manpower and employees not directly involved in production
- Factory supplies: utilities (water, power, gas, steam), effluent disposal, office supplies, Maintenance

These cost items should be estimated by the service cost centers where they accrue.

Administrative Expenses: These are cost elements that should be estimated for administrative cost centers such as management, bookkeeping and accounting, legal services and patents, traffic management and public relations, etc. these costs should only be calculated separately in cases where they are of considerable importance. Otherwise they could be included under factory overheads. Typical cost items categorized under administrative overhead costs include:

- Wages and salaries (including benefits and social security contributions)
- Office supplies, communications
- Engineering, rents, insurances (property), taxes (property)

Marketing overhead Costs: Indirect marketing costs that cannot be easily linked directly with a product are dually treated as marketing overheads costs. These costs are often included under administrative overheads. Typical cost items include:

- Wages and salaries (including benefits and social security contributions)
- Office supplies, utilities, communication, indirect marketing costs, advertising, training etc.

Depreciation Costs: depreciation is an accounting method used to distribute the initial investment costs of fixed assets over the lifetime usually the fiscal standard lifetime of the corresponding investment. Depreciations are frequently included under overhead costs. Since, however, these costs are treated differently for the discounted cash flow method, depreciation costs should be shown separately from overhead costs.

Financial Costs: -Financial costs such as interest on long-term loans, should be shown as a separate item, because they have to be excluded when computing the discounted cash flows of the project, but are to be included for financial planning.

The different fields of project study so far considered are essentially relevant for financial/private project study, which may not be required to incorporate other social and environmental costs and benefits.



Dear learner! Can you explain the importance of organizational analysis and its contribution to the final success of a project?

2.4. Financial Analysis

Financial analysis seeks to ascertain whether the proposed project will be financially viable in the sense of being able to meet the burden of servicing debt and whether the proposed project will satisfy the return expectations of those who provide the equity capital. Here the project analyst is concerned with the financial effects of the proposed project on each of its various participants (firms, framers/workers, government etc.). By examining the financial implications for these parties the analysts need to identify the projects financial efficiency, incentive impact to the participants in the project, creditworthiness and liquidity (say, could firms have enough working capital?). For instance projections of receipts of one particular participant may help to

identify the possibility of/or the demand for credit for that participant. The aspects which have to be looked into while conducting financial appraisal are:

Investment outlay and costs of the project II.

Means of financing

III. Cost of capital

Break-even point

VI. Cash flows of the project

VII. Investment worthwhile ness judged in terms of various criteria of merit

VIII. Projected financial position

IX. Level of financial risk

2.5. Economic Analysis

The economic aspect of project preparation is primarily concerned with the determination of the likelihood of the proposed project, and hence the committing of scarce resources, by justifying the significance of the project from **the whole economy** point of view (the society as a whole). In such evaluation 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 form 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

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 subsidy re a return/income.

The reason for this distinction is basically the point of view (society as opposed to firm).

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 'accounting prices' or 'economic accounting prices'.

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

2.6. Social Analysis

This aspect is more important to public projects. Project analysts are expected to examine the broader social implications of the proposed project. Sufficient attention should be given to the social soundness of a project. This is particularly related to the:

The attitude and the likely response of the beneficiary groups;

The existence of potential implementation capacities or organization within communities;
The cultural factors related to the implementation and outcomes of the project;
The political factors;
Income distribution implications of the project,
Employment creation: income distribution could be related to employment creation.
Issues of balanced regional development,
The displacement impact of the project (the Wonji-Methara sugar plantations displacement is a good case in point);
The gender implication of the adopted technology;
Environmental impacts etc.

Guidelines for the social analysis of poverty reduction projects

Assess the socio-cultural and demographic characteristics of the beneficiary community: its size, sex distribution, and social structure, including ethnic, tribal and class composition;
Determine the way in which the beneficiary community has organized itself to carry out productive activities, including the structure of households and families, the availability of labor, the ownership of the land to be used, and access to and control of resources;
The project's cultural accessibility; that is, its capacity both for adapting to and from bringing about desirable changes in the beneficiary group's behavior and in how the group perceives its needs.
The strategy necessary to elicit commitment from the beneficiary population and to ensure the population's sustained participation from design through to successful implementation, operation and maintenance;
The needs and concerns of sensitive beneficiary groups, such as minorities, women, and so on.

Guidelines for ensuring the project is grounded on an understanding of the culture and the environment of the intended beneficiaries

Consult with beneficiaries on the scope and implementation strategy of the proposed project;
Ascertain the willingness of each of the affected groups to commit the financial resources and labor assumed in the project design;
Assess the likely response to the project of powerful local economic and political groups and identify ways in which their support, can be obtained or their opposition reduced;
Assess the potential conflict the project may cause within the community and surrounding areas, and identify ways in which the conflict could be avoided or reduced;
Try to understand the "psyche" of the poor and destitute, and seek to understand why they may be reluctant to participate in a project that appears attractive to an outsider;

Use social impact assessment techniques to assess how each of the principle socio economic groups is likely to be affected, place particular emphasis on assessing the extent to which project benefits will be accessible to the most vulnerable groups.

2.7. Environmental /Ecological Analysis

In recent years environmental concerns have assumed a great deal of significance. Ecological analysis should be done particularly for major projects, which have significant ecological implications like power plants and irrigation schemes, and environmental polluting industries. The key questions raised in ecological analysis are:

What is the likely damage caused by the project to the environment?

What is the cost of restoration measures required to ensure that the damage to the environment is contained within acceptable limits?

Chapter- Two: Review Questions

Briefly Explain the Following Questions

The project analyst must consider several aspects when carrying project analysis. What are the **major tasks** on each aspect the project analyst should make during project preparation and analysis (feasibility study)?

Demand and Market Analysis:

Technical Analysis:

Organizational Analysis:

Financial Analysis:

Economic Analysis:

Social Analysis:

Environmental Analysis:

CHAPTER THREE

FINANCIAL ANALYSIS AND APPRAISAL OF PROJECTS

Introduction

Dear learner! In this chapter, we would like to introduce you with the financial analysis and its appraisal criteria's in the project work. Every project has to be first analyzed in terms of its timely implementation and financing. Commercial profitability analysis or financial analysis of a project amounts to reviewing it from the angle of the entity (private or public) that will be responsible for its execution. The necessity to determine the financial profitability of a project to the project implementer calls for undertaking financial analysis. It aims at verifying that under prevailing market conditions the project will become and remain viable.

Learning Objectives

Dear distance learner! After completing this chapter, you will be able to:

- Understand the scope and rationale of financial analysis in project appraisal
- Know the way of identification of costs and benefits in financial analysis of a project
- Realize the classification of costs and benefits in financial analysis of a project
- Comprehend the valuation of financial costs and benefits in project appraisal
- Recognize the method of investment profitability analysis in project appraisal
- Identify the technique of sensitivity analysis in project appraisal

3.1. Scope & Rationale

3.1.1. What is Commercial/Financial Analysis?

It is concerned with assessing the feasibility of a new project from the point of view of its financial results. 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 pecuniary 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, the financial analysis is all about the assessment, analysis and evaluation of the required project inputs, the outputs to be produced/generated/ and the future net benefits, (expressed in financial terms) with the aim of determining the viability of a project to the private investor or the executing entity public body.

In general Financial Analysis is a process of:

- Analyzing and interpreting financial statements.
- Critically examining the accounting information given in the financial statements.
- Evaluating relationship b/n component parts of financial statements to obtain a better understanding of firm's position and Performance.

The commercial analysis deals with two issues:

Investment profitability analysis, with different methods of analysis;

Simple methods of analysis of rate of return/static methods/ non-discounted techniques/. This include: Simple rate of return, Pay-back period, urgency, etc.

Discounted-cash-flow methods/dynamic methods. This includes: NPV, IRR, etc.

Financial analysis/ ratio analysis/.

Liquidity analysis;

Capital structure analysis (debt/equity ratio).

The two types of analysis are complementary and not substitutable. In fact in the relevant literature commercial analysis and financial analysis are used interchangeably. Whatever the terminology, the investment profitability analysis is the measurement and assessment of the profitability of the resources put into a project, more directly the return on the capital no matter what the sources of financing. Thus, 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 (ratio 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.

Objectives/Importance of Financial Analysis

- To assess the earning capacity and profitability of a project
- To assess the operational efficiency and marginal effectiveness
- To make inter-project comparisons
- To make forecasts about future prospects of a project
- To help in decision making and control of a project
- To identify the reason for change in profitability and financial position

Steps in Financial Analysis

- Establish objectives of the analysis
- Define extent of analysis
- Re-organization and re-arrangement of financial data
- Relationship among financial statements with help of tools & methods
- Interpretation of information
- Drawing a conclusion for decision making process

3.1.2. Why and When One Undertakes Financial Analysis?

Commercial/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 it 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 it is undertaking. Even non-commercially oriented government institutions 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 may be required to provide the cheapest services. Under such circumstances a cost minimization or cost effectiveness exercise will be undertaken.

Commercial 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 of 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:

- Revenue, both forecasted sales and selling price; (from the Demand and Market Study)
- Initial investment costs distributed over the implementation of the project; (from Engineering, Site Development as well as Materials and Inputs analysis);
- Operating costs of the envisaged operational unit/firm/ over its operating life.

The issues and concerns of financial analysis are:

- Identification of required data;
- Analysis of the reliability of data;
- Analysis of the structure and significance of costs and benefits/incomes/;
- Determination and evaluation of the annual and accumulated financial net benefits; expressed as profitability, efficiency or yield of the investment;
- Consideration of the spread of flows of the costs and benefits over time
- Costs of capital over time;



Dear learner! Can you explain the concept of financial analysis in your own word?

3.1.3. Planning Horizon and Project Life

Planning is understood as a consciously programmed activity having as its focus the objective consideration of the future. The anticipations and assumptions about the future need to be explicit and should be analyzed in order to find the optimal development path. The project planning horizon of a decision maker may 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, that is, the period over which the project would generate net gains, depends basically on the technical or technological life cycle of the main plant items, on the life cycle of the product and of the industry involved, and on 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 which are as follows:

-  Duration of demand (position in the product life cycle);
-  Duration of raw material deposits and supply;
-  Rate of technical change;
-  Life cycle of the industry;
-  Duration of building and equipment;
-  Opportunities for alternative investment;
-  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; in other words it must be less than or equal to the shorter of the latter.

3.2. Identification of Relevant 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 same and then assessment of the quality and reliability of the collected information. 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 cost 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 and different objectives. Whatever the nature of the project, its implementation will always reduce the supply of inputs ("consumed" by the project).

Without the project, the supply of these inputs and outputs to the rest of the economy would have been different. (Examining this difference between the availability of inputs and outputs with and without the project is the basic method of identifying its costs and benefits.) In many cases the Situation without the project is not simply a continuation of the status quo, but rather the Situation that is expected to exist if the project is not under taken, because some increases in output and costs are often expected to occur any way. Different participants in a project have many and different objectives.

No formal analytical technique could possibly take in to account all the various objectives of every participant in a project. Some selection will have to be made. Most often 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. Anything that reduces national income is a cost and anything that increases national income is a benefit. Thus anything that directly reduces the total final goods and services is obviously a cost, and anything that directly increases them is a benefit. The task of the economic analyst will be to estimate the amount of the increase

in national income available to the society i.e. to determine whether, and by how much, the benefits exceed the costs in terms of national income.

Quantification:

Once costs and benefits are enumerated the next step is accurate prediction of the future benefits and costs which then is quantified in Dollars and cents. Thus, quantification involves the quantitative assessment of both physical quantities and prices over the life span of the project. The financial analysis of projects is typically based on accurate prediction of market prices, on top of quantity prediction. It is worth thinking about the impact of the project itself on the level of prices; and the independent movement of prices due other factors. The same principle applies in the Sense of economic analysis the only difference being the price needs to be changed to reflect net efficiency benefits to the nations at large. One widely accepted "efficiency" measure is its actual or potential value as an import or export; similarly the opportunity cost of any input is related to the question of its potential contribution to foreign exchange. In other words, world prices are considered as efficiency price indicators compared to domestic prices. However, to take account of the distribution impact of project further adjustment of such price is required. This lends itself to the social cost-benefit analysis.



Dear learner! Can you define and classify tangible and intangible costs/benefits?

3.3. Classification of Costs and Benefits

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

- Total investment costs; includes:

- Initial investment costs; includes:

- Fixed investment costs;

- Pre-Production expenditures;

- Investment required during plant operation / rehabilitation and replacement investment costs/

- Net working capital

- Operational/running costs/costs of goods sold

3.3.1. Tangible costs of a project

In almost all project analyses costs are easier to identify (and value) than benefits. In examining costs the basic question is whether the item reduces the net benefit of a farm or the net income of a firm. The prices that the project actually pays for inputs are the appropriate prices to use to estimate the project's financial costs. These prices may include taxes, tariffs; monopoly or

monopsony (seller monopoly) rents, or be net of subsidies. 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 on the following items:

- Initial Fixed Investment costs
- Pre-production Expenditures
- Plant and Equipment Replacement Costs
- Terminal Values/End-of-Life Costs/Salvage Costs/
- Net Working Capital
- Costs of Goods Sold
- Sunk costs
- Technical know-how and Engineering fees.
- Expenses on Foreign Technicians and Training of local technicians abroad

Total Investment Costs

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.

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
- Cost of tubes wells

The cost of buildings and civil works

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

Plant and machinery costs

Cost of imported machinery: is the sum of **i)** FOB value, shipping, **ii)** freight and insurance costs, **iii)** import duty, and **iv)** clearing, loading, unloading, and transportation costs

Cost of local or indigenous machinery: consists i) FOR cost, **ii)** sales tax, and other taxes if any, and **iii)** railway freight and transport charges to the site
Cost of stores and spares
Foundation and installation charges

The cost of plant and machinery is based on the latest available quotation adjusted for possible escalation. Generally, the provision for escalation is equal to the following product: (latest rate of annual inflation applicable to the plant and machinery) x (length of the delivery period)

Miscellaneous fixed assets: fixed assets and machinery which are not part of the direct manufacturing process may be referred to as 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/ inauguration and commencement of service delivery for public service rendering projects/.

This includes the following investment cost items.

Intangible assets: these assets represent expenditures which yield benefits extending over a longtime period. These include:

Patents, licenses, lump sum payments for technology, engineering fees, copy rights, and goodwill.

Preparatory studies, like feasibility studies, specific functional studies and investigations, consultant fees for preparing studies, supervision costs, project management services, etc.

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.

Other Pre-operation expenses. These include:

Rents, taxes, and rates

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;

Traveling expenses interest and commitment charges on borrowings

Insurance charges

Mortgage expenses interest on differed payments,

Miscellaneous expenses

There are two approaches in allocating of pre-production expenditures.

All pre-production expenditures may be capitalized and amortized over a period of time that is usually shorter than the period over which equipment is depreciated, say five years;

A part of the pre-production expenditures may be initially allocated where attributable to the respective fixed assets and the sum of both amortized/depreciated/ as the fixed asset, machinery and/or equipment.

Plant and Equipment Replacement Costs

Every machinery and equipment does not have equal economic life. There are machineries and equipment that productively be operated for many years, 20 years in the case of industrial technologies, about 50 years in the case of agricultural and infrastructural works. 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. In fact the first thing to do would be 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/ “Exit is not free and perfect!!”

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 of 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 to embrace 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. Any change in the current assets and/or current liabilities will have an impact on the net working capital requirements. Any increase in net working capital/NWC/ corresponds to a cash outflow to be financed, and any decrease would set free financial resources (cash inflow for the project). 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:

- raw materials;
- stores and spares;

work-in-process;
finished goods inventory;
Debtors/accounts receivable;
Cash and bank balance.

Net working capital is defined as gross working capital less current liabilities. Current liabilities consist of credits, provisions, accrued expenses, and short-term borrowings. 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. Commercial banks and trade creditors provide the principal support for working capital. However, a certain part of working capital requirement has to come from long-term sources of finance. Referred to as the "**margin money for working capital**", this is an important element of the project cost.

The margin money for working capital is sometimes utilized for meeting over-runs in capital cost. This leads to a working capital problem/crisis when the project is commissioned. To mitigate this problem, financial institutions stipulate that a portion of the loan amount, equal to the margin money for working capital, be blocked initially so that it can be released when the project is completed.

B) Costs of Goods Sold/Operational 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. It will not be difficult to identify and quantify the labor required for the production process. From the highly skilled manager to the unskilled factory worker the labor input can easily be identified. Problems in the case of valuing unskilled labor and family labor might arise in the economic analysis of projects.

Factory Overhead: the expense on repairs and maintenance, rent, taxes, insurance on factory assets, etc. are collectively referred to as factory overheads.

Land to be used for the project: can also be easily identified and quantified. It will not be difficult to know how much land is needed and about the location. Yet problems might arise in valuing land because of the special kind of market conditions that exist when land is transferred from one owner to another.

Contingency allowances: are usually included as a regular part of the project cost. In general project costs estimates are assume that there will be no relative changes in domestic or international prices and no inflation during the investment period or there will not be any modification in design, no exceptional conditions such as unanticipated environmental conditions (flood, landslides, or bad weather). It would be unrealistic to base project cost estimates only on these assumptions of perfect knowledge and complete price stability. Sound project planning requires that provision be made in advance for possible adverse changes in physical conditions or prices that would add to the baseline cost.

Contingency allowances may be divided into those that provide for physical contingencies and those for price contingencies. In turn price contingencies comprise two categories, those for relative changes in price and those for 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. But they are considered as transfer payments in economic analysis.

Debt service: the same approach applies to debt service - the payment of interest and the repayment of capital. Both are treated as an outflow in financial analysis. In economic analysis debt service is treated as a transfer payment within the economy even if the project will actually be financed by a foreign loan and debt service will be paid abroad.

✚ **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 however, poorly advised they may have been. 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.

✚ **Technical know-how and Engineering fees.**

Often it is necessary to engage technical consultants or collaborators from local or abroad for advice and help in various technical matters like preparation of project report, choice of technology, selection of plant and machinery, detailed engineering, and so on. While the amount payable for obtaining technical know-how and engineering services for setting up the project is a component of project cost, the royalty payable annually, which is typically a percentage of sales, is an operating expense taken in to account in the preparation of the projected profitability statements.

✚ **Expenses on Foreign Technicians and Training of local technicians abroad**

Services of foreign technicians may be required for Setting up the project and supervising the trial runs. Expenses on their travel, boarding, and loading along with their Salaries and allowances must be shown here. Likewise, expenses on local technicians who require training abroad must also be included here.

Means of Finance

To meet the cost of project the following means of finance are available:

Share capital: There are two types of Share capital- equity capital and preference capital. Equity capital represents the contribution made by the owners of the business, the equity shareholders, who enjoy the rewards and bear the risks of owner ship. Equity capital being risk capital carries no fixed rate of dividend. Preference capital represents the contribution made by preference shareholders and the dividend paid on it is generally fixed.

Term loans: Provided by financial institutions and commercial banks; term loans represent secured borrowings, which are a very important source for financing new projects as well as expansion, modernization, and renovation schemes of existing firms.

Debenture capital: Debentures are instruments for raising debt capital. There are two

broad types of debentures: non-convertible debentures and convertible debentures. Non-convertible debentures are straight debt instruments. Typically they carry a fixed rate of interest and have a maturity period of 5 to 9 years. Convertible debentures, as the name implies, are debentures, which are convertible, wholly or partly, in to equity shares. The conversion period and price are announced in advance.

Deferred credit: Many a time the suppliers of plant and machinery offer a deferred credit facility under which payment for the purchase of plant and machinery can be made over a period of time.

Incentive sources: The government and its agencies may provide financial support as incentive to certain types of promoters or for setting up investment in certain location. These incentives may take the form of seed capital assistance, or capital subsidy or tax exemption.

Miscellaneous sources: A small portion of project finance may come from miscellaneous sources like unsecured loans, public deposits, and leasing and hire purchase finance.

3.3.2. Tangible Benefits

Tangible benefits can arise either from increased production or form reduced costs. The specific forms, in which tangible benefits appear, however, are not always obvious and valuing them might be difficult. 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

Cost reduction through technological advancement

Reduced transport costs

Losses avoided

3.3.3. Intangible costs and Benefits

There may be some costs and benefits that are intangible. These may include the creation of new employment opportunities, better health and reduced infant mortality as a result of more rural clinics, better nutrition, reduced incidence of waterborne diseases, national integration, or even national defense. Such intangible benefits, however, do not readily lend them to valuation. Under such circumstances one may have to resort to the least cost approach instead of the normal benefit cost analysis. Although the benefits may be intangible most of the costs are tangible. Construction costs for schools, hospitals, pipes for rural water supply, etc are all quantifiable. However, cost such as the disruption of family life, the increased pollution as a result of the project, ecological imbalances as the result of the project, etc, are difficult to capture and quantify. But effort should be made to identify and quantify wherever possible.

3.4. 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. Ideally, 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 just the revenues received and the financial costs are the expenditures that are actually incurred by the implementing agency as a result of the project.

If the project is producing some goods and services for sale the revenue that the project implementer expects to receive every year from these sales will be the benefits of the project. The costs incurred are the expenditures made to establish and operate the project. These include capital costs, the cost of purchasing land, equipment, factory buildings vehicles, and office machines, working capital as well as its ongoing operating costs; for labor, raw material, fuel, and utilities.

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.

In a freely perfectly competitive market, without taxes or subsidies the market price of an input will equal its competitive supply price at each level of production. This is the price at which

producers are just willing to supply that good or service. The supply curve will reflect the opportunity cost, or the value in their next best alternative use, of the resources used to produce that input. In equilibrium the supply price of an input will equal to its demand price at the market-clearing price for that input.

The financial benefit from a project is measured in terms of the market value of the project's output, net of any sales taxes. If the project's output is sold in a competitive market with no rationing or price control for the good concerned, and the project is small and does not change the good's price, its market price will equal its competitive demand price. This is a minimum measure of what people are willing to pay for a unit of the good or service (produced by the project, at each level of output demanded. Prices may be defined in various ways, depending on whether they are:

- Market/explicit/ or shadow/imputed/ prices;

- Absolute or relative prices;

- Current or constant prices.

Market Vs 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.

b) Absolute Vs Relative prices

Absolute prices reflect the value of a single product in an absolute amount of money, while **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.

c) 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 problem of choosing between current and constant prices does not exist, since they are equal and the planner may use either.

3.5. 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. So the definition of costs and benefits might be confusing. 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. Rather it transfer income from the firm to the government so that this income can be used for social purposes presumed to be more important to the society than the increased individual consumption or investment had the firm retained the amount of the tax. So, in economic analysis taxes will not be treated as a cost in project account.

No matter what form a tax takes, it is still a transfer payment - whether a direct tax or an indirect taxes such as sales tax, an excise tax, or tariff or duty on an imported input for production. Whether a tax should be treated as a transfer payment or as a payment for goods and services needed to carry out the project or merely a transfer, to be used for general purposes, of some part of the benefit from the point to the society as a whole.

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 that will reduce his costs and thereby increase his 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 that 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 is transferring the claim to the real resource back to the lender - but neither the loan nor the repayment represent in itself, use of the resources. From the standpoint of the producer, receipt of a loan increases the production resources he has available; payment of interest and repayment of principle 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. The loan transaction from one enterprise to another would not reduce the national income; it is rather, a direct transfer payment. Repayment of a loan is also a direct transfer payment.

3.6. Financial Appraisal Criteria of Projects and Selection of Investments

The three basic steps in determining whether projects is worthwhile or not are:

- Estimate project cash flows
- Establish the cost of capital; and
- Apply a suitable decision or appraisal rule or criterion.

This section deals with the third step.

It is to be reminded that the theme of project planning/study is to determine whether an investment is feasible or not. This means to show whether the financial return on both the total capital invested and on the paid-in equity capitals sufficiently high or not. Although sufficient returns are essential for a project to be implemented, investments must be justified usually within wider context, which for investors and financiers includes any gains, whether net profits or non-cash benefits, resulting directly or indirectly from an investment. Thus once, costs and benefits have been identified, priced and valued, the project analyst should work out to determine on which project (s) to invest. To this effect, the project analyst should have ways and means/methods, tools, approaches/ to select more profitable from less profitable or unprofitable projects.

A wide range of criteria have been suggested for choosing investment proposals, which are suitable for both financial and economic analysis. These criteria may be classified into two categories:

Non-discounting criteria, including:

- Ranking by inspection
- Urgency;

Payback period;
 Proceeds per unit of outlay
 Out-put- capital ratio

Discounting criteria, including:

Net present value/NPV/
 Internal rate of return/IRR/
 Net benefit investment ratio /NBIR/
 Domestic resource cost ratio/DRCR/
 Benefit-cost ratio/BCR/

3.6.1. Non-Discounted Measures of Project Worth

Projects, which are powerful means of development, have to be appraised by multiple criteria. In order to appraise a project idea we need operational criteria applicable in evaluating alternatives. Technical criteria are used to compare the merits of alternative technical solutions. It should be noted that there might be no one best technique for estimating project worth although some may be better than others. We should also note that these are only tools to improve decision-making. There are other non-quantifiable and non-economic criteria for making project decisions. The tools are only used to improve the decision making process. Before we discuss the discounted project appraisal criteria we need to consider some common undiscounted measures.

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.

Two investments have identical cash flows each year up to the final year of the short-lived investment, but one continues to earn cash proceed (financial results or profits) in subsequent years. The investment with the longer life would be more desirable.

Example: Consider the following hypothetical projects

Investment (Project)	Initial cost	Net cash proceeds per year		Total Proceeds
		Year I	Year II	
A	10,000	10,000	-	10,000
B	10,000	10,000	1,100	11,100
C	10,000	3,762	7,762	11,524
D	10,000	7,762	3,762	11,524

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&D,

Two investments have the same initial out lay (the total net value of incremental production may be the same), the same earning life and earn the same total proceeds (profits) but one project has more of the flow earlier in the time sequence, 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 4000 more in year 1 than investment C, which does not make up difference until year 2.

2) Urgency

According to this criterion projects which are considered to be more urgent get priority over projects which are regarded as less urgent. The problem with this criterion is: how can the degree of urgency be determined? In certain situations it may not be practically difficult to determine the urgency of a certain project proposal. For instance the project could be bottleneck alleviation of an ongoing operation/firm/ etc. Since it is not a systematic decision, this is not something that can be encouraged. Rather it is a practice that should be discouraged.

3) The Payback Period

The payback period also called the payoff period is one of the simplest and apparently one of the most frequently used methods of measuring the economic value of an investment. Since it addresses the prime concern of an investor in terms of reclaiming/recovering the initial outlay, it is frequently used method of project evaluation. The recovered money can be reinvested in something else. If the investor recovers its initial outlay, then in a way it is minimizing the risk it faces in the subsequent operation of the project.

The payback period is defined as the length of time required for the stream of cash proceeds produced by the investment (project) to be equal to the original cash outlay required by the investment (capital investment). It is defined as 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 cost of the projects initial capital investment. It is the period of time that the investor recovers its initial total outlay. This criterion is most often used in the business enterprises. However, its use in agricultural projects is limited.

Example-1: 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-2: consider the previous project C. . Then Then the payback period is 1.80 years. Similarly, for the other projects:

Investment (project)	Payback period (in years)	Ranking of projects using the payback period criteria
A	1	1
B	1	1
C	1.8	4
D	1.7	3

Investment A and B are both ranked as 1, since they both have shorter payback periods than any of the other investments, namely 1 year. But investment B which has the same rank as A will not only earn 10,000 Birr in the first year but also 1,100 Birr a year later. Thus investment B is superior to A. But a ranking procedure such as the payback period fails to disclose this fact. Thus it has **two important limitations**:

It fails to give any considerations to cash proceeds earned after the payback date. It simply emphasizes quick financial returns, ignoring the performance of the project over its economic life.

It fails to take into account differences in the timing of receipts and earned proceeds prior to the payback date. For instance, if we have two projects with the same capital cost and if they have the same payback period then they are equally ranked. Yet we know by the inspection method the project with earlier benefits should be desirable and should be preferred since the earlier benefit is received the earlier it can be reinvested or consumed.

Proceeds per Unit of Outlay

Under this method, investments are ranked according to their total proceeds divided by the amount of the corresponding investments. In other words the total net value of incremental production divided by the total amount of the investment gives us the proceeds per unit of outlay.

Example: consider the following hypothetical example

Investment	Total proceeds	Investment	Proceeds per Unit of outlay	Ranking
A	10,000	10,000	1.00	4
B	11,100	10,000	1.11	3
C	11,524	10,000	1.15	1
D	11,524	10,000	1.15	1

Accordingly project C and D must be implemented. However, both projects are given the same rank. Although we know by inspection that project D is superior because D generates Birr 4000 of proceeds in year 1. This method is again deficient because it still **fails to consider the timing of proceeds**. In other words, the method considers that 1 Birr of proceeds received in year 2 is

equal to 1 Birr received in year 1. This is inconsistent with the generally accepted economic principle that 1 Birr today is more valuable than 1 Birr at some future date.

