

Project Management

Theory and Practice

Dr. Buddhi Man Shrestha

Publisher

Bivek Shrestha

Project Management: Theory and Practice

Author: Buddhi Man Shrestha Copyright: Author

Edition: Second, 2023

Publisher: Bivek Shrestha, Nagarjun Municipality-10,
Tappakot, Kathmandu, Nepal Tel. 00977-
9841611459

Email: sbuddhiman@yahoo.com

Price: NPR 450

ISBN: 978-9937-1-3830-7

Dedicated to

My Parents

*Late Father Harka Lal Shrestha,
Late Mother Durga Laxmi Shrestha
&
Late Father in Law Ram Das Shrestha*

Foreword and Acknowledgements

The first edition of this book gives me a valuable insight and inspired me for the publication of second edition. At the same time, recently, some of my colleagues and students suggested that I revise and update the book, and I also realized the need to do so. I hope this second edition will help to the project management students and concerned people those who have involved directly or indirectly in this sector.

This book is an attempt in the direction of addressing the issues of project management theory and practice, which are interrelated. It has tries to discuss all the stages of project life cycle. This type of book was felt need for the academicians and practitioners. It has also covers the academic course content of project management. In fact, this book aims to provide knowledge of project management as prescribed in Master of Public Administration (MPA) and Bachelor of Public Administration (BPA). In addition to this, it is hoped that this book will be helpful for the other competitive examinations

Project management is a key aspect of economics. It is because that the economic development goal cannot be achieved without proper analysis of a project. Therefore, it can be said that project management is an important subject for getting

successful results of project's goal. In addition to that it has demanded in other field of science such as sociology, arts, politics etc. Therefore, projecting the pure form or scientific aspect of project management is crucial. Today, project management is more known in the context of its technicalities and tools and techniques involved in it. Moreover, project management theory today mostly addresses the issues pertaining to the execution stage of a project life cycle. However, a project life cycle has two more important stages before the execution stage such as concept stage and planning stage. In this regard, joining of preplanning stage and execution stage would add meaning to project management.

To bring this book into reality, I hereby offer my acknowledgements to Prof. Dr. Tek Nath Dhakal, Prof. Dr. Shree Krishna Shrestha, Er. Prabin Babu Dhakal, who have inspired me to write book. My MPA students also always knocked to fulfill the gaps they felt during their study.

I heartily welcome comments, suggestions and feedback from the readers. Such comments will be pathfinders for me to improve the book in the forthcoming edition.

Dr. Buddhi Man Shresth

April, 2023

Table of Contents

Chapter 1	Project and Project Management	
1.1	Concept of Project	1
1.1.1	Characteristics of Projects	3
1.1.2	Classification of Project	4
1.2	Concept of Project Management	4
1.2.2	Four element of project management	6
1.2.3	Project Management Triangle	6
1.3	The National Planning	7
1.3.1	Some Terminologies in Regards to Planning	7
1.3.2	Projects are the Cutting Edge of Development	10
1.3.3	Plan and Project	12
1.3.4	The Role of National Planning in Plan Formulation	13
1.3.5	Critical issues to determine a project	16
1.3.6	The role of national planning authority	18
1.3.7	Relevance of Project Planning in Developing Nations	19
Chapter 2	Project Planning	
2.1	Concept of Problem Identification	22
2.1.1	Concept of Problem and Problem Tree	22
2.1.2	Concept of Objective and Objective Tree	26
2.2	Concept of Project Planning	28
2.3	Concept of Aspects of Project	34
2.3.1	Technical Analysis	34
2.3.2	Institutional-organizational-managerial aspect	39
2.3.3	Social Aspect	40
2.3.4	Commercial Aspect	40

2.3.5 Financial Aspect	44
2.3.6 Economic Aspect	49
2.4 Project Cycle	51
2.4.1 Project Identification	52
2.4.2 Preparation of a Project	52
2.4.3 Analysis and Appraisal of the Project	53
2.4.4 Project Approval/Selection	54
2.4.5 Project Implementation	55
2.4.6 Project Operation	56
2.4.7 Project Evaluation	56
2.5 Proposal Writing	57
2.5.1 Precondition to be taken to select or writing a proposal	57
2.5.2 Types of Project	58
2.5.3 Project Selection Process	59
2.5.4 Basic Elements of Project Proposal	59
2.5.5 Proposal Submission	61
2.5.6 Linkage of project proposal with log frame matrix	61
2.5.7 Format of the Funding Proposal	62
2.5.8 Importance of Project Proposal	63
2.6 Report Writing	63
2.6.1 Basic Features of Report	64
2.6.2 Types of Report	64
2.6.3 Technique of Good Report Writing	66
2.6.4 Report Organization	67

Chapter 3 Project Appraisal

3.1 Concept of Project Appraisal	68
3.1.1 Identifying Project Costs and Benefits	69
3.1.2 Cash Flow Analysis	74

3.2	Concept of Discounting and Non Discounting Technique	76
3.2.1	Time value of Money	76
3.2.2	Discounting	77
3.2.3	Net Present Worth (NPW) or Net Present Value (NPV)	81
3.2.4	Cost-Benefit Analysis	83
3.2.5	Internal Rate of Return (IRR)	89
3.2.6	Non Discounting Technique	93
3.3	Concept of Social Analysis	97
3.3.1	Importance of SCBA	100
3.3.2	Difference between Financial and Economic/Social Analysis	102
3.3.3	Objectives of Ffinancial and Social/Economic Analysis	104
3.4	Feasibility Analysis	105
3.5	Concept of Risk, Uncertainty and Sensitivity Analysis	106
3.5.1	Concept of Risk	107
3.5.2	Uncertainty	108
3.5.3	Sensitivity Analysis	110
3.6	Concept of Environmental Analysis	112
3.7	Financial Ratios	118
3.8	Cost Recovery	120

Chapter 4 Project Implementation

4.1	Concept of Project Implementation	125
4.2	Network Analysis: PERT and CPM	127
4.2.1	Critical Path Method (CPM)	129
4.2.2	Program Evaluation and Review Technique (PERT)	132
4.3	Concept of Project Control	134

4.3.1 Organizations and Structure of Project	134
4.3.2 Organizing and Staffing the Project Office and Team	135
4.4 Project Management Information System (PMIS)	138
4.4.1 Basic Objective of a PMIS	139
4.4.2 PMIS Criteria: It must	139
4.4.3 Understanding Project Management and its Functions	140

Chapter 5 Monitoring and Evaluation

5.1 Concept of Monitoring	145
5.2 Concept of Evaluation	147
5.3 Distinctions between Monitoring and Evaluation	149
5.4 Concept of Logical Framework Approach	149
5.5 Project Monitoring and Evaluation System in Nepal	153
5.5.1 Monitoring and Evaluation Bases	154
5.6 Project Evaluation Methods Adopted by UN System Selected International Institutions: UNIDO, OECD and World Bank	154
References	157
Appendix	158

PROJECT AND PROJECT MANAGEMENT

Background

The English word *project* comes from the Latin word *projectum*. It means "to throw something forwards". The word "project" thus originally meant "something that comes before anything else happens". It is formulated before implementation of anything to be done. The process of formulation is very important to achieve desirable result. During the formulation process, it is analyzed in its all aspects. After analyzing the all aspects of project, all information should be collected and get ready to implement the project. It is a process of managing the project.

1.1 Concept of Project

Projects are the time-bound specific action units or schemes designated for the investment of given set of resources and skills with an aim of attaining some predetermined objective(s). In other word, a project is a logical document having sequential or scientific work plan which aims to achieve certain objective, contributing targeted goal within given length of time and budget. It can differ in size, nature, objective and complexity, which ultimately expect to yield identifiable output.

In fact, a project is a temporary endeavor, having a defined beginning and end (usually constrained by date, but can be by funding or deliverables), undertaken to meet particular goals and objectives, usually to bring about beneficial change or added value. The beginning to end consists of initiation, planning or development, production or execution, monitoring and controlling and closing. It is an activity in which money are expended expecting returns and which logically seems to lend itself to planning, financing, and implementation as a unit. In a project, there should be a specific activity with a specific starting point and a specific ending point intended to accomplish a specific objective. Thus, project provides an important means by which investment and other development expenditure foreseen in plans that can be clarified and realized.

Little and Mirrlees define a project as a scheme or a part of a scheme, for investing resources that can be analyzed and evaluated as an independent unit. A project could be broken down into parts for separate consideration each part could be a project. But, if two or more parts are linked that one could not be operated or fulfill its purpose without the other. In such a case the two parts must be considered as whole i.e. as one project. For example irrigation project cannot be separated by dam and distribution canal. However, spares parts of motorcar can be separated as separate project, because, a transmission system is essential to functioning of a motorcar. The part can be used for other car manufacturers as well as for oneself. Thus, a project can simply be defined as an activity, which aims to achieve specific objective. In other words, money is expended expecting returns from the project which logically seems to lend itself to planning, financing, and implementation as a unit.

Projects are the smallest analytical or operational part or element of a plan or program, which help to make the plan to noticeable reality. This is the reason that the projects are said as cutting edge

of development. Projects always remain at the bottom level of a plan. We know that a plan is a representation of a vision and projects are the real actions to be executed in order to make a plan (vision) successful. Therefore, formulation of a development project and program in proper way necessarily indicates a promising development process of any community, district, and thereby of an economy. In developing countries, the most difficult problem often faced by the administrators and development workers in the implementation of development projects or programs. The reason behind this problem is poor designing of project.

Projects involve the execution of real actions. The project could be functioning either independently or jointly within a program. There may be several types and nature of projects functioning in different sectors and at different levels. All of such projects will have a linkage with their respective programs. Likewise, there may be several programs within a plan. Therefore, projects are the building blocks of a program and programs are the integrated blocks of a development plan.

1.1.1 Characteristics of Projects

A project is of unique type having with definite time period and dynamic character. It has a definite goal and team efforts to fulfill the customer wants. The life cycle from beginning to end completed in a coordinated way. In this context, the characteristic of project is given below.

Objective: each and every project must have its objective or a set of objectives.

Investment: every project requires certain investment of resources (money, manpower, time, material technology, etc.)

Space: every project needs space be it physical, aerial, aesthetic, political, cultural etc.

System: all projects need to undergo a system of inputs-process-outputs.

Cycle: every project will have its own cycle characterized by different phases. In other words, every project starts from its identification and ends up with impact evaluation.

1.1.2 Classification of Project

Basis	Type and Nature
Sector	non industrial or industrial
Ownership	private or public
Output	goods producing or service producing
Goal	profit or non-profit oriented
Scale	small, medium, large (depends on definition)

1.2 Concept of Project Management

It is argued that project management has been practiced since early civilization. The 1950s marked the beginning of the modern Project Management era. It was in the 1950s that organizations started to systematically apply project management tools and techniques to complex projects. Project management was formally recognized as a distinct discipline arising from the management discipline. This use of "project" changed in the 1950s with the introduction of several techniques for project management. Two forefathers of project management are Henry Gantt, called the father of planning and control techniques, who is famous for his use of the Gantt chart as a project management tool; and Henri Fayol for his creation of the 5 management functions (planning, organization, command,

co-ordination and control) which form the foundation of the body of knowledge associated with project and program management. The primary challenge of project management is to achieve all of the project goals and objectives while honoring the preconceived project constraints. http://en.wikipedia.org/wiki/Project_management - cite_note-5 Typical constraints of project are scope, time and budget. The others are to optimize allocation and integration of inputs necessary to meet the objectives. Management operates through various functions, often classified as planning, organizing, leading/motivating, and controlling.

- **Planning:** Planning means deciding advance. This involves why in action, how to take action, and when to take action. Planning includes determination of specific objectives, determining projects and programs, setting policies and strategies, setting rules and procedures, and preparing budgets.
- **Organizing:** Implementation means making optimum use of the resources required to enable the successful carrying out of plans. It ensures all activities and processes to achieve organization's goal. For this getting right people, defining their responsibility, designing an organization and a structure are important aspects.
- **Leading:** It consists of directing, influencing, supervising, and guiding for effecting functioning. Determining what needs to be done in a situation and getting people to do it.
- **Controlling:** It means control of people, finance, time and activities. Coordination implies softer approach to controlling and control implies active monitoring about to do monitoring according to rules and regulations.
- **Monitoring,** checking progress against plans, this may need to modify the project activity.

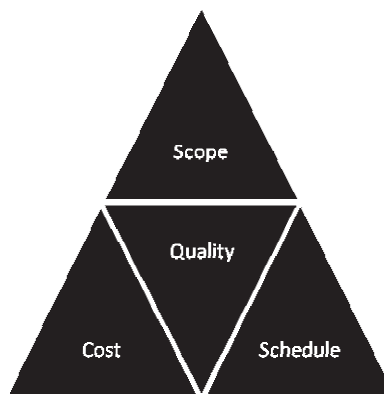
- **Staffing:** It consists of selection, training, promotion, compensation and personnel development.

1.2.2 Four element of project management

- Guiding project strategy
- Creating congenial environment
- Effective operation (program, resources, personnel and operation directory)
- Developing critical appreciation (M & E system)

1.2.3 Project Management Triangle

The project management triangle shows the relationship between scope, cost and schedule of the project to produce quality output. It is a typical constraints to achieve desirable result. The discipline of Project Management is about providing the tools and techniques that enable the project team (not just the project manager) to organize their work to meet these constraints. The triangular relationship is given below.



In above triangle, one side of the triangle cannot be changed without affecting the others. 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 scope constraint refers to what must be done to produce the project's end result. 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.

In the management process of a project the project strategy should be considered. In this regard, project manager should create congenial environment. In such an environment, project manager can starts effective operation (program, resources, personnel and operation). There should be developed critical appreciation i.e. M & E system.

1.3 The National Planning

The vision of a country is achieved through the process of national planning. The national planning commission is a advisory body to determine national goal. The projects should be identified to achieve the goal. In this regard, all the components national goal should be understand before formulation of project. In this regard, national planning authority issues the guideline document or manual, giving advice, managing the staff and arranging the training.

1.3.1 Some Terminologies in Regards to Planning

Vision

A picture of a preferred future- realistic, credible, and attractive or more desirable states that we wish to create for our organization and to which we commit ourselves. The vision of the business

reflects its aspirations and specifies its intended direction or future destination.

Mission

A statement of what an organization is why it exists and the unique contribution it can make. (What, who, why, how: e.g. to preserve and improve human life). The **mission** of the business is its most obvious purpose—which may be, for example, to make soap

Goal

A desired or need results to be achieved in the long-run. A **goal** or **objective** is a projected state of affairs that a person or a system plans or intends to achieve—a personal or organizational desired end-point in some sort of assumed development. Many people endeavor to reach goals within a finite time by setting deadlines. A desire or an intention becomes a goal if and only if one activates an action for achieving it. Goal-setting ideally involves establishing specific, measurable, attainable, realistic and time-targeted objectives.

Objectives

An end result of planned activity. They state what is to be accomplished by when. They should be quantified as far as possible. They should be S-M-A-R-T. The **objective** of the business refers to the ends or activity at which a certain task is aimed.

Plan

A plan is an image, map, or vision to represent the forms and/or features of desired situation(s). A plan is the result of planning efforts and the planning is the systematic management of assets in pursuit of goals. The goals of a plan could be alleviating poverty,

sustainable development etc. For designing a realistic plan, it requires a great deal of knowledge about the concerned projects.

Planning

Planning is a process to formulate a plan and also an action drive to put the plan into operation.

Policy

Policy is defined as plan of action selected (as by the government, political parties, business organizations to achieve desired goal) from among alternatives to determine present and future decisions. In social and political usage policy refers to a course of action or intended course of action conceived of as deliberately adopted after a review of possible alternatives and pursued, or oriented to be pursued. The policy process is the formulation, promulgation and application of these courses of action.

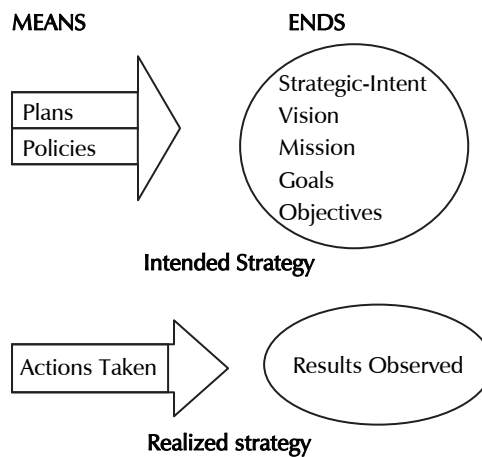
Programme

A programme is the extensive and consistent set of action unit stating the needs of interrelated activities in order to achieve the plan's objectives and goal. The programmes are narrower in scope than policy, but more specific with regard to what is to be done, how, by whom, and where. It is a less clearly bounded entity than project. The development programme is of two types. **(a) Sectoral** programmes containing activities within the same sector (such as education or agricultural extension). **(b) multi-sectoral** program containing activities within several sectors.

Strategy

Strategy is a systematic plan of action to defend oneself or to defeat rivals. Strategy is formulated in anticipation of the possible positions, moves, actions, and reactions of the rivals. A well thought out systematic plan of action for survival and success,

formulated by due considerations of the possible positions and defensive and offensive moves. Waterman defines strategy as “a coherent set of actions aimed at gaining a sustainable advantage over competition, improving position vis-a-avis customers or allocating resources.” It is an art of planning for operation.



1.3.2 Projects are the Cutting Edge of Development

Projects are the smallest analytical or operational part or element of a plan or program. It helps to make the plan to noticeable reality. This is the reason that the projects are said as cutting edge of development. A sound project could enhance the development endeavor. Higher the project’s benefit higher the economic benefits to the country.

Sound development plan require good projects because, projects provide an important means by which investment and other development expenditures foreseen in plans. Realistic planning involves knowing the amount that can be spent on development activities each year and the resources that will be required for particular kinds of investment. In other words, a sound plan

requires a great deal of knowledge about existing and potential projects. To analyse the potential project, establish well worked out relationship between investment and growth rate. It is analysed by capital output ratio i.e. the relationship between value of capital investment and value of output.

To select the project, determine benefits of project to the economy. The benefit of a project must be related to achieve development goal. Benefits may increase either from industry, agriculture, and economic infrastructure or from education, health, birth control and so on. Benefits of the projects are hard to measure. However, some doctrines or strategies are made to measure the benefit. Benefits measure as the priority sector of the country with technical feasibility. Generally, priority is determined considering the following points.

- Priority must be given to industry.
- Self-sufficiency in food is a first consideration.
- Heavy or basic industry must be established first.
- Light and consumer goods industries are usually, and should be, established first
- Labour-intensive industries must have priority in developing countries.
- There is a lot to be said for capital-intensive industries
- Preference must be given to industries which process indigenous materials, especially those which are exported.
- Import substitution is the best road to progress.

Therefore, for a good realistic plan, there is essential of a great deal of project planning and economic appraisal of projects. To make more realistic plan, use of quantitative analysis is most important whenever possible. It can make possible by applying cost benefit

analysis. Thus, project is a helping hand of plan because plan is only a document.

1.3.3 Plan and Project

The twin propositions that plan require projects and projects require plan seems to be insoluble chicken-and-egg dilemma. If a good project cannot be formulated without a proper economic appraisal of projects, and if the real value of projects can not be properly ascertained, except within the framework of a plan, where does one start? Sound development plan require good projects, just as good projects require sound planning. The two are interdependent. There is mutual feedback between project analyses on the one hand and the formulation of economic plans in terms of macroeconomic aggregates on the other hand.

Plan Require a project:

Plan requires a project because without project plan is only an imaginary dream. Plan is a total picture, program is sectoral picture and project is specific picture of the national plan. A formulated plan gives direction to the project.

Project Requires Plan

Projects and programs are the integrated block of development plan. It means a project is a part of plan, so a good project requires sound planning. In other word, the realistic and good project is formulated in the sound framework of planning. The best economic appraisal of projects cannot be made without a proper plan. Plan helps to choose the right project. Determination of choosing right project depends on estimation of demand for product. Demand for product depend upon the determinants of demand, in sum it is said that economic condition of country. Economic plan is made considering aggregate demand also, which is a macroeconomic variable. National economy is affected by long

range of plan and policies of government. Economic forecasting is in the plan. The government's plans for industrialization and capital development must play a large role in any demand analysis. The study of demand theory helps to identify and analyse the basic determinants of consumer needs and wants. They are the sources of many useful insights for business decision making. From the managerial viewpoint the main objectives of demand analysis are the discovery and measurement of the variables that affect product sales. So, it is an essential part of business planning. Total demand depends on government policy with respect to tariffs, exchange rates, and import controls.

On the other hand, any analysis of the real cost of project requires a knowledge of the strength of the scarcities. Scarcities change as development proceeds. Scarcities and demand forecasting is calculated in a plan. Generally, project is last for 10 or 20 years or more. Therefore, a good project requires a sound plan.

1.3.4 The Role of National Planning in Plan Formulation

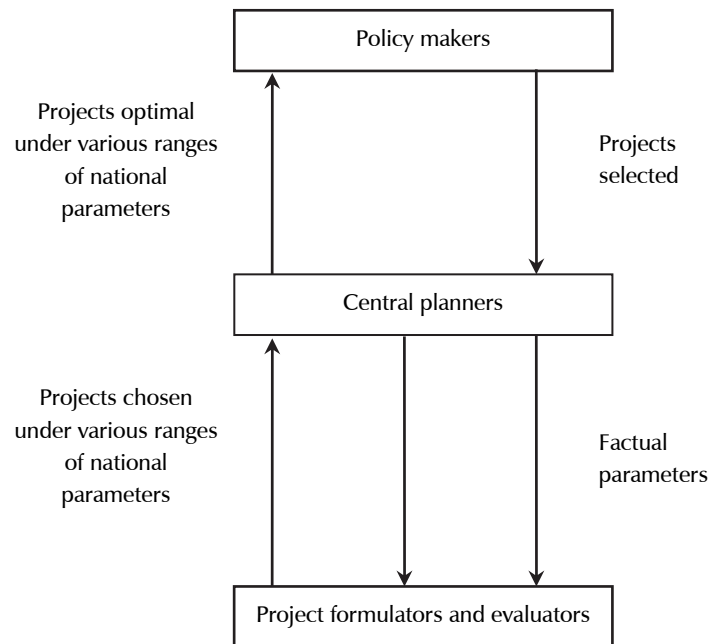
Plan is known as state intervention. National planning authority is, therefore, a state intervening authority for the economic development of a country. There may be various types of plan in the development endeavor. If we understand it as state intervention, it can be defined as a top down approach. National planning authority formulates the national plan and programme under which select the project. Gunnar Myrdal in *Asian Drama* defines project formulation as "Project formulation is one of the basic techniques through which planning can change from an institutional base to an institutional and rational base". Whether it is institutional and rational or not, it can be decided by the stakeholders. Project or development beneficiaries are also important stakeholders. Therefore, the top down approach has become a debatable issue and developed and emerges new broader ideas, known as bottom up approach in the project formulation process. The key role played by national planning commission even

in the adaptations of bottom up approach in national planning process. Planning thus serves to reduce the uncertainties in demand that the authorities responsible for individual sectors faces. Plan also serves as a means for assigning overall magnitudes within which project formulation and evaluation take place.

The technique of project formulation is an analytical works generally done by national planning authority as a facilitator. It analyses the project's technical feasibility, economic advantages combined with its viability, financial profit, institutional and managerial requirements, environmental consideration etc. in formulation process. To analyze the project certain parameter is determined by the NPC. Parameter of national plan is only as a forecast of what will be not of what ought to be. National parameter reflects characteristics of the pattern of development. For example, shadow price of investment depends on capital productivity, propensity to consume and social rate of discount. Here, capital productivity and propensity to consume is the characteristics of development which should be optimal. Considering the parameters the role can be defined under following points.

- The need for national parameters:
- The circularity in determining national parameters:
- Leaving determination of national parameters to the project level:
- The central planning authority (CPO) as the "visible hand":
- Determining national parameters from an optimal national plan, feasibility frontier:
- Using "equal welfare" curves to choose the optimal plan:
- Inferring national parameters from the feasibility frontier:
- Consistent forecasting, a positive role for planning:

A complete picture of role of national planning are: formulation, evaluation and planning.



Monitoring of project

- If there is undue delay to set in motion trouble shooting action to break the bottleneck.
- To reschedule planned expenditure
- To warn any linked project for delay in supply of output
- To learn lessons for future planning to be more realistic
- To discipline the project appraisers who have to make predictions.
- Identify potential and actual social profitability of either industrial or agricultural projects.

- To receive feasibility reports, discuss them with the originators, agree amendments, append their comments, submit them for decision to the appropriate body and assist in the integration of such projects into a planned investment program.

