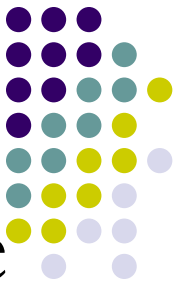


# Chapter 3: Technical Analysis



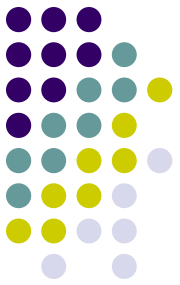
- Technical analysis seek out to decide whether the fundamentals for the successful commissioning of the project has been considered and reasonably good options have been made with respect to location, size, process etc.
- It is done continually when a project is being examined and formulated.

The broad purpose of technical analysis is:



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

## 3.1. Production Program and Plant capacity



### 3.1.1 Production Program

- define the levels of output to be achieved during specified period
- should indicate **the basic products, by – products, and wastes** during the process.
- It should:
  - be directly related to the specific sales forecasts.
  - Consider losses of production within the production plant site, in storage, transportation and by warranty service.
  - Take into account level of technology absorption



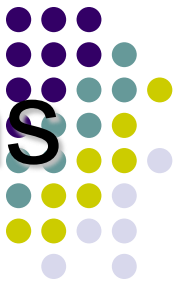


- The production program (**capacity utilization**) changes in time during project life.
- Initially (for the first one or two years of operation) small capacity utilization is often achieved.
  - market is not ready to acquire large amounts of new product
  - the technological difficulties obstruct the full – capacity operation of the equipment.
- The determinants of a production program during the initial production years vary considerably from project to project.
  - Single – product – continuous process manufacture: production problems are more critical
  - Multiple – product – continuous process production: both production and sales problems
  - Batch/job order production: Sales problems are more critical
  - Assembly/mass manufacture: sales problems in relation to price are critical

## 3.1.2 Plant Capacity



- Plant capacity is the upper limit or ceiling on the load that an operating unit can handle.
- It is the maximum rate of output of a process or system
- Accounting, finance, marketing, operations, purchasing, and human resources all need capacity information to make decisions



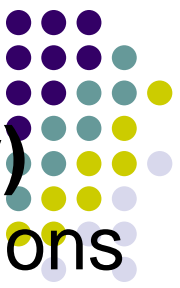
# Importance of Capacity Decisions

- Impacts ability to meet future demands
- Affects operating costs
- Major determinant of initial costs
- Involves long-term commitment
- Affects competitiveness
- Affects ease of management

# Factors determining Capacity decision:



- **Technological Requirement:** Minimum Economic size determined by the technological factor
- **Input Constraints:** constraints on the availability of certain inputs.
- **Investment Cost:** with no serious input constraint, cost per unit of capacity decreases as the plant capacity increases.
- **Market Conditions:**
  - If very strong, higher capacity is preferable.
  - If very uncertain, start with small capacity
- **Resources of the Firm:** Managerial and financial
- **Government Policy:** minimum economic capacity



## ***Types of plant capacity:***

### ***1. Design capacity (Nominal Maximum Capacity)***

- Maximum obtainable output under ideal conditions
- Can only be achieved with unusual working conditions.

### ***2. Effective capacity (Feasible Normal Capacity)***

- Maximum capacity given product mix, scheduling difficulties, and other doses of reality (lunch breaks, machine maintenance).
- The output to be achieved under efficient operating condition.

### ***● Actual output***

- Rate of output actually achieved--cannot exceed effective capacity. This is effective capacity minus unforeseen problems, such as machine breakdown, union problems, and so on.