5) Output - Capital Ratio

This is another crude index of investment efficiency. It is defined as the average (undiscounted) value added produced per unit of capital expenditure. Under this criterion we select the project with the highest output capital ratio or the lowest capital output ratio (capital coefficient). The main problem with this approach is that it ignores other factors of production such as labor and land and concentrates only on the productivity of capital. Accordingly the criterion favors those projects that use large quantities of labor and land in place of capital. Further it does not consider the timely spread of costs and proceeds. There are **two other undiscounted measures of project worth**.

The average annual proceeds per unit of outlay

This is similar to the proceeds per unit of outlay except that the average proceeds per year is expressed as a ratio of the original investment. The total proceeds are first divided by the number of years during which they are received, and this figure (the average proceeds per year) is then expressed as a ratio of the original outlay. In other words;

$$\frac{\text{Average annual proceeds}}{\text{Original Outlay}}$$

This method fails to take properly into considerations the timing of proceeds and exhibits a built in bias for short-lived investment with high cash proceeds. **Example:** consider the following hypothetical example:

Investment (project)	Total Proceeds	Average annual proceeds	Original Outlay	Average annual proceeds per unit of outlay	Ranking
A	10,000	10,000	10,000	1.00	1
B	11,100	5,550	10,000	0.555	4
C	11,524	5,762	10,000	0.576	2
D	11,524	5,762	10,000	0.576	2

We know that project D is superior to C although this method gives them equal ranks. Investment A and B are also incorrectly ranked by ranking A above B in spite of the fact that the

latter is obviously superior. No weight is given to the time distribution. For instance, a project that earns 10000 Birr for 10 years would also have an average proceed of 10000 per year and it would be given the same rank as project A.

Average Income on the Book Value of Investment

This is the ratio of the income to the book value of its assets. The value of assets as recorded in the operation's financial account books.

3.6.2. Discounted Project Appraisal Criteria

The undiscounted measures discussed so far share common Weakness. They fail to take into account adequately the timing of benefits. Thus, it is an accepted principle in economics that inter-temporal variations of costs and benefits influence their values and a time adjustment is necessary before aggregation. Therefore a time dimension should be included in our evaluation. That means we need to express costs and benefits in terms of value by discounting all items in the cash flows back to year 0. The need for such a procedure will be apparent if one considers the following simple argument. Suppose one is offered the choice between receiving birr 100 today and receiving the same amount in a year's time. It will be rational to prefer to receive the money today for several reasons.

One may expect inflation to reduce the real value of birr 100 in a year's time

If there were no inflationary effect, it would still be preferable to take the money today and invest it at some rate of interest, r , hence receiving a total of birr $100(1+r)$ at the end of the year.

Even if no investment opportunities are available, one might reason that birr 100 today would still be preferable on the grounds that there is a finite risk to collect the money next year.

Even where inflation, investment opportunities and risk are ignored, there is pure time preference, which would lead one to prefer the immediate offer.

For all these reasons we say there is a positive rate of discount, which leads us to place a lower present value on a given sum of money the further in the future one expects it to accrue. The accepted method for this adjustment amounts to bringing them to a common time denominator. This principle is called discounting.

Discounting is a technique or a process by which one can reduce future benefits and costs to their present worth or present value. This is the method used to revalue future cost and benefits are discounted by a factor that reflects the rate at which today's value of a monetary unit decreases with the passage of every time unit. Any costs and benefits of a project that are received in future periods are discounted, or deflated by some factor, r , to reflect their lower value to the individual (society) than currently available income. The factor used to discount future costs and benefits is called the discount rate and is usually expressed as a percentage.

Hence, discounting is very important for project analysis. The discount rate is usually determined by the central authorities.

Note that in order to clearly understand the principles of discounting it will be helpful to have a clear understanding of the principle of compounding. Compounding is the technique of calculating the future worth (F) of a present amount (P) at the end of some period T at a given interest rate. On the other hand finding the present worth of a future Stream of value is called discounting. Hence, if there is an initial amount p at present, then if this investment was borrowed from the bank at an interest rate of "r" birr then after one period it becomes:

Since the borrower must also repay the principal After two periods the amount becomes:

In general, the amount accumulated after t periods would be

Now given that future value accumulated after t periods as above, if we want to know the present value of this amount we would be taking about discounting. Hence the present value would be:

$$P = \frac{A}{(1+r)^t} = \frac{\text{amount.. accumulated at some future date}}{(1+r)^t}$$

$$A(1+r)^{-t}$$

The term $(1+r)^t$ in the denominator or $(1+r)^{-t}$ in the numerator is referred to as **discounting factor**, a factor used to estimate the present value of a stream of future values. The 'r' in this term is referred to as **discounting rate**. So the discount factor tells us how much Br 1 at a future date is worth today at a certain discount rate.

A) The Net Present Value (NPV)

The most widely used and straightforward discounted measure of project worth is the net present value (NPV). This value is obtained when a stream of cost and benefits accruing over a period of time are discounted to the present is called the present value of the stream. The NPV is defined as the difference between the present value of benefits and the present value of costs. The NPV can be obtained by discounting separately for each year, the difference of all cash outflows and inflows accruing throughout the life of project at a fixed, pre-determined interstate rate.

The net present value formula is:

Where: b_t are the project benefits in period t .

C is the project cost in period t .

r is the appropriate financial or economic discount rate

n is the number of years for which the project will operate

The discounted rate should be equal either to the actual rate of interest on long term loans in the capital market or to the interest rate paid by the borrower. However, since capital market does not usually exist in developing countries, the discount rate should reflect the opportunity cost of capital i.e. the possible return of capital invested elsewhere. This is the minimum rate of return below which the planner considers that it does not pay for him to invest.

The discounting period should normally be equal to the life of the project. This period is the economic life of the project and varies from project to project.

Having set the discount rate, an investment project is deemed acceptable if the discounted net benefits (benefits minus costs) are positive. The economic criterion of project appraisal is to accept all projects that show positive NPV at the predetermined discount rate and reject all projects that show Negative NPV. Thus, the decision is to accept if $NPV > 0$. We can also discount benefits and costs separately, and if $B > C$ then $NPV > 0$. **Example 1:**

Table 1: Consider the following Discounted Cash Flows for a Fertilizer Project in million Birr

	1	2	3	4	5	6	7
Year	Costs	Benefits	Net benefits (Cash flow) = (2-1)	Discounted factors (10 %) = _____	Discounted Net benefits (Net cash flow) (10%)= (3*4)	Discounted factor (20%) = _____	Discounted Net benefits (Net cash flow) (20%)=(3*6)
0	20	0	-20	$1/(1+0.10)^0=1.00$	-20.0	$1/(1+0.20)^0=1.00$	-20.0
1	10	14	4	$1/(1+0.10)^1=0.909$	3.64	$1/(1+0.20)^1=0.833$	3.33
2	10	14	4	$1/(1+0.10)^2=0.826$	3.30	$1/(1+0.20)^2=0.694$	2.78
3	10	14	4	=0.751	3.00	=0.579	2.32
4	10	14	4	=0.683	2.73	=0.482	1.92
5	10	14	4	=0.621	2.48	=0.402	1.61
6	10	14	4	=0.564	2.26	=0.335	1.34
7	10	14	4	=0.513	2.05	=0.279	1.12
8	10	14	4	=0.467	1.87	=0.233	0.93
9	10	14	4	=0.424	1.70	=0.194	0.78
10	10	14	4	$1/(1+0.10)^{10}=0.386$	1.54	$1/(1+0.20)^{10}=0.162$	0.65
NPV					4.57		-3.21

Note: the values for discount factors for $r = 10\%$ and $r = 20\%$ can be obtained from any standard set of discount tables.

Since discounting the cash flow at 10 percent produces a positive NPV of 4.57 million Birr we conclude that the project should be undertaken. Suppose now that the cost of capital were to be raised to 20 percent, the project produces a negative NPV of 3.21 million Birr. In this event the project would have to be rejected. This shows that the NPV is critically dependent upon the level of the discounting rate, r .

It is also possible to discount costs and benefits separately (individually) and now the decision rule becomes that the discounted benefits should exceed the discounted costs, i.e. $B > C$ and $NPV = B - C > 0$.

Example 2: what would be the present value of 1000 Birr received five years in the future assuming a 9 percent discount rate?

We consider the discount factor for the 5th period under the 9 percent table. The discount factor is 0.6499. Then we multiply the amount due by the discount factor.

$$1000 * 0.6499 = 649.90 \text{ Birr}$$

Example 3: what would be present value of a stream of income of 5000 Birr received each year for nine years assuming a discount rate of say 10 percent?

We use the table that gives the annuity factors to be used to derive the present value of a stream of uniform values over a number of years. Thus the annuity factor for 9 years at 10 percent discount rate is 5.759.

Now the annual income to be received is multiplied by the annuity factor.

$$5000 * 5.759 = 28795 \text{ Birr}$$

Thus if the going rate of interest is 10 percent then we could afford to invest Birr 28795 in an enterprise that would yield us an annual return of Birr 5000 for each of the 9 years.

Prioritization/Selection/ from a Number of Projects

If there are alternative projects, how do you select from the available alternative projects? The NPV does not indicate the rate of return, in the sense that it does not directly indicate the magnitude of investment that generates the NPV.

If one of several project alternatives has to be chosen, the project with the **largest NPV** should be selected. But we should know how much investment would be required to generate these positive NPVs if there are two or more alternatives. The ratio of the NPV and the present value of investment (PVI) should be considered and we get the **net present value ratio (NPVR)** when comparing alternative projects.

—

Given alternative projects, the one with the **highest NPVR** should be chosen. When comparing alternative projects, care should be taken to use the same discounting period and rate of discount rate for all projects.

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 is greater than 0 (approve any project for which $NPV > 0$). 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. If there is resource constraint and the decision maker is forced to make choices, then one will have to choose the project with the highest NPV.

Decision Rule for Mutually Exclusive Projects

A mutually exclusive project is defined as a project of that can only be implemented at the expense of an alternative project as they are in some sense substitutes for each other. The decision rule for such projects is to accept the project with the highest NPV.

Example: Consider two hypothetical dams, which may be proposed for one prime site in a locality in a fast flowing river (in million birr). All the benefits and costs are discounted figures.

Alternative Projects	Years									
Dam A	1	2	3	4	5	6	7	8	9	10
Cost	5									
Benefits	0	0.5	1	1	1	1	1	1	1	1
Net benefits	-5	0.5	1	1	1	1	1	1	1	1
<u>NPV=3.50</u>										
Dam B	1	2	3	4	5	6	7	8	9	10
Cost	500									
Benefits	0	50	50	50	50	100	100	100	100	100
Net benefits	-500	50	50	50	50	100	100	100	100	100
<u>NPV=200</u>										

Which one of the two dams do you choose? Why?

If the two projects were independent and there was no budget constraint, the country could therefore construct both, and then it should do so as they both have positive NPVS. However,

since the projects are mutually exclusive the dam with the higher NPV should be selected, that is dam B.

Practical application for the present value method

The practical application of the present value criterion as a means of evaluating investment proposals for project planning implies the following assumptions.

Annual out lays and receipts from each investment are known for the entire life of the project.

That the project life span is known.

That there is a rate of discount, which can be applied to every proposal and for every time period.

However, the information required (the assumptions) made above is not always available for every project. That means the NPV criterion may be applicable only to a limited number of project proposals on which relevant data as indicated above could be computed or imputed. In some projects investment outlays are difficult to estimate.

Advantages of NPV method

Conceptually sound, the net present value selection criteria have considerable merits:

It is simple to use and does not rely on complex conventions about where costs and benefits are netted out.

It is the only selection criteria that can correctly be used to choose between mutually exclusive projects, without further manipulation

It takes in to account the time value of money

The net present value of various projects, measured as they are in today's birr, can be added.

For example, the net present value of a package consisting of two projects, A and B, will simply be the sum of the net present value of this project individually:

$$NPV (A+ B) = NPV (A) + NPV (B)$$

Limitations of the Net present value method

Some projects could be deferred from implementation although they show positive NPV, due to scarcity of funds. Thus passing the NPV test may be a necessary condition but not a sufficient condition.

If some projects were mutually exclusive then the implementation of one would naturally exclude the execution of the other. This will lead both the central authorities and the sponsoring agency in to a dilemma which project should be implemented. If funds are unlimited then both could be implemented, but this is not always the case.

The selection of an appropriate discount rate is another limitation

It does not show the exact profitability rate of the project.

For some projects the required information/data/ for computing the NPV may not be available, or cheaply accessible.

It assumes the same class (type and degree) of risk for both the costs and revenue sides of the cash flow of a project.

When it is used to select among projects, it implicitly assumes that all projects share common type and degree of risk.

The Internal Rate of Return of a Project (IRR)

This is a second measure of the long- term profitability of an investment. It is also called the **Yield of an Investment Method** or simply the **Yield Method**. The IRR of a project is probably the most commonly used assessment criterion in project appraisal. This is because the concept of an IRR is in some way comparable to the **long-term profit rate of a project** and is therefore easily conceivable for non-economists. In fact, IRR is defined as the “**earning rate of a project**”.

Unlike NPV, it does not rely on the selection of a predetermined discount rate. The method utilizes present value concept but seek to avoid the arbitrary choice of a discount rate. Hence an attempt is made to find that discount rate, which just makes the net present value of the cash flow equal to zero. It is possible to think a level of interest rate that could result in NPV of zero. This rate of interest is termed as the Internal Rate of Return (IRR). The IRR is the rate of discount, which makes the present value of the benefits exactly equal to the present value of the costs. Thus, it is the discount rate at which it is worthwhile doing the project. This is the interest rate that a project could pay for the resources used if the project is to recover its investment and operating cost and still can be at the break-even point. Denoting it by R , it is the solution to the definition of the NPV when the latter is set to zero,

For financial analysis it would be the maximum interest rate that the project could afford to pay on its funds and still recover all its investment and operating costs. While calculating the NPV we have used a pre-determined discount rate and a table. But the calculation of the IRR amounts to searching for the discount rate that gives a zero NPV. This is achieved through trial and error using the standard discounting table. This rate, if it is determined, will represent the exact profitability of the project.

If the IRR is computed for financial appraisal in which all values are measured in market prices, it is called the financial internal rate of return (FIRR). When economic prices are used instead, it will be termed as economic internal rate of return (EIRR).

Calculation of IRR

The calculation procedure begins with the preparation of a cash flow table. Estimated discount rate is then used to discount the net cash flow to the present value. If the NPV is positive a higher rate is applied. If it is negative at this higher rate the IRR must be between those two rates.

By **iterations** it is possible to determine the discount rate that just makes the project's NPV equal to zero. This rate is the IRR of the project. Fortunately spreadsheet programs such as Lotus 123 and excel can calculate the IRR of project's net benefit flow once starting value for the iteration is provided.

Example: To illustrate the calculation of internal rate of return, consider the cash flows of a road project (million Birr):

Year	0	1	2	3	4
Cash flow	-100, 000	30,000	30,000	40,000	45,000

The internal rate of return is the value of r , which satisfies the following equation

$$0 = \frac{-100,000}{(1+r)^0} + \frac{30,000}{(1+r)^1} + \frac{30,000}{(1+r)^2} + \frac{40,000}{(1+r)^3} + \frac{45,000}{(1+r)^4}$$

$$100,000 = \frac{30,000}{(1+r)^1} + \frac{30,000}{(1+r)^2} + \frac{40,000}{(1+r)^3} + \frac{45,000}{(1+r)^4}$$

We try different values of r till we find that the right-hand side of the above equation is equal to 100,000. Let us, to begin with, $r = 12$ percent.

$$\frac{30,000}{(1.12)} + \frac{30,000}{(1.12)} + \frac{40,000}{(1.12)} + \frac{45,000}{(1.12)} = 107,773$$

Since this is more than 100,000, we have to try a higher value of r . (In general, a higher r lowers the right-hand side value and a lower r increases the right-hand side value.) Let $r = 14\%$

$$\frac{30,000}{(1.14)} + \frac{30,000}{(1.14)} + \frac{40,000}{(1.14)} + \frac{45,000}{(1.14)} = 103,046$$

Since this value is higher than the target value of 100,000, we have to try a still higher value of r . Let $r = 15\%$

$$\frac{30,000}{(1.15)^1} + \frac{30,000}{(1.15)^2} + \frac{40,000}{(1.15)^3} + \frac{45,000}{(1.15)^4} = 100,802$$

This value is a shade higher than our target value, 100,000. So we increase the value of r from 15% to 16%. The right-hand side becomes:

$$\frac{30,000}{(1.16)^1} + \frac{30,000}{(1.16)^2} + \frac{40,000}{(1.16)^3} + \frac{45,000}{(1.16)^4} = 98,641$$

Since this value is now less than 100,000, we conclude the at the value of r lies between 15 percent and 16 percent

At 15 percent, the present value is 100,802

At ___ Percent, the present value is 100,000

At 16 percent, the present value is 98,641

1 percent difference (between 15 percent and 16 percent) corresponds to difference of 2,161= (100802-98641). The difference between 100,802 (present value at 15 percent) and 100,000 (target present value) is 802= (100,802-100,000). This difference will correspond to a percentage

difference of: $\frac{802}{2161} \times 100 = 0.37 \text{ percent}$

Adding this number to 15 percent, we get the interpolated value as **15.37 percent**.

Note: If the positive and negative NPVs are close to zero, a precise and less time consuming way to arrive at the IRR is using the following interpolation formula.

Where: I_1 = the lower discount rate

I_2 = the upper discount rate

Pv = NPV (positive) at the lower discount rate of I_1

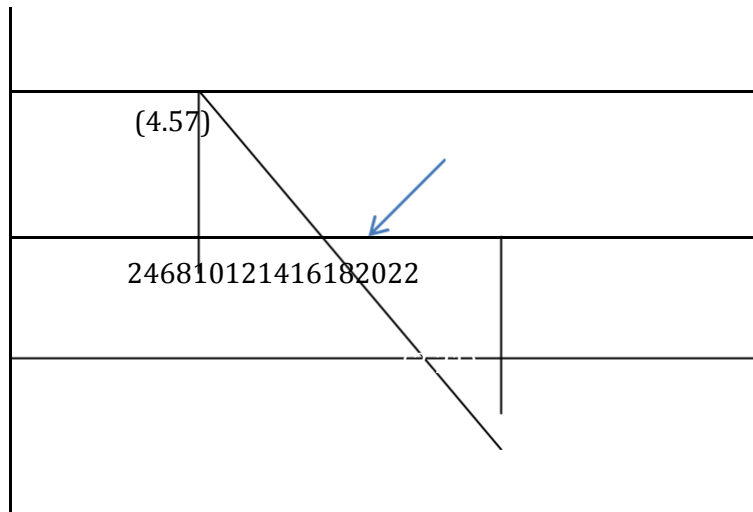
Nv = NPV (negative) at the higher discount rate of I_2

Note: I_1 and I_2 should not differ by more than one or two percent.

$$IRR = 15 + \frac{802 (16 - 15)}{802 + 1359} = 15 + \frac{802}{2161} = \underline{\underline{15.37\%}}$$

Another approximate solution to IRR is to plot the NPVs corresponding to several discount rates to give what we call the NPV curve. The present values are plotted on the Y - axis and the discount rates on the x-axis. A curve is then drawn to connect the various points on the graph. The point at which the curve cuts the x-axis represents the rate at which the present value of the investment is equal to zero.

Example: By experimenting with discount rates between 10 and 20 in our hypothetical project, the IRR for the project is fractionally above 15%. The simplest way of getting this is by plotting the NPV (y-axis) against different level of discount rates (x-axis); three points are usually sufficient. The point at which this curve (called the NPV curve) crosses the x - axis provides the IRR value.



Decision rule for independent projects in IRR

According to the IRR Version of economic criterion we implement all projects that show an IRR greater than the predetermined discount rate (opportunity cost of capital), i.e. accept all independent projects having an IRR greater than the opportunity cost of capital (cut off rate). The reference discount rate, which is also called the target rate, is predetermined by the central bank. Once the IRR is identified, the decision rule is accept the project if the IRR is greater than the cost of capital, say r . Note also that:

When $NPV > 0$ then $IRR > r$

$NPV = 0$ then $IRR = r$

$NPV < 0$ then $IRR < r$

All projects with an internal rate of return greater than some target rate of return r , should be accepted. The target rate is usually the same rate used as the financial or social discount rate employed in the computation of the projects net present value.

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.

Comparison of the NPV and IRR

From the foregoing discussions it is clear that both the NPV and the IRR methods can and do rank investment projects in more rational manner than the other methods previously considered. Thus it is advisable to calculate these measures so that easily understandable information is

provided to the authorities. In general it can be said that the NPV method is simpler, easier, and more direct and more reliable. In some situations both the NPV and the IRR criteria give the same accept- reject decision. However, there are two probable reasons why all acceptable projects cannot be under taken. One is that investible funds (capital funds) may be limited. The second real problem is that the discount rate has not been set correctly.

When the capital requirements of all acceptable projects exceed the available funds, the central authorities should raise the discount rate up to that level where the projects passing the test are just enough to exhaust the available funds. But if too few projects are acceptable then the discount rate should be reduced. Hence as long as capital funds are "unlimited" it is argued that NPV should be the relevant criterion. But the function of the discount rate is to ration capital in such a manner, as eventually to pass just sufficient projects as well use up available investment resources. Hence the argument is not whether NPV or IRR should be preferred as a criterion, but whether planners have set the discount rate correctly.

The IRR and NPV might suggest different projects for similar level of discount rate.

Example: cash flows for a hypothetical project.

Year	Cash flows		
	Project A	Project B	Project C
0	-20	-40	-20
1	4	8	14
2	4	8	14
3	4	8	-
4	4	8	-
5	4	8	-
6	4	8	-
7	4	8	-
8	4	8	-
9	4	8	-
10	4	8	-
NPV at 10%	4.57	6.08	4.36
IRR	15.1%	13.7%	25.8%

As it can be observed from the table above the three projects by their NPVs (at 10% discount rate) results in project B heading the list, while ranking them according to their IRRs would lead the planners to prefer C. 25.8% is better because a project with 25.8% economic rate of return is likely to a better investment than with a project with 15% economic rate of return. That is, it contributes more to the national income relative to the resources used.

There are two possible reasons for not to undertake all the above projects. The first is there may not be enough capital funds the second problem is related to the fact that two or more projects could be mutually exclusive. If there are enough budget resources, both NPV and IRR give the

same accept-reject decision. However, ranking the projects using the two methods will lead to the choice of different projects: project B on NPV basis and project C on the IRR basis.

Note however, that 10% is not an appropriate discount rate because it passes all the three projects more than can be accommodate by the given capital. Hence we have to set the discount rate correctly up to the level where the projects passing the test are just enough to exhaust the available funds as shown below.

	Projects		
	A	B	C
NPV 15%	0.08	-1.84	2.76
NPV 10%	4.57	6.08	4.36
NPV 20%	-3.23	-7.75	1.39

In general if funds are unlimited and the projects are not mutually exclusive, the NPV is the relevant criteria. All projects with positive NPV should go ahead. But, the function of the discount rate is to ration capital in such a way that eventually to pass just sufficient projects that will exhaustively use up available inevitable funds. Thus, the important question is not whether NPV or IRR is to be preferred, but whether planners have set the discount rate correctly or not.

Example: Assume that the total investment budget is birr 80 million. The projects above are all projects in the economy. In this case planners can implement all projects. If the budget is birr 40 million however can implement all projects. If the budget is birr 40 million however, the planner has to make the choice of carrying B alone or A and C together. Since the combine NPV of A and C is larger B is the least choice at 10% discount rate.

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.

It is a measure that could be understood 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.

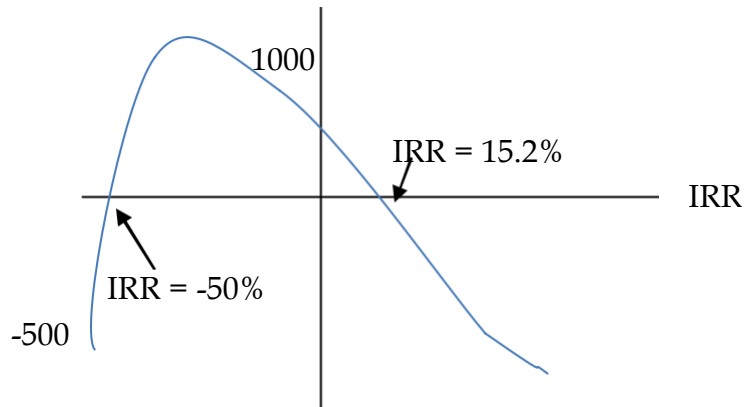
A project must have at least one negative cash flow period before it is possible to calculate its internal rate of return. This is because the NPV will always be positive to matter how high the discount rate used to discount it, unless the project has at least one negative cash flow period.

Certain cash flows can generate $NPV = 0$ at two different discount rates. If a project has more than one IRR, then neither can be reliably used and another decision rule such as the NPV must be used rather than the IRR.

The following cash flows generates $NPV = 0$ at both (-50% & 15.2%)

C_0	C_1	C_2	C_3	C_4	C_5	C_6
-1000	+ 800	+ 150	+ 150	+ 150	+ 150	- 150

Multiple IRRs



It is relatively complex to compute the IRR-the iterative nature of its computation. But prior to the advent of business calculators and computers software programs like Lotus and Excel estimation of the IRR was a tedious process involving interpolations. However this is not anymore a problem. In fact, we have dedicated project study software's, like COMFARE, by UNIDO.

C) The Net Benefit Investment Ratio (NBIR)

It is the ratio of the present value of the projects benefits, net of operating costs, to the present value of its investment costs. This is given by,

$$\frac{\sum_{t=1}^n \frac{B_t - OC_t}{(1+r)^t}}{\sum_{t=1}^n \frac{IC_t}{(1+r)^t}}$$

Where OC_t is operating costs in period t ; IC_t is investment costs in period t ; r the appropriate discount rate, and B the benefits in period t . The NBIR shows the value of the projects discounted benefits, net of operating costs, per unit of investment.

The decision rule using NBIR is to accept the project if its value is greater than 1. This criterion is especially important for ranking investments that shows the benefit per unit of investment. When we have a single period budget constraint projects with the highest NBIR should be selected up to the point where the budget exhausted.

The main advantage of the NBIR is its capacity to determine the group of priority projects if there is a single period budget and investment constraint. Its limitation is however, that it is not suitable for choosing between mutually exclusive projects, for the same reason that the IRR cannot be used for this purpose. That is a project with highest NBIR could have the lowest absolute net present value. The other disadvantage of NBIR is that the convention used for dividing costs in to operating and investment may vary from institution to institution and may render problems of comparability.

D) The Domestic Resource Cost Ratio (DRCR)

This ratio is often used in trade oriented projects or trade policy. In its simple form the DRCR (sometimes referred as Bruno ratio (Bruno, 1967)) is a discounted measure of project worth calculated for a single typical year of project operation.

DRC is a measure of the economic efficiency of production of a commodity or in other words the national comparative advantage in its production. It is defined as the value of domestic resources (primary, non-traded factors of production) in domestic currency units required to earn or save a unit of foreign exchange that is the cost per unit of foreign exchange saved for imported competing goods and the cost per unit of foreign exchange earned for exports. The DRC coefficient is a cost benefit ratio and it is essentially a **measure of the efficiency** of domestic production relative to the international market.

If the DRC for a commodity is greater than the appropriate accounting price of foreign exchange (OER or SER) a comparative cost advantage exists in producing the commodity in question and vice versa. From this:

DRC < 1 implies that the productivity is economically profitable because its production yields more than enough international value added to compensate for the cost of domestic factors used.

DRC = 1 implies a **break-even situation**, where it is only just economically worthwhile to produce the commodity.

DRC > 1 indicates that the cost of domestic resources needed to generate one unit of foreign exchange exceeds the value of the foreign exchange. This means the country is internally not competitive in the production of the commodity or the country is better off to import rather than to produce the commodity.

Undiscounted measures, as we noted, are excessively crude and most invariably inaccurate. Thus, the discounted version is the most appropriate one. It is given as,

Where are the benefits of the project obtained in local currency

Are the costs of the project incurred in local currency

Are the benefits of the project obtained in foreign exchange

Are the costs of the project incurred in foreign exchange.

The decision rule for DRCR

When undertaking a financial appraisal of a project should be accepted if it's DRCR is less than or equal to the official exchange rate, OER. This means a project should proceed if it uses less domestic resources, measured in local prices, to earn 1 unit of foreign exchange than is the norm for the whole economy (the norm here being represented by the official exchange rate.) The modified DRCE (Modified because it is discounted which traditionally was not the case) is sometimes referred as the internal exchange rate approach to emphasize the fact that the computation of DRCR is independent of any predetermined exchange rate as that of IRR, which do not immediately, require a discount rate. It produces own internal exchange rate, which is internal to the project.

