FACULTY OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

PROJECT ANALYSIS AND MANAGEMENT

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Table of Contents

Contents **Page**

CHAPTER ONE

1. INTRODUCTION TO PROJECT

INTRODUCTION

Project is a means of implementing the firm's plans. As a means of plan implementation, project involves a complex process. Before discussing the complex process of project, it is reasonable to introduce basic concepts of projects. This unit highlights the nature of project, types of projects, importance of projects, difficulties in projects, objectives of projects, the phases of projects.

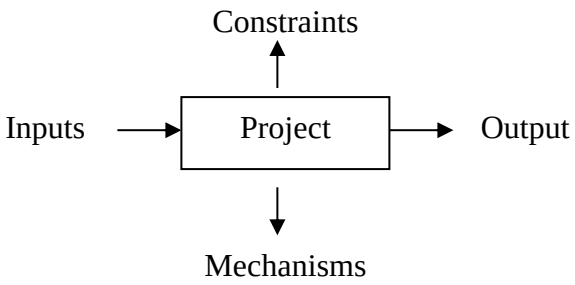
1.1 Definition of a Project

According to the British Standard 6079 of 1996 (as cited by ICMR, 2007), a project is defined as a unique set of coordinated activities, with definite starting and finishing points, undertaken by an individual or organization to meet specific objectives within defined schedule, cost, and performance parameters. The Project Management Institute (2004) has also defined a project as a temporary endeavor undertaken to create a unique product or service.

Project has also defined by many authors as:

- A set of proposals for the investment of resources into a clearly identified set of actions that are expected to produce future benefits that exceeds costs.
- A proposed undertaking involving a complex of economic activities in which scarce resources are committed in expectation of benefits that exceed the costs.
- The "cutting edge" of development which is the powerful means to achieve the development objectives; it is the crucial building block of a development structure.
- Any undertaking with a defined starting point and defined objectives by which completion is identified. Most projects depend on finite or limited resources by which the objectives are to be accomplished.
- A one shoot, time limited, goal directed major undertaking, requiring the commitment of various skills and resources.
- A combination of human and non-human resources pooled together in a temporary organization to achieve a specific purpose.

The term 'project' may be defined as a complex of economic activities in which scarce resources are committed in expectation of benefits that exceed the costs of resources consumed. Projects require resources. They are also expected to derive benefits. Projects are said to desirable if their benefits are greater than the costs incurred on them. A project can also be referred to as a non-repetitive activity. A project is viewed as a conversion process. This implies that a project involves a transformation of some form of inputs into an output. (See the following diagram).



In the above diagram, we observe that project is a conversion process which serves in transforming inputs into outputs. Inputs represent want or need whereas outputs represent satisfied need. Constraints consist of factors such as financial, legal, ethical, environmental, time, and quality. Mechanisms include people, knowledge of expertise, capital, tools and techniques, and technology.

In general, project means

- An investment activity in which financial resources are expended to create capital assets that produce benefits over an extended period of time.
- A complex set of activities where resources are used in expectation of return
- An economic activity with well-defined objectives and having a specific beginning & ending point
- Undertaken to accomplish a specific objective or goal
- A non-repetitive activity.
- A set of proposals for the investment of resources into clearly identified set of actions

- The three basic attributes in this definition are:
  - A course of action
  - Specific objectives
  - Definite time perspective

1.2 Classification of a Project

1.2.1 Project may be broadly classified as:

Industrial/Commercial projects

For example, establishment of factories, industries, service rendering enterprises,etc.

Agricultural projects

For example, establishment of farming, breading, forestry, horticulture, fishery, etc.

Infrastructure projects

For example, **e**stablishment of roads, airport, schools, health stations, hospitals,universities, etc.

1.2.2 Alternative classification of projects:

1. **Basically, three types of project can be identified depending upon how new resources committed to them relate to existing economic activities:**

New Investment

Designed to establish a new productive process independent of previous lines of production. They often include a new organization, financially independent of existing organization.

Expansion Projects

Repeating or extending an existing economic activity with the same output, technology and organization.

Updating projects

Replacing or changing some elements in an existing activity without a major change of output. It involves some change in technology but within the context of an existing though possibly reformulated organization.

2. **Classification by Goals:**

Nature of goods and services produced - quantified and non- quantified.

Type of Consumption - to meet domestic demand and export demand; economic goods and social goods.

3. **Classification by time elapsing between the initial investment and the obtaining of final results –**

projects of long and short duration; projects with rapid and low amortization period; etc.

4. **Classification with respect to complexity –**

highly and low complex.

5. **Classification with respect to age:**

Green field/grass-root project is a project starting for the first time orstarting from scratch, everything is new.

Brown field project is a project that exists but shifting its resources toother places or field of work, starting a new course.

6. **Classification based on Time, Cost, and Performance (Quality):**

Normal project is a project not much problem is faced as per time, cost,and performance, i.e., completed with the set time, cost, and quality.

Crash project is a project, for many reasons, completed by a crash program that entails less time, high cost, and with a compromisingquality, i.e., likely quality will decrease.

Disaster project is a project that is not performing as per the set plan. Therefore, it needs immediate remedy that entails less time, high costand likely low quality. It is an opposite of the **normal project**.

Generally, project classified into four major types of projects; experimental project, pilot project, demonstration project and production project.

A. **Experimental project**: attempt to address a problem in an innovative manner using the alternative approaches. E.g., crop innovation.

B. **Pilot project**: the pilot project strengths the applicability of the experience derived from experimental project to local level. It can highlight the problem of implementation: test the effectiveness of the approach adopted and can provide valuable training experiences for personnel. An important function of a pilot project is to test the replicability of the project to other areas and to other beneficiaries.

C. **Demonstration project**: it's basically a form to exhibit new techniques or approaches of a pre-tested experiment. E.g., Demonstration farms used to disseminate new crop varieties among farmers.

D. **Production project**: the production project has the role of increasing productivity, adjusting to scale requirements and a high degree of replicability.

Projects may be classified in to three, depending on how the new resources committed to them relate to the existing economic activities. These are:

a. **The Large Projects:** involve new investment that can establish new productive process and independent of previous lines of projects.
b. **Expansion Projects**: these types of projects involve repeating or extending an existing activity with the same output, technology and organization.
c. **Upgrading Projects**: involve replacing or changing some elements of an existing activity without major changes of output.

1.3 Characteristics/ Features of a Project

1. General Characteristics

A project is something unique or different from the usual way of doing things. It is time bound, separate from other activities, uses assigned scarce resources and it is meant to achieve a specific objectives. Its general characteristics are summarized as follows (Choudhury, 1988; Gizaw, 2003; Joy, 1994):

- Projects involve the commitment of scarce resources to a specific line of action that prevents the use of those resources elsewhere. These resources include: financial capital, raw materials, the product of manufacturing and service capacity elsewhere in the economy, labor of various kinds, managers and organizations, and so on. Almost all of these are certain to have an alternative possible use elsewhere.
- Projects resources are committed for a long period to produce benefits that are usually quite clearly identifiable. Their effects are usually gradual and lasting for several years, but involve waiting for results. This waiting obviously has a cost.
- Projects are the subject of special arrangements and procedures for their planning, appraisal, and so on because of the shortage of resources usable for development and the commitment of substantial amounts of resources by projects.
- Projects involve a closely defined action and special financial arrangements, including loans from overseas, development banks, and other agencies. These defined action and financial arrangements tends to give projects a clear boundary and individual identity.
- The pattern of resources commitment in projects is usually for capital investments to

be made to establish productive capacity, constraint removing, and physical works that have a long life of operation or use, etc.

2. Specific Characteristics

According to Choudhury (1988), the specific characteristics of a project are identified as follows:

- **Importance**- it must be important in the eyes of top management to justify setting up a special organizational unit outside the routine structure of the existing organization
- **Objective**- it is goal directed, i.e., it is meant to achieve a specific objective.
- **Scarce resource**- it has limited budgeted, both for personnel as well as other resources. An attempt to obtain additional resources leads to conflict with, for example, functional departments.
- **Conflicts**- it competes with other projects or functional departments for resources and personnel.
- **Life span**- it has a beginning and an end.
- **Single entity**- it is distinct and separate entity from others that requires independent pooling of human and non-human resources, administration and monitoring, etc.
- **Teamwork**- it is a pool of variety disciplines.
- **Life cycle**- project has a start, growth, maturity and decline stages.
- **Uniqueness**- even though the desired end results may have been achieved elsewhere; it is at least unique to this organization. It is different from other projects with regard to the financial requirements, skill requirements, users, managers, technology requirement, etc.
- **Interdependencies**- it interacts with other projects being carried out simultaneously by their parent organization. Its interaction may take the form of resource sharing or competition for scarce resources.
- **Changes**- it is subject/susceptible to changes as the environment (internal/external) is changing. Change comes during its life cycle, especially during its implementation phase. What we conceive/perceive may not be as what we have faced.
- **Successive principle**- it has various stages, i.e., it must be handled in stages because problems, prospectus, constraints, etc come by at the different project stages.
- **Made to order**- projects are often made to order (i.e., a customized product/service made as per the order).
- **Subcontracti**ng- in case 100% handling of the project is not viable/possible, certain percent of the project can be made on subcontract basis with co- contractor.
- **Risk and uncertainty**- there is risk and uncertainty associated with a given project. The level of risk and uncertainty diminishes as we go to the finishing stage because of the successive principle. However, an ill-defined project will have extremely high degree of risk and uncertainty.

- **Routineness of task**- routine ness of project task increases as we go to the finishing stage.

1.4 National Development Planning and Project Analysis

National planning is the mechanism by which governments set up their priorities, objectives and demonstrates their intentions. Thus, development planning is the exercise of forethought in an attempt to select the best policies, to be implemented over a medium term period, for the development of the national economy. Viewed in this way, development planning can also be regarded as an attempt to raise the **rationality of decision**-making- carefully specifying objectives and systematically sifting alternative policy instruments so as to find the optimal means of achieving the objectives (Cusworth and Tom, 1993; DEPSA, 1981, 1990; Gittenger, 1972, 1885, 1998).

In general, the essence of development planning is that it is futuristic, i.e. it is forward looking and it involves systematic thought and preparation.

A sound plan required a great deal of knowledge about existing and potential projects. Thus, plans require projects. Since projects commit scarce resources, project selection is meaningful only when it is placed with in a **broader development framework**- the medium or long-term development plans and policy statements issued by the government (Cuury and Weiss, 1993; Gittenger, 1998; Little and Mirrlees, 1974).

The best economic appraisal of projects cannot be made without referring to such plans and policies. The more elaborate the plans and policies of the government, the easier becomes the work of the project planner. For example, the project planner will have to refer to such plans and policies to see to it that the project being considered fits well in the plan and contribute most to the fundamental objectives of the government. These objectives can include self-sustaining growth, promotion of employment and income distribution, etc.

Identifying national development objectives, elaborate sector programs, selecting priority areas for investment, designing effective price policies and mobilizing resources are of great help in identifying development projects. A realistic plan shall be prepared by assessing the development potentials in the various sections of the economy

1.4.1 RATIONAL FOR NATIONAL PLANNING

The rational for national planning is (Gittenger, 1998):

- Failure of the market to transform economy. Although the market economy is the better way of tackling problems, private investors may tend to imitate each other.
- People nationally prefer present consumptions to future consumptions. Using national planning, people may tend to increase future consumption by giving up present consumption.
- Projects or investments that ate viable to the society may not be profitable for individuals. This is due to the effect of externalities.

1.4.2 Project analysis

According to Chandra (2006) and Cuury and Weiss (1993), **project analysis** involves estimating and comparing the beneficial effects of an investment with its costs. Such a comparison is done with in a broader economic framework that basis on which full costs and benefits are identified and valued. Both the resources required (in the form of finance, materials, and manpower) and the generated benefits (such as cost savings, increased production, and institutional development) are estimated in advance. Costs and benefits are calculated in financial and economic terms or defined (if quantification is not possible) with sufficient precision to permit a reasoned judgment to be made as to the optimum set of actions.

1.4.3 Project planning process

Project planning process consists of a set of procedures and techniques that can be applied in the process leading up to a decision whether or not to invest and in the implementing and organizing of the project. It is necessary to take project planning to issue efficient utilization of the program and to implement the action program as to the time planned (DEPSA, 1981, 1990). Moreover, project planning has a far-reaching effect on economic development and good project planning is needed as a result it requires well-trained people. Different sectors of project planning need different expertise (Gittenger, 1998).

Project planning has two main characteristics (Little and Mirrlees, 1974):

- It is an exercise that is done to ensure efficient utilization of resources.
- It is a bridge in the transformation of national plans into concrete actions to achieve predetermined objectives.

Project planning is frequently conceived as a series of stages (Chandra, 2006; Gizaw, 2003):

- Identification of investment possibilities,
- Preliminary investigation of investment possibilities through a pre-feasibility study,
- More detailed investigation and implementation plan through a feasibility study, and
- Decision process accepting or rejecting the project.

At each stages of project planning process, a decision is required whether to commit planning resources to the subsequent more detailed stage. Once a project has been accepted further stages involve detailed design and finance negotiations, construction and commissioning and full operation of the project. Projects that a nation chooses to implement should be of high priority in the national development program.

According to the program approach, a development project is formulated and operated in the following national context

a. National Policies

A government must have a clear policy statement. For example: '*Reduce poverty, Ignorance and disease'.*

b. Strategies

In the context of that policy, the chosen strategies for poverty reduction may be:

- Enhancement of agricultural production
- Increased social service expenditures
- Expansion of employment opportunities
- Direct income transfers

When one sees such statements, one asks the question: 'What does that mean and how will it bedone?'

c. Legislation

Policies take effect through legislation, which establishes the institutional framework, forexample empowering the Ministry of Agriculture to take action.

d. Programs

Policies are implemented through programs usually overall lengthy time scale of five to tenyears. Programs have broadly expressed development objectives. For example, in the context ofa policy of enhancing agricultural production, development objective could be 'expand and diversify the output of the agricultural sector.'

e. Projects

Projects are the building blocks of programs and are usually of shorter duration. It is a means by which national, regional, local, etc plans are made operational. Any kind of plan shows the general direction of action leading toward the achievement of set objectives. It is not enough for the purpose of implementation. This means the plan has to be elaborated or cut into 'packages of action'.

The package of action can be divided into two broad categories. These are:

i. **Program-** which is the first step in plan elaboration and
ii. **Project-** the second step in plan elaboration.

Program,

which is a bigger package of action, composed of a number of projects aiming at attaining one or more related objectives of plan.

Project

on the other hand achieves goals, which lead to the accomplishment of specific objectives with in program. The difference and similarities between projects and programs can be summarized in the following table:

Projects in general need to be **SMART** (Specific, measurable, area bounded, real and time bounded)

Difference:

Projects	Programs
• Specific Objectives • Specific Project Area • Specific Beneficiary Group • Clearly Determined Fund • Specific Lifetime (finite) • General Objectives	• No Specific Project Area • No Specific Beneficiary Group • No Clear determined resource Allocation • No Specific Lifetime (Duration Period)
Similarities	• Both having Objectives or Goals • Requiring Financial, Personnel, Material and other Resources • Generating Outputs of Goods and/or Services • Serving as instruments for the execution of development • Plans in order to be able to Develop the National Economy

1.5 Role of Project Manager

The project manager is the individual responsible for delivering the project. The individual leads and manages the project team, with authority and responsibility from the project board, to run the project on a day-to-day basis.

1.5.1 Specific responsibilities of the project manager

Responsibilities of a project manager.The project manager:

- Manages the project taking into account integration across all areas.
- Engages with stakeholders.
- Develops Project Plan.

- Directs project resources.
- Monitors and manages the project schedule, project budget and project risk.
- Deals with operational issues.
- Organizes steering committee meetings, including ensuring that minute will betaken.
- Reports to the steering committee, raising strategic issues.
- Prepares Project Status Reports and Project Change Requests for the steering committee.
- Ensures project meets requirements and objectives.
- Manages project team members.
- Negotiates and resolves issues as they arise across areas of the project andwhere they impact on other activities, systems and projects.
- Looks after the interests of the project team.
- Organizes and chairs project reference group meetings, as appropriate.
- Communicates project status to project sponsor, all team members, and otherrelevant stakeholders and involved parties.
- Maintains project documentation.

1.5.2 **Skills and attributes needed to be a project manager**

The project manager should be able to:

- Establish a good working relationship with the Senior Responsible Owner
- Direct, manage and motivate the project team
- Develop and maintain an agreed project plan and detailed stage plans
- Understand and apply business case and risk management processes
- Tailor expert knowledge to meet specific circumstances
- Plan and manage deployment of physical and financial resources to meet project milestones
- Build and sustain effective communications with other roles involved in the project
- Apply quality management principles and processes

1.6 Project Management Environment

The project environment directly influences the project and how it should be managed. For project managers to be effective, they must have a thorough understanding of the project environment that may well be changing and so continually shifting the goal posts. The project environment consists of the numerous stakeholders and players that have an input or are affected by the project. All must be managed as any one person could derail the project. Consider the following (Chandra, 2006; ICMR, 2007):

- Stakeholders (all interested parties),
- Client/Sponsor's requirements,
- Company's organization structure,
- Market requirements,
- Competitors,
- New technology,
- Rules and regulations,
- Economic cycle, etc.

1.7 Project Organization Structure

Project management is the process of planning, organizing, executing, and controlling a project. There are many different types of project management structures that you can choose from depending on the structure of the project you are running or the specific needs of your business.

Whether a firm is undertaking a few occasional projects or is fully project-oriented and carrying on scores of projects, any time a project is initiated, the following three organizational issues immediately arise. A decision must be made about how

- To tie the project to the parent firm (inter-organization),
- To organize the project itself (intra-organization), and
- To organize activities common to other projects (across-organization).

This section focuses on the interface between the project and its parent organization, i.e., how the project is organized as a part of its host. Meredith and Mantel (2006) have described the following three major organizational forms that are commonly used to house projects. These are:

The project as “part of the functional organization”, for example, if the Master of Finance and Investment is place under the Department of Accounting and Finance.

1.7.1 Type of project organizational structure

Waterfall Modeling

The most common type of project organizational structure is called Waterfall Modeling or Waterfall Methodology (also known as sequential or traditional methodology). The waterfall is a widely used project management structure that organizes work into phases.

Each phase has its own set of tasks, which must be completed before moving on to the next step. Waterfall projects typically have a long-term timeline, so they're good for large-scale initiatives that take time to complete.

Agile Modeling

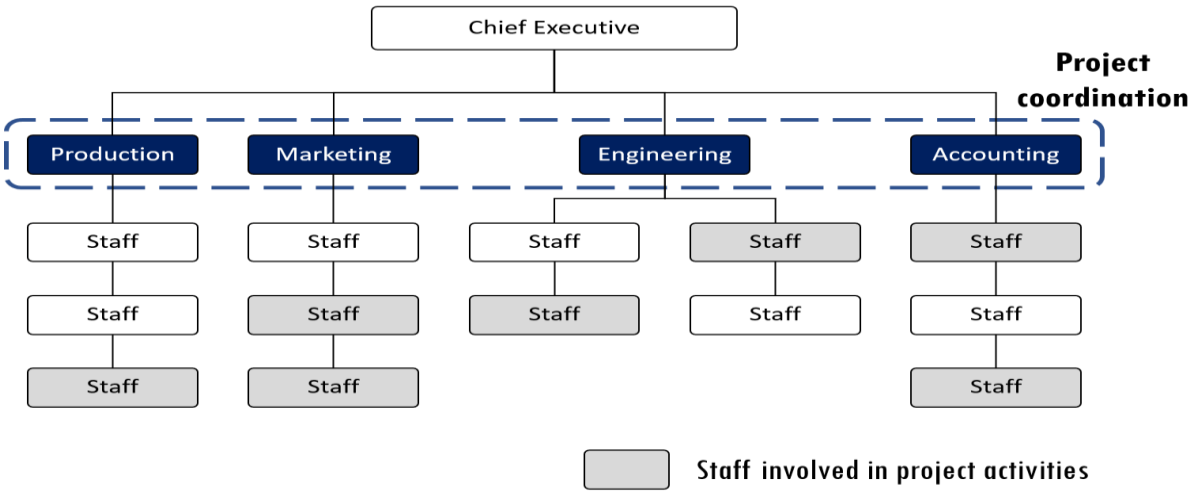
Another popular model is called Agile Modeling or Agile Methodology (also known as "iterative" or "incremental"). The agile method is based on smaller chunks of work completed in parallel rather than consecutively. This helps speed up delivery time by breaking down large projects into smaller ones with smaller timelines.

This means that Agile projects have shorter timeframes and more frequent milestones along the way, and they can be great for smaller projects or when there's limited time or funding available.

1.7.2 Types of Project Management Structure

The three primary types of project management structures are functional, projectized and matrix

1. Functional Organization Structure



Functional organization is a Project Management Structure that focuses on specialization and departmentalization to achieve efficiency and effectiveness. This structure is usually used in organizations with a flat hierarchy, where the project team is formed of different units or departments.

The **benefit** of this (PMO) project organizational structure is that it allows more specialized employees to contribute to a project without going through layers of management.

The **disadvantage** is that it may be difficult for the project manager to keep track of everything happening within the team since each employee will have their responsibilities and deadlines.

2. Projectized Organization Structure

Projectized organizations are those that have a structure that is designed to create and deliver projects rather than complete long-term goals. In this way, it is similar to an ad hoc organization in that it is temporary and focused on a specific task or set of functions.

The advantage of a projectized organization is that it can be very flexible in terms of how it organizes its resources, which helps to ensure that the most appropriate people are assigned to each task at hand. This can be especially beneficial when the scope of a project changes significantly over time. However, it may not be able to effectively manage large projects if there isn't enough time spent planning ahead of time.

3. Matrix Organization Structure

Matrix organizations are one of the most flexible project management structures available. It can be more responsive than other types of project management structures because it allows teams to quickly shift their focus when necessary. It is also less costly than other types of project management structures. Besides, they allow for greater employee involvement in decision-making processes, resulting in better-quality decisions and higher employee satisfaction.

However, Matrix organizations may be less efficient than other structures because they require more communication between teams and management. They may also be demanding for new employees to understand.

1.7.3 Features of Project Organization Structure

Many features make up a good project organization structure, but the four main features are-

1. Flat Management Structure

A flat management structure means everyone is responsible for their work and reports directly to the higher-ups. In some cases, this can lead to accountability and transparency concerns. Therefore, we recommend creating a project organization structure as part of your process.

When you have a flat management structure, it's vital that everyone understands what their role is within the company and how they fit into the bigger picture. Having a clear idea of what each person needs to do will help them feel more empowered and motivated about their work.

2. Clear Communication Guidelines And Procedures

A project organization structure helps get clear communication guidelines and procedures because it is used to communicate the roles and responsibilities of each team member. It also contains information about reporting relationships, forms, templates, and checklists required for various processes.

3. Comprehensive Planning

A project organization structure is an integral part of comprehensive planning because it helps ensure everyone involved in the project understands their role. It can be used to show how different departments or teams will work together on a given project, and where each department or team falls in a hierarchy. This can help to ensure that everyone knows who they should report to if they have any questions or concerns about their role.

1.7.4 Methods of creating Project Organizational Chart

If you need to make an organizational project chart, you can use the following methods to create an organizational project chart

1. Identify Personnel

Before making an organizational project chart, you must list all the personnel involved. This includes everyone from those who will be building the project to those who will be managing it and even those who are providing support services.

2. Create Senior Management Team

Once you have identified all the personnel involved in your project, create a senior management team that will oversee each area of expertise (**marketing**, design, etc.). These

people should be skilled leaders with significant years of experience in their respective fields. You can also include them on your project organizational chart if they are not directly related to your department.

3. Assign Project Coordinators

The next step is to assign people who will act as coordinators for each department. They should be knowledgeable about what goes on within each department but not necessarily skilled at carrying out tasks themselves.

4. Note Stakeholders

A stakeholder is a person or group with a vested interest in a project, whether directly involved or not. These people have something to gain from the project's success or loss because of its failure. For example, if you're planning a fundraising event for your local dog shelter, the stakeholders include everyone who benefits from the event's success: donors, volunteers, shelter staff and volunteers, and even potential adopters of dogs from the shelter.

5. Identify Training Requirements

Once you've identified all the stakeholders and their interests in your project, you'll need to identify any training requirements for each group. This includes identifying what training each group will need and how long they'll take to complete training. Keep in mind that some groups may need more time than others; this could be due to their schedule or other factors like language barriers.

6. Create Project Organization Chart

Once training requirements are identified for each stakeholder group, it's time to create a project organization chart for your project team members and their responsibilities within the project organization structure.

Points to Consider When Making a Project Organizational Chart

Here are seven points to consider if you're working on an organizational project chart-

- Make sure you're using the right kind of chart for your needs.
- Consider the level of detail and granularity needed in your chart.
- Identify and label the data sources used in your chart.
- Ensure you have all the information and expertise needed to create a quality chart.
- Work with an expert who can help you craft a compelling project organizational structure.

- Use visual cues to help readers follow the flow of information through your organization.
- Ensure everyone involved in creating or using your project's organizational structure understands it.

Examples of Project Management Organizational Structure

Following is the work breakdown structure examples of project management org structures:

1. Functional Organizational Structure

It focuses on the specific functions that need to be completed by each employee. For example, an employee who works in accounting may have multiple tasks within their job description, like processing payables and receivables. Functional organizations are suitable for companies with several employees who have similar roles and responsibilities.

2. Matrix Organizational Structure

A matrix organizational structure combines the best aspects of both functional and project-oriented organizations into one system. Employees often have multiple reporting relationships depending on their role in the company and their level of expertise in different domains. It helps them complete their work more efficiently as a result of the top-down or Bottom-up approach.

Advantages and Disadvantages of "Matrix Structure"

Advantages

- The project is the point of emphasis.
- Access to the entire reservoir of technology and expertise in all functional divisions.
- Reduce duplication of technology, personnel and other physical resources.
- Rapid response to client needs.
- Permits operational flexibility.
- Employs holistic approach, i.e., systems approach.
- Ensures consistency with the policies, practices and procedures of the parent firm.