1.3.5 Critical issues to determine a project

- **Identification of project:** Project identification is a most important part of the development plan. A project is determined to meet the objectives of development plan. Identification of national development objectives, selecting priority areas for investment, designing effective price policies, and mobilizing resources are the critical part of the national plan. Identification of sectoral projects and interlinkage of projects is determined by the help of plan.
- **Micro and Macro analysis of market:** the market analysis is a part of national plan by which the economic and social benefit of project is analyzed to formulate a project.
- **Balance Development:** the balance development of country is an objective of national plan. Therefore, the project is formulated to fulfill such objective.
- **Resource plan:** Realistic planning involves knowing the amount that can be spent on development activities each year and the resources that will be required for particular kinds of investment. A sound plan has to be formulated with resources in order to achieve the desired goal. For example, basic health program is of preventive in nature e.g. Maternity health, in which projects may be of immunization, reproductive, nutrition, sanitation, drinking water for implementation. Such projects could also be classified into sub-project to provide the services to target group such as immunization for under 5 year children, nutrition food supply for karnali zone. In such cases national plan specify the projects as the national objectives.

Thus, planning commission is trying to setup a project screening mechanism. In the mean time, it has directed the ministries to prioritize the projects according to the plan objectives and guidelines. In the case of local government, in line with the Decentralization Act, 2055, NPC is assisting the district development committees to develop or prepare the district level periodic plans. Moreover, it is helping them to strengthen their institutional capacities so as to enable them to improve implementation capacity of the projects and programmes that they undertake.

Following initiations has to be undertaken to make the planning system and process more efficient and effective. They are also has to be taken into consideration to formulate project by NPC to pace with the recent development of the world.

- Directing to allocate available resources in the gainful activities,
- Mobilisation of local resources,
- Pulling foreign resources to implement the project in cash/kind/technology/human resource etc,
- Dissemination of technology,
- Employment generation,
- Fulfilment of basic needs,
- Enhancement of capacity development through a mechanism of "on the job training",
- Achievement of socio-political-economic objectives,
- Solving the specific problems,
- Penetrating the target groups,
- Strategy for development interventions etc.

The process of need assessment, planning, implementation, monitoring, review and evaluation are prerequisites to success a project that is included in plan. Resource allocation (eg. determination of per unit cost, cost benefit analysis, cash flow analysis etc.), identify the marketing potentialities; determine how inputs are to be used? Where output will be used? Should also consider formulate realistic project. Thus, plan and projects are complement and supplement to each other. It is two side of the same coin.

Designing a good project is a difficult task. In developing countries, administrators and development workers have often face problem for project implementation because of the poor designing of projects. It requires careful analysis of interrelated acts of activities. Identifying national investment, designing effective price policies and mobilising resources are all critical. Capital is severely shortage for investing developing infrastructures in one hand, and on the other hand, available financial, human, and natural resources are found under utilized in a desired extent. Breaking such dilemma, it requires to identity or initiates good projects for the optimum use of available resources and developing the country in greater speed.

1.3.6 The role of national planning authority

- Framing of concept of development thrust with plan and policies.
- Determine pattern and pace of development.
- Consultation between planners, politician and economist
- Formulation of long term and short term development strategy and objective.
- Determine the prioritization sector in order to achieve the development goal.

- Responsible for planning and coordinating public investment
- Determining the policy instruments: Accounting Rate of Interest (ARI) and Shadow Wage Rate (SWR)
- Monitoring of the projects
- Evaluation of individual projects.
- Determining the social costs and benefits
- Determining the coherent and productive investment program
- Determining the prioritization of projects
- Determining the project staff
- Arrangement of the training program
- Formulating a realistic plan
- To formulate or propose the social profit of project or plan

1.3.7 Relevance of Project Planning in Developing Nations

Developing nations refers to those countries where there are prospects of development however potential resources have not been utilized as its capacity as well as availability. This means that, the available resources are underdeveloped in developing countries. The general people do not know how to use the available resources. The country's capacity and practices to mobilize the resources is very poor. In such situation project planning is must for effective implementation of project in particular and to achieve development goal in general of developing countries.

Project is that part of institution which has specific action plan having with analysis of all aspects of project to achieve desired goal. It is smallest analytical and operational part of plan. Kepner states that project planning is sequencing and scheduling the work

to accomplish the project objectives. Project planning is, thus, for the identification of appropriate types and nature of projects with analysis is critical. The sequencing and scheduling to use of available factors with analysis in developing countries, therefore, is most important to achieve desired goal. In this context, the relevancies of project planning can be defined under the following points.

1. **To take decision on use of current world market price of factors and products:** One of the successful decision criteria of project is to take decision on use of current world market price of factors and products.
2. **To analyze project's returning power and its continuity:** The economic returns of an economy are an algebraic sum of projects returns. Therefore, the method of choice and project plan is very important which shows the projects returning power and its continuity.
3. **To determine project formulation process properly:** The number and size of projects determine the development of country. The development administrator of developing countries facing the problem of implementation of projects. Such problem arises because of wrong formulation process of projects.
4. **To take decision on capital expenditure:**
 - Capital expenditure is of long run nature; therefore, present expenditure affects future returns.
 - Capital expenditure amount in project is very large.
 - Capital expenditure decision can not be changed easily.
5. **To make effective development projects:** Watrston (economist, World Bank) gives his view that in developing

countries there can be found suitable development plan but can not be found effective development projects.

6. **To make realistic project:** Dr. Mahabut Ul Haq (economist, World Bank) is of the view that projects are formulated without in-depth study, so that, projects are only of theoretical idea in developing countries but not clear implementation process with proper analysis and this also affects to prepare foreign investment portfolio.
7. **To formulate fiscal policy and economic plan:** It is known that, projects are the building block of programme and programme are integrated block of development plan. Tinbergen (nobel prize winner) is of the view that projects are the bottom level of development unit which helps to identify the implementation problems and to suggest the remedy. National accounting position is determined by sectoral and project based activities.
8. **To achieve end result:** Project needs for the effective implementation of programme. Therefore, development can not think without implementation of projects because projects are the cutting edge of development plan.
9. **To choose a project from the alternatives:** The project planners have mainly two alternatives to choose project i.e. perfect project which gives return future and imperfect project which gives returns immediately. In such a situation project planner can choose the project which gives immediate returns in the context of developing countries. Because technically and economically appropriate project is present need.
10. **To determine the measurement scales of project's variables:** Development aids are project oriented so that measurement of variables such as discount rate, wage rate etc. becomes complex.

PROJECT PLANNING

2.1 Concept of Problem Identification

Problem identification is a process of selecting solvable issue. It provides the platform for investigating a broad range of interventions and generating options. The process of problem identification involves the development of clear, straightforward problem statements that can be linked directly with the specific goals and objectives already identified. The time limit has played important role to link in-between identified problem of existing situation and goals. In this regard, problem statements are tested and refined through more detailed analysis undertaken as part of problem assessment and prioritization.

2.1.1 Concept of Problem and Problem Tree

Problem: Problem is a matter or situation regarded as unwelcome or harmful and needing to be dealt with and overcome (<https://en.oxforddictionaries.com>). It is a situation that disturbs project in achieving its objective. It shows that there is a distinction between present and desired situation. The difficulty to achieve desired situation is problem. In other word, it is the difference between the hoped for and the actual situation which is directly or indirectly related to a desired outcome or standard of behavior. In

fact, a problem occurs when there is a difference between what "should be" and what "is". It is a distinction between the ideal and the actual situation. However, it needs to be solved to reach in the desired situation. To solve the problem, firstly need to understand the cause and effect relationship of problem. To solve the root problem, it is necessary to treat the cause, not the symptom. In fact, problem is occurred to fulfill something. The need is a desired condition which is difficult to achieve due to the various causes. Therefore, identification of root problem is crucial to reach in desired situation.

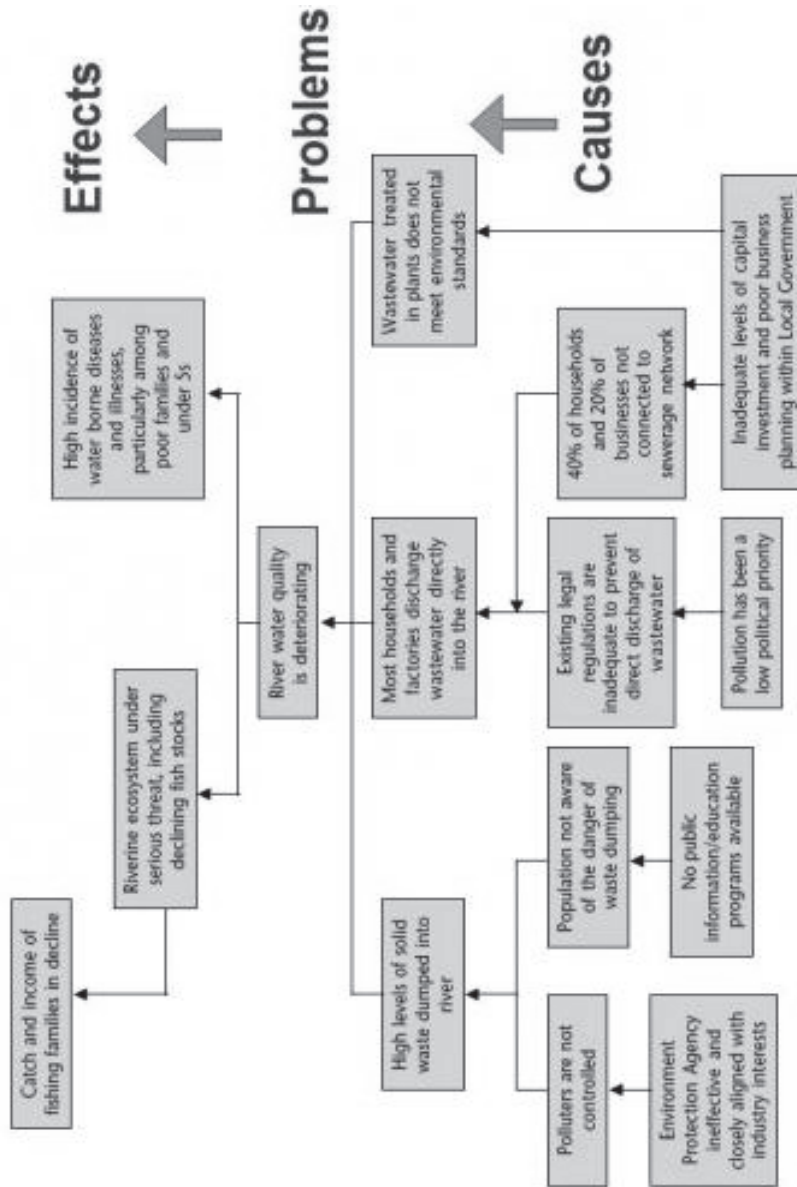
In the case of research problem, it is an issue or concern that needs to be addressed (Creswel, 2009:18). There may have various issues in the selected research area. Among various issues, the solvable problem should be picked up for the research study. In a problem, there exist cause and effect relationship. The identification of root cause is a difficult task. Moreover, problem is solvable; therefore, it has to be picked up from the various issues.

A clearly specified list of problems is the most suitable basis for identifying potential solutions. There is necessary to discuss with all stakeholders to find the solution. It is about cause and effect relationship. It is fact that each problem has cause and its effect can be seen. Moreover, problem can be identified, both now and in the future, as evidence that objectives are not being achieved. However, objectives are often rather abstract, and it may be easier for members of the public to understand a strategy based on clearly identified problems. This problem-oriented approach to strategy formulation is an alternative to starting with objectives, but does still need to be checked against the full list of objectives.

The identified problem can be solved by focusing the situation that we want to address; or the issues that prevent us from achieving a desired situation. When working with problem we can:

- Identify problems and problem-owners
- Structure problems and relations between them
- Develop a shared perception of problems
- Develop options for which problems to concentrate on

Problem Tree: The problem tree known as problem analysis is basically used in project planning. It is important to identify the negative aspect of existing situation and establish the cause and effect relationship. It provides an overview of all the known causes and effects to an identify problem. It helps to find solutions by mapping out the anatomy of cause and effect among various issues. The problem tree can help to broken-down the problem into manageable and definable chunks. It helps to focus on objective. It helps to understanding the problem through interconnection of causes. It is important to create win-win situations. The solution is derived from the discussion with 6 to 8 stakeholders and identifies the constituent issues and arguments. The discussion should be held about present issues – rather than apparent, future or past issues – are dealt with and identified. This process of analysis is important to build a shared sense of understanding. The schematic cause and effect relationship is given below.



Source: https://www.researchgate.net/figure/Figure-A2-Simplified-example-of-a-problem-tree-drought-resistant-crops_fig10_318109356

2.1.2 Concept of Objective and Objective Tree

Objective is something toward which effort is directed: an aim, goal, or end of action (<https://www.merriam-webster.com>). It is a future oriented desired situation that we want to achieve. The desired situation can be achieved by using means. Therefore, there is a relationship between means and ends. The means is resources; which is necessary to use to get end result. The end result should be specific that a person or system aims to achieve within a time frame and with available resources. Gittinger rightly states that "Simply put, a cost is anything that reduces objective, and a benefit is anything that contributes to an objective". The aggregate consumption, income redistribution, growth rate of national income, employment level, self reliance, and merit wants may be areas and issues according to which we determine the project's objective.

In general, objectives are more specific and easier to measure than goals. Moreover, the goal is achieved by fulfilling the objective(s). In other word, there may have more than one objective to achieve a goal. In this regard, it is necessary to reformulate all the negative statements of identified problems as present problematic situations in the project area to positive statements about a future situation, where the problems are solved. In objective analysis there has been explained about solution to problems and its effects. In fact objectives are basic tools that underlie all planning and strategic activities. They serve as the basis for creating policy and evaluating performance. For this, the objective should be SMART.

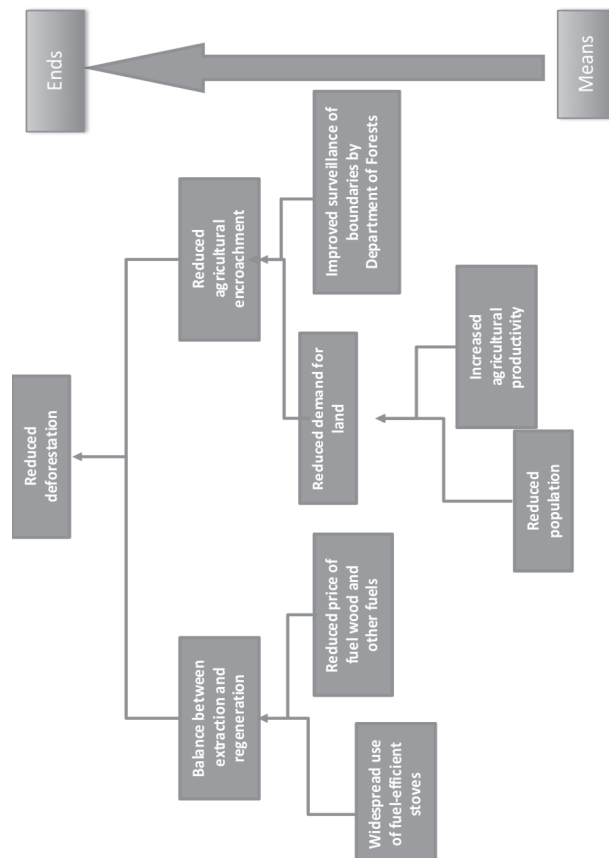
- S = Specific
- M = Measurable
- A = Achievable
- R = Realistic
- T = Time bound.

The end result can be achieved by focusing on objectives. The objective focus is of future oriented. When we focus on objectives, we can:

- Identify objectives and "objective-owners"
- Structure objectives and relations between them
- Develop options for what objective to pursue.

Objective Tree

The objective tree is important to transform negative situations identified in the problem tree into positive and already reached situations.



This method is an approach to transfer vague design statement into more specific considering the problem statement. It is important to clarify the problem statement of why? How? What? into objective. In a objective tree, there should have list of design objectives. The design objective should be listed into set of higher level and lower level objective. It should be interconnected showing hierarchical relationship. The means ends relationship is interconnected in hierarchical forms.

2.2 Concept of Project Planning

Planning is a process of problem analysis, assessment of possible measures to address clarified problems, and decision making for problem-focused action (Dale, 2009:24). The project planning is a process of determining beginning to end of the project cycle. Moreover, there is a distinction between planning and plan of a project. Planning is the process of coordination of time, resources, factors and programme. A plan is a framework that details the methods and tasks that are to be implemented in order to achieve a desired goal. Project formulation is directed to carry out the project analytical work i.e. technical feasibility, economic advantages combined with its viability, financial profit, institutional and managerial requirements, environmental consideration etc. It is changing into reality of some sort of vision or interest of the person/organization. Gunar Myrdal in *Asian Drama* defines "project formulation is one of the basic techniques through which planning can change from an institutional base to an institutional and rational base".

Project planning is a part of project management which should have schedule of what should be done, when, where and how such as Gantt chart. A planning unit must be created to ensure that all plans are consistent and that policies and strategies are aimed at achieving the same mission and objectives. The planning phase determine the nature and scope of the development whereas the

implementation phase includes conversion (transfer of data from old to new system), documentation and training. After the planning phase, the system is built and tested.

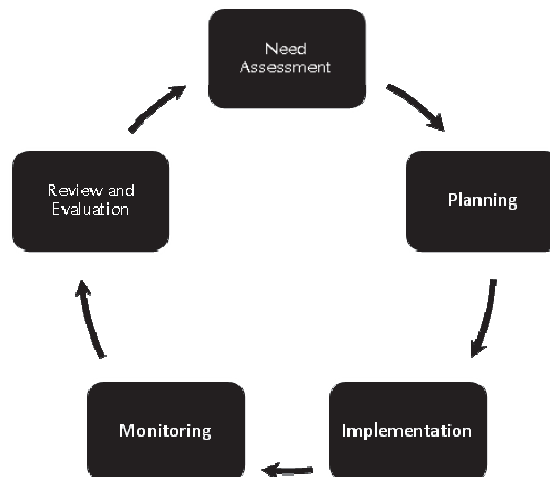
A plan is the result of planning efforts and the planning is the systematic management of assets in pursuit of goals. The goals of a plan could be alleviating poverty, sustainable development etc. For designing a realistic plan, it requires a great deal of knowledge about the concerned projects. Projects are the smallest analytical or operational part or element of a plan or program, which help to make the plan to noticeable reality. This is the reason that the projects are said as cutting edge of development.

Designing a good project is a difficult task. It requires careful analysis of interrelated sets of activities. Identifying national investment, designing effective price policies and mobilizing resources are all critical. Capital is severely shortage for investing developing infrastructures in one hand and on the other the available resources like water, forest, land and labor could not be used in desired extent. Breaking such dilemma, it requires for identifying or initiating good projects for the optimum use of available resources and developing the country in greater speed. For this, project planning could be helpful for – directing resources to the gainful activities, mobilization of local resources, pulling foreign resources, dissemination of technology, generation of employment, fulfilment of basic needs, achievement of socio-political-economic objectives, solving the specific problems, penetrating the target groups, interventions etc. Therefore, designing a good project is not an easy task. It requires careful analysis of interrelated activities. For this purpose project planning can contribute in different ways.

The term project planning means the identification of appropriate type and nature of projects with operational process required making a program successful. Sometimes there may be confusion

between the terms project planning and project formulation. Whereas the latter is directed to carry out the project analytical work i.e. technical feasibility, economic advantages combined with its viability, financial profitability, institutional and managerial requirements, social acceptability, environmental consideration etc.

Project planning is a complex process. It consists of work requirements, quantity of work, and resources. Each project passes through a cycle and the cycle constitutes different stages or phases with some variations from project to project. Project formulation covers project identification and analysis of the project for its successful implementation. It is changing into reality of some sort of vision or interest of the person/organization. To initiate a project, first of all, we need some sort of idea or concept. This idea should be verified with the existing situation and ask oneself *Is the Idea Prima Facie Promising* i.e., is it better to confirm whether it could serve the interest of the person or the society. The following process should be considered during the idea prima facie of project.



Project plan is the key to the development of adequate control procedures and mechanisms. Sound development plans require good projects, just good project require sound planning. The two are interdependent. To identify a project it requires sound judgment in making choice of the proposed project with regard to sectoral priorities or the objectives of the regional or national plan.

Information on details of economic and sectoral analysis made by the concerned government or the multinational agencies like World Bank would be helpful. Recently World Bank study suggests that “development planning focuses mainly on project implementation, and that much less attention is paid to issues of operation, maintenance and sustainability”. World Bank defines sustainability more or less similarly as to be the ability of a project to maintain an acceptable level of benefit flows through its economic life. It depends upon the nature of a project or a sector, sustainability may include a range of issues such as:

- The continued operation and maintenance of project facilities,
- The continued accrual of net incremental income and productivity,
- Community participation
- Equitable sharing of project benefits and income
- Maintenance of environmental balance.

Characteristics of Project Planning

- Clear objectives, which is known and can be specified.
- Determination of anticipated date of completion.
- Predetermine schedule of actions and activities to accomplish the objective
- A desired or required sequence for performing the activities.

Projects are a part of an overall development strategy and a broader planning process as such, they must fit appropriately. Analysis of project is the most important stage, which provides a comprehensive review of all aspects of the project and provides a basis for implementation and evaluation. It is also important to find its worth or value of investment by the individual/organization/nation. The analysis covers major aspects such as technical, marketing, financial, economic/social, institutional and ecological.

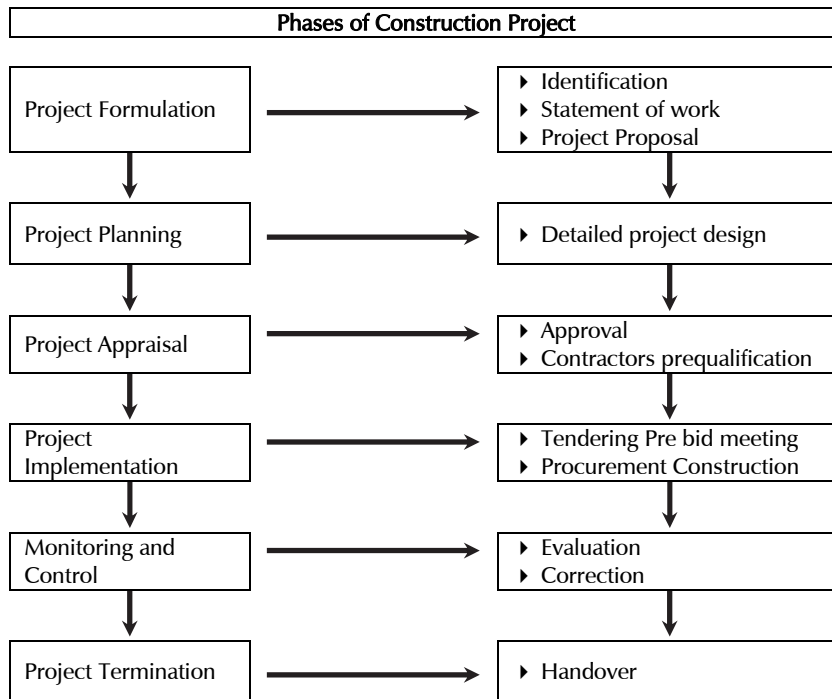
Importance of Project Planning

- To mobilize the factors of production properly
- To operationalized the plan
- To make project's relevancy connecting with the specific objectives of the country
- To generate the national income and employment
- To mobilize the foreign resources
- Technical transformation
- Establishment of development relations between the sectors as well as regions.
- To accelerate the economic growth with development
- Fulfillment of basic needs
- Penetrating the target groups
- Balance development
- Strategy for development interventions
- To solve the specific problems etc

A Model of Project Planning by Log Frame Technique

Design summary	Objective Verifications Indicator	Means of Verification	Risk and Assumption
Goal (vision)	Impact indicators	Where /how to find the information	For long term sustainability
Objective	Outcome indicators		For contribution to the goal
Output (results)	Output indicators: resulting from completion of activities		...achievement of project's purpose
Activities	Resource inputs/ costs, personnel funding, materials and equipment		For achievement of project output/ results

The project formulation process is given in following figure.



2.3 Concept of Aspects of Project

The understanding to aspects of a project is important to design and analyze effective project. It is factors that affect on success of project implementation. It helps to determine how remunerative a proposed investment will be. All the aspects of a project are mutually correlated. The judgment of one aspect affects on other aspects. Therefore, all aspect must be considered at every stage in the project planning and implementation cycle. The major responsibility of analyst is to consider all relevant aspect during the project plan formulation period. In this regard, Gittinger has divided project preparation and analysis into six aspects such as technical, institutional-organizational-managerial, social, commercial, financial, economic aspects. They all are important factor for the success or failure of project.

2.3.1 Technical Analysis

The technical analysis concerns with the projects inputs (supplies) and outputs (production) of real goods and services. It examine the possible technical relations in inputs and outputs of a proposed project, for example, in a agriculture project soil, potential for agriculture development, irrigation, crop varieties and also examines marketing, storage processing system. The project framework must be defined thoroughly and preciously. The other aspects of a project proceed in light of the technical analysis. Project costs and operating costs are derived from the technical analysis. Good technical staff as well as devotion of staff are also essentials for this work, no matter how competent, if they are not given adequate time. The technical analysis may identify gaps in information that must be filled either before project planning or in the early stages of information. For example, the information may be taken from soil survey, ground water survey for agriculture project.

The project costs and operating costs are derived from the technical feasibility study. Therefore, the technical analysis is a most important part to analyze a project, in which other types of analysis also dependent and closely interrelated. In this context, role of technical analyst is to make sure that of appropriateness of technical work. It should be determined based on the technical estimate and projects.