Example: Estimation of the domestic resource costs ratio, special economic zone project - foreign exchange component (denominator) million us dollar.

	Year							
	1	2	3	4	5	6	7	30
Local costs								
Investment	40	60	30	10				
Production	0	50	75	90	100	100	100	100
Total local costs	40	110	105	100	100	100	100	100
Local Sales	0	0	20	25	25	25	25	25
Net local costs	40	110	85	75	75	75	75	75
PV of net local costs	Birr 711.6							

	Year							
	1	2	3	4	5	6	7	30
Foreign exchange earnings								
Exported output	0	3	20	30	30	30	30	30
Foreign exchange costs				2				
Imported investment goods	20	40	12	8	10	10	10	10
Other imported items	0	5	7					
Net foreign exchange earnings (export-imports)	-20	-42	1	20	20	20	20	20
PV of net foreign exchange earnings	Us \$ 86.7							

Therefore, _____

The **main advantage** of this approach is that non-economists can readily understand its decision rule. More substantially in economics with serious balance of payment problem the DRCR clearly show the potential of a project to earn foreign exchange. However, its **disadvantages** includes, like that of IRR it cannot be used to rank projects. It cannot also be used to choose between mutually exclusive projects if both use less domestic resource to earn a unit of foreign exchange. This is because it does not show which of the two, or more, mutually exclusive projects will generate the greatest net benefits for the country.

E) The Benefit Cost Ratio (BCR)

The benefit cost ratio is the earliest discounted project assessment criterion to be employed. The BCR is defined as the ratio of the sum of the project's discounted benefits to the sum of its discounted investment and operating costs. This is given as,

$$\text{BCR} = \frac{\sum \frac{B_t}{(1+r)^t}}{\sum \frac{C_t}{(1+r)^t}}$$

The Decision rule for BCR

A project should be accepted if its **BCR is greater than or equal to 1** (i.e. if its discounted benefits exceed its discounted costs). But if BCR is less than 1, the project should be rejected. The BCR will be less than, equal to, and greater than one when the discount rate used is greater, equal to, and less than the IRR. One possible advantage of the BCR, on top of being easy to show to non-economists is that it is easy to show the impact of a percentage change in cost or benefits on the projects viability. Its major disadvantage is the need to specify and adhere to conventions regarding the designation of expenditures as costs and benefits.

Example: cost of transporting finished goods (say Br. 25) may be figured as cost in one project (other costs are Br. 25 + transport cost Br. 25 = Br. 50; if sales price is Br. 100 the BCR will be but price may be given net of transport cost (Br.100- Br.25=Br.75; compare to cost Br. 25 will give a BCR of 3) in the other and the two projects, thus, are incomparable. Clear convention on such issues will be necessary for comparison purposes.

3.7. Sensitivity Analysis: Is Discounting Unfair to Future Generations?

Some people believe that discounting future values is wrong and even immoral. Yet the developed countries economic system is predicated on the borrowing and lending of money. A more modern argument against discounting (and implicitly against charging interest) is that it is unfair to future generations. The discount rate is determined by the current generation without any input from future generations. Since the discount rate can be interpreted as an exchange rate for the value of goods tomorrow versus the value of goods today, then there is a tradeoff between how we value the well-being of current and future generations that is implicit in the interest rate.

Interest rates are like a price set in a market where one group of traders (the current generation) gets to set the price and everyone else (all future generations) has to live with that price. Some people suggest that, while it is necessary to discount, lower interest rates should be used for investments with particularly desirable “social” benefits. I am not convinced by these arguments. First, it is not clear that low interest rates are always better for future generations. Not discounting at all is the same thing as using an interest rate of zero. When someone says they don’t believe in discounting, or that they believe that discounting is unfair and should not be done, they are essentially suggesting that interest rates should be zero.

However, if interest rates were zero, there would be no incentive for anyone to save money. If no one saved any money, there would be no investment, and that would not be good for future generations at all. Thus, a discount rate of zero would not necessarily be good for future generations. So, would positive, but lower interest rates be good for future generations? Low interest rates do benefit future generations in some ways. For example, with low interest rates more investment projects that benefit future generations would be able to pay the interest on the capital used in the project and still show a profit.

Using a lower interest rate for projects which are particularly beneficial to future generations is a way of biasing the analysis in favor of those projects. However, with low interest rates fewer people would be willing to invest their money at all, so there will be less money available for investments in general. In order to raise the capital to fund all the projects that would be profitable at lower-than-market interest rates, the government would have to subsidize these investments. This would represent a transfer from the current generation to future generations. A good argument can be made that current generations are better off than earlier generations and that future generations are likely to be even better off than we are.

In that case, why should the current generation subsidize future generations? Furthermore, if these subsidies are funded by deficit spending, as is usually the case for modern governments, future generations will end up paying for the subsidies anyway. It is best to think of an interest rate as an equilibrium price where the supply of investment money is just high enough to satisfy the need for funds from projects that can meet the given interest rate.

One reason suggested for using lower-than-market interest rates for some projects is that there are benefits associated with those projects that are not accounted for in the cost-benefit analysis. This may be true; however, we should not arbitrarily bias the financial analyses of such projects for this reason. A better approach is to use financial analysis as only one of the criteria for evaluating projects. Benefits that are difficult to quantify in a financial analysis should be addressed by the other criteria used to evaluate projects. It is probably true that an equilibrium interest rate that is lower will benefit future generations more than an equilibrium rate that is higher. But, too low an interest rate may not be fair to current generations.

Chapter- Two: Review Questions

Part I: Read Each Expression and Choose the Most Appropriate Answer.

Which one of the following is not the immediate objective of Financial Analysis?

- To assess the earning capacity and profitability of a project
- To assess the operational efficiency and marginal effectiveness
- To make inter-project comparisons
- To investigate the contribution of a project for national income
- To help in decision making and control of a project

The initial fixed investments constitute the major resources required for constructing and equipping an investment project which include these costs items **except**?

- A. The cost of land and site development
- D. Miscellaneous fixed asset costs
- B. The cost of buildings and civil works
- E. None
- Plant and machinery costs

Another component of the initial investment cost is the pre-production expenditures which includes the following investment cost items **except**?

- Patents, licenses, lump sum payments for technology, engineering fees, copy rights
- Preparatory studies, specific functional studies, consultant fees for preparing studies
- Expenses related to furniture, office machines, tools, equipments, vehicles
- Registration expenses, legal fees and costs of advertisements
- Rents, taxes, and rates, Trial runs, start-ups and commissioning expenditures

Once the project idea has been accepted and the project is being implemented the cost of production may be worked out which include cost items **except**?

- A. Material, utilities and labor costs
- D. Contingency allowances
- B. Plant and equipment replacement costs
- E. Taxes & Debt service
- C. Factory overhead costs

To meet the cost of project which of the following means of finance are available and should be principally exploited?

- A. Share capital
- C. Deferred credit
- E. All
- B. Term loans
- D. Incentive sources

Part II: Workout Questions

1. Consider the following hypothetical cash flows for sugar production projects in million Birr.

Investment (Project)	Initial cost	Net cash proceeds per year		Total Proceeds	Payback Period	Proceeds per Unit of Outlay
		Year I	Year II			
A	9,000	5,500	6,000	11,500		
B	10,000	6,000	6,500	12,500		
C	8,500	6,000	5,000	11,000		
D	9,500	6,500	5,500	12,000		

Given the above information, estimate the payback period of each project and determine which project is superior to other projects as per the decision rule.

Given the above information, estimate proceeds per unit of outlay of each project and determine which project is superior to other projects as per the decision rule.

Consider the following discounted cash flows for a fertilizer project in million Birr. The discounted rate equal either to the actual rate of interest on long term loans in the capital market or to the interest rate paid by the borrower which is equal to 11%.

Year	Costs	Benefits	Net benefits	Discounted factors	Discounted Net benefits
0	20	0			
1	10	15			
2	10	15			
3	10	15			
4	10	15			
5	10	15			
6	10	15			
					NPV=

A. Given the above information, estimate net present value (NPV) of the project and determine whether it is financially feasible or not as per the decision rule.

Given the above information, estimate the internal rate of return (IRR) of the project and determine whether it is financially feasible or not as per the decision rule.

CHAPTER FOUR

ECONOMIC ANALYSIS OF PROJECTS

Introduction

Dear learner! In this chapter, we would like to introduce you with the economic analysis and its appraisal criteria's in the project work. The main objective of conducting a project economic analysis is to help not only assess the sustainability of investment projects but also to inform the design and select projects that can contribute to a sustainable improvement in the welfare of project beneficiaries, and the country as a whole. Economic analysis is a means to help bring about a better allocation of resources that can lead to enhanced incomes for investment or consumption purposes. Therefore, it is best undertaken at the early stages of the project cycle to enable decision makers to make an informed decision on whether to undertake a particular investment given various alternatives and their corresponding costs.

Learning Objectives

Dear distance learner! After completing this chapter, you will be able to:

- Familiarize with the concept Economic Analysis
- Realize identification Costs and Benefits of Economic Analysis
- Know the method of determining Economic Values
- Understand the principles of Social Cost Benefit Analysis and Cost Effectiveness

Social Cost Benefit Analysis (SCBA), also known as economic analysis, is a methodology developed for evaluating investment projects from the point of view of the society (or economy) as a whole. In the economic analysis of projects, we are interested in the total return or productivity or profitability to the whole society or economy of all the resources committed to the project. Project economic analysis aims to ensure that scarce resources are allocated efficiently, and investment brings benefits to a country and raises the welfare of its citizens.

All resource inputs used by a project have an opportunity cost because, without the project, they could create value elsewhere in the economy. An economically viable project requires that, first, it represents the least-cost or most efficient option to achieve the intended project outcomes; second, it generates an economic surplus above its opportunity cost; and third, it will have sufficient funds and the necessary institutional structure for successful operation and maintenance.

In the context of planned economies, SCBA aids in evaluating individual projects within the planning framework which spells out national economic objectives and broad allocation of resources to various sectors. In other words, SCBA is concerned with tactical decision making within the framework of broad strategic choices defined by planning at the macro level. The perspectives and parameters provided by the macro level plans serve as the basis of SCBA which is a tool for analyzing and appraising individual projects.

4.1. Major Questions that Economic Analysis Should Answer

A large part of project analysis serves to establish a project's technical and institutional feasibility, its fit with the government's strategy for the country and the sector, and the appropriateness of the economic context for the project. Economic analysis takes for granted that the project is technically sound and that its institutional arrangements will be effective during implementation. It is, therefore, only one part of the overall analysis of the project, but a very important part, as its main objective is to ascertain that the value of project benefits will exceed project costs. Good economic analysis should leave no doubts about the project's contribution to the country's welfare. This section provides a general overview of the questions that good economic analysis should answer and can serve as a checklist and a map for finding tools that could help answer those questions.

1) What Is the Objective of the Project?

The first step in the economic analysis of a project is to define clearly its objective(s). A clear definition is essential for reducing the number of alternatives to consider and for selecting the tools of analysis and the performance indicators. If the project tries to achieve a narrow objective, such as improving the delivery of vaccines to a target population, then the analyst will only look at alternative ways of delivering vaccinations to a target population and will judge the success of the project terms of the vaccination coverage obtained. If the project tries to achieve a broader objective, such as improving health status, then analysts will look not only at alternative ways of delivering vaccinations, but at alternative ways of reducing morbidity and prolonging the lives of the target population.

The success of the project then will be judged in terms of its impact on health status. The appropriate tool of analysis also depends on the breadth of the objective. For example, if the objective is to reduce the cost of vaccination, cost-benefit ratios might be adequate ways to compare and select among interventions. If the objective is to improve health status, then the interventions need to be compared in terms of their impact on health status. If the objective is even broader say, to increase a country's welfare; then the comparisons need to be done in terms of a common unit of measurement, usually a monetary measure.

2) What Will Happen if the Project Proceeds or Not?

One of the most fundamental questions concerns a counterfactual: What would the world look like without the project? What would it look like with the project? What will be the impact of the project on various groups in society? In particular, what will be the impact of the project on the provision of goods and services in the private sector? Will the project add to the provision of goods and services, or will it substitute for or displace goods and services that would have been provided anyway? These differences between the situation with and without the project are the basis for assessing the incremental costs and benefits of the project. Both the financial and

economic analysis of the project are predicated on the incremental net gains of the project, not on the before and after gains.

3) Is the Project the Best Alternative?

Another important question concerns the examination of alternatives. Are there any plausible or mutually exclusive alternatives to the project? Alternatives could involve, for example, different technical specifications, policy or institutional reforms, location, beneficiaries, financial arrangements, or differences in the scale or timing of the project. How would the costs and benefits of alternatives compare with those of the project? Comparison of alternatives helps planners choose the best way to accomplish their objectives.

4) Does the Project Have Separable Components?

Is the project one integrated package, or does it have separable components that could be undertaken and justified by themselves? If the project contains separable components, then each and every separable component must be justified as if it were an independent project. Omitting a component that cannot be justified always increases the project's net benefits. Separable, unsatisfactory components should always be deleted from the project.

5) Winners and Losers: Who Enjoys the Music and Who Pays the Piper?

A good project contributes to the country's economic output; hence, it has the potential to make everyone better-off. Nevertheless, usually not everyone benefits from a project, and some may lose. Moreover, groups that benefit from a project are not necessarily those who incur the costs of the project. Identifying those who will gain, those who will pay, and those who will lose gives the analyst insight into the incentives that various stakeholders have to implement the project as designed, and to support it or oppose it. Identifying the benefits accruing to and the costs borne by the poor or very poor is especially important.

6) What Is the Project's Fiscal Impact?

Given the importance of fiscal policy for overall macroeconomic stability, the fiscal impact of the project should always be analyzed. How and to what extent will the costs of the project be recovered from its beneficiaries? What changes in public expenditures and revenues will be attributable to the project? What will be the net effect for the central government and for local governments? Will the cost recovery arrangements affect the quantities demanded of the services provided by the project? Are these effects being properly taken into account in designing the project? What will be the effect of cost recovery on the distribution of benefits? Will the cost recovery arrangements contribute to the efficient use of the output from the project and of resources? Is the non-recovered portion factored into the analysis of fiscal impact?

7) Is the Project Financially Sustainable?

The financing of a project is often critical for its sustainability. Even projects with high benefit suffer go lean periods when external funds must sustain them. The cash flow profile is often as important as the overall benefits. For these reasons, knowing how the project will be financed, and who will provide the funds and on what terms, is important. Is adequate financing available for the project? How will the financing arrangements affect the distribution of the project's benefits and costs? Is concessional foreign financing available only for the project and not otherwise?

8) What Is the Project's Environmental Impact?

An important difference between society's point of view and the private point of view concerns costs or benefits attributable to the project that are not reflected in its cash flows. When these costs and benefits can be measured in monetary terms, they should be integrated into the economic analysis. In particular, the effects of the project on the environment, both negative (costs) and positive (benefits), should be taken into account and, if possible, quantified and valued in monetary terms. The impact of these external costs and benefits on specific groups within society especially the poor should be borne in mind.

9) Techniques for Assessment: Is the Project Worthwhile?

After taking into account all the costs and benefits of the project, the analyst must decide whether the project is worth undertaking. Costs and benefits should be quantified whenever reasonable estimates can be made, but given the present state of the art, quantifying all the benefits and costs is not always possible. Various proxies or intermediate output may have to suffice. The net present value is the appropriate yardstick for judging the acceptability of projects whose benefits are measured in monetary terms. To be acceptable on economic grounds, a project must meet two conditions:

The expected net present value of the project must not be negative.

The expected net present value of the project must be higher than or equal to the expected net present value of mutually acceptable project alternatives.

For other projects, physical indicators of achievement in relation to costs, or cost-effectiveness, are appropriate. In some other cases, a qualitative account of the expected net development impact might have to suffice. In all cases, however, the economic analysis should give a persuasive rationale for why the benefits of the project are expected to outweigh its costs, that is, economic analysis should give the reasons for expecting the net development impact of the project to be positive. When analysts carry out quantitative analysis, they should apply economic prices, not market prices.

10) Is This a Risky Project?

Economic analysis of projects is necessarily based on uncertain future events and involves implicit or explicit probability judgments. The basic elements in the costs and benefits streams are seldom represented by a single value. More often they are represented by a range of values with different likelihood of occurring. Therefore, analysts should take into consideration the range of possible variations in the values of the basic elements and reflect clearly the extent of the uncertainties attached to the outcomes. At the very least, economic and risk analysis should identify the factors that could create the greatest risks for the project. To the extent possible, the analysis should also identify and reflect the likelihood that these variables may deviate significantly from their expected value and show the major factors affecting these deviations. The analysts should be explicit about actions taken to reduce these risks.

4.2. Scope of Economic Analysis

The purpose of the economic analysis of projects is to bring about a better allocation of resources, leading to enhanced incomes for investment or consumption. For a directly productive project, where the output is sold in a relatively competitive environment, choices are made within the economy to ensure that projects selected for investment meet a minimum standard for resource generation and to weed out those projects that do not. For an indirectly productive project, where the output is not sold in a competitive environment, choices are made within the project between different means of achieving the same objectives. Economic analysis is used to choose the means using the least resources for a given output. All resource inputs and outputs have an opportunity cost through which the extent and value of project items are estimated. Projects should be chosen where the resources will be used most effectively.

Economic viability depends upon the sustainability of project effects. Projects are sustainable if their net benefits or positive effects endure as expected throughout the life of the project. Sustainability is enhanced if environmental effects are internalized, and if financial returns provide an adequate incentive for project related producers and consumers. Sustainable development is concerned also with distributional issues. When looking at the distribution of project effects and judging project social acceptability, it is important to determine who benefits and who pays the costs. An assessment of the capacity of the project to cope with an uncertain future is another measure. Sensitivity analysis is applied when testing projects for both productive and allocative efficiency. The scope of economic analysis seeks to address several issues in the economic analysis of Bank project loans (see Figure 1). Previous practice focused on forecasting demand, choosing least-cost options, and, where possible, calculating the economic internal rate of return.

The demand forecasts themselves depend upon project charges and affordability, which also affect financial incentives for different participants. At the same time, environmental effects can now be incorporated into the analysis, and policy dialogue requires a statement of the distribution of project effects. This broadening of the scope of economic analysis must be

tailored to the particular project and the issues it generates. In some cases, project preparation does not end with the decision to accept a project. In process projects, design and appraisal are continual and go along with project implementation. This allows for greater participation by project beneficiaries in the design and testing of different options. Economic analysis can be applied at the outset of such projects to test the underlying rationale. The principles of economic analysis can be applied at key decision points in the process. The procedure for undertaking economic analysis follows a sequence of interrelated steps:

Defining project objectives and economic rationale;

Forecasting effective demand for project outputs;

Choosing the most cost effective way of attaining the project objectives;

Determining whether economic benefits exceed economic costs;

Assessing whether the projects net benefits will be sustainable throughout the life of the project;

Testing for risks associated with the project;

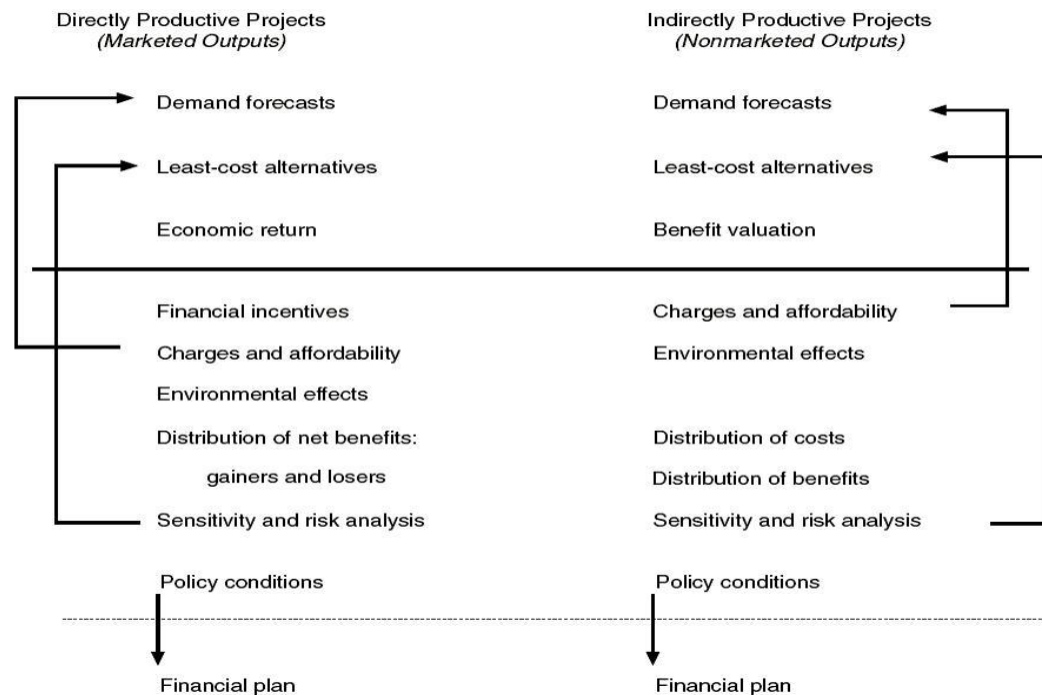
Identifying the distributional effects of the project, particularly on the poor; and

Enumerating the non quantifiable effects of the project that may influence project design

and the investment decision.

For indirectly productive projects, economic analysis would comprise all of the above steps, except determining whether economic benefits exceed costs.

Figure 1: Scope of Economic Analysis



Basically, the procedures followed and the criteria used (NPV, IRR, BCR) are the same in economic and financial analysis of projects. But the values, which the NPV, IRR and BCR

assume, are different in economic analysis and financial analysis. The main factors, which explain this difference, are:

The items considered as inputs and outputs of the project

The prices used in the valuation of inputs and output

The treatment of taxes, subsidies and other transfer payments



Dear learner! Would you please explain the concept and significance of economic analysis of a project?

4.2.1. Items Considered as Inputs and Outputs

Often, some real costs and benefits attributed to projects do not appear among its inputs and outputs when it is analyzed from the enterprises viewpoint and, therefore, they do not enter the calculations of financial NPV, IRR, and benefit cost ratio. The main reason for excluding certain cost and benefits is that they are considered “external” to the enterprise. But costs or benefits viewed as “external” to the enterprise are “internal” when they are considered from the economy’s angle; somebody pays for these “external” costs and somebody receives these “external” benefits, even if it is not the enterprise. Consequently, to the extent that they can be measured and valued they are included in the calculations of the economic NPV, IRR, and BCR.

4.2.1.1. Meaning, Sources and Implications of Market Failure

In a perfectly competitive market, the opportunity cost of an item would be its price, and this price would also be equal to the marginal value product of the item. If a non-traded item is bought and sold in a relatively competitive market, the market price is the measure of the willingness to pay and is generally the best estimate of an opportunity cost. In a perfectly competitive market, the opportunity cost of an item would be its price which in turn will equal the marginal value product of the item. Most agricultural projects are expected to meet a growing demand for food or fiber and are small relative to the total agricultural production of the nation. If that is the case, in general we can accept the market price directly as our estimate of the economic value of a non-traded item. Also, if we are valuing a domestically produced project input that is produced by a supply industry operating near full capacity, we can generally accept the market price of the input as its economic value.

In a neo-classical world, domestic price is presumed to reflect marginal utility of consumption on the one hand, and marginal production cost on the other. The legitimacy of such an assumption is conditional upon certain well-known conditions being satisfied; i.e. homogeneous goods (in quality), perfect knowledge of all economic agents, large number of competitors, absence of externalities, acceptance of the ruling pattern of income distribution, ability of consumers to be the best judges of their welfare and so on. That some, or all, of these conditions may not hold is widely recognized, particularly in the case of LDCs where income disparities are likely to be very wide, markets poorly articulated, and choice information at a premium. Nevertheless, it has usually been convenient to justify valuation decisions ‘as if’ such conditions did hold.

Economic analysis will state the cost and benefit to the society of the proposed project investment either in opportunity cost or in values determined by the willingness to pay. The costs or values will be determined in part by both the resource constraints and the policy constraints faced by the project. Basically, one major argument in favor of economic pricing (against financial analysis of projects) is that of market failure. What do we mean by market failure and why does the market fail? Divergence between market and economic price is simply what we mean by market failure. It occurs whenever the market fails to function effectively or when the government intervenes. The market fails when it can't value appropriately project costs and benefits! Market failure manifests itself in different forms:

A. Failures of Competition: The existence of various types of monopoly power in the economy, for example the existence of localized trading monopolies on the supply of consumer goods to rural areas or in the purchase of crops from farmers brings absence of competition.

Failures of Provision / Incomplete Markets / Missing Markets: The existence of a class of goods and services that private operators are not prepared to supply because once they are made available it is impossible to exclude individuals from making free use of them (public goods) such as street lighting, police force, road in LDCs, national defense, and so on. Where markets fail to produce commodities or services for which there is a private demand at prices above production costs, due to transaction cost and moral hazard, and adverse selection problems is another source of market failure. The credit market and the insurance business with high risks of default and high cost of enforcing the agreement in the transaction are possible cases in point.

Open Access Resources: Resources of communal access (e.g. forestry for firewood, wild life, fishery, where the private cost of using more of resource is lower than the social cost incurred by the community as a whole, resulting in over - exploitation (over-fishing, over-grazing, and over-hunting and possible permanent damage to the resource) which is the result of absence of well defined property rights is another source of market failure.

Failures of Information: A tendency to under-produce (due to private interest) the type of information to which everyone should have access if markets are to work well (e.g. information on prices and technologies) is another source of market failure problem.

Macro-economic Problems: Problems that can only be handled by a central authority, like money supply inflation, exchange rate, taxation, balance of payment problems and soon are problems which are never the concerns of private investors from whose point of view financial CBA is normally done

Poverty and Inequality: The market outcome may result in a degree of inequality or an incidence of poverty that is regarded as unacceptable by the majority of people in society.

Environmental Problems, Futures Generation and Sustainability: These are very difficult, controversial and debatable issues of recent origin in the economics literature. They are hardly dealt by the interplay of demand and supply. Therefore, the market fails due mainly to the absence of coincidence of national and private objectives.

4.2.1.2. Government Intervention

As there is market failure, there is also government failure which needs to be taken care of. Government intervention takes different forms - protective trade policies (import taxes, subsidies, quotas, and import licensing); unrealistic rates of fixed exchange rates - overvalued currencies; government controls of interest rates - subsidized interest rate; controls on prices, production, and sales; private monopolist controls of production prices; government or trade union pressure (wage rates exceeding real cost of labor - minimum wage legislation); and so on. In financial analysis, the project analyst is concerned with the profitability of the project from an individual (firm's profitability) point of view. The main objective here is to maximize the income of the firm or to analyze the budgetary impacts.

In financial analysis the analysis is done by applying market prices. Given the prevailing market prices the financial analysis will tell the project analyst whether a project will be financial profitable. Thus, governments and other individuals can pursue only limited objectives when they choose projects on the basis of financial appraisal. However, the objective of any legitimate government should be the promotion of community welfare. They will be more concerned with their public work programs to promote community welfare than they merely maximize financial profits at distorted local prices. The basic question here is whether it is possible to use market prices to assess the economic worth of projects or not. In financial analysis prices could be distorted because of:

Failure of markets

The absence of perfect knowledge and the existence of externalities, consumer and producer surplus, government and public goods, etc.

So that governments must choose projects on the basis of an economic analysis if they wish to promote the community's welfare. It is useful to have a full understanding of the areas where government intervention and market failure result in serious distortion in market prices. 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 headings:

Government intervention in and/or failures of goods market; including the markets for internationally traded goods.

Government intervention in and/or failure of factor markets including the market for labor, capital, and foreign exchange.

The existence of externalities, public goods, and consumer and producers surplus.

Government Interventions and /or Failure of Goods Market.

a) Failure of Domestic Goods Market

The true economic value of a good produced by a project, which can be called its marginal social benefit, or how much it will add to community welfare, is in general measured by what people are willing to pay for that good. Traditionally this is reflected by the market prices of the

commodity. But the market price of that commodity will not measure what people are willing to pay for it unless the following conditions are met:

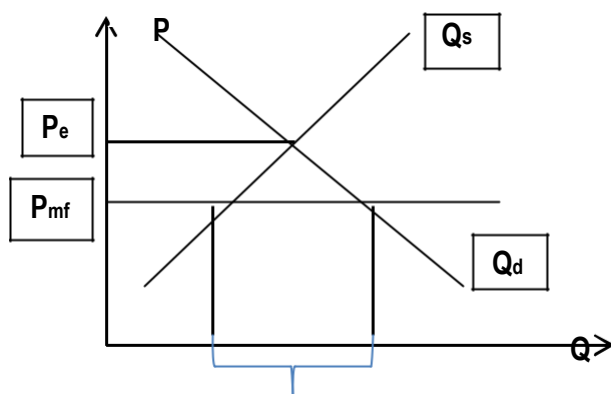
If there is no price controls in the market for the good. That is the quantity of the good that is demanded by consumers must equal the quantity supplied by producers, and the price of the good must be its competitive demand price.