Disadvantages:

- Brutal infighting to avoid blame if the project is a failure, because power is balanced between the project manager (PM) and the functional heads.

- Infighting among project managers during movement of resources from project to project for ensuring success for their projects than the total system that optimizes organization wide goals.
- Success is doubtful for a PM without strong negotiating skill, because the PM controls administrative decisions and the functional heads control technological decisions.
- Lack unity of command because the project personnel have at least two bosses, i.e., the functional heads and the PM.

1.8 Management-By Project

Management by projects –

a set of activities including planning, decision making, organization and leadership

i.e. managing people and controlling, used with the intention of achieving the objectives of various projects in an efficient and effective manner.

Meredith and Mantel (2006) have reported that the process of managing organizations has been impacted by three revolutionary changes since 1990s. These are:

- Replacement of traditional and hierarchical management by consensual management,
- Adoption of the "systems approach"/"systems engineering" to deal with organizational or technological problems, and
- Establishing projects as the preferred way to accomplish goals, respectively.

Management-by-project:

- Integrates all functional divisions,
- Enhances functional trade-offs,
- Ensure that the proper knowledge and resources are available when and where needed, and
- Ensure that the expected results are produced in a timely, cost-effective manner.

This can help ensure good governance by preventing anticipated flaws and by fixing accountability on failures that might prevail in the form of deviations from quality specification, committed budget, delay in work schedule and negative service disconfirmation.

Some government office managers used to say "**government purchase is all about purchase of low quality at cheap price**". This is absolutely wrong because quality is not what is paid; it is rather **how the prepared purchase specification is fit for purpose**. This specification

document is prepared before the venders' invitation for offering their prices. Those vendors who do not appropriately fill the specification document shall be dropped first, the candidates will be only the legible ones, and then subsequent selection of vendors will be made based on who offers the specified quality at the cheapest price. So, government is quality-seeker, buying quality at the lowest price possible, like any private organization. The purchasing committee decision statement must also state that "**the XYZ organization is selected because it has filled the bid document as per the instructions, met the quality specification, and offeredthe cheapest price**".

There are times, however, the purchasing committee put its decision statement as "**the XYZ organization is selected by quality**", at a higher price than the least offer. This is totally dishonesty because the committee is not entitled to revise and set new quality specification other than checking confirmation of the filled specification document against the original specification. Besides, Vendors are not competing for setting a new specification instead they are competing on the price they can offer for the alreadygiven specification. Moreover, it is disappointing when you think of the "**persocracy**" (i.e., the individual's personal practices that are officially overriding the bureaucracy) that is unnecessarily obstructing service solutions/performances.

Employing the project techniques permit a steward office manager to fix such "**solution-crimes**" along with the "**Snakes**". All the office activities such as purchase, maintenance, recruitment, training and development are actions either for searching, giving or accepting solutions. There is a **solution-crime** when there is a deliberate do away with the solutions and those crime actors and actresses are the **Snakes**. The management-by projects approach, thus, encourages:

- Organizational flexibility,
- Decentralized management responsibility,
- Holistic view of problems, i.e., systems approach,
- Goal-oriented and focused problem solution process for seamless solutions,
- Enhances good governance through transparency,
- Builds human capital in the process,
- Boost employees' job, organizational as well as psychological commitment, etc.

1.9 Summary

A project is a group of unique, inter-related activities that are planned and executed in acertain sequence to create a unique product or service, within a specific timeframe, budget and the client's specifications.

Some of the characteristics of the tasks that qualify to be a project are: uniqueness, specificity of goal, sequence of activities, specified time and interrelatedness.

Projects are carried out under many resource constraints (time, cost and material resources) and their success depends on the ability of the manager to manage these constraints effectively.

Project management is the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations.

1.10 Exercise

Short Answer Questions

1. Lists the Characteristics/ Features of a Project (5-pts).

_____

_____

2. List and describe the Role of Project Manager (5-pts)

_____

_____

CHAPTER TWO

2. THE PROJECT CYCLE

Introduction

Project passes through series of activities called **stages**. **Project cycle** refers to the various stages through which project planning proceeds from the inception to implementation. In other words, it is the life cycle through which a project advances from infancy to maturity. The main features of this cycle are information gathering, analysis, and decision–making. A natural sequence in the way projects are planned and carried out. Before any project is actually realized, it goes through various planning phases. The different phase through which a project passes is often called "**the project cycle**". A self-renewing cycle

Models of Project Cycle

These are several models of project cycles. These are:

1. Traditional approach of World bank project cycle
2. The process approach of World bank project cycle
3. The European Union project cycle
4. The Asian development bank project cycle
5. The UNIDO project cycle
6. The DEPSA's Project Cycle

2.1 The UNIDO model

The United Nation's Industrial Development Organization (UNIDO) gives emphasis to industrial projects. It is more practical than conceptual. Beherens and Hawranck (1991) in collaboration with the UNIDO have identified three project phases: Pre-Investment, Investment and Operation Phases.

Has three phases:

1. The pre-investment phase
2. The investment phase
3. The operational phases

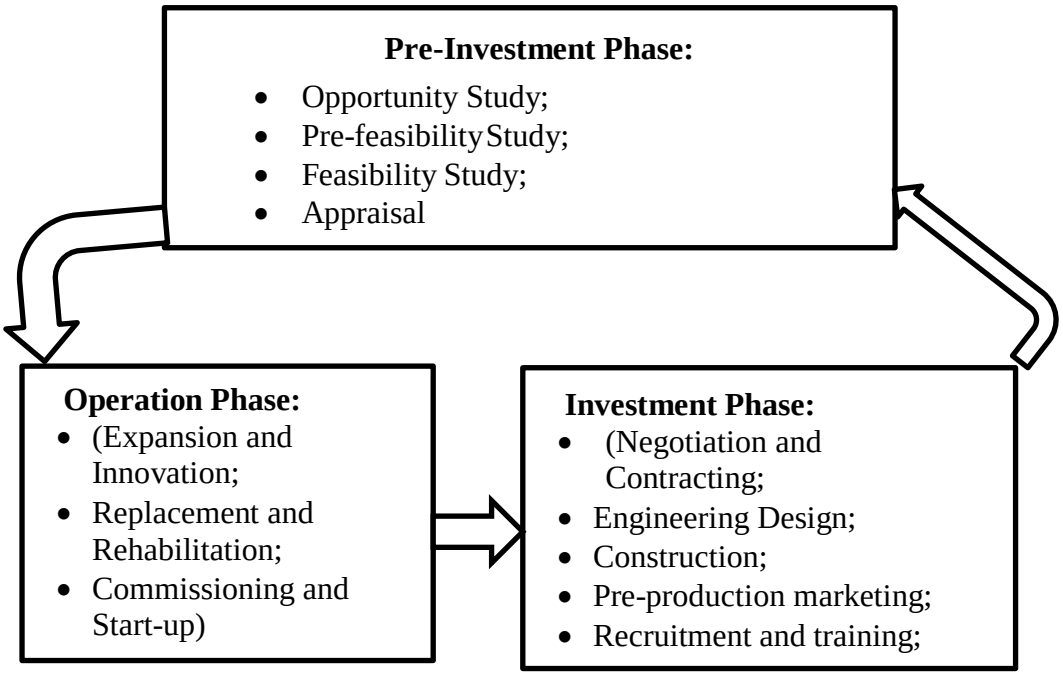


Figure 2.1: UNIDO (1991) Project Life Cycle

1. The Pre-Investment Phase

- The first phase of a project
- Comprises five stages:

The pre-investment phase includes project activities such as:

1) Opportunity study- identification
2) Pre-feasibility study- pre-selection/ analysis of project
3) Functional study- Support studies
4) Feasibility study- preparation
5) Appraisal report- Investment decision

2. The investment (construction or implementation) phase

The investment or implementation phase consists mainly of activities involved in developing the infrastructure for the project as well as creation of assets. This phase of a project provides wide scope for consultancy and engineering work, first and foremost in the field of project management.

The investment phase includes project activities such as:

Project and Engineering Design

It comprises of designs of buildings and other facilities that include time scheduling, site prospecting and probing, preparation of blue prints, detailed plant engineering and a final selection of technology and equipment.

Negotiation and Contracting

It includes definition of the legal obligations in respect to project financing, acquisition of technology, construction of building and services, and supply of machinery and equipment for the operation phase. It also requires negotiation with equipment and machinery suppliers and collaborators and contracting with architects and contractors.

Construction

It includes actual construction of building, installation of machinery and manpower. It involves site preparation, construction of building and other civil works together with the erection and installation of equipment in accordance with proper programming and scheduling.

Recruitment and Training of Workers

It includes local and abroad recruitment and training of workers for the smooth running of operation. It should proceed simultaneously with the construction stage and it may prove relevant to the rapid growth of productivity and efficiency.

Commissioning and Start up

It requires handover of the building to project sponsor or promoter. Start up (delivery stage) is brief but technically critical span in project development. Its success indicates the effectiveness of the planning and execution of the project.

3. Operation phase

The operation phase includes project activities such as expansion and innovation, replacement and rehabilitation, and commissioning and start-up. The issues in the operational phase need to be considered both from long and short-term viewpoints.

The short-term view point relates to:

- Application of production
- Operation of Equipment
- Labor productivity and skill, etc.

The long-term view point relates to:

- Production cost
- Income from sales, etc.

2.2 BAUM'S Project Life Cycle (BAUM'S Model)

Baum (1978), an employee for the World Bank, has developed the following fiveproject cycles that are related with performance of the World Bank:

1. **Identification** - Selection of viable ideas
2. **Preparation** - Determine whether the project is viable or not.
3. **Appraisal** - Audit whether the preparation process is carried out adequately.
4. **Implementation**: - Actual implementing of the project (construction ofbuilding, hiring employees, etc.)
5. **Evaluation** - Evaluate whether the project has enabled to achieve the desiredobjective since its implementation.

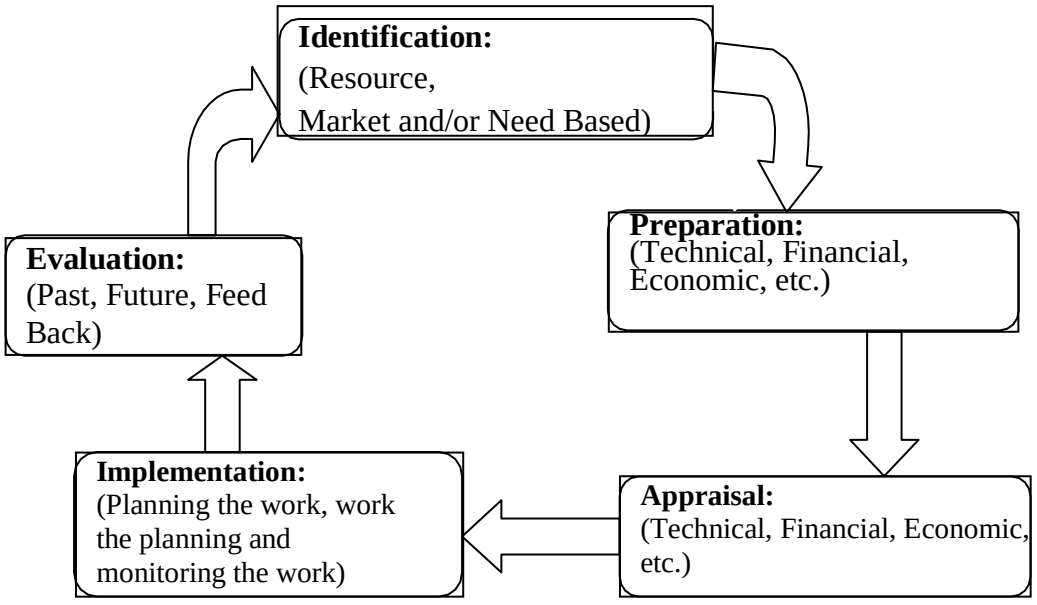


Figure 2.2: Baum (1978) Project Life Cycle

i. Identification

- The first stage in the cycle is to find potential projects.
- Some may be '**resource-based**
- Some projects may be '**market-based**
- Others may be **need-based**
- **Well-informed technical**
- **Ideas for** new projects

The **Identification** phase is one of identifying the problems, which need to be addressed, and analyzing the ways in which they can be addressed. This would include, for example:

- Analysis of existing situation
- Problems/needs identification
- Prioritization of ideas
- Selection of a project idea
- Definition of the project idea
- Consultation with stake holders
- Establishment of overall objectives

ii. Preparation (Pre-feasibility or feasibility studies)

- More detailed preparation and analysis of project plans.
- Project formulation covers the establishment of technical, economic and financial feasibility.
- Decisions have to be made on the scope of the project, location and site, soil and project size (farm or factory size)

Project preparation sometimes called project formulation covers the establishment of technical, financial, economic, social and institutional aspects of the project. Following preliminary screening, promising project options should be investigated in a systematic manner. The analysis of the projects technical, commercial, social, environmental, financial, economic and institutional aspects should be detailed and comprehensive enough to decide on the future of the project with confidence.

The Preparation/Formulation stage involves the detailed planning of the project idea. The result of which is a set of tangible proposals with an associated set of costs and benefits. These will usually be contained in pre-feasibility or feasibility study. Furthermore, this phase is one of defining more clearly the actual project, who will do it, what resources are viable, and how it will be divided into different tasks. This would include:

- Specification of objectives and results
- Identifying resources available for the project
- Identifying resources needed for the project
- Design of the project
- Packaging and planning of the project

iii. Appraisal and Selection

It is the comprehensive and systematic assessment of all aspects of a proposed project. During appraisal, it should be verified that the proposed project, in combination with other policies, contributes the maximum possible towards achieving certain development objectives. In project appraisal, a project is viewed from different perspectives: technical (including ecological), commercial, sociological, financial, economic, managerial and organizational.

When appraisal is completed, an appraisal report is prepared which contains the findings and final recommendations. The recommendation may be to approve, reformulate, postpone or abandon the project under review.

The Appraisal/Audit phase involves a systematic review of all aspects of the project in order that a decision can be made as to whether to proceed. The following questions are often the subject of an appraisal report on the basis of which a series of decisions may be made. These could involve discarding the project or alteration of some of the plans.

- Technical- Is the project design appropriate and will the project work as expected?
- Financial- Has proper provision been made to cover the financial requirements and obligations of the project? Is the financing planned adequate? Are the financial aspects of the project beneficial to the different actors and beneficiaries involved with the project? If the project is commercial how will the necessary inputs be obtained and (where relevant) how will the output be sold?
- Economic- Is the project advantageous from the point of view of the economy as a whole?
- Social- Is the project both advantageous and acceptable to the people affected by it?
- Institutional- Are there suitable organizations in place to implement and manage the project? Is the legal framework appropriate?
- Environmental- Have the environmental impacts of the project been properly considered?
- Sustainable- Will the project be sustainable in the long term both financially and institutionally?

iv. Implementation

The Implementation phase is one of actually performing the project and ensuring that the objectives are met and the out puts made. This includes:

- Mobilization of resources for each task and objectives
- Project marketing
- Ongoing monitoring and reporting arrangement
- Identifying problems
- Addressing failures
- Modification of the planned results and project objectives as appropriate

v. Evaluation

The **Evaluation phase** is the process of reviewing the completed project to see whether the intended benefits are likely to be achieved. It should be a natural part of the process and not seen as a 'punishment' for a project, which has failed to perform. This includes:

- Assessing whether the contractor has truly completed the task
- Identifying best practice for further projects
- Identifying what resources are required for the future (if something goes wrong this may mean that more resources are required rather than that the project has failed)?
- Identifying the need for future projects

The final phase in the project cycle is evaluation.
Compare actual progress with the plans, and to judge whether the decisions and actions taken

2.3 Choudhury's Project Life Cycle

According to an Indian scholar, **Choudhury** (1988), the project life cycle has five phases:

1. Conception,
2. Definition,
3. Planning and Organizing,
4. Implementation and
5. Clean-Up.

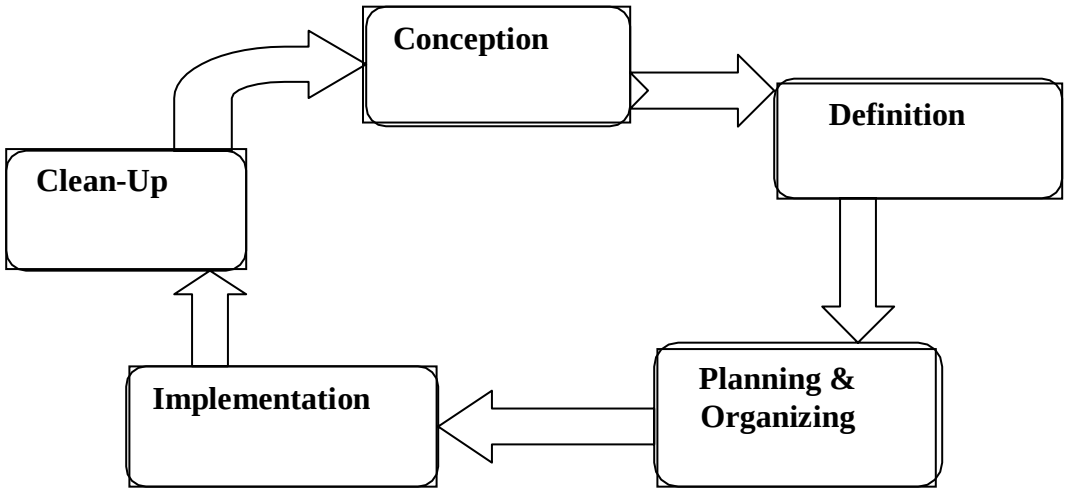


Figure 2.3: Choudhury (1988) Project Life Cycle

1. Conception

It is the phase where the project ideas germinate or conceived. This could be because of two reasons:

i. **Growth**- expansion, modernization, diversification, etc.
ii. **Solve a problem**- to remove constraints.

Project idea can be conceived by anybody in the organization and therefore has to be put in black and white before it can be compared with other project ideas or weigh to beseen its relevance. Project ideas examined in the light of projective constraints, opportunities, and what finding shows a green light may become the future project. Allprojects are identified or conceived in this way.

2. Definition

It defines the conception phase and therefore works to define the idea generated during the conception phase. This phase prepares a document using sufficient details and on the basis of this documents all customers, or financial institutions, or government may say yes or no to the project idea. This project report is called a Detailed Project Report (DPR). For instance, for a cement industry, the DPR encompasses raw material availability, plant size and capacity, technology selection, plant lay out, machinery and equipments needed, electrification and infrastructure work, civil and engineering work, utility (telephone, water, fuel, power, etc), financial analysis (total investment cost, source of finance, total production cost), the implementation schedule (when to start and end), etc.

What are the best decisions with the product leads to that signal it gets from the government. Banks have laid down various projects appraisal procedures.

3. Planning and organizing

It involves in the planning of the projects and organizing the human and non-human resources required to implement the project. It looks in to organizing or arranging for items needed, like purchase of technology, machines and equipments, inviting tenders, say, from construction company for construction of plan, call for issue of shares, call for appointment of specialized personnel, etc.

4. Implementation

It is the phase where the conceived project idea takes shape gradually, in this fieldwork starts. For capital equipment projects, it includes actual ordering and receipts, equipment and machine erections, civil construction of the plant, electrical piping, fitting, etc, trial and run, and final commissioning.

5. Clean-up

It is where the plant commission is handed over to different agency for production. This is where the BOT (Built, Operate, Transfer) or BOLT (Built, Operate, Lease, Transfer) works and hence known as Transaction Phase. This includes closing of all accounts, etc. As the project is in termination phase, project team also disintegrates and each person leaves the organization in the very sequence in which they hand entered. For example, designing and architecture could leave before construction engineers. Every organization also prepares lessons learned from this project for future project works including qualitative and quantitative database. This is known as "feedback phase". The information includes assessment of customers' e-mail, listing of problems encountered and remedies taken, technological advancements, and therefore recommendation for future R & D (Research and Development) and future projects.

2.4 Project Clearance Report (PCR)

Comprehensive study guidelines have been prepared by different organizations such as the United Nations Industrial Development Organization (**UNIDO**), World Bank (**WB**), Institution of Monetary Fund (**IMF**), national organizations concerned with national economic development and planning, etc

Whenever project is identified it is often done with reference to the countries development strategies and economic policies. Therefore, even if a privateentrepreneur is identifying a project, the project must serve to fulfill the social and economic need of the country. This has to pass through **at least** the under mentioned three stages of scrutiny and clearances (Choudhury, 1988; Joy, 1994).

Government may have a three-stage project scrutiny. These three stages are often knownas:

- First stage: Pre-Feasibility Report (PFR)
- Second stage: Techno-Economic Feasibility Report (TEFR)

- Third stage: Detailed Project Report (DPR)

2.4.1 Pre-feasibility report

Pre-feasibility report (also called project formulation report or project opportunity study report). PFR is a document that elicits the preliminary sanctions of the first stage clearance by the government and this has a specified outline to supply information. Industry practices is that the same pro forma is being used for all the aforementioned three stages of scrutiny but information gets refined by and by at its stage.

The objective of this scrutiny is to ensure that the project is viable from various angles:

- Market demand for the project or a product exist
- Plant capacity
- Materials and inputs used
- Location and site
- Project engineering and investment cost
- Plant organization and overhead cost
- Manpower requirement
- Implementation schedule
- Financial and economic evaluation
- Statutory clearances

Along with this, project cost estimates are also submitted. Industry collects historical estimates and adjusts for escalation, inflation, local factors, etc which may be based on statistics and experiences. If no previous experience of having such experience, consultants are hired for this purpose.

PFR is evaluated by various agencies from various angles. Each of them gives their individual clearances, record their objection, or get rectifications made (ask for further explanation). And this grants the first stage clearance is over.

Once getting clearance from the first stage (PFR), it moves to the second stage (TEFR).

2.4.2 Techno-economic feasibility report (TEFR)

In this stage, project scope is defined, capacity or size is identified, and also the method to be used is determined.

2.4.3 Detailed project report (DPR)

This is the last and most important stage for project pre investment phase. The DPR and Detailed Cost Estimates (DCE) are together for scrutiny and clearance. The outline and the items for DPR remains the same as TEFR; however, the level of accuracy increases because this is a period only when basic engineering, process design, and equipment listing is complete.

To prepare DPR from the TEFR:

- Breakdown all the project components, time phase them, schedule them, with accurate cost estimates along with explanations by giving reasons for your assumptions and calculations.
- Develop base line for controlling time and cost during the implementation of the project components.
- Prove preparedness with all the technical and resource requirements to implement the project.

2.5 Management Approach to Project Cycle

From identification through evaluation of the project cycle is a process that can and should be managed. Management has been traditionally associated with the implementation phase and often equated with the efficiency with which this activity has been carried out. The management aspect, however, is not restricted to implementation but includes all stages of project cycle.

The five managerial functions (planning, organizing, staffing, directing, and controlling) shall be applied for accomplishing each successive project cycle. Each successive cycle calls for a distinctive planning of its activities to be done; organizing of its structure, planned activities and the various resources required; staffing of its structure with the right people who are fit for the purpose; directing of its people involved in towards attaining the set goals; and controlling (monitoring and evaluating) of its performance so that to take corrective as well as preventive measures when needed.

Therefore, each project cycle has to be managed; it is a process for decision-making, not an end in itself. As more information is gathered during the various phases, the project is modified and reshaped, with consequent changes in its cost estimates, implementation schedule, and so on. The process may also identify additional projects that overlap and interlock with the initial proposal.

A report is usually prepared at the end of each phase. The report might include an analysis for decision-making, prospective budget and work plan for the next phase and elementary plan for the whole cycle. As the project progresses throughout various phases, those summary master plans can be refined with evermore detail and revised to take account of new and more comprehensive information.

2.6 Summary

Project management is an integrated and interdependent function. The success or failure of one activity of a project affects other activities. The interactions between the various components of project management can be direct and clearly defined, or they can be ambiguous. For

instance, a slight change in the scope of the project will certainly change the cost of the project but it is difficult to determine whether it will have an impact on the team motivation and quality of the end product. For a project to be successful there has to be a balance between the various objectives of the project, because to enhance performance in one area, performance in another area may have to be sacrificed.

Project management processes can be split into three, four, five or six stages- called the project life cycle- with respect to special nature of the project.

The components of the project cycle go through specific interaction patterns that contribute to the success of the individual processes and the project as a whole. A given processes and the interaction between their components is not applicable to all projects, thus, the project processes can be customized as per the requirements of the project.

2.7 Exercise

Multiple Choice questions

1. __In the _____stage of the project life cycle, projects that can contribute towards achieving the specified objectives are listed.

Identification C. Feasibility study

Appraisal D. Implementation

2. ___ Which of the following activities are undertaken in implementation phase of UNIDO project cycle?

A. Establish legal, financial and organizational basis

B. Technology acquisition and transfer

c. Recruitment, training, and placement of workers.

D. All of the above

3. ___The European Union project cycle includes all except;
   a. Programming C. Preparation
   b. Identification D. Appraisal
4. ___Pre-investment phase of UNIDO project cycle are;
   a. Identification, Selection, preparation and appraisal.
   b. Identification, preparation, appraisal, implementation and evaluation.
   c. Identification, preparation, appraisal and implementation.
   d. Programming, identification, preparation and appraisal.
5. ___In the _____ stage of project cycle, monitoring activity is under taken in order to encourage the project team.
   a. Evaluation C. Appraisal report
   b. Implementation D. Identification e. All of the above
6. ___Which of the following is incorrect about project cycle?
   a. The various stages through which project planning proceeds from the inception to implementation.
   b. The life cycle through which a project advances from infancy to maturity.
   c. Among the different models of project cycle most of the projects implemented in Ethiopia have been followed Baum Project cycle of 1975.

d. None of the above E. A and B

7. ___ In the DEPSA Project cycle model, which of the following is true order of the different stages of the cycle?
   a. Identification, formulation, Appraisal, Implementation, Operation and Ex-post Evaluation
   b. Identification, programming, Appraisal , Implementation, operation and Ex – post evaluation
   c. Identification, Preparation, implementation, Appraisal, operation and Ex – post evaluation
   d. Identification, formulation, operation, implementation, Appraisal and Ex – post evaluation
   e. None of the above
8. ___ Which of the following is not incorrect?
   a. Feasibility study provides a comprehensive review of all aspects of the project and lays the foundation for implementing the project.
   b. Project cycle is goes through various planning phases before any project is actually realized.
   c. Opportunity study is concerned with the collection, compilation and analysis of economic data to locate possible opportunities.
   d. All of the above E. A and C
9. ____In the _____ stage of the project life cycle, funds are actually disbursed to get the project started and keep running.
   a. Evaluation c. Appraisal
   b. Feasibility study d. Implementation
   E. None of the above
10. ____Among the following, one is odd from the given alternatives?
   a. Negotiation and contracting stage c. Project design stage
   b. Construction stage d. Procurement stage
   E. None of the above

CHAPTER THREE

3. PROJECT IDENTIFICATION

Introduction

Project identification is the first and, perhaps, the most crucial stage of both project cycles. It is from this idea that the project will be based, and a poor idea or lack of ideasis likely to lead to poor or no projects. The initial project idea may be made in rather general or sketchy terms, and different versions of the same project may be conceived.It is at this stage that an initial screening of project ideas will take place, with some project ideas being abandoned as impractical or of a low priority. Ideas for projects can come from a range of different sources and organizations including ministries, individuals, local communities, non-government organizations, and donor and international agencies.