In the case of physical project, Prasanna Chandra has suggested following points for technical analysis.

1. **Material inputs and utilities:** The availability of material inputs and utilities plays significant role to run the project. Therefore, the following particular inputs and utilities should be analyzed in technical part.
 - **Raw materials:** (a) agriculture product (b) mineral product (c) livestock and forest (d) marine product
 - **Processed industrial materials and components:** It consist of base metals, semi processed materials, manufactured parts, components, and sub assemblies. Determine requirements, source availability past trend and future behavior of product.
 - **Auxiliary materials and factory supplies:** It consists of chemicals, packaging materials, paints etc cleaning materials.
 - **Utilities:** It consist of power, water, steam, fuel etc. assessment should b made with respect to location, technology and plant capacity. Collect inputs a considering qualities of product, source of supply, potential availability, and shortage/bottleneck.
2. **Manufacturing process / technology:** For manufacturing a product/service often two or more alternatives technologies are available. For example the rice field can be digging by the

tractor or spade or oxen. Cement can be made either by the dry process or the wet process. Soda can be made by the electrolysis method or the chemical method. The technology may be of labour intensive or capital intensive. It depends on following things.

a) Choice of technology is influenced by mainly followings

- Plant capacity
- Principal inputs: it determine technology
- Investment outlay and production cost
- Use by other units
- Product mix
- Latest development
- Ease of absorption: particular technology can influence the choice of technology. Sometimes a high level technology may be beyond the absorptive capacity of developing country which may lack trained personnel to handle that technology.

b) Acquiring technology: it is from other enterprise may be by way of

Technology licensing: technology license gives the licensee the right to use patented technology and get related know how on a mutually agreed basis. Think: what, guarantees, cost, duration, items.

Outright purchase: it may (acquire) be use in certain kind of industries. It is appropriate when there is no possibility of significant improvement in technology in the foreseeable future and there is hardly any need for technological support from the seller of technology.

Joint venture arrangement: the supplier of technology may participate technically as well as financially in the project.

- c) **Appropriateness of technology:** It refers to methods of production which are suitable to local economic, social, and cultural conditions.
 - d) **Technological requirement:** There is a certain minimum economic size determined by the technological factor.
 - e) **Input constraints:** Power supply may be limited.
 - f) Investment cost:
 - g) Market conditions: use capacity of technology as the market conditions.
 - h) Resources of the firm
 - i) Government policy
3. **Product mix:** It is mainly affected by variations in size and quality of product.
4. **Plant capacity:** Decision on a. technological requirement b. input constraints c. investment cost d. market conditions e. resources of the firm f. government policy.

Principal inputs: it determine technology

5. Location and Site

- Proximity to raw materials and markets: proximity to sources of rw materials and nearness to the market for final products
- Availability of infrastructure: power, transportation, water and communications.
- Governmental policies

- **Other factors:** labour situation, pollution, general living conditions.
- **Site selection:** Cost of land, cost of site preparation

6. Machines and Equipments

It is dependent on production technology and plant capacity, which is influenced by the type of project.

Constraints in selecting machineries and equipments.

Procurement of plant and machinery

7. Structure and Civil Works

- Site preparation and development
- Buildings and structures
- Outdoor works

8. Project Charts and Layouts

- General functional layout:
- Material flow diagram
- Production line diagrams
- Transport layout
- Utility consumption layout
- Communication layout
- Organizational layout
- Plant layout.

9. Work Schedule

It reflects the plan of work concerning installation as well as initial operation.

Need for Considering Alternatives

- Nature of project
- Production process
- Product quality
- Scale of operation and time phasing
- Location

2.3.2 Institutional-organizational-managerial aspect

This is also an important aspect of project. The appropriately institutional setting of the project could affect on socio cultural pattern of the project. For example, in agriculture project, project analyst should consider does the project design take into account the custom and culture of the farmers? Who will participate whether new procedure will accept or not?

The project should also relate to institutional structure of the country or region. For example, in agriculture project, what will be the arrangement for land tenure? What size holding will be encouraged? How will the administrative organization of the project relate to existing agencies?

The organizational structure of the project should be manageable. There may have various ladders in an organization. The questions such as are authority and responsibility properly linked? Is a special monitoring group needed?

Managerial issues are crucial to good project design and implementation. The analysis must examine the ability of available staffs to implement the project and assumes that new and complex managerial skills and its administrative cost of project.

Thus it is concerned to overcome the managerial and administrative problems as well as realistic assessment is made of how fast they will be resolved.

2.3.3 Social Aspect

Social pattern and practices of projects is also an important aspect. So project analyst should examine carefully about the broader social implication of proposed investment. The project analyst should consider on such proposed project which is responsive to national objectives for example, employment generating project is more profitable than income distribution. The project is a bottom level activity which gives end result so that the link of project with UN and national goal is important. Furthermore, the social acceptability is also important for the success of project.

There are also considerations concerning the quality of life that should be a part of any project design. Consider the issue of adverse environment impact.

2.3.4 Commercial Aspect

It include the arrangement for marketing the output produced by the project and supply of inputs needed to build and operate the project on the output side. It ensure that there will be an effective demand at a remunerative price. The questions such as where will the products be sold? Marketing channel, is the products from domestic consumption or for export? On the input side, appropriate arrangement must be made in production process. Do market channels for inputs exist? And also include arrangement for the procurement of equipment and supplies. In this regard, market analysis is essential.

Market Analysis

This step of project analysis is to estimate the potential size of the market for the product proposed to be manufactured or service planned to be offered. Its aim is to assess the sales potentiality of proposed product. The market size affects to demand for product of proposed project. Therefore, the aggregate demand for product

and share in the market of potential project's product is great issue to analyze. These are very important, yet difficult, issues in project analysis. It has to be analyzed based on creative judgment and wishful thinking. It is assessed through meaningful comparison of some broad economic and cultural indicators. The in-depth study has to be made to assess the various factors such as per capita level, income disparity level, literacy level, patterns of consumption growth, income and price elasticity of demand, composition of the market, nature of competition, availability of substitutes, reach of distribution channels, and so on. To be successful project, each and every such determinant factors has to be analyzed as far as practicable. Demand and price estimates are derived from the market feasibility study. The following key steps for market analysis have to be followed:

1. **Situation analysis and specification of objectives :** The base line data should be collected from the customers, competitors, middlemen, considering the preference and purchasing power of customers, actions and strategies of competitors and practices of the middlemen. According to which the project analyst should determine the project's objectives.
2. **Collection of secondary information:** The secondary information can be collected from the secondary sources such as government agencies like CBS, MoF, NPC, non government organization like WB, UNDP, etc which provides the base and the starting point for market analysis.
3. **Conduct of market survey:** To acquire comprehensive information market survey needed, survey may be sample or census. Which relate
 - Total demand and rate of growth of demand
 - Demand in different segment of the market
 - Motives for buying
 - Income and price elasticity of demand

In sampling process determine target population, sample size, questionnaire, field investigation, information collection, scrutinize, analyse

4. Characterization of market

- Effective demand in the past and present
- Breakdown of demand: nature of product, consumer groups, geographical division.
- Price: manufacturer's price quoted, landed price for imported goods, average wholesale price, and average retail price.
- Methods of distribution and sales promotion: distribution channel, advertising, discounts, gift schemes.
- Consumers: demographic and sociological with respect to attitudinal. For example, age -preferences, sex- intentions, income-habits, etc.
- Supply and competition: sources of supply, location, present production capacity, quality, and availability and so on.
- Government policy: the role of government in influencing the demand and market for a product may be significant.

5. **Demand forecasting:** Demand forecasting refers to the forecasting of future conditions of demand. Successful forecasting aims at reducing the uncertainty that surrounds management decision making with respect to costs, profits, sales, production, pricing, capital investment, and so on. There are three methods to the market analyst.

- Qualitative methods: opinion survey
- Time series projection methods: historical series.
- Causal methods: this method seeks to develop forecasts on the basis of cause – effect relationships.

6. **Market planning:** It is necessary to enable the product to reach a desired level of market penetration. Penetration can be performed by covering pricing (e.g. discount), distribution (packaging, channel), promotion (branding, advertising), service (installation, warranties).

Market analysis should be carried out systematically by adopting above 6 steps,

It is through the study of

- Effective demand in the past and present: production, imports, and exports. Change in stock level
- Breakdown of demand: nature of product and consumer group, price, method of distribution and sales promotion, consumers, supply and competition, government policy.

At first identify the technical input and outputs for a proposed investment, then by valuing the input and output at market prices to construct the financial account, and finally by adjusting the financial prices so they better reflect economic values.

To find prices, the analyst must go into the market consult with various sources such as consumer small merchants, importers, exporter, farmer market specialist, study of published data etc. From these sources, the analyst must come up with a figure that reflects the going price for each input and output in the project.

- First sale or farm gate price: if market is competitive may good estimate. If not competitive: better to reflect the opportunity cost or value in use of the commodity.
- Pricing intermediate good: it may vary from project-to-project depending on particular market structure.
- Problem of finding market price
- Project boundary price

- Producing future prices
- Changes in relative prices: a change in relative price means a change in market price structure that producer face either for inputs or for outputs.
- Inflation

2.3.5 Financial Aspect

The technique of financial cost benefit analysis is used to analyze the private sector's projects. The financial analysis takes the viewpoint of the individual participant and estimates returns to a project participant. Once costs and benefits have been identified, if they are to be compared, they must be valued. The value should be measured in terms of money. We must find and determine the proper prices for the financial analysis of project. All financial analysis is an assumption that prices reflect value or can be adjusted to do so. In financial analysis following questions should be considered.

How much budget needed? How much will be the internal source? How much loan needed? How much time needed for returns of the investment? Input costs, administrative cost? Salary scales of project personnel? Fiscal impact of some project will need to be considered, operation and maintenance cost, the some discounted cash flow measures are applied in the financial analysis to estimate returns to project participation.

The financial analysis also includes

- Projections are made for prices of products, factor costs,
- The period of estimation is determined which is justified by factors like the product life cycle, business cycle, ability to forecast, period of debt funds, etc.

- Financing alternatives are considered and tentative choice is made
- Basic working schedule are made like interest and repayment, working capital, depreciation schedule for income tax purpose
- Some financial statements are prepared like profit and loss accounts, balance sheet, cash flow statement
- Financial indicators are calculated like debt service coverage ratio, NPV or IRR

Objective of financial analysis are

- Assessment of financial impact
- Judgment of efficient resource use
- Assessment of incentives
- Provision of a sound financing plan
- Coordination of financial contribution
- Assessment of financial management competence.

It is an important aspect of project, for which following information is needed.

A. Cost of Project:

1. **Land and site development:** It includes basic cost of land, premium payable, read access, cost of gates etc.
2. **Building and civil works:** Buildings for the main plant and equipments, laboratory, water supply, warehouses, canteens, guesthouses, quarters, drainage etc.
3. **Plant and machinery:** Cost of imported machinery, cost of indigenous machinery cost of stores and spares, foundation and installation charges.

4. **Technological know-how and engineering fees:** Technical consultants, preparation of technical report etc.
5. **Miscellaneous fixed assets:** It includes furniture, tools, vehicles, transformers, laboratory equipment trademarks, copyrights etc.
6. **Preliminary expenses:** Brokerage, fees to managers and registrars, printing and postage expenses, advertising etc.
7. **Preoperative expenses:** Establishment expenses, rent, traveling expenses, insurance charge etc.
8. **Provision for contingencies:** It is made to provide for certain unforeseen expenses and price increases over and above the normal inflation rate which are already incorporated in cost estimates.
9. **Margin money for working capital:** This money is provided by commercial bank to creditors as working capital.
10. **Initial cash losses:** The project incurs losses at initial stage, which affects the liquidity positions and impairs (weak) the operations.

B. Means of Finance

1. **Share capital:** Equity and preference capital (dividend fixed)
2. **Term loan:** Secured borrowing may be in domestic or foreign currency
3. **Debenture capital:** Akin to promissory notes-nonconvertible (fixed rate of interest say for 5-9yrs) and convertible (can be convert into equity)
4. **Deferred credit:** Payment for the purchase of plant or machinery can be made over a period of time.

5. **Incentive sources:** Incentives provided by promoters with soft loan as a seed capital, capital subsidy.
6. **Miscellaneous sources:** Loan, public deposit etc.

Planning the Means of Finance: Norms of regulatory bodies and financial institution and Key business consideration: cost, risk, control, flexibility.

C. Estimates of Sales and Production

It includes the estimation of production and sales forecasting revenue.

D. Cost of Production: its components are

- Material cost: raw materials, chemical
- Utilities: power, water, and fuel cost
- Labour cost: all manpower employed in factory
- Factory overhead: repairs, rent, taxes, insurance on factory assets

E. Working capital requirements and its financing

Estimate it and plan for financing, however there is no hard and fast rule, suggestion made by Prasanna Chandra Raw materials (10-25%), work in process (20-40%), finished goods (30-50%), and debtors (30-50%) (p. 106).

F. Profitability Projections (or Estimates of Working Results):

After the estimation of sales revenues and cost of production, a project should follow the next step to prepare the profitability projection. The estimate process

- Cost of production
- Total administrative expenses

- Total sales expenses
- Royalty and know how payable
- Total cost of production (a+b+c+d)
- Expected sales
- Gross profit before interest
- Total financial expenses
- Depreciation
- Operating profit (g-h-i)
- Other income
- Preliminary expenses written off
- Profit (loss before taxation (j+k-l)
- Provision for taxation
- Profit after tax (m-n) loss divided on: * preference capital
*equity capital
- Retained profit
- Net cash accrual (p+i+l)

G. Break Even Point

Break even analysis is a technique of profit planning that has been used by accountants, business man, and some economists. It is essentially a device for integrative cost, revenue and output of the firm in order to illustrate the probable effects of alternative sources of action upon net profit. The technique contains many variations and applications, economic basis is one, to provide a basic understanding of its nature and relation to managerial decision making.

The economic basis of break even analysis steps from the cost-output and revenue –output functions of the firm.

Break-even point = $\frac{\text{Fixed costs}}{\text{unit selling price} - \text{unit variable cost}}$.

- Break even quantity (Q_b) = $\frac{\text{TFC}}{\text{P}-\text{AVC}}$
- Break even sales (S_b) = $\frac{\text{TFC}}{1 - (\text{TVC}/\text{TR})}$
- Break even percentage of capacity (% b) = $\frac{\text{TFC}}{(\text{P}-\text{AVC})Q_{\text{max}}} \times 100$.

There are two economic concepts to project analysis: marginal value product and opportunity cost. The extra revenue from increasing the quantity of an input used, all other quantities remaining constant, the marginal value product of the input. The marginal value product must equal the price.

2.3.6 Economic Aspect

In this aspect analyst analyzes a proposed projects contribution to the development of the total economy and need of scarce resource. The financial and economic analysis are complementary the financial analysis takes the view point of the individual participants' and the economic analyst that other society. Same discounted cash flow measures in the economic analysis to estimates returns to society. Policy makers must concern about the investment of scarce capital resources that will best for further national objectives. The technique of economic analysis helps to identify those projects that make the greatest contribution to national income. Once financial prices for costs and benefits has been determined and entered in the project accounts, the analyst estimates the economic value of a proposed project to the nation as a whole. The financial prices are the starting point for the economic analysis; they are adjusted as needed to reflect the value to the society as a whole both the inputs and outputs of the project.

When the market price of any good or service is changed to make it more closely represent the opportunity cost (the value of a good

or service in its next best alternative use) to the society, the new value assigned becomes the shadow price (sometimes referred to as an accounting price). A shadow price is any price that is not a market price, but the term usually also carries the connotation that it is an estimate of the economic value of the good or service in question, perhaps weighted to reflect income distribution and savings objectives.

In project analysis, the objective of a firm is to maximize the incremental net benefit, from the societal point of view, it is, to maximize the contribution a project makes to the national income, that is, the value of all final goods and services produced in the country during a particular period. This analysis is generally measured in financial terms, but in economic analysis, it is beyond financial accounting. In financial analysis, numeraire -the common yardstick of account- is the real income change of the entity being analyzed valued in domestic market prices and in general expressed in domestic currency. But in economic analysis, since market prices do not always reflect scarcity values, our numeraire becomes the real, net national income change valued in opportunity cost. One methodology expresses these economic values in domestic currency and uses a shadow price of foreign exchange; the shadow price increases the value of traded goods to allow for the premium on foreign exchange. Another method in use expresses the opportunity cost value of real national income change in domestic currency converted from foreign exchange at the official exchange rate and applies a conversion factor to the opportunity cost. The conversion factor reduces the value of nontraded goods relative to traded goods to allow for the foreign exchange premium.

Economic Social Analysis

It is a methodology developed for evaluating investment projects in an economy as a whole. So it also a part of feasibility report. It

consists of project details and justifies the assumption made about input and outputs and appropriate market price. It measures the direct benefit of a cost of project in shadow price, not in market price. It analyses the effect of income distribution in a society.

2.4 Project Cycle

Project planning is a natural sequence from planned to carry out the project activities which is often called "project cycle". It is divided into sequential order. In other word, process of project plan and carried out project is called project cycle. A project has a life cycle reflected by growth, maturity and decay. Little and Mirrlees define a project as a scheme or a part of a scheme, for investing resources that can be analyzed and evaluated as an independent unit. It requires careful analysis of interrelated sets of activities. Identifying national investment, designing effective price policies and mobilizing resources are all critical. Often, capital input becomes a critical factor for investing in the developing infrastructures in one hand, and on the other, the proper utilization of available resources also become problematic due to lack of knowledge, skill, and commitment. Breaking such dilemma, it requires identifying or initiating good projects for the optimum use of available resources and developing the country in greater speed. For this, project approach could be helpful for - directing resources to the gainful activities, and mobilization of available resources.

A project can simply be defined as an activity, which aims to achieve specific objective. Little and Mirrlees define a project as a scheme or a part of a scheme, for investing resources that can be analyzed and evaluated as an independent unit. In other words a project is an activity in which money is an expended expecting return and which logically seems to lend itself to planning, financing, and implementation as a unit. There should be a specific

activity with a specific starting point and a specific ending point intended to accomplish a specific objective.

Project planning is a complex process. Each project passes through a cycle and the cycle constitutes different stages or phases with some variations from project to project, but is generally common to all. These different stages of a project cycle are identification, preparation and analysis, selection (approval), implementation, and monitoring and evaluation.

2.4.1 Project Identification

The first stage in the cycle is to find potential project(s). As a project changes, the vision or the interest(s) into reality of some persons or the organization should also be changed. Gunar Myrdal in *Asain Drama* defines “project formulation is one of the basic techniques through which planning can change from an institutional base to an institutional and rational base”. To initiate a project, first of all, we need some sort of idea or concept. This idea should be verified with the existing situation and ask oneself *Is the idea Prima Facie Promising* i.e., is it better to confirm whether it could serve the interest of the person or the society.

To identify a project it requires sound judgment in making choice of the proposed project with regard to sectoral priorities or the objectives of the regional or national plan. Information on details of economic and sectoral analysis made by the concerned government or the multinational agencies like World Bank would be helpful. The projects should bear the likelihood of getting financed because following identification they enter the multi-year lending program, which may have long-term impacts on society.

2.4.2 Preparation of a Project

After identification a project enters preparation stage. The first step is to undertake a feasibility study that will provide enough

information for deciding whether to begin more advanced planning. In this stage a project brief is prepared for each project describing its objectives, identifying principal issues and establishing the timetable for its further process. For this a detailed data is collected which provides a basis for working out alternative approaches for designing a project.

2.4.3 Analysis and Appraisal of the Project

Analysis of project is the most important stage, which provides a comprehensive review all aspects of the project and provide a basis for implementation and evaluation. It is also important to find its worth or value of investment by the individual/organization/nation. The analysis covers major aspects such as technical, marketing, financial, economic/social, institutional and ecological. Some of the questions and issues raised in such a detailed analysis are as follows:

1. Market Analysis:

- What would be the aggregate demand of the proposed product/service in future?
- What would be the market share of the project under analysis?

2. Technical Analysis:

- Whether the production process chosen is suitable?
- Whether the equipment and machines chosen are appropriate?
- Whether the technology proposed to be employed is appropriate from the social point of view?

3. Financial Analysis:

- What would be the investment outlay and cost of project, cost of capital and means of financing?

- What would be the projected profitability and break-even point?
- What are the projected uncertainties and level of risks?

4. Economic/Social Analysis:

- What are the direct economic benefits and costs of the project?
- What would be the impact of the project on the distribution of income in the society?
- What would be the impact of the project on the level of savings and investment in the society?

5. Institutional Analysis:

- What should the project institution and management system be like?
- What kind of manpower, service condition of the project employees needed for the project?

6. Ecological Analysis:

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

2.4.4 Project Approval/Selection

After the analysis, the project is ready for financing and negotiation. Negotiation is a process of give and take between the donor and the borrower culminated in an agreement. The financier should basically be satisfied with the overall financial objectives, the rate of return of the project and the conditions of repayment. Based on the appraisal criteria, the funding proposal may be

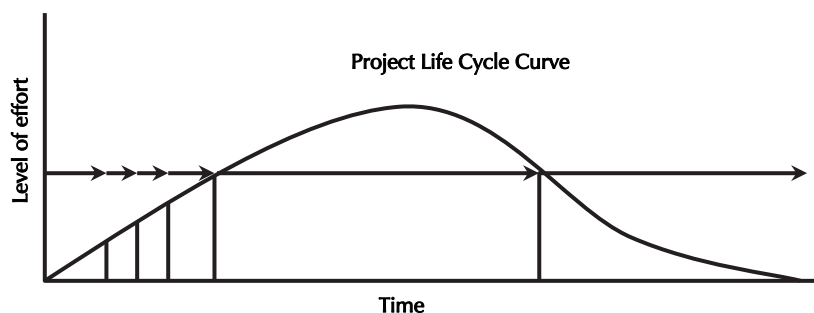
2.4.6 Project Operation

This stage is the actual running of project activities. It includes setting up of operating agency or institution, supervising and controlling and monitoring functions in different activities like procurement of resources, accessories, construction or the installation of the building premises, tender bidding, contracting, quality controlling etc. The operating agency or the management must be efficient and clearly aware of the project objectives, flexible about the new opportunities and ready to change direction as required.

2.4.7 Project Evaluation

Monitoring & evaluation places an important role in the life of a project. Performance review should be done periodically to compare actual performance with projected performance. A feedback device, it is useful in several ways:

- It thows light on how realistic were the assumptions underlying the project,
- It provides a documented log of experience that is highly valuable in future decision making;
- It suggests corrective action to be taken in the light of actual performance,
- It helps in uncovering judgmental biases, and it induces a desired caution among the project sponsors.



2.5 Proposal Writing

A proposal is an action plan or scheme in which all the future activities are included with clear vision. It is a device used to bring income or revenue to the requesting organization. It could be requesting for a grant to fund a new research and development effort or to sell an item of equipment. It is a document with action plan, by which company or organization secure new business. Proposal is an integrated block of whole activity of a project in the form of document.

A project proposal is the guiding document of a project. Virtually, success of a project is largely determined by its proposal. So there is a close interlink between a project and its proposal. Depending upon the type, scale and nature of different projects, each and every project will have its own uniqueness from different standpoints. There is no standard format of proposal for all types of project having this and that to write a project proposal. However, as the nature of project, certain demarcation with guidelines can be found.

A proposal should have

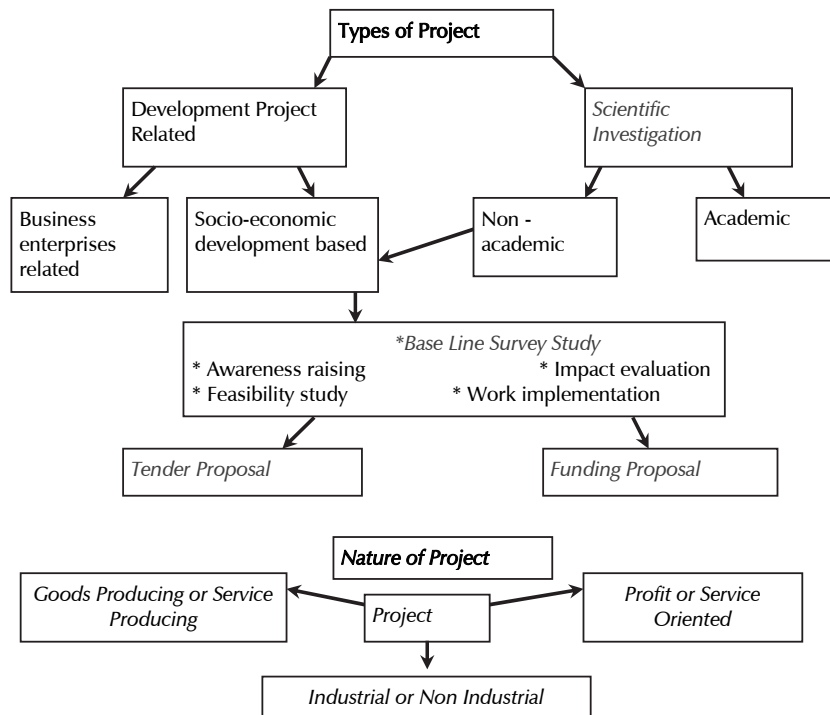
- What and why you are proposing to do?
- What you expecting?
- How and when execute?
- How much resource needed?
- How much time?
- How the project output be measure?
- What limitations?