If 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.

If 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 income in welfare 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).

Figure 2: Goods market distortions, price fixing

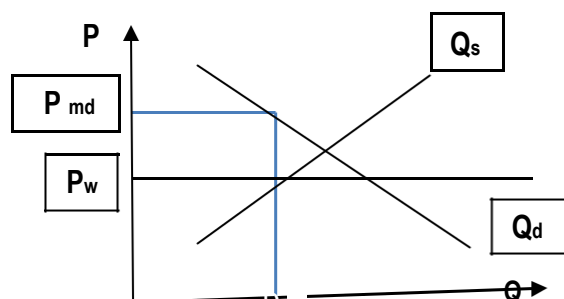


In the figure the price of controlled commodity is set at P_{mf} , below the market-clearing price (equilibrium price) P_e . This results in excess demand for the commodity ($Q_d - Q_s$), so the existence of controlled price will result in rationing of the commodity.

b) Trade protection and Intervention in the Markets for internationally traded goods

Governments frequently intervene in import markets by imposing quotas & tariffs to protect infant industries that are internationally competitive. Tariffs and quotas will cause a divergence between local market prices and the world prices of internationally traded goods.

Fig 3: Traded goods market distortions - Import quota.



An import quota will push the domestic market cost of the input to P_{md} , well above the foreign exchange cost to the economy of importing the input, which is the world price P_w . So, such import quota over value the social cost of the traded input used by the project.

2) Failures of /or Interventions in Factor Market

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:

There are no rationing, price controls or taxes in factor markets

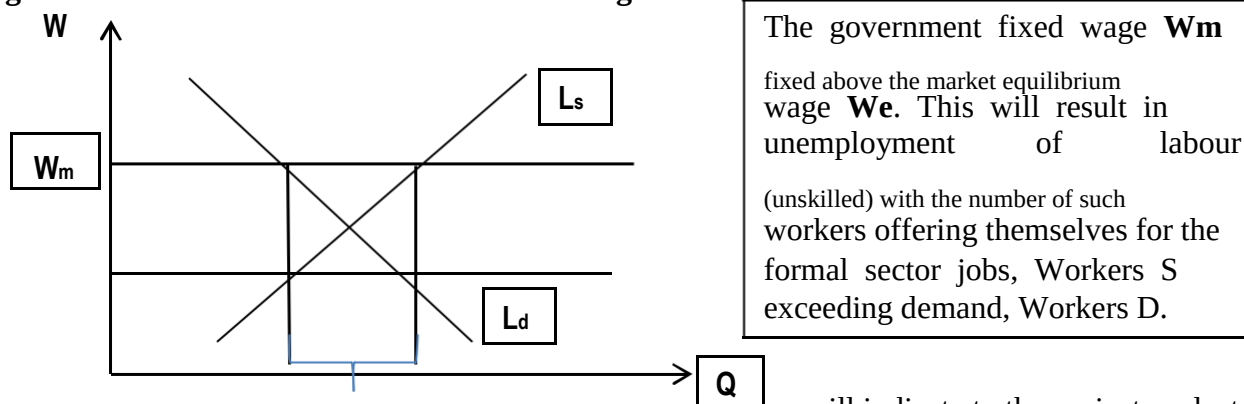
There is no producer's surplus in the market price of the input

There is no monopsony buyer who is 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 Labor Market:

Labor markets are frequently regulated with fixed minimum wage rates or centrally fixed wage rates for formal sector jobs. If these wages rates are set above the Market clear levels, there is likely to be open unemployment or disguised unemployment. This is particularly true for unskilled labour. In the case of skilled labour, fixed wage rates may actually be set below market clearing levels causing an artificial shortage of skilled labour.

Figure 4: Labour market distortions - fixed wage rates



The existence of open unemployment or underemployment

will indicate to the project analyst

that market wage for the categories of labour concerned is greater than its marginal social cost.

The project analyst will need to adjust these wage rates downwards until they reflect the true social cost of labour in the country, the shadow wage rate.

b. Intervention in / or Failure of Capital Market:

Another important factor market in which governments often intervene by fixing prices is the

capital market. In order to encourage investment interest rates are often kept low .The interest

rate paid for investible funds is held down to I

mf 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. It will then be necessary 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 peg or 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.

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 over valuation makes exporting as compared with supplying the local market, financially unattractive to producers. The price that exporters receive in local currency for a given dollar value of exports is reduced if the exchange rate is overvalued.

The official exchange rate is fixed at OER. This will result in excess demand for foreign exchange $Q_{fed} - Q_{fes}$. 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 Q_{fes} . 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, therefore, will fail 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, or its production, that are not directly felt by the people who buy it and hence may not be reflected in the price they are willing to pay for it. 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.

Example:

The costs incurred in providing the project area with infrastructure inputs, e.g. access roads, energy lines, sewerage services, etc. Although these inputs are required by the project their cost is often met by the government rather than the enterprise, because often they serve other purposes too.

Flood control measures (benefits) resulting from a hydroelectric dam are real benefits to downstream farmers and the economy but external to the power authority.

Pollution created in the production of a commodity is a cost to the society but external to the project.

b) The Existence of Public Goods

Public goods are usually provided free by governments and in 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 out puts it would be wrong to value them at their market price of zero in many economic analysis of the project. They will have to be valued at the amount that it is estimated people will be willing to pay for them. In short, public goods and services can be described as: Goods and services whose use by one person does not reduce their availability to others.

4.2.2. The prices used in the valuation of inputs and output

Another difference between financial and economic analysis is that even inputs and outputs “internal” to both the enterprise and the economy are valued differently. In financial analysis the rule is to value inputs and outputs at actual market prices, at the same time in economic analysis shadow or Efficiency or Accounting prices are employed. Consequently, using different prices will give different economic and financial NPV, IRR, and BCR even if the inputs and outputs are identical in physical terms. For example, the enterprise will have to pay workers the market wages in real Birrs (not in shadow ones), irrespective of what is believed to be their opportunity cost from the economy’s viewpoint.

Similarly, the enterprise will collect for its exports the equivalent of local currency calculated at the official exchange rate, even when it is believed that the foreign currency is undervalued. Again, in financial analysis it is the actual expenditure and revenue, which matter, not shadow ones. Market prices, which form the basis for computing the monetary costs and benefits from the point of view of project sponsor reflect social values only under conditions of perfect competition, which are once in a blue moon, if ever, realized by developing countries. When imperfections are obtained, market prices do not reflect social values. The common market imperfections found in developing countries are: Rationing, Prescription of minimum wage rates, and Foreign exchange regulation.

Rationing of a commodity means control over its price and distribution. The price paid by a consumer under rationing is often significantly less than the price that would prevail in a competitive market.

When minimum wage rates are prescribed, the wages paid to labour are usually more than what the wages would be in a competitive labour market free from such wage legislations.

The official rate of foreign exchange in most of the developing countries, which exercise close regulation over foreign exchange, is typically less than the rate that would prevail in the absence of foreign regulation. This is why foreign exchange usually commands premium in unofficial transactions.

4.2.3. The Treatment of Taxes, Subsidies and other Transfer Payments

Some payments that appear in the cost streams of financial analysis do not represent economic costs, but merely a transfer of the control over resources from one group in society to another. Transfer payments 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. Thus transfer payments are payments made among different persons/economic agents/ but they are not related to any particular resources cost. So they do not reflect changes in the national economy. The term direct transfer payment notifies payments that show up directly in the project accounts but do not affect National income. Direct transfer payments redistribute national income and generally affect the government treasury, positively or negatively. When looking at the project from the project entity's point of view, taxes and subsidies affect the benefits and costs of the project.

When looking at the project from society's viewpoint, however, a tax for the project entity is an income for the government, and a subsidy for the entity is a cost to the government; the flows net out. Hence transfer payments have to be excluded from all estimates of economic costs and benefits during the economic analysis of a project. It is to be noted that transfer payments affect the distribution of income though they don't affect the overall level of resources available to the economy/society/. Taxes and subsidies should not be disregarded altogether.

Transfer payments affect the distribution of project costs and benefits and, hence, are important to assess gainers and losers. If taxes and subsidies render a project unfeasible from the project entity's viewpoint, they are important in assessing project sustainability. A complete profile of the project should identify not only the amounts involved in taxes and subsidies but also the groups that enjoy the benefits and bear the costs. Usually, the government collects the taxes and pays the subsidies. In these cases, the difference between the financial and economic analysis accounts for a major portion of the fiscal impact of the project.

The other reason why financial and economic NPV and IRR might differ emanates from the treatment of taxes, subsidies and other transfer payments. This issue relates to the valuation of inputs and outputs discussed above, but it is treated separately because of its importance in practice. Taxes and customs duties from which the enterprise is not exempted are taken as cost in financial analysis although they do not reflect commitment of real resources; for this reason they are excluded from the calculations of the economic NPV and IRR. Similarly, subsidies paid to the enterprises by the government are viewed as transfer payments and are excluded from consideration in economic analysis, but they are treated like any other revenue of the enterprise

in computing the financial NPV or IRR or BCR. In addition to the factors discussed above, the impact of the project on savings, its effect on redistribution, and the consideration for merit goods are also seen as the other factors that entail differences between financial and economic analysis of projects:

Concern for Savings: Unconcerned about how its benefits are divided between consumption and savings, a private firm does not put differential valuation on savings and consumption.

From a social point of view, however, the division of benefits between consumption and savings (which leads to investment) is relevant, particularly in capital-scarce developing countries. One Birr of benefits saved is deemed more valuable than a birr of benefits consumed. The concern of society for savings and investment is properly reflected in SCBA wherein a higher valuation is placed on savings and a lower valuation is put on consumption.

Concern for Redistribution: A private firm does not bother how its benefits are distributed across various groups in the society. The society, however; is concerned about the distribution of benefits across different groups. One Birr of benefit going to a poor section is considered more valuable than a Birr of benefit going to an affluent section.

Merit Wants: Goals and preferences not expressed in the market place, but believed by policy makers to be in the larger interest, may be referred to as merit wants. For example, the government may prefer to promote an adult education program or a balanced nutrition program for school-going children even though; these are not sought by consumers in the market place. While merit wants are not relevant from the private point of view, but relevant from social point of view.

For the reasons discussed above the financial and economic analysis of a project will show a different picture, particularly as regards the NPV, IRR, and BCR. In analyzing public projects in particular both the financial analysis and the economic analysis should be conducted. This is especially user-to view a project from various angles and to obtain different perspectives. Decision makers need both profiles in order to evaluate a project and to design the necessary fiscal and monetary measures to meet its financial requirements. In deciding on the acceptance or rejection of such projects, the economic criterion is superior to the financial one, and when a project passes the economic test it is an acceptable project for the country. It should be implemented provided that the government will take the necessary financial and other measures to ensure its smooth operation. `

A project, for example, that shows very low, or even negative financial returns as a result of the fact that the major benefits it generates are “external” to and cannot be captured by the enterprise, could show acceptable economic returns when these benefits are considered as “internal” to the economy and are valued accordingly. In this case the solution is to subsidize the enterprise sufficiently so that it will stay in operation and generate these benefits. However, although this is the economically rational approach, one should be careful with projects that pass the economic test but fail the financial test. The project analyst explaining the pass/fail situation

with projects that pass/fail the financial and economic test should present convincing data and justification in such a way that one can feel more comfortable.

Taxes versus User Charges

Some care must be exercised in identifying taxes. Not all charges levied by governments are transfer payments. Some are user charges levied in exchange for goods sold or services rendered. Water charges paid to a government agency, for example, are a payment by farmers to the irrigation authority in exchange for the use of water. Whether a government levy is a payment for goods and services or a tax depends on whether the levy is directly associated with the purchase of a good or a service. Also, it must accurately reflect the real resource flows associated with its use. For example, irrigation charges frequently do not cover the true cost of supplying the service. While they indicate a real resource flow as opposed to a pure transfer payment, the real economic cost would be better measured by estimating the long-run marginal cost of supplying the water and showing the difference as a subsidy to water users.

Subsidies

Subsidies are taxes in reverse. They shift control over resources from the giver to the recipient and do not constitute a cost to society. As with taxes, analysts must keep track of the recipient's benefit and the giver's cost to present a complete picture of project flows. Because the flows net out, they are not a cost to society. Nevertheless, because subsidies often flow from the government to the project entity, they are part of the project's fiscal impact, and analysts must take care to show them explicitly.

Donations and Contributions in Kind

In some cases, the project entity receives goods and services free of charge. For example, hospitals may receive costly medical equipment as gifts from the private sector or nongovernmental organizations. When evaluating projects from society's viewpoint, it is important to include these items. It is customary to impute a value to the goods and services so rendered by valuing them at their market price as a first approximation to their economic cost. The next chapter will deal with the valuation problems in more detail.

IV. Interest Payments and Repayment of Principal

Financial costs are an important component of a firm's income statement. Debt service—the payment of interest and the payment of principal entails cash outlays, but is never the less omitted from economic and financial analysis. In both cases assessing the quality of the project independently of its financing mode is what matters most. Another reason for excluding debt service from economic analysis is that debt service does not entail a use of resources, but only a transfer of resources from the payer to the payee.

Gittinger (1982) states the rationale clearly: From the standpoint of the farmer [who receives a loan], receipt of a loan increases the production resources he has available; payment of interest and repayment of principal reduce them. But from the standpoint of the economy, things look

different. Does the loan reduce the national income available? No, it merely transfers the control over resources from the lender to the borrower. A loan represents the transfer of a claim to real resources from the lender to the borrower. When the borrower pays interest or repays the principal, he is transferring the claim to the real resources back to the lender but neither the loan nor the repayment represents in itself, use of the resources (Gittinger, 1982).

Consumer Surplus

In some cases, a project may not only increase output of a good or service but also reduce its price to consumers. When a project lowers the price of its output, more consumers have access to the same product, and the old consumers pay a lower price for the same product. Valuing the benefits at the new, lower price understates the project's contribution to society's welfare. If the benefits of the project are equated with the new quantity valued at the new price, the estimate of benefits ignores consumer surplus-the difference between the maximum amount consumers would be willing to pay for a product and what they actually pay. In principle, this increase in consumer surplus should be treated as part of the benefits of the project. There may also be a gain in consumer surplus without any decline in price. If supply is rationed at a price below what consumers would be willing to pay, an increase in supply at the same controlled price involves a gain in consumer surplus over and above what consumers actually pay for the increase. This may be particularly significant for public utility projects.

VI. Externalities and Linkage Effects

[A] Externalities

Externality is an economic problem that arises as a result of relationships among economic agents whereby agent 'A' is benefited or not benefited by other economic agent (s) without being charged or paid for the benefit derived or the cost incurred. Externalities may be positive or negative. Positive externalities may be production or consumption. Externalities, created by another agent, which have positive production effect to an economic agent without his / her intention, are called positive production externalities while externalities of opposite nature are called negative production externalities. Externalities, created by another agent, which have positive utility effect to an economic agent without his/her intention, are called positive consumption externalities while externalities of opposite nature are called negative consumption externalities. These 'good- positive externalities' or 'bad - negative externalities' do not have a market price.

Costs that are not incurred by the private operator but represent negative benefits to other members of the community, such as the impact on downstream river users of pollution by a private industrial plant (negative externality), or benefits that do not accrue to the private operator but represent gains to society, such as the beneficial impact of higher education on the level of skills in the country and workers' on the job training (positive externality) are some of the practical externality problems. Smoke coming from a cigarette smoker in your dormitory is a negative consumption externality. Waste disposal by a factory to fisherman's river is negative

production externality. The mutual beneficial relationship between the bee keeper and horticulture farmer is a positive production externality to both economic agents. A garden freely made available to someone by his / her neighbor is positive consumption externality. In addition to the above mentioned ones, externalities may take different forms:

Price effects, one form of externality whereby higher price may be the result of undertaking the project for inputs that it requires and lower price for outputs that it produces.

For projects that produce an export product or that use an import input, there may be a price externality with an international dimension - effect of the project on world price.

Increased competition as a result of the project may be another externality effect

Unfortunately, externalities are mostly difficult to identify and nearly always difficult to measure. However, whether or not externalities can be quantified, they should at least be discussed somewhere in the project document in qualitative terms. The general principle in considering externalities in economic analysis is that the effects should be measured and, where possible, valued so that they can be included in the costs and benefits of the project. This is what is sometimes called 'internalizing the externalities'. Externalities may be considered as a special class of non-traded goods that may be either positive or negative.

Linkage Effects

Linkage effects occur when the activities of one project cause an increase (or a decrease) in economic activity elsewhere in the economy. To some extent this happens with all projects. Forward linkage effects may occur in industries that use or process a project's output, and backward linkages in industries that supply its inputs. Such industries may be encouraged or stimulated by increased demand and higher prices for their output or lower prices for their inputs. For economic analysis, what is important is whether the linkage effect is a necessary consequence of the project. For instance, production and processing of the perishable primary products is the case in point. In Ethiopia, this applies particularly to the sugar and tea industries. Sugarcane has little or no economic value outside the immediate production system in which it is produced unless it is processed in a sugar mill. One can find forward (input supplying) and backward (output purchasing) linkage effects. A project which affects sugarcane production, therefore, necessarily has some consequences for the sugar industry (a forward linkage).

The economic analysis of a sugarcane production project would, therefore, have to extend the boundaries of the project to include the impact of the project on the sugar industry. The linkage from the sugarcane farm to the sugar mill could be looked at in another way (backward linkage effect) if a new sugar mill were to be established in an area that was previously too inaccessible for sugarcane production to take place. The new sugar mill would not make any sense without a supply of sugarcane and so it would be necessary to include the backward linkage to the sugarcane farmers in the economic analysis of the project.

The sugarcane example above can be contrasted with the situation in the meat sector. The livestock sector has an export market in the form of live animals. A livestock production project

might cause more animals to be sold to meat processing industries but it is not a necessary consequence of the production of the livestock. The decision whether or not to slaughter the animals locally can be regarded as a separate economic decision that depends on whether the meat industry can pay at least as much as the exporters for animals. Since the linkage effect is not a necessary one it would not be included in the economic analysis of the livestock project. Similarly, the decision to establish a meat processing project can be separated from the decision to produce more livestock. If Ethiopia is regarded as a net exporter of livestock, establishment of additional meat processing capacity might have the effect of reducing net livestock exports rather than increasing livestock production. In practice, it is usually only backward linkages that can be picked up.

4.3. Identification of Costs & Benefits of Economic Analysis

Identifying costs and benefits is the first and most important step in economic analysis. Often project costs and benefits are difficult to identify and measure, especially if the project generates side effects that are not reflected in the financial analysis, such as air or water pollution. A second important step is to quantify them. The final step is to value them in monetary terms. The major steps in economic analysis can be summarized as:

- Identification of cost and benefit items that need to be incorporated in economic analysis; this involves the inclusion of some variables and exclusion of others from the economic accounts.

- Quantify both the cost and benefit items;

- Revalue the cost and benefit items; i.e. what prices to use?

The projected financial revenues and costs are often a good starting point for identifying economic benefits and costs, but two types of adjustments are necessary. First, we need to include or exclude some costs and benefits. Second, we need to revalue inputs and outputs at their economic opportunity costs. Financial analysis looks at the project from the perspective of the implementing agency. It identifies the project's net money flows to the implementing entity and assesses the entity's ability to meet its financial obligations and to finance future investments. Economic analysis, by contrast, looks at a project from the perspective of the entire country, or society, and measures the effects of the project on the economy as a whole. These different points of view require that analysts take different items into consideration when looking at the costs of a project, use different valuations for the items considered, and in some cases, even use different rates to discount the streams of costs and benefits.

Financial analysis assesses items that entail monetary outlays. Economic analysis assesses the opportunity costs for the country. Just because the project entity does not pay for the use of a resource, does not mean that the resource is a free good. If a project diverts resources from other activities that produce goods or services, the value of what is given up represents an opportunity cost of the project to society. Many projects involve economic costs that do not necessarily involve a corresponding money flow from the project's financial account. For example, an

adverse environmental effect not reflected in the project accounts may represent major economic costs. Likewise, a money payment made by the project entity--say the payment of a tax--is a financial but not an economic cost. It does not involve the use of resources, only a transfer from the project entity to the government. Finally, some inputs say the services of volunteer workers--may be donated, entailing no money flows from the project entity. Analysts must also consider such inputs in estimating the economic cost of projects.

Another important difference between financial and economic analysis concerns the prices the project entity uses to value the inputs and outputs. Financial analysis is based on the actual prices that the project entity pays for inputs and receives for outputs. The prices used for economic analysis are based on the opportunity costs to the country. The economic values of both inputs and outputs differ from their financial values because of market distortions created either by the government or by the private sector. Tariffs, export taxes, and subsidies; excise and sales taxes; production subsidies; and quantitative restrictions are common distortions created by governments. Monopolies are a market phenomenon that can either be created by government or the private sector. Some market distortions are created by the public nature of the good or service. The values to society of common public services, such as clean water, transportation, road services, and electricity, are often significantly greater than the financial prices people are required to pay for them. Such factors create divergence between the financial and the economic prices of a project.

Economic and financial costs are always closely intertwined, but they rarely coincide. The divergence between financial and economic prices and flows shows the extent to which someone in society, other than the project entity, enjoys a benefit or pays a cost of the project. Sometimes such payments are in the form of explicit taxes and subsidies, as in a sales tax; sometimes they are implicit, as in price controls. The magnitudes and incidence of transfers are important pieces of information that shed light on the project's fiscal impact, on the distribution of its costs and benefits, and, hence, on its likely opponents and supporters. By identifying the groups benefiting from the project and the groups paying for its costs, the analyst can extract valuable information about incentives for these groups to implement the project as designed, or to support it or oppose it.

A thorough evaluation should summarize all the relevant information about the project. To look at the project from society's and the implementing agency's viewpoint, to identify gainers and losers, and ultimately to decide whether the project can be implemented and sustained, it is necessary to integrate the financial, fiscal, and economic analyses and identify the sources of the differences.

4.3.1. Sunk Costs

For both financial and economic analysis, the past is the past. What matters are, future costs and future benefits. Costs incurred in the past are sunk costs that cannot be avoided. When analyzing a proposed project, sunk costs are ignored. Economic and financial analyses consider only future

returns to future costs. Ignoring sunk costs sometimes leads to seemingly paradoxical, but correct, results. If a considerable amount has already been spent on a project, the future returns to the costs of completing the project may be extremely high, even if the project should never have been undertaken.

As a ridiculous extreme, consider a bridge that needs only one dollar to be completed in order to realize any benefits. The returns to the last dollar may be extremely high, and the bridge should be completed even if the expected traffic is too low to justify the investment and the bridge should never have been built in the first place. However, arguing that a project must be completed just because much has already been spent on it is not valid. To save resources, it is preferable to stop a project midway whenever the expected future costs exceed the expected future benefits.

On the other hand, although stopping a partially completed project may be more economical than finishing it, closing a project is often costly. For example, one may have to cancel partially completed contracts, and lenders may levy a penalty. Such costs have to be taken into account in deciding whether or not to close the project. Similarly, the cash flow of a project should show some liquidation value at the end of the project. This liquidation value should be counted as a benefit. Sometimes, to focus attention on the years for which the information is more reliable, we use the estimated liquidation value of a project as of a certain year.

4.3.2. Determining Economic Values

Valuation of the Impact of a Project: Pareto Optimality Vs. the Hicks Kaldor Compensation Principle

This section is meant to lay the theoretical basis for evaluating the worth of a project. Different economists are concerned with the valuation of alternative economic situations (state, configurations) from the point of society's well-being. To evaluate alternative economic situations, we need to have criteria for evaluating social well-being or welfare (social welfare function). Measurement of welfare requires some ethical standard and interpersonal comparisons, both of which involve subjective value judgments. Welfare economics is concerned with the evaluation of alternative economic situations from the point of the society's well-being. Welfare analysis is a systematic method of evaluating economic implications of alternative allocations. Welfare analysis gives answers to the following questions:

Is a given resource allocation efficient?

Who gains and who loses under various resource allocations? By how much? Related to the above two questions, the two major tasks of welfare economics (WE) are:

To show/measure present day welfare (W) and show whether or not the present welfare is less than the optimal welfare (W^*), i.e. $W < W^*$

Suggest ways to rise W to W^* .

Welfare economics is a methodological approach to assess resource allocations and establish criteria for government intervention. Once a project's financial cost and benefits have been

identified, valued in market prices and entered in the cash flow, the remaining task is to use this information to determine whether or not the project will be profitable and should be selected for implementation. The basic selection criterion, which is applicable in both financial and economic analyses, is that a project should not be undertaken unless its benefits outweigh its costs. The theoretical justification for this rule is the Hicks - Kaldor selection criterion.

The standard measure employed in welfare economics to determine whether a change in resource allocation will result in people being better off is the **Pareto welfare improvement criterion**. A Pareto improvement in welfare is said to occur if at least one person is made better off and no one is made worse off by a given change in economic conditions. When using this criterion it is unnecessary to make any comparison between the utility (welfare) enjoyed by different people as a result of any change in their income, since everyone must either be unaffected or made better off by the change for it to be considered a Pareto welfare improvement. However, if projects could only be implemented when they were expected to result in an actual Pareto welfare improvement, it is obvious that very few, if any, would be approved. This is because there will always be someone who is made worse off by the improvement of project, such as a tax payer who does not receive any benefit.

To overcome the restrictive nature of Pareto unanimity rule, the concept of a potential Pareto improvement or the compensation principle, was developed by Hicks (1939) and Kaldor (1939). This criterion states that a given change in the allocation of resources will potentially improve welfare if those who gain could compensate those who lose, and still be better off themselves. The Hicks-Kaldor compensation principle is central to the theoretical justification for cost benefit analysis in welfare economics. This criterion provides the rationale for choosing projects whose benefits outweigh their costs, even if the people who gain from a project are not the same as those who pay for it. The excess of benefits over costs is called the project's net benefit. A crucial element of this criterion is that it is not necessary for the gainers from a project to actually compensate the losers, only for them to be able to do so if they wished and still remain better off than if the project had not been implemented.

Hence a project that meets the Hicks - Kaldor hypothetical compensation criterion will not necessarily result in an actual Pareto welfare improvement, only a potential improvement. The Hicks - Kaldor criterion can be criticized because of its failure to address the distributional impacts of projects. Total welfare will not necessarily be increased even if a project meets the Hicks - Kaldor criterion, unless those who gain receive the same increase in their utility from an extra unit of income as those who lose from the project. However, it is a basic tenet of welfare economics that the poor can be expected to receive a greater increase in their utility or welfare from 1 extra unit of income than the rich.

That is, the poor are expected to have higher marginal utility of income than the rich. Put simply a project that costs the poor 1 unit of income and increases the income of the rich by 1.5 units will pass the Hicks - Kaldor criterion and be selected, but will not increase total community

welfare if the poor value their unit of lost income twice as highly as the rich value each additional unit of income they gain. Nevertheless, in economic analysis these problems are largely ignored and it is implicitly assumed that everyone has the same marginal utility of income. However, the rationale for the social analysis of projects is largely based on this failure of the Hicks - Kaldor compensation criterion to deal with the distributional issues that will arise if actual compensation does not take place.

4.4. Social Cost-Benefit Analysis

In essence, project analysis assesses the benefits and costs of a project and reduces them to a common denominator. If benefits exceed costs both expressed in terms of this common denominator-the project is acceptable: if not, the project should be rejected. Economic analysis of projects is similar in form to financial analysis in that both assess the profit of an investment. The concept of financial profit, however, is not the same as the social profit of economic analysis.

The Purpose of Social Cost-Benefit Analysis

When undertaking 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 appropriate. A financial objective is narrow one for a public agency to pursue and for public decisions. But in most countries governments are not only interested in increasing efficiency but also in promoting greater equity. When one project is chosen rather than another 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 social cost-benefit analysis 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 also receives the benefits and pays the costs. In a situation where a project is only marginal from the point of view of an economic analysis but has strong positive distributional benefits, the analyst may consider a social analysis in addition to the traditional economic analysis.

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 or she receives a high income. An economic analysis of

projects A & B would not capture those differences and would merely indicate that both had the same positive impact on community welfare.

Difference between Financial Calculation and Social Cost-Benefit Analysis:

Financial profitability is measured in terms of the difference between the value of earnings and costs in a certain period. Social cost-benefit analysis must go deeper and ask what the meaning of profit is.

The price offered in the market is not a good guide to Social welfare for it includes the influence of income distribution on the prices offered. One of the simpler means of income redistribution may in fact be project Selection. The choice may be between project A to be located in a poor region or project B to be located in a rich area or between project X which uses a large amount of poor, unskilled labor which might be unemployed and project Y which uses factors of production supplied by rich people.