3.1 Project Identification

Project identification is the findings of project that could contribute towards achieving specific development objectives. Often, project ideas should, in general, aim at overcoming constraints on the national development effort.

3.1.1 **Pre-Identification**

It is an important prelude to project identification. This pre-identification stage involves surveying, reviewing, inventorying, integration and analysis of strategies and policies, natural resources data and socio-economic information.

While a good data base is a prerequisite to sound project formulation. While the analysis of data will identify gaps and throw up ideas for possible projects, project identification must be carried out also with in a frame-work of national, regional, and sector development (including pricing, taxation, and subsidy) policies, otherwise much time and effort might be wasted in identifying and preparing projects which would be rejected on policy grounds or which might turn out to be unfeasible because of, for instance, tax and subsidy policy. Thus, those who are responsible for identifying projects need to be aware of accepted strategies and policies.

3.1.2 **Identification**

Having a reasonable database and development strategies and policies have been formulated in sufficient detail to be operationally useful, how do we then set about identifying projects? The bases for project identification:

Projects are identified where there is a demand for the output of the project and where it isthought that the resources can be made available to satisfy the demand. A distinction is sometimes made between **demand-based** projects and **resource-based** projects. Where projects are not undertaken for commercial objectives, the project may be **need-based.**
Demand for project output may be reflected in terms of:

- Local consumer demand for the product (goods or services)
- Export opportunities
- Demand for intermediate inputs into other sectors/activities

Incorrect assumptions about the size of future demand or the price at which products can be sold can cause problems of either inadequate or excess capacity that can be difficult or expensive to rectify.

Resource-based identification is often important for the development of agro-industries. Many agro-industrial projects are identified because of existing production of agricultural raw materials or the availability of land that is suitable for their production. Surveys of land capability may lead to the identification of potential new areas of economic activity. Agro-industrial projects involve the matching of raw material supply with processing capacity and so they may involve more than one project or a project having two or more components.

Need-based projects are most common in the social sectors where requirements for health and education facilities or support facilities for unemployed workers are related to an assessment of need. Normally the distinction between demand and need is based on whether or not the output of a particular activity is sold on a commercial basis. In this respect some infrastructure projects are also identified on a need basis, although the need may be defined using a similar approach to the projection of demand for a commercial project.

There are essentially two complementary approaches to be followed in generating ideas. Assessment of the supply and demand side helps identify feasible project ideas.

First, find out what the nation wants and needs in order to improve quality of their lives. This grass roots level approach is the essence of good bottom-up planning, and is essential if we want to reach the really poor and needy in the rural areas. It does not follow that what people say they want or what is good for them is always sound. But, we should at least take the trouble to ask people what they want, listen carefully to what they say and try as far as possible to see

how their ideas can be fitted into the available resources, strategies and policies, taking into account physical, human, institutional, and financial constraints.

Second, look at the existing situation in respect to the demand and supply of goods and services and to look at past trends and likely future trends. Some of the questions that have to be raised during such assessment are illustrated below:

Questions on the Supply Side

- Is the existing product produced for subsistence needs or for sale or for both?
- What are the possibilities for improving the subsistence production and increasing output for sale?
- What products are not being produced in sufficient quantities in terms of the resource available?
- What are the most important constraints inhibiting a faster growth? Etc.

Questions on the Demand Side

- What are the markets for the goods and services currently being produced?
- What are the prospects for entering other markets?
- What are the possibilities for import substitution?
- What are the possibilities for export substitution?
- What are the possibilities for increasing existing exports or developing new export items?
- Are pricing, tax, and subsidy policies conducive to increased production and exports? Etc.

There are four key phases of project identification. These are:

- Actual Project Identification- The generation of project ideas by formal and informal institutions and individuals.
- Description of Project Idea- An actual written description of the project idea or concept, summarizing the main elements of the proposed project to use in the screening, ranking and prioritization of project ideas.
- Screening- An initial review of project ideas and concepts to see if they should be advanced or abandoned at an early stage.
- Prioritization- The ranking and selection of projects against a set of criteria to identify the "best" projects to move actively into the designed stage and development.

3.2 Sources of Project Ideas

How to come up with a project before grasping to project preparation? Usually there are two major levels where project ideas are originated- the macro and micro level.

3.2.1 Macro level

Project ideas may emanate from:

- National, sector or regional plans
- Constraints in the development process due to shortage of essential infrastructure facilities
- Government's decision to correct social and regional inequalities or to satisfy basic needs of the people through development projects.
- Possible external threat that necessitates projects aiming at achieving, for example, self-sufficiency in basic materials, energy, transportation, etc
- Unusual events such as droughts, floods, earthquakes, etc.
- Government decision to create locally project-implementing capacity in such areas as construction, etc.
- Multilateral or bilateral development agencies.
- Regional or international agreements in which a country participates.

3.2.2 **Micro Level**

Project ideas may emerge from:

- Existence of unused or underu tilized natural and human resources and the perception of opportunities for their efficient use
- Identification of unsatisfied demand or needs
- Need to remove shortage in essential materials, services, or facilities thatconstrain the development effort.
- Initiative of private or public enterprises in response to incentives provided bythe government
- Necessity to complement or expand investments previously undertaken
- Desire of local groups or organizations to enhance and improve their welfare.

During identification, the analyst should eliminate project proposals that:

- Are technically unsound and risky
- Have no market for the out put
- Have inadequate supply of inputs
- Are very costly in relation to benefits
- Assume over ambitious sales and profitability, etc.

As a result, some of the project alternatives will be rejected and those that are promising will be advanced to the next stage called project preparation. In general, by the end of the identification stage, mainly, we should know:

- Whether further detailed work is justified?
- What major issues have been identified? What project alternatives have been considered? Which of them have been rejected? Etc.
- Rough estimate of costs for projects that still look promising, a specific work plan for the next stage should also be included in the study

3.3 Who Identifies Projects?

Projects can be identified by many different agencies depending on the type of projectunder consideration. Projects might be identified by (Chandra, 2006; Gizaw, 2003):

- Small producers' organizations
- Large scale individual private sector producers
- Product marketing organizations
- Private sector companies (Local and Foreign)
- State owned enterprises and organizations
- Government ministries
- Development banks
- Other aid agencies
- Local government
- Local politicians and pressure groups, etc.

Projects can be identified by institutions on the information they hold and receive. This information can be formal surveys and reviews, or it can be informal, e.g., local peoples' views and opinions. The main formal information sources of project ideas for the agricultural sector, for example, are (Gittenger, 1998; Gizaw, 2003):

- Policy reviews and development plans made by federal government ministries
- Sector surveys by technical ministries
- Survey conducted by local government (district and regional) and other regional organizations
- Formal problem diagnosis and analysis exercises
- Environmental and natural resource surveys
- Reviews and evaluations of past projects
- Community meetings and public gatherings
- Participatory rural appraisal and participatory development programs
- Private sector, co-operative and parasternal corporate plans
- Investment identification missions by development and other aid donors, etc

3.4 Project Concepts And Profiles

Once a project idea has been conceived, the next stage is to describe the idea so that it can be prioritized and move on to the next stage in the process. This may involve the preparation of a project identification report or project concept or profile. It might be part a more general sector or regional planning exercise or the result of participatory approach at the village level by a district officer. Whenever it is developed, it is essential to have a clear idea of what the proposed project is supposed to be and what are the hopes to achieve. A project concept or profile should be short and can sometimes be only a couple of pages.

The conceptualization stage of the project can be very important. It is at this early stage when alternative strategies can be examined most easily. As project preparation proceeds, it becomes more and more difficult to alter the fundamental project design. It is also important that the

initial identification or project concepts give consideration to all possible options. Careful work at this stage can help not just in ensuring that good project proposals work, but also in rescuing or amending proposals that might otherwise have been disasters.

3.5 Prioritization And Ranking

The limited resources available mean that effective project identification and selection at various levels will be essential. There will be more ideas for potential projects than resources available. This will occur at all levels from community-based projects to national based projects. Even individual farmers will have to allocate resources between 'personal' projects on their own farms, even when there is no outside intervention and support.

At the national level different agencies and divisions within ministries will have their own project ideas and will have to compete for support and resources. To decide which projects to support, it will be necessary to set priorities. This calls for the ranking of projects. But how are projects to be ranked, and who is to do this? A set of criteria against which project can be ranked needs to be established; these criteria will vary depending upon the level of a project. The criteria of a village in selecting projects will be different from that of the ministry of agriculture. Criteria include social, economic, financial and environmental factors.

Examples of Criteria for Ranking Projects

Extent
- Number of people affected by the project
- Geographic area affected by the project

Economic and financial
- Potential economic benefits to the country or region
- Potential financial benefits to farmers and local communities

Environmental
- Conservation of natural resources and more sustainable land use
- Protection of natural resources (e.g., forests)

Social
- Poverty alleviation
- Assistance to disadvantaged groups

Policy
- Is the project in line with national policies?

Resources
- Availability of human resources to implement project
- Likely availability of funding from government, NGO and/or donors

Success or failures
- What are the chances of the project successfully meeting its objectives?
- What degrees of the risks are associated with the project that may affect its implementation?

Support
- Political support for project
- Community support and demand for project

During selection process, each project can be assessed against each of the criteria to give a

rating. At this stage of the project cycle this is more likely to be qualitative than quantitative. Certain criteria can be given greater weighting to reflect the importance of the criteria in determining the overall rank of the project.

3.6 Identification of Commercial Project Ideas

3.6.1 Prescriptions for fostering organizational creativity

Organizational leaders can cultivate institutional creativity for commercial project idea generation through (Chandra, 2006):

- Develop an acceptance for change.
- Encourage new ideas.
- Permit more interaction.
- Tolerate failure
- Provide clear objectives and freedom to achieve them
- Offer recognition, Etc.

3.6.2 Scouting for project ideas

Good project ideas (the key to success) are elusive. So, a wide variety of sources should be tapped to identify them. Here are some of the suggestions in this regard (Chandra, 2006; ICMR, 2007; Meredith and Mantel, 2006):

- Analyze performance of existing industry.
- Examine input and output of various industries.
- Review imports and exports (this is helpful to understand, say, the trend of imports of various goods and the potential for import substitution).
- Study plans outlay and government guidelines.
- Look at the suggestions of financial institutions and development agencies.
- Investigate local material and resources.
- Analyze economic and social trend.
- Draw clues from consumption abroad.
- Study new technological development.
- Explore the possibility of reviving sick units.
- Identify unfulfilled psychological needs.
- Attend trade fairs, etc.

3.6.3 Preliminary project idea screening

Preliminary screening is required to eliminate ideas that are not promising from beginning. The following six dimensions should be considered for preliminary project idea screening

a) Compatibility with promoter

The idea must be compatible with the interest, personality, and resources of the entrepreneur,

- It must fit the personality of the entrepreneur.
- It must be accessible to the entrepreneur.
- It must offer the entrepreneur the prospect of rapid growth and high return on investment.

b) Consistency with governmental priorities

- Is the project consistent with national goals and priorities?
- Is there any environmental effect contrary to government regulations?
- Can the foreign exchange requirements of the project be easily accommodated?
- Will there be any difficulty in obtaining the license for the project?

c) Availability of inputs

The input requirements, their availability and cost should be considered. Resources and inputs required must be reasonably assured, i.e.

- Capital needs
- Technical know how
- Raw material
- Power, etc.

d) Adequacy of the market

The size of the present market must offer the prospect of adequate sales volume, potential for growth, and a reasonable return on investment. To check adequacy, see for:

- Present and future demand
- Market share of own and competitor
- Domestic and export market
- Quality-price relationship vis-à-vis competitive products
- Economic, social, demographic trends for demand
- Barriers to the new entry, sales and distributions system, patent protection, projected increase in consumption, etc.

e) Reasonableness of cost

Cost structures (RM, Labor, FOH, Administration, Selling and Distribution, etc) of the proposed project must enable it to realize an acceptable profit with a competitive price.

f) Acceptance of level of risk

To ascertain degree of risk involved, the following factors should be considered:

- Vulnerability to business cycle
- Change in technology
- Competition from substitute
- Competition from imports
- Government control over price and distribution, etc.

3.6.4 Project Rating Index (PRI)

When large numbers of project ideas are generated, we need preliminary screening to judge whether the project is primarily worthwhile or not. The **PRI** streamlines the process of preliminary screening (**example below)**. The steps are (ICMR, 2007; Meredith and Mantel, 2006):

i. Identify factors relevant for project rating.

ii. Assign weights to the factors (the weights are supposed to reflect their relative importance).
iii. Use suitable rating scale (say, a five or seven point scale).
iv. Rate the project proposal on various factors.
v. Multiply each factor rating with factor weight. This gives score for the factor.
vi. Add factor scores. This gives an overall project-rating index.
vii. Compare the overall project-rating index (step no.6) against the predetermined hurdle value (cut-off point).
viii. If equal or more accept or else reject the project.

Example: Construction of Preliminary Rating Index (PRI)

Step 1	Step 2	Step 3 & 4					Step 5
Factors	Factor Weight	FIVE POINT RATING SCALE					
		(5) V.G	(4) Good	(3) Ave.	(2) Poor	(1) V.P	Factor Score
Input availability	0.25			□			0.25*3=0.75
Technical know how	0.10		□				0.10*4=0.40
Reasonableness of cost	0.05		□				0.05*4=0.20
Adequacy of market	0.15	□					0.15*5=0.75
Stability	0.10		□				0.10*4=0.40
Complementary relationship with other products	0.05		□				0.05*4=0.20
Dependence on firm's strength	0.20	□					0.20*5=1.00
Consistency with government priorities	0.10			□			0.10*3=0.30
	1.00	**Step 6 ⟶ Rating Index (□) = 4.00**					

When screening ideas, the project manager must avoid two types of errors: drop-error and go-error. Drop-error occurs when a good idea is rejected and go-error occurs when a poor idea identified for further development.

3.7 Summary

Project ideas are generated through different sources like customers, competitors, and employees. Sometimes they are discovered through accident. Project manager should try to enhance people's creativity, scan the entire business environment and appraisethe company's strengths and weaknesses to generate a large number of ideas. Techniques like attribute listing, brainstorming, and Delphi technique are useful for improving the creativity at individual and group level.

The project manager should analyze the business environment that consists of the economic sector, the governmental sector, the technological sector, the socio-demographic sector, the competition sector and the supplier sector. Once a pool of ideas has been generated, the project manager should carefully screen them. The Project Rating Index method or the development funnel tube helps a manager eliminate poor ideas in the initialscreening process.

3.8 Exercise

1. List down the steps in Preliminary project idea screening

2. List and describe the two Sources of Project Ideas

CHAPTER FOUR

4 TECHNICAL ANALYSIS OF PROJECT

Introduction

A **feasibility** study is an assessment of the practicality of a proposed project or system. It is the process of defining exactly what a project is and what strategic issues need to be considered to assess its feasibility, or likelihood of succeeding. Its aim is to analyze the viability of a proposed project, product or service.

A feasibility study looks at the viability of an idea with an emphasis on identifying potential problems and attempts to answer one main question:

- Will the idea work and should you proceed with it?
- Feasibility studies address things like where and how the business will operate.

Why are feasibility studies so important?

- In modern times, business operations are complex requiring
- Carefully prepared plans.
- Feasibility study helps the promoter to make the investment decisions correctly and to obtain funds without many difficulties.

The information you gather and present in your feasibility study

Will help you:

- List in detail all the things you need to make the business work;
- Identify logistical and other business-related problems and solutions;
- Develop marketing strategies to convince a bank or investor that your business is worth
- Considering as an investment and
- Serve as a solid foundation for developing your business plan.

4.1 The role of feasibility Studies

- Determine:
    a) technically feasible
    b) feasible within the estimated cost
    c) will be profitable
- Identify reasons not to proceed/progress
- Enhance the probability of success

- Provide quality information for decision making
- Help to increase investment in the company
- Help in securing funding from lending institutions and other monetary sources

4.2 Market demand analysis

Market analysis is a process of assessing the level of demand for product or service to be produced from the project i.e.

- determining the marketability of the product or service of the project under consideration.
- It is a critical stage in the FS of projects intended especially for wealth maximization purposes.
- D/t techniques of demand forecasting and analysis are used in analyzing the availability of markets for the products and assessing the level of demand.

There are **six** components of feasibility study in the project feasibility report, namely:

1. Market and demand feasibility
2. Technical feasibility
3. Financial feasibility
4. Economic feasibility
5. Environmental feasibility
6. Legal and management feasibility

4.2.1 Market feasibility study

Market and demand analysis aims at determining the **aggregate demand** for the product/service and the market share of the proposed project.

More specifically, it deals with:

Objectives of market analysis - determine the effective demand for the envisaged (proposed) project.

The marketing elements- Business philosophy, research, instruments and plan and budget.

Situational analysis -establish the relationship between the product and its market (customers, competitors and middlemen (wholesalers and retailers).

Collection of information- In order to achieve the market and demand analysis objectives, information should be obtained from various sources (primary sources and secondary sources).

Characterization of the market- involves describing the market for product/service in terms of the effective demand, price, and methods of distributions, promotion, consumers, supply and competition.

4.2.2 Technical Feasibility Study

Associated with the technologically evaluates the project.

The broad purpose of technical analysis is:

- To ensure that the project is technically feasible in the sense that all the inputs required to set up the project are available
- To facilitate the most optimal formulation of the project in terms of technology, size, location, and so on.

It covers:

- Manufacturing process/technology
- Technical arrangements
- Materials and inputs(raw materials, utilities, factory supplies)
- Plant capacity/production capacity
- Location and site- location- broad and site- specific piece of land
- Machineries and equipment
- Structures and civil works- site preparation, buildings and structures and outdoor works (supply and distn., landscaping, transportation etc)
- Environmental aspects

4.2.3 Financial Feasibility Study

The objective of financial analysis is 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 capital.

It tells a project's worthiness and analyzes how a project is financially feasible; how the returns exceed its costs. One duty of a financial manager is to choose projects with satisfactory cash flows and rates of return.

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.

It is concerned with assessing the feasibility of a new project from the point of view of its financial results.

The project's direct benefits and costs are, therefore, calculated in monetary terms at the prevailing by examining the financial implications to identify the projects financial efficiency, incentive impact to the participants in the project, creditworthiness, and liquidity (say, could firms have enough working capital.

To judge a project from the financial angle, we need information about the following:

- Cost of project
- Means of financing
- Estimates of sales and production
- Cost of production
- Working capital requirement
- Estimates of working results
- Break even points
- Projected cash flow statements

4.2.4 Economic feasibility study/Socio cost Benefits

A methodology for evaluating projects from the social point of view.

Aids in evaluating individual projects within the planning framework.

Focus is on social costs and benefits of a project which tends to differ from financial analysis.

It focuses on the costs associated with a project and how they can be kept at a minimum level.

The major factor under an economic feasibility study is whether the project is possible given the resource constraints.

4.2.5 Environmental feasibility Study

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:

a) What is the likely damage caused by the project to the environment?
b) What is the cost of restoration measures required to ensure that the damage to the environment is contained within acceptable limits?

4.2.6 **Legal and management feasibility Study**

Legal feasibility study is use to conclude whether the proposed plan or system is conflicts with the national or international legal requirements. Protection Acts simply use to decide the any violation the legal requirements. It is also a planned method.

Market and demand analysis is a key process in determining the feasibility of a project.

It must be carefully structured and planned to:

- obtain required information within the time and cost limits and
- determine the possible marketing and production strategies required to reach the basic corporate objectives.

Market analysis is discussed based on the following pattern:

- Concept of marketing
- Marketing research
- Outline of project strategy and steps in demand projection.

1. Marketing

It can be explained as a market orientation of management with regard to business decisions.

Marketing can be characterized by the four key elements. These are:

1. Business philosophy
2. Marketing research
3. Marketing instruments and
4. Marketing plan and budget.

1. Business Philosophy-

Marketing is above all business philosophy.

It does not focus on products/production, but it puts:

- The problems,
- Needs and
- Desires of existing or potential consumer groups at the center of the business activities of the firm.

This requires that decision makers at all levels will have to orient their thinking towards the market.

2. Marketing Research

It is a concise and systematic assessment of information on the market and market environment.

It is the task of marketing research to:

- obtain,
- analyze and
- interpret this information and
- to provide the basis for other basic decisions.

For the development of the project strategy and the marketing concept, careful marketing research is

essential.

Any errors made in the research phase would result in:

- wrong marketing concepts and
- may place the whole project in **jeopardy/danger/risk.**

Hence, it shall be done so carefully and critically.

The following will be **some of the steps involved in the process**

- Assessment of the target market structure.
- Customer analysis and market segmentation
- Analysis of channels of distribution
- Analysis of competitors
- Analysis of socio-economic environment
- Life cycle of a sub-sector
- Projecting marketing data.

3. Marketing Instruments/Tools

The successful implementation of marketing strategies:
shapes and influences the market in a well-planned manner, Using the necessary combination or mix of marketing/ instruments like the **4Ps** (*product, price, promotion & Place*).

4. **Marketing plan and Budget**

To achieve the marketing objectives, it is necessary to:

- **determine** the required measures or means and
- to prepare a plan of action

on the basis of findings of marketing research **a project shall be based on** well-defined marketing concept to achieve the desired objectives.

4.3 Production Program and Plant capacity

4.3.1 Production Program: Basis and Aspects

Sales Program as a Basis

Sales program shows the level of sales forecast to be realized during the specified life of plant in terms of:

- Local sales,
- Export sales,
- Total revenues over the project life, etc

1. Sales program is projected under market analysis

Market requirements and market structure identified
Marketing strategies will be defined & the implications, broadly, in terms of:

- Product pricing
- Production program,
- Promotional efforts,
- Sales & distribution mechanisms, etc

Marketing mix - combination of the controllable marketing variables

2. Provides inputs for financial analysis

After projecting sales for d/t stages of production, a FS should define and come up with the detailed ***production program*.**

A production program **defines:**
the level of output to be produced during specified period and,
it should be directly related to **the specific sales forecasts**.

Aspects of Production Program
The demand and **market analysis** specify:
The sales program, which should be transformed into the plant production program.
It indicates the level of output and the timing for production.

Determining capacity utilization:
The **production program** should indicate:

- The quantity of outputs to be produced each time in the planning horizon and
- The associated level of capacity utilization in terms of:
    - initial production period,
    - Intermediate production period, and
    - Full production stages.

Determining the type of products or range of products produced over the life of plant in terms of:

- main product,
- by-products and reworks, and
- associated wasted units & scraps

➢It is related to the sales program (sales forecast)
The determinants of a production program during the initial production years vary considerably from project to project

The production program changes over time during the project's life with respect to capacity utilization.
In general: the initial level of production may not be higher than 40 to 50% of the overall design capacity, for the first one or two years of operation. **This is b/c:**

- Market may not be ready to acquire large amount of new product or
- Technological difficulties may obstruct the full-capacity operation of the equipment

Full production capacity is being reached usually towards the third or fourth year and stabilizes for about 10 to 15 years. After certain period (probably 30 or more years), however, the project necessarily terminates production due to:

- the low market competitiveness,
- de-capitalization of the equipment,
- environmental reasons,

old plants often result more environmental pollutions as compared to new ones. Once a production program defines the levels of outputs in terms of:

- end product,
- possibly of intermediate products, and
- the operating ratio b/n various production lines and processes, the specific requirements of materials and labor should be qualified for each stage.

The *specific quantities needed* for each stage of the production program and costs should be determined. The input requirements and costs have to be assessed in terms of:
Basic materials such as RMs, semi-processed items, etc

- Auxiliary materials and factory supplies,
- Major utilities, and
- Direct labor requirements.

Detailed estimates should be prepared for the stages of *initial production* and *full production*.

Factors Considered in setting the Production Program

1. **Production Level (Capacity Utilization)**

Production may not be at full capacity during the initial period due to:
Production and technological difficulties

- New technology,
- Design of the production process,
- Flow of operation, etc

➢ Skill and productivity to be learned
➢ Lack of marketing experience (commercial difficulties)
➢ Plant is new for competition - more time needed to cope up with the competitive environment

2. **Production Problems:**

✓ Machine breakdowns
✓ Problems of line balancing in operations;
✓ Raw material shortages or
✓ Materials may not be up to the standard;
✓ Utilities shortage, etc.

3. **Wastage and Spoilage:**

➢ Try to avoid abnormal spoilages & wastages, and
➢ only anticipate normal ones.

Abnormal spoilages and wastages **can be eliminated through efficiency in operations** and, **Thus,** are controllable/avoidable. However, **normal spoilages and wastages** are not controllable or unavoidable.
Anticipate/Allow for → Normal wastage → Normal spoilage

4. **Price Vs Quantity Sales:**

Sales might be affected by the price established. The impact of higher prices may be reflected in terms of lower sales volume/quantity. Lower sales volume, in turn, affects the production program. The price charged for goods/services affects the production program and Hence, it should be taken in to account.