2.5.1 Precondition to be taken to select or writing a proposal

1. Technically feasible

2. Financially profitable
3. Economically beneficial
4. Socially acceptable
5. Politically neutral
6. Environmentally friendly or sustainable
7. Marketable
8. Gender responsive
9. Poverty responsive
10. Free from legal barriers
11. Manageable from organizational and working point of view.

2.5.2 Types of Project



Thus, project is a written document prepared to do something in a pre-planned way with a view to successfully carryout the proposed assignment.

2.5.3 Project Selection Process

- Recognize the types and nature: project may be a. profit or service oriented b. private or public or mixed c. goods producing or service producing d. industrial or non industrial
- Establish operational nature
- Basic homework: logical, realistic, informative, a. situation analysis b. problem analysis c. opportunity analysis d. resource constraints
- Find funding agency (government or non government, national or international)
- Understand the interest of agency
- Prepare and forward project proposal:
- Level or scale of project proposal: Smallness and bigness of a project largely depends upon a number of parameter like amount of investment, covering area, employment generation etc.

2.5.4 Basic Elements of Project Proposal

Title of the project: the title of the project may be of various forms such as

- A proposal for Establishing Drinking Water in (a feasibility study)
- A proposal for Establishment of Drinking Water in (operational)
- A proposal for the Impact Evaluation of Drinking Water project in (Evaluative)

1. **Introduction:** Introduce the subject matter, geography, demography, types, nature, scale, objective, method, resources.
2. **Statement of Problems:** Legal problem, functional, environmental etc. the problem can be analyzed by the help of problem analysis tree.
3. **Set Objectives:** Objective may be general objective and specific objective (s). it is interrelated with methodology and budget. Objective should be SMART considering the ToR.
4. **Explain the Expected Outcome:** It is determined by using the method of cost benefit analysis for big project and own justification for small project.
5. **Methodology:** (a) If the project is investigative or feasibility study, diagnostic, generally we use statistical tools like sampling. (B) If awareness creating project. We use the methods like training, seminar, workshop etc. to enhances the education, communication, demonstration. (c) if project implementation. We make implementation plan such as staffing pattern, reporting system, implementing agency.
6. **Estimate Resource Requirements:** For funding proposal physical resources (land, space, materials, instruments etc.); Human resources (people having diffeent levels of skills in different fields); Financial resource; Time duration (work schedule) should be estimated.
7. **State Limitation or Risk Factor:** It depends on research type in terms of its coverage. If project work is likely to face certain constraints mention external risk factors as well.
8. **State the Monitoring and Evaluation to be Used:** Monitoring refers to the collection of information. In connection with the performances of schedule activities of given project.

2.5.5 Proposal Submission

The following things should be considered to submit the funding proposal.

Mention covering letter,

Executive summary:

- Be succinct, brief and clearly expressed
- Identify the target group that will be served by the project.
- Describe the reason for the grant request (the issue, problem or need).
- Describe the proposed solution for which the objectives should be clear and the kinds of activities to be conducted to accomplish the objectives.
- Describe the products and anticipated results of your proposed project.
- Describe the importance of the project and include the total cost, funds committed and amount requested.
- Keep the abstract to one page.

Content page needed if proposal is more than approximately 20 and appendixes: project's facts and figure, CV, technical and financial aspects.

2.5.6 Linkage of project proposal with log frame matrix.

Terminology used in:	
Logical Framework	Project Proposal
Goal: expected overall outcomes from the project.	General Objective
Purpose: targeted fixed outcomes set to produce from the project.	Specific Objective
Outputs/results: measurable outcomes to be achieved from the project.	Expected Outcomes

Inputs: resources (human, financial, materials, etc.) required for the said project.	Required resources and Budget
Activities: things to be performed while carrying out project's scheduled works.	Activities listed under Methods and work schedule
Log frame: sequential or logical operation order of project activities.	Consistency
OVI, MoV	M & E
Risk factors/ Assumptions	Limitations

Tips for organizing a good proposal

The covering letter should be:	*In conversational style *In positive term *Calling for action
The title on covering page must be:	*Persuasive *Positive *Reflecting benefits
The body of the proposal should cover:	*Introduction and problems *Objectives *Methods of operation *Type and quantity of resources to be required *Budget
The appendices should have:	*Copy of the client's brief (including ToR, if any) *Calculation details of resources and budget *Other relevant information.

2.5.7 Format of the Funding Proposal

A. Project Description

Background/Rationale

Goal/Purpose

Outputs

Expected benefits

Intended beneficiaries

Project area

Time frame

- B. Logical Framework: goal-purpose-output-indicators; Activities -inputs-costs-assumption.
- C. Recipient Organization and Organizational Profile
- D. Supervision mechanism
- E. Project Approach (Implementation Mechanism and Evaluation)
- F. Risk and Sustainability
- G. Project Cost

2.5.8 Importance of Project Proposal

A doctor needs detail examination of his/her patient before to prescribe medicine. Similarly, development actors may be recognized as a social engineer to architect future of his community. Proposal writing may be considered management science as well as art.

Management needed because

- Right project
- Reasonable and achievable objective
- Appropriate method
- Use of resources in an effective (doing right things) and efficient (doing things right) way. Art needs in writing, organizing and presenting.

2.6 Report Writing

A project report is a written statement and/or document prepared after a detail investigation or causes, effects, and possible solutions of a give problem. The main purpose of a report preparation is to

communicate its information or findings to the concerned authority or targeted group of audience. In official term, the job of report preparation is usually understood as an assignment given to an official to prepare an authentic document on a given issue or subject so that the prepared document may work as an instrument to facilitate the official decision making process.

2.6.1 Basic Features of Report

➤ Introduction Section

This includes the introduction of subject matter, its problem statement objective /s and methods used for preparing the report.

➤ Information Section

This section contains the presentation of facts and figures and analytical interpretation of such information with the help of words, logic, symbol, statistical tools, charts, diagrams etc. All the information should be relate with the introduction section.

➤ Inference Section

Here the conclusion and recommendations are drawn on the basis of information. Inference should be drawn according to the introduction section and the recommendations put forward are based on the output of the information section. Finally, you should always keep in mind that the suggestions and recommendations put forward are workable and helpful to facilitate decision-making process in one way or another.

2.6.2 Types of Report

There could be several types of report, which may be a page of doctor's report to a voluminous document produced by government organization, NGO etc. the report may be of business report, political report, political report and so on. But since the

focus of the whole work is centered around developing and presenting proposal and reports falling within the scope of socio economic activities.

The report may be prepared either in a descriptive or prescriptive way. Descriptive reports are prepared in an explanatory way while prescriptive reports prepared in a technical (to serve the concern of target group) way.

Classification of report on the basis of type, stage, and way of presentation

<p>Report: based on types</p> <ul style="list-style-type: none"> ➤ Baseline survey report ➤ Feasibility study report ➤ Impact evaluation study report ➤ Implementation progress report ➤ Research investigation report ➤ Training evaluation report ➤ Others report 	<p>Report: based on preparation stage</p> <p>Preliminary/draft report</p>
<p>Report: based on presentation</p> <ul style="list-style-type: none"> ➤ General/descriptive report ➤ Technical prescriptive report 	<p>Final report</p>

Points to Remember

Virtually, there is not cookbook formula to be employed while writing a report. However, some of the basic points keep in mind before starting to write the report, which are outlined below.

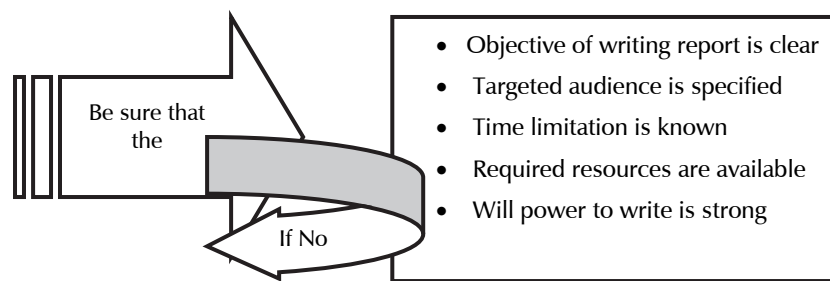
- Objective: why you are writing report?
Drawing attention of your audience or for circulating findings or for asking help?
- Target: for whom you are writing to?
For own interest or for client or audience.

- Time: how much time you need to prepare the report?
- Resource: what sort of and how much resource you need to prepare the report?

Depending upon the nature and objective set to prepare a report, the dose of resource (human, financial, equipment etc) may vary substantially.

- Will power: have you got strong commitment?

It is hidden factor,



2.6.3 Technique of Good Report Writing

Remember always that clear understanding leads to clear thinking and clear thinking leads to clear writing.

Principles of good writing

- Keep the report short and specific.
- Keep sentences short and try to avoid complex sentences.
- Write to express the facts, findings, and logical interpretation to justify the objective/s.
- Avoid jargons as well as metaphoric words. eg dog not home guard
- Make it reader centered.

- Consider your reader/s, their outlook, profession, and experience.
- Give visual impression to look the report attractive (size, font..).

2.6.4 Report Organization

Cover page

Title of the report

Name of report writer (if any)

Name of the organization (if any and/or if necessary)

Date of the report issued

1. Table of contents
 - Abstract/Summary
 - Foreword - optional
 - Acknowledgement - optional
2. Chapter plan
 1. Main heading
 - 1.1 sub-heading
 - 1.1.1 sub-sub-heading
 2. Main heading
 - 2.1 sub-heading
 - 2.1.1 sub-sub-heading
3. Table /Figurs/Diagrams.....
4. Appendixes
5. Reference:

PROJECT APPRAISAL

3.1 Concept of Project Appraisal

The project appraisal criteria are also known as evaluation method is very important for investment decision making. It helps to determine the cost and benefit of a project. Moreover, there are more than thirty criteria (Chandra,1995:229) have been proposed in the extensive literature on this subject to guide investment decision making. However, these criteria are classified into two broad categories in determination of project worth in order to back calculate profitability i.e. discounting (NPV, BCR and IRR) and non discounting (Payback period, ARR and Urgency) techniques. Project appraisal discloses an opportunity to reexamine every aspects of the project to assess whether it is sound to be implemented. Usually, appraisal is done on the basis of predetermined criteria and norms. If the benefit of project is more than the cost the project is generally called feasible and is accepted and vice versa. Before the project implementation, project appraisal must be ensured that the project is financially viable and profitable. The project analysis has to be done to determine the profitability.

The project analysis is the most important part to select a project. The project analyst has to be analyzed whether the selected project would economically beneficial or not in the selection process.

There are four basic steps to analyzing the economic viability of a project:

- Identify the economic costs and benefits;
- Quantify the costs and benefits, as much as possible;
- Value the costs and benefits; and
- Compare the benefits with the costs.

In fact, the project analysis is done before the implementation of project, therefore, the identification of project and analysis of its costs and benefits plays greater role to achieve desired goal. The conceptual framework of project analysis is

- Directly productive projects for which a direct market demand exists for valuing project output.
- Indirectly productive projects for which demand is derived from non market goals.
- The integrated approach to project appraisal helps to prevent the misallocation of resources. This is an appraisal tools, which analyzes the means ends relationships, input output linkage.

3.1.1 Identifying Project Costs and Benefits

There may have various nature of project in a society such as economic, social, judicial and so on. In economic nature of project, we undertake economic analysis of projects, such as agricultural projects, industrial projects, infrastructures development projects etc., to compare costs with benefits and determine which among alternative projects have an acceptable return.

There are some key questions in identification of costs and benefits of project. Such as

- Have the without and with project situations both have been described?

- Have all project costs, comparing with and without project situations been identified?
- Have all project benefits, comparing with and without project situations been identified?
- Which benefits have been quantified and valued and which have not?

'With' and 'Without' Project

To identify project costs and benefits, the situation without project should be compared with the situation with the project. There should also consider the before project situation. The without-project situation is not the same as the before-project situation because it is often inaccurately described without the project. It is not the implementation of the next best alternative, unless there is clear evidence to suggest that this is most likely to be the case. It is not the delayed implementation; it is just the existing circumstances. Without project is the continuation of existing implementation practices and before project is the end period which is going to be implemented with the project. However, in with project situation, there may have various alternatives to identify a project. Which alternative projects have an acceptable returns is determine by the analysis of project's costs and benefits.

Objectives, Costs and Benefits

The cost and benefit of a proposed project must be identified. For this, they must be priced and their economic value has to be determined. In this process the objective of the project should be clear. The project's objective defined in different way, Gittinger rightly states that "Simply put, a cost is anything that reduces objective, and a benefit is anything that contributes to an objective". This indicates that the maximization of benefit and minimization of cost is a chief aim of the project's objective. However, the objective may different for different institutions.

The aggregate consumption, income redistribution, growth rate of national income, employment level, self reliance, and merit wants may be areas and issues according to which we determine the project's objective.

Merit wants: This tends to be more commonly associated with social projects such as health, education than with industrial projects. A society's objective is to increase national income. The additional objectives are

- To increase the number of productive job opportunities so that unemployment may be reduced.
- To increase the proportion of savings in any given period so there will be more to invest, faster growth and hence more income in future.

The problem with such simplicity, however, is that each participant in a project has many objectives. In this regard, Gittinger opined with an example that *for a farmer, a major objective of participating is to maximize the amount his family has to live on. But, this is only one of the farmer's interests. He may also want his children to be educated' as a result, they may try to do other jobs as well as change in cropping pattern also avoiding risk on farm. These are sensible decisions in the farmer's view.* In this regard, farmer tries to identify the cropping patterns that will most probably select and judge the effects on his incremental income and, thus, on the new income generated by the project that helps to provide education for his children.

Similarly, for a private business firms or government corporations, a major objective is to maximize net income by reducing risk. And a society as a whole will have as a major objective increased national income. The additional objective may be different; one objective may income distribution while other may to increase the number of productive job opportunities so that unemployment may be reduced. Other objective may be to increase the proportion

of savings in any given period so there will be more to invest, faster growth, and hence, more income in the future (focused on GDP rather than GNP). Any of these objectives might lead to the choice of a project (or a form of a project).

A formal criteria very straightforward objectives of income maximization and accommodate other objectives at other points in the process of project selection. The most important objective of national economic policy of developing countries is to increase national income. Thus, anything that reduces national income is a cost and anything that increases national income is a benefit. Since our objective is to increase, the sum of all final goods and services is obviously a cost and anything that directly increased them is clearly a benefit. The determination of objective may lead to select with or without project.

The situation of with and without project is not same as comparing the situation before and after the project. The before and after production comparison of a project fails to measures the changes that would occur without the project. The without project situation represents the present level of productivity of the relevant resources which is often inaccurately described. The without project situation prevail in most of the activities. It is not the implementation of the next best project alternative and not the delayed implementation of the same project.

The objective of a project is to increase quantity of growth by intensifying the production. Project analyst tries to identify and value the costs and benefits that will arise with the proposed project and to compare them with the situation, as it would be without the project. The difference is the incremental net benefit arising from the project investment.

An important distinction in identifying project benefits and costs is that between non-incremental and incremental outputs, and between non-incremental and incremental inputs. In a project, the

positive effects are included in benefits and negative effects are included in costs. The difference between benefits and costs are defined as the incremental benefits. The distinction is important because non-incremental and incremental effects are valued in different ways which is used to identify and quantify the project effects.

Non-incremental outputs are project outputs that substitute for existing production. For example hydropower substitutes the fire wood. This is also known as primary or direct benefits. Incremental outputs are project outputs that expand supply to meet new demands, for example, the growing demand for electricity reduces the generation and transmission costs.

Non-incremental inputs are project demands that are met not by an expansion of overall supply but from existing supplies, that is by competing supplies away from existing producers. For example supply of additional water to meet new demand from the existing water supply system. Incremental inputs are project demands that are met by an increase in total supply of the input, for example, where an increase in demand for water is met by an overall expansion of the water supply system.

Each project will exhibit different degrees of non-incremental and incremental effects for both outputs and inputs. Part of the process of forecasting involves analyzing these effects for the main project outputs and inputs. If the project is small relative to the size of the market, it is likely that the project output will be fully incremental. This is the case for most outputs that are traded internationally. And if the project is large relative to the size of the market, the project's output may be non-incremental.

Sunk cost: sunk costs are those costs incurred in the past upon which a proposed new investment will be based. Such cost cannot be avoided.

3.1.2 Cash Flow Analysis

Cash flow analysis is a central part of the financial and economic evaluation of project. It conceptualizes a stream of cash flowing out and an incoming stream of a project or enterprise. It is known as cash outflow and inflow. The *cash outflow* refers to pays for capital goods, services, management, and labor for the project. The *cash inflow* refers to the benefit stream or returns to the project. The *annual cash flow* is the net incremental "benefits" for each year of a project and which is the difference between the incremental benefits and costs. Similarly *total cash flow* is the sum of annual cash flows for the life of the project. The net cash flow (the difference between cash inflow and outflow) describes the dynamic transaction of the project at yearly intervals. The distinction between "with projects" and "without project" is easier to calculate than the difference between financial and economic analysis. The incremental costs and benefits are computed by subtracting "without project" values from the "with project" values as the difference between financial and economic analysis significantly affects the inputs to the cash flow analysis and the conclusions, which may be drawn from the results. Thus, Cash flow analysis determines the difference between the incremental costs and the incremental benefits for each year of a project in order to evaluate its financial viability. On the basis of timing of occurrence, cash flow is classified into three groups that is initial investment, operating cash flow and terminal cash flow.

Uses of Cash Flow

- Provides an overall picture of the incremental costs and benefits accruing from a project over the estimated life of the project,
- Indicates any negative cash flow years which may affect project viability,
- Provides the basis for calculating measures which account for the time value of money.

Advantages

- Cash flow analysis shows the changes that the project is expected to bring about in both incremental benefits and costs.
- The total cash flow of a project gives an indication of the performance of a project during its life.
- A negative cash flow may indicate financing problem of a project, or other reasons, which need to give special attention.

Limitations

- The assumptions about individual project induced changes in the environment may be lost in the aggregate data.
- The unquantifiable effect (eg. good will, sense of security, etc) is difficult to include in the total cash flow.

Procedure of calculating Cash flow

The following procedure should be adopted to determine the net incremental benefit of cash flow (see appendix 3.1 for details).

- Identify costs and benefits components of the project
- Determine the life span or the time span of the analysis
- Estimate gross costs and benefits of each year of the project
- Compute the incremental cost and the benefits of the project for each year
- Compute annual cash flows or net incremental benefits

	Gross costs	Gross benefits	Net
With project	C	B	B - C
Without project	c	b	b - c
Incremental (marginal) Δ	$C - c = \Delta C$ incremental cost, CASH OUTFLOW	$B - b = \Delta B$ incremental benefit, CASH INFLOW	$\Delta B - \Delta C$ (Incremental benefit-Incremental cost) = Net incremental benefit

Where, C = gross cost of with project, c = gross costs of without project, B = gross benefit of with project, b = gross benefit of without project, Δ = incremental or marginal change.

The above procedure shows the incremental change of cash outflow and cash inflow. The difference between inflow and outflow is the net incremental benefit of project.

3.2 Concept of Discounting and Non Discounting Technique

3.2.1 Time value of Money

In economic term time is money. It suggest to have money now rather than later. This theory focused on time preference of money. The firm's cost of capital is generally considered to be the time value of money. We all know that Rs. 100 now and Rs. 100 after one year are not equal, because, money loses its value over a period due to inflation, wait for longer time etc. A popular English proverb "a bird in hand is worth two in the bush". This proverb indicates that a currently available thing is more important than future dreams because present values are better than the same values in the future. "Earlier returns are better than later". These proverbs overcome the weaknesses of the undiscounted measures of project worth, so that we considered and include a time dimension in the analysis of project or evaluation through the use of discounting. This is determined by time value of money. If a person wanted to have money at present than future, then it is called time value of money. It is because of (i) uncertainty (ii) present consumption (iii) investment opportunity. The project's life is of generally more than a year, so that project appraisal is made in present value of money. Therefore, time value of money plays important role in project appraisal.

3.2.2 Discounting

Discounting is essentially a technique by which one can reduce future benefit and costs streams to their present worth. The process of finding the present worth of a future value is called discounting. The interest rate assumed for discounting is the discount rate. Conceptually, the interest rate used for compounding assumes a view point from here to the future, whereas discounting looks backward from the future to the present. In other word, the value of the present investment on future date is called compounding or future value of money whereas in discounting all cash flows can be brought to today's value, instead of compounding to future date. Mathematically,

$$P = M \times \frac{1}{(1+r)^n},$$

Where, P = present value of money, M = quantity of money at present,

Here, $\frac{1}{(1+r)^n}$ = discount factor.

The technique of discounting permits us to determine whether to accept for implementation project that has variously shaped time streams. In a time stream, the patterns of costs and benefits fall during the life of the project that differs from one another. The most common means of doing this discounting process is to subtract year by year and the costs from the benefits to arrive at the incremental net benefit stream that is cash flow. This approach will give one of three discounted cash flow measures of project worth: NPW, IRR or NBIR (Net Benefit Investment Ratio). Another discounted measure of project worth is to find the present worth of the cost and benefit streams separately and $\frac{B}{C}$ to obtain benefit cost ratio.

Discounting is a process of converting a single future payment or series of future payments to the equivalent present worth. The computation requires specifying a discount rate from which a discount factor may be determined. Discounting shows the future payments account for the time preference at present rather than future benefits. By discounting, payments that occur at various times throughout the life of a project can be made equivalent to present payments. A complex flow of payments can be converted to a single net figure, facilitating the valuation of one project or a comparison between projects in a way that reflects time preference and opportunity cost. This time preference assumes that there is an opportunity cost in waiting to receive the benefits. For example, one year deferred payment of Rs. 100 is less than Rs. 100 at present. The present value and one year later value of Rs.100 depends on interest rate. Thus, as the longer time of deferred payment present value of money will be less and less.

The discount rate is selected to correspond to the highest return available from alternative investment. This represents the time value of money as an opportunity cost. One cost is the opportunity to invest in an alternative project which will yield a greater return than the amount invested. The second cost is uncertainty of receiving delayed payments. The risk increased with the period of delay. It is the reverse of the compound interest process. The discounted value can be used to compute financial criteria for project evaluation such as NPW, BCR, IRR.

Purpose

Discounting provides a basis for analyzing and comparing future streams of costs and benefits by reducing them to their equivalent present worth.

Uses

- Future payments, either single, a uniform series, or an irregular series can be converted to their present worth by

using discount factors computed from an appropriate discount rate.

- The difference between payments made in the future can be translated into a constant discount rate to measure the preference for present as opposed to future benefits.
- Discounting permits inclusion of time preference in analyzing the net value of a single project, and in comparing two or more projects with dissimilar time stream of costs and benefits.

Advantage

- Discounting provides a logical basis for comparing payments at various times. It facilitates the valuation of single project or a comparison between the projects.
- Discounting puts more value on near term than on distant payments. Since more distant forecasts are generally less reliable than short term forecasts, discounting increases the degree of confidence that the analyst may have in his valuation.

Limitations

- Theoretically complex and practically difficult process. In practice, high rate is preferable to a low one. Generally, we consider 8-15% and more than 20% is negligible.
- The choice of a particular rate will influence the attractiveness of a project.
- The interest rate may vary over time.
- Time consuming

Choosing the discount rate

We must decide the discount rate to be used for calculating the net present worth (NPW), benefit cost ratio (BCR), net benefit internal return (NBIR), internal rate of return (IRR).

For financial analysis, the discount rate is usually the marginal cost of money to the firm for which the analysis is being done. The marginal cost of money often will be the rate at which the enterprise is able to borrow money. It is $(\text{equity capital} \times \text{return needed to attract equity capital} \div \text{total capital}) + (\text{borrowed capital} \times \text{borrowing rate} \div \text{total capital}) = \text{discount rate}$.

For example: $\frac{1000 \times 100}{5000} + \frac{500 \times 10}{5000} = 20 + 1 = 21$, **Discount rate**.

For financial analysis using

An efficiency price, probably the best discount rate, is the opportunity cost of capital. It would be the return on marginal investment that uses up the last of the available capital. In most developing countries, it is assumed to be somewhere between 8 and 15 percent in real term. A common choice is 12 percent (Gittinger, 1982:314).

Borrowing rate: The nation must pay to finance the project to choose the best selection of projects given the resources available and the ability to prepare them.

Social time preference rate: society's preference is different from individual. Society has a longer time horizon, so that its discount rate would be lower than individuals or private project.

A hypothetical discount table of five years at 8% interest rate.

	Calendar year	Amount at end of year		One plus interest rate		Amount at beginning of year
t ₅	2013	1,200	÷	1.08	=	1,111
t ₄	2012	1,111	÷	1.08	=	1,029
t ₃	2011	1,029	÷	1.08	=	953
t ₂	2010	953	÷	1.08	=	882
t ₁	2009	882	÷	1.08	=	817
t ₀	2008	817	÷	1.08	=	

The above table shows that present worth of Rs.1200 five years in the future is Rs.817. It means future value of money is decreased. In the process of calculation, the more than 15% interest rate and 20 years period will not be considered in calculation.