A project may have influences that work outside the market rather than through it. These effects are called "externalities" externalities are relevant for social choice and provide a sufficient argument for rejecting commercial profitability as a guide to public policy. Externalities may arise in the process of production, in the process of consumption, and in the process of Sales and distributions.

Even in the absence of externalities and consideration of income distribution commercial profitability may be misleading because of consumer's surplus.

Two Approaches to Social Cost-Benefit Analysis (SCBA)

Two principal approaches to SCBA have emerged in the late 1960s and early 1970s: the UNIDO approach and the Little and Mirrlees approach. The UNIDO approach was first articulated in the Guidelines for Project Evaluation (1972) which provides a comprehensive framework for SCBA in developing countries. The rigor and length of this work created a demand for a concise and operational guide for project evaluation in practice. To fulfill this need, UNIDO came out with another publication, Guide to Practical Project Appraisal in 1978. UNIDO is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability. The Little and Mirrlees approach (also known as the OECD approach) was developed by I.M.D. Little and J.A. Mirrlees in their work Manual of Industrial Project Analysis for Developing Countries, Volume II, Social Cost-Benefit Analysis (1968) and Project Appraisal and Planning for Developing Countries (1974). We shall investigate the two approaches briefly in the following part.

4.4.1. The UNIDO (United Nations Industrial Development Organization) Approach

The UNIDO approach to SCBA involves five stages, each stage of which measures the desirability of the project from a different angle:

Calculation of financial profitability of the project measured at market prices.

Obtaining the net benefit of project measured in terms of shadow or economic (efficiency) prices.
Adjustment for the impact of the project on savings and investment.
Adjustment for the impact of the project on income distribution.
Adjustment for the impact of project on merit goods and demerit goods whose social values differ from their economic values.

The measurement of financial profitability of the project in the first stage is similar to the financial analysis.

Stage two of the UNIDO approach is concerned with the determination of the net benefit of the project in terms of economic (efficiency) prices, also referred to as shadow prices. Market prices represent shadow prices only under conditions of perfect markets, which are almost invariably not fulfilled in developing countries. Hence, there is a need for developing shadow prices and measuring net economic benefit in terms of these prices.

4.4.1.1.Shadow Pricing: Basic Issues

Before we deal with shadow pricing of specific resources, certain basic concepts and issues must be discussed: choice of numeraire, concept of tradability, source of shadow prices, treatment of taxes, and consumer willingness to pay.

Choice of Numeraire: Just as it is a great convenience to express market prices in terms of money, so it will be appropriate to measure shadow prices all in terms of a unit of account, which is called the numeraire. In economic analysis the value of inputs and outputs is expressed using this numeraire, or unit of account. In the UNIDO approach 'aggregate consumption expressed in domestic prices' is used as the unit of account; i.e., inputs and outputs are measured in terms of domestic a price that is used as a numeraire. In the Little and Mirrlees approach, 'uncommitted social income measured in border prices' is the unit of account; i.e., values are expressed in terms of border prices that is used as the numeraire.

Concept of Tradability: A key issue in shadow pricing is whether a good is tradable or not. For a good that is tradable, the international price is a measure of its opportunity cost to the country. Why? For a tradable good, it is possible to substitute import for domestic production and vice versa; similarly it is possible to substitute export for domestic consumption and vice versa. Hence the international price, also referred to as the border price, represents the 'real' value of the good in terms of economic efficiency.

Sources of Shadow Prices: The UNIDO approach suggests three sources of shadow pricing, depending on the impact of the project on national economy. A project, as it uses and produces resources, might for any given input or output:

- Increase or decrease the total consumption in the economy,
- Decrease or increase production in the economy,
- Decrease imports or increase imports,
- Increase exports or decrease exports.

If the impact of the project is on consumption in the economy the basis of shadow pricing is consumer willingness to pay. If the impact of the project is on production in the economy, the

basis of shadow pricing is the cost of production. If the impact of the project is on international trade - increase in exports, decrease in imports, increase in imports, or decrease in exports, and the basis of shadow pricing is the foreign exchange value.

Taxes when shadow prices are being calculated, usually pose difficulties. The general guidelines in the UNIDO approach with respect to taxes are as follows:

When a project results in diversion of non-traded inputs which are in fixed supply from other producers or addition to non-traded consumer goods, taxes should be included.

When a project augments domestic production by other producers, taxes should be excluded.

For fully traded goods, taxes should be ignored.

4.4.1.2. Shadow Pricing of Specific Resources

Tradable Inputs and Outputs: A good is fully traded when an increase in its consumption results in a corresponding increase in import or decrease in export or when an increase in its production results in a corresponding increase in export or decrease in import. For fully traded goods, the shadow price is the border price, translated in domestic currency at the market exchange rate. The above definition of a fully traded good implies that domestic changes in demand or supply affect just the level of imports or exports. This means for an imported good, the following conditions should be met:

If there is an import quota, it is not restrictive.

The import supply is perfectly elastic over the relevant range of import volume.

There is no surplus capacity in the domestic industry; all additional supply must be imported.

If there is surplus domestic capacity it cannot be utilized for want of necessary inputs.

If extra demand exists inland, the imported goods, after taking into account the cost of transport from the port of entry to the point of inland demand, cost less than the marginal cost of local production;

The imported input costs less than the domestic marginal cost of purchase.

When the above conditions are satisfied, additional demand will be met fully by external trade. Hence the input is considered fully traded. Similar conditions must be satisfied for importable outputs, exportable inputs, and exportable outputs, if they are to be considered fully traded. In practice, it is reasonable to regard tradable inputs and outputs as fully traded, if the above-mentioned conditions are not fully satisfied.

Non-tradable Inputs and Outputs: A good is not traded if it is tradable but conditions (i) through (iv) above are not fulfilled. For non-traded goods the border price does not reflect its economic value. What then is the value of non-traded goods? The value of a non-traded good should be measured in terms of what domestic consumers are willing to pay, if the output of the project adds to its domestic supplies or if the requirement of the project causes reductions of its consumption by others. The value of a non-traded good should be measured in terms of its

marginal cost of the project causes reduction of production by other units. A good is non-tradable when the following conditions are satisfied:

Its import price (CIF price) is greater than its domestic cost of production

Its export price (FOB price) is less than its domestic cost of production.

CIF - Cost Insurance and Freight (named port of destination): Seller must pay the cost and freight includes insurance to bring the goods to the port of destination. However, risk is transferred to the buyer once the goods are loaded on the ship.

FOB - Free on Board (Freight on Board): This basically means that the cost of delivering the goods to the nearest port is included but you the buyers, are responsible for the shipping from there and all other fees associated with getting the goods to your country/address.

The valuation of non-tradable is done as per the principles of shadow pricing discussed earlier. On the output side, if the impact of the project is to increase the consumption of the product in the economy, the measure of value is the marginal consumers' willingness to pay; if the impact of the project is to substitute other production of the same non-tradable in the economy, the measure of value is the saving in cost of production. On the input side, if the impact of the project is to reduce the availability of the input to other users, their willingness to pay for that input represents social value; if the project's input requirement is met by additional production of it, the production cost of it is the measure of social value.

Labour Inputs: The principles of shadow pricing for goods may be applied to labour as well, though labour is considered to be service. When a project hires labour, it could have three possible impacts on the rest of the economy: it may take labour away from other employments; it may induce the production of new workers; and it may involve import of workers. When a project takes labour away from other employments, the shadow price of labour is equal to what other users of labour are willing to pay for this labour. In a relatively free market this will be equal to the marginal product of such labour. The social cost associated with inducing 'additional' production of workers consists of the following:

The marginal product of the worker in the previous employment - if the worker is previously unemployed, this would naturally be zero;

The value assigned by the worker on the leisure that he may have to forego as a result of employment in the project -the value of this leisure is reflected in his reservation wage;

The additional consumption of food when a worker is fully employed as opposed to when he is idle or only partly employed;

The cost of transport and rehabilitation when a worker is moved from one location to another;

The increased consumption by the worker and its negative impact on savings and investment in the society when the worker is paid market wage rate by the project; and

The cost of training a worker to improve his skills. The social cost associated with import of foreign workers is the wage they command. In this case, however, a premium should be added on account of foreign exchange remitted abroad by these workers from their savings.

Capital Inputs: When a capital investment is made in project two things happen:

Financial resources are converted into physical assets.

Financial resources are withdrawn from the national pool of savings and hence alternative projects are foregone.

Thus, shadow pricing of capital investment involves two questions:

What is the value of physical assets?

What is the opportunity cost of capital (which reflects the benefit foregone by sacrificing alternative project/s)?

The value (shadow price) of physical assets is calculated as the value of other resources is calculated. If it is a fully traded good, its shadow price equal to its border price. If it is a non-traded good its price is measured in terms of cost of production (if the project induces additional domestic production of the asset) or consumer willingness to pay (if the project takes the asset from other users). The opportunity cost of capital depends on how the capital required for the project is generated. To the extent that it comes from additional savings, its opportunity cost is measured by the consumption rate of interest (which reflects the price the saver must be paid to sacrifice present consumption); to the extent that it comes from the denial of capital to alternative projects, its opportunity cost is the rate of return that would be earned from those alternative projects. This is also called the investment rate of interest. In practice, the consumption rate of interest may be used as the discount rate because in stage three of UNIDO) analysis an inputs and outputs are converted into their consumption equivalents.

There are, however, problems in determining the consumption rate of interest empirically. So the UNIDO approach recommends a 'bottom up' procedure. As per this procedure, the project analyst calculates the internal rate of return of a project and presents the project to the planners (or politicians) who are the decision makers. If the project is accepted, the analyst may assume that the planners judge the consumption rate of interest to be more than the internal rate of return. On the basis of a repetitive application of this process, the range for estimated consumption rate of interest can be sufficiently narrowed for practical use, provided, of course, the planners on the top are consistent.

Foreign Exchange: The UNIDO method uses domestic currency as the numeraire. So the foreign exchange input of the project must be identified and adjusted by an appropriate premium (as discussed below). This means that valuation of inputs and outputs that were measured in border prices has to be adjusted upward to reflect the shadow price of foreign exchange.

The premium on foreign exchange and the Shadow Exchange Rate: The official exchange rate, OER, will be equal to the true economic value placed on foreign exchange if it is able to move freely without intervention or control by the government and if there is no rationing of foreign exchange, no tariffs or non- tariff barriers on imports and no taxes or subsidies on exports. In countries where these conditions hold the market price of foreign exchange, the OER, should be a good measure of people's willingness to pay for the foreign exchange needed to buy

imported inputs and the economic benefit the local economy receives from any foreign exchange earnings made by a project.

In many developing and developed countries, there are many distortions in the market for foreign exchange and traded goods. The market for foreign exchange may be strictly controlled and it may only be possible to purchase foreign exchange for permitted purposes. These controls will often be imposed because the fixed official exchange rate is overvalued, which results in the demand for foreign exchange greatly exceeding supply. A currency is overvalued if the official exchange rate understates the amount of domestic currency that residents of the country would be willing to pay for a unit of foreign currency, such as one dollar US, if they could freely spend it on duty-free goods - goods sold at their border prices. Obviously, in most countries, people would pay more for foreign currency if they could spend it freely on duty-free goods without having to travel internationally to do so.

Most currencies in the world are therefore overvalued in this sense, with the exception of those of duty-free economies like Hong Kong and Singapore. Trade distortions such as import tariffs and quotas therefore result in a country's currency being overvalued. If the official exchange rate, OER, expressed in terms of units of local currency needed to buy one unit of foreign exchange is fixed below the appropriate level it is said to be overvalued. This means that an unrealistically high value is placed on the local currency in terms of how much foreign exchange can be bought with a unit of currency.

Countries that have an overvalued exchange rate are said to place a premium on foreign exchange, or to have a foreign exchange premium. A foreign exchange premium, FEP, measures the extent to which the OER understates the true amount of local currency that residents would be willing to pay for a unit of foreign exchange, or its true opportunity cost to an economy. The FEP can be measured crudely by the ratio of the value of total trade, imports plus exports, valued in domestic prices and therefore including the effect of tariffs and other distortions, to the value of trade in border prices, minus one, as given in the equation below:

Where:

t are the tariffs, or tariff equivalents of non-tariff barriers, imposed on imports

d are the export tax equivalents of any restraints and taxes imposed on exports

s are the export subsidy equivalents of any support given to encourage exports

M is the value of imports in border prices, (CIF)

X is the value of exports in border prices, (FOB).

The numerator of this ratio measures the total amount in local currency that residents are actually paying to consume imports, including tariffs and taxes, plus the amount they are actually accepting for exports, excluding export taxes and including export subsidies. It therefore measures the true value put on traded goods consumed and produced by the country. The

denominator of the ratio in the above equation shows the actual foreign exchange value of these traded goods when they are measured at their border prices, converted into local currency at the OER. The ratio of the domestic value to the border price value of trade therefore shows the true value placed on traded goods, relative to apparent economic value at the official exchange rate. The FEP is usually expressed as a percentage, so the ratio of value of trade in domestic prices to its value in border prices, minus one, is multiplied by 100. The FEP therefore shows the extra percentage local residents would be willing to pay for foreign exchange, above the official exchange rate, if they were able to buy currency freely and spend it on duty-free goods.

When estimating the economic prices of tradable in countries that have an overvalued exchange rate, it will not be correct to merely value traded goods (which may normally be subject to a tariff) at their border prices and then convert these values to local currency at an artificially low official exchange rate. Such a process would make them appear unrealistically cheap compared with locally produced non-traded goods. This is because the local price of non-traded goods will, over time, have adjusted upwards to equal the tariff inclusive price of traded goods, which consumers find equally attractive. Given a choice between a US dollar's worth of imported goods, valued at their tariff-free border price and converted to local currency at the official exchange rate, and a US dollar's worth of locally produced non-traded goods, valued at their domestic market price, the average consumer would prefer a dollar's worth of duty-free imported goods. The foreign exchange required to purchase these imported goods will therefore have a higher value to the local consumer than is indicated by the official exchange rate, OER.

In this situation, the project analyst must correct for these distortions in the market for foreign exchange and traded goods that result in a premium being placed on foreign exchange. Almost all projects include a mixture of traded and non-traded inputs and outputs. If no correction is made for this premium on foreign exchange in economic appraisals, projects that produce traded good outputs will yield an NPV that is undervalued, compared with those producing non-traded goods. This occurs because the traded good outputs would be valued at their FOB (or CIF) border prices, converted into local currency at the artificially low official exchange rate, in terms of local currency per \$US. On the other hand, projects that use imported inputs will appear to have low costs when the border prices of these inputs are converted at the OER and will therefore have a NPV that is overvalued compared with projects using non-traded good inputs.

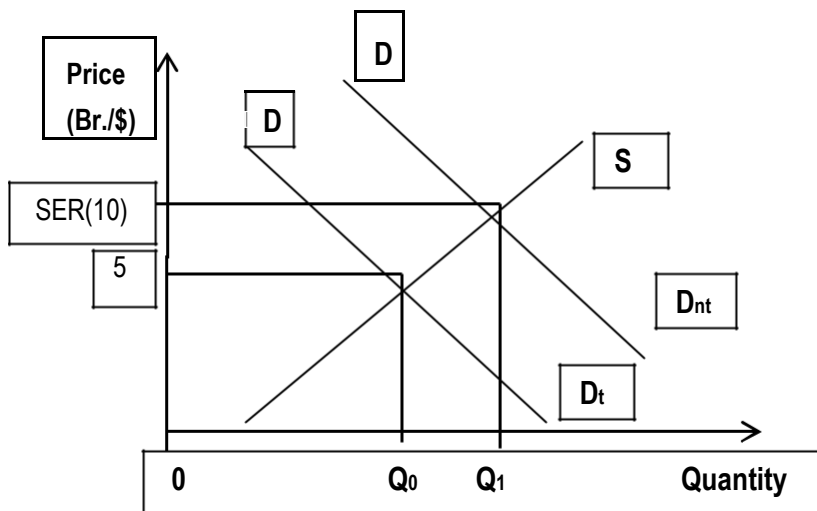
If a foreign exchange premium exists, it is therefore necessary to take account of it in all projects where both traded and non-traded goods and services are included among project inputs and outputs, or when comparing projects producing or using traded and non-traded goods and services. If both traded and non-traded commodities are used or produced in a project, they need to be valued in comparable prices before they can be added together in the net cash flow of the project. The reason for this can be seen from the following simple example.

Assume that in a particular economy there are only two homogeneous consumer products produced and consumed. One is a non-traded good, housing, and the other is a traded good,

automobiles. The average equilibrium price for both houses and automobiles in the domestic market is Br. 100 000. At this price, consumers are just as indifferent to purchasing more automobiles as to more housing, since both are equally valuable to them. However, automobiles are subject to a 100 percent tariff and are sold on the international market for only \$US 10 000, or Br.50000 (converted at the OER of Br. 5 to \$US 1). Since automobiles are the only goods traded (imported) by this economy, from the equation above, the foreign exchange premium will be:

In this country, two alternative projects are being considered: one a housing construction program and the other an automobile factory. When an economic appraisal is made of the auto factory, if no account is taken of the foreign exchange premium, automobiles, which are traded goods, would be valued at their border price, Br. 50000 per automobile. On the other hand, an economic analysis of the housing construction program would value housing, a non-traded good, at its local free market equilibrium price, Br. 100 000 per house. If the two projects had the same level of input costs per unit of output and the same project life, the housing construction program would appear to have the higher net present value. It would therefore be selected in preference to the automobile project if only one of two projects could be undertaken.

Figure 5: Demand and Supply of Foreign Exchange with no trade distortions



However, if the tariffs were removed from automobiles and local residents could buy them for Br.50 000 each, domestic demand for cars would increase strongly. As there is only one traded good in this economy, at every exchange rate the demand for foreign exchange would rise, as can be seen from the figure above. The demand curve for foreign exchange, DD_t would move out to DD_{nt} , the tariff-free demand curve for foreign exchange and demand for foreign exchange would expand from Q_0 to Q_1 . As a result, if the OER were allowed to float freely it would devalue increasing the units of local currency received for each US dollar of foreign exchange earned.

This would encourage producers to export more and earn more foreign exchange, to the point where demand for and supply of foreign exchange would again be equal. In the figure above this occur at an exchange rate of Br. 10 / \$US1. At this new distortion-free equilibrium exchange rate, the border price of automobiles would rise to Br. 100,000 and their economic price would in fact equal the price of the non traded housing.

Alternatively, if the project were designed to export automobiles, these could be sold for \$US 10 000 of foreign exchange per automobile. If we continue the assumption that there is only one traded good in the economy, the foreign exchange would be used to import more automobiles for which people would be willing to pay Br. 100000. On the other hand, the project might produce automobiles that could be sold locally in competition with imported automobiles, also for Br.100 000 per automobile. The \$US 10 000 of foreign exchange earned for each exported automobile from the project would actually have a value of Br.100 000 to the economy at local market prices. Thus, in this one-traded-good economy, the true value of each \$US1 of foreign exchange earned would be Br. 10, not Br. 5. The results of this simple example can be used to show how the SER of the economy is calculated.

The shadow exchange rate, SER, is the foreign exchange rate that reflects the true economic value placed on foreign exchange in an economy. In an economy with no trade or foreign exchange market distortions the SER would be the equilibrium exchange rate. However, if distortions remain in the market for foreign exchange, the shadow exchange rate will be different. One way of correcting for an overvalued exchange rate in project appraisal is to use a shadow exchange rate, rather than the official exchange rate to value all foreign exchange earned and used by the project.

A simple definition of a country's SER involves addition of the percentage FEP to the OER, or more precisely, multiplication of the OER by one plus the FEP divided by 100:

—

In our example of the two-good economy, with a FEP of 100 per cent, the shadow exchange rate can be estimated by:

— — —

The shadow exchange rate would therefore be —

So foreign exchange in fact has twice the value indicated by the official exchange rate. From the definition of the foreign exchange premium, the SER can also be defined as:

—

Where:

t are the tariffs, or tariff equivalents of non-tariff barriers, imposed on imports

d are the export tax equivalents of any restraints and taxes imposed on exports

s are the export subsidy equivalents of any support given to encourage exports

M is the value of imports in border prices, (CIF)

X is the value of exports in border prices, (FOB).

If the country imports 100 cars and its tariff on cars is 100 per cent, its SER will equal:

In this simple formula for measuring the SER, the OER is inflated by the ratio of the full amount people are actually willing to pay for traded goods in domestic market prices, to the value of these goods in border prices converted at the OER. The SER will always be higher than the OER, in terms of the local currency unit people will pay for a unit of foreign exchange, if the value of traded goods in domestic prices, including taxes and tariffs is higher than their value in border prices (if export taxes do not outweigh import tariffs).

The traditional method employed in cost benefit analysis to take account of the foreign exchange premium that was used in the 'UNIDO Guidelines' is to value all traded and non-traded goods and services in terms of domestic price equivalents. Domestic prices are used as the numeraire or common unit of account, in terms of which all project inputs and outputs are valued. For this reason, the UNIDO approach is sometimes known as the domestic price approach. The project's traded good inputs and outputs are firstly valued in their FOB and CIF border prices. They are then converted from foreign currency to local currency using a shadow exchange rate, SER, rather than the official exchange rate, OER.

This is done to better reflect the true economic value of foreign exchange to the economy. In a situation where the local currency is overvalued and the foreign exchange premium is positive, the ratio of the shadow exchange rate to the official exchange rate will be greater than one (when both are expressed in terms of units of local currency per dollar of foreign exchange). Use of a shadow exchange rate to convert the border prices of traded goods into local prices will have the effect of inflating these border prices until they equal the amount that people are willing to pay, or receive, for traded goods.

These inflated traded goods prices will then reflect the true value placed on traded goods vis-à-vis non-traded goods. As these traded goods will now be valued in domestic price equivalents they will be directly comparable with the project's non-traded inputs and outputs valued in domestic prices. When using the domestic price approach, a project's non-traded inputs and outputs are simply valued in their domestic prices. As indicated earlier, adjustments should

first be made to the prices of non-traded goods to ensure that they reflect the true marginal social costs and benefits of consuming and producing these goods. This will be done by including consumers' surplus, but excluding producer surplus, and deducting transfers where appropriate.

No additional adjustment is made to non traded goods prices to reflect their overvaluation in relation to traded goods, the foreign exchange premium, as this would involve double counting. Both traded and non-traded goods will then be valued in comparable, domestic price equivalents and it will therefore be possible to add them together in the project's cash flow. The domestic price approach therefore corrects for the FEP by inflating the border price values of traded goods, using the economy's estimated SER, until these values correctly reflect the goods' relative worth compared with the domestic prices of non-traded goods.

In summary, the domestic price approach values:

Traded Goods	Non Traded Goods
@ Border price x SER	@ Domestic prices
↓	↓
Domestic price equivalent	Numeraire: domestic prices

Examples using the UNIDO approach

[I] Imported input

Table 1 below illustrates how the economic value of a project's imported textile inputs will be measured using the UNIDO approach. It has been estimated that the country has a foreign exchange premium of 30 per cent and the shadow exchange rate is therefore $(1 + 0.3) \times \text{OER}$. All tariffs and taxes are deducted from the domestic retail price of textiles and their tradable (foreign exchange) component is inflated by the shadow exchange rate to obtain the domestic price equivalent of the CIF import price. The economic cost of domestic transport and handling is then added.

Table1: Valuation of imported textile inputs using the UNIDO approach (Millions of Birr)

	Financial Cost	Economic Cost
CIF import price (@ OER)	250	
(@ SER = 1.3 x OER)		325
Import Tariff (40 Per Cent)	100	0
Internal Transport	50	50
Total	450	395
Handling and Distribution*	50	20

*60 per cent of these 'costs' represent rents earned from privileged access to foreign exchange, and are therefore not included in the economic cost of handling and distribution

Ratio of Economic Value to Financial Value= —

[II] Exported output

Table 2 below gives an example of the economic valuation of a project's exported garment output, using the UNIDO approach. The country again has a foreign exchange premium of 30 per cent. The foreign exchange earnings are inflated by the shadow exchange rate and all export subsidies are deducted from the fob export price to obtain the domestic price equivalent of the border price.

Table 2: Valuation of exported garment output using the UNIDO approach (\$'000)

	Financial Cost	Economic Cost
FOB output value (@ OER)	1200	-
(@ SER = 1.3 x OER)	-	1560
Export Tax (10 Per Cent)	-120	0
Transport to port* (including 50% fuel tax)	-40	-30
Total	1040	1530

*The market price of transport includes a 50 per cent fuel tax. Since fuel equals half of total transport costs its economic value = $40 - (40 \times 0.5 \times 0.5) = 30$

Ratio of Economic Value to Financial Value = —

[III] Non-traded input

The domestic price approach to the valuation of a non-traded input such as electricity is shown in Table 3 below. The financial cost of the electricity is its domestic sales price, Br.2 million, plus Br. 300,000 sales tax. If the non-traded input's supply can be increased, its economic value will be measured by its domestic market supply price, after any adjustments have been made for market imperfections such as taxes, price fixing, subsidies or monopoly pricing. If the project uses electricity that must be bid away from existing consumers, then the electricity should be valued at the price that people are willing to pay for it, its demand price. In the example above, electricity is a private monopoly and monopoly rents are found to represent Br. 500,000 of the total Br. 2 Million supply price of electricity. If the project uses electricity that must be bid away from existing consumers, then the monopoly rents should be included when measuring its economic value, as people are willing to pay this total amount, including these rents for this electricity.

Monopoly rents are only treated as a transfer and excluded if the supply of electricity can be expanded to meet the project's needs. In this case only the cost to the economy of producing additional electricity is the relevant economic cost. Of the project's total electricity input requirements, 40 per cent will be met by displacing existing consumers and 60 per cent will be met by expanding supply. The economic cost of this displaced consumption is the total amount that people were willing to pay for this electricity, including monopoly rents and sales tax. Approximately Br.200, 000 (40 percent of Br. 500,000) of the monopoly rents should therefore be included in the economic value of the input, but the remaining Br. 300,000 should not be

included. Similarly, approximately 40 percent of the sales tax (Br.120, 000) should be included in the economic value of the input, the part that is met by displacing existing consumers, but the remaining Br. 180,000 of sales tax should not be included in the project's economic costs.

Table 3: Valuation of 1 Giga watt of electricity input using the UNIDO approach (Br. '000)

	Financial Cost	Economic Cost
Domestic Sales price (before tax)	2000	-
Cost of new production	1200	900*
Cost of displaced consumption:	800	800
Of which monopoly rents are:	(500)	(200)
Sales Tax	300	120
Total	2300	1820

*The economic cost of newly produced electricity; is obtained as $(2000 \times 0.6) - (500 \times 0.6) = 1200 - 300 = 900$, since that part of monopoly rents that is earned on newly produced electricity is only a transfer.

Ratio of Economic Value to Financial Value=—

[IV] Non-traded output

If instead the project is producing electricity a non-traded output, the UNIDO approach to valuing this electricity is as shown in the Table 4 below. If the entire project's output meets new demand its economic value is simply its domestic market demand-price, as long as there is no price fixing or rationing. In this case all new output represents an increment in supply. Consequently, all monopoly rents and sales taxes imposed should be included in measuring the economic benefits of the project, as this is the amount people are willing to pay for the electricity. The electricity authority does not receive the sales tax paid on electricity, so it is not a financial benefit to it.

Table 4: Valuation of 1 Giga watt of electricity output using the UNIDO approach (Br. '000)

	Financial Cost	Economic Cost
Domestic Sales price:	2000	2000
Of which monopoly rents are:	(500)	(500)
Sales Tax*	0	300
Total	2000	2300

*Sales tax is included as an economic benefit because the country's government will receive the tax revenue even though the electricity authority will not

Ratio of Economic Value to Financial Value =—

4.4.1.3.Impact on Income Distribution

Many governments regard redistribution of income in favor of economically weaker sections or economically backward regions as a socially desirable objective. Due to practical difficulties in

pursuing the objective of redistribution entirely through the tax, subsidy, and transfer measures of the government, investment projects are also considered as investments for income redistribution and their contribution toward this goal is considered in their evaluation. This calls for suitably weighing the net gain or loss by each group, measured earlier, to reflect the relative value of income for different groups & summing them. Stages three and four of the UNIDO method are concerned with measuring the value of a project in terms of its contribution to savings and income redistribution.

To facilitate such assessments, we must first measure the income gained or lost by individual groups within the society. **Groups:** For income distribution analysis, the society may be divided into various groups. The UNIDO approach seeks to identify income gains and losses by the following: Project, Other private business, Government, Workers, Consumers, and External Sector. There can, however be, other equally valid groupings. **Measure of Gain or Loss:** The gain or loss to an individual group within the society as a result of the project is equal to the difference between the shadow price and the market price of each input or output in the case of physical resources or the difference between the price paid and the value received in the case of financial transaction.