Factors Affecting Capacity Decisions

3. Technological Requirements:

It is a minimum economic size determined by the technological factor. For many industrial projects, there is certain minimum economic size determined by the technological factor.

4. Input Constraints:

In developing countries, there often are constraints on the availability of certain inputs. Some mentionable constraints are:

- Power supply may be limited
- Basic raw materials may be scarce
- Foreign exchange available for imports may be inadequate

These constraints should be borne in mind while choosing the plant capacity

5. Investment Cost:

Investment cost per unit of capacity decreases as the plant capacity increases i.e. capacity cost increases at a decreasing rate. That is, some capacity costs remain the same regardless of the size of the plant like:

- Installation costs,
- Technicians charges, and
- The rest often increase still at a lesser proportion.

In other words, as capacity increases, the investment **cost per unit of capacity decreases.** The capacity-cost relationship could be **: C2 = C1 x(Q2/Q1)**

Where:

C1 = Known cost for Q1 units of capacity

C2 = Derived cost for Q2 units of capacity

α = (Alpha), which is a factor **reflecting capacity-cost relationship**

Alpha is usually set in between **0.2 and 0.9.** If **α** = 0, it means that there is no relationship b/n capacity and cost; and If **α** = 1, it means that capacity cost increases in the same proportion with the increase in the level of capacity.

6. Market Conditions:

The anticipated market for the product has an important bearing on plant capacity. If the market for the product is likely to be very strong, a plant of higher capacity is preferable. If the market is likely to be uncertain, it might be advantageous to start with a small capacity. Further addition to capacity may be effected with the growth of market.

7. Resources of the Firm:

The following resources define a limit on a firm's capacity decision:

- Managerial infrastructure,
- Finance, and
- Availability of skilled employees to a firm

8. Government Policy:

Minimum Economic Capacity Policy in several industries

- Economic use of raw materials and other scarce resources such as land, capital, etc
- Economies of scale and subsequent low prices to consumers
- Optimum investment in imported machinery & equipment (to save foreign exchange)
- To minimize fragmented (small-scale) investments and encourage long-term investments in large capacity plants

Government policies and regulations with regard to working hours, pollution, etc

Feasible Normal Capacity (FNC). The FNC is the number of units produced during a given period of time. This capacity should represent the optimum level of production. It is determined by the *relative interactions of various components of the FS such as:*

- Technology,
- Availability of resources,
- Investment and production costs,
- Raw materials
- supplies (auxiliary & utilities),
- Human resources, etc.

The FNC is achievable under normal working conditions by taking into account the following conditions:

Installed equipment:

- Level of sophistication (technical)

- Standard of operation (Rate of operation)
- Specific characteristics

Technical plant conditions:

- Down time (a period where by the plant is not in operation or not running due to technical requirements)
- Maintenance requirement
- Tool checks

Organizational and management aspects:

- Normal working hours
- Holidays
- Normal labor strikes
- Ability to manage and coordinate diverse interactions

Availability of inputs

Skill of employees (i.e. employee skill should fit to the technological requirement) Nominal Maximum Capacity (NMC).This is the technically feasible capacity and frequently corresponds to:

The installed capacity as guaranteed by the supplier of the plant. NMC is defined by system engineering i.e. the equipment installed capacity, which includes reserve and stand-by capacity.

To reach the maximum output figures:

- overtime work may be needed
- it might result in excessive consumption of:
    - factory supplies,
    - utilities,
    - spare parts, and
    - wear & tear parts.

This results in a disproportionate production cost increase, which is called diseconomies of scale. In general, the FNC is less than the NMC under normal condition

4.4 Raw Materials and supplies study

There is a close relationship b/n the study of RM &S required and other project formulation stages, such as:

- definition of plant capacity,
- location of the project
- selection of technology and equipment,

The main basis for the selection of materials and inputs is, however:

- The demand analysis,
- The production program, and
- The plant capacity.

UNIDO Approach in the Study

The approach followed by UNIDO in the study *of RM & SS* are as follows:

- Step 1: Classification of Raw Materials
- Step 2: Specification of Requirements
- Step 3: Check Availability and Supply of Inputs
- Step 4: Supply Marketing and Supply Program
- Step 5: Estimate Cost of Raw Materials and Supplies

Step 1. Classification of Raw Materials and Supplies

- **Unprocessed and Semi–processed**

a. Agricultural Products

If the basic material is an agricultural product: First the quality of the product must be identified.

If the project involves large quantities, the production of agricultural input may have to be increased. This may require the extension of the area under cultivation. Example: for a Sugar Factory, we need to increase within the same region for plantation of sugar cane b/c: it cannot be transported over long distance without high costs, loss of content, or both.

b. Livestock and Forest Products

In most cases of livestock product and forest resources:

➢ specific surveys are called for to establish the viability of an industrial project. However, general data from official sources and local authorities only sufficient for opportunity studies is required.

c. Marine Products

The major problem in marine-based raw materials is to assess:

- The potential of availability,
- The yields, and
- Cost of collection.

Availability of marine products depend on:

- ecological factors,
- national polices and
- bilateral or multilateral agreements

Example: *fishing quotas.*

d. Mineral Products

For mineral products detailed information:

➢ on the proposed exploitable deposits is essential and proven reserves are needed.

- The availability of opencast or underground mining;
- the location,
  size, depth, and quality of deposits; and
- the impurities and the need for beneficiation should be
  qualified.

- **Processed Industrial Materials and Components**

It constitute an expanding category of basic inputs. Such inputs can generally be classified under:

- Base metals,
- Semi-processed materials, and
- Manufactured parts: components for assembly type and engineering goods industry

- **Factory Supplies**

a. Auxiliary Materials:

All manufacturing projects require various auxiliary materials and utilities. It is not always easy to distinguish b/n: Auxiliary Materials, such as Chemicals, Additives, Packaging Materials, Paints, and Varnishes and Factory Supplies such as Maintenance Materials, Oils, Greases, and Cleaning Materials, since these terms are used interchangeably.

b. Utilities:

A detailed assessment of the *utilities required like:*
electricity, water, steam, compressed air, fuel, and their efficient disposals).

Could only be made after analysis and selection of:
✓ location,
✓technology, and
✓plant capacity.

An estimate of *utilities consumption* is essential for identifying:
✓ the existing sources of supply,
✓ any bottlenecks, and
✓ shortages that exist or are likely to develop.

c. Spare Parts:

All machinery and equipment will finally break down after a certain lifetime. Various spare parts will be required to keep a plant in operation. It is important to correctly *identify:*

- *Essential spare parts,*
- *The quantities required, and*
- *Available suppliers*.

Step 2. Determination/specification of requirements

To estimate the materials and supplies to be used, the requirement should be:

- identified,
- analyzed, and
- specified in FS, both quantitatively and qualitatively.

In this regard, a number of factors such as:

- Socio-economic factors,
- Financial factors, and
- Technical factors should be considered in specifying the requirement.

Step 3. Availability and supply

A number of projects are conceived either:

- to *exploit available raw materials* or
- to *utilize basic materials that become available* from other production process.

A FS should show:

- how the materials and inputs required will be *provided.*
- General availability,
- potential users, and
- supply sources & supply programs.

If a basic input is available within country:

- its location and the area of supplies should be determined.
- The issue of *transportability and transport costs* should be analyzed.

If the basic material is imported, as a whole or in part:

- The implications of such imports, the sources, and the alternatives should be fully assessed as well as determined.
- Input alternatives should be identified.
  - ➢ assessment of opportunities for substitutions should be made.

Step4. Supply marketing and supply program

I. Supply marketing is the acts of an institution in the supply market to acquire basic inputs through backward integration with suppliers.

An enterprise acts as:

➢ a buyer on supply markets when purchasing required RMS and factory supplies and

➢ a seller in the markets for finished goods/services.

Objectives of Supply Marketing

The basic objectives of supply marketing are:

a. Cost Minimization,

Input costs can be reduced by:

✓ selecting appropriate suppliers

✓ choosing a proper volume and frequency of orders.

✓ Economic Order Quantity/Size

b. **Risk Minimization and Reliability of Suppliers:**

Reliability with regard to:

✓ quantity and quality,

✓deadlines (schedule), and

✓prices is significant for the entire manufacturing process.

➢Late deliveries,

➢ lack of quality, or

➢ poor maintenance services negatively influence the projects activities.

c. Cultivating/Creating Relations with Suppliers:

➢ Is establishing smooth, productive, and long- term relations with the suppliers.

➢ Building up maximum bargaining power is needed.

Purchasing prices largely depend on the bargaining power of the project and its management.

It is essential to identify:

✓ the possible *supply alternatives or* suppliers and

✓ the *quantities* to be purchased from each should be determined in the study.

II. Supply Program

It is an outline that shows how supplies of materials and inputs will be secured.

A *supply program* should deal with:

- Identification of supplying sources and suppliers,
- Agreement and regulations,
- Quantities and qualities,
- Consignments,
- Means of transport,
- Storage, and
- Risk assessment

Considerations should be made While identifying suppliers, considerations should be made with regard to Geographic location, Ownership, Main activities, Financial strength and profitability, Production capacity, and Business experience with the product.

Step 5. Cost of raw materials and supplies

a. Unit Costs:

In the case of domestic materials, current prices have to be viewed in the context of: past trends and future projection of the elasticity of supply. For imported material inputs, the following costs should be considered: C.I.F prices, Clearing charges including loading & unloading charges and port charges, Tariffs and local insurance, and Cost of internal transport to the plant.

The prices of imported inputs fluctuate and depend on international market situations.

b. Annual Costs:

The price basis for the estimates are:

- Market price level,
- Quotations from suppliers,
- world market prices,
- comparisons with similar inputs in other projects, etc

b. ***Overhead Costs of Supplies*:**
Costs related to: level of service, administration and finance, and sales cost centers. should be properly estimated

4.5 Location and site selection and Environmental impact assessment

Location and site are often used interchangeably but must be distinguished.
Location refers to a fairly broad, general geographical area, such as city or sub-city, an industrial zone, or a coastal area.
Site refers to a specific piece of land where the project would be set up. It may refer to the specific kebele or village.Ideally, a project can be located in lots of potential locations and specific sites.
Location and site of the project affect:

- the profitability of the project
- the long-run goodwill of the company.
- the lives of the residents in positive as well as in negative ways.

Hence: they shall be selected considering various relevant factors. A proper EIA is essential before locating a project somewhere. Project shall be put at a project location taking in to account various factors such as:

- proximity to inputs or
- to markets and others.

Location Analysis

Location analysis has to identify locations suitable for the industrial project under consideration. A location may sometimes be suggested at an early stage by the project promoter. It should fulfill the key requirements identified as an essential or critical for a feasible implementation of project. The impacts and requirements to be Identified in

Location Analysis:

Natural environment, geographical conditions and protection requirements. Ecological impact of the project, Environmental Impact Assessment, Socioeconomic policies, incentives and restrictions, and government plans and policies, Infrastructural services,

condition and requirements, such as: the existing industrial infrastructure, the economic and social infrastructure, the industrial framework, urbanization and literacy

An analysis of key aspects is basically made in qualitative terms and does not enter in to any financial calculations.

The Natural Environment

In selecting a location for a project, two issues related to the natural environment shall be critically observed: Climatic conditions and Ecological requirements. Climate is one of the important factors in the choice of locations. There is a direct impact on the project costs of such factors as : dehumidification, Air conditioning, refrigeration, or special drainage.

On the other hand, the environmental effects of the project may be significant. Hence, information shall be gathered on: temperature, rainfall, flooding, dust, fumes, and other factors for different locations. Climatic conditions can also determine the success of a project in an indirect way.

Environmental Impact Assessment (EIA)

It is an assessment of ensuring that development projects are environmentally sounded (friendly). EIA is designed to develop an understanding of the environmental consequences of a newly planned or existing project. This is a critical factor for the selection of location for a project. This issue is becoming very sensitive these days, especially: when project feasibility is developed for applying for international funding. EIA is part of the project planning process. Environmental benefits or costs of a project are usually externalists or side effects that affect the society in a whole or in part. Actual economic actors take decisions in the pursuit of their maximum benefit. Some examples of Tax and Subsidy Treatment of externalities:

Example 1:

The manufacturer of the paper pulp demand large quantities of water. In the process, such water washes away chemical products thus becoming polluted. If the firm throws away the polluted water as it come out of the process, over ground and/or underground rivers become polluted too.

Consequences:

Drinking water will become dangerous for humans and cattle. Fishes will become contaminated too and thus useless as food. Water may become unsuitable for irrigation. Water may become unsuitable for further use in other industrial process. Tourism and nautical and fishing activities may suffer. The paper pulp firm will not continue these damages as part of its costs unless a tax is imposed on the disposal of polluted water.

Possible Measurements

Option 1: a tax may be imposed, calculated per cubic meter of polluted water. Paying taxes that will be used either: to purify the water, or to compensate those damaged by the polluted water.

Option 2: Building a system to purify out-flowing water

Example2:

The building of dam for irrigation and electricity results in large artificial lakes that make for the

possibility of : Tourism and water sports, Increase in rainfalls. The firm that manages the irrigation and electricity project will not compute these benefits in its balance sheet unless a subsidy is paid.

Possible Treatment

The government may either: Grant the rights to exploit tourism and water sports to the Irrigation and Electricity company if: this is institutionally unfeasible, or Sell those rights to another company and pay the proceedings to the Irrigation and Electricity Company

Example3: A family that: repairs and paints the front of its house, planting a garden as well. All neighbors will benefit but none will pay.

Possible Encouragement

The state may: Grant prizes to the nicest houses in the neighborhood, levying a tax on real estate to finance them, and Legislate on the maintenance of pavements and house fronts. EIA is required by a law in some countries and could be critical if international financing is sought for the project. It is also a requirement to include an EIA in a project FS to get permission. The general objective of EIA: ensuring that development projects are environmentally sound, to arrive at appropriate decisions, for public participation from the earliest stage throughout the development project cycle is essential.

Specific Objective of EIAs:

Promoting a comprehensive, interdisciplinary, investigation of the environmental consequences of the project and its alternatives. Developing an understanding of the scope and magnitude of environmental impacts of the project under alternative designs. Incorporating any existing regulatory requirements in the project design, standards, environmental audit Identifying measures for reducing adverse environmental impacts and enhancing beneficial impacts.

Socio-Economic Policies

The other factor influencing choice of location is socioeconomic policies. Socio-economic policies encompass two basic factors:

1. Public policies

Gvt regulations and restrictions about public policies may be critical for the location of a project. In public policies like: identification of industry zones, incentives to encourage investment projects, etc are important location factors.

For example:

some area may be prioritized for a certain project or tax holiday may be given for projects in a certain area. Hence, investors will consider such advantages in selecting location. Public policies may directly determine industrial locations when: there is a substantial involvement of public or institutional finance. Hence, the location of some public financed projects may be decided by the government regardless of: economic, market, and inputs consideration. This is b/c the project may be targeted to: balance resource distribution among the society through locating projects in a backward regions or it may be based on a wider policy for regional dispersion of industries.

Infrastructural Conditions

❖*Relevance of Infrastructure*- The availability of: a developed and diversified economy and social infrastructure is often of key importance for a project. The FS should identify such key infrastructural requirements b/c they are vital to the operation of any project.

❖*Transport and Communication* Transport facilities such as by water, rail, air, or road may be available for the inflow of various inputs and for the marketing products. The availability of good communication facilities.

Like: telephone, Internet availability and Other means of communications have impact on alternative locations.

Choice of site

The structure of site analysis is basically the same as that of location analysis. The key requirements identified for the location of the project may give guidance also for site selection. The selection of the specific site for the project could also be done simultaneously with choice of location. Requirements and conditions to be assessed for Site Selection:

Ecological conditions for sites-

these include factors such as soil type, site hazards, seismic history, etc.

Environmental impacts-

These include the nature of the project in relation to: restrictions, standards and guidelines of the government concerning: noise, air pollution, effects if it is close to residential areas, etc.

Cost of land-

Cost of land differs from site to site depending on: the course of its proximity to main streets and other transport facilities, major markets, customers, etc. Hence, there will be some trade-off in here.

Infrastructure-

This concerns the work involved in obtaining utility connections such as: markets, resources, customers, etc and the cost associated with them.

Site preparation and development cost-

Some areas are more appropriate for construction without much preparations and development efforts. While other areas may need several works to make them ready for use. This will contribute to the cost of the land.

Strategy of the projects such as future expansion-

After the project is in operation, the owners may think of expanding it in the future. some sites may be attractive with existing planned capacity but may not enable future expansion. Hence, a site that enables an expansion will be preferred.

4.6 Technology and Engineering studies

It is to be ensured that the manufacturing process to be adopted is modern and at the same time appropriate to the level of economic development of the country. Where sophisticated

or new process is to be adopted, the advice of a committee of technical experts is also sought before the project is cleared.
Normally the choice of technology is influenced by a variety of consideration:

Plant capacity: there is a close relationship between plant capacity and production technology. To meet a given capacity requirement perhaps only a certain production technology may be viable.
Principal Inputs: the choice of technology depends on the principal inputs available for the project. In some cases, the raw materials available influence the technology chosen.
Investment outlay and production cost: the effect of alternative technologies on investment outlay and production cost over a period of time should be carefully assessed.
Use by other units: the technology adopted must be proven by successful use by other units.
Latest development: the technology adopted must based on the latest development in order to ensure that the likelihood of technological obsolescence in the near future, at least, is minimized.
Ease of absorption: the case with which a particular technology can be absorbed can influence. The choice of technology, sometimes a high level technology may be beyond the adoptive capacity of a developing country which may trained personnel to handle the technology.
Another issues related with technology is: acquiring technology, and appropriateness of technology.

Acquiring Technology

- The company can acquire technology by way of
- Technology licensing
- Outright purchases
- Joint ventures arrangement

4.7 Human Resource and organization study

A satisfactory human relation system is essential for the successful execution of a project. Without such a system, the other systems of project management, however sound they may be by themselves, are not likely to work well. While technical problems can often be solved with additional investment of resources, people's problems may not be amenable to satisfactory solution in the short span of the project life.
Individuals with a certain responsibility in the project should be given appropriate authority so that they can make a right decision and take action on a timely basis. A project manager also has to strengthen the managerial orientation of project personnel so that project goals and objectives can be effectively achieved within the constraints of time and budget.
The project manager functions within the boundaries of a socio-technical system. Most of the factors of this system – organizational structure, technical requirements, competencies of project personnel are more or less "given" for him. The principal behavioral factor which he can influence is the motivation of the project personnel. In order to succeed in motivating

project personnel, the project manager must be a perceptive observer of human beings, must have the ability to appreciate the variable needs of human beings, must have skill in several styles of management suitable to different situations, and must be sensitive to the reactions of people so that he can act supportively rather than threateningly.

4.8 Exercise:

Choose

1_____Which of the following statement is **correct**?

A. Feasibility study provides a comprehensive review of all aspects of the project and lays the foundation for implementing the project.
B. Project cycle is goes through various planning phases before any project is actually realized.
C. Opportunity study is concerned with the collection, compilation and analysis of economic data to locate possible opportunities.
D. All of the above

2_____The main objective of financial feasibility study is to;

A) Ascertain whether the proposed project will be financially viable in the sense
B) Ensure that the project is technically feasible in the sense that all the inputs required to set up the project are available
C) Facilitate the most optimal formulation of the project in terms of technology, size and location
D) All of the above

3_____Structure and civil works in technical feasibility study includes:

A) Site preparation and development
B) Buildings and structures
C) Outdoor works
D) All of the above

Workout

1. **Assume that:** C1 = Birr 1,000,000 that represents the investment cost in capacity level Q1, Q1 = 5,000 units per annum at the normal capacity level, and $\alpha = 0.6$, reflecting the capacity-cost relationship.

Required:

How much will be the investment cost in new capacity (C2) for a level of production (Q2) equal to **10,000 units per annum?**

CHAPTER FIVE

5 FINANCIAL ANALYSIS OF PROJECTS

5.1 Financial Analysis Basic

Financial analysis involves assessment of financial impact, judgment of efficient resource use, assessment of incentives, provision of a sound financing plan, coordination of financial contribution, and assessment of financial management competence. The main objective of financial analysis is to determine the requirements of funds/timing and the expected returns on investment from the points of view of the various parties involved in the financing of the project. Under this analysis, judgment is framed about the project's financial efficiency, incentives, credit-worthiness and liquidity. In financial analysis, **cost and benefits** are calculated using current market prices**.**

The reasons why financial analysis should be undertaken for public sector projects are to: Determine the **long-term budgetary implications and provide an adequate financing plan** for a proposed project. Determine the profitability of the proposed project from the perspective of either owners or beneficiaries. To provide-management information, to aid the operation and control of the project.

To assess financial viability of a project a range of tools and methods can be used and various types of financial statements can be prepared.

This includes:

1. Resource flow statements
2. Profit and loss statements
3. Cash flow statements and
4. Balance Sheet

i. Resource Flow Statements

The starting point of the financial analysis of a project is drawing up of a statement of project cost and benefits. The benefit and cost items included in the statement should include only those items, which are incremental. The resource flow statement shows: (1) the list of resources used in the project and (2) the resources generated by the investment on the project.

The major elements of resource flow statements are:

1. **Investment costs:**

investment costs cover capital expenditure items such as land, buildings, equipment and furniture etc. It includes three group of costs:

(a) Initial fixed investment costs.
(b) Pre-production capital expenditure.
(c) Working capital.

Generally speaking, the amount of funds required for operating needs varies from time to

time in every business. But a certain amount of assets in the form of working capital are always required; if the business has to carry out its functions efficiently and without a break. The two types of requirements are permanent (fixed) and variable.

2. Operating Costs/Production Costs.

Operating costs can be divided into two: Fixed and Variable components. The total operating costs will then be the sum of the fixed and variable costs and will increase over the operating years until full utilization of the investment asset is reached. It includes costs like; Cost of Production, Administrative Expenses, Selling Expenses, Depreciation, and Production Build Up

3. Benefits

Benefits of a project can be several. For example, a range of different farm products in an agricultural project, or cost savings as well as production benefit from a transport infrastructure project. The different benefits will all be variable with respect to their associated costs, and hence, total benefits will also be variable.
Benefits can be direct (production output) which may include items like:

- Main product
- By product
- Residual and other income

Benefits can also be indirect or external. For example, in a road projects reducing transportation costs, reducing operating costs for maintenance of vehicles and saving time of the society are indirect benefits of the project.

Benefits are associated with the capacity utilization factor to which operating costs were also related. When the value and timing of investment costs of and operating costs have been determined the net benefits of the project can be calculated. The net benefit is computed by simply subtracting the investment, operating and working capital costs from benefits.

The following table depicts the complete project resource statement, which brings together the investment costs, operating costs, working capital and project benefits.

The net benefits are negative in the first years whiles investment is taking place, and become positive when the utilization of the new assets is building up.

ii. Project Financial Statements

Financial analysis also involves formulation of various financial statements, which enable project owners and other interested stakeholders to know whether the projects worthy or not. Most commonly prepared financial statements are balance sheet, loss and profit statement, and cash flow statements.

a. Profit and Loss Statements

The main purpose of profit and loss or trading profit and loss account in short income statement is to calculate the profit or loss of enterprise or project. It is the measure of the profitability of the project.

The format of the profit and loss account varies according to who is preparing it and for what purpose, and on the type of activity, be it manufacturing, retail or service projects.

Gross profit is calculated by deducting direct production costs (cost of sales) from sales revenue. Net profit item is calculated by deducting other operation costs, such as overhead costs including depreciation, loan interest and corporate tax from gross profit. The last part of P/L account is the appropriation account, which shows how much of the net profit is retained to be reinvested in the project and how much is distributed to stockholders.

b. Balance Sheet

Balance sheet is a statement of the assets and liabilities of the enterprise and gives "the net worth" an enterprise at a point of time. It is prepared to present a picture of the firm on one day in the year. The information represents the account balances recorded and does not indicate exact economic values.

The balance sheet shows the way in which a project is financed, whether by sponsors, lenders or creditors and how these funds have be employed. The sources of funds, even where they represent the capital invested by shareholders are regarded as the liabilities of the company and the use to which funds have been put are the assets.

The Balance Sheet is the key to understanding the financial position of a project or enterprise shows how well a project has performed over a period of time, the balance sheet is a measure of what the project is worth at a particular point in time..

Balance sheets are presented in a number of different formats. An example of a typical vertical format is shown below.

c. Cash flow statement

Finance is considered by many as the lifeblood of an organization or any project. A well designed project may fail due to insufficient cash for its day to day operation. Therefore, a project planner has to develop some techniques of forecasting cash in flows and out flows. Cash flow statement is a basis for showing the cash flows associated with operating resources, funding and investment.

Cash flow statements are prepared for two reasons:

First, it is prepared for financial planning purpose: in this case, the purpose is to know the liquidity position of the project. Secondly, cash flow statement may be prepared for the purpose of Net Present Value (NPV) and Internal Rate of Return (IRR) calculation. The purpose here is to measure the overall profitability of the project.

In general, cash flow statement is the main tool of financial planning and is sometimes referred to as the "Source and application of funds statement".

Present value is the net cash flow of the project over its life subject to discounting. If you are given the discounting rate say 10%, you can calculate discounting factors and then the present value of the net cash flow of the project. Example: if the Net cash flow of the project is in its first year of operation is Br. 100,000 and discounting rate is 10%, the present value of this sum of money (at Zero period) is given by the formula:

The value of the discounting factor (1+i)-n can be determined either using a calculator or a financial table prepared for this purpose.

The cumulative cash flow must always show a positive balance. Because, a negative amount indicates that the project has run out of cash. Cash flow statement records (cash inflow and out flow) are presented on the cash basis of accounting not on the accruals concept, hence it does not give an indication of profitability. It simply tells you the amount of cash available at any one point in time and whether it is sufficient to be able to meet commitments as they fall due. It is possible for a project to be profitable yet find itself short of cash when it is needed to
meet different types of operational commitments such as interest and loan repayments. This may be because sales revenue has not been collected.