3.2.3 Net Present Worth (NPW) or Net Present Value (NPV)

Net Present Worth also known as Net Present Value measures a project's financial and economic viability by taking into account a time preference for money. It compares the present value of the cost streams with the present value of the benefit streams. It analyzed by taking the costs streams, away from the benefit streams to obtain net benefit stream, which can then be discounted. It is determined from the discounted cash flow. The project's alternative can be ranked according to their NPVs, which at economic prices represent the present value of net output that will be generated in the economy over the life of the project. Alternatively, computing the difference of the project's discounted annual incremental benefits and discounted annual incremental costs gives the net present worth. This is calculated by using bank discount rate generally of 10 to 12 percent (Gittinger, 1982).. It is computing the difference of projects discounted annual investment benefit and costs give the NPV. A positive NPV indicates that the projected return from the project investment is greater than the estimated opportunity to invest elsewhere. It assumes that benefits and costs can be discounted at a discount rate which reflects the opportunity cost of tying up project resources for the life of the project. The NPV is computed based discounting technique from following formula.

$$NPW = PW_b - PW_c \text{ or } NPV = PV_b - PV_c$$

Where, NPV = Net Present Value

PV_b = Present Value of Benefit

PV_c = Present Value of Cost.

The calculated NPV of a project is equal to the sum of the present value of all cash flows associated with it. NPV so far do not consider the time value of money. It can be easily appreciated that a rupee today has a higher value than a rupee after a year from now. This is because of interest that the rupee is going to earn over the next one-year period.

The decision rule of NPV

- Accept the project if it's NPV is positive: sufficient to recover investment.
- Reject it if its NPV is negative: insufficient to recover the investment, i.e. better to put money in bank.
- Indifference if NPV is zero

It is preferred criterion for choosing among mutually exclusive alternatives. A problem of NPV measure is that the selection criteria cannot be applied unless there is a relatively satisfactory estimate of the opportunity cost of capital. It is absolute measure.

Disadvantages

- Difficult to determine discount rate.
- Cannot prioritize the project.

Future value of annuity: the annuity is the equal sum of money paid regularly. The principal amount will returned with interest. (Rijal, 2002:93)

Present value of an annuity: the present value of money, which will be available regularly in equal amount. An individual may promised to pay equal sum of money required in future, what may be the present value of that money is calculated in this annuity (Rijal, 2002:95).

3.2.4 Cost-Benefit Analysis

The cost benefit analysis is the most scientific and useful criterion of discounting technique for project evaluation. It is most appropriate and popular method in appraising projects from the national viewpoint. It helps the planning authority in making correct investment decisions to achieve present value of benefits and costs of a project. It involves the enumeration, comparison and evaluation of benefits and costs. This implies weighing of the returns against the costs involved in a project. A project's benefit cannot fulfill the needs of the society. Naturally, the needs and wants of the society are unlimited, while the resources to meet these needs are limited. Therefore, there arises the need for prioritization of investment projects considering the maximization of its return from investment. The return is usually the monetary one for a private entrepreneur but for the society it could be monetary and non monetary or tangible as well as intangible (goodwill).

There are two types of cost benefit analyses.

1. **Financial cost benefit analysis:** The technique of financial cost benefit analysis is used to analyze for private sector projects. In this technique the investment amount is measured by using financial prices/market prices.
2. **Social cost benefit analysis:** The technique of social cost benefit analysis is used to analyze for social projects. In this technique the investment amount is measured by using economic prices or economic price.

Economic prices can be defined as the value of the contribution to the country's basic socio-economic objectives made by the marginal change in the availability of commodities or factors of production. The shadow prices are equivalent of efficiency prices in free market economics, that is, they are meant to reflect the most

efficient allocation of resources, the one that will ensure the maximum benefit. In a business application, a shadow price is the maximum price that management is willing to pay for an extra unit of a given limited resource.

Social cost benefit analysis helps to describe and quantify the social advantages and disadvantages of a policy in terms of a common monetary unit. Its objective function is the establishment of net social benefit. $NSB = \text{Benefit} - \text{Cost}$, where benefit and costs are measured in terms of shadow or accounting prices of inputs and outputs instead of in actual market prices.

It is a simple term covering a range of theoretical issues and practical techniques. Because, CBA has been practiced in many disciplines, a universal approach has not evolved. This description presents the systems engineering approach which views as a multi-stage process leading to a comprehensive picture of project benefits vs. costs. A systems approach using CBA begins by specifying objectives, generating technically feasible alternatives, and then evaluating their economic and social consequences. Techniques for determining evaluation criteria are listed as prerequisites. CBA is a synthesis of these technique as well as techniques for identifying objectives, generating alternatives and gathering cost benefit data.

Project cost are both direct (e.g. equipment, labor, management, physical resources) and indirect (e.g. displaced workers, pollution, added infrastructure requirements). Similarly, benefit may be both direct (e.g. increase production, reduced transport costs, increased earning power, better health) and indirect (e.g. employment generation, support of local service enterprises, upgraded manpower). Some cost and benefit may be intangible (e.g. goodwill, improve morale, aesthetics), but are included in the presentation to decision markets.

However, costs and benefits are identified and valued from three viewpoints:

- The individual project entity (private or financial analysis).
- The economic system (public or economic analysis),
- The socio-political economic system (social cost benefit analysis)

The second differs from the first in that market prices are adjusted to true equilibrium values using shadow prices or accounting prices. Social cost benefit analysis is the more controversial approach of using conversion factor to weight cost benefit estimates. Generally, the financial prices are converted into economic prices by using the standard convection factor (SCF). The SCF is derived from the following formula,

$$\text{SCF} = \frac{\text{Official exchange rate}}{\text{Shadow exchange rate}}$$

Subjectively estimated factors incorporate social political goals into the analysis, e.g., equitable distribution of project benefits favoring employment generation, or promoting independence from foreign goods. There are different criteria for analysis of project.

Criteria for Cost - Benefit Analysis

There are four benefit-cost criteria used by the US sub-committee on calculation of benefits and costs. They are 'B-C', 'B-C/I', ' $\Delta B/\Delta C$ ' and $\frac{B}{C}$, where B = benefit, C = cost, I = direct investment and Δ = incremental or marginal change.

The best and most reliable criterion for project evaluation is $\frac{B}{C}$. In this criterion; the benefit-cost ratio is the measure for the evaluation of a project. After the calculation

- If $\frac{B}{C} = 1$, the project is marginal. It is just covering its costs.
- If $\frac{B}{C} > 1$, the benefits are more than costs and it is beneficial to undertake the project.
- If $\frac{B}{C} < 1$, the benefits are less than costs and the project cannot be undertaken.

This is the ratio obtained when the present worth of the benefit streams is divided by the present worth of the cost stream. The higher the benefit cost ratio, the higher will be the priority attached to a project. The above formula does not take into account the 'time horizon' of the project.

Purpose

CBA identifies, assesses, and weighs costs vs. benefits to evaluate the financial and economic merits of development projects. It shows the efficiency of project resource utilization.

Uses

CBA generally used in mutually exclusive project to compare and prioritize the project. Such project may be of

Extremely alternative project: for example, small and big irrigation project at same place, select any one.

Similar utility and different satisfying power project: for example, light from hydro electricity or thermal plant.

Time exclusive: if we implement the project at present, no need in future of that project.

Use of technology: apply labour intensive or capital intensive technology.

Multipurpose project:

CBA is used to:

- Provide a comprehensive analysis of costs and benefits including secondary, indirect, intangible, and societal benefits and costs of a proposed project or program.
- Provide measures for deciding whether a project is financially viable and in the process of analysis, to raise questions for consideration in redesign or implementation.
- Rank projects for founding priority.
- Decide alternative policies, strategies, or components of a single program, e.g. for planning, programming, and budgeting.

Advantages

The benefit-cost ratio reduces the investment decision to a single number, which reflects the proportion of total benefits to total costs. When total resources are limited, rank-ordering projects by the benefit-cost ratio maximizes the return for each investment rupee.

CBA rationalizes the decision making process to make the best allocation of scarce development resources. Attention is focused on the direct and indirect project impacts. Factors other than cost may enter into the computation and evaluation. Unintended side effects (indirect costs) and unequal distribution of benefits can often be pinpointed.

Socially desirable objectives may be explicitly treated as part of the evaluation criteria.

A common measurement dimension (monetary units) permits comparing alternatives.

Limitations

The distribution of benefits and costs is not reflected in the benefit-cost ratio. One group in society may benefit at the cost of other groups. It reflects only the economic aspects of efficient resource utilization. The net present worth criterion is preferred for choosing between mutually exclusive projects. The actual data of cash flow and discount rate is needed. Limitations of SCBA are described in following bullets.

- Many social costs and benefits cannot be quantified or accurately measured, e.g. the value of educational programs or the benefits of increased health, security, or aesthetics. Quantitative factors receive disproportionate emphasis simply because they are measurable; cost-effectiveness analysis partly addresses this problem.
- All selected project may not effective: Selecting projects using the benefit-cost ratio or internal rate of return presupposes that project efficiency is the overriding goal. Yet an efficient project may be ineffective: that is, it may contribute little to achieving development objectives.
- Large scale projects output may affect on price: If a project is of sufficiently large-scale, the increased production or other project outputs will have an impact on prices. Consequently, “no ‘partial’ measure of project worth is appropriate and much more elaborate analytical procedures must be called into play”.
- Conversion factor is only value judgment: Conversion factors for social-cost-benefit analysis are subjectively estimated value judgments. Conflict in values clouds the subsequent cost-benefit analysis.

In offering guidelines for the use of cost-benefit analysis in developing countries, we pay special attention to industry and

agriculture, as well as to infrastructure projects where the output has a market price. Education, health, and defense are neglected.

A project's anticipated receipts and expenditures cannot be relied upon to measure social benefits and costs in most developing countries, therefore a strong prima facie case for the use of cost-benefit analysis. The basic idea of such an analysis is to use hypothetical rather than predicted actual prices when evaluating a project. The rate of discount may also not correspond to any actual interest rate. These 'shadow' prices, as they are often called, are chosen so as to reflect better the real costs of inputs to society, and the real benefits of the outputs, than do actual prices.

Assumptions

All benefit derived from the projects are identifiable and measurable. The opportunity cost of capital is specified: i.e. $B/C > 1$ funded the project.

3.2.5 Internal Rate of Return (IRR)

The benefit and costs effect of the project alternative is the IRR of discounting technique. The IRR represent the rate of return in economic prices that would be achieved on all expenditures of the project. IRR is calculated through an iterative process by assuming different discount rates. In this method instead of assuming a fixed discount rate, the discount rate is varied till the net present value becomes zero. The discount rate at which the net present value becomes zero is known as internal rate of return or IRR. In other word, a project's IRR is the discount rate at which the present worth of the net incremental benefit is exactly zero.

IRR is one of the three widely used criteria for evaluating the financial and economic viability of projects. Like NPV, IRR is computed from the present worth of gross incremental benefit and costs. Unlike NPV, IRR does not indicate the present worth of the

net incremental benefit. Rather, IRR is an efficiency measure, reflecting the payoff of the project in terms of the present return on outlay i.e. similar to BCR.

IRR shows what would be earning of money invested in the project? What interest rate project earn? There is no formula for finding the IRR, the systematic procedure of trial and error method is used to find NPV zero. After the evaluation, the project is accepted if IRR is greater than cost of capital, otherwise rejected.

It is the maximum interest that a project could pay for the resources used, if the project is to recover its investment and operating cost and still breakeven. It is the "rate of return on capital outstanding per period while it is invested in the project". It is very useful measure of project worth used by World Bank and other international agencies for practically its economic and financial analysis. It is useful technique to avoid confusion between financial and economic analysis. It is use financial rate of return for financial analysis and economic rate of return for economic analysis (Gittinger: 1982:331).

A way of using the incremental net benefit stream of incremental cash flow for measuring the worth of a project is to find the discount rate that makes the net present value of the incremental net benefit stream or incremental cash flow becomes zero. Cash flow can exist when at least one value is negative, if it is all positive, no discount rate can make the NPV of the stream is equal to zero. If IRR is greater than cost of capital the project is accepted otherwise the project is rejected. Discount factor is IRR if it is zero. If investment capital is less than discount factor then return from investment is greater than cost of capital and project is acceptable otherwise reject the project.

The IRR is compared to opportunity costs to determine whether the amount of return on investment is sufficiently high to justify the project. The difference between internal financial return and

internal economic return is not only in the assessment of costs and benefits, but in deciding whether the return is sufficient to individual or for the society respectively.

IRR can tell us that one project is better than another. In the sense that it contribute to national income relative to the resource used. We use systematic procedure of trial and error to find that discount rate which will make the NPV of the incremental benefit stream equal zero. The most difficult aspect of the trial and error is making the initial estimate. If the estimate is too far from the result, we have to use two rates through interpolation. However, difference is better if not more than 5 percentage point. Interpolation is the process of finding a desired value between two other values. Since this cannot be solved analytically, it must be determined by interpolation (addition).

IRR assumes that one discount rate will apply during the life of the project. This is not necessarily a limiting assumption, but it does make the measure less flexible than net present worth. If NPV is zero, trial discount rate is IRR. If NPV is not zero, IRR should be estimated by interpolation. In the mathematical field of numerical analysis, interpolation is a method of constructing new data points within the range of a discrete set of known data points.

Mathematically formula for the interpolation is as followings.

$$\text{IRR} = \text{Lower discount rate} + \text{Difference between discount rate} \left[\frac{\text{Present worth of internal net benefits stream (cash flow) at lower discount rate}}{\text{Sum of the present worths of the incremental net benefit streams (cash flow) at the two discount rate, sign ignores}} \right]$$

Suppose difference DR is 16% and 20% or 4 percent PV of incremental stream at lower DR of 16 is 2.21 million. The PV at higher DR of 20 is 1.58 million. The sum of PV of the streams at the

two DR ignoring signs is 3.79 million ($2.21+1.58=3.79$). Therefore, $IRR = 16 + 4 (2.21 \div 3.79) = 16+4(0.58) = 18.32 = 18\%$.

Purpose

The internal rate of return (IRR) is a criterion for analyzing projects based on the percentage return on investment.

Uses

- IRR can tell us that one project is better than another
- IRR can be safely used only if there is no incompatibility.
- The IRR is used as a criterion for evaluating the financial (and economic) advantages of a single project.
- The IRR is used to rank projects according to the most efficient utilization of resources.

Advantages

- The IRR may be computed without specifying the discount rate, which corresponds to the opportunity cost of capital. NPV and BCR require this specification.
- The IRR is the preferred criterion for ranking projects when total funds are limited.
- Total return of the project is whole project life.

Limitations

The IRR cannot be determined if the annual cash flows for a project are always positive (or zero). There must be at least one negative yearly cash flow so that the discounted benefits are equal to the discounted costs.

Computation of IRR

year	Capital items	op.& mnt	Prod.	GC	DF18%	PV	VIP (GB)	PV	INB	PV
1	1.09	0	0	1.09	0.847	0.92	0	0	-1.09	-0.92
2	4.83	0	0	4.83	0.718	3.47	0	0	-4.83	-3.47
3	5.68	0	0	5.68	0.609	3.46	0	0	-5.68	-3.46
4	4.5	0	0	4.5	0.516	2.32	0	0	-4.5	-2.32
5	1.99	0	0	1.99	0.437	0.87	0	0	-1.99	-0.87
6	0	0.34	0.33	0.67	0.37	0.25	1.67	0.618	1	0.37
7	0	0.34	0.63	0.97	0.314	0.3	3.34	1.049	2.37	0.74
8	0	0.34	0.96	1.3	0.266	0.35	5	1.33	3.7	0.98
9	0	0.34	1.28	1.62	0.225	0.36	6.68	1.503	5.06	1.14
10-30	0	21*0.34	1.61	1.95	1.214	2.37	8.38	10.17	6.43	7.81
Total	18.09	8.5	37.01	63.6	5.516	14.7	192.67	14.67	129.07	0

Source: the table adopted from the Gittinger, 1982:330.

Note: Op = operation and maintenance, prod = production, GC= gross cost, DF = discount factor, PW= present worth, VIP = value of incremental product, GB = gross benefit, INB = incremental net benefit =GB - GC.

NPV at 18% = Rs. 14.67 –Rs.14.67 = Rs. 0.

Therefore, IRR = 18%.

3.2.6 Non Discounting Technique

Non discounting technique does not considered time value of money. In this method project worth is measured without calculating interest of investment. Some important methods of this technique are: Payback Period, Accounting Rate of Return, and Urgency.

1. Payback Method

Payback period is the time required to recover the original investment through incomes from the project. The time for returns of investment from project is called payback period. It is the length of time from the beginning of the project until the net value of incremental production stream reaches the total amount of the

capital investment. It is a common, rough means of choosing investments in business enterprises, especially when the choice entails a high degree of risk.

The payback period considers the cash flow, but ignores the time value of money. It is that period of time in which the addition of undiscounted cash flow is equal to investment amount in project. The reciprocal payback period is just a different expression of payback. PBP reflects how soon the money sunk in the project is going to be recovered. According to this criterion, the project is more desirable as the shorter of the payback period. It is calculated by the formula, when the annual cash inflow is a constant sum.

$$\text{Payback period} = \frac{\text{initial investment}}{\text{annual cash inflow}} \\ (\text{returns from the total investment amount from project}).$$

Assuming that the annual income from the project before depreciation but after taxes is uniform, then pay back period is:

$$\text{Payback Period} = \frac{\text{Original Investment (Rs.)}}{\text{Annual Income (Rs.)}} = \text{Number of years.}$$

The annual income will be computed as gross earning less total operating costs excluding depreciation.

Advantage of Payback Period

The method is simple and easy to calculate. This is very popular criteria in investor and businessmen. This is also known as capital recovery criterion. This method was massively used by planners of USSR in recoupment period.

This method is used to prioritized two or more than two project.

- Very simple method:
- Very unprocessed method to evaluate internal risk of project: the project is prioritized first which invest more amounts at first.

- Investment recovery time reflect the project's liquidity: therefore, less returnable project could be important in the tight money condition.
- Emphasized on fast returnable project.

2. Accounting Rate of Return - ARR

The amount of profit, or return, that an individual can expect based on an investment made. Accounting rate of return divides the average profit by the initial investment in order to get the ratio or return that can be expected. This allows an investor or business owner to easily compare the profit potential for projects, products and investments. Thus, the ARR is profit based method. The profit in the ARR are different due to the element of depreciation.

ARR is considered a straight-line method of gathering quantitative information. While this is a positive measure in some aspects, its lack of sophistication is also a drawback. ARR does not consider the time value of money, which means that returns taken in during later years may be worth less than those taken in now, and does not consider cash flows, which can be an integral part of maintaining a business.

Formula

Accounting Rate of Return is calculated as follows:

$$\text{ARR} = \text{Average Accounting Profit/Initial Investment}$$

Decision Rule

Accept the project only if its ARR is NOT less than the required accounting rate of return. In case of mutually exclusive projects, accept the one with highest ARR.

Example 1: An initial investment of \$130,000 is expected to generate annual cash inflow of \$32,000 for 6 years. Depreciation is to be allowed on the straight line basis. It is estimated that the

project will generate a scrap amount of \$10,500 at end of the 6th year. Calculate its accounting rate of return assuming that there are no other expenses on the project.

Solution

Annual Depreciation = (Initial Investment - Scrap Value) / Useful Life in Years

Annual Depreciation = (\$130,000 - \$10,500) / 6 \approx \$19,917

Average Accounting Income = \$32,000 - \$19,917 = \$12,083

Accounting Rate of Return = \$12,083 / \$130,000 \approx 9.3%

Advantages

Like payback period, this method of investment appraisal is easy to calculate.

It recognizes the profitability factor of investment.

Disadvantages

It ignores time value of money. Suppose, if we use ARR to compare two projects having equal initial investments. The project which has higher annual income in the latter years of its useful life may rank higher than the one having higher annual income in the beginning years, even if the present value of the income generated by the latter project is higher.

It can be calculated in different ways. Thus there is problem of consistency. It uses accounting income rather than cash flow information. Thus it is not suitable for projects which having high maintenance costs because their viability also depends upon timely cash inflows.

3.3 Concept of Social Analysis

Social cost benefit analysis is mostly used in government projects. Economic and social analysis is also called social cost benefit analysis. The phrase cost benefit analysis always refers to the social variety. The easiest way to understand social cost benefit analysis is therefore to examine the difference. The differences have already been referred to. First, the inputs and outputs may be differently valued. The second, the benefits or costs appear resulting from the project's operation. The third difference is one of timing. Its chief aim is to determine whether the project is acceptable or not in the context of broader social point of view. Social analysis is different from the monetary analysis and private commercial analysis. Social benefit cost analysis, however, is not a technique but an approach. It provides a rational framework for project choice using national objectives and values. Projects are judged in terms of their precise impact on the economy and this impact is evaluated by using parameters reflecting national goals, social objectives and global facts. The national goals, social objectives and global facts are the main guiding parameters to evaluate, to formulate, and to implement the social project. There may have number of variables in the parameters, one can vary in formulating the new projects. The guiding approach is to determine variables, in terms of importance and worth pursuing, provided by social cost benefit analysis. If cost benefit methods are being widely applied in the public sector, the AP some years ahead may be taken to be the MSC at the point where MSC and MSB are equal.

In social analysis of a project, some questions has emerges.

- What may be the direct and indirect cost benefit in shadow or accounting price rather than current market price?
- What may be positive or negative effect of project in social income distribution system?

- What may be the effect of project in total social saving and investment?
- What may be the effect of project in independency, employment, and social system?

Considering these questions, planner ascertains the project considering which ones best satisfy the interests and objectives of the nation. In social projects, personal objectives are fairly unimportant; planner must choose the best thing for the society. However, this is a complex process because the national interests are not easy to define and different planners may have different perceptions. It is also realized that, if different planners pursue different national objectives, the result may be unsatisfactory and conceivably disastrous. If so, what may be the appropriate indicator to select the project, the choice of one project rather than another must be view in the context of their total national impact, and this total impact has to be evaluated in terms of a consistent and appropriate set of objectives.

The social benefit cost analysis is important to avoid the dichotomy between project choice and national planning. For example, the projects effects may be in employment, output, consumption, savings, foreign exchange earning, income distribution and other things of relevance to national objectives. The purpose of social benefit cost analysis is to see whether these consequences taken together are desirable in the light of the objectives of national planning or not.

Social profitability analysis is mostly used for evaluating public sector projects also where the principal objective may not be to maximize financial yield from the capital investment. The chief aim of the public sector project is welfare maximization. The objective setting of the public project is more complex for the planner who has to seek an appropriate compromise between the various divergent objectives and goals of national planning. Since

the nation is a collection of diverse groups with different interests, therefore, the problem cannot be casually dismissed.

In the multiplicity of objectives of public project, the choice of a rate of interest to discount future social benefits is a very difficult task. It can be reflected a particular compromise of the conflicting interests of different generations. But, for a commercial firm the rates of interest may simply reflect the rates at which it can lend or borrow. However, to a planner interest rates must be viewed as a method of apportioning benefits and costs to different time periods, and possibly between different generations. The planner has to compare the value of benefits today with that of benefits in the future.

The choice of the appropriate discount rate is a difficult task. It is because that value of changes over a period of time unexpectedly. This problem is faced not merely by the government project planner, but by all project planners. It is therefore a matter of national policy, and it would be incorrect to expect the government project evaluator to be able to decide on the rate of discount. The rate of discount is, thus, national parameters. The choosing between the projects is not sufficient to know all the impacts of the choices on all economic and social magnitudes, since the planner must also have some method of evaluating this total impact. The difference between consumption of this year and next year is a part of obtaining values to evaluate facts. In fact, each project affects to employment and wage payments. It may be important for each project evaluator to know how much of the wage bill is consumed and how much is saved; also to know whether the project pool of unemployed people or not. These magnitudes can also be viewed as national parameters. The set of national parameters is, thus, not merely concerned with value judgments and national objectives, but also with systematic information on facts that are relevant to all project selection exercise.

SCBA is increasing emphasis in view of growing importance of public investment in developing countries, where government are playing significant role in economic development. It is also relevant, to a certain extent, to private investment because private investment bring to bear larger national considerations in the decisions. Furthermore, SCBA aids in evaluating individual projects within the planning framework which spells out national economic objectives and broad allocation of resources to various sectors. The perspectives and parameters provided by the macro level plans serve as the basis of SCBA which is a tool for analyzing and appraising individual projects. The effectiveness of social benefit cost analysis depends much upon how national parameters are derived and used.

Suppose that in a particular year a project has equal probabilities of making a million rupees of social profit, and of making zero social profit. Perhaps it is a bicycle factory, and it is hoped to sell its output in a new export market; if that falls through, the bicycles will have to be sold at home where the market is already well supplied, so that the social profit would be, say, zero. The social profit is measured in terms of convertible foreign exchange. The essence of a cost-benefit analysis is that it does not accept that actual receipts adequately measure social benefits, and actual expenditures social costs. The difference between receipts and costs measured at accounting prices is called social profit.