Example1: Farmers in a certain area use 1 million units of electricity generated by a hydro-electric project. The benefit derived by them, measured in terms of the willingness to pay is equal to Br. 0.4 million. The tariff paid by them to the electricity board is Br. 0.25 million. So the impact of the project on the farmers gain of Br. 0.15 million. $(0.4 - 0.25 \text{ million})$

Example2: A mining project requires 1000 laborers. These laborers are prepared to offer themselves for work at a daily wage rate of Br. 8.00. (This represents their supply price.) The wage rate paid to the laborers, however, is Br. 10 per day. So the redistribution benefit enjoyed by the group of 1000 laborers is Br. 2000 $(1000 \times (10 - 8) \text{ per day})$.

4.4.1.4. Savings impact and its value

Most of the developing countries face scarcity of capital. Hence, the governments of these countries are concerned about the impact of a project on savings and its value thereof. Stage three of the UNIOO method, concerned with this and seeks to answer the following questions: Given the income distribution impact of the project what would be its effects on savings? What is the value of such savings to the society? **Impact on Savings:** The savings impact of a project is equal to:

Where: Y_i = Change in income of group i as a result of the project.

MPS_i = Marginal propensity to save of group i

Example: As a result of a project the change in income gained/lost by four groups is:

Group 1=10000; Group 2=50000; Group 3=-20000; and Group 4=-40000.

The marginal propensity to save of 4 groups is : $MPS_1=0.05$; $MPS_2=0.10$; $MPS_3=0.20$; and $MPS_4 = 0.40$.

The impact on savings of the project=

$$10000 \times 0.05 + 50000 \times 0.10 - 20000 \times 0.20 - 40000 \times 0.40 = -14500.$$

4.4.1.5. Adjustment for Merit and Demerit Goods

In some cases, the analysis has to be extended beyond stage four to reflect the difference between the economic value and social value of resources. This difference exists in the case of merit goods and demerit goods. A merit good is one for which the social value exceeds the economic value. For example, a country may place a higher social value than economic value on production of all because it reduces dependence on foreign supplies. The concept of merit goods can be extended to include a socially desirable outcome like creation of employment. In the absence of the project, the government perhaps would be willing to pay unemployment compensation or provide more make-work jobs.

In the case of a demerit good, the social value of the good is less than its economic value. For example, a country may regard alcoholic products as having social value less than economic value. The procedure for adjusting for the difference between social value and economic value is as follows:

- Estimate the economic value.

- Calculate the adjustment factor as the difference between the ratio of social value to economic value and unity.

- Multiply the economic value by the adjustment factor to obtain the adjustment

- Add the adjustment to the net present value of the project.

To illustrate, consider a project for which the following information is available:

The present economic value of the output of the project is Br. 25 million.

The output of the project has social value, which exceeds its economic value by 20 per cent. Given this information, the adjustment factor would be 0.2 (120 per cent/100 per cent - 1).

Multiplying the present economic value by 0.2, we get an adjustment of Br. 5 million. This, then, is added to the present economic value of Br. 25 million. Where the socially valuable output of the project does not appear as an output in the economic analysis - as is the case where the project generates employment - the procedure is somewhat different. In such a case the output is treated like an externality and its valuation in social terms is the adjustment.

While the adjustment for the difference between the social value and economic value is seemingly a step in the right direction, it is amenable to abuse. Once, the analyst begins to make adjustment for social reasons, projects which are undesirable economically maybe made to appear attractive after such adjustments. Since the dividing line between 'political' and 'social' is rather nebulous, it becomes somewhat easy to push politically expedient projects, irrespective of their economic merit by investing them with social desirability. While there is no way to prevent such a manipulation, the stage-by-stage UNIDO approach mitigates its occurrence by throwing it in sharp relief.

4.4.2. Little and Mirrlees Approach

The Little and Mirrlees approach (sometimes known as the border price approach), also values traded goods at their border prices, in the same way as the UNIDO (domestic price) approach. However, these border prices are then converted into local currency at the official exchange rate rather than at a shadow exchange rate. The project's traded good inputs and outputs are effectively kept in their border prices. However, if there is a foreign exchange premium in the country concerned the prices of non-traded goods will have risen to match the tariff inclusive prices of tradable. The price of non-tradable will therefore overstate the goods' true value to consumers, relative to the border prices of traded goods. The border price approach therefore revalues these non-traded goods in border price equivalents using commodity specific Conversion Factors.

These conversion factors are the ratio of the border price equivalent of each non-traded good to its domestic price. Multiplying the domestic price value of a non-traded good by its conversion factor has the effect of converting the good's domestic price into its border price equivalent. Both traded and non-traded goods are then valued in the same numeraire, i.e., border prices, so it will be possible to include them together in the project's cash flow. This is the reason why this method can also be called the border price approach. The Little-Mirrlees approach makes traded and non-traded goods prices comparable by precisely the inverse method to that used by the UNIDO approach, which values both traded and non-traded goods in comparable, domestic prices. In summary this approach values:

Traded Goods	Non Traded goods
@ Border price x OER	@ Domestic price i x Cfi
↓	↓
Numeraire: border prices	Border price equivalent

Practical Examples of the Little - Mirrless Approach

[I] Imported input

For purposes of comparison, we shall use similar examples to the ones used under the UNIDO approach. If the analyst decides to use the border price approach to incorporating the foreign exchange premium, a project's imported textile inputs would be valued as shown in Table 5 below. All tariffs and taxes are deducted from the domestic retail price but the foreign exchange component of the input is valued at the official exchange rate, so that it is expressed in border prices. Non-traded components such as transport and internal handling and distribution, on the other hand, are valued in border price equivalents using individual conversion factors.

Table5: Valuation of imported textile inputs using the L-M approach (Br.'000)

	Financial Cost	Economic Cost
CIF import price (@ OER)	250	250
Import Tariff (40 Per Cent)	100	0
Internal Transport*	50	40
Handling and Distribution**	50	14
Total	450	304

*The conversion factor for transport, CF_t which puts the domestic price of transport into its border price, = 0.8, hence the transport's economic value = $50 \times 0.8 = 40$

**60 per cent of this item represents rents earned from privileged access to foreign exchange. In addition, the conversion factor for handling, CF_h, = 0.7.

Hence economic value = (financial value $\times$ 0.4) $\times$ CF_h = $20 \times 0.7 =$

14 Ratio of Economic Value to Financial Value=—

[II] Exported output

As shown in Table 6 below, to value the exported garment output of a project using the border price approach the foreign exchange component is converted into local currency using the official exchange rate and any export taxes and subsidies are treated as transfers and are deducted. Once again, non-traded components will be valued in their border price equivalents using their own conversion factors.

Table 6: Valuation of exported garment outputs using the L-M approach (Br.'000)

	Financial Cost	Economic Cost
FOB output price (@ OER)	1200	1200
Export Tax (10 Per Cent)	-120	0
Transport to Port*	-40	-24
Total	1040	1176

*The 50 per cent fuel tax is deducted (fuel = half transport costs), and CF_t = 0.8, hence the transport's economic value = $[40 - (40 \times 0.5 \times 0.5)] \times 0.8 = 24$

Ratio of Economic Value to Financial Value = —

[III] Non-traded input

The valuation of non-traded electricity inputs using the L-M approach is shown in Table 7 below. As in the example in Table3, 60 per cent of the project's electricity requirements will be met by new production and 40 per cent by displacing existing consumers. The electricity is valued at its border price equivalent by multiplying its corrected domestic prices, as calculated in Table 3, by its commodity specific demand and supply price conversion factors, CF_{dpi} and CF_{spi}. These conversion factors are the ratio of the economic price (border price equivalent) to the financial (market price) of electricity.

Table 7: Valuation of 1 giga watt of electricity input using the L-M approach (Br.'000)

Cost	Financial Cost	Economic
Domestic Market Price:	2000	
Of which monopoly rents are:	(500)	
Sales Tax	300	0
Cost of new production*	1200	630
Supply Price Conversion Factor for Electricity, CFsp		0.7
Sales Tax (0.6 x 300)	180	0
Cost of Displaced Consumption** (pretax)		800
640		
Demand Price Conversion Factor for electricity, CFdp		0.8
Of which monopoly rents are:	(200)	(160)
Sales Tax (0.4 x 300)	120	48
Total	2300	1318

*Economic cost of new production in border prices = economic cost in domestic prices x CFsp = 900 x 0.7 = 630, see notes at the bottom of Table.2 for an explanation of the derivation of the economic cost of new production and displaced consumption in domestic prices

**Economic cost of displaced consumption in border prices = economic cost in domestic prices (including sales taxes) x CFdp = 800 x 0.8 = 640

Ratio of Economic Value to Financial Value = —

[IV] Non-traded output

The method of valuing non-traded electricity output using the border price approach is shown in Table 8. If all of the project's electricity output meets new demand, its economic value is its domestic market demand price, including any monopoly rents and sales taxes, multiplied by the demand price conversion factor relevant to electricity output. This CFdp for electricity has already been assumed to be 0.8.

Table 8: Valuation of 1 giga watt of electricity output using the L-M approach (Br.'000)

Cost	Financial Cost	Economic
Domestic Market Price (pretax):	2000	
Of which monopoly rents are:	(500)	
Sales Tax	300	
Value of new consumption (pretax)	2000	1600
Demand Price Conversion Factor for Electricity, CFdp		0.8
Of which monopoly rents are:	(500)	(400)
Sales Tax (0.8 x 300)	0	240
Total*	2000	1840

*Economic value of new electricity consumption in border prices = economic value in domestic prices (including sales taxes) x CFdp = 2300 x 0.8 = 1840

Ratio of Economic Value to Financial Value =——

4.4.3. Usage, Advantages and Disadvantages of the Two Approaches

The L-M approach is probably the more widely used of the two approaches, according to recent surveys of the practice of social cost benefit analysis. This is probably because it has been adopted by major international lending institutions like the World Bank and several of the regional development banks like the Asian Development Bank and Inter-American Development Bank. The border price approach is easier to use when analyzing projects that use mainly traded good inputs and produce traded good outputs, such as export-oriented industries. Tradable goods and services can be readily valued in border prices and converted to local currency at the official exchange rate. The main claim to superiority of the border price approach is that it may enable more precise estimates to be made of the economic value of the project by making use of individual conversion factors for non-traded goods.

These show the precise impact of the project on welfare, in border prices. Because the L-M approach uses many individual conversion factors and the data requirements for estimating each conversion factor are less, the chance and consequences of making a major error may be reasonably low. On the other hand, for projects that mainly uses non-traded inputs and produce non traded outputs, such as local infrastructure and social service projects, the UNIDO approach may be more appropriate and simpler to use. In this case these non tradable can be simply left in their domestic price values once corrections have been made for domestic distortions. It could be claimed that the UNIDO approach gives a less precise measure of the project's impact on economic welfare as a result of its use and production of traded goods. This is because the method uses only one parameter, the SER, to revalue traded goods in domestic price values.

The SER is an average measure of the value placed on foreign exchange and consequently there are sound theoretical reasons for using it to revalue traded goods in domestic prices. However, there are empirical problems in accurately estimating a country's SER. As this parameter is so central to the UNIDO (domestic price) approach, there is scope for making substantial errors in a project appraisal if the analyst has made a mistake in the estimation of the SER. However, if a reliable estimate for the SER is available, this method may be simpler to implement, particularly if the project has many non traded inputs & outputs.

In summary, because of the difficulty of obtaining accurate data on the ratio of domestic to border prices for all traded goods in an economy, empirical estimates of shadow exchange rates can be subject to considerable uncertainty and may not be very satisfactory. In addition, the use of a shadow exchange rate in project appraisals may be politically unacceptable to a country as it can be seen as an admission of sub-optimal trade and foreign exchange regulation policies. For these reasons, among others, the World Bank and many other international institutions prefer to

use the Little and Mirrless approach to correct for the foreign exchange premium in an economic analysis. Nevertheless, both techniques are in common use and the analyst may vary the approach used depending on the nature of the project being appraised.

4.5. Cost Effectiveness

Thus far we have focused on cost-benefit analysis. This technique is appropriate for projects with benefits and costs that are measurable in monetary terms. A vast class of projects generates benefits that are not easily measurable in monetary terms. If the project measures its benefits in some non-monetary unit, the NPV criterion for deciding whether to implement it cannot be used. In such cases, economic analysis can still be a great help in project design and selection. We use it to help select among programs that try to achieve a given result, such as choosing among several methods to improve mathematical skills. Economic analysis is also useful to select among methods that have multiple outcomes. For example, three methods might be available for raising reading speed, comprehension, and word knowledge. Each method may have a different impact on each of the three dimensions and on cost. Economic analysis enables us to compare the costs of various options with their expected benefits as a basis for making choices.

Two main techniques exist for comparing projects with benefits that are not readily measurable in monetary terms: Cost effectiveness and Weighted Cost effectiveness. In all cases we measure costs as shown in the previous sections. The main difference between the approaches is in the measurement of benefits. If the benefits are measured in some single non-monetary units, such as number of vaccines delivered, the analysis is called cost-effectiveness. If the benefits consist of improvements in several dimensions, for example, morbidity and mortality, then the several dimensions of the benefits need to be weighted and reduced to a single measure. This analysis is known as weighted cost-effectiveness. The choice of technique depends on the nature of the task, the time constraints, and the information available. We would use cost-effectiveness for projects with a single goal not measurable in monetary terms, for example, to provide education to a given number of children.

When the projects or interventions aim to achieve multiple goals not measurable in monetary terms, we use weighted cost-effectiveness; for example, several interventions may exist that simultaneously increase reading speed, comprehension, and vocabulary, but that are not equally effective in achieving each of the goals. A comparison of methods to achieve these aims requires reducing the three goals to a single measure, for which we need some weighting scheme. All evaluation techniques share some common steps. The analyst must identify the problem, consider the alternatives, select the appropriate type of analysis, and decide on the most appropriate course of action. This topic provides the tools for identifying the costs and benefits and assessing whether the benefits are worth the costs.

4.5.1. Cost Effectiveness Analysis

Cost effectiveness analysis is a technique closely related to cost benefit analysis .it differs in that it asks a different question, namely given a particular objective, which is the least cost way of achieving it? It aids choice between options but cannot answer the question whether or not any of the options are worth doing. It is utilized when there are difficulties in associating monetary values with the outcomes of projects but where the outcomes can be quantified along some non-monetary dimension. In cost-effectiveness analysis, we measure the benefits in non-monetary units, such as test scores, number of students enrolled, or number of children immunized.

Cost effectiveness in education: As an example, suppose we want to evaluate the cost effectiveness of four options to raise mathematics skills:

- Small remedial groups with a special instructor
- A self-instructional program supported with specially designed materials
- Computer-assisted instruction
- A program involving peer tutoring

We first estimate the effect of each intervention on mathematics skills as measured by, say, test scores, while controlling for initial levels of learning and personal characteristics. Suppose we find that students taught in small groups attain scores of 20 points, those undergoing the self-instructional program score 4 points, those with computer-assisted instruction score 15 points, and those in the peer-tutored group score 10 points (table 9). These results show that small group instruction is the most effective intervention. Now consider cost-effectiveness. Suppose that the cost per student is US\$300 for small group instruction, US\$100 for the self-instructional program, US\$150 for computer-assisted instruction, and US\$50 for peer tutoring. The most cost-effective intervention turns out to be peer tutoring; it attains one-half the gain of small group instruction at only one-sixth the cost for a cost-effectiveness ratio of only 5 (see table 9). Cost-effectiveness analysis can be used to compare the efficiency of investment in different school inputs.

Table 9: Hypothetical cost-effectiveness ratios for interventions to improve mathematics skills

Intervention	Size of effect on test scores	Cost per student (US\$)	Cost effectiveness ratio
Small group instruction	20	300	15
Self-instructional materials	4	100	25
Computer-assisted instruction	15	150	10
Peer tutoring	10	50	5

Cost-effectiveness ratios must always be used with caution. In the above example, peer tutoring is the most cost-effective intervention. If we have several cost effectiveness (CE) ratios and either the numerator or the denominator has exactly the same value in all cases, CE ratio can be

used safely for decision-making. CE ratios would be safe to use if the benefits had differed, but the cost per student had been the same for each intervention. If, however, both the measure of benefits – test scores in this case – and the costs per student vary among interventions, the analyst should use CE ratios with caution.

In the example above computer assisted instruction produces a gain of five points over peer tutoring at an additional cost of US\$100, or US\$20 per point. To choose peer tutoring over computer-assisted instruction solely on the basis of CE ratios would be tantamount to saying that the marginal gain in test scores is not worth the marginal expense. When using CE ratios, we advise analysts to ask the following three questions:

Can I increase the intensity of an intervention and improve the results?

Can I combine interventions and improve the results?

Is the intervention's marginal gain worth the extra cost?

Cost Effectiveness in Health

We can use cost-effectiveness in evaluating interventions that aim to improve the health of a population. Suppose that we want to design a program of immunization that would provide the maximum improvement in health for allocated program funds. The package could include only DPT (a combination of diphtheria, pertussis, and tetanus vaccines) for the child and T (tetanus toxoid) for the mother, or it could also include BCG (Bacille Calmette Guérin, used to prevent tuberculosis) for the child. We would want to examine the economic advisability of adopting a DPTT program, a BCG program, or a combined DPTT plus BCG program rather than continuing with the existing low level of immunization and treatment of morbidity for diphtheria, pertussis, and tetanus.

Having mounted a DPTT program, suppose we want to examine the advisability of adding a BCG program and vice versa. Table 10 summarizes the incremental costs and benefits of adding an expanded program of immunization to the existing program of health services. We measure the benefits of the project in terms of the deaths prevented, as calculated from a simple epidemiological model. We base this model on the number of immunizations, the efficacy of the vaccines, and the incidence and case fatality rates of the diseases involved. The most effective alternative is a complete immunization program. A DPT only immunization program, however, is just as cost effective.

If the budget constraint were US\$115 million, the most cost-effective feasible alternative would be a program of DPT immunization. This example starkly illustrates the limitations of CE ratios. In line 1, DPT only is just as effective as line 3, a total immunization program. The cost per life saved for either program is about US\$480. Adding BCG to an existing program of DPTT, however, saves an additional 29,500 lives at a cost of US\$14 million, or US\$475 dollars per life. Forgoing adding the BCG program to DPT on the grounds of CE ratios alone would be tantamount to saying that each additional life saved is not worth US\$475.

Table 10: Cost-benefit comparison of immunization alternatives

Alternative	Benefits (Death prevented)	Costs (US\$ millions)	Cost-benefit ratio
DPTT only	231,900	111	478.7
BCG only	29,500	61	2,067.8
DPTT+BCG	261,400	125	478.1
Existing BCG,DPTT added	231,900	64	276.0
Existing DPTT,BCG added	29,500	14	474.6

Assessing Unit Costs

We use unit costs for comparing the intervention's efficacy within and across countries. In education, for example, analysts often wish to know the average cost per student of a particular intervention. Calculating the unit costs of a mature intervention that has reached a steady state is the simplest of problems, as all the capital costs have already been incurred. The recurrent costs and the number of students enrolled are fairly stable. Assessing unit costs for a new intervention is more difficult. Capital costs are typically higher in the initial years, and enrollment and graduates are typically higher once the project is working at full capacity. Thus, comparing costs and benefits that occur at different points in time is necessary. The tools of economic analysis are helpful in these instances as well. Given the cost and benefit profile of the project, the analysis can discount the benefit and costs flows and compare them at a single point in time.

Consider Higher and Technical Education Project. One of the purposes of this project was to increase the number of graduates coming out of the University of the Country and the three polytechnic schools. The investment costs, which would be distributed over five years, amounted to Birr 343 million (present value discounted at 12 percent). The recurrent costs would be proportional to the number of students and would rise from about Birr 4 million in the initial year to about birr 21 million once full capacity had been reached. The discounted value of the recurrent costs over the life of the project was assessed at Birr 143 million. Enrollment, on the other hand, would rise slowly from 161 students in the initial years, to about 3700 at full capacity. To assess the cost per student, the number of students enrolled throughout the life of the project was discounted at 12 percent.

The discounted number of students was calculated at 13,575 students and the cost per enrolled student at US\$2048 at the then prevailing market exchange rate. Similar calculations show the cost per graduate at about US\$8700. Analysts could use the same methodology to assess the unit costs of interventions in health or in any project where the output is not easily measured in monetary terms. For the moment, suffice it to say that by using this procedure, analysts are discounting the project's benefits. The number of students enrolled is a proxy for these benefits. In this sense, the procedure is, in principle, the same as for projects with benefits measurable in monetary terms.

4.5.2. Weighted Cost-Effectiveness

Sometimes project evaluation requires joint consideration of multiple outcomes, for example, test scores in two subjects, and perhaps also their distribution across population groups. In such situations, the analyst must first assess the importance of each outcome with respect to single goal, usually a subjective judgment derived from one or many sources, including expert opinion, policymakers' preferences, and community views. These subjective judgments are then translated into weights. Once the weights are estimated, the next step is to multiply each of the outcomes by the weights to obtain a single composite measure. The final step is to divide the composite measure by the cost of the options being considered. The results are called weighted cost-effectiveness ratios.

Application in Education

Suppose that employing better-qualified teacher raises mathematics scores more than language scores. To evaluate the two options for improving student learning, the analyst must compare the effect of each option on mathematics and language performance. The analyst could apply equal weights to the gains in test scores, but if mathematics is judged to be more important than language, policy makers may prefer to weight scores differently to reflect the relative importance of the two subjects. Owing to the many dimensions of learning, the need for weighting may arise even when only one subject is involved.

Consider the data in table 11 which show the effects of two improvement strategies for three dimensions of reading skills, as well as the weights assigned by experts to these skills on a scale of 0-10 points. Assigning the weights is the trickiest part of the exercise; the rest of the calculation is mechanical. Dividing the weighted scores by the cost of the corresponding intervention gives the weighted cost-effectiveness ratio for comparing the interventions. At a cost of US\$95 per pupil for intervention A and US\$105 per pupil for intervention B, the option with the more favorable ratio is the latter.

Table 11: Weighting the outcomes of two interventions to improve reading skills

Category	Weights assigned by expert opinion	Intervention Aa	Intervention Bb
Reading speed	7	75	60
Reading comprehension	9	40	65
Word knowledge	6	55	65
Weighted test score b	n.a	1215	1395
Cost per pupil	n.a	95	105
Weighted cost-effectiveness ratio	n.a	12.8	13.3

n.a. Not applicable

a. the scores on each dimension of outcome are measured as percentile ranking

b. The weighted score is calculated by multiplying the score for reading speed, reading comprehension, and word knowledge by the corresponding weight and summing up the result. The weighted score of 1215 for intervention A equals $(7 \times 75 + 9 \times 40 + 6 \times 55)$.

Note that this procedure becomes meaningful only when the analyst scores outcomes on a comparable scale. We could not compare, say, reading speed in words per minute with reading comprehension in percentage of material understood. The reason is that the composite score would then depend on the scale used to measure the individual scores. The metric used must be the same for all dimensions being compared. One procedure is to express all the scores in terms of percentile rank, as in the earlier example. Applying the appropriate weights to the scores then provides the desired composite score.

Application in Health

Weighted cost-effectiveness is also useful for assessing health projects. Going back to the immunization example considered before, the immunization interventions reduce morbidity as well as mortality. A given intervention might have different impacts on the reduction of these two indicators. To choose among several interventions would require weighting morbidity and mortality to produce a single measure of benefits. It has become increasingly common to measure and aggregate reduction in morbidity and premature mortality in terms of years of life gained.

Table 12 Benefits from interventions: years of life gained from immunization program

Category	Mortality	Morbidity	Total	Gain from DPT only	Gain from BCG only
Benefits (years)	56,000	16,992,000	17,048,000	15,127,000	1,921,000
Costs (US\$ millions)	n.a	n.a	125	111	61
Cost-effectiveness ratios	n.a	n.a	7.3	7.3	31.8

n.a Not applicable

Table 12 shows the costs and benefits of three interventions with the benefits calculated in terms of health years of life gained, which are calculated as the sum of the difference between the expected duration of life with and without the intervention plus the expected number of years of morbidity avoided as a result of the intervention. The analyst calculates the years of life gained from reductions in mortality and morbidity by using the same epidemiological model applied to calculate deaths prevented by adding the computation of cases, information on the average duration of morbidity, & years of life lost based on a life table.

4.5.3. Comparing Option with Subjective Outcomes

Sometimes no quantitative data exist that relate interventions to outcomes. Suppose that we want to assess two options to improve performance in mathematical and reading, but have no data on test scores. The evaluator could first ask experts to assess the probability that test scores in the two subjects will rise by a given amount, say by one grade level, under the interventions being considered, and then weighting these probabilities according to the benefit of improving test scores in the two subjects. To elaborate, suppose informed experts judge the probability of raising mathematics scores to be 0.5 with strategy A and 0.3 with strategy B. Experts also judge the probability of raising reading scores to be 0.5 with strategy A and 0.8 with strategy B. The

information is insufficient to choose between the strategies, however, because neither dominates for both subjects. The weighted cost-effectiveness approach overcomes this difficulty by asking policymakers or other relevant audiences to assign weights to the gain in test scores.

Some important caveats

When quantitative data on the relationship between project interventions and their outcomes are available, and when only a single dimension of outcomes matters, cost-effectiveness analysis offers a systematic tool for comparison. The method does not incorporate subjective judgments. When such judgments enter into measuring project outcomes, the method is called weighted cost effectiveness analysis. The main advantage of weighted cost-effectiveness analysis is that we use it to compare a wide range of project alternatives without requiring actual data. The reliance on subjective data gives rise to important shortcomings in weighted cost-effectiveness analysis. These shortcomings related to two questions: Who should rank the benefits of the options being considered? How should the ranking of each person or group be combined to obtain an overall ranking? Choosing the right respondents is critical.

An obvious group to consult comprises people who will be affected by the interventions. However, other relevant groups include experts with specific knowledge about the interventions and government officials responsible for implementing the options and managing the public resources involved. Given that the choice of respondents is itself a subjective decision, different evaluators working on the same problem almost invariably arrive at different conclusion using weighted cost-effectiveness analysis. The method also does not produce consistent comparisons from project to project. Analysts must be careful when consolidating individual rankings. Preference scales indicate ordinal, rather than cardinal, interpretations.

One outcome may assign a score of eight as superior to one assigned a score of four, but this does not necessarily mean that the first outcome is twice as preferable. Another problem is that the same score may not mean the same thing to different individuals. Finally, there is the problem of combining the individual scores. Simple summation may be appealing, but as pointed out in a seminal paper on social choice, the procedure would not be appropriate if there were interactions among the individuals so that their scores should really be combined in some other way. Because of the problems associated with interpreting subjective weights in project evaluation, weighted cost effectiveness analysis should be used with extreme caution, and the weights be made explicit.

Chapter Review Questions

Part I: Read Each Expression and Choose the Most Appropriate Answer.

Which one of the following expression **cannot** represent the purpose of conducting economic analysis of a project?

To evaluate the profitability, sustainability and viability of investments from the project point of view

To assess a sustainable improvement in the welfare of project beneficiaries

To ascertain that the value of project benefits will exceed project costs

To ensure that scarce resources are allocated efficiently and raises the welfare of its citizens

To assess the productivity of all the resources committed to the project in the economy

An economically viable project requires that?

It represents the least-cost or most efficient option to achieve the intended project outcomes

It generates an economic surplus above its opportunity cost

It will have sufficient funds and well planned resources mobilization

It will have the necessary institutional structure for successful operation and maintenance

All of the above

Among the following expressions which one is the **wrong** about economic analysis of a project?

Comparison of alternatives helps planners choose the best way to accomplish their objectives

Groups that benefit from a project are not necessarily those who incur the costs of the project

Economic analysis of projects is necessarily based on certain future events

The cash flow profile of a project is often as important as the overall benefits

Costs and benefits should be quantified whenever reasonable estimates can be made

The main factors, which explain the difference in the values of the NPV, IRR and BCR assumed different in economic analysis and financial analysis **except**?

The items considered as inputs and outputs of the project

The prices used in the valuation of inputs and output

The procedure for undertaking economic analysis differ that of financial analysis

The treatment of taxes, subsidies and other transfer payments

None of the above

In a neo-classical world, domestic price is presumed to reflect marginal utility of consumption on the one hand, and marginal production cost on the other. The legitimacy of such an assumption is conditional upon certain well-known conditions being satisfied **except**?

Homogeneous goods (in quality)

Perfect knowledge of all economic agents and large number of competitors

Absence of externalities, acceptance of the ruling pattern of income distribution,

Ability of consumers to be the best judges of their welfare

None

Part II: Short Answer Questions.

What are the major questions that good economic analysis should answer and can serve as a checklist and a map for finding tools that could help answer those questions.