As it is shown in the above schedule, CFS can be prepared for IRR and NPV calculation purpose to see whether the project is profitable or not. If a project has a negative cash flow but is acceptable in terms of its IRR and NPV and profitable in terms of the net profit figures then there are a number of options the project analyst can consider to improve the liquidity position of the project.

d. Supporting statements/schedules

To prepare the three main financial statements the following supporting schedules and additional information are required:

- Depreciation schedule:
- Taxation
- Loan repayment schedule:

5.2 Measures of project cash flow

Measures of project worth are measures that tell you whether a project is worth undertaking from a particular viewpoint.

- All such measures are concerned with the question "**are the benefits greater than the costs?“**
- There are different ways of measuring project worth, which may fall under two categories,

1. Non-discounting (traditional) criteria

a. Payback Period (PBP)
b. Accounting Rate of Return (ARR)

1. Discounted Cash Flows (DCF) criteria

a. Net Present Value (NPV)
b. Internal Rate of Return (IRR)
c. Profitability Index (Benefit-cost ratio)

5.3 Non-Discounted Cash Flow approach/method

It does not consider the time value of money.

a. Payback Period

- The payback period in capital budgeting refers to the period of time required for the return on an investment to "repay" the sum of the original investment.
- The payback period quiet simply asks the question “how long will it take for the project to pay back its initial investment?”
- The time value of money is not taken into account in this method.
- Payback period intuitively measures how long something takes to "pay for itself."
- Payback Period = Expected number of years required to recover a project’s cost

Depending on the *nature of net cash flows*, payback period may be computed in two ways.

a) When cash flow is in **annuity form**

Annuity refers to ***equal amount of cash flows that occur every period over the life of the project.***

$$PBP = \frac{Initial\ Investment}{Annual\ Net\ Cash\ Flows}$$

To illustrate the computation of payback period, assume that a project requires an initial investment of Br. 24,000 and annual after tax cash flows of Br. 6000 for five years. How long it takes the company to recover its initial investment?

$$PBP = \frac{24{,}000}{6000} = \underline{4 \text{ years}}$$

It is expected to take the company four years to recover the project's initial investment of Br. 24,000

b) When cash flows are **not in annuity form**

When net cash flows are not annuity, payback period is obtained by adding net cash flows for successful years until the total is equal to initial investment.

$$\textbf{PBP= Years before full recovery} + \frac{\textbf{Un recovered cost}}{\textbf{Cash flow during the next year}}$$

To exemplify, assume that a project requires an initial investment of Br. 60,000. The after taxes cash flows (or net cash flows) are as follows:

Year 1 = 8000 Year 3 = 22,000 Year 5 = 20,000

Year 2 = 15,000 Year 4 = 20,000

The payback period is computed as follows:

$$PBP = 3 \text{ years} + \frac{15{,}000}{20{,}000} = \underline{3.75} \text{ years}$$

In the above example, if the 1st three years' net cash flows are added, the sum is equal to Br. 45,000. But the initial investment is Br. 60,000. If the fourth year net cash flows (Br. 20,000) is added to Br. 45,000, the sum is Br. 65,000 which is greater than the initial investment. Thus, the payback period is between year 3 and year 4. To find the exact payback period, we take the three years and divide the remaining cash flows by the fourth year net cash flows. If the exact payback period is needed in months the fraction can be computed as follows:

$$PBP = 3 \text{ years} + \frac{15{,}000}{20{,}000}(12\ months)$$

$$= \underline{3 \text{ years and } 9} \text{ months}$$

Merits of Payback period

- Easy to calculate and simple to understand.
- It favors projects that "pay back quickly" and hence contributes to the firm's overall liquidity.
- Reduces the possibility of loss on account of obsolescence.

Weakness of payback period

- Ignores the time value of money. This weakness is eliminated with the discounted payback period.
- Ignores cash flows occurring after the payback period.

The Decision Rule for Payback Period Criterion

Decision Rule for Payback Period

1. If PBP < Target period** - Accept the proposal (project)
2. If PBP > Target period - Reject the proposal (project)
3. If PBP = Target period - Further analysis is required

(**Target period is the minimum period targeted by management to cover initial investment. It acts as benchmark for those involved in capital budgeting decision.)

b. Accounting Rate of Return (ARR) or Return on Investment (ROI)

Also called the average rate of return on investment, the accounting rate of return is a measure of profitability which relates net income to investment. Both net income and investment are measured in accounting terms. Although there are several methods of computing ARR, the most common method is shown below:

$$\text{ARR} = \frac{Average\,annual\,net\,income}{Average\,investment}$$

$$\text{Average Investment} = \frac{Original\,costs + salvage\,value}{2}$$

To illustrate, assume that a project has original investment of Br. 70,000, life of 4 years, and salvage value of Br. 6000. Straight-line method of depreciation is used. Income before depreciation and taxes for each of the four years are as follows: year1, Br. 40,000; year 2, Br. 42,000; year 3, Br. 36,000; and year 4, Br. 50,000. Income tax rate is 40%.

$$\text{Depreciation} = \frac{70{,}000 - 6000}{4} = 16{,}000$$

Before ARR is determined, it is necessary to compute net income for each of the four years as follows:

	Year 1	**Year 2**	**Year 3**	**Year 4**
Income before depreciation tax	40,000	42,000	36,000	50,000
Less: Depreciation	16,000	16,000	16,000	16,000
Income before taxes	24,000	26,000	20,000	34,000
Less: Taxes (40%)	9600	10,400	8000	13,600

Net income	14,400	15,600	12,000	20,400

$$\text{Average Net income} = \frac{14{,}400 + 15{,}600 + 12{,}000 + 20{,}400}{4} = 15{,}600$$

$$\text{Average Investment} = \frac{70{,}000 + 6000}{2} = 38{,}000$$

$$\text{ARR} = \frac{Average\ Annual\ \ Net\ Income}{Average\ Investment}$$

$$= \frac{15600}{38000} = 41\%$$

Decision Rule for Accounting Rate of Return

i. Accept the project if ARR exceeds the required rate of return.

ii. Reject the project if ARR is less than the required rate of return.

Advantages of ARR

1. It is simple to calculate
2. It is based on accounting information, which is readily available and familiar to businessmen.
3. It considers benefits over the entire life of the project.
4. It facilitates post-auditing of capital expenditures.

Limitations of ARR

1. It is based upon accounting profit, not cash flow.
2. It does not take into account the time value of money.
3. Accounting income is not uniquely defined because it is influenced by various methods, such as depreciation methods, inventory costing method etc.

5.4 Discounting Cash Flow approach

Is a technique that converts all benefits and costs into their value in the present .It is based on the premise/basis/principle that a money received today is worth more than a money received in the future. Discounting is the opposite of compounding .The rate at which a future value is discounted is closely related to the rate at which present values are compounded which is interest rate.

a. Discounted Payback Period

Since the payback period rule ignores the time value of money, some firms have modified it to reflect the time value of money; this is the discounted payback period. This technique specifies that the cash flow from each period has to be discounted appropriately by the firm's cost of capital(i.e. a risk adjusted WACC).

Given a 10% weighted average cost of capital, the payback period will;

Year	Project L		Project S	
	Cash flow	Discounted cash flow	Cash flow	Discounted cash flow
0	($100)	($100)	($100)	($100)
1	10	9.09	90	81.82
2	60	49.59	30	24.79
3	80	60.12	50	66.55

Discounted payback- project L= 2+ (41.32/60.12) = 2.7 years

Discounted payback –project L = 1 + (18.18/24.79) = 1.7 years

Example 2: A project costs Br. 110,000 in year 0. Cash inflows are:

Y1 = Br. 40,000,
Y2 = Br. 60,000,
Y3 = Br. 70,000,
Assume a discount rate of 10%.

Format for Computing Discounted Payback:

	Year 1	Year 2	Year 3
Discounting Inflows	Br. 40,000	Br. 60,000	Br. 70,000
	(1+10)	$(1+10)^2$	$(1+10)^3$
	=Br. 40,000/1.1	=Br. 60,000/1.21	=Br. 70,000/1.331
	=**Br. 36,364**	**Br. 49,587**	**Br. 52,592**

Outflows……	Br. 110,000
Less Discounted inflows ofY1……..	36,364
Discounting inflows of Y2…….. …….. …….	49,587
Residue (110,000-36,364-49,587)…….....	24,049

Residue/inflow in year 3 = Br. 24,049/Br. 52,592 = 0.454

Discounted Payback period = 2 years + 0.454 = 2.454 years

Advantages:

(i) Considers the time value of money.

(ii) Considers the riskiness of the cash flows involved in the payback

Disadvantages

(i) No concrete decision criteria that tells us whether the investment increases the firm's value.

(ii) Calls for a cost of capital

(iii) Ignores cash flows beyond the payback period

b. The Net present value (NPV)

The net present value (NPV) method calculates the expected financial gain or loss from a project by discounting all expected future cash inflows and outflows back to the present point in time using the RRR.

The most widely used method of financial analysis

A way of comparing the value of money now with the value of money in the future.

A dollar today is worth more than a dollar in the future, because inflation erodes the buying power of the future money, while money available today can be invested and grow. It helps you to find the present value in "today's dollars" of the future net cash flow of a project.

Only projects with a positive NPV are acceptable because the return from these projects exceeds the cost of capital (the return available by investing the capital elsewhere).

Net present value is the difference between the present value of all cash inflows and the present value of all cash outflows over the period of the investment.

The net present value of project is the difference between the present value of net cash inflows and present value of initial investment. In formula,

$$\textbf{NPV} = \sum_{i=1}^{n} \frac{C_t}{(1+r)^t} - I_0$$

Where:

NPV = Net present value C_t = Net cash flows at the end of year t

n = Life of the project r = Discount rate I_0 = Initial investment

Net present value can also be determined as follows:

NPV = PV of NCF – I_0

Where: **PV = Present value and NCF = Net cash flows**

Decision Rule for NPV

So it can be positive, negative or zero depending on the size of the **income** and **expenditure.**

1. **If NPV < 0**: The **PV** of the income stream is less than the **PV** of the cost stream, i.e. insufficient to cover investment and undesirable
2. **NPV = 0**: The **PV** of the income stream equals the **PV** of the cost stream. (At Break – even point).
3. **NPV > 0**: The **PV** of the income stream is greater than the present value of the cost stream; yield from investment is higher than the discount rate assumed. (Therefore it is desirable).

☞ We accept all independent projects with NPV greater than zero.

☞ For **mutually exclusive** projects, project with higher NPV will be accepted.

c. Profitability Index (PI)

The profitability index, also called benefit - cost ratio, is the ratio of the present value of net cash flows and initial investment.

$$PI = \frac{Present\ value\ of\ NCF}{Initial\ investment}$$

To illustrate, assume that a project is expected to have initial investment and useful life of Br. 90,000 and four years respectively. Annual net cash flows amounted to Br. 40,000. The discount rate is 10%. Profitability index can be computed as follow:

Year	Cash Flows (1)	***Present Value Interest Factor at 10%*** (2)	***Present Value*** (3)= (1) x (2)
0	**(Br.100,000)**		
1	**10,000**	**1/ (1.10)1 = .909**	**9,090**
2	**60,000**	**1/ (1.10)2 = .826**	**49,560**
3	**80,000**	**1/ (1.10)3 = .751**	**60,080**
	Total Present Value of Inflows		**118,730**

$$PI = \frac{Present\ value\ of\ NCF}{Initial\ investment}$$

$$= \frac{40{,}000(3.170)}{90{,}000} \qquad = \frac{126{,}800}{90{,}000} = \underline{1.41}$$

Decision rule for profitability Index

ii. Accept if the project's profitability index is greater than 1

iii. Reject if the project's profitability index is less than 1

Example: Consider the expected cash flows for project L and you are expected to decide whether the project is accepted or rejected. Discounting rate or the project's cost of capital is 10%.

Solution:

	Expected Net Cash Flow
Year	Project L
0	(Br.100,000)
1	10,000
2	60,000
3	80,000

It follows that,

$$PI = \frac{Present\ Value\ of\ Cash\ Inflows}{Initial\ Investment} = \frac{Br.118{,}730}{Br.100{,}000} = \underline{\mathbf{1.1873}}$$

Decision: Accept the project as PI > 1.

Example: There are two projects available to your firm. The management needs to decide which project to undertake. The following is the after tax cash flows for each project and the firm's cost of capital is 10%. Make your recommendation using the PI technique.

Year	Project A	Project B
0	-$100	-$100
1	10	70
2	60	50
3	80	20

PV of project A= 10/(1+0.1)1 + 60/(1.1)2 + 80/(1.1)3 = **$118. 79**

PI of project A = PVC/Initial cost = $118.79/100 = **1.2**

Advantages

- It accounts for all cash flows
- It recognizes the time value of money
- It considers the riskiness of future cash flows

Disadvantages

- It requires a cost of capital for its calculation
- It may not give correct decision when comparing mutually exclusive projects

5.5 Criteria for Investment decision

The main factors to be considered for project selection are listed below:

- Viability of project
- ROI (Returns on Investments), maximization of returns.
- Maintaining minimum market share, increase or consolidate the existing market share.
- Enabling the company or economy to enter new markets or areas of operation.
- Maximum utilization of the workforce available.
- Maximum or optimum utilization of technical resources (plant and machinery)
- Help the company or economy to improve its position.
- Risk and uncertainty are under the acceptable limits.
- Scope of the operations of the project is within the capabilities of a company or country.

CHAPTER SIX

6 ECONOMIC ANALYSIS

6.1 The Rational For Economic Analysis

Social Cost and Benefit Analysis (SCBA), also called economic analysis, is a methodology developed for evaluating investment projects from the point of view of the society as a whole. This is basically used to evaluate public investments. However,it is also used in case of private investment, as these need approval by various governmental and quasi-governmental agencies. In SCBA, the focus is on social costs and social benefits of the project. These differ from monetary costs and benefits of the project. The principal sources of discrepancy are (Beherens and Hawranck, 1991; Chandra, 1995, 2006; Cusworth and Tom, 1993; Cuury and Weiss, 1993; DEPSA, 1990; Gittenger, 1998; Squire and Vander Tek, 1992; UNIDO,
1978):

6.1.1 **Market imperfection (market prices are distorted)**

In many developing countries market prices are distorted by the presence of taxes and subsidies on goods, by the presence of monopoly production and consumption, and by the existence of economic of scale. Public goods such as education, health, and defense are not necessarily being sellable in the market at all and hence their value can not be ascertained by identifying market prices. These factors therefore distort the efficient allocation of scarce resources. For example, the price paid by a consumer under rationing is often significantly less than the price that would prevail in a competitive market. Besides, the minimum wages prescribed is much more than the wages that would be paid in a competitive market situation.

6.1.2 **Externalities (existence of external effect)**

External effect also prevents the achievement of economic efficiency through the market. These are real costs and benefits to the economy that do not affect the firms' financial calculations. Externalities may be considered a special class of non-traded goods that may be either positive or negative. These "goods" or "bads" do not have a market price. For instance, Goods (positive externalities) arise from workers training, but the beneficiaries pay no charge; equally bads (negative externalities) arise from air pollution, but those adversely affected are not compensated. Hence, it may be necessary to take such externalities in to account and place a valve on them for economic analysis when possible. For instance, a project may create infrastructure facilities like roads that benefit the neighboring areas. However, it may cause environmental pollution.

6.1.3 **Existence of structural rigidities (or administration of foreign exchange) in the economy**

Another source of price distortion is the existence of the administration of foreign exchange in the national economy. This situation prevents markets from working properly. Thus, the relative prices of imports and exports are controlled through the foreign exchange rate.

6.1.4 Merit wants (existence of sub-optimal rate of investment/cost of capital in the economy)

The rate of investment can be lower than that desirable from the national interest point of view. This tends to reduce the rate of economic growth to below what is considered to be nationally desirable. For example, an organization may run a policy of adult literacy program that is relevant from SCBA point of view. However, it does not have return on investment.

6.1.5 Taxes and subsidies

Taxes are monetary costs and subsidies are monetary gains. According to SCBA, taxes and subsidies are generally regarded as transfer payments and considered irrelevant. Tax is cost to payer while benefit to government; and subsidy is benefit or gain to receiver while it is cost to government who gives the subsidy.

6.1.6 Concerns for saving

According to SCBA, the division of benefits between consumption and saving is relevant in capital scarce developing countries and a Birr of benefit saved is more valuable than a Birr of benefit consumed because saving is used for future investment. Therefore, a higher valuation is placed on saving and a lower on consumption.

6.1.7 Redistribution

A private firm is not concerned how its benefits are distributed across various groups in a society. But, the society is concerned. A Birr spent on poor is more valuable than spent on affluent (rich).

To summarize, therefore, economic analysis is designed to take in to account some or all of the above four factors. Shadow prices are required for economic analyses whenever market prices do not accurately expressed (distorted) the valve or cost to the society of some items. As discussed above, discrepancies arise between market and economic values as a result of market imperfections, externalities, the impact of taxation and subsidies, and other government actions. Specifically, economic analysis is designed to cope with situation in developing countries when one or more of the following features are present:

a) Domestic prices of imported goods differ substantially from world prices (shadow prices) of the same items. For example, price of fertilizers and petroleum,
b) Labor is unemployed or under employed, especially in a rural areas,
c) Labor costs are a significant proportion of total costs for many goodsproduced domestically,

d) Foreign exchange is scarce and imported items are judged to beparticularly valuable, and
e) Investment is scarce and interest rates do not reflect rates of return oninvestment.

6.2 Valuation and shadow prices (the use of trade opportunity cost values)

According to Little and Mirrlees, (1974) and UNIDO (1978, 1991), the economic analysis of a project requires that inputs and outputs be valued at their contribution to the national economy, through shadow prices (Accounting or world price), and it is the notion of opportunity cost that underlies the application of shadow prices in project analysis. From the national point of view, it is the alternative production forgone or the cost of alternative supplies that should be used to value project inputs and outputs.

6.3 Basic Principle Of Shadow Price

The alternative source of supply for many inputs and outputs is through international trade. The price at which to value a project input is its import price if it has to be imported or its export price if greater domestic use led to a reduction in exports. Similarly, the price at which to value a project output is its export price if it adds to exports or its import price if local production led to a saving in imports. For such traded goods, since international trade forms the alternative source of supply, the use of world prices to value project in puts and outputs amounts to applying the principle of trade opportunity cost. However, this principle could not immediately be applied to all project inputs and outputs since not all actually enter in to foreign trade.
Shadow prices can be applied to a large number of different items, out of which the following are the most important ones (Gittenger, 1972, 1998; Little and Mirrlees, 1974; UNIDO, 1978, 1991).

6.3.1 **Shadow wage rate (SWR)**

The main principle of the valuation of labor from the national economy point of view is its opportunity cost to the economy; the opportunity cost of labor reflects its real resource cost. Therefore, we have to require output foregone by employing workers in the project we are considering and this is usually done by making the simplifier neoclassical assumption that the "marginal product of a worker is equal to his/her wage." His/her wage is therefore used as proxy for the value of a workers output. If project workers were formerly employed elsewhere in the modern sector of the economy this might seem a simple matter of pricing of them at the wages they were receiving in their former employer. However, the case is not simple because it is most likely that their former employers will be able to replace them with the new recruits so that the ultimate source of our projects work force may be quite different from its proximate source. The approach taken by most economists to this question is to treat the rural economy as the employer of last resort and assume, therefore, that the ultimate source of new modern sector for unskilled employment is traditional agriculture. In this case, the marginal product of labor in traditional agriculture represents the opportunity cost and it is usually possible to obtain some indicators of the value of this.
Broadly speaking, the analyst must consider the project's impacts on the rest of the economy when it hires labor, for instance,

(a) The project may take labor away from other users - the shadow price will be the willingness of other users to pay for this labor. If the market is relatively free, it will correspond to the marginal product of such workers.

(b) The project may stimulate the "production" of new workers:

Employment of previously unemployed workers (i.e., transformation of non worker into a worker): The basic cost of transforming an unemployed worker into an employed one is zero if the worker is truly unemployed, i.e., if his/her product is zero, because society gives up nothing to gain the additional worker.

- Improved productivity of underemployed workers (i.e., transformation of a partial worker in to a full time worker): - the cost of transforming an under employed person to a fully employed worker is the cost to society of giving up what little he/she may have produced in his/her former employment (his/her marginal product).
- Urban employment of rural workers (i.e., transformation of a rural worker in to an urban worker): - the cost of transforming a rural worker in to an urban worker is the social cost of migration, which may be greater than the cost of providing housing, electricity, water, hospitals, schools, and other social services required by the migrant who takes the job; the social cost should considerer the marginal economic cost of producing an additional man-year of labor in the urban area.
- Skilled employment of previously unskilled workers (i.e., transformation of unskilled worker in to a skilled worker): - the cost of transforming an unskilled work in to a skilled worker, or in more general terms, of employing a worker with lower skills in a job requiring higher skills, is the cost of training.

(c) The project may cause the importation of workers (i.e., importation of foreign workers when they are not available domestically) - the cost or the shadow wage for such labor is the wage they command.

6.3.2 Social rate of discount (SRD)

The capital cost of a project can usefully be viewed from two perspectives for shadow pricing. These are the asset and the rent components. When $ 100,000 is invested in project x, for example, two things happen. First, $ 100,000 of financial resources is converted in to real physical assets. Second, the investor removes this $ 100,000 worth of financial resources from the national pool of savings that might be used for investment in alternative projects. Once invested in project x, therefore, these assets should yield a benefit, or rent, at least equal to what they would have otherwise earned somewhere else.

There are two alternative basis which we might estimate the Social Rate of Discount (SRD). The first of this suggests that we can use the SRD to balance the computing claims of the present generation and future generation; present consumption as against future consumptions. Viewed in this way, the SRD is an expression of society's time reference the rate of which our valuation of the worth of some given amount of consumption diminishes over time. This approach treats SRD as a budgetary device rather than as an economic reality that can be verified empirically. An alternative approach is to revoke the opportunity cost principle (or accounting rate of interest) that makes SRD an expression of the social marginal productivity of capital. If the margin in the application of public investment is expected to yield say 12%, then we should only under take projects that yield at least this rate of return.

Optimal Investment where MCC equals Return

Because of the problem of determining empirically an appropriate SRD, it is recommended treating it as an unknown to be determined later as a "switching value", that is, the value at

which a project becomes acceptable. Switching value for one project is the value of the SRD that leaves a zero net present value for the project; it is the discount rate at which the net present value switches from positive to negative. Therefore, the switching value can also be regarded as the Internal Rate of Return(IRR) of the project. When more than one project is being considered, the switching value of the SRD is the discount rate at which one alternative comes to have a highernet present value than the other, a point also widely known as the cross-over discount rate.

Economists differ in the solution they propose but probably the most widely adopted approach is to make the assumptions that fiscal policies would bring social time references into line with the social marginal productivity of capital and hence toestimate the SRD on the bases of marginal productivity. Here to then we are forced to the conclusion that the actual estimation of the SRD is at most an approximate exercise,a matter of taking market interest rate and adjusting them with such information as can be obtained on the social marginal cost of capital.

6.3.3 **Traded and non-traded goods**

A central issue in shadow pricing is whether a good is "tradable" that is, can it be imported or exported? If a good is tradable, the international market place offers an option to domestic production and consumption and thus a measure of its economic opportunity cost or its "real" value to the country interims of pure efficiency. If for example, a country decides to produce refrigerators, it must consider the cost of production as against the "trading opportunity cost" of importing them. Conversely, when evaluating the cost of production, if domestically produced steel costing 40% more than the comparable import is to be used, the analyst must consider the trading opportunity cost of importing the steel instead.

Traded Goods are goods that would be imported or exported in the absence of trade barriers such as tariffs and quantitative restrictions, whose use for production by a project has a direct effect on the balance of payment. Their opportunity cost for the economy is their value on the world market. A number of different types of traded goods can be identified:

a) **Exports** are goods that are exported as a result of a project would be traded directly. Their value to the economy would be their FOB export price.

b) **Imports** are goods imported by a project. For example, machinery, raw materials, etc are traded directly. Their cost to the economy would be their C.I.F. import price.

c) **Import substitutions** are goods whose production by a project saves imports; that is they will save foreign exchange to the economy equal to the C.I.F. price of equivalent imports.

d) **Export Substitutions** are goods used as inputs by a project which could otherwise have been exported will have a cost to the economy equivalent to FOB export value they could have earned.

In all the above cases, the world price of these goods are used (C.I.F. for import items and F.O.B. for export items) not the price at which they sell domestically to measure the costor benefit of the economy to the country, i.e., **their shadow price would be their worldprice**. In addition, each of these concepts applies to services as well as goods.

Non – Traded Goods are goods whose real domestic cost of production together with its international transport cost is too high to permit export and too low to makeimport attractive;

in other words, a price higher than F.O.B. but lower than C.I.F. Their use for production by a project affects the domestic economy directly and the trade balance only indirectly. A number of types of non-traded goods may be distinguished (or identified).

a) Some goods are non-traded because of their physical nature (i.e., physical immobility and high transport cost). They cannot enter international trade. For example, domestic transport, education and health, public utilities (such as power and water) and construction.

b) Other goods may be non-traded if government policy prevent their import andexport. For example, if import control prohibits importation of particular commodities, their local production will add to domestic supplies of these commodities rather than save foreign exchange through import substitution.

c) Finally, other goods may be non-traded if it is not possible for a particular economy to trade internationally in the items concerned. This can arise if local production is of poor quality, type of design that cannot be exported.

In the case of non-traded goods, there would be either no comparable world prices or alternatively the world price will not represent the gain or loss to the economy from the useor production of the item. However, two alternative bases exist for the shadow prices ofnon-traded items whose use will depend upon what is assumed about the effect of the project under examination on the supplies of the relevant non-traded commodity.

a) If use of non-traded items by a project leads to an **expansion of its domestic production** to meet the needs of the project, the shadow price of the non-traded items will be the value of the resources used in its production, themselves, measured in shadow prices. This is often the assumption adopted in the industrial project appraisal. As a short cut off to estimate average cost of production of a non-traded goods, the domestic market price often used as a rough estimate of its shadow price.

b) The alternative to assuming that use of non-traded items in a project will lead toan **expansion of its supply** is to assume that supply remains constant and that the project under examination will divert the non-traded item away from other users. In this case, the shadow price will be the values the non-traded items would have produced in its alternative use. In practice, if this assumption is added, this is common to use the domestic market price of the non-traded goodsas proxy for its value in other uses.