3.3.1 Importance of SCBA

- **Market imperfection:** Monetary cost benefit is measured on the basis of current market price. Social value is measured only in perfect competition market. Perfect competition is characterized by large number of buyers and sellers, homogeneous product, free entry and exit of the firm from the industry, no government intervention etc. The developing countries are characterizes by market imperfection which

implies the rationing, minimum wage rate, control international market mechanism, protectionism in market mechanism. Thus, SCBA is most important.

- **Externalities:** A project may have positive or negative effects. For example, construction of road may have positive effect to road side people. It is analyzed in social cost benefit analysis but not included as monetary profit in project because the project does not take any monetary reward or fee from the beneficiaries. On the contrary, the project may give negative effect. For example, pollution, it may affect to the whole society but the project does not pay any monetary cost to society. All these cost and benefits are calculated in social cost benefit analysis whereas these are not important in individual project analysis.
- **Taxed and Subsidies:** Tax is cost and subsidy is benefit from the individual point of view but from the social point of view it is only transfer payment which is not important.
- **Concern for Saving:** The individual economic unit does not consider about the benefit of saving and consumption. Whereas it is important in social cost benefit analysis for the developing countries like Nepal because saving is most important factor for investment and without investment capital creation process may not be possible. Therefore, saving of one rupee is most important than consumption.
- **Concern for Redistribution:** Individual enterprises does not consider about the distribution of income whereas society think seriously about the distribution of income. It is true that one rupee is more important to the poor than the rich people.
- **Merit Wants:** Individually less important preferences or objectives but socially very important preferences and objectives are the merit wants. For example, informal

educations, Tiffin for school going children are important from the social point of view whereas less important from the individual point of view.

3.3.2 Difference between Financial and Economic/Social Analysis

There is no difference between the financial and economic viability for companies. However, from the national angle and from the view point of the economy as a whole, economic and financial feasibility are not considered to be the same. Cost and benefits to the nation due to the proposed project are considered in the economic feasibility test. Tax revenue, generation of employment, savings of foreign exchange and such other factors, differentiate economic viability from financial viability (Patel, 2000:168).

The financial and economic analysis, to some extent, it depends on nature of project. For private or individual project, the project analyst focused on market, technical and financial feasibility, whereas, the government level of project considered including economic and social feasibility.

The contribution of project to the economy as a whole studied in economic analysis. In economic analysis taxes and subsidies are treated as transfer payments. The taxes are part of the total project's benefits are transferred to the government, which acts on behalf of the society as a whole, and are not treated as costs. Conversely a government subsidy to the project is a cost to the society. In economic analysis interest on capital is never separated and deducted from the gross returns. In financial analysis, interest paid to the external supplies of money may be deducted to drive the benefit stream available to the owner's of capital.

In the financial analysis, such adjustment are normally unnecessary, taxes are usually treated as a cost and subsidies as a return. In financial analysis, market price are normally used. From

these prices, the available data are used in economic analysis. Some market price may be changed that reflect in social or economic values. These adjusted price are called 'shadow' or 'accounting' prices. It is also known as efficiency price. The distinction is given below.

Financial analysis	Economic/social analysis
Views the project from the perspective of the implementer businessman, farmer, government agency.	Views the project from the perspective of the community, society, region or country.
Assesses monetary income and expenditure	Measures the effect of the project in the economy as a whole.
Based on actual price	Assesses the opportunity costs for the region/country.
Private investor	Public services

The measurement of financial and economic/social aspects of project is essential for project selection. The project analyst should have to develop indicators to measure the financial profitability and economic benefit of project. The guidelines for developing indicators in order to measure the financial and economic/social contribution of a project are given below.

Indicators	Financial analysis	Economic/social analysis
benefit/cost affect the	individual firm/group	national economy/society
level of analysis	Micro	macro
measuring value	market price	shadow price ¹
effect of externalities ²	does not consider	consider

1 Shadow price is the adjusted market prices, which reflect the true benefit or costs to the economy, e.g., different between the market (subsidized) price of fertilizer and the world price the government must pay. Shadow price may not be applied in perfect market situation. But in developing countries, it is difficult to find out such situation. Market become imperfect because of (i) rationing (ii) prescription of minimum wage rates, and (iii) foreign exchange regulation.

2 A project may have beneficial external effects. The benefits/costs at the neighboring areas of a newly constructed road could be the externalities. The economic analysis considers benefits for a positive external effects and costs for negative external effects. While, financial analysis does not consider the costs/benefits of such effects.

tax, subsidies & interest	consider as cost if the firm pays and considers benefit it receives	transfer payment ³ & interest is taken as benefit as it is the earning of capital
concern for savings	does not consider	consider
concern for redistribution	does not consider	consider
merit wants	does not consider	consider

3.3.3 Objectives of Financial and Social/Economic Analysis

Financial Analysis: it refers to individual purpose concerning to income and expenditure at market price. It analyze only about last prices of goods and services. That is, no concern about other costs such as subsidy, or taxes. The contribution of project to the investors studied in financial analysis.

Economic Analysis: economic analysis is performed only in the large projects, and which is immediately related to the perspective of state economy. Some related components of economic analysis are socioeconomic analysis, financial analysis, GDP and GNP. Therefore, analysis is made to national purposes is called economic analysis.

- Assessment of financial impact
- Judgment of efficient resource use
- Assessment of incentives
- Provision of a sound financing plan
- Coordination of financial contributions
- Assessment of financial management competence.

3 In financial analysis tax and interest payment are considered as cost because the project loses these payment from the firm but in economic analysis it is taken as transfer payment, which is not a cost, but only it changes the ownership. Similarly, subsidies are taken as benefit in financial analysis but economic analysis considers it also as transfer payment and takes it as irrelevant for analysis.

3.4 Feasibility Analysis

A feasibility analysis is an important part for the selection of a project. It is an analysis used in measuring the ability and likelihood to complete a project successfully including all relevant factors. All the determinant factors are analyzed in feasibility report. It is a comprehensive report that examines in detail analysis of all aspects of a given project. The project analyst should be considered about the objectives, output level and scope of capital of project during the analysis of its aspects. Analysis of objectives, output and scope of project based on each aspect to select investment project. Therefore, following things should be considered in project feasibility analysis.

Components	Objectives	Output	Scope of capital/inputs
Market analysis	The determination of quantity demand for product, and quantity sale.	Analyzed demand and supply situation	Assume existing and projected the future demand for and supply of product in the market
Technical analysis	The determination of possible quality, quantity, costs and timing of product as target group or market.	Product specification Existing investment amount and projected cost of production	Market specification Sale/forecast/stock policy Alternative technology Production material, quantity and costs
Financial analysis	The determination of need identification of investment fund & identify sources of fund and analyze financial profitability	Total investment cost Sources of fund, Project benefit and cost, Cash flow Balance sheet, Financial ratio analysis	Fixed capital investment Working capital Loan investment Sales and costs
Economic analysis	The determination of need of project from the socioeconomic point of view	Socio economic benefits	Benefit cost analysis

Environmental analysis	The determination of environment friendliness	Positive and negative effect of project I environment	Initial environment evaluation of environment effect
Organization/ management analysis	The determination of organization structure, manpower and operating time	Organization structure Need of manpower Time line	Analysis of organization structure, Marketing of production, administration, account staff, Planning of marketing of production and operation

3.5 Concept of Risk, Uncertainty and Sensitivity Analysis

The expected output of a project may be affected by risk and uncertainty. The terms risk and uncertainty used as synonymous but which carry different meaning in the context of analyzing the expected output of project. The difference between the terms risk and uncertainty (Patel, 2000:354):

Risk is that uncertainty which is predictable, and to which probability can be assigned. The following conditions should be fulfilled to be risk:

- The decision maker is aware of all possible outcomes which may occur and affect his decision.
- The decision maker is in a position to assign a probability to each possible outcome envisaged by him.

If these two conditions are absent it is called uncertainty. It means uncertainty cannot be predicted. In fact, if the planner analyzes the various outcome or probability distribution based on the historical data, there exist the risks of project. If the historical data are not available, the project planner takes decision considering probability distribution on the basis of educated guesses, which is termed as uncertainty. Risks are of four types. Those are

replacement (known as depreciation which is calculable), risk proper, uncertainty (entrepreneur bears in the hope of earning profit) and obsolescence (included costs). In other word, risk is a quantifiable uncertainty. Moreover, as less and less the knowledge of expected outcome, there exists more and more of the uncertainty. This can be defined from the following continuum line.



As move from left to right, the uncertainty increases and vice versa. The rational decision maker always tries to minimize the uncertainty by reducing the risk. The project may face risk; if there exist to determine possibility of alternative result, uncertainty if not existed. In economic sense uncertainty is unforeseen risk which arises due to the change in tastes of consumer, behaviour of the competitors, technical change in machines and equipments, trade cycle, intervention by the government.

3.5.1 Concept of Risk

Risk is inherent in everything we do where there is the possibility of loss or injury (<https://www.merriam-webster.com>). The possibility refers to future impact on project's output. Therefore, a risk begins with an uncertain event or condition that could at least in one project objective. In this regard, project analyst should focus on identifying and assessing the risks to the project and managing those risks to minimize the impact on the project objective. It is fact that every project has some sort of risk because there are an infinite number of events that can have a negative effect on the project. Moreover, risk management is not about eliminating risk but about identifying, assessing, and managing risk. The identification of potential risk is difficult task. To identify potential risk, project analyst firstly should think about the positive and negative impact of project then needs to increase the likelihood and positive impact

and decrease the dislike and negative impact. The SWOT analysis can be a good tool to identify project risk. The probability of loss and impact determine the level of risk of project.

In the context of technological development, generally, the government of developing countries should get the impression that such changes are usually adverse to them due to the decrease in value of the industrial products that the developing countries are beginning to produce. The developing countries live in a very risky world as a group; their risk in international trade may be no greater than the risk of the industrial countries. In this context, some uncertainties are outside the control of project planner, others, say risk, can easily be influenced by their policies. The extent of the risks associated with a project may be reduced either by making advance arrangements or by insurance or by many other ways. The risk is classified into business risk, financing risk and market risk.

3.5.2 Uncertainty

The uncertainty means the quality or state of being uncertain (<https://www.merriam-webster.com>). The theory of choice under uncertainty is a difficult subject, and there is some disagreement among economists and statisticians on quite fundamental issues. We shall avoid the more controversial and difficult parts of the subject, and try to take the most sensible view of what is relevant to practical decision taking, even when our suggestions would not be universally accepted.

The uncertainties of particular projects are often rather insignificant when measured against the total performance of the economy. The planner has to be decided what particular figure to put to costs or benefits when uncertainty is present. The problem is what kind of average is appropriate, how to get it; and what to do when the uncertainties are for one reason or another. The

uncertainties of a particular project arise from many unpredictable influences. One cannot perfectly predict future technology or tastes or the actions of the government any one cause can falsify the project's assumptions.

It is important to bear in mind this distinction between uncertainties about the project itself and uncertainties about the environment in which it operates-that is, about the rest of the economy and the rest of the world. These two sources of uncertainty will often act independently of one another. Uncertainties in export markets may be rather large, in part because of unexpected changes in the tastes of foreigners. For example the change in tin planting techniques affects the demand for tin, development in plastic threaten disaster for jute producers, new important restrictions can destroy a market overnight. It is assumed that in project analysis, the costs and benefits are known in advance. But a project planner never is certain of the outcome. Project planners ought to pay some attention this uncertainty.

The uncertainties of a particular project arise from many unpredictable influences. One cannot perfectly predict future technology or tastes or the actions of the government any one cause can falsify the project's assumptions. It is important to bear in mind this distinction between uncertainties about the project itself and uncertainties about the environment in which it operates-that is, about the rest of the economy and the rest of the world. These two sources of uncertainty will often act independently of one another.

In project analysis it is assumed that, the costs and benefits are known in advance. The expected input and output of project are calculated before start to implement. But a project planner may not be confident in expected outcome, however, they analyze approximately or the correct average of the various possibilities. In such process, project planners ought to pay some attention to this

uncertainty. They must decide what kind of average is appropriate and how to get it and what to do when uncertainty are. In a project there may have various uncertainties. Unpredictable influence such as technology or tastes or the action of the government may occur which can quite easily falsify the assumptions of project and of course the project itself may not perform in the way expected.

There is clear distinction between uncertainties about the project itself and uncertainties about the environment in which it operates. These two sources of uncertainty will often act independently of one another. For example, the price of the output may depend upon the demand for the commodity is environment effect, whereas the quantity of output that can be produced depends upon the success with which the project is being operated. Moreover, the quantity also may depend upon prices. Uncertainties in export market may be large because of unexpected change in the tastes of foreigners.

For each possible future of the project, and the economy, one can in principle calculate the present social value. Project planner can estimates the range of possible project social values.

3.5.3 Sensitivity Analysis

Sensitivity means the quality or state of being sensitive (<https://www.merriam-webster.com>). A sensitivity analysis can be a great help in deciding whether a more careful examination of the various possibilities is desirable, so as to reduce uncertainty before a decision is made, but it does not do more than that. Sensitivity analysis is the study of how the uncertainty in the output of a mathematical model or system (numerical or otherwise) can be apportioned to different sources of uncertainty in its inputs (<https://en.wikipedia.org>). It is also known as what if analysis. It is analyzed by determining the relationship between the basic underlying factors and net present value. The range of

variations and the most likely value of each of the basic underlying factors should be estimated. Finally, effect of net present value of variable should be studied at basic variable.

Sensitivity analysis shows how the value of the criterion (normally Present Social Value (PSV) of the project, but possibly the Internal Rate of Return (IRR) change with changes in the value of any variable in the Discounted Cash Flow (DCF) analysis. Therefore, it can be a great help in deciding whether a more careful examination of the various possibilities is desirable, so as to reduce uncertainty before a decision is made, but it does not do more than that. All the projects are subjected to sensitivity analysis. Sensitivity analysis is useful for an ordinary profitability analysis as well as for social cost benefit (SCB) analysis.

Sensitivity Analysis Approach

- Percentage change approach
- Accounting break-even point approach
- Net present value break-even point approach
- Pay-off matrix

The uses of Sensitivity Analysis

- In showing how marginal a project is
- In indicating risk, and the need for further work
- In dealing with unquantified values.
- The IRR as a function of the shadow wage
- Abuse of sensitivity analysis

Sensitivity analysis is abused if

- The evaluator uses it as an excuse not to try to quantify things that might have been quantified.

- If the report presents merely a complicated set of interrelated switching values, and fails to give a lead.

A list of possibilities is thus only the beginning of an adequate description of an uncertain prospect. The description must be completed by means of the quantitative language of probabilities.

More difficult case

- The accounting price of one of the outputs (or inputs) may depend quite sensitively on the amount being produced (or used).
- The output of the project may be closely related to the overall performance of the economy.
- Uncertainty about the results of a particular project may actually be undesirable in itself.
- The extent of uncertainty may not be small in relation to the national income. This might be true of a very small country.
- When a project brings about irreversible effect, the EPSV may seriously overstate its value; for the project will then exclude other (generally later) projects which might have a higher EPSV.

3.6 Concept of Environmental Analysis

Environmental analysis is the description of all the components of project organization. It is the process which examines internal or external factors that has an influence on the performance of the organization. The internal components indicate the strengths and weakness of the organization entity whereas the external components represent the opportunities and threats outside the organization. It is a strategic tool of the decision-making process. The analysis helps align strategies with the firm's environment.

It is fact that, economic development is the result of the interaction between natural resources and technology supported by and designed for people. People are the center for development. It is directed to satisfy needs and wants of man through altering and using environmental resources. Therefore, the methodology of integrating the costs and benefits of environmental changes in economic analysis is still evolving.

Stresses on Environment

Environmentalists have identified four types of different stresses or pressures that are being continuously inflicted on environment. They are

- Eutrophic stress: it refers to the release of various kinds of wastes into the river and other water bodies and their consequent drying.
- Exploitative stress: it refers to the exploitation of natural resources endowment for production and consumption purpose through agriculture industry fishing.
- Disruptive stress: it refers to the physical alterations in nature resulting from such activities like forest clearance, highways, railways, factory buildings and so on. These physical changes disturb the environmental and ecological balance.
- Chemical and industrial stress: this results mainly from the developments in science and technology and their applied fields like industry, warfare and agriculture. This comprises mainly the pollutants and effluents of all types, radiation etc.

Environmental Resources/values/Components of Environment

Level 1: physical resources, covering land, water and air.

Level 2: ecological resources, consisting of aquatic, terrestrial and endangered species (other than man).

Level 3: human use values, covering transport, agriculture, water supply, recreation, mining, industry, flood control, etc.

Level 4: quality of life values, covering socio-economic, cultural and aesthetic aspects.

Meaning of Environment

Environment includes everything external to man/organism. It covers the region, surrounding or circumstances in which anything exists. It is broadly divided into two components.

- Abiotic or inorganic milieu: it comprises the physical elements like land, water, atmosphere, climate, sound and tastes. They are inanimate element of the habit systems.
- Biotic or organic milieu: it comprises the animals, plants, bacteria, viruses all other living organisms. And the social factors including aesthetics. They are animate elements.

Particularly, the environment is defined as the “the surrounding zone (the specific zone to be affected by the project), all natural resources (physical and biological), and the human resources (people economic development and quality of life values). This definition is more suited to operationalize, quantify and measure the environmental impacts of a given action. The impacts of action can be distinguishes between legal boundary and environmental boundary.

Different types of environmental stressors impact on different aspects (air, water and land some others are human health, human welfare and environmental resources) of the environment. Broadly there are two types of project. The physical project which is produces physical goods like cement, steel, papers, etc. The environmentalists are mostly concerned with such types of projects. These projects convert the natural endowment into saleable and exchangeable product, which may disturb the

environment and ecological balance. And the project, which produces services such as health, education transport, energy, defense etc., is called non-physical project. Such project also cover actions like land reform, agriculture extension services, sales promotion campaigns etc. such project do not directly cause any physical changes in the environment, however, it changes the values, attitudes, lifestyles social relation and so on. The ultimate effect of such project is the creation of new wants and needs in the society, which enhances the consumption demand and thereby increase the number of manufacturing goods. Thus, both are interrelated. Each project has two dimensions

- intended objectives known as stated goal or benefit
- the unintended consequences. They are also called externalities or social costs which are unplanned, unwanted and unanticipated. The environmental management or planning is the study of the unintended consequences of a project. Its purpose is to identify, examine, assess and evaluate the likely and probable impacts of a proposed project on environment and thereby, to work out the remedial action plans to minimize the incidence of adverse impacts. It is not anti development nor is it against the projects. Its goal is development without damage or least damage. The basic premise behind the environmental impact assessment /environmental impact statements is that no one has any right to use the precious environmental resources resulting in greater loss than gain to the society. Its net effect will be a desirable gain.

The environment is increasingly being treated as a form of natural capital resource and therefore damaging or using the environment is in a sense similar to the use of any other form of capital. Some part of this capital, for example, the ozone layer cannot be replaced or substituted with manufacture capital. So valuation of these resources in the context of project is thus, fundamental to the

notion of sustainable development. Therefore, the impact of such problem needs to address at the outset.

The general approach to valuation

It is necessary to choose a technique for valuing the environmental impact of the project and necessary to define the boundary of analysis. Since most environmental impacts include externalities, how far to expand economic analysis is important issue. For example, the downstream effects of hydroelectricity project whether immediate or long term impact to fishing, irrigation, drinking water. It is also necessary to define an appropriate time horizon i.e. project life.

The net present value is appropriate criteria to compare the without and with project environmental impacts. The discounting criteria depend on the choice of the discount rate which could reflect the opportunity cost of capital or the social rate of time preference. Only one discount rate should be used for any single economic analysis. The discount rate based on society's time preference would be lower than market based discount rate.

Environmental impacts may be on air, water and land some others are human health, human welfare and environmental resources. The impact can have both use and nonuse values. The use value is divided into direct (park) and indirect (ecosystem) whereas nonuse value is an assessment made of possible damage expressed or revealed in market behavior. There are a number of primary valuation methods that are used to value environmental impacts. Two distinct approaches are used for valuation:

- Objective valuation approaches: damage functions based on technical relationships between environmental stressors and the degree of physical damage are estimated. And
- Subjective valuation approaches: assessments are made of possible damage expressed or revealed in market behavior.

The benefit transfer approach

The benefit transfer approach essentially uses the primary research data generated elsewhere for valuing impacts after adapting such values to the economic valuation of a given project. There are three major steps to value environmental impacts.

First select the appropriate literature given in look up tables to find reference values and major assumptions regarding the valuation and country conditions.

Second step is to adjust these values to the location specific conditions. The values are important to correct for difference between assumptions, such as income, level of human development, wages, cost of time, or price levels.

The third and final step is to set these values in the context of the economic analysis framework. The environmental costs and benefits need to be expressed using the same numeraire as for the project economic analysis.

Valuing environmental impacts: sample look-up tables under the benefit transfer methodology

Resources or resource impact	Specific resource or impact being valued, country	Monetary value (1993 US Dollars unless noted)	Citation	Comments/caveats
All water	Annual damage in 1986 from all water pollution in the Netherlands	\$1.3 to \$ 3.7 billion magnitudes of pollution not given and reason for range not given.	Opschoor as cited in OECD (1989)	OECD study, prepared by Pearce and Markadaya states that various techniques were used to derive figures and they were at best ball park numbers.
...

Source: Guidelines for economic Analysis of projects, ADB p. 172.

There are a number of important issues that need to be kept in view while valuing environmental impacts.

- Recorded values can only provide an approximate range.
- There is a great deal of uncertainty attached to these values.
- For projects with possible large environmental impacts, additional resources should be devoted for data collection and validation of primary research data.
- The evaluator will need to explicitly state omissions and subjective judgements in a transparent manner for an informed decision.

3.7 Financial Ratios

From the projected financial statements for an enterprise, the financial analysis is able to calculate financial ratios that allow him to form a judgment about the efficiency of the enterprise, its return on key aggregates, and its creditworthiness. There are various means of computation by which the analyst will have to form a judgment about whether the ratio indicates an acceptable situation for the kind of enterprise that is the subject of the projected accounts. The financial ratio is calculated at the end of each year from the projected financial statements for an enterprise. Generally, the analyst weights the analysis towards the last months of operations as long as clarity and consistency are maintained. However, if an enterprise is highly seasonal calculating the ratios on a year end basis could be misleading. In such case analyst should examine the pattern of seasonal fluctuations within the accounting period and make a judgments about whether the seasonal variation would affect in conclusions about the efficiency return or credit worthiness of the proposed enterprise.

Efficiency Ratio

Efficiency ratio provides measurement of asset use and expense control.

In the computation of the efficiency ratio the cost of goods sold is divided by the inventory. In inventory turnover, when the ratio is much higher than the industry average, it may mean that the enterprise is very efficient in managing its inventories.

The operating ratio is obtained by dividing the operating expenses by the revenue. The operating ratio is an indicator of the ability of the management of control operating cost including administrative expenses. If the ratio is increasing, the cost of raw materials is increasing, that the management is having problems controlling labour costs. It may also mean that there is substantial competition and that it is necessary to reduce prices. In general, the larger the capital investment is relative to sales volume, the lower will be the operating ratio.

Income Ratio

Three ratios return on sales, return on equity and return on assets can be used to judge net income or profitability. The income ratios are calculated on a year to year basis.

The return on sales is determined by dividing the net income by the revenue. Which shows how large an operating margin the enterprise has on its sales. The lower the return on sales the greater the sales that must be made to make an adequate return on investment. It is useful to compare industry, company etc. The return on equity is obtained by dividing the net income after taxes by the equity.

Creditworthiness Ratio

The purpose of creditworthiness ratios is to enable a judgment about the degree of financial risk inherent in the enterprise before

undertaking a project. they are also a basis for the project analyst to estimate what financing an enterprise will need and what will be suitable terms.

Current ratio

The current ratio is the current assets divided by the current liabilities. It is an indication of the margin that the enterprise has for its current assets to shrink in value before it faces difficulty in meeting its current obligations. If the company has a rapid inventory turnover and can easily collect its receivables, the current ratio can be lower.

Debt-equity ratio

It is calculated by dividing long-term liabilities by the sum of long term liabilities plus equity to obtain the proportion that long term liabilities are to total debt and equity and then by dividing equity by the sum of the long term liabilities plus equity to obtain the proportion that equity is of the total debt and equity.

Debt service coverage ratio = This is the net income plus depreciation plus interest paid divided by interest paid plus repayment of long term loans. It is a form of a judgment about the efficiency of the enterprise, its return on key aggregates, and its creditworthiness.

3.8 Cost Recovery

The cost recovery refers to the users charges in which users should pay the economic cost of the good or service being provided. It is also known as the degree of revenue generation. Marginal cost principle is the appropriate cost for charging user to pay. The increase of user charges may affect the scale of the investment to be undertaken and its organization.

When governments invest in projects that increase the income of individual farmers, the question arises about how much of the government expenditure should be recovered from the project beneficiaries. Only through appropriate cost recovery policies can government recoup the expended money. There are two important issues to be addressed in formulating cost recovery policies.