The UNIDO approach to SCBA involves five stages, each stage of which measures the desirability of the project from a different angle. Explain the five stages of UNIDO approach.

CHAPTER FIVE

PROJECT IMPLEMENTATION, MONITORING AND EVALUATION

Introduction

Dear learner! In this chapter, we would like to introduce you with the some ideas of project implementation and evaluation in the project work. It will be recalled that a project is an assemblage of people, financial resources and material facilities mobilized and organized for the purpose of attaining a well defined objective. The implementation of a project requires from the person in charge the display of managerial capacities in the widest sense of the term, in order to forecast, organize, direct and control the various operations. More specifically, an efficient planning system is an indispensable tool for the management of the project.

Learning Objectives

Dear distance learner! After completing this chapter, you will be able to:

- Understand some basics of monitoring and evaluation
- Realize the significance of monitoring and evaluation
- Know kinds of monitoring and evaluation
- Familiarize with procedures in monitoring and evaluation

Project management/implementation is the project cycle, specifically evolved to coordinate and control the numerous activities of a project having complex interrelationships. The execution of a modern project, most of the times, is a race against time. The efficient utilization of resources and meeting the target dates had become highly complicated and involved and has necessitated the application of scientific techniques of planning, scheduling and control.

Once a project is selected, the focus shifts to its implementation. This involves the completion of numerous activities (project components) by employing various resources-men, materials, machine, money, and time-so that a project on paper is translated into concrete reality. The activities of a project have inter-relationships arising from physical, technical, and other considerations. For proper planning, scheduling, and control of the activities of a project, given their inter-relationships and constraints on the availability of resources, network techniques have been found quite useful.



Dear learner! Can you explain the concept of project implementation, monitoring and evaluation in the project work?

5.1. PROJECT IMPLEMENTATION

A. PRE-INVESTMENT PHASE

This stage deals with all issues related to the financial package (mobilizing the financial resources, conditions of disbursement getting -paying out, loan negotiations, and mobilizing the expertise necessary for the successful construction and operation of the project. It is at this stage

that loan negotiations are made. The financing package becomes more difficult to assemble in projects involving co-financing. Co-financing refers to cases where two or more lending agencies and/or donors join together in a coordinated way to undertake their loan activities and establish conditions for a particular project. Broadly speaking, co-financing takes two forms, namely, joint financing and parallel financing. In joint financing, the funds of the co-lenders are blended together and there is no attempt separately to finance clearly identifiable components of the project.

There is a common list of goods and services, and the financing of all or certain items is shared between the co-lenders in agreed proportions. In parallel financing, in contrast, the co-lenders deliberately would select certain project components, that is, they would finance development goods and service or parts of the project. For example, in a multi-purpose water development project, one agency might finance the electrical power-generation aspects; a second agency might finance the downstream activities of land development and agriculture support services, while a third might finance the dam and irrigation network.

Disbursement of the loans, recruitment of management and technicians, and supervision during construction and implementation of auxiliary programs necessary to ensure the supply of inputs are all the subordinate operational decisions taken during the pre-investment stage. Mobilizing the necessary financial resources for the project and mobilizing the expertise necessary for successful construction and operation of the project are all issues of pre-investment. The end result of loan negotiation is the drawing up of a set of loan documents, for example, loan agreement, or credit agreement, guarantee agreement, subsidiary loan agreement and/or joint project agreement which are legal instruments with covenants binding on both the lender and the borrower, and the guarantor, where applicable.

B. INVESTMENT PHASE

If the preparatory work in the pre-investment is finished and the result of the appraisal is positive, the implementation or execution phase follows, in which first a detailed design of the technical components is made. In this stage discrepancies may exist between the costs estimated and the actual costs to be incurred. If these discrepancies are large, the appraisal may lose its validity and may need to be redone. One of the objectives of any effort in project planning and analysis is to have a project that can be implemented to the benefit of the society. Thus, implementation is perhaps the most important part of the project cycle. 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. This emphasizes once again the need for careful attention to each aspect of project planning and analysis.

Project implementation must be flexible. Circumstances will change, and project managers must be able to respond intelligently to these changes. Technical changes are almost inevitable as the project proceeds. Price changes may necessitate different techniques of production or adjustments in inputs. Other changes in the project's economic or political environment will alter

the way in which it should be implemented. 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 re-plan parts of the project, or perhaps the entire project.

Project analysts generally divide the implementation phase into three different time periods:

Investment period: the period when Project investments are undertaken. This usually extends 3-5 years in agricultural and high scale infrastructure construction projects.

Development period: As the production builds up, the project is spoken of as being in the development period (may be 3-5 years additional). This period ranges from starting production until full capacity production.

Full development period: Once the full development is reached, it continues for the economic life of the project. After the project design is prepared negotiations with the funding organization starts and once source of finance is secured implementation follows. Implementation is the most important part of the project cycle. The better and more realistic the project plan is the more likely it is that the plan can be carried out and the expected benefits realized.

Project implementation must be flexible since circumstances change frequently. Technical changes are almost inevitable as the project progresses; price changes may necessitate adjustments to input and output prices; political environment may change. Translating an investment proposal into a concrete operational unit is a complex, time consuming and risk fraught task. Delays in implementation, which are common, can lead to substantial cost overrun. For expeditious implementation at a reasonable cost, the following are helpful.

Adequate formulation of projects. A major reason for the delay is inadequate formulation of projects. Put differently if necessary homework in terms of preliminary studies and comprehensive and detailed formulation of projects is not done, many surprises and shocks are likely to spring on the way. Hence the need for adequate formulation of the project cannot be overemphasized.

Use of the principle of responsibility accounting. Assigning specific responsibilities to project managers for completing the project within the defined time frame and cost limits is helpful in expeditious execution and cost control.

Develop project management competence: Use of network techniques. For project planning and control two basic techniques are available - PERT (program evaluation Review Technique) and CPM (Critical Path Method). These techniques have lately merged and are being referred to by common terminology that is network techniques. With the help of these techniques, monitoring becomes easier.

The investment phase can be divided into the following steps:

Establish project management office which involve establishing of the legal, financial and organizational basis for the implementation of the project

Technology acquisition and transfer, including basic and detailed engineering

Engineering design and Construction work

Installation and erection;

Pre-production marketing, including securing of supplies and setting up the administration of the firm

Recruitment and training of personnel, and

Plant commissioning and start-up.

This implementation basically involves capability in project management. The function of project management is to foresee or predict as many of the dangers and problems as possible and to plan, organize and control activities so that the project is completed successfully in spite of the risks. Project management is the planning, organizing, directing, and controlling of resources for a specific time period to meet a specific set of one-time-objectives. This process starts before any resources are committed and must continue until all work is finished. The aim is for the final result to satisfy the project sponsor or purchaser, within the promised timescale and without using more money and other resources than those, which were originally set aside or budgeted for. Since there are different types of projects, the management of these different types of projects is also different reflecting the peculiarity of the projects. Project management is a multifaceted process in which many different things get managed simultaneously. In managing projects we are normally involved in the following types of management:

- Scope management

- Time management

- Human resource management

- Cost management

- Quality management, and

- Communication management

For each of these activities it is necessary to plan, organize, direct, and control. Successful project management can then be defined as having achieved the project objectives: within efficient time & cost.

C. OPERATIONAL PHASE

Project operation involves the running and maintenance of new entity in accordance with set objectives and planned tasks. The problems of the operational phase need to be considered from both a short-and long-term viewpoint. The short-term view relates to the initial period after commencement of production when a number of problems may arise concerning such matters as the application of production techniques, operation of equipment or inadequate labour productivity owing to a lack of qualified staff. Most of these problems have their origin in the implementation phase. The long-term view relates to chosen strategies and the associated production and marketing costs as well as sales revenues. These have a direct relationship with the projections made at the pre-investment phase. If such strategies and projections are proved faulty and remedial measures will not only be difficult but may prove to be highly expensive.

The operational phase involves the following main functions.

Commissioning and starting of commercial production

Project commissioning is the process of assuring that all systems and components of a building or industrial plant are designed, installed, tested, operated, and maintained according to the operational requirements of the owner or final client. A commissioning process may be applied not only to new projects but also to existing units and systems subject to expansion, renovation or revamping. In practice, the commissioning process comprises the integrated application of a set of engineering techniques and procedures to check, inspect and test every operational component of the project, from individual functions, such as instruments and equipment, up to complex amalgamations such as modules, subsystems and systems. Commissioning activities, in the broader sense, are applicable to all phases of the project, from the basic and detailed design, procurement, construction and assembly, until the final handover of the unit to the owner, including sometimes an assisted operation phase.

Ex-post project evaluation

The final phase of the project is the evaluation phase. Many usually neglect this stage. The project analyst looks carefully at the successes and failures in the project experience to learn how better to plan for the future. In this stage it is important to examine the project plan and what really happened. Performance review should be done periodically to compare actual performance with projected performance. A feedback device, it is useful in several ways: (i) it throws light on how realistic were the assumptions underlying the project; (ii) it provides a documented log of experience that is highly valuable in future decision making; (iii) it suggests corrective action to be taken in the light of actual performance; (iv) it helps in uncovering judgment biases; (v) it induces a desired caution among project sponsors. Weakness and strengths should carefully be noted so as to serve as important lessons for future project analysis undertaking. Evaluation is not limited only to completed projects. Ongoing projects could also be evaluated to rectify problems when the project is in trouble. The evaluation may be done by the project management, the sponsoring agency, or other bodies.

Replacements/ Rehabilitation

Replacement investment is usually neglected in conventional project studies. However, the economic life of involved machineries and equipment is different. In fact the economic life of the envisaged firm/plant is determined on the basis of the economic life of the 'core' technology. A number of other technologies, specifically the hard ware technologies do have different economic life. Normally the Rehabilitation works are usually undertaken as a project, because not only they involve substantial investment, but also they have to be rationalized as whether to rehabilitate the existing facilities replace the entire plant or consider alternative ways of rehabilitation.

IV.Expansion/Innovation/

There are different economic forces that justify expansion and innovation. Given the nature of the technology is a matured one, without substantial change in the nature of the need and hence chance of proceeding with the same product, expansion may be a rational venture. On the other hand the industry could be dynamically changing. In such a state of changing industry, there is a need for at least keeping up with the truck of change or the firm may venture to be the setter of the competitive benchmarks of the industry.

Dear learner! Can you mention the three phases of project implementation?

5.2. Monitoring and Evaluation: What is Monitoring and Evaluation?

Throughout life we are monitored and evaluated: in school we receive grades, at work we are given performance appraisals, and we evaluate relationships and monitor our health. Before we use the formal definitions of monitoring and evaluation, let's use commonsense definitions: Evaluation asks the question "Are we doing the right thing" or "Do we have the right plan?" and Monitoring checks to see if we are following our plan. Monitoring and Evaluation is the systematic collection and analysis of information to enable managers and key stakeholders to make informed decisions, maintain existing practices, policies and principles and improve the performance of their projects.

Monitoring is the regular gathering analyzing and reporting of information that is needed for evaluation and/or effective project management. Monitoring is either ongoing or periodic observation of a project's implementation to ensure that inputs, activities, outputs, and external factors are proceeding according to plan. It focuses on regular collection of information to track the project. Monitoring provides information to alert the stakeholders as to whether or not results are being achieved. It also identifies challenges and successes and helps in identifying the source of an implementation problem.

Evaluation is a selective and periodic exercise that attempts to objectively assess the overall progress and worth of a project. It uses the information gathered through monitoring and other research activities and is carried out at particular points during the lifetime of a project. Evaluation is different from monitoring. Monitoring checks whether the project is on track; evaluation questions whether the project is on the right track. Monitoring is concerned with the short-term performances of the project, and evaluation looks more at long-term effects of project goals. Frequently, evaluation is perceived as an activity, carried out by an expert or a group of experts, designed to assess the results of a particular project. This is a common misconception. It is vital that evaluation is carried out with the participation of all project stakeholders, including beneficiaries. The results of a periodic evaluation are fed into the project planning process as quickly as possible to enhance the project's effectiveness.

Monitoring is useful because it tends to highlight little problems before they become big ones. An evaluation is a systematic examination of a project to determine its efficiency, effectiveness,

impact, sustainability, and the relevance of its objectives. The dictionary defines evaluation as a systematic investigation of the worth or merit of an activity. Traditionally, evaluation has been the last step in the project life cycle and in the project development process. However, it does not make sense to wait until the project is finished to ask the question “Did we do the right thing?” Indeed, you could evaluate the effectiveness at each stage of the project life cycle.

In a project the monitoring and evaluation group decides what to monitor. By collecting data regularly on activity inputs and outputs, processes, and results, the community can monitor the progress toward the group’s goals and objectives (e.g., income generated by the sale of a cookbook, how many people sold how many books over what period of time). In managing a project indicators are indispensable management tools. They define the data needed to compare the actual versus the planned results. M&E can be seen as a practical management tool for reviewing performance. M&E enables learning from experience, which can be used to improve the design and functioning of projects. Accountability and quality assurance are integral components of M&E, which help to ensure that project objectives are met, and key outputs and impacts are achieved.

5.3. Why Monitor and Evaluate?

M&E can help an organization to extract, from past and ongoing activities, relevant information that can be used as the basis for future planning. Without M&E how would it be possible to judge if a project was going in the right direction, whether progress and success was being achieved, and how future efforts might be improved? A structured M&E approach makes information available to support the implementation of projects and activities and will enhance the sustainability. Used effectively M&E can help to strengthen project implementation and encourage useful partnerships with key stakeholders. The main objectives of M&E are thus to:

- Ensure informed decision-making;
 - Enhance organizational and development learning;
 - Assist in policy development and improvement;
 - Provide mechanisms for accountability;
 - Promote partnerships with, and knowledge transfer to, key Stakeholders;
 - Build capacity in M&E tools and techniques.
- M&E is about feedback from implementation.
- The ultimate purpose of M&E is change for the better.

5.4. Different Kinds of Monitoring & Evaluation

M&E can deal with many issues. It can be M&E of projects, policy implementation, the performance of a unit in an organization, staff performance or, for example, deliveries from a subcontractor. This (course) module deals with M&E related to a project. The concepts, tools, and procedures for project M&E, as presented in this module, also helps to understand other

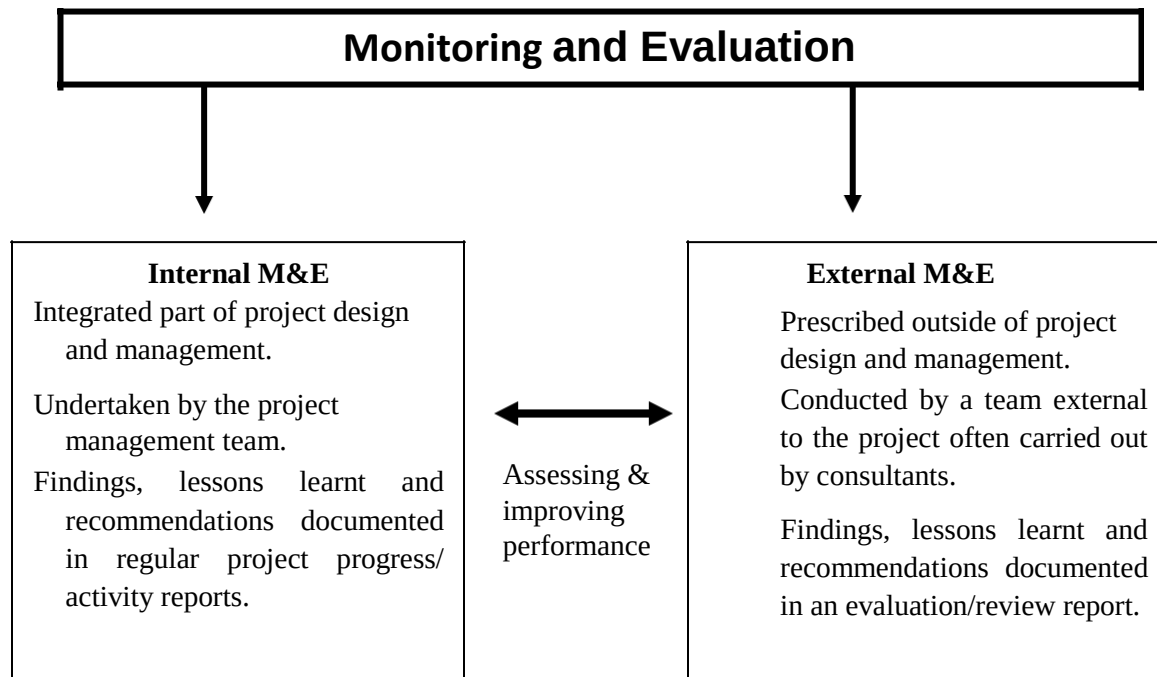
kinds of M&E.

Internal and External Project Monitoring & Evaluation

Internal Project M&E is built into the design of a project and is undertaken by the team that is responsible for management and implementation of the project. This is done to ensure that the project meets deadlines, stays within the budget and achieves its objectives, activities, outputs and impacts!. A project that does not monitor its implementation is not a well-managed project. Findings, recommendations etc of internal monitoring is usually captured in progress reports submitted by project management. External Project M&E is carried out by an outside team, which is not directly responsible for the management or implementation of the project. External M&E should assess the effectiveness of the internal M&E put in place by the project management team. External monitoring can take place once the project has been completed, and/or during implementation of the project.

External M&E is often required by donor agencies or government organizations if, for example, they need to know how their funds are being spent or if their policies are being adhered to. All projects can benefit from external M&E. Findings and recommendations of external monitoring are often documented in a review or evaluation report.

Figure 5.1: Differences Between Internal and External Monitoring & Evaluation



Dear learner! Can you explain the difference between project monitoring and evaluation?

Monitoring Levels

Traditionally, M&E focused on assessing the inputs and activities of a project. Today the focus is increasingly on measuring the outputs and impacts of a project to achieve a broader development objective or goal. Project inputs, activities and assumptions/risks are also important, however, as they all affect outputs. For example, if the budget (an input) is cut by 50%, this will obviously affect the outputs of the project and will need to be taken into account when conducting the M&E. The various monitoring levels in a project are:

Input Monitoring

Input monitoring is the monitoring of the resources that are put into the project - these include budget, staff, skills, etc. Information on this type of monitoring comes mainly from management reports, progress reports and accounting. For example, ways of measuring this can be the number of days consultants are employed, or the amount of funds spent on training and equipment.

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.

Output Monitoring

Output monitoring is a level between activity and impact monitoring. This type of monitoring assesses the result or output from project inputs and activities. The measurements used for output monitoring will be those which show the immediate physical outputs and services from the project.

Impact Monitoring

Impact monitoring relates to the objectives of the project. The aim of impact monitoring is to analyze whether the broader development objectives of the project have been met. Such monitoring should demonstrate changes that are fundamental and sustainable without continued project support.

Monitoring & Evaluation and Stakeholder Participation

The participatory approach to project management seeks to enable local communities living adjacent to projects and other local stakeholders to take part in decision-making and share the benefits of project activities. This participatory approach should also be applied to M&E. Participatory M&E can play an important role in ensuring that the participatory principles are put into practice by:

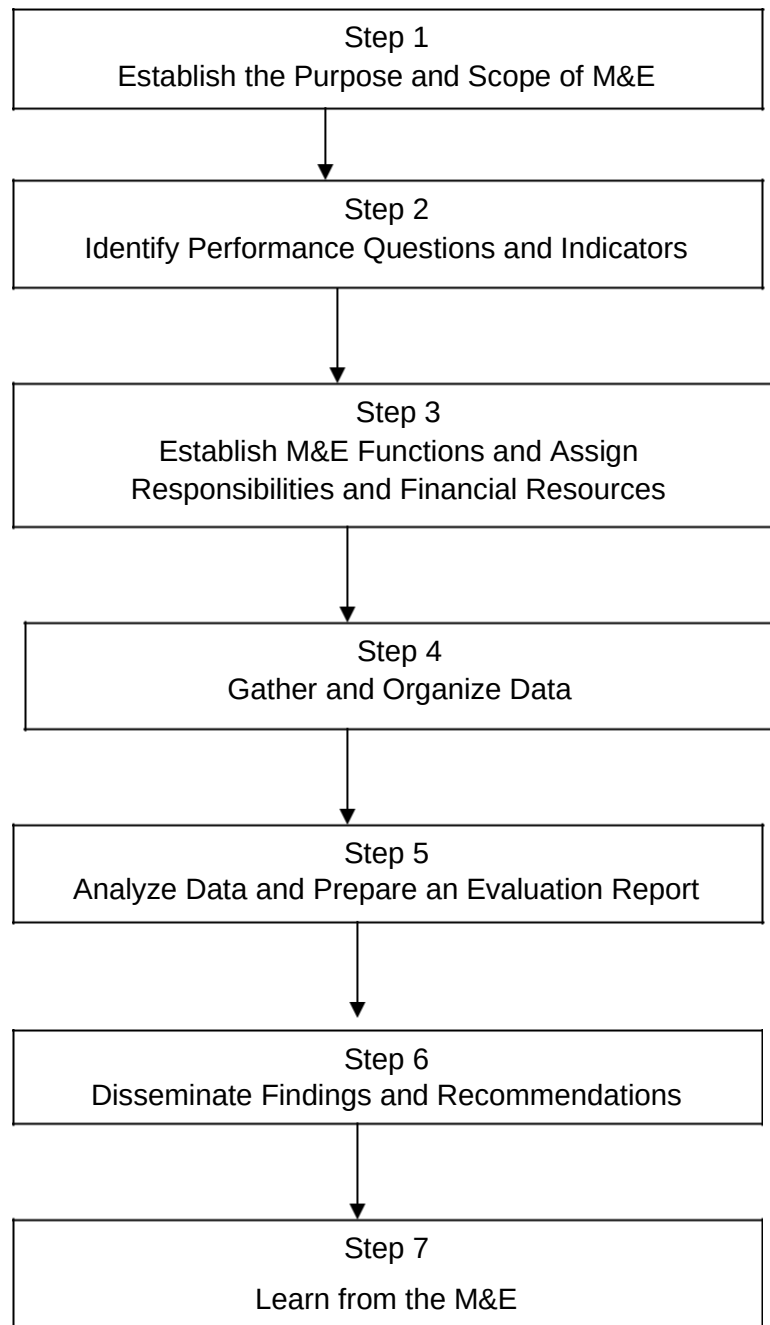
- Improving the effectiveness of project management and decision-making, as the parties who have been involved in M&E will be informed and aware of the results of the M&E procedure;
- Ensuring that accurate and reliable information is communicated to communities and stakeholders from the M&E process;
- Ensuring that stakeholders understand the reasons for failure in achieving project outputs and objectives and how and what to improve in the future;
- Providing mechanisms for transparency and accountability to stakeholders;
- Building community capacity in M&E tools and techniques.

Recommendations from M&E are more likely to be accepted and taken forward by stakeholders, if they have had an active role in shaping them.

5.5. The Monitoring and Evaluation Procedure

The M&E procedure below sets out the steps in planning and implementing external M&E. The M&E procedure must be customized to the specific needs of each project, taking into account the project objectives, inputs, outputs, activities, stakeholders and beneficiaries. The M&E steps will vary from situation to situation. Seven key steps are listed in Figure 5.2 and further explained in the rest of this chapter.

Figure 5.2: The M&E Procedure



Step 1: Establish the Purpose and Scope of M&E

Specifying the purpose and scope of the M&E helps to clarify what can be expected of the M&E procedure, how comprehensive it should be and what resources and time will be needed to implement it.

When formulating the purpose of M&E, relevant stakeholders including the project management team, should be consulted or at least made aware of and understand the purpose of the M&E.

Example of an External M&E Purpose

To verify that the development objective and outputs of the project have been achieved within the allocated budget. The scope of the M&E may be determined by asking some of the following questions:

- What is the purpose of M&E?

- How much money is available for your M&E?

- What type of information is required by project management, donor agents or other stakeholders?

- What is the level of M&E expertise available?

- To what extent should local communities and other stakeholders, participate in the M&E procedure?

Step 2: Identify Performance Questions and Indicators**Performance Questions**

A performance question is used to focus on whether a project is performing as planned and if not, why not. Performance questions will be guided by the broader development objective, the project objectives, the project outputs, as well as the M&E purpose. Once performance questions have been identified, it will be easier to decide what information is needed to evaluate the project. Table 1 gives examples of performance questions for the M&E of a particular project.

Indicators

Indicators should be guided by performance questions and linked to the purpose of the M&E. Indicators are basically measurements that can be used to assess the performance of the project. While performance questions help to decide what should be monitored and evaluated, indicators provide the actual measurements for M&E and determine what data needs to be gathered. The project itself may have indicators by which it monitors its own progress - these may be used for external M&E, if relevant. Also the funding organization and other stakeholders can provide broader indicators that may be relevant to the external M&E of the project.

Indicators, and therefore the data needed to verify them, can be qualitative or quantitative. Quantitative data is factual while qualitative information is based on opinions and perceptions

and thus may be subject to further interpretation. During M&E, one should aim to have both qualitative and quantitative indicators. Table 3 provides examples of quantitative and qualitative indicators.

Table 3: Examples of Quantitative and Qualitative Indicators

INDICATOR TYPES	EXAMPLES
Quantitative Indicators	. Fifty bundles of poles are harvested each month. . Five training courses were run during the project.
Qualitative Indicators	The pole harvesters regard the harvesting system as being sustainable Those who attended the training courses perceived the courses to be meeting the demands for skills in the area.

Relevant - The indicators should be directly linked to the project Objectives/ outputs.

Technically feasible - The indicators should be capable of being verified or measured and analyzed.

Reliable - The indicators should be objective: i.e. conclusions based on them should be the same if different people assess them at different times.

Usable - People carrying out the M&E should be able to understand and use the information provided by the indicators to evaluate the project.

Participatory - Relevant stakeholders should be involved in the collection of information generated by the indicators, the analysis of the information and possible use of the information in the future.

Step 3: Establish M&E Functions and Assign Responsibilities and Financial Resources

Establishing M&E functions and responsibilities at the beginning of the procedure can help to avoid major communication issues, conflicts of interest, duplication of tasks and wasted efforts. Organizing responsibilities means deciding which stakeholders will be involved and clarifying and assigning roles to these stakeholders as well as to funding organization officials, project management and any partner organizations. Stakeholders may need to be trained in different aspects of the M&E procedure

M&E will require financial resources in accordance with the type of project(s) that is being evaluated as well as the M&E purpose, performance questions and indicators. Among the items that should be included in M&E costs are:

Staff salaries;

Fees and expenses for consultants;

M&E training;

Organizing M&E meetings and other participatory exercises.

Consultants can play an important role in enabling projects to fulfill its M&E responsibilities by providing specialist knowledge and expertise that may not be readily available in the organization.

Step 4: Gather and Organize Data

Data is the oxygen that gives life to M&E. However, selecting methods of data collection can be confusing, unless it is approached in a systematic fashion. Rarely is anyone method entirely suitable for a given situation. Instead, using multiple methods helps to validate M&E findings and provides a more balanced and holistic view of project progress and achievements. The performance questions and indicators will provide guidance in deciding what data/information to gather and the methods to be used. Data can either be primary or secondary.

A. Data Sources and Data Collection Methods

Potential data sources and data collection methods are listed below:

Document Review: Documents and reports provide a rich source of information for M&E.

.Interviews : Interviews can provide a rich source of data, particularly in regard to qualitative and sensitive information that may not be readily available in official documents.

Surveys and Questionnaires: Surveys and questionnaires provide a way of obtaining information from a large number of people. Questions should be relevant and simple to answer.

Field Visits and Transect Walks Visits to the site of a project can provide valuable information about the environment in which the project is taking place, its impact on beneficiaries and the working methods that are being used. Transect walks are an effective participatory method to gather this information.

Expert Opinion Obtaining the views of experts who are knowledgeable about particular aspects of the project's activities can in some instances provide valuable insights that may not be revealed by other methods of data collection.

B. Organizing and Storing Data

Data needs to be captured, organized and stored so that it can be readily used for the M&E purposes.. Proper capturing, organizing and storage is particularly important when information has been collected from different sources with different methods.

Step 5: Analyze Data and Prepare an Evaluation Report

The captured and organized data needs to be analyzed, and findings and recommendations summarized and compiled into a report. In this regard, the performance questions and indicators can provide important assessment tools for the analysis. A final comparison with the outputs and impacts of the project should then be made. In this way performance, progress and achievements

of the project can be assessed.

Reporting

Feedback and reporting are key to both internal and external M&E as, in this way, information can be meaningfully combined, explained, compared and presented. All reporting should thus be as accurate and relevant as possible. As mentioned earlier, external M&E will frequently use the internal project progress reports and other relevant information as part of the information gathered to externally monitor and evaluate the project. For external M&E the report is usually called an evaluation or review report.

Step 6: Disseminate Findings and Recommendations

The evaluation reports, or summaries of these reports, should be widely distributed and presented to decision-makers and key stakeholders including those who were consulted in the M&E process.