6.3.4 **Treatment of direct transfer payments**

Direct transfer payments are payments that represent not the use of real resources but onlythe transfer of claims to real resources from one person in the society to another. The mostcommon form of direct transfers is the payment of taxes and the receipt of subsidies. Theseshould be omitted from economic analysis. Financing items also need to be removed fromproject statements for economic analysis. The receipt of loan, the payment of interest, orrepayment of a loan, transfers purchasing power but does not represent directly the use ofresources.

6.4 Use Of Conversion Factor

Conversion factor (CF) can be used to revalue resources from their market to their shadowvalues.

For each output and input, a conversion factor can be calculated where the conversion factor is the ratio between shadow and market prices for the project item, so that

Conversion Factor (CF) = Shadow Price
Market price

Then, shadow price value = CF * Market price value.

For example, if Radio components are to be imported at a C.I.F. price of $ 1,000 per unit, but, after a tariff, will be bought by a factory for $ 1,250 per unit; then, ignoring handling and other costs, the conversion factor for Radio components will be:

CF = $1,000 = 0.80.
$1,250

Therefore, the $81,250,000 (market price) value of the annual radio components at shadow price will be:

Value at shadow price = 0.8*$ 81,250,000 = $65,000,000

Similar conversion factors can be calculated for all project outputs and inputs.

Conversion factors are based on the comparison of the national opportunity cost of a project item with its market price. For many project items, the opportunity cost will be given directly by its border price with minor modifications. The implicit objective of project analysis when project items are valued at opportunity cost is to maximize the netresources available to the economy.

However, shadow prices can be expressed in two ways. Either they can all be expresseddirectly in foreign exchange units, valuing all project effects at world prices **[**termed using a world price numeraire (Little-Mirrlees Method)**]** or they can be expressed in domestic price units **[**termed using a domestic price numeraire (UNIDO method)**]**. (Numeraire is a unit of account, the measure that makes it possible to add and subtract unlike items).

6.5 Sources of Shadow Prices

Little and Mirrlees (1974) and UNIDO (1991) explained that in a perfect market, the shadow price for any resource would be its market price. In this ideal world, the price consumers were willing to pay for one more units (its marginal value) would be exactlyequal to the producer's cost of supplying it (the marginal cost). If the resources were traded internationally, the market price would also equal the relevant border price (C.I.F. for importable; F.O.B. for exportable). The price could not move higher, for consumers would import instead of paying more than the C.I.F. price to domestic producers; and it would not move lower, for producers would export rather than sell forless than the f.o.b. price on the domestic market.

Squire and Vander Tek (1992) and Ward and Deren(1991) also discussed that in the realworld, because market imperfections such as tariffs, quotas and monopolies create distortions in demand and supply, there is little chance that the market price will reflect the true economic value and cost of inputs and outputs. For tradable resources, the domestic market price is likely to be higher than the border price. Because of market distortions, marginal social cost as seen from the supply side and marginal social value,as seen from the demand side for non- traded goods also will probably not be equal. Itis therefore necessary to decide whether the project's impact will be on demand or supply to determine its shadow price.

The three recommended sources of shadow prices depend on the project's impact onthe

national economy. A project through its use and production of resources may for any given input or output affect the:

- Supply available to the rest of the economy
- Level of its production in the rest of the economy
- Level of its imports or exports

In terms of production of an output, the project may:

- Increase total consumption in the rest of the economy
- Decrease production in other parts of the economy
- Decrease imports or increase exports

The corollary impact of a project's consumption of inputs may be to:

- Decrease consumption in the rest of the economy
- Increase production within the economy
- Increase imports or decrease exportsFor example,

Impact	**Basis for shadow pricing**
- Consumption with in the economy	- Consumer willingness to pay
- Production with in the economy	- Cost of production
- International trade	- Foreign exchange value

6.6 Shadow Pricing and the Numeraire

When domestic market prices differ from border prices for similar goods, the average difference defines the relation between the world price and domestic price numeraires. The use of a different numeraire to express opportunity costs will not affect the relative value of project outputs and inputs (Little and Mirrlees, 1974; UNIDO 1978, 1991).

Suppose there are two forms of output, both having the same foreign exchange effect; an export product worth £100 at the f.o.b. border price and an import substitute product worth £100 at the c.i.f. border price. At shadow prices given by their price at theborder, these two products will be worth the same to the economy. If the official exchange rate between pounds and domestic currency ($) is **$15 = £1**, the foreign exchange effect of the export or the import substitute product in local (or domestic) currency is $1,500.

Suppose there is no tax or subsidy on the export product (i.e., sellable in the domestic market at $ 1,500) but there is an import duty on competing imports of 40% (i.e., the import substitute product is sellable in the domestic market at $ 2,100=1.4x$ 1,500). In domestic market prices, the import substitute has a higher price, although the value to the national economy at world prices is equal to that of the export product.

How can the domestic market prices for these two products be adjusted to reflect the fact that they are worth the same from the national point of view? The adjustment can take place in two ways; using:

a. World Price Numeraire

The domestic market price of the import substitute needs to be adjusted down wards toits world price.

World Price =<u>World Price</u> Numeraire

Domestic Market Price = $1,500 = 0.714.
$2,100

Then, the world price of the import substitute product is: **0.714 * $2,100 = $1,500.**

Therefore, it can then again be directly compared with the export product.

b. Domestic Price Numeraire

The border price (world price) of the export product needs to be adjusted upwards to its equivalent domestic market price.

Domestic Price = Domestic Market PriceNumeraire
World Price
= $2,100 => 1.40.
$1,500

Then, the domestic price of the export product is: **1.4 * $1,500 = $2,100.**

In general, the adjusted values for the export and import substitute goods will be equivalent.

6.7 World Price System Of Economic Analysis [Little- Mirrlees Method]

The Little-Mirrlees Method (LMM) uses world price numeraire in order to valueproject's costs and benefits from national point of view (Little and Mirrlees, 1974).

6.7.1 Valuation technique

a. Valuation of Traded Goods

Traded goods are those whose production or use by a project has an effect on the country's balance of payments, because either the goods themselves are exported or imported, or because they are close substitutes for goods which are exported or imported. The extent to which the production or use of these goods affects the foreign exchange position of the economy is determined by their price on the world market (or border price).

The shadow prices based on the world market, with no reference to value in domestic use or supply, are used to value traded goods. World price are used because they represent the terms on which a country can participate in world trade and are therefore the opportunity cost of using or producing traded goods.

In a world price (border price) system, it is conventional to convert world prices in to local currency at the official exchange rate so that the shadow price of a traded goodcan be expressed as:

Shadow = World Price * Official ExchangePrice

And its conversion factor is:

Conversion Factor = Shadow Price (i.e., the world price numeraire).
Domestic Price

The approach can be illustrated with a simple numerical illustration. An import substitute project produces an output with a CIF price of £100 per unit. The domestic price of the output in local currency is $250. It is also stated that the official exchange rate between pounds and domestic currency is $2 = £1. Therefore, the shadow price of the product in local currency is:

Shadow Price= World Price (Border Price) *Official Exchange Rate = £100 x $ 2 = $200

And its conversion factor (or world price numeraire) is:

Conversion Factor = Shadow Price = $200 = 0.80.
Domestic Price $250

b. Valuation of Non-traded Goods

Non-traded goods do not enter in to international trade, so that their production and use can only affect the supply available to the economy. Their valuation requires an estimate of their foreign exchange equivalent value, which takes account of theirindirect foreign exchange effect. This can be done by decomposing their marginal cost of production in to the various resource categories embodied in them, that is essentially as traded goods and labor (skilled and unskilled). Once the cost breakdown being calculated, each of the resource categories is valued at its world price using the world price numeraire.

6.7.2 Standard or average conversion factor (SCF OR ACF)

Normally, in any economy there will be some divergence between world and domestic market prices for similar goods. **A weighted average ratio of world to domestic prices**for the main sectors of the economy is termed the average or standard conversion factor.It is often useful to have such an aggregate conversion factor to revalue relatively minoritems for which detailed information is not available. For example, in the case of a non-traded input and output, if its share in total project costs is small, there may be little lossof accuracy in converting to world price by SCF (or ACF) rather than calculating a specific conversion factor.

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

Where,

- M and X are the total value of imports and exports respectively in a given year, converted in to local currency at the official exchange rate,
- T_m and T_x are total trade taxes on imports and exports respectively, and
- S_m and S_x are total trade subsidies on imports and exports respectively.

Labor in a World Price System

In a world price system labor (along with all other inputs) must be valued at world prices. The direct and indirect foreign exchange consequences of additional employment by a project are estimated.

The shadow wage rate (SWR) can be expressed algebraically as: $SWR = \sum a_i m_i * CF_i$

Where,

- a_i is the proportion of new workers coming from activity i,
- m_i is the output foregone at domestic market prices for workers drawn from activity i, and
- CF_i is the conversion factor for activity i to convert output foregone to world prices.

Land in a World Price System

The shadow price of land is given by its opportunity cost that is the net income at worldprices that could be obtained from the land in its most likely alternative use. When land was previously unused its direct opportunity cost will be zero. Where the analysis is at world prices, land like all other inputs must be valued at world prices.

6.7.3 **Discount rate**

It is specified as opportunity cost of investment funds reflecting either return available on alternative investment (where returns measured at world prices) or cost of additionalborrowing from domestic or foreign sources.

6.7.4 **Shadow price adjustment**

In order to revalue cost and benefits in terms of the world price numeraire, each item is broken down in to the following components:

Note:

a) The shadow price for traded goods is f.o.b. and c.i.f. price for export and import goods. It is already at world prices so it has a SCF or 1.0.

b) There is considerable rural underemployment in developing countries. Thus, the lion's shares of unskilled workers are drawn from rural areas, and the SCF for unskilled labor at world price is 0.5. However, the SCF for a skilled labor at world price is 1.0, because, often, skilled labor has competitive market price.

c) The SCF for non-traded goods is 1.0 because their shadow price is an equivalent world price.

6.8 Domestic Price System of Economic Analysis [UNIDO Method]

Under UNIDO method project costs and benefits are valued in terms of their opportunitycosts in domestic prices and foreign exchange is revalued using a shadow exchange rate, SER, (UNIDO, 1978, 1991).

6.8.1 **Choice of price units**

The choice of price units in which to express the value of project benefits and costsdoes not in itself determine the opportunity cost of an item. When domestic prices are the numeraire, the world price of these traded goods must be expressed as equivalent to a value in units of domestic prices. In addition, domestic market prices are used for non-traded goods because they are taken to be a reasonable proxy for the economic value of the good in units of domestic prices.

6.8.2 **Shadow exchange rate (SER)**

SER = OER (1+ P)

Where, P is the premium to adjust OER in to its market exchange rate.

The net effect of SER is to raise domestic prices for traded goods above border price (world price) if the OER does not reflect the full value of additional foreign exchange to theeconomy.

SER = Domestic Price (DP) World Price (WP)

Conversion Factor for = SER Foreign Exchange OER = 1
ACF
= (M + Tm – Sm) + (X + Sx – Tx) (M + X)

For example, an import good is priced at £10, and at the official exchange rate of $10 per £1, its price converts to $100. However, domestic price are 40% above the world price. Hence, the domestic price of the import is raised to $140. Therefore, the SER andCF for foreign exchange are:

SER = DP = $140 = 1.40.
WP $100

CF for Foreign = SER = $14 = 1.40.
Exchange OER $10

Traded and Non – Traded Goods in a Domestic Price System

The shadow price of a traded good in a domestic price system is the world price converted at the shadow exchange rate (SER). However, in the most approximate approach, domestic market prices of non-traded activities are used as a proxy for their shadow prices [i.e., the conversion factor in a domestic price system (domestic price numeraire) is 1.0]. Moreover, local materials are treated as non-traded inputs whose shadow and domestic market prices are equal. Also for skilled labor, market wages are taken as a proxy for output foregone at domestic prices. In contrast, the conversion factor or the domestic price numeraire is assumed to be 0.50 for unskilled labor.

6.8.3 **Shadow price adjustment**

Breaking down each of the project costs and benefits as follows best carries out an economic analysis using a domestic price numeraire:

6.9 Exercise

Choose

1. Which of the following techniques does take into account the time value of money?
   a. Accounting rate of return c. Payback period
   b. Profitability index d.A and B e. All
2. Which of the following statements is **incorrect**?
   a. If the PI of a project is greater than 1, the proposed project will be rejected
   b. If the PI of a project is less than 1, the proposed project will be accepted
   c. If the PI of a project is greater than 0, the proposed project will be accepted
   d. If the PI of a project is less than 1, the proposed project will be accepted e. None
3. Outdoor works includes:
   a. Supply and distribution utilities c. Handling of emission and wastages
   b. Transportation and traffic signals d. Outdoor lighting e. All
4. If the net initial investment is birr 60,000 and the uniform increases yearly cash flows is birr 50,000, then payback period will be:
   a. 1.2 years b. 2.34 years c. 5.34 years d. 1.6 years e. None
5. The main objective of financial feasibility study is to;
   a. Ascertain whether the proposed project will be financially viable in the sense

b. Ensure that the project is technically feasible in the sense that all the inputs required to set up the project are available
c. Facilitate the most optimal formulation of the project in terms of technology, size and location
d. All E) B and C

6. Among the following, one is a demerit of payback period
   a. Reduces the possibility of loss on account of obsolescence
   b. Ignores the time value of money
   c. Ignores cash flows occurring after the payback period
   d. Considers benefits over the entire life of the project
   e. All except A
7. Which of the following is a decision rule for Accounting Rate of Return?
   a. Reject the project if ARR is less than the target period
   b. Accept the project if ARR less than the required rate of return
   c. Accept the project if ARR is exceeds the target period
   d. Accept the project if ARR exceeds the required rate of return
   e. B and C
8. The common advantage of payback period and accounting rate of return is_____.
   a. Ignores cash flows occurring after the payback period
   b. Ignores the time value of money
   c. Call for cost of capital
   d. Considers benefits over the entire life of the project
   e. None
9. The ratio of the present value of net cash flows and initial investment is:
   a. Profitability index c. Net present value
   b. Accounting rate of return d. Internal rate of return e. All
10. From the following listed, one is disadvantage of profitability index.
    a. Requires a cost of capital for its calculation
    b. Accounts for all cash flows
    c. Recognizes the time value of money
    d. Considers the riskiness of future cash flows
    e. None
11. Which of the following capital budgeting techniques takes into account the incremental accounting income rather than cash flows:
    a. Accounting rate of return c. Internal rate of return
    b. Net present value d. Payback period e. All
12. If present value of total cash outflow is $15,000 and present value of total cash inflow is $18,000, what is the net present value of the project?
    a. $1,000 b. $3,000 c. $2,000 d. $33,000 e. None
13.. Investment analysis tool that accounts for all cash flows is;
    a. Net present value c. Profitability index
    b. Accounting rate of return d. Payback period e. All

13. Which of the following investment rules does not use the time value of money concept?
    a. Net present value c. Accounting rate of return
    b. Internal rate of return d. Profitability index e. All
14. Structure and civil works in technical feasibility study includes:
    a. Site preparation and development c. Buildings and structures
    b. Outdoor works d. A and C e. All

Workout Questions

1. The following is the after – tax cash flows for the project, and the firm's cost of capital is 10%.

Year	**Cash follows (Birr)**
0	-60,000
1	30,000
2	20,000
3	15,000
4	30,000

Directions: Calculate the following:

a. Payback Period (2-pts)
b. Discounted Payback Period(3-pts)
c. Net Present Value (3-pts)
d. Profitability index (2-pts bonus)

CHAPTER SEVEN

7 PROJECT PLANNING, ORGANIZING AND IMPLEMENTATION

Introduction

A project starts from an idea with a definite mission and proceeds through different formulation and preparation processes in order to generate activities involving a varietyof human and non-human resources which all geared towards the achievement of a goaland stops once the objectives are fulfilled. This project stage is called implementation.It is a stage where the earlier preparations and designs are tested in the reality. It is at this stage we commit the huge share of our scarce resources allocated for the project.

Translating project plans into actual investment and operation is one of the most criticaland difficult tasks. No matter how sophisticated or detail the project preparation work,it has no value unless it is transformed into action or implemented. The successful implementation of development projects depends on the efficient use of the scarce resources as planned. However, there are enormous problems that impeded the timely implementation of projects. These problems are more evident in developing countries like ours. Indeed there were very few successful projects that have been completed on time, at a reasonable cost and with the expected benefits realized.

Although there are other factors, the failure or the success of implementation is mainly attributable to the financial, managerial and institutional, technical and political factors. Particularly the influence of the quality of management significantly affects the performance of project implementation.

7.1 Project planning and organizing

Project planning need is much greater for project work than for normal operations. Project planning serves several important functions (Meredith and Mantel, 2006):

- It provides a basis for organizing the work on the project and allocating responsibilities to individuals.
- It is a means of communication and coordination between all those involved in the project.
- It induces people to look ahead.
- It instills a sense of urgency and time consciousness.
- It establishes the basis for monitoring and control.

A comprehensive project planning covers the following:

a) **Planning the project work-** the activities relating to the project must be spelt out in detail. They should be properly scheduled and sequenced.
b) **Planning the manpower and organization-** the manpower required for the project must be estimated and the responsibility for carrying out the project work must be allocated.
c) **Planning the money-** the expenditure of money in a time-phased manner must be budgeted.
d) **Planning the information system-** the information required for monitoring the project must be defined.

Project plan failures are mostly caused by (Choudhury, 1988; Joy, 1994):

- Lack of integration in both planning and implementation efforts,
- Absence of commitment on the part of people engaged on implementation, and
- Non-involvement by the top management and administrative ministries in the monitoring of projects and in trouble-shooting.

To attain success requires planning, implementing, and controlling the project through integration, commitment, and involvement. The ultimate objective of planning is timelyand economical implementation.

Planning is the formation of a detailed scheme for proper arrangement of the necessary action steps and means for achieving the project objectives. The planning exercise should be guided initially by the overall time schedule and cost estimate given in the Detailed Project Report (DPR).

In the planning stage, the project is broken-down in to many manageable elements, fixed in to a time frame with in the overall time schedule, with an allotment ofresources with in the overall project cost, and released for execution.

An achievable realistic plan fitting in with the overall project time and project cost isthe essential requirement for a project's success. Performance guidelines and a controlling system to evaluate and modify the performance as required shall form part of the plan.

Between (i) the formulations of preliminary plan in the DPR stage and (ii) the finalization of plan for implementation, the plan has to be subjected to **'iterations'** for apossible reformation of the preliminary plan.

The traditional form of **Organization** characterized by a continuous flow of repetitive work, with each department attending to its specific functions, is not suitable for projectwork for the following reasons:

- It has no means of integrating different departments at levels below the top management and
- It does not facilitate effective communication, coordination, and control when several functional departments, with different professional backgrounds and orientations are involved in project work under time and cost pressures, which often call for overlap, at least partial, of development, design, procurement, construction, and commissioning work.

a. Line and Staff Organization

A person is appointed with the primary responsibility of coordinating the work ofthe people in the functional departments. He/she acts in a staff position to facilitate the coordination of line management in functional departments. This type of organization is usually not suitable for large projects. **However, it is conducive to an efficient use of resources but is not suitable for an effective realization of project objectives.**

b. Divisional Organization

A separate division is set up to implement the project. Headed by the project manager, this division has its complement of personnel over whom the project manager has full line authority. It implies the creation of a separate goal-oriented division of the company, with its own functional departments. While the project manager still has the problem of coordinating the inputs of other organizations involved in the project, he/she has total formal control over the division he/she heads. **However, it is suitable for an effective realization**

of project objectives but is not conducive to an efficient use of resources.

c. Matrix Organization

It seeks to achieve the twin objectives of efficient resource utilization and effective realization of project objectives, at the cost of greater organizational complexity. The project manager integrates the contributions of personnel in various functional departments toward the realization of project objectives. The personnel working on the project have a responsibility to their functional superior as well as to the project manager. **It seems to be a better vehicle for the simultaneous pursuit of the twin objectives, i.e., efficient utilization of resources and effective attainment of project objectives.**

Project Implementation can be defined as a project stage that covers the actual development or construction of the project up to the point at which it becomes fully operational. It includes monitoring of all aspects of the work or activity as it proceeds.It is where the earlier preparations and designs, plans and analyses are tested in the light of reality. The project's objectives are realized only when it is successfully implemented. Most of the work done in the earlier stages (i.e., identification, preparation, and appraisal) is directed toward ensuring successful implementation.

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

a) **The investment period-** when the major project investments are undertaken.
b) **The development period-** when the project's production builds up.
c) **The life of the project-** when full development is reached.

For getting started a project implementation, we have to provide answers to the following questions about the project:

- What are the goals and objectives of the project?
- Who are the principal participants in the project?
- When must the project be started and finished?
- Where will the project be executed?
- Why is the project being launched?
- How will the product or services be produced?

7.2 Managing The Implementation Process

These processes encompass (Gittenger, 1998; Meredith and Mantel, 2006; UNIDO, 1991):

7.2.1 Development of project plan objectives

Planning aims at achieving the project completion making the most effective use oftime and resources. Thus, **the scope of the project plan must be defined (i.e., define the boundary and define only the work required to complete the project successfully).** A clear understanding of the plan objectives is a requirement for the plan's success. Ensure that the objectives are achievable, measurable, simple to understand and consistent with the resource levels fixed and assumptions made in the DPR estimates.

We can develop a statement of plan objectives in an orderly and systematic sequence through the following **seven questions**. We need to update ourselves and the project to the changing environment because there is a significant time gap between the present project implementation planning and organizing cycle and the previous project appraisal cycle.

a. What?

Describe the project objectives and its end results in detail and define the scope of work to be accomplished.

b. Why?

State the purpose of the project and why it is important to the national economy,to you, and to the project team.

c. How?

State the strategy and the approach or method proposed to adopt in the project's execution, i.e.,

- Define the management practices, construction technology, controlling and administrative procedures, information systems, etc and the nature of execution.
- Describe documentation and coding and accounting procedures.
- Specify commitment authority and financial power.
- Anticipate problems and develop contingency plan, etc.

d. Where?

- Define the geographic area or location where different activities will be carried out.
- Define the organizational level or division or team to which different tasks are assigned.

e. When?

- Fix a timeframe to the total project; with a schedule of major milestones, in line with the commitment made in the DPR, and then, with in the overall timeframe, fix time duration for every major project activity.
- Distribute the entire work over the project duration.
- Determine work sequence and priorities in an acceptable manner, suiting the overall plan.

f. How Much?

State the quantum (quantities) of the major activities involved and resources required based on the DPR estimates and subsequent firming up and refinements.

g. Who?

- Design the project organization and assign responsibility to teams and individuals with due consideration for competence.
- Specify the type and size of organization, hierarchy and levels, qualification and experience for each position.
- Specify job specifications of every position/title.

7.2.2 **Programming of action**

Program is the forerunner of schedule. It is from a program of action that the scheduleis prepared. The programming of action comprises:

a. Listing of Works (List the Work)

List the tasks and the activities under each work, showing main work elements of the total project by functions, disciplines, skills, crafts, and etc. The list can be a simple, phase wise, tabular statement with columns for task code, task description, durations (working days), and estimated man days (category wise).

Project Code-01

Task Description	Task Code	Man days
Electrical Work	011	2
Civil Work	012	5
‘’’’’’’’’’’’’’’’’’’’	‘’’’’’’’	‘’’’’’’’’’’’’

b. Definition of Work

Define the listed work elements in greater detail for clearer understanding. This definition should remove uncertainties, if any, contained in Detailed Project Report.

c. Work Breakdown Structure (WBS) and Codification of Tasks

The WBS is a detailed listing of the deliverables and tasks for completing the project. It is a top-down, broad to specific hierarchical outcome of the work to perform. Knowledge of the project

outputs then makes possible the breaking down of the project in to management components and sub components. There are several benefits to developing WBS:

- Forces the project manager, team members, and clients to delineate the steps required to build and deliver the output.
- Lays the groundwork for developing an effective schedule and good budget plans.
- Makes it easier to hold people accountable for completing their tasks.

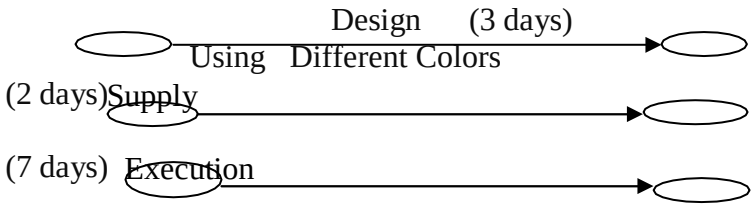
Following the identification of activities, the following factors can be identified for each individual activity. These are:

- The sequence of project activities.
- The resource requirement for undertaking the activity.
- The estimated time it will take to complete.
- The responsibility for undertaking it.

Breakdown the work into small packages and activities for easy control and codify them. The volume of work allotted to a team should be of a controllable size. Codification of tasks and related project accounts facilitate effective management and control. The numbering structure should be logical, interrelated and level related. Coding can be done either numerically or alphabetically or combined alpha- numerically. The coding system and numbers must be made known to everybody connected with the project.

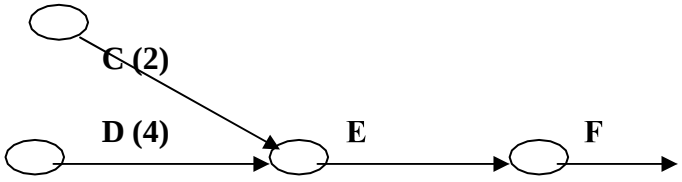
d. Modeling the Work

Make models of the main work segments with a beginning and an end, i.e., make graphic models of the main segments and important elements of the work. The models shall indicate the various angles of the type and magnitude of the work to be put in, and the technical, functional, and logical relationship of the various activities involved in the work. Addition of time duration to every model with a beginning and an end is done here. The time is fixed in terms of project months or project days, starting from the zero date. For example,



e. Identification of Critical Activities

Identify critical activities for special attention. Some activities finishing do not hold up (tie) other activities. But, some activities are so critical that the preceding items' tie-in and succeeding items' start are dependent on their finishing. These latter items have to be separately identified and listed for special management attention towards their completion,in the interest of timely completion of the project. We may call it as a "**red list**". For example,



- Slack of two days to start activity **E,** because activity **D** must be fully completed to start activity **E.**
- Decision should be made when to start activity **C**; either simultaneously

with activity **D** (called **forwarding**) or two days after activity **D** starts (called **back warding**).