- The proportion of cost expended on a project to be repaid.
- The proportion of the benefit received by individuals to be recovered through charges.

Any cost recovery policy must be a political decision; it cannot be divorced from the broader sectoral and social settings. Any approach to cost recovery must be flexible and based on a recognition that what might be a good policy decision.

Objectives of the Cost Recovery

Economic Efficiency: its objectives are minimization of cost or waste and optimal allocation of resources to maximize the net benefit from the project to the economy.

This concerns the level and structure of prices to be charged. For example, in an irrigation project, to be charged price for water, the objective is to minimize the waste and to allocate water optimally to maximize the net benefit from the project to the economy. The best way to measure is the price of water equals to its contribution to increase output in an efficiency price.

However, in volumetric water, it is very difficult to measure the contribution of water. Some recovery of benefits and costs will usually come from existing general taxes, such as an export tax or an income tax (Gittinger, 1982:224).

Income Distribution: second objective is to collect charges equitably and in line with national policy for income distribution.

This policy objective is to collect charges equitably and in line with national policy for income distribution. In regards to tax payment, small project at least do not pay a higher proportion of their benefit from the project than do larger project.

Public Saving: most governments in developing countries are short of financial resources for development. Consequently, it may be desirable for the government to collect more resources than would be generated solely from efficiency pricing or from recovering only the cost of the project and no part of the net benefit. This enables to undertake other project like rural development project.

Measures

Two measures are usually calculated to help form judgments about cost recovery.

- Cost Recovery Index: it gives an idea of what proportion of public expenditure on a project will be recovered directly from the beneficiaries and through taxes collected off the farm/firm.

It is: present worth of incremental water charges plus present worth of incremental benefit taxes divided by present worth of incremental public sector outlays. It is calculated using constant market prices.

$$\text{Cost Recovery Index} = \frac{\text{Present worth of incremental water charges} + \text{Present worth of benefit taxes}}{\text{Present worth of incremental public sector outlays}}$$

in constant market prices.

The appropriate discount rate is the economic opportunity cost of capital. The cost recovery = direct recovery + indirect recovery.

Direct recovery = water charge + benefit tax: direct recovery is the amount recovered by consumer, say, farmer themselves.

Indirect recovery = excise tax + sales tax.

Total Cost Recovery Index

(Rs. Per hectare, constant 2009 prices)

S. N.	Item	Amount
1	Present worth of capital cost (per hectare of cultivable command area)	
	Irrigation infrastructure ^a	18550
	Supporting works ^b	1850
	total	2040
2	Annual financial equivalent (per hectare of net cultivable command area)	
	Irrigation infrastructure	1871
	Supporting works	301
	Operation and maintenance	100
	Total	2,272
3	Cost recovery (under existing charges)	
	Direct incremental water charge	258
	Incremental benefit tax ^c	306
	Indirect receipts ^d	95
	Total	659
	Total cost recovery index ^e	29

Source: Gittinger: p.

- a) It is (annuity for recovery) the present worth of capital cost multiply by capital recovery factor for n years at i percent, given, $1850 \times 0.1008 = 1871$.
- b) Annuity for recovery over 10 years at 10 percent rate. It is calculated by multiplying the present worth of capital cost of the supporting works by the capital recovery factor for 10 years at 10 percent which is 0.162745.

- c) Incremental benefit taxes include a tax to recover the capital cost of the supporting works i.e. 301 and an incremental land revenue assessment of Rs. 5 per hectare ($301 + 5 = 306$).
- d) Indirect cost recovery receipts average Rs. 40 per hectare for the purchase tax on rice and Rs. 55 per hectare for the sales tax on cotton and dal or $40 + 55 = 95$.
- e) Total cost recovery under existing charges divided by annual financial equivalent per hectare of net cultivable command area multiplied by 100 ($\frac{659}{2,272} \times 100 = 29$).

The cost recovery index in various forms may then be used as a basis for conclusions about cost recovery policy. The effect of various levels of water charges and benefit taxes can be tested until decision is reached about a suitable level and combination of these given such other public policy considerations as equity and the amounts charges elsewhere in the country.

- Rent Recovery Index: the rent recovery index for beneficiaries will be used to estimate the proportion of the benefit received by project beneficiaries that is recovered by the public authorities. It gives an idea of what proportion of the total benefit will be recovered from the project beneficiaries and from other sources.

According to ADB "the extent to which user charges for goods and services recover the full costs of providing such services, including a return on capital employed. It can be defined in terms of financial cost recovery using financial costs or economic cost recovery using economic costs".

PROJECT IMPLEMENTATION

4.1 Concept of Project Implementation

Project implementation is an important phase of project management life cycle. The implementation involves putting the project plan into action. It is the process of transforming allocated resources into outputs, considered necessary to attain the objective of particular development thrust (Dale, 2009:24). Once the project has been planned accordingly to its scope and goals, the implementation phase can begin. In this phase, project manager coordinate and direct project resources to meet the objective of project plan. It consists of execution, monitoring and control, and move to production. The execution of project means starts to produce something in deliverable form. During this period, project manager should monitor and control production process in desirable direction. The desirable direction means quality of output produced within the stipulated time, cost and quality. This is the good implementation of plan and processes in efficient way.

Implementation simply means carrying out the activities according to work plan. It shows the plan into reality. Poor financial planning can lead to budget constraints in the midst of implementation. Therefore, good planning is essential which gives benefits to the service seeker or users. For this, the implementation package can be breakdown into different forms. The reason of

breakdown of each objective is change the implementing package into manageable actions and activities that helps to get expected results. In fact, project is not always an individual endeavor. A project is implemented having with members of an organization. Different organization can be involved to implement a project. One organization can be partner another organization (or with various organizations). Therefore, before the project begins it is important to define the roles (who does what) and responsibilities (who decides what or is accountable for what) of each team member.

The implementation phase is important for getting expected result. In this phase, action plan is put into the operation. It is important for achieving tangible change and improvements. This makes possible to ensure construction of new infrastructure, new institutions and new resources are sustainable in every aspect. The weak project implementation practice does not give expected result. In such a situation, even the effective project planning becomes meaningless.

The implementation phase is of team based project work which makes possible to produce the project output deliverables. The word "deliverable" means anything the project delivers. The deliverables of project output include all of the products or services that are performing by the team for the client, customer, or sponsor, including all the project management documents that can be put together. However, the steps undertaken to build each deliverable will vary depending on the type of project undertaking. In addition to this, the implementation phase keeps the project plan on track with careful monitoring and control processes to ensure the final product deliverable. Most often, changes are identified by looking at performance and quality control data. Routine performance and quality control measurements should be evaluated on a regular basis throughout the implementation phase. If any change is occurred, it affects on the triple constraint (time, cost, scope) and impacts project quality.

During the implementation phase, any time may need to make a change to your plan, and it must start with a change request.

The implementation phase uses the most project time and resources, and as a result, costs are usually the highest during this phase. Project managers also experience the greatest conflicts over schedules in this phase. In such as situation, monitoring of project implementation considering actual time and scheduled work is crucial. How is going on time, cost and schedule of project can be monitor based on network analysis.

4.2 Network Analysis: PERT and CPM

Network is technical sequencing or schedule of problem concerning of minimizing the total time to complete the project or total cost or something like that by enhancing the project's efficiency. It is useful to analyses the complex situation, designing, planning, coordination, controlling, taking decision. Networks are composed of events and activities. An event is defined as the starting or ending point for a group of activities and an activity is the work required to proceed from one event or point in time to another. Project implementation involves numerous activities (project components) by employing various resources such as men, materials, machine, money, and time. The activities of a project have inter-relationships arising from physical, technical and other considerations.

Network: there are two basic network techniques: PERT and CPM.

The common characteristics of these networks are

- The project can be broken down into a well-defined set of jobs or activities.
- The activities must be performed in a certain sequence which is technologically ordered.

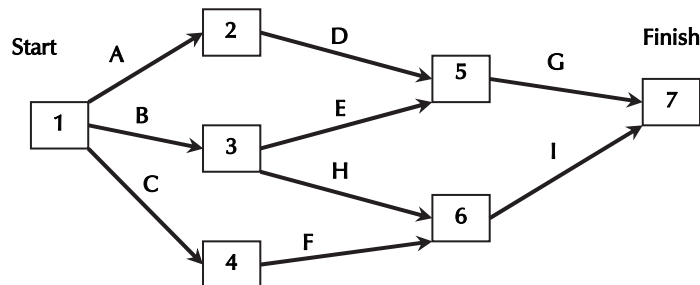
- Within a defined sequence, the activities may be started and stopped in an independent manner.

Activity: an activity is a definite task, job, or function to be performed in a project. An activity is represented by an arrow. The head of the arrow marks the completion of the activity and the tail of the arrow marks its beginning.

Event: an event is a specific point in time indicating the beginning or end of one or more activities. It represents a milestone and does not consume time or resources.

Network: A network diagram should be prepared for the project implementation. This can be helpful to determine shortest time for the implementation.

Preparation of Network Diagram - Illustration				
Name of Activity	Activity		Pre-requisite Activity	Estimated Time (Weeks)
	Event	Event		
A	1	2	None	3
B	1	3	None	5
C	1	4	None	4
D	2	5	A	2
E	3	5	B	3
F	4	6	C	9
G	5	7	D, E	8
H	3	6	B	7
I	6	7	H, F	9



4.2.1 Critical Path Method (CPM)

The maximum time to complete the event and schedule of interrelated activities is called critical path. It takes long time so that it determines the project completion time. All the activities of critical path are called critical activities. Disturbing on any one activity may affect to complete the project. In other word, the critical activity is the sequence of critical activities from project start to project finish that determine the shortest project duration. CPM is a networking technique for planning and managing projects. It is useful to identify critical activities which require special attention from management, to assists in estimating the minimum total time needed to complete the project. CPM is one method, which requires a database of cost time relationships to implement. Basically, such known relationship utilizes for individual activities as a basis for reallocating resources among activities. The known cost time relationship is an unrealistic requirement in the case of most complex projects. Since no such database usually exists. However, it is taken to assume simple linear cost time relationships.

The relationship of above network diagram is explained in following points.

1. The path form $\boxed{A} \rightarrow \boxed{D} \rightarrow \boxed{G}$ has took time to complete the project $3+2+8 = 13$ weeks.
2. The path form $\boxed{B} \rightarrow \boxed{E} \rightarrow \boxed{G}$ has took time to complete the project $5+3+8 = 16$ weeks.
3. The path form $\boxed{B} \rightarrow \boxed{H} \rightarrow \boxed{I}$ has took time to complete the project $5+7+9= 21$ weeks.
4. The path form $\boxed{C} \rightarrow \boxed{F} \rightarrow \boxed{I}$ has took time to complete the project $4+9+9 = 22$ weeks. This is critical path. Because the

longest to complete the project is estimated 22 weeks. So that this is a bottleneck activities.

It was develop to solve the scheduling problems in industrial settings. It is primarily concerned with the trade-off between cost and time. It has been applied mostly to projects that employ a fairly stable technology and are relatively risk free. Hence its orientation is 'deterministic'.

Critical Activities or bottleneck activities:

- All the activities of critical path are called critical activities. Disturbing on any one activity may affect to complete the project.
- Slack: The time to complete the project and the difference between the lengths of activities is called slack. It indicates time day weeks, months, and something like that, which enable to complete the project in time even any one activities be late. This may be positive or negative. Positive slack shows the idle time and resources and negative slack shows the needs of additional time and resources. In addition this, slack is the amount of time a task can be delayed without changing the Critical Path. A task on the Critical Path has no (zero) slack.

We calculate Slack by making a right-to-left pass across the network and find the latest start date for each task.

- Earlier Start Time (Est): The earliest time before initial start to particular activities of a project.
- Earlier Finish Time (Eft): The time period of addition of Est and other particular activities.
- Latest Finish Time (Lft): The last time of timely completing project.

- Latest Start Time (Lst): The difference between Lft and the time of concerned activities is called Lst.

$$\text{Latest Start Date} - \text{Earliest Start Date} = \text{Slack}$$

The Critical Path are those tasks where the Early Finish of the Preceding Task is the Same as the Early Start of a Following Task.

Importance of Updating Critical Path Data

- It is important to update project schedule information to meet time goals for a project
- The critical path may change as you enter actual start and finish dates
- If you know the project completion date will slip, negotiate with the project sponsor
- It was develop to solve the scheduling problems in industrial settings. It is primarily concerned with the trade-off between cost and time. It has been applied mostly to projects that employ a fairly stable technology and are relatively risk free. Hence its orientation is 'deterministic'.

Advantages

- Using CPM for a project promotes advance planning
- CPM provides a concise framework for an ongoing review of project progress.
- The visual representation of the total project communicates effectively to line personnel, funding agencies, and other interest groups.

Limitation of CPM

- Project's activities may not completed within stipulated or predetermine time.

- The time is not analyzed according to statistical method.
- This method is used to control project's activities.

4.2.2 Program Evaluation and Review Technique (PERT)

PERT was originally developed to facilitate the planning and scheduling of the Polaris Fleet Ballistic Missile Project of the U.S. government. It was designed to handle risk and uncertainties. This technique is suitable for research and development programmes, aerospace projects, and other projects involving new technology. In such project time required for completing various jobs or activities can be highly variable. Hence the orientation of PERT is 'probabilistic'.

Latter on PERT was developed as a technique for evaluating established plans and schedules, but its utility is not limited to this. Furthermore, PERT can also be used as a planning and scheduling techniques. It is also called multiple time estimates. The PERT technique for estimating elapsed times provides a way of handling some of the uncertainties in estimating the time required to perform many types of activities.

PERT is basically a management planning and control tool. It can be considered as a road-map for a particular program or project in which all of the major elements (events) have been identified together with their corresponding interrelations. PERT charts are often constructed from back to front because for many projects, the end date is fixed and the contractor has front end flexibility. The purpose of PERT chart is to determine how much time is needed to complete the project. In PERT, uses time as a common denominator to analysis the element which influence the success to the project, namely, time, cost, performance. Since time required for performing of development activities which is often uncertain, this led to the statistical estimation technique. PERT is use in

statistical analysis, time span to complete project activities may not be fixed. It is analysed by three ladders. They are:

Most optimistic time (t_o): the shortest time to complete the project in general time period or no obstacle to run the project.

Most pessimistic time (t_p): long gestation time to complete the project due to the unusual activities.

Most likely time (t_m): the appropriate time to complete the project in general condition.

The expected time (t_e) is calculated on the basis of above three points:

$$t_e = (t_o + t_p + t_m) / 6$$

After the network is prepared, the PERT planners obtain three elapsed time estimates for each activity: the shortest, the longest, and the most probable. These three estimates are used to compute the expected times required to perform each activity and a measure of the probability of accomplishing the activity in that time.

In PERT network analysis, the circle represents events and arrows represent activities. The numbers in the circles signifies the specific events or accomplishments. The numbers over the arrow specifies the time needed (hours, days, months) to go from one event to another. The event need not be numbered in any specific order.

Certain statistics must be known for PERT analysis. They are

- Schedule of each activities and also before starting of activities.
- Time span to complete the project's activities.

4.3 Concept of Project Control

The project control is associated with project planning. Project planning and control is not separable activities. The good planning requires control mechanism. The control mechanism is related to project organization, planning tools and techniques, issue of contracting, monitoring of progress and review based decisions. A suitable organization structure, use of appropriate planning tools and techniques, contracting with agencies, effective monitoring and timely and appropriate decisions are essential for control mechanism. It means effective control is a multi-faceted activity. It is more concerns with technicalities of project planning and control. The technical analysis is done in holistic approach.

4.3.1 Organizations and Structure of Project

Organization means a set of understandings of how human and other resources are to be marshaled toward the achievement of an objective. The understandings of organization structure ranging from policies and procedures to personnel assignments. The acting agency, that is formed when organization work as a process and structure which relate the efforts of number of individuals to perform joint accomplishment.

An organization is created when two or more people agree to cooperate in seeking a common goal. An organizational element is carried out through plans, policies, procedures, and rules, which formally prescribe how the elements are to relate. The organizational techniques such as centralization, decentralization, functional, departmental, product, and process, geographical are patterns for structuring the organization.

Project organization is used to denote an interdisciplinary and inter organizational team pulled together for a specific task. Today, organizational restructuring is a compromise between the

traditional and the behavioral schools of thought; management must consider the needs of the individuals as well as the needs of the company. There are a wide variety of organizational forms for restructuring management. The exact method depends upon the people in the organization, the company's product lines, and managements' philosophy.

4.3.2 Organizing and Staffing the Project Office and Team

Forms of project organization

1. Line and Staff Organization

This is a weak form of organization, which may be employed mostly for small projects as it is certainly not suitable for large projects. A person appointed as project coordinator (PO) works in a staff position to facilitate the coordination of line management in functional departments. The PO does not have authority and direct responsibility of line management but work as focal point for receiving project-related information and seeks to promote the cause of the project by rendering advice, sharing information, and providing assistance. It is conducive to an efficient use of resources but is not suitable for an effective realization of project objectives.

A person is appointed with role and responsibility to coordinate with the personnel of different department. S/he works as an advisor without any direct rights and responsibility to the department. A coordinator is an informant of project, through which s/he advised for the success of project. Weak organization structure coordinator can give coax (soft pressure) to department chief. Its importance is as follows:

- It is useful for small project.
- Not useful for large project.

- Useful to use resources efficiently.

2. Divisional Organization

Under this form of project organization, a separate division is set up to implement the project. A full line authorized project manager (PM) is appointed as the head of this division with a complement of personnel and total formal control over the division. Such division is a separate goal-oriented department with its own functional departments. The divisional project organization facilitates the process of planning and control, brings about better integration of efforts, and strengthens the commitment of project-related personnel to the objectives of the project. Due to the duplication, the approach of this organization may be ineffective use of resources of the firm, unnecessary duplication of specialists. However, it is effective realization of project objective but fails for the efficient utilization of resources. A separate department is established in which department chief have full authority to run the project.

This type of organization is considered more strong organization. It helps to plan project and control, achieve goal within stipulated time and budget, to control misuse of resources of project, to control unnecessary irritation to specialized person.

3. Matrix Organization

The matrix form of project organization is developed achieve twin objectives of effective realization of project objectives and efficient use of resources at the cost of greater organizational complexity. Personnel working in this form of organization have dual responsibility to project manager and the functional manager. The authority and influence of the project manager cut across the traditional vertical line of command.

It is incongruent with the traditional organizational theory: there is a dual subordination, responsibility and authority are not

commensurate, and the hierarchical principle is ignored. It involves greater organizational complexity and creates an inherently conflictive situation. Yet it seems to be better vehicle for the simultaneous pursuit of the twin objectives - efficient utilization of resources and effective attainment of project objectives. Generally, project office personnel are assigned full time to the project and work out of the project office, whereas the project team members work out of the functional units and may spend only a small percentage of their time on the project. In fact, project management is not a one-person operation; it requires a group of individuals dedicated to the achievement of a specific goal. It includes:

- A project manager
- An assistant project manager
- A project office
- A project team

Line and staff and divisional organization is useful only to effective use of resources. It is not useful to achieve projects objective. But matrix organization is useful to achieve goal by effective utilization of resources. However, organizational structure becomes more complex. In this form of organization project's personnel is responsible to project. The authority is divided into program chief and department chief. It is different from other traditional organization theory. In this system, the project personnel work under the two different chief but no uniformity of role and responsibility. No valid of ladder system. This implies that organizational structure more complex and fear from conflicts.

4.4 Project Management Information System (PMIS)

An information system is as essential to the effective control and performance of projects as it is to meeting external reporting requirement, project progress to top management. It helps to foresee potential problem. Actually, an information system is developed for two purpose: visibility for the functional manager and visibility for the project manager in terms of time, cost and performance. It shows the required time, cost and performance based on project plan.

PMIS is a basic information system structure that are used in managing of plan, organization, staffing and controlling. In this regard, there is difficult to define PMIS as it is used 'information processing system', 'information/decision system', or 'information system'. However, the meaning is same to manage information systematically in systematic manner. Moreover, a management information system is an integrated use-machine system for providing information to support the operation, management and decision making function in an organization.

The objective of an information system is to provide the basis to plan to monitor to do integrated project evaluation, and to show the interrelationships among cost, schedule, and technical performance for the entire project. The organizational structure and concept is designed to obtain more effective and efficient utilization of the project's resources of manpower, money, information/technology, equipment, facilities, and materials. For this, a resource needs to flow horizontally and vertically for its effective utilization. In addition to this, the development of a project information system involves the gathering and combining of data from the functional units supporting the project.

4.4.1 Basic Objective of a PMIS

- To develop model information system: It may be developed within an organization to serve as a model information system for all projects. The term model refers to a basic information system structure which will provide essential information to the project manager and to top management, and, at the same time,.
- Flexibility: Sufficiently flexible so that it can be modified to suit the unique needs of the individual project manager
- Adaptability: Adaptable to many different projects, adaptable to differing customer information requirements.

Such model will provide a basic information source to meet the requirements of functional manager, project manager, top management, and customer information.

4.4.2 PMIS Criteria: It must

- Provide essential information on the cost-time-performance parameters of a project.
- Useful to top management for multi-project control and long range planning.
- Provide for customer reporting requirements.
- Be exception oriented.
- Fit into the overall organization information system and strategic planning system.
- Be prospective in nature rather than retrospective (showing).
- Incorporate both external and internal data to provide a capability.
- Be consistent with existing project management guides and procedures.

- Be consistent with policy documentation developed earlier by the organization.
- Provide a capability for routine reporting exception reporting and special analyses.
- Provide for measurement at the critical project functional interface.
- Provide a basic data requirement for functional managers to furnish to the project office and to facilitate in house functional visibility.
- Provide for project visibility during the various phases of a project life cycle.

4.4.3 Understanding Project Management and its Functions

The system approach to implementation is most often spoken of as project management, program management, or matrix management (others task force management, team management). Project management is a systems approach for efficient and effective achievement of project objectives. It consists of knowledge, tools and techniques for managing a project. The strategic choice of implementation function of management becomes paramount: i.e., the actions or programs which have been decided upon must be put into action and evaluated for effectiveness.

Project management is the discipline of defining and achieving targets while optimizing the use of resources (time, money, people, materials, energy, space etc.) over the course of a project. It is often considered to be both an art and a science. It is an art because of the strong need for interpersonal skills, and the project planning and control forms attempt to convert part of the art into a science. The idea of a project – a combination of human and nonhuman

resource pulled together in a 'temporary' organization to achieve a specified purpose- reflects the systems approach to the implementation function of management.

The word management is divided into MANAGE-MEN-T. This implies that management means managing tactfully by human beings. Management is the art of getting things done through people. According to Harold Kerzner project management is the planning, organizing, directing and controlling of company resources for a relatively short term objective that has been established to complete specific goal and objective. Project management is carried out by a set of managers acting as unifying agents for particular projects in respect to the current resources of time, funds, materials, people, and technology.

Function/process of project Management

Project management is composed of several different types of activities such as:

- Planning the work
- Assessing the mitigating risk
- Estimating resources
- Organizing the work
- Acquiring human and material resources
- Assigning tasks
- Directing activities
- Controlling project execution
- Reporting progress
- Analyzing the results based on the facts achieved.

Project management tries to gain control over five variables:

- Time
- Cost
- Quality
- Scope : specified for the end result
- Risk : potential points of failure.

Functions of management

Planning: Objectives, goals, strategy, development of work breakdown structure, determine sequences of activities, network diagram, time schedule, and resource planning.

Organization: determine project team, role, and law define policies, procedure and techniques, authority, responsibility and accountability.

Directing: determine resource allocation and utilization limit, develop leadership system, capability, participatory approach, decision making techniques.

Controlling: determine cost, schedule, performance standard, means of evaluation, project management information system,

Motivation: determine group member, advice and monitoring, rewards,

Characteristics of Project Management

- Objectives oriented
- Change oriented
- Single responsibility center
- Team based
- Functional coordination

- Planning and control
- Constraints

Body of knowledge (management of scope, time change, integration cost quality human resource, conflict risk, procurement)

Benefit of Project Management

- Expansion of knowledge of technology
- Identification of exact problem
- Timely work
- Team speed
- Satisfaction of customer
- Quality work
- Conflict management
- Adaptation of change

MONITORING AND EVALUATION

Background

Monitoring and evaluation has an important role to play as a management tool and process of achieving objectives and targets determined by plan through effective implementation of development plan. Performance has to be monitored in order to complete the development programs and projects in the stipulated quantity, quality, costs and time for the target of the periodic plan to be accomplished. Monitoring of sustainability aspects and evaluation of different aspects has to be carried out to check whether beneficiaries could reap targeted outcomes from development policies, programs and projects in a sustainable way and thereby to check the impacts of those in their lifestyle. In the same way, it is necessary to monitor development results and poverty in order to adjust overall development process against its impacts on livelihoods of all regions, sex, social groups and backward group. By considering all of these facts, monitoring and evaluation system has to be made further effective so as to conduct review of past efforts and institutionalize monitoring and evaluation more effectively with necessary revisions and to especially monitor programs of reconstruction, rehabilitation and

readjustment to be implemented during interim plan period and additional new programs (Agrawal, 2014:202).