Step 7: Learn from the M&E

Knowledge gained through M&E lies at the core of DW AF's organizational learning process. M&E provides information and facts that, when analyzed, understood and accepted, become knowledge that can be used to improve Project management. Besides learning about the progress/achievements of the project outputs, etc, it is essential to learn from what works regarding partnership strategies, project design and implementation, and to feed this knowledge back into ongoing and future projects and policies. This information also provides a means to regulate the sustainable management of state projects by other agencies. Project evaluations can help to bring development partners together, and when this occurs the learning from M&E goes beyond project to stakeholders involved in other development and natural resource management activities.

Chapter Review Questions

Part I: Read Each Expression and Choose the Most Appropriate Answer.

Delays in implementation, which are common, can lead to substantial cost overrun and; to reduce such discrepancies and expeditious implementation at a reasonable cost we should give due attention for?

- Adequate formulation of projects
- Use of the principle of responsibility accounting
- Developing a network for functions

In managing projects we are normally involved in the following types of management **except?**

- A. Scope management
- B. Time management
- Human resource management
- D. Cost management
- E. None

Which one of the following expression is **wrong** about project monitoring and its purpose?

Monitoring is the regular gathering, analyzing and reporting of information that is needed for effective project management.

Monitoring is either ongoing or periodic observation of a project's implementation to ensure that inputs, activities, outputs, and external factors are proceeding according to plan

Monitoring is a selective and periodic exercise that attempts to objectively assess the overall progress and worth of a project.

Monitoring provides information to alert the stakeholders as to whether or not results are being achieved.

Monitoring also identifies challenges and successes and helps in identifying the source of an implementation problem.

The various monitoring levels in a project includes all **except**?

Activity monitoring

D. Impact monitoring

E. None

Part II: Short Answer Questions.

Briefly explain the three important phases of project implementation and their relative functions.

Describe the main objectives of project monitoring and evaluation.

CHAPTER SIX

SOME BASICS OF IMPACT EVALUATION

Introduction

Dear learner! In this chapter, we would like to introduce you with the some ideas of project impact evaluation in the development intervention. An impact evaluation provides information about the impacts produced by an intervention - positive and negative, intended and unintended, direct and indirect. This means that an impact evaluation must establish what has been the cause of observed changes (in this case impact referred to as causal attribution (also referred to as causal inference). If an impact evaluation fails to systematically undertake causal attribution, there is a greater risk that the evaluation will produce incorrect findings and lead to incorrect decisions. For example, deciding to scale up when the program is actually ineffective or effective only in certain limited situations, or deciding to exit when a program could be made to work if limiting factors were addressed.

Learning Objective

Dear distance learner! After completing this chapter, you will be able to:

- Familiarize with the idea of project impact assessment
- Realize the methodologies used in impact evaluation

6.1. What is Impact Evaluation?

An impact evaluation provides information about the impacts produced by an intervention. The intervention might be a small project, a large programme, a collection of activities, or a policy. Many development agencies use the definition of impacts provided by the Organisation for Economic Co-operation and Development – Development Assistance Committee: “positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.” (OECD-DAC 2010).

This definition implies that impact evaluation:

- Goes beyond describing or measuring impacts that have occurred to seeking to understand the role of the intervention in producing these (causal attribution);
- Can encompass a broad range of methods for causal attribution; and,
- Includes examining unintended impacts.



Dear learner! Can you explain the idea of impact evaluation on your own word?

6.2. Why do Impact Evaluation?

An impact evaluation can be undertaken to improve or reorient an intervention (i.e., for formative purposes) or to inform decisions about whether to continue, discontinue, replicate or scale up an intervention (i.e., for summative purposes). While many formative evaluations focus on processes, impact evaluations can also be used formatively if an intervention is ongoing. For

example, the findings of an impact evaluation can be used to improve implementation of a programme for the next intake of participants by identifying critical elements to monitor and tightly manage. Most often, impact evaluation is used for summative purposes. Ideally, a summative impact evaluation does not only produce findings about ‘what works’ but also provides information about what is needed to make the intervention work for different groups in different settings.

6.3. When to do Impact Evaluation?

An impact evaluation should only be undertaken when its intended use can be clearly identified and when it is likely to be able to produce useful findings, taking into account the availability of resources and the timing of decisions about the intervention under investigation. An evaluability assessment might need to be done first to assess these aspects. Prioritizing interventions for impact evaluation should consider: the relevance of the evaluation to the organizational or development strategy; its potential usefulness; the commitment from senior managers or policy makers to using its findings; and/or its potential use for advocacy or accountability requirements. It is also important to consider the timing of an impact evaluation. When conducted belatedly, the findings come too late to inform decisions. When done too early, it will provide an inaccurate picture of the impacts (i.e., impacts will be understated when they had insufficient time to develop or overstated when they decline over time).

Issue	Impact evaluation might be appropriate when...	Impact evaluation might NOT be appropriate when...
Intended uses and timing	There is scope to use the findings to inform decisions about future interventions.	There are no clear intended uses or intended users – for example, decisions have already been made on the basis of existing credible evidence, or need to be made before it will be possible to undertake a credible impact evaluation.
Focus	There is a need to understand the impacts that have been produced.	The priority at this stage is to understand and improve the quality of implementation.
Resources	There are adequate resources to undertake a sufficiently comprehensive and rigorous impact evaluation, including the availability of existing, good quality data and additional time and money to collect more.	Existing data are inadequate and there are insufficient resources to fill gaps.
Relevance	It is clearly linked to the strategies and priorities of an organisation, partnership and/or government.	It is peripheral to the strategies and priorities of an organisation, partnership and/or government.

6.4. Who to Engage in the Evaluation Process?

Regardless of the type of evaluation, it is important to think through who should be involved, why and how in each step of the evaluation process to develop an appropriate and context-specific participatory approach. Participation can occur at any stage of the impact evaluation process: in deciding to do an evaluation, in its design, in data collection, in analysis, in reporting and, also, in managing it. Being clear about the purpose of participatory approaches in an impact evaluation is an essential first step towards managing expectations and guiding implementation. Is the purpose to ensure that the voices of those whose lives should have been improved by the programme or policy are central to the findings? Is it to ensure a relevant evaluation focus? Is it to hear people's own versions of change rather than obtain an external evaluator's set of indicators? Is it to build ownership of a donor-funded programme? These, and other considerations, would lead to different forms of participation by different combinations of stakeholders in the impact evaluation.

The underlying rationale for choosing a participatory approach to impact evaluation can be either pragmatic or ethical, or a combination of the two. Pragmatic because better evaluations are achieved (i.e., better data, better understanding of the data, more appropriate recommendations, better uptake of findings); ethical because it is the right thing to do (i.e., people have a right to be involved in informing decisions that will directly or indirectly affect them, as stipulated by the UN human rights-based approach to programming).

Participatory approaches can be used in any impact evaluation design. In other words, they are not exclusive to specific evaluation methods or restricted to quantitative or qualitative data collection and analysis. The starting point for any impact evaluation intending to use participatory approaches lies in clarifying what value this will add to the evaluation itself as well as to the people who would be closely involved (but also including potential risks of their participation). Three questions need to be answered in each situation:

What purpose will stakeholder participation serve in this impact evaluation?;

Whose participation matters, when and why?; and,

When is participation feasible?

Only after addressing these, can the issue of how to make impact evaluation more participatory be addressed.

6.5. How to Plan and Manage an Impact Evaluation?

Like any other evaluation, an impact evaluation should be planned formally and managed as a discrete project, with decision-making processes and management arrangements clearly described from the beginning of the process.

Planning and managing include:

Describing what needs to be evaluated and developing the evaluation brief

Identifying and mobilizing resources

- Deciding who will conduct the evaluation and engaging the evaluator(s)
- Deciding and managing the process for developing the evaluation methodology
- Managing development of the evaluation work plan
- Managing implementation of the work plan including development of reports
- Disseminating the report(s) and supporting use

Determining causal attribution is a requirement for calling an evaluation an impact evaluation. The design options (whether experimental, quasi-experimental, or non-experimental) all need significant investment in preparation and early data collection, and cannot be done if an impact evaluation is limited to a short exercise conducted towards the end of intervention implementation. Hence, it is particularly important that impact evaluation is addressed as part of an integrated monitoring, evaluation and research plan and system that generates and makes available a range of evidence to inform decisions. This will also ensure that data from other M&E activities such as performance monitoring and process evaluation can be used, as needed.

6.6. What Methods can be used to do Impact Evaluation?

Framing the boundaries of the impact evaluation

The evaluation purpose refers to the rationale for conducting an impact evaluation. Evaluations that are being undertaken to support learning should be clear about who is intended to learn from it, how they will be engaged in the evaluation process to ensure it is seen as relevant and credible, and whether there are specific decision points around where this learning is expected to be applied. Evaluations that are being undertaken to support accountability should be clear about who is being held accountable, to whom and for what. Evaluation relies on a combination of facts and values (i.e., principles, attributes or qualities held to be intrinsically good, desirable, important and of general worth such as ‘being fair to all’) to judge the merit of an intervention (Stufflebeam 2001). Evaluative criteria specify the values that will be used in an evaluation and, as such, help to set boundaries. Many impact evaluations use the standard OECD-DAC criteria (OECD-DAC accessed 2015):

Relevance: The extent to which the objectives of an intervention are consistent with recipients’ requirements, country needs, global priorities and partners’ policies.

Effectiveness: The extent to which the intervention’s objectives were achieved, or are expected to be achieved, taking into account their relative importance.

Efficiency: A measure of how economically resources/inputs (funds, expertise, time, equipment, etc.) are converted into results.

Impact: Positive and negative primary and secondary long-term effects produced by the intervention, whether directly or indirectly, intended or unintended.

Sustainability: The continuation of benefits from the intervention after major development assistance has ceased. Interventions must be both environmentally and financially sustainable. Where the emphasis is not on external assistance, sustainability can be defined as

the ability of key stakeholders to sustain intervention benefits – after the cessation of donor funding – with efforts that use locally available resources.

The OECD-DAC criteria reflect the core principles for evaluating development assistance (OECD-DAC 1991) and have been adopted by most development agencies as standards of good practice in evaluation. Other, commonly used evaluative criteria are about equity, gender equality, and human rights. And, some are used for particular types of development interventions such humanitarian assistance such as: coverage, coordination, protection, coherence. In other words, not all of these evaluative criteria are used in every evaluation, depending on the type of intervention and/or the type of evaluation (e.g., the criterion of impact is irrelevant to a process evaluation).

Evaluative criteria should be thought of as ‘concepts’ that must be addressed in the evaluation. They are insufficiently defined to be applied systematically and in a transparent manner to make evaluative judgements about the intervention. Under each of the ‘generic’ criteria, more specific criteria such as benchmarks and/or standards* – appropriate to the type and context of the intervention – should be defined and agreed with key stakeholders. The evaluative criteria should be clearly reflected in the evaluation questions the evaluation is intended to address.

*A benchmark or index is a set of related indicators that provides for meaningful, accurate and systematic comparisons regarding performance; a standard or rubric is a set of related benchmarks/indices or indicators that provides socially meaningful information regarding performance. Defining the key evaluation questions (KEQs) the impact evaluation should address. Impact evaluations should be focused around answering a small number of high-level key evaluation questions (KEQs) that will be answered through a combination of evidence. These questions should be clearly linked to the evaluative criteria. For example:

- KEQ1. What was the quality of the intervention design/content? [assessing relevance, equity, gender equality, human rights]
- KEQ2. How well was the intervention implemented and adapted as needed? [assessing effectiveness, efficiency]
- KEQ3. Did the intervention produce the intended results in the short, medium and long term? If so, for whom, to what extent and in what circumstances? [assessing effectiveness, impact, equity, gender equality]
- KEQ4. What unintended results – positive and negative – did the intervention produce? How did these occur? [assessing effectiveness, impact, equity, gender equality, human rights]
- KEQ5. What were the barriers and enablers that made the difference between successful and disappointing intervention implementation and results? [assessing relevance, equity, gender equality, human rights]

KEQ6.	How valuable were the results to service providers, clients, the community and/or organizations involved? [assessing relevance, equity, gender equality, human rights]
KEQ7.	To what extent did the intervention represent the best possible use of available resources to achieve results of the greatest possible value to participants and the community? [assessing efficiency]
KEQ8.	Are any positive results likely to be sustained? In what circumstances? [assessing sustainability, equity, gender equality, human rights]

A range of more detailed (mid-level and lower-level) evaluation questions should then be articulated to address each evaluative criterion in detail. All evaluation questions should be linked explicitly to the evaluative criteria to ensure that the criteria are covered in full.

The KEQs also need to reflect the intended uses of the impact evaluation. For example, if an evaluation is intended to inform the scaling up of a pilot programme, then it is not enough to ask ‘Did it work?’ or ‘What were the impacts?’. A good understanding is needed of how these impacts were achieved in terms of activities and supportive contextual factors to replicate the achievements of a successful pilot. Equity concerns require that impact evaluations go beyond simple average impact to identify for whom and in what ways the programmes have been successful.

Within the KEQs, it is also useful to identify the different types of questions involved – descriptive, causal and evaluative.

Descriptive questions ask about how things are and what has happened, including describing the initial situation and how it has changed, the activities of the intervention and other related programmes or policies, the context in terms of participant characteristics, and the implementation environment.

Causal questions ask whether or not, and to what extent, observed changes are due to the intervention being evaluated rather than to other factors, including other programmes and/or policies.

Evaluative questions ask about the overall conclusion as to whether a programme or policy can be considered a success, an improvement or the best option.

Impact evaluations must have credible answers to all of these questions. Defining impacts

Impacts are usually understood to occur later than, and as a result of, intermediate outcomes. For example, achieving the intermediate outcomes of improved access to land and increased levels of participation in community decision-making might occur before, and contribute to, the intended final impact of improved health and well-being for women. The distinction between

outcomes and impacts can be relative, and depends on the stated objectives of an intervention. It should also be noted that some impacts may be emergent, and thus, cannot be predicted.

Defining success to make evaluative judgments

Evaluation, by definition, answers evaluative questions, that is, questions about quality and value. This is what makes evaluation so much more useful and relevant than the mere measurement of indicators or summaries of observations and stories. In any impact evaluation, it is important to define first what is meant by ‘success’ (quality, value). One way of doing so is to use a specific rubric that defines different levels of performance (or standards) for each evaluative criterion, deciding what evidence will be gathered and how it will be synthesized to reach defensible conclusions about the worth of the intervention.

At the very least, it should be clear what trade-offs would be appropriate in balancing multiple impacts or distributional effects. Since development interventions often have multiple impacts, which are distributed unevenly, this is an essential element of an impact evaluation. For example, should an economic development programme be considered a success if it produces increases in household income but also produces hazardous environment impacts? Should it be considered a success if the average household income increases but the income of the poorest households is reduced?

To answer evaluative questions, what is meant by ‘quality’ and ‘value’ must first be defined and then relevant evidence gathered. Quality refers to how good something is; value refers to how good it is in terms of the specific situation, in particular taking into account the resources used to produce it and the needs it was supposed to address. Evaluative reasoning is required to synthesize these elements to formulate defensible (i.e., well-reasoned and well evidenced) answers to the evaluative questions. Evaluative reasoning is a requirement of all evaluations, irrespective of the methods or evaluation approach used.

An evaluation should have a limited set of high-level questions which are about performance overall. Each of these KEQs should be further unpacked by asking more detailed questions about performance on specific dimensions of merit and sometimes even lower-level questions. Evaluative reasoning is the process of synthesizing the answers to lower- and mid-level questions into defensible judgements that directly answer the high-level questions.

Using a theory of change

Evaluations produce stronger and more useful findings if they not only investigate the links between activities and impacts but also investigate links along the causal chain between activities, outputs, intermediate outcomes and impacts. A ‘theory of change’ that explains how activities are understood to produce a series of results that contribute to achieving the ultimate intended impacts, is helpful in guiding causal attribution in an impact evaluation. A theory of

change should be used in some form in every impact evaluation. It can be used with any research design that aims to infer causality, it can use a range of qualitative and quantitative data, and provide support for triangulating the data arising from a mixed methods impact evaluation.

When planning an impact evaluation and developing the terms of reference, any existing theory of change for the programme or policy should be reviewed for appropriateness, comprehensiveness and accuracy, and revised as necessary. It should continue to be revised over the course of the evaluation should either the intervention itself or the understanding of how it works – or is intended to work – change.

Some interventions cannot be fully planned in advance, however – for example, programmes in settings where implementation has to respond to emerging barriers and opportunities such as to support the development of legislation in a volatile political environment. In such cases, different strategies will be needed to develop and use a theory of change for impact evaluation (Funnell and Rogers 2012). For some interventions, it may be possible to document the emerging theory of change as different strategies are trialled and adapted or replaced. In other cases, there may be a high-level theory of how change will come about (e.g., through the provision of incentives) and also an emerging theory about what has to be done in a particular setting to bring this about. Elsewhere, its fundamental basis may revolve around adaptive learning, in which case the theory of change should focus on articulating how the various actors gather and use information together to make ongoing improvements and adaptations.

A theory of change can support an impact evaluation in several ways. It can identify:

- Specific evaluation questions, especially in relation to those elements of the theory of change for which there is no substantive evidence yet
- Relevant variables that should be included in data collection
- Intermediate outcomes that can be used as markers of success in situations where the impacts of interest will not occur during the time frame of the evaluation
- Aspects of implementation that should be examined
- Potentially relevant contextual factors that should be addressed in data collection and in analysis, to look for patterns.

The evaluation may confirm the theory of change or it may suggest refinements based on the analysis of evidence. An impact evaluation can check for success along the causal chain and, if necessary, examine alternative causal paths. For example, failure to achieve intermediate results might indicate implementation failure; failure to achieve the final intended impacts might be due to theory failure rather than implementation failure. This has important implications for the recommendations that come out of an evaluation. In cases of implementation failure, it is reasonable to recommend actions to improve the quality of implementation; in cases of theory failure, it is necessary to rethink the whole strategy for achieving impacts.

Deciding the evaluation methodology

The evaluation methodology sets out how the key evaluation questions (KEQs) will be answered. It specifies designs for causal attribution, including whether and how comparison groups will be constructed, and methods for data collection and analysis.

Strategies and designs for determining causal attribution

Causal attribution is defined by OECD-DAC as: “Ascription of a causal link between observed (or expected to be observed) changes and a specific intervention.” (OECD_DAC 2010).

This definition does not require that changes are produced solely or wholly by the programme or policy under investigation (UNEG 2013). In other words, it takes into consideration that other causes may also have been involved, for example, other programmes/policies in the area of interest or certain contextual factors (often referred to as ‘external factors’).

There are three broad strategies for causal attribution in impact evaluations:

- Estimating the counterfactual (i.e., what would have happened in the absence of the intervention, compared to the observed situation)

- Checking the consistency of evidence for the causal relationships made explicit in the theory of change

- Ruling out alternative explanations, through a logical, evidence-based process.

Using a combination of these strategies can usually help to increase the strength of the conclusions that are drawn.

There are three design options that address causal attribution:

- Experimental designs – which construct a control group through random assignment.

- Quasi-experimental designs – which construct a comparison group through matching, regression discontinuity, propensity scores or another means.

- Non-experimental designs – which look systematically at whether the evidence is consistent with what would be expected if the intervention was producing the impacts, and also whether other factors could provide an alternative explanation.

Some individuals and organisations use a narrower definition of impact evaluation, and only include evaluations containing a counterfactual of some kind. These different definitions are important when deciding what methods or research designs will be considered credible by the intended user of the evaluation or by partners or funders.

Data collection, management and analysis approach

Well-chosen and well-implemented methods for data collection and analysis are essential for all types of evaluations. Impact evaluations need to go beyond assessing the size of the effects (i.e.,

the average impact) to identify for whom and in what ways a programme or policy has been successful. What constitutes ‘success’ and how the data will be analysed and synthesized to answer the specific key evaluation questions (KEQs) must be considered up front as data collection should be geared towards the mix of evidence needed to make appropriate judgements about the programme or policy.

In other words, the analytical framework – the methodology for analysing the ‘meaning’ of the data by looking for patterns in a systematic and transparent manner – should be specified during the evaluation planning stage. The framework includes how data analysis will address assumptions made in the programme theory of change about how the programme was thought to produce the intended results. In a true mixed methods evaluation, this includes using appropriate numerical and textual analysis methods and triangulating multiple data sources and perspectives in order to maximize the credibility of the evaluation findings.

Start the data collection planning by reviewing to what extent existing data can be used. After reviewing currently available information, it is helpful to create an evaluation matrix (see below) showing which data collection and analysis methods will be used to answer each KEQ and then identify and prioritize data gaps that need to be addressed by collecting new data. This will help to confirm that the planned data collection (and collation of existing data) will cover all of the KEQs, determine if there is sufficient triangulation between different data sources and help with the design of data collection tools (such as questionnaires, interview questions, data extraction tools for document review and observation tools) to ensure that they gather the necessary information.

Evaluation matrix: Matching data collection to key evaluation questions

Examples of key evaluation questions (KEQs)	Programme participant survey	Key informant interviews	Project records	Observation of programme implementation
KEQ 1 What was the quality of implementation?		✓	✓	✓
KEQ 2 To what extent were the programme objectives met?	✓	✓	✓	
KEQ 3 What other impacts did the programme have?	✓	✓		
KEQ 4 How could the programme be improved?		✓		✓

There are many different methods for collecting data. Although many impact evaluations use a variety of methods, what distinguishes a 'mixed methods evaluation' is the systematic integration of quantitative and qualitative methodologies and methods at all stages of an evaluation (Bamberger 2012). A key reason for mixing methods is that it helps to overcome the weaknesses inherent in each method when used alone. It also increases the credibility of evaluation findings when information from different data sources converges (i.e., they are consistent about the direction of the findings) and can deepen the understanding of the programme/policy, its effects and context (Bamberger 2012).

Good data management includes developing effective processes for: consistently collecting and recording data, storing data securely, cleaning data, transferring data (e.g., between different types of software used for analysis), effectively presenting data and making data accessible for verification and use by others. The particular analytic framework and the choice of specific data analysis methods will depend on the purpose of the impact evaluation and the type of KEQs that are intrinsically linked to this.

For answering descriptive KEQs, a range of analysis options is available, which can largely be grouped into two key categories: options for quantitative data (numbers) and options for qualitative data (e.g., text).

For answering causal KEQs, there are essentially three broad approaches to causal attribution analysis: (1) counterfactual approaches; (2) consistency of evidence with causal relationship; and ruling out alternatives (see above). Ideally, a combination of these approaches is used to establish causality.

For answering evaluative KEQs, specific evaluative rubrics linked to the evaluative criteria employed (such as the OECD-DAC criteria) should be applied in order to synthesize the evidence and make judgements about the worth of the intervention (see above).

6.7. How can the Findings be Reported and Their Use Supported?

The evaluation report should be structured in a manner that reflects the purpose and KEQs of the evaluation. In the first instance, evidence to answer the detailed questions linked to the OECD-DAC criteria of relevance, effectiveness, efficiency, impact and sustainability, and considerations of equity, gender equality and human rights should be presented succinctly but with sufficient detail to substantiate the conclusions and recommendations.

The specific evaluative rubrics should be used to 'interpret' the evidence and determine which considerations are critically important or urgent. Evidence on multiple dimensions should subsequently be synthesized to generate answers to the high-level evaluative questions. The

structure of an evaluation report can do a great deal to encourage the succinct reporting of direct answers to evaluative questions, backed up by enough detail about the evaluative reasoning and methodology to allow the reader to follow the logic and clearly see the evidence base.

The following recommendations will help to set clear expectations for evaluation reports that are strong on evaluative reasoning:

The executive summary must contain direct and explicitly evaluative answers to the KEQs used to guide the whole evaluation.

Explicitly evaluative language must be used when presenting findings (rather than value-neutral language that merely describes findings). Examples should be provided.

Use of clear and simple data visualization to present easy-to-understand ‘snapshots’ of how the intervention has performed on the various dimensions of merit.

Structuring of the findings section using KEQs as subheadings (rather than types and sources of evidence, as is frequently done).

There must be clarity and transparency about the evaluative reasoning used, with the explanations clearly understandable to both non-evaluators and readers without deep content expertise in the subject matter. These explanations should be broad and brief in the main body of the report, with more detail available in annexes.

If evaluative rubrics are relatively small in size, these should be included in the main body of the report. If they are large, a brief summary of at least one or two should be included in the main body of the report, with all rubrics included in full in an annex.

Chapter Review Question

Part I: Short Answer Questions.

What is Impact Evaluation? Why do Impact Evaluation? When to do Impact Evaluation?

What Methods can be used to do Impact Evaluation?

How can the Findings be Reported and Their Use?

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Assignment for Development Planning and project Analysis II Module

Maximum weight 30 %

Part I: Read Each Expression and Choose the Most Appropriate Answer (Each 1.5 Pt.)

One of the following points **is not** worth mentioning while discussing on the activities accomplished within a given project.

The project cycle is not as such a sequential activity or in practice many of the phases overlap.

An understanding of the project cycle would enable the project analyst to grasp the intricacies of bringing an investment project

All the stages of project cycle are not equally valid, and the process is inflexible and making a mistake at any stage is not equally terrible.

All the stages of project cycle are equally valid, and the process is flexible and making a mistake at any stage is equally terrible.

Project preparation is a group work involving peoples from different disciplines on the project.

Good project identification should incorporate the following activities **except**?

Justify the project in a sectoral context;

Highlight pertinent issues and propose solutions;

Demonstrate the alternative and that further resources should be devoted for preparation;

Establish clearly the follow -up steps for full preparation.

None

It is an independent assessment of the project to identify the weaknesses and strengths of the study that have a bearing on the decision to invest, and/or to finance the project **known** as?

A. Project identification stage D. Project feasibility study B. Project appraisal stage E.

Project Evaluation

Project preparation and analysis

Project management is a multifaceted process in which many different things get managed simultaneously which involved in the following types of management **except**?

Scope management

Time management

Cost management

The following alternative reasons can be taken as the significance of project planning **except**?

To eliminate uncertainties

To receive loan or financial support from promoters

To increase the effectiveness and efficiency of the operations

To identify and work towards a common goal

To establish a means of project monitoring and control

Among the following issues which one is **not** the factor that entails differences between financial and economic analysis of projects?

The impact of the project on savings

The effect of the project on income redistribution

Estimation of profitability at different currencies

D. The consideration for merit goods

E. None

The purpose of social cost-benefit analysis is to see whether these consequences taken together are desirable in the light of the objectives of national planning which includes?

A. Employment and output,
distribution

D. Income

B. Consumption and savings

E. All

Foreign exchange earnings

Delays in implementation, which are common, can lead to substantial cost overrun and; to reduce such discrepancies and expeditious implementation at a reasonable cost we should give due attention for?

Adequate formulation of projects

Use of the principle of responsibility accounting

Developing a network for functions

In managing projects we are normally involved in the following types of management **except?**

E. Scope management

D. Cost management

F. Time management

E. None

Human resource management

Planning and managing impact evaluation includes:

Describing what needs to be evaluated and developing the evaluation brief

Identifying and mobilizing resources

Deciding who will conduct the evaluation and engaging the evaluator(s)

Deciding and managing the process for developing the evaluation methodology

All of the above

Part II: Short Answer Questions (3 points each)

Briefly explain the three important phases of project implementation and their relative functions.

Describe the main objectives of project monitoring and evaluation.

What is Impact Evaluation? Why do Impact Evaluation? When to do Impact Evaluation?

Part III: Workout Questions

Consider the following hypothetical cash flows for sugar production projects in million Birr.

Investment (Project)	Initial cost	Net cash proceeds per year		Total Proceeds	Payback Period	Proceeds per Unit of Outlay
		Year I	Year II			
A	9,000	5,500	6,000	11,500		
B	10,000	6,000	6,500	12,500		
C	8,500	6,000	5,000	11,000		
D	9,500	6,500	5,500	12,000		

Given the above information, estimate the payback period of each project and determine which project is superior to other projects as per the decision rule **(3 Points)**.

Given the above information, estimate proceeds per unit of outlay of each project and determine which project is superior to other projects as per the decision rule **(3 Points)**.

Consider the following discounted cash flows for a fertilizer project in million Birr. The discounted rate equal either to the actual rate of interest on long term loans in the capital market or to the interest rate paid by the borrower which is equal to 11%.

Year	Costs	Benefits	Net benefits	Discounted factors	Discounted Net benefits
0	20	0			
1	10	15			
2	10	15			
3	10	15			
4	10	15			
5	10	15			
6	10	15			
					NPV=

A. Given the above information, estimate net present value (NPV) of the project and determine whether it is financially feasible or not as per the decision rule **(2.5 Points)**.

Given the above information, estimate the internal rate of return (IRR) of the project and determine whether it is financially feasible or not as per the decision rule **(2.5 Points)**.