7.2.3 **Scheduling of resources and time (project implementation schedule)**

Scheduling is principally the exercise of lying out and integrating time, resources, and the main work elements of engineering, procurement, and construction on the most efficient manner to achieve the project execution. Resources availability and their economic levels of distribution, time duration for individual activities and for the total project, and the estimated costs are interrelated through the scheduling exercise.

Schedules deal not only with construction or other investment components, but also with actions such as appointment of staff and consultants, adoption of legislative or administrative measures, changes of policy, etc. Furthermore, scheduling of projects has the following major advantages (ICMR, 2007; Meredith and Mantel, 2006):

- Encourages planning
- Guideline project execution
- Establish day to day priorities
- Control of progress (targets, milestones)
- Achieve better resource allocation
- Minimize project costs

Features (characteristics) of good schedule (Chandra, 2006; Choudhury, 1988; Joy, 1994):

- All work items included
- Sequence of work clearly shown
- Easy to understand
- Easy to revise
- Important work items highlighted
- Constraints easily detected

a. Forward and Backward Scheduling (Resource Smoothing)

It is a scheduling strategy used for keeping down the level of resources deployment and making the optimum use of them by taking advantage of floats. This can be done by estimating the time for all individual work elements.

Forward scheduling starts as soon as working **front clearance** is available for an activity and it often finishes before the required due date. The philosophy is '**finish every activity as early as possible**'. On the other hand, **backward scheduling** starts backwards from the required due date of finishing the activity and arrives at a required starting date. The philosophy is **'finish economically when required'**.

Assess the resources requirement in detail and match them with the project estimates, i.e.,

- Take stock of the total available resources **(AR**) that can be mobilized during the activity time.
- Assess the most economic quantity of resources requirement (**RR**) for finishing the activity with in the time duration.
- If **RR** > **AR,** revise the activity duration using the forward and backward scheduling technique (i.e., called **Resource Smoothing);** adjust the volume of activities to suit the **AR;** and then calculate the reassessed requirement of resources **(RRR).**
- Make provision for procurement of the difference between **RRR** and **AR.**

- Make a master bar chart schedule of the activities with starting and finishing dates and a corresponding tabular schedule of time phased allocation of all resources.

b. Master Schedule and Master Budget

Make overall (i) master schedule with mile stone completion dates and (ii) master budget supported by detailed scheduling of resource.
A corresponding master schedule of resources should list the requirementsof major resources of man, equipment, and materials for the same work packages in a matching time phase with consideration for procurement time and mobilization time, to enable timely work execution.
A corresponding master budget shall ensure financial allocation and the project fund flow.
The master resources schedule and master fund flow statement shall be based on the project cost estimate, project investment cost distribution schedule, and their subsequent refinement based on firmed up project data and engineering details.
Several-detailed breakdown scheduling of individual activities and resources shall support the master schedule. Also the master budget shall be supported by detailed budgets of different resources.

Key events or ending of key activities in the course of setting up a project are milestones. Their achievement without slippage on the specified dates will generally ensure the project's timely completion. So a project must have a separate master milestone schedule for special management attention. Its contents are the numbers indicating milestone events placed in circles set in calendar time columns with arrows linking the preceding and succeeding events.

c. Make Time-Phased Construction Schedule, Manpower Schedule and Construction Equipment Usage Schedule

	Period (Workday)							
Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Manpower	US	SS	S					
Material								
Equipment	EM		CR		CRU		SO	
Resources								

Where, US = Unskilled, SS = Semi-skilled, S = Skilled, EM = Earthmover, CR = Crane, CRU = CrusherSO = Sorter

Construction Usage Schedule:

(i) Manpower Resource

Type	**Source**		
	Own	**Hire**	**Contract**
Project Mgt.	√	-	√
Construction	-	√	√
Operations and Maintenance	√	√	-
Management and Control	√	√	-

(ii) Equipment Resource

Equipment	**Own**	**Hire**	**Contract**
Earth Mover	√		
Crane	-	√	√
Crusher		√	√
Sorter	√	-	-

d. Make schedules of ordering and delivering of incorporated equipment and materials

Procurement Schedule

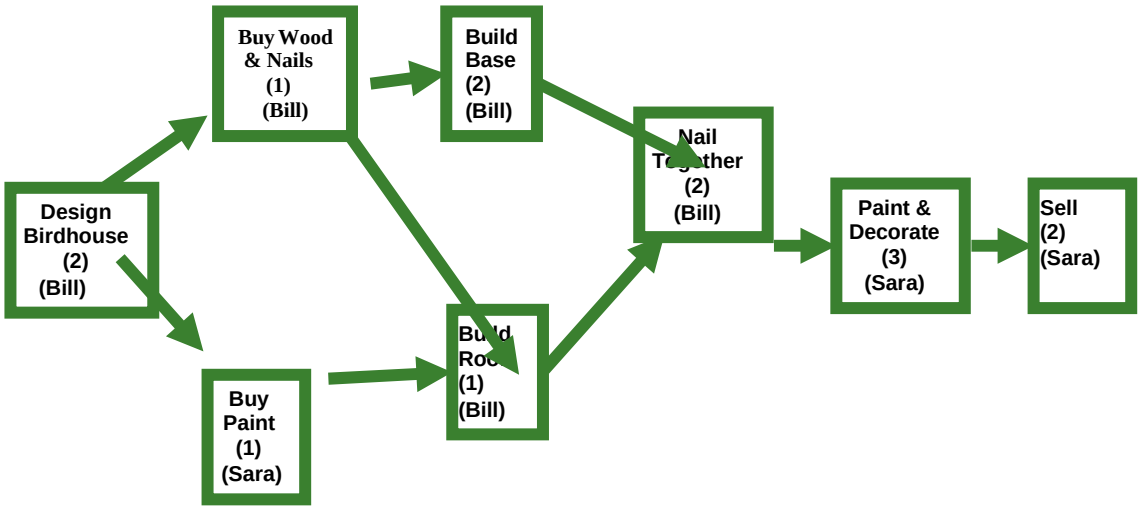
Equipment	**Order Date**	**Receipt Date**	**Last usage Date**	**Delivery Date**
Earth Mover	191 st	198 th	201 st	201st
Crane	188 th	198th	218th	218th
Crusher	180th	183th	193th	193th
Sorter	180th	183th	195th	195th

e. Make Detailed Schedules for All Key Tasks, Dovetail Schedules and Integrate Them in to the Master Schedule

Sample Gantt-Chart and Network Chart

- For building and selling a birdhouse and
- Each block contains a task and a time estimate.

	Period											
	1	2	3	4	5	6	7	8	9	10	11	12
Design birdhouse												
Buy wood & nails												
Buy paint												
Build roof												
Build base												
Nail together												
Paint & decorate												
Sell												



7.2.4 Organizing project team, infrastructures and working methods

A good project organization in which all individuals concerned constantly interact for achieving project objectives is vital for the success of a project. In this stage, the organization is given a more formal character and strengthened with clearly defined responsibilities and commensurate (adequate) authority.

a) Creating Internal Team

Make a strong cohesive (unified) internal team to suit the project's internal as well as external environment. The establishment of project implementation unit and the selection and appointment of a competent and capable project manager is vital for project implementation. Similarly selection of key project staff or strategic personnel should be given due

consideration. For example, establish recruitment, procurement, engineering and technical committees.

b) Setting Agencies

Involve all agencies connected with the project (i.e., all the stakeholders) and establish an integrated all agencies' project team, that is, a committee represented by the project people and the stakeholders. For example, establish a project implementation council comprising the project people, local administration, financial institutions, etc.

c) Coordination

Make and issue co-ordination procedure guidelines and operating manuals that will govern the internal team and the agencies. For example, the "financial manual" for the internal team and "power and duty protocol" for the agency.

d) Communication

Set up communication network and streamline project administration, such postal,telephone and internet services.

7.2.5 **Project budget and fund flow statement**

In the study phase, the budget and fund flow statement were prepared. At this stage, they have to be rechecked, revised, where necessary, and time-phased to suit theschedule.

a. Master Budget

Ensure that the master budget is time-phased according to assured funding arrangements and the master schedule.

b. Detail Budget

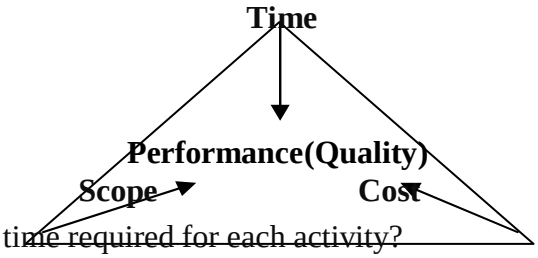
Make and issue detailed budgets and performance standards for each functional department in the project.

c. Cash Flow Statement

Make cash flow statement to suit disbursement for suppliers, services, and construction,as finally scheduled.

7.2.6 **Designing a controlling system**

The primary aim of a project is to deliver a product to a client within the specified **time**,**cost** and **scope**. The success of a project depends on the project manager's ability to strike a balance between these interrelated variables or constraints. The project managercontrols project **Performance (Quality)** in terms of **Time**, **Cost** and **Scope** parameters.



- What is the time required for each activity?
- What is the cost required for each activity?
- What is the scope level required for each activity? Performance or quality denotes specifications or requirements of deliverables.

Like any human undertaking, projects need to be performed and delivered under certain

constraints. These constraints are **scope**, **time** and **cost**. These are also referred to as the Project Management Triangle where each side represents a constraint. One side of the triangle cannot be changed without affecting the others. A further refinement of the constraints separates product quality or performance from scope, and turns quality intoa fourth constraint.

The time constraint refers to the amount of time available to complete a project. The cost constraint refers to the budgeted amount available for the project. The scope constraint refers to what must be done to produce the project's end result. These three constraints are often competing constraints. Increased scope typically means increased time and increased cost; a tight time constraint could mean increased costs and reduced scope; and a tight budget could mean increased time and reduced scope.

The objective of the control system is to control the schedules of time and cost, achieve the required quality within the prescribed scope, and reduce the risks connected with the projects. This objective is to be achieved through the following steps.

a. Integrating Total Activities
b. Fixation of Performance Standards
c. Monitoring of Performance
d. Plan Updating
e. Performance Evaluation
f. Corrective and Preventive Actions
g. Reporting System

7.3 Problems in Project Implementation

There are enormous problems in project implementation. Particularly in developing countries, the nature and degree of problems varies from sector to sector, from projectto project, from region to region, and from area to area. However, for the convenience of discussion, the commonly encountered project implementation problems are divided in to four categories. These are financial, managerial and institutional, technical and political.

7.3.1 **Financial problems**

Financial difficulties occur frequently during project implementation. Inadequate allocation of budgetary funds, shortage of foreign exchanges (for projects constitute foreign components), delay in budget releases, general price and salary increases, change in tariff and interest rates, and losses due to fluctuations in foreign exchange rates are the most common causes of financial problems.

The effects of financial difficulties on implementation

- Delay/interruption of project activities
- Cost increase (over-run)
- Reduction in the scope of the project

7.3.2 **Management problems**

This encompasses what are usually considered institutional problems. Managerial problems can be manifested:

- In the top government administration
- In the regional or local levels
- In the upper or middle management of the project and/or implementing agencies.

An ill-defined organizational set-up, low salaries and poor staffing policies, lack of coordination among various agencies that influence the project implementation, and

discontinuity of management as a result of changes for political and other reasons, etc are some features of management problems. Weak management and institutional capacity is a reflection of lack of skilled manpower, inadequate monitoring and evaluation system, inadequate project coordination and lack of information system. **These managerial and institutional problems are often the root cause of implementation delays and cost over-runs.**

7.3.3 **Technical problems**

In many cases technical problems result from the poor estimates and projections on the project activities and characters during the preparation stage. For example, in **engineering** area such problems as difficult soil conditions, poor quality of materials, technical defects in design, mistakes in installation and start-up of equipment, unsuitability of imported equipment for local conditions, etc. And in **agriculture**, inadequate technical packages, inadequate awareness of the beneficiary farmers, etc are some of the frequently observed problems.

Although technical problems do arise continuously in the course of implementation, solutions are generally found. However, better technical preparation standards result in better implementation, particularly with regard to technical aspects and, therefore,reduce both implementation delays and cost over-runs.

7.3.4 **Political problems**

When government (at all levels) commitment is absent, weak or changing, obviously project implementation suffers. A rapid rotation of political appointees in some areas considerably influences success in project implementation. Project management has to takein to account the potential impact of such political and administrative factors, anticipate theproblems in so far as possible, and modify the implementation path accordingly.

7.3.5 **Other problems**

Donor conditionality, lengthy project approval and fund disbursement procedures of donors (financing agencies), low community involvements in project planning andimplementation, etc are the other contributing factors in delay of implementation.

7.4 Success In Project Implementation

A successful project implementation means that the project has been completed on time, at or reasonably close to the original cost estimates, and with the expectedbenefits realized or even exceeded. The following are some of the principal factors that could account for successful projects (Kebede, 2003):

7.4.1 **political commitment**

Strong and sustained commitment by all levels of the government body (national, regional, zonal, Woreda, and Kebele) to the project's objectives is the first and probably most important reason for success. Political or government commitment meanthat the continuing interest and active support of these agencies and individuals who are in a position to influence attainment of the project's objectives whether through the allocation of human, financial and other resources or through the workings of headministrative and political apparatus.

It is strongly advisable that stakeholders' participation and consultation during project preparation would help to ensure commitments, i.e., to incorporate the main influencing agencies and actors in the preparation and appraisal process would enhance more the success in implementation. A careful monitoring of the political environment is one of the duties of a good project manager.

7.4.2 **Simplicity of design**

Selection of proper project design is central to successful project implementation.Projects with relatively simple and well-defined objectives and based on proven and appropriate technologies or approaches have a better chance of being implemented successfully. The major success factors in some rural development programs and projects appear to have been the appropriateness of the technologies proposed for the specific local conditions, the complement of recommended inputs, and the strength of the support systems, etc.

7.4.3 **Careful preparation**

Project must be sufficiently prepared before it started. Careful preparation includes not only matters such as detailed engineering and land acquisition but also other technological packages, socio-economic factors, environmental issues, organizational and institutional arrangements, and other supporting services.

For a big project, like that of rural development, pilot project is sometimes important to test proposed activities and approaches under local conditions. This would not only improve success in implementation but also help to save both time and money that might be unnecessarily spent.

7.4.4 **Good management**

The influence of the quality of management on project implementation performance is usually visible. Many projects in serious difficulty during implementation have been turned around by the appointment of a competent manager. What are the qualities of good manager and management?

Superior performance in managerial job is associated with performing satisfactorily **'key areas'** of the job. A key area can be defined as a major component of a managerialjob of such importance that its failure to perform satisfactorily will endanger the whole job. The following are the standard list of key areas of project manager's job. The list isonly an approximation of the job of a project manager, and if it is used, it needs to be compared intelligently with the actual situation of the project under consideration.

Standard list of 'key areas' for a project manager

Cusworth and Tom (1993), Cuury and Weiss (1993) and Kebede (2003) have identifiedthe following key areas for a project manager:

a. Prepare and Maintain a Project Work Plan
- Review project priorities
- Prepare overall and progress work plan
- Update overall and progress work plan

b. Maintain National and Local Information
- Recall country problems and priorities
- Recall local problems and priorities
- Recall related programs/projects
- Recall cultural characteristics
- Recall social and economic characteristics

- Recall geographical characteristics
- Recall political characteristics

c. Mobilize Project Resources

- Recruit staff
- Obtain funds
- Secure facilities
- Procure equipment and supplies

d. Manage Staff

- Agree and review individual work plan
- Use appropriate management style
- Reward performance
- Manage staff training

e. Manage Funds

- Prepare estimate of expenditures
- Maintain budgetary planning and control systems
- Maintain controls for disbursement of funds
- Prepare financial reports

f. Manage Materials and Facilities

- Maintain inventories
- Maintain equipment, facilities, vehicles, etc
- Maintain security systems
- Operate comprehensive insurance policies

g. Monitor and Evaluate Progress

- Monitor activities
- Monitor outputs
- Monitor administration

h. Maintain Communications

- Prepare manager reports
- Ensure team prepares report
- Maintain record
- Maintain correspondences
- Maintain working relationships with national and local institutions and with related programs/projects

7.4.5 Other factors

In addition to the above list, following are the other contributing factors for project implementation success:

- Well defined goals and objectives
- Agreement over goals and objectives among the participants in the project
- Detailed work break-down structure and commitment to achieving goals and objectives
- Reliable monitoring and tracking techniques, etc.

7.5 Project Monitoring

Creating a system of control and accountability, which can provide rapid feedback to policy makers, planners and managers on the performance and potential problems of development programs and projects are very crucial. Adequate project preparationincludes not only detailed engineering design, financial and economic analysis, but also the ways and approaches used for timely monitoring the overall performance.

Practically every development program/project undertakes monitoring both the achievements of its targets (physical and financial) and the benefits actually accruing toits

target group. Monitoring is a tool for project managers to use in judging andinfluencing the progress of implementation. Managers have the responsibility for deciding the tactics for implementation within the strategy laid down in its documentation.

What do we mean by project monitoring and what it is for? A number of definitions have been put forward for this term. Meredith and Mantel (2006) define monitoring as "the continuous and systematic collection of information over the life of a project which allows adjustments to be made and objectives to be refined. Monitoring involves setting indicatorsof achievement or progress and the means of measurement of those indicators. It provides the information on which evaluation is based".

Similarly, ICMR (2007) defines monitoring as "a systematic and continuous assessmentof the progress of piece of work overtime .It is a basic and universal management tool for identifying strengths and weaknesses in a program. Its purpose is to help all the people concerned make appropriate and timely decisions that will improve the quality ofthe work."

Other authors also have a little variation in their definition of the term 'monitoring', according to particular needs or understanding of the concepts. Nevertheless, they all show broad agreement on why monitoring should be undertaken and what its use is within a development project.

In summary, monitoring can be defined as a continuous assessment of both the functioning of the project activities in the context of implementation schedules and the use of project inputs by targeted populations in the context of designed expectations. It isan internal project activity, an essential part of good management practice, and, therefore,an integral part of day-to-day management. The term has a close meaning with control and supervision.

7.5.1 **Functions of monitoring**

As stated above, monitoring is a management tool that contributes to effective and efficient implementations. Managers and donor representatives, responsible for monitoring, should be open to modify original plans during implementation, if such action seems warranted. Therefore, monitoring must be integrated within the project management structure.

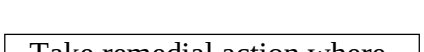
Monitoring is an evaluative activity. By comparing what has been accomplished to targets set up in advance for a given time period, monitoring identifies shortcomings before it is too late. It also provides elements of analysis as to why progress fell short of expectations, identifying constraints and pointing the way toward measures to overcome them.

Monitoring may be used to adjust specific objectives and revise the work plan during the current period and for the next reporting period. This does not mean that objectives should be changed lightly. But when monitoring signals that something is off course (derail), a careful review of the situation should be undertaken to assess if a modificationof objectives is merited. Adopting a flexible planning style is usually more successful than following original plans rigidly because unexpected opportunities as well as obstacles often arise. In many cases where the objective is a change of behavior, it is impossible to accurately predict people's reaction to interventions. Hence, monitoring andsubsequent adjustments of activities are essential.

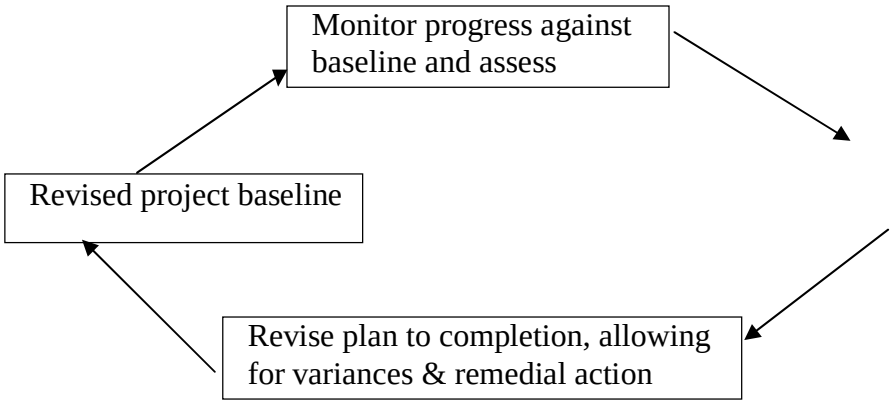
7.5.2 **Focus and types of monitoring**

Monitoring is the provision of information and the use of that information to enable management to assess progress of implementation and take timely decisions to ensure that progress is maintained according to schedule. It assess whether project inputs are being delivered and used as intended. It is a process of measuring, recording, collecting and processing project data for management decision making. In relation to development projects, monitoring focuses on the operation, performance and impact of the project.

Monitoring has the following cycles (Chandra, 1995, 2006; CRDA, 1998; ICMR, 2007;



Meredith and Mantel, 2006; Pearce and Robinson, 2001):



The essence of a project monitoring system is the continuous comparison of the actual situation against the plan, in relation to physical progress, financial expenditure and quality. When the monitoring system shows a deviation between the planed progress and the actual progress (known as 'Variance'), project managers need to decide whetherremedial action is possible or necessary.

Designing a proper information system is a prerequisite for effective project monitoring. The function of the information system (often called the project management information system-PMIS) is to provide managers with the information onwhich they can take timely action in pursuit of project activities. Information is passed from the project site to the mangers who use it to monitor project progress against plan. If deviations have occurred and modifications to the plan are required, these are instituted through the control system, and the consequent deviations are passed back to the team at the project site using the established communication system.

Too often, in public sector project administration, monitoring system is considered onlyas a means of centralized checking and recording, particularly focusing on financial performance. Project managers instead of using the system to help them manage their project activities more efficiently, it has been observed that the information collectedon their project monitoring is transmitted to the head office. It should be noted that monitoring is an internal process and has to be carried out by managers and project internal staff, for managers as part of the effective implementation of projects. Those involved must look on the management systems as being assistance to them in the carrying out of their own duties rather than as something required by others for different purposes.

While all monitoring data need to be processed to provide information, managers should use that information to guide them to take action only where necessary. The datawill provide information on which it will be possible to compare actual progress againstthe plan. Areas of concern are those where there are substantial deviations from the plan (i.e., Management by Exception). The manager will then be concerned to assess the implications of these deviations. Managers do not need to take action on monitoringinformation except in those situations where the information shows substantial deviations between planned and actual progress.

a. Project Monitoring Systems

In managing development projects, it is essential for the manager to:

- Further specify the project objectives as a basis for preparing a detailed implementation strategy,
- Develop appropriate activities and delivery systems and determine the required inputs and outputs,
- Prepare realistic work plans and schedules, keeping in view the available

resources and staff capabilities,

- Maintain detailed records of physical and financial performance,
- Monitor the project environment so that it can facilitate project implementation or suitable adjustments can be made in ongoing or planned activities, and
- Provide periodic reports to the responsible agencies and institutions (Chandra, 2006; Joy, 1993; MEDAC, 1996).

Management personnel at various levels of project hierarchy need timely and relevant information to undertake these functions. Thus, in order to implement a project, the manager needs a regular flow of information on the resources (staff, equipment, money,etc) deployed and deployable, the stage of preparation of infrastructure and services, theavailability of supply and inputs, the contact with targeted beneficiaries and their reactionsto the stimulus offered by the project and the environment as it affects the implementationof the project.

The range of required information for monitoring can be divided into three main types (Chandra, 2006; ICMR, 2007; Kebede, 2003; Pearce and Robinson, 2001):

i. Information pertaining to the physical delivery of the structures and services provided by the project, together with the relevant financial records.
ii. Information pertaining to the use of the structures and services by the targeted population and the initial consequences of that use.
iii. Information on the social, economic or environmental reasons for any unexpected reaction by the target population that is revealed by the information about the use of structures and services.

In general, the monitoring system depends on the definition of the project plan through the identification of project targets to be achieved at a particular time. These targets describe the quantified objectives of the project at a particular time. For effective monitoring, it is necessary to set physical targets for outputs as well as financial targets (budgets) for inputs and progress can be measured directly against these targets. When we say inputs, we refer to resources provided for an activity, and include cash, supplies, personnel, equipment, training, etc., whereas outputs are the specific products, goods or services that an activity is expected to produce/deliver as a result of receiving the inputs.

b. Type of Monitoring

Development programs /projects are often carried to bring change on people and their surroundings. These may be economic, social, organizational, technological, etc. or other intended or unintended results over a longer period. Monitoring that considers this change is called **impact monitoring**.

The following are the items that have to be closely monitored in development programs/projects (CRDA, 1998; Cusworth and Tom, 1993; ICMR, 2007; Meredith and Mantel, 2006):

- Program/physical progress
- Financial Progress
- Beneficiary contact Monitoring
- Management/Administration

A distinction has to be made between process monitoring and impact monitoring. Monitoring that involves about the use of resources, the progress of activities, and the way these are carried out is a process monitoring. It is a means for reviewing and planning work on a regular basis.

Although detail consideration is given for program/physical, financial progress and beneficiary contact monitoring, summarized information will be provided for

management/administration monitoring

i. Program/Physical Progress Monitoring

Monitoring program/physical progress is a vital element of successful project implementation. It is generally accepted that projects that are implemented on time have a much better chance of being implemented within budget than those that suffer delays. Physical progress monitoring should, therefore, be directed to assisting the managers and owners of the project in keeping a check on whether activities in the project are up to schedule. If they are not, managers need to be able to assess how significant the delay is,and whether remedial action needs to be taken. Managing physical progress can be likenedto managing time.

The simplest method of physical progress monitoring is by means of project milestones. Milestones are significant events in the implementation program, for example, the event marking the completion of various critical activities. Completion of the tendering process and the award of contract is often a very important milestone for resource-intensive projects with major physical components. Failure to achieve milestones by the appropriate date signals to the management that problems are likely to occur in the future, and that remedial action may be necessary.