Monitoring and evaluation are considered important aspect of project for achieving the objectives. The key things for M and E are time, cost and performance standards. The M and E are related but they are different in distinct activities. Monitoring is usually an ongoing activity throughout the life of the project while evaluation is periodic. Evaluation is undertaken at certain times, such as mid-term or termination of a project. Generally use of M and E is considered the synonymous but it has distinct differences, however, which has close relationship.

5.1 Concept of Monitoring

Monitoring is a continuous or frequent (usually regular) assessment of implementation and its outcomes (Dale, 2009:24). the systematic and continuous assessment of the progress of a piece of work over time. It is an objective and systematic judgmental process for determining relevance, efficiency, effectiveness and impact of project performance. It is a basic and universal management tool for identifying strength and weakness in a program. It helps to take appropriate and timely decisions that will improve the quality of the work. The setting goals, indicators and targets for programs is the central part of monitoring system. It fact, monitoring can help to improve policy design and implementation as well as promote accountability and dialogue among policy makers and stakeholders. Monitoring may be done for three main purposes: assessing the performance of a programme or project; analyzing organizational performance; and examining features and processes in the environment of an organization or scheme. However, they are more or less related to each other.

Monitoring covers a wide variety of techniques and methods and applies to the management of finance, personnel, vehicles and buildings, as well as to the progress to program activities and the way the activities are carried out. Therefore, it is not simply a means of collecting information however, it must also be a communication system in which information flows in different directions between all the people involved. The aim of monitoring is tracking and improving project implementation. It is a feedback mechanism in which problems are identified and corrective actions are taken. It is an internal activity in the project.

Monitoring is continuous process of observation regarding the flow of investment and implementation to find whether correct or not the investment/materials, implementation schedule or work plan, objective returns and other related works project or program implementations. It tries to find the tracks about what is happening within a program and uses the data collected to inform program implementation and day-to-day management and decisions. In this process, generally use the administrative data. The data is to improve implementation process and effectiveness of costs. Monitoring can also include outcomes, such as progress toward achieving national development goals.

The essential components of monitoring system

- The selection of indicators for each activity.
- The collection of data concerning the indicators.
- The analysis of data.
- Presenting the information in an appropriate way.
- Using this information to improve the work.

Challenges of Monitoring

The project analyst should have to face various challenges to determine the monitoring system such as:

- Identify the goal: reducing the poverty can be a goal but how much percentage is a difficult task.
- Identify the key indicators: indicators may be calories of food? Per capita income?
- Set targets: a target might be to halve the number of households living on less than a dollar a day by 2020.
- Establish a monitoring system: progress toward achieving specific targets and to inform policy makers.

5.2 Concept of Evaluation

Literally, evaluation means "assessing the value of". *Evaluation, in the context of development work, as mostly a more thorough examination than monitoring, at specified point of time, of programmes, projects or organizational performance, usually with emphasis on impact for people on commonly also relevance, effectiveness, efficiency, sustainability and replicability* (Dale, 2009:50). It is the process of examining a program or process to determine the working performance such as what's working, what's not, and why. It is categorized into formative and summative evaluation. Formative evaluation aim at improving the performance of the programmes or projects at are evaluated, through learning from experiences gained (Dale, 2009:33). A *formative evaluation* (sometimes referred to as internal) is a method for judging the worth of a program while the program activities are in progress. The formative evaluations permit the designers, learners, instructors, and managers to monitor how well the instructional goals and objectives are being met. Its main purpose is to catch deficiencies of project meet required skills and knowledge. It is done more than once for a particular scheme.

While summative evaluation (sometimes referred to as external) is a method of judging the worth of a program at the end of the program activities (summation). Summative evaluations are undertaken after the respective development schemes have been completed (Dale, 2009:34). Its aim is to judge the worth of projects in terms of design and management. Its findings can be used in the planning and implementation of other projects. The focus has given on the outcome. Evaluation is the measuring of project objective and its relevancy, capacity, beneficial and effectiveness.

Evaluations are periodic, objective assessments of a planned, ongoing, or completed project, program, or policy. Evaluations are used selectively to answer questions related to design, implementation, and results. In contrast to continuous monitoring, they are carried out at discrete points in time and often seek an outside perspective from technical experts. Their design, method, and cost vary substantially depending on the type of question the evaluation is trying to answer. In this regard, it is necessary to distinguish whether evaluation is operation or impact.

- Operational evaluations examine how effectively programs were implemented and whether there are gaps between planned and realized outcomes.
- Impact evaluation studies whether the changes in well-being are indeed due to the program intervention and not to other factors.

In fact, an evaluation is the assessment at one point in time of the impact of a piece of work and the extent to which stated objectives have been achieved. The evaluation is important for evidence based policy making. The essential components to carry out evaluation are

- Clear, measurable objectives.

- Key indicators which can show what progress has been made towards achieving the objectives.
- Information about the indicators.

Evaluation of development project must begin with design. Evaluation is done to improve project implementation and to improve future project planning and decision making. It is an external activity in the project.

5.3 Distinctions between Monitoring and Evaluation

Monitoring	Evaluation
It is continuous process of ongoing project. It can be considered as internal activities.	Initial ex-ante evaluation, mid-term evaluation, terminal evaluation and ex-post evaluation.
Monitoring is done only in operational period.	Evaluation is done both in operational and after completion of project.
It is a process to improve the weakness of operational piece of work.	It helps to improve the project implementation, getting feedback as well as program and decisions improvement.
It is directly related to process of project implementation, investment and result.	It is related to effect of predetermine goal and achievement to stakeholders/beneficiaries.
It is a part of management.	It is a process of getting feedback and lesson learn.
It is done by implementing agency.	Generally, it is done by external and independent institutions.

5.4 Concept of Logical Framework Approach

The logical framework approach is a planning tool-or rather an open set of tools- for project design and management. It helps to identify the goal, objective, and output of a project and cause and effect relationship between them. It also helps to develop the indicators whether project goal and objectives are achieved or not.

It analyzes the effect of external factors based on assumptions in the success or failure of project. It can be used simply to structure and create overview of complex projects on a single sheet of paper. The aim of LFA is opening and sharing perceptions, options and choices.

Its purpose is to provide a clear, rational frame work for planning the envisioned activities and determining how to measure a project's success, while taking external factors in to account.

- **Why:** A project is carried out/organization is established?
- **What:** Intended effect (cumulative effect of all achievements) the project/organization would like to make (conditions to be brought at the end of the project phase/period), which can be observed at the beneficiary level?
- **How:** The project/organization is going to achieve these outputs? (What specific tasks the project/organization team have to carry out?)
- **Which:** External factors are crucial for the success of the project/organization?
- **What:** Outputs or concrete achievements the project/organization must bring about (for which the implementation team should be held responsible)?

History of LFA

After second world war Different agencies started development activities in their own way in this context USAID monitored its activities all over the world and found following facts:

- Programs and objectives were not matching
- External factors of the projects were not considered
- No indicators for monitoring and evaluating the project

In order to solve above problems Log Frame was used by USAID and Canadian Government during 1970s which focused mainly on Log frame. At that time present analytical tools like Context, Problem and objective analysis were not used. During 1980s, Gtz reviewed this tool and included the following parts in LFA.

- Involvement of stakeholders while during stakeholders analysis
- Use of problem tree while analyzing problem
- Developing the project by the stakeholders
- Use of cards and charts to write workshop output

During 1990s Many of the International organizations like DFID, NORAD, EU, DANIDA and CIDA adopted this tool in planning of the project. In Nepal this tool was adopted by NPC as a formal planning tool.

Three LFA generations

- First generation: Description of projects in a standardized matrix
- Second generation: Combines the matrix with a problem and objective
- Third generation: When implementing and managing projects. It is used as a tool to increase communication between the involved parties in the project.

LFA Matrix

LFA basically design in 4×4 matrix. It is also called project design matrix (PDM), ZOPP. In Nepali it is called vision matrix. In this matrix, there are four column and four rows. In first column, there is project's goal, objectives, output and activities. The different indicators mention in second column, objective verifiable

indicators in third and assumptions/risk in fourth column. Each column represents the relationship between investment, activities, objective and goal of the project. It is called vertical logic. The rows show the achievement of activities which is called horizontal logic. A matrix table is given below.

Design Summary	OVI Objectively Verifiable Indicators	Means of verifications	Risk and Assumptions
Goal	Development goal	Official document(s)	From immediate objective to development objectives
Objective	Immediate objective		From result to immediate objectives
Output	Outputs		From activities to results
Activities	Input		Preconditions

LFA and its application

LFA tool can be used in various activities such as

- Terms of Reference
- Project Identification
- Project Appraisal
- Work Planning
- Team Building
- Reporting
- Project Review
- Project Evaluation

Working Areas of LFA

1. **DEFINE FOCUS QUESTION:** Focus question is a central part of working process where the task is given. Generally the question is started from How? There are mainly five focus areas such as context (stakeholders, policy concern,

uncertainties), problem (want to address), objective (want to achieve desired situation), choice (comparison of options), action (strategy chose and selects concrete).

5.5 Project Monitoring and Evaluation System in Nepal

The M/E system developed and its use begins by different countries and UN system during the decade of 1960 and 70. At that time the system was adopted and focused on flow of investment/materials and its returns rather than project's effect and impact to the beneficiaries. After 1980 the approach is established and adopted as a system tool of development project and program for effective and objective oriented management. In Nepal, the monitoring and evaluation system was introduced in fifth periodic plan (2032 - 2037 BS). At that time only weightage system was used to evaluate the project. In 2042, the sectoral performance indicators was developed, however, the system did not work in sustainable way. From the eighth plan (2049 -2054) this approach was developed as system of monitoring and evaluation. The National Development Action Committee-NDAC was established under the chairmanship of prime minister and the Ministerial Development Action Committee - MDAC at the ministerial level from cabinet decision of 2049/04/08 BS. Poverty Monitoring and Analysis System - PMAS was started from tenth periodic plan (2059 - 2064 BS) as well as three years interim plan (2064 - 2067 BS) having with monitoring and evaluation policy based on log table. The time taken to be public service delivery was monitored under the office of auditor general based on Public Expenditure Tracking System -PETS. There is also a provision of impact evaluation under the national planning commission and providing of feedback regarding the development plan, policy, programme and project.

5.5.1 Monitoring and Evaluation Bases

- Policy
- Periodic plan
- Business plan: Managing for Development Results –MfDR, Performance Indicators
- Medium-Term Expenditure Framework
- Budget Policy and Programme
- Project Document
- Immediate Action Plan

5.6 Project Evaluation Methods Adopted by UN System Selected International Institutions: UNIDO, OECD and World Bank

UNIDO and LMST Techniques of Project Appraisal:

This technique was developed during the decade of 1960-70. the first, second and third techniques are UNIDO, OECD and World Bank respectively. OECD technique developed by Little and Mirrlees and World Bank technique developed by Squire and Van der Tak. After hot discussion, Squire and Van der Tak were drawn conclusion from UNIDO and OECD and were developed as new technique, and which was named as LMST technique.

The UNIDO approach was first articulated in the Guidelines for Project Evaluation which provides a comprehensive framework for SCBA in developing countries. The UNIDO method of project appraisal involves five stages.

- Calculation of financial profitability of the project measured at market prices.
- Obtaining the net benefit of project measured in terms of economic prices.
- Adjustment for the impact of the project on savings and investment.
- Adjustment for the impact of the project on income distribution.
- Adjustment for the impact of project on merit goods and demerit goods whose social values differ from their economic values.

Assumptions of UNIDO and LMST Techniques

Open and liberal economic system of international trade is principle basis of LMST and UNIDO, which enhances the efficient product and service price. It is possible if factor of production is allocated efficient, which raises the growth rate.

- A social preference is attracted on existing income distribution system.
- All the international traded goods and services can be freely determined however they use.
- Interpersonal utility comparison is possible.
- Macro planning variables can be included in micro planning. Therefore, public project planning authority is provided to central planning authority.

There is no significant difference in UNIDO and LMST Techniques which gives same result in project appraisal, however, UNIDO is more theoretical and less practical advice. The most striking difference lies in the choice of numeraire (accounting system). According to LMST technique uncommitted foreign exchange in

the hands of government is called numeraire. Whereas, in UNIDO technique, domestic consumption expressed in local currency is called numeraire. There is another operational difference to calculate the goods or services which is used in operation of project but not included in internal trade.

Similarity between UNIDO and L-M approach.

- Calculating accounting (shadow) prices particularly for foreign exchange savings and unskilled labour.
- Considering the factor of equity
- Use of DCF analysis

Differences

- The UNIDO approach measures costs and benefits in terms of domestic rupees whereas LM approach measured it in terms of international prices.
- UNIDO approach measures costs and benefits in terms of consumptions whereas LM approach measures it in terms of uncommitted social income.
- The stage-by-stage analysis recommended by the UNIDO approach focuses on efficiency, savings, and redistribution considerations in different stages. The LM approach, however, tends to view these considerations together.

Development

6.1 Concept of Development

No society can surely be flourishing and happy, of which by far the greater part of the numbers are poor and miserable.

– Adam Smith, 1776, *The Wealth of Nations*

Development can be seen . . . as a process of expanding the real freedoms that people enjoy.

– Amartya Sen, Nobel laureate in economics

Development is the process of improving the quality of all human lives and capabilities by raising people's levels of living, self-esteem, and freedom

– Todaro and Smith

Development is considered an elusive (vague) concept. It can be explained but cannot be defined by a specific word. It is an contextual issue which depends on time, place, society, individual choice, new invention etc. In economic perspective, it is a continues process where an individual never be fully satisfied. Therefore, it is said that development is a process of change (Zeller M., 2000). It indicates that needs and aspirations of people are continuously increasing one after another. Moreover, change may be considered to be an instrument of development (Singh Katar, 2014). It may be measured based on quantitative and qualitative changes in an economy. Moreover, a benchmark has been developed by UN for all over the world to identify the status of development in the country. The countries having an HDI below 0.5 are considered to have

a low level of human development, those between 0.5 and 0.8 a medium level, and those above 0.8 a high level.

Human beings are conscious living beings who want to have something to live. The basic things are required known as human rights to live. In this regard, Samuelson rightly says that men do not always starve quietly. In this context, the concept of development can be explained based on the theory of development. Three ways of thinking about development theory.

- Theory as paradigm: assumption changed from economic development to economic + non-economic.
- Theory as a 'lens': experience and perception of people about development different way.
- Theory as new knowledge: finding through methods.

Economic Development is a race between population growth and technological development. Whereas economic growth is "the process whereby the real per capita income of a country increases over a long period of time" Meier, G.M. cited in Jhingan, 1992). The change in quantity and quality of physical and human capital (legal system; education, health, social habit). The performance of quantitative and qualitative result can be determined by benchmarking. This benchmarking by numbers and by good institutional practices are the approaches to measure the performance of government (Vazquez-Caro and Bird, 2011). Development must be redefined as an attack on the chief evils of the world today: malnutrition, disease, illiteracy, slums, unemployment and inequality.

For Sen, human “well-being” means *being well, in the basic sense of being* healthy, well nourished, well clothed, literate, and long-lived and more broadly, being able to take part in the life of the community, being mobile, and having freedom of choice in what one can become and can do.

Happiness = material consumption/desire

Happiness is part of human well-being, and greater happiness may in itself expand an individual’s capability to function. One of the findings is that the average level of happiness or satisfaction increases with a country’s average income.

Happiness: relationships, financial situation, work, community and friends, health, personal freedom, and personal values.

Thus, development is a normative concept.

Evolution of Concept of Development Economics:

The concept of development has been changed with the change in passage of time such as ancient, classical, modern, postmodern.

- First thinkers: Kautilya, Aristotle,... Merchantalist.
- Classical views: Supply creates its own demand. $D = S$ (perfect market)

Modern views: Demand creates its own supply. In development economics it deal with the *economic, social, political, and institutional mechanisms, in both public and private sectors to improve human lives in sustainable way (imperfect market)*. A larger government role and some degree of coordinated economic decision making directed toward transforming the economy are usually viewed as essential components of development economics.

- Postmodern views: Equilibrium between living and nonliving things i.e. relationship between human and natural environment.

The concept of economic development has been evolved with the political decisions. It interplays between economic system, politics and institutions for allocating resources and generates incentives considering markets, poverty, welfare, inequality, taxation, regimes, transitions, growth, ethnicity, religion, and culture. Therefore, political economy of development is concerned with relationship between politics and economics in decision making. Up to 1970 development means increased output i.e. GDP. It means increase sustained rate of growth of output in per capita than size of population and wellbeing = real per capita GNI – Rate of Inflation.

What can be done to hasten the growth and development?

- Population problems: health and nutrition, education, agriculture and industry, disguised unemployment.
- Natural resources: better use of existing resources.
- Capital formation: low saving, inequality, qualitative distortion of investment, FDI,
- Technological change: Imitating technology, interplay of technology, entrepreneurship and innovation.

Development Cycle

Thing that has developed.

- Underdeveloped: under-utilizing the resources.
- Overdeveloped: over-utilizing the resources
- Appropriately Developed: appropriately use of resources.

Distinctions between growth and development

The growth and development sometime considered interchangeable. However, it can be distinguished in regards to various issues. Economists have distinguished it in various ways some economists' views are presented in following.

Growth	Development	Economist
Increase in income of rich country	Increase in income of poor country	Maddison
Development of unused resources	Use of resources	Mrs. Hicks
Gradual and steady change in the long run.	Discontinuous and spontaneous change in stationary state	Schumpeter
More output	More output and change in the technical and institutional arrangements	Kindleberger
Expansion of system without change in structure.	Structural transformation of social system	Friedmann
Quantitative changes (transformation of natural capital into manmade capital)	Qualitative change (increased quality of goods and services)	Herman Daly

Source: Jhingan.

6.2 Poverty

"Poverty is the denial of all human rights. It is not created by the poor. It is created and sustained by the 'system' we have built around us."

Muhammad Yunus

Poverty refers to the hungry, lack of shelter which is unwanted situation of human beings.

poverty, the state of one who lacks a usual or socially acceptable amount of money or material possessions. It is defined as human poverty, income poverty. Some terminologies of poverty is given below.

1. Human Poverty: the lack of essential human capabilities, such as being literate or adequately nourished.

Human Poverty Index (HPI)

HPI-1: represent developing countries in same dimension of HDI. Indicators are age 40 years, adult literacy rate, overall economic provisioning (improved water, underweight children).

HPI-2: represent OECD (Organization of Economic Cooperation and Development) countries in same dimension of HDI. Indicators are age 60 years, adult functional literacy rate, income poverty less than 50% median. One additional dimension is social exclusion.

2. Income Poverty: the lack of minimally adequate income or expenditures.

Extreme Poverty: indigence or destitution usually specified as the inability to satisfy even minimum food needs.

Overall poverty: a less severe level of poverty, usually defined as the inability to satisfy essential nonfood as well as food

needs. The definition of essential nonfood needs can vary significantly across countries.

Relative Poverty: poverty defined by standards that can change across countries or over time. An example is a poverty line set at one half of mean per capita income implying that the line can raise along with income. Often this term is used loosely mean overall poverty.

Absolute Poverty: poverty defined by a fixed standard. An example is the international one dollar-a-day poverty line-which is designed to compare the extent of poverty across different countries. Another example is a poverty line whose real value stays the same over time so as to determine over changes in poverty in one country. Often this term is used loosely to denote extreme poverty.

Poverty Dimensions	Indicators
Health	Child Mortality Nutrition
Education	Years of schooling School attendance
Living Standards	Cooking fuel, Toilet, Water, Electricity, Floor, Assets

Causes of Poverty



References

Agrawal, Govind Ram (2014) *Project Management*. Kathmandu: M.K. publishers and Distributer.

Chandan, Prasanna (1999) *Projects: Planning Analysis Selection Implementation and Review*. New Delhi: Tata McGraw-Hill Publishing Company Limited.

Chaudhary, S. (2001) *Project management*. New Delhi: Tata Mc Graw-Hill Publishing Company Limited.

- Dale, Reidar (2009), *Evaluating Development Programmes and Projects*, SAGE Publications India Pvt Ltd, fifth edition.
- Gittinger, J. Price (1982), *Economic Analysis of Agriculture Project*, Published for EDI SERIES IN ECONOMIC DEVELOPMENT, World Bank, The Johns Hopkins University Press.
- Joy, P.K. (1999) *Total Project Management: The Indian Context*. Delhi: Machmilin India Limited.
- Karki , Rajendra (2063) *Project management*. Kathmandu: M.K. publishers and Distributers.
- Kerzner, Harold (2004) *Project management: A Systems Approach to planning Scheduling and Controlling*.
- Khandker, Shahidur R., Koolwal, Gayatri B. and Samad, Hussain A.(2010), *Handbook on Impact Evaluation, Quantitative Methods and Practices*, the International Bank for Reconstruction and Development, World Bank.
- Little, IMD and Mirrless, J.A.(1974) *Project Appraisal and Planning for Developing Countries* . New Delhi: Oxford and IBH Publishers company.
- Meredith, Jack/Mantel, Samuel J. (1989) *Project Management*. New York: John Wiley and son. Inc.
- Rijal, Puskar Raj (2002) *Essential of Project appraisal and Management*. Kathmandu Kastamandap Academic Enterprise.
- Sharma, Bhakti P. (2006) *Project management: Planning, Analysis and Control*. Kathmandu: Ekta Books.

Appendix

Table 3.1 An imaginary numerical example of cash flow analysis by taking with and without project situation.

	Years from start of project										Total
	1	2	3	4	5	6	7	8	9	10	
<u>Without project</u>											
Usual production expenses	100	100	100	100	100	100	100	100	100	100	1000
Gross benefits	160	160	160	160	160	160	160	160	160	160	1600
Net benefits (annual profit)	60	60	60	60	60	60	60	60	60	60	600
<u>With project</u>											
Investment costs (tractor)	500	0	0	0	0	0	0	0	0	0	500
Production expenses											
Usual expenses	130	130	130	130	130	130	130	130	130	130	1300
Operating and maintenance of tractor	50	50	50	50	50	50	50	50	50	50	500
Gross benefits	360	360	360	360	360	360	360	360	360	360	3600
Net benefits* (annual profit)	(320)	180	180	180	180	180	180	180	180	180	1300
Changes due to project											
Intermediate cost (cash outflow)	580	80	80	80	80	80	80	80	80	80	1300
Intermediate benefits (cash inflow)	200	200	200	200	200	200	200	200	200	200	2000
Net incremental benefits (project annual cash flow)	(380)	120	120	120	120	120	120	120	120	120	700
Total cash flow = Rs. 700											

Note: $NB^* = GB - GC$, incremental cost = gross cost of with project - gross costs of without project, incremental benefits = gross benefit of with project - gross benefit of without project, net incremental benefit = incremental benefit - incremental cost (B-C). Figure in parenthesis represent the negative sign.

Table 3.2 Computing the IRR for Small Farmer Tractor Utilization -Purchase Option.

year	GI COSTS			DF at 15%	PV of GI costs	GI benefits	PV of GI benefits	INB = GB-GC	PV = INB×DF
	Investment	Others	Gross						
1	500	80	580	0.870	505	200	174	-331	-288
2	0	80	80	0.756	60	200	151	91	68.79
3	0	80	80	0.658	53	200	132	79	51.98
4	0	80	80	0.572	46	200	114	68	38.89
5	0	80	80	0.497	40	200	99	59	29.32
6	0	80	80	0.432	35	200	86	51	22.03
7	0	80	80	0.376	30	200	75	45	16.92
8	0	80	80	0.327	26	200	65	39	12.75
9	0	80	80	0.284	23	200	57	34	9.65
10	0	80	80	0.247	20	200	49	29	7.16
Total	500	800	1300	5.019	838	2000	1002	164	-30.5

Note: PV = present value, GI = gross incremental, DF = discount factor

The above table shows that in 15 percent interest rate the present value would not have zero. Therefore, the process of interpolation has to be followed to make zero present value.

$$IRR = r_L + [\Delta r \times N_L / (|N_H| + |N_L|)].$$

Where, suppose

r_L = lower discount rate. = 8%

Δr = difference between discount rates. = 10%

168 Development

N_L = net present worth of lower discount rate. = Rs. 100.00

N_H = net present worth of higher discount rate. = -Rs. 50.00

$IRR = 8 + [10 \times 100 / (50 + 100)]. = 8 + 1000/150 = 14.67$ percent.

About the Author

Dr. Buddhi Man Shrestha is lecturer at Public Administration Campus, Tribhuvan University, Nepal since 2008. He has completed MA in economics, MPhil in Public Administration, Post Graduate from Bergen University, Norway and PhD in Public Administration. He has been teaching economics, public finance, project management, local governance at this campus. He has work experience of training and research specialist at Local Development Training Academy, Jawalakhel.

He has done various research works such as intergovernmental relationship in plan formulation (National Planning Commission), equalization grants (Fiscal Commission), Revenue Prediction (Province and Local Governments), periodic plan of local governments and DDC and capacity development of DDC, revenue prediction and social audit of municipality, cost- benefit analysis of suspension bridge, organization and management and the like. In addition to this, he has published various articles in the journals. He presented his research works in various national and international conferences.