The number and type of milestones used for project monitoring will depend on the levelof management that wishes to use them .Top management will be concerned with a fewkey milestones that will indicate progress on the project as a whole. These milestones arelikely to represent important dates in major activities or complete components of the project.

Middle management will be concerned with more milestones, at more regular intervals,and relating only to that part of the project for which they are responsible. Linesupervisors will be concerned with the achievements of detailed milestones, at frequent intervals, for one specific activity.

Identifying appropriate milestones is a matter of judgment. If, however, Critical Path Method (CPM) is used to plan project implementation, the project network and time charts are useful aids in this respect. When identified, the milestones can be marked up.This is commonly done on the **bar chart**.

An effective monitoring aid using milestones is the mile stone chart (see table below).It shows, for each project, the milestone, the originally planned date, the revised planned date, and the achieved date.

Monitoring using milestones concerns the occurrence of key events and only signals when problems have already happened. It does not help mangers to anticipate problems. To help anticipate problems, it is necessary to use measures of physical progress which are regularly reported during the activity and which help the project manager to look forward to assess whether future milestones will be achieved on timeor not.

The other items to be considered during program/physical monitoring are:

- Results of activities/project outputs
- Project inputs
- Progress of program according to objectives
- The way the program is managed and style of work
- Background information on target population and context

Information to be collected, sources and use of information on the above items are summarized and presented in

a) Financial Progress Monitoring

Managers are also concerned to measure financial progress, both to relate it to the total project budget and to ascertain the costs of individual items and activities within the project and how these compare to the original estimate. This process also requires the preparation of financial plan (budget) for the project, and subsequent measurement of actual expenditure and comparison against budget.

Once the budget has been prepared and the project is underway, the project manager willneed a cost reporting system to provide information on actual costs. Unfortunately it is often not possible to rely directly on the accounting system to do this, for a number of reasons.

- The accounting system is likely to have been established prior to the project and to be used for many other activities of the sponsoring ministry or organization. It is thus unlikely to record costs for individual items in the way that the project manager would find useful.
- Accounting system is often slow so that costs are recorded and reportedseveral months after they are actually incurred, too late to allow corrective action if variances are observed.
    - Accounting systems do not record costs committed but not yet incurred.

For instance, costs that are committed on the signing of a contract may be a main elementin the overall buildup of costs. Project managers will, therefore, need to establish a cost reporting system that provides the information required (costs incurred and committed, foreach item and activity in the work break down structure) in a timely fashion, say within amonth.

b) Beneficiary Contact Monitoring

Physical and financial monitoring generally measures a project's provision and deliveryof services and inputs. However, as a program/project is implemented, the perceptionof its intended beneficiaries will lead either to growing demand for its outputs/services or to its increasing irrelevance. Hence, in project management it is important to know whether the outputs/services provided are being accepted by the intended beneficiaries and how they are being integrated in to the existing systems (e.g. farming systems, education systems, etc.) or not. This can be done through beneficiary contact monitoring.

Beneficiary contact monitoring requires that project beneficiaries can be identified. This is possible in most development projects. Because project preparation and appraisal reports generally specify intended group of beneficiaries -whether by location, type of activity, eligibility for services or willingness to use project's inputs or techniques- and give working estimates of their number.

Three techniques can be used to keep track of beneficiaries' attitudes and behaviors:

- To maintain records for each participant/beneficiary/ and to analyze these periodically to monitor the penetration of the outputs/services and the establishment of clientele.
- To establish a regular schedule of surveys to enable managers to measure the progress of a project and the responses of its beneficiaries. Formal sampling techniques must be used to get satisfactorily significant data from these surveys.
- To use normal interviews to alert managers to outstanding success stories or problems.

Monitoring staff can develop many useful insights by talking to project beneficiaries and summarizing their comments. The monitoring staff has the primary responsibility for

initiating and maintaining contacts with beneficiaries. They must also keep the project records well organized and will usually conduct interviews if sample surveysare needed.

Furthermore, beneficiary contact monitoring should answer the following basic questions (CRDA, 1998; Cusworth and Tom, 1993; Cuury and Weiss, 1993):

- Who has access to project services and inputs?
- How do they react to these stimuli?
- How do these stimuli affect their behavior and performance?
- To what extent did persons with access understand the available services form the project?
- To what extent did those who saw them as relevant try the services?
- Did those who tried the services continue using them?

It is important to note here that the monitoring of the initial effects of a new output/product on the behaviors and performance of beneficiary groups extends the monitoring system to one more level of detail-namely the initial outcome of the use of project outputs/services in terms of physical output or economic effect. This is a kind ofmonitoring that resembles to what is called on-going evaluation. It will be discussed broadly later during our evaluation session.

Proper approach has to be used during beneficiary contact monitoring. For many aspects of beneficiary contact monitoring, simple interviews with a small sample of beneficiaries will provide adequate indicators of project penetration, adoption, andresponse if the sample is drawn according to randomization procedures. It is strongly recommended that probability sampling be used in monitoring the proportion of beneficiary population that exhibits pertinent characteristics.

7.5.3 **Organization for monitoring**

As it is discussed above, monitoring encompasses the collection of recorded projectdata and supplementary information for the analysis and interpretation required to makedecisions concerning the functioning of the project. Thus, establishing M&E unit within the project is vital. Particularly to serve as a management tool, monitoring system that fit the management system should be organized at each level of management. Nevertheless, in order to effectively use the system, the following issues should be properly considered (ICMR, 2007; Joy, 1994; Meredith and Mantel, 2006; Pearce and Robinson, 2001):

- Decentralized management, i.e., management decisions taken as close as possible to the activity. Management from a distance does not motivate personnel, can only react slowly to changing needs and situations, and does not encourage an economical use of resources.
- Management by objectives, i.e., managers should not merely perform and oversee the performance of specified activities, but should be most interested in their outcomes and impact.
- Community participation, i.e., development of community participation in certain activities into community responsibility for these efforts. Ideally, consultation between local government workers and community members should lead to the community assuming greater responsibility for an effort e.g. through a management committee in a health center, school construction, road construction, local resource management, etc.

The staff of M&E unit can contribute, among others, in the following activities:

- Sort, summarize and disseminate the information flowing from the various units and staff engaged in implementing the project.
- Analyze the administrative files and records pertaining to the project implementation.
- Collect and analyze data from the intended beneficiaries of the project to supplement the available records and reports.
- Identify problems being encountered by the project and conduct diagnostic studies bearing on these problems.
- Maintain in a retrievable format the various data series overtime as an aid to later evaluation
- Prepare reports that highlight the findings of the various analysis and to the extent appropriately present a range of logical options required decisions by the management of the project or other concerned body (Chandra, 1995, 2006; Cuury and Weiss, 1993; Joy, 1994; Meredith and Mantel, 2006, Pearce and Robinson, 2001).

Although it is not limited to these, the monitoring functions can cover the above functions. In general, the manager is in charge to monitor the overall project environment in order that suitable adjustment can be made on the project objectives, assumptions, implementation strategies and procedures of the on -going or planned activities so that it can facilitate project implementation. In other words, matters requiring the attention of, and action by, the project management or authorities at the higher level must be brought timely to the attention of the project manager and through him to the concerned higher authorities.

7.5.4 **Indicators selection**

Selection of indicators that will be used to judge project progresses and achievements is critical to conduct M&E. If appropriate indicators are chosen, they help M&E by (Chandra, 2006; Cusworth and Tom, 1993; Cuury and Weiss, 1993, DEPSA, 1990; MEDAC, 1996; UNIDO, 1991):

- Showing the prevailing progress and problems in project implementation.
- Revealing the nature and rate of change that has occurred or appears to be occurring.
- Enabling progress to be compared with the planned targets.
- Assisting in input-output and cost-benefit analysis.

What is an indicator? An indicator can be defined as an objective measure of change or results brought about by an activity or an output from an activity. Indicators can be used to measure progress of all sorts within a project, broadly relating to the process and the impact of implementation. Its two major components are (Kebede, 2003):

a) **Process indicators** are those, which show whether the planned activities are actually being carried out effectively.
b) **Impact indicators** are used to assess what progress is being made towards reaching the project's objectives and what impact the work hashad on the different groups of people affected by the work.

Choice of appropriate indicators is a task that requires experience and skill, a thorough understanding of the information needs of management at various levels, knowledge of how

best to obtain the data for the indicators and of the limits imposed by both costs and techniques. For example, household income data as an indicator of living standard is notoriously difficult to collect and highly unreliable. For this reason, if it is used at all, it should be supported with related data, of which ownership of visible assets, such as house and consumer durables. Similarly deforestation rate may be a suitable indicator for monitoring forest area coverage in countries/regions/ with effective land use plan and cadastral system. It may be quite unsuitable for project monitoring where this system doesn't exist and/or where the data must be obtained from survey.

Project managers guide the choice of indicators for monitoring purpose by deciding what they need to know. Some indicators are especially important because they illuminate matters that the project managers can influence to improve project performance. However, the list of indicators has to be limited. Otherwise as the list grows large, so does the number of inappropriate indicators, which can doom an information system.

Indicators can be quantitative, measuring tangible effects, or qualitative, dealing with concepts which are less easy to pin down. Recognition of the relative strengths and weaknesses in quantitative and qualitative approaches to M&E work is important in deciding the most appropriate mix of methods or techniques to be used in any given situation.

Indicators essentially develop from objectives. Therefore, objectives whether short term, intermediate or long term, need to be stated clearly and unambiguously. If a directindicator cannot be found which can be measured accurately at a reasonable cost, a proxy indicator that can be measured should be sought.

As we already discussed indicators are designed to provide a standard against which to measure, or assess the progress of an activity against stated targets, towards delivering its inputs (input indicators), providing its outputs (output indicators) and achieving its objectives (effect and impact indicators).

Let us consider a program, which is devised to introduce new extension packages to peasant agriculture to understand the distinctions between input, output, effect, and impact indicators. One of the main objectives of the program is to attain food self- sufficiency. Some of the main activities of the packages include (Cusworth and Tom, 1993; Cuury and Weiss, 1993; Gittenger, 1996, 1998):

- Improving extension agent to farmer ratio
- Expanding the use of improved farm technologies like fertilizers, improved seeds and plant protection chemicals
- Expanding application of soil and water conservation measures
- Improving crop management practicesIn such a situation,

a. Examples of input indicators will include:

- Increase in the number of extension agents
- Increase in the delivery of fertilizers, seeds, pesticides, oxen and other technological inputs
- Change in the volume of credit made available to farmers
- Change in the number of trucks allocated to transporting inputs

b. Examples of output indicators will include:

- Increase in area under crop and forage production
- Increase in food production

c. Examples of effect indicators will include:

- Increase in yield per hectare for target crops
- Increase in livestock productivity

- Percentage increase in the number of farmers who adopted the extensionpackages

d. Examples of impact indicators will include:

- Increase in asset ownership
- Increase in land holding
- Change in the constitution of diet
- Change in weight in relation to height in children

The choice of basic indicator should be both sub-sector and project specific. What is appropriate for one project is not for another, and what can be measured in oneenvironment cannot be in another.

There are a number of criteria that are considered to contribute to effective indicators. These are (CRDA, 1998; Cusworth and Tom, 1993; Cuury and Weiss, 1993, MEDAC, 1996):

- Simplicity	- Validity	- Specificity
- Independence	- Relevance	- Timeliness
- Accessibility	- Cost effectiveness	- Verifiability
- Meaningfulness to all involved	- Sensitivity	

Simplicity/Unambiguous Definition

The indicator must be simple and clearly defined in the project's context. For example, what does an 'adopter' of a project -supplied input such as fertilizer mean? Does it include all farmers who bought the fertilizer or farmers who apply it but less than recommendations call for or only farmers who follow the input recommendations? Adoption rates are highly recommended indicators in agricultural projects, but they must be clearly defined.

Validity/Consistency

The values of the indicators should stay valid/constant as long as they are collected in identical conditions, no matter who does the collecting. As far as possible, indicators should be chosen to give objective rather than subjective data.

Specificity

Indicators should measure specific conditions that the project aims to change. Specificity usually decreases along the path from inputs, outputs and effects to impact. For example, the delivery of inputs within a defined area is specific. A changed deliver rate reflects a real change in project's implementation. Crop output, however, is a less specific indicator, since outside factors may have greater influence on total production than the project. An indicator is especially valuable to project officials if it clarifies possible corrective action.

Sensitivity

Indicators should be highly sensitive to changes in a project situation. For example, the managers of a project that provides a new seed to smallholders need to monitor the seeds' adoption rate. Short-term movement in this rate in the early years could reveal whether or not farmers favor the seed-a critical monitoring indicator.

Cost-Effectiveness/Ease of Data Collection

The collection of the data needed to calculate the chosen indicators should be within the capability of a limited team. The fact that an indicator is believed to be important does not mean that it is practical to measure it. But the results should be worth the time and money it costs to apply them.

Relevance

It should be relevant to project objectives.

Timeliness

The indicator should be sensitive to the time it is done and possible to collect the data reasonably and quickly.

The criteria for selecting indicators for monitoring also apply to evaluation. However, the following additional observations about indicators for evaluation are appropriate:

- Some indicators are slow to change and, therefore, have limited value for normal project evaluation. For example, infant mortality remains still a valuable indicator for all developing countries, as it was a useful indicator for health and nutrition in Western Europe many years ago when communicable disease was high and life expectancy was low.
- Appropriate indicators for evaluating a project should be determined at the design or early implementation stage so that arrangements can be made to collect the necessary data. The main criterion for these indicators is that they should be sensitive to project induced change and measurable without the need for continuous, complex observation of large samples.
- The number of indicators should be kept to a bare minimum. Most of the indicators used for monitoring can also be employed for evaluation, but they must be analyzed for a larger period.
- Evaluation should not and cannot always depend on quantitative indicators. The purpose of evaluation is to generate in-depth understanding and not mechanically to report progress or the lack of it. Therefore, qualitative indicators should be used to evaluate social consequences in particular.

7.6 Project Evaluation

We have seen earlier the concept and definition of evaluation. It is closely related with monitoring and draws on the data base created during the monitoring process, supplemented if necessary with data on project impact, and reviewing the combined information over an extended period to judge the achievements. Indeed both M&E functions differ from project to project depending on the type of project, its objectives and components.

Evaluation can be seen in two ways, i.e., in periods of evaluation and persons evaluating. In terms of the periods of evaluation, four types of evaluation may be distinguished. These are (Chandra, 1995, 2006; CRDA, 1998; Cusworth and Tom, 1993; ICMR, 2007; Joy, 1994; Kebede, 2003; Meredith and Mantel, 2006):

- Ex-ante evaluation,
- Mid-term or on-going evaluation,
- Terminal evaluation, and
- Ex-post evaluation.

a) Ex-ante Evaluation (Pre-feasibility, Baseline Data, or Situational Analysis)

It is carried out before the implementation of the program/project activity in order to determine the needs and potentials of the target group and its environment, and to assess the feasibility, potential effects and impacts of the proposed program or project. For projects, which aimed to develop infrastructures (and to all others too), this can be looked as a "base line" study in which the situation of project area, the target group and its environment is described. At a later stage the effects and impacts of the Program or project can be compared with this situation.

b) Mid-term or On-going Evaluation (Progress evaluation)

This type of evaluation takes place while the implementation of the planned project is on-progress. Its primary focus is on project performance. It is an analysis of the relation between outputs and effects. What distinguishes it from later evaluations (terminal and ex-post) is that correction to the current project still can be made on the basis of findingsand

recommendations. This may lead to a redefinition of objectives or a change in implementation strategies. Unlike monitoring, on-going evaluation does not deal with daily problems but produces periodical assessment. It is an important evaluation tool forproject success since it would provide an opportunity for corrections on some mistakes observed on the implementation process. This means that it can lead to suitable modifications in the project design and implementation strategies. The major items covered include (CRDA, 1998; Cusworth and Tom, 1993; Cuury and Weiss, 1993):

- Organization structure and management capacities of the project.
- Progress and problems in staff recruitment and placement
- Procurement of necessary work goods and services from national and international sources (In many projects, procurement delays are a major obstacle to effective implementation).
- Progress in establishing delivery systems for supplying the necessary inputs and services
- Progress in physical work (construction).
- Volume and quality of inputs and services made available.

Note that at this stage evaluators will not be able to assess the effects and impacts of the project.

c) Terminal Evaluation (Phase out or Completion Report)

It is conducted when the funding for the project comes to an end. This may not mean that the services and inputs being supplied by the project terminate. But it is assumed, in most cases, as the responsible institutions or the beneficiaries will handle them. The distinguishing features of terminal evaluation are:

- It takes longer time for review of the initial outputs and effects
- It undertakes a careful examination of performance
- It assesses the sustainability of the benefits accruing to the target area/ group from the project and the rate of return on investment is assessed.

In the terminal evaluation, in addition to the project records, documents and outputs, an inquiry should be made for secondary data that are relevant for a comparison. Hence a wide range of data and information gathered from various source should be reviewed. Recommendations from terminal evaluation are primarily directed to improve the planning and design of future projects.

d) Ex-Post Evaluation (Post Implementation or Impact Evaluation)

It is designed as in-depth studies of the impact of a project that has been already executed or an intervention (support) given for certain development activities. It is made some times (in most cases 5 –10 years) after the program/project activity has been terminated in order to determine its impact on the target group and the local area. We shall discuss in detail on the project impact analysis on the next topic.

On the basis of the evaluating person, evaluation can be classified into internal and external. Persons who have a direct role in the program/project perform **InternalEvaluation**. The management team or persons assigned from the implementing agency can do on-going or mid-term evaluation. On the other hand, persons from outside the program/project carry **External Evaluation**. External evaluators often conduct terminaland ex-post evaluation. In most cases it is conducted by the funding/sponsoring agencies with formally designated persons outside the project at fixed points in time.

7.7 Project Impact Analysis

The main goal of a development project is to enhance the development process of the country in general and improvement of the wellbeing of the intended beneficiaries in

particular. During preparation and implementation of a project, considerable financial, technical, manpower and other resources are usually deployed. Hence, in order to mobilize or note additional resources on similar projects in the future, adequate and timely impact analysis should be conducted to know the positive and negative (anticipated and unanticipated) changes occurred as a result of the implemented project.The impact analyses should be undertaken with close contact and consultation with all the stakeholders in the project, such as the targeted beneficiaries, local leaders, community leaders, government agencies and other NGOs working in the project.

How and what to analyze?

Often some government institutions, specialized agencies and NGOs make use of consultants (in most cases foreigners) to assess and analyze their project impacts. These consultants make a 'rapid assessment' at considerable expense and subsequently disappear to be called again when the situation calls for it. On the other hand, the potential of local project professionals in the concerned institutions remains underutilized. Instead of infrequent, expensive and single shot approaches, projectprofessionals in the institution when appropriately instructed and trained and given the responsibility can gradually build a capacity to hand over a timely impact analysis on a regular basis. They can make available information base for their continuous impact assessment. However, the effort of many institutions in building their own capacity is limited.

Lack of adequate base information, which could help as a reference, is one of the crucial problems facing during the impact analysis. Hence, as far as possible in-depth information at the project area/community level is necessary before initiating development projects. As mentioned on the previous chapter this could be collected at ex-ante evaluation period, If not through a rapid area assessment. The required information includes mainly basic project area and community profiles such as,

- Major occupations,
- Income and expenditure pattern
- Marketing situation in the area,
- Infrastructure development and accessibility, etc before the project is initiated.

One thing we should know here is that much of the information collected may have negligible value during the analysis. But instead of confronting information shortage, it would be advisable to collect more information.

Assessment of the positive and negative impacts of a project must be targeted not only to the specific area situation where the project is physically implemented but also to theoverall long-term local, regional and national economic development.

Like that of indicators prepared for monitoring, there is a need to establish a frame work which would facilitate to analyze and appreciate the outcomes or impacts resulted from development projects. Answers for the questions raised can be collected not only from the project implementing bodies but also from the beneficiaries of the project, the local communities, leaders and other concerned bodies. The following is the general framework, which could help you for the impact assessment of a single. It can be adapted as required by a particular project under consideration. Note that some of the questions may not be relevant to all projects.

Major Differences between Monitoring & Evaluation

	Monitoring	Evaluation
Objectives	To determine the efficiency & legitimacy of the application and use of inputs as well as their conversion into outputs. To facilitate an adjustment of activity plans, time schedules or budgets	To determine whether the objectives set were realistic, given the capacities with whichand the circumstances in which they had to be fulfilled To undertake review of things done, i.e., to assess the impact of the project activities
Reference Period/Frequency	It takes place during the execution of a Program/project activity. It is a continuous feedback system that remains in force throughout the Program/project implementation stage. Focus on inputs, process, output and work plan.	Carried out periodically, i.e., before the implementation of the program/ project and on different periods while the planned activities are on progress as well as after it become operational Focus on effectiveness, relevance or impact and cost-effectiveness
Primary Users	It is a tool for project managers to use in judging and influencing the progress of implementation	Results are used by funding agencies and other relevant institution in future programs /projects design
Data Gathered	Primarily quantitative	Primarily qualitative

7.8 Reporting

Reports are tools through which we know what happened or what we got from M&E activities. While monitoring mainly focuses on what goes into a project/program, evaluation deals with what we got out from the intervention. Reporting on the other hand happens both during monitoring and evaluation and is used to determine if the objectives have been met and impacts attained.

Reporting is a systematic activity of processing and distributing information to partners depending on the type of information they require.

Information requirements of stakeholders of an NGO project could be different. What the NGO management, Staff and Board want may be different from what regulatory government agencies, donors, beneficiaries need. Hence, reports have to be tailored according to the needs of users.

Following are the features and types of reports; structure of reports; check list for controlling quality of reports; and tips for successful monitoring, evaluation and reporting, as identified by Meredith and Mantel (2006), Chandra (2006), ICMR (2007) and Pearce and Robinson (2001):

7.8.1 Features and Types of Reports

A report,

- Narrates an event or an activity
- Is a formal way of presentation
- Is prepared for a specific audience
- Explains how the information is gathered
- States why the information is collected and how useful it is
- May include conclusion reached
- May also include recommendation as required

A **good M&E report** must be well planned, systematic and presented in simple, clear

and logical manner. The following points could be useful in preparing M&E reports:

- Define the objective of the report
- Identify your audience
- Know what the audience wants to know
- Determine the time frame for repotting
- Design appropriate data collection tools
- Use good formats for reporting
- Carefully select useful information for your target users.
- State conclusions and recommendations (as necessary)
- Circulate the draft report to get comments for improvements
- Review as necessary and prepare summary of main findings, conclusions & recommendation (if your report is big).
- Distribute to those concerned

Reports could be **informative** containing only facts and figures. Such reports leave the analysis, interpretation, conclusion and recommendation to the users. Another type of report is the **interpretive** report, which includes analysis, interpretation, conclusions and recommendations by the writer of the report.

The above two classifications of report are only general. There are various smallcategories of reports depending on the purpose of the report and the type of activity or event to be reported on.

7.8.2 **Structure of Reports**

The structure of M&E reports often depends on what is required, who needs the report and how much information is desired. There could be standard M&E reporting formats by different organizations and bodies. **Generally, full-fledged formal reports have the following structure**:

- Title Page
- Acknowledgment
- Table of Content
- Executive summary
- Introduction
- Analyses and Findings
- Conclusions
- Lessons learned
- Recommendations
- Attachments (Appendix)
- References

7.8.3 **Checklist for Controlling the Quality of M&E Reports**

Once the report is prepared, the following checklist could be used to test the quality ofthe report to make it more relevant for effective decision-making:

- Does the title reflect the contents of the report?
- Have the terms of reference for the report been properly followed?
- Does the report contain the required items?
- Does the introduction clearly state the purposes of the report?
- Are the findings based on the data gathered?
- Are the conclusions based on the findings?
- Is the report divided into related units and sub-units?
- Is the language clear and simple?
- Are all the references fully stated?

- Is the report prepared for the right audience?
- Does the report fit into the capacity of the users?
- Are the recommendations viable, concrete and practicable?
- Is the report attractively presented?

7.8.4 **Tips for a Successful Monitoring, Evaluation and Reporting (M, E, & R) System**

a) Improve the collaboration of information sources through

- Involving the sources in reviewing M, E& R procedure and tools
- Providing orientation on how to use the tools
- Simplifying the approaches and tools
- Avoiding too many questions
- Assuring sources that data will not be used to measure their performance.

b) Provide adequate and continuous training on M, E& R to staff and other to be involved

- Conduct periodic review meeting on M, E &R
- Retain trained staff

c) Simplify M, E&R tools by

- Having separate instruments for each of them
- Developing clear objectives
- Prioritizing information needs
- Identifying and prioritizing key factors, indicators and items
- Pick only items which are related to inputs, activities and outputs for monitoring and only items that relate to effects and impacts for evaluation

d) Unload information through

- Using people who were involved in collecting the data
- Using simplified data processing methods
- Training staff on data processing

e) Create closer contact between data sources and users by

- Inviting them for consultative sessions
- Arranging frequent visits
- Improving reports and information exchange.

f) Share the results of M, E& R

- Disseminate the results of M, E &R to all who need to know
- Provide clarification when necessary
- Generate feedback for improvement
- Review M, E&R systems and procedures periodically through the involvement of management, staff, beneficiaries, donors' regulatory organs and others concerned.

7.9 Exercise

a) One of your relative wants to invest in bread bakery project. Besides, she seeks your expert help on project implementation planning and organizing. Therefore,

1. List out, in detail, the series of activities to be involved in constructing the project building.
2. Determine the time required for each activity listed above.
3. Put these series of activities in sequence (priority) by using arrow and nod.
4. Prepare a Gantt chart.

b) Assuming the same project as above,

   1. List out, in detail, the series of activities to be involved in purchasing a baking machine from abroad.
   2. Determine the time required for each activity listed above.
   3. Put these series of activities in sequence (priority) by using arrow and nod.
   4. Prepare a Gantt chart.

c) Identify at least four projects that are in progress or are completed. Then, classify them as successful or problem project, and put the factors that make them either successful or problem with brief explanation.