$$\text{Efficiency} = \frac{\text{Actual output}}{\text{Effective capacity}}$$

$$\text{Utilization} = \frac{\text{Actual output}}{\text{Design capacity}}$$



# Capacity and Scale

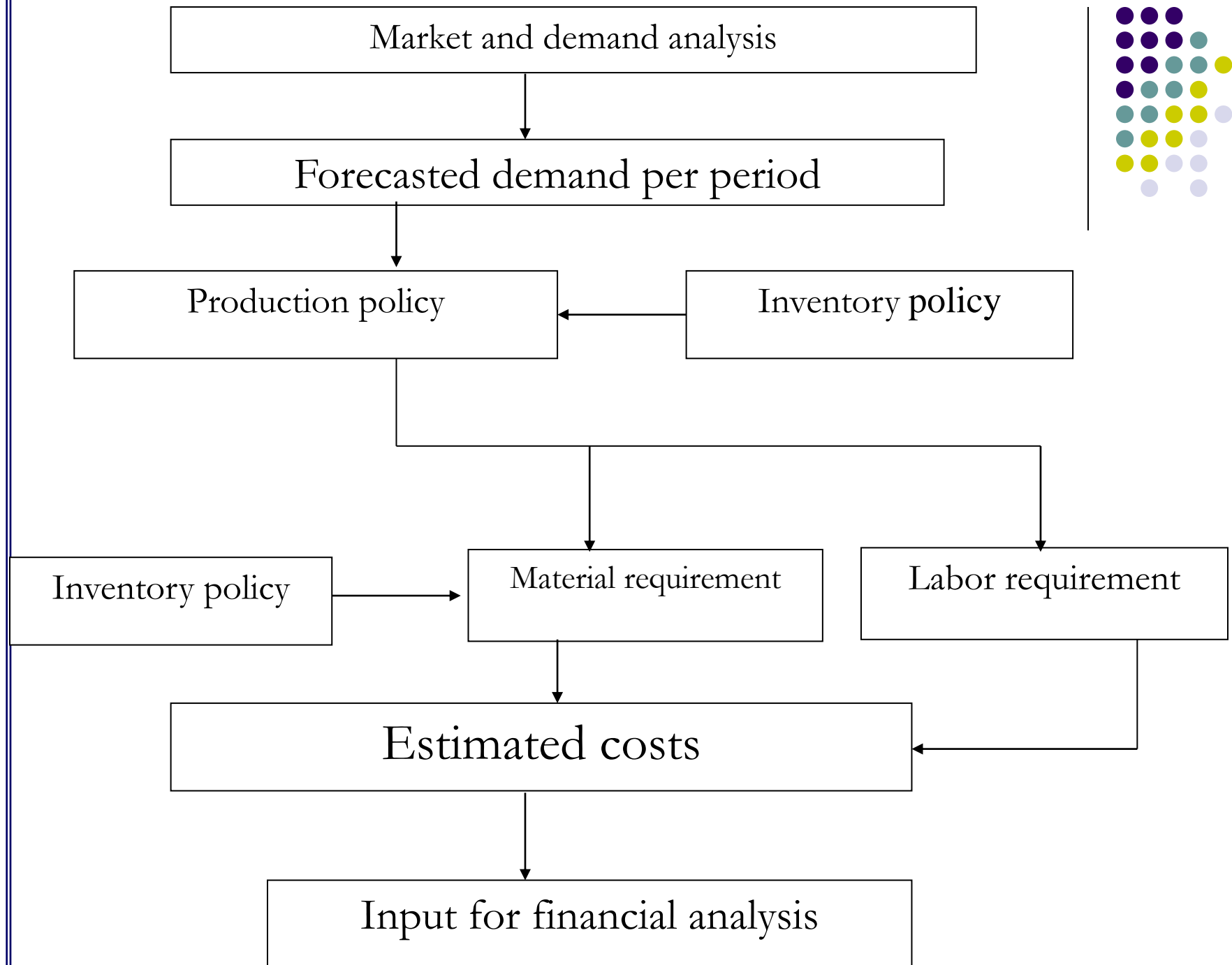
- **Economies of scale:** cost advantages exploited by expanding the scale of production in the long run. It leads to reduction in long run average costs over a range of output.
  - Spreading fixed costs
  - Reducing labor costs
  - Cutting costs of purchased materials
  - Finding process advantages
- **Diseconomies of scale:** rising long run average costs
  - ◆ Complexity
  - ◆ Loss of focus
  - ◆ Inefficiencies

## 3.2 Raw material and Supplies study



- Materials and supplies are the major inputs (ingredients) of any project though the degree of consumption may differ from project to project.
- closer relationship between the definition of input requirements and other aspects of the project formulation:
  - definition of plant capacity
  - location & site analysis
  - selection of technology and equipment
  - Economic viability
  - Etc

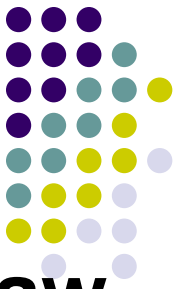






- The objective is:
  - to identify and quantify the project material inputs and
  - to assess the feasibility of a sustained supply of these inputs all through the effective life span of the project.
- Basic issues to be raised:
  - What types of materials are needed?
  - Where are the sources of these materials?
  - How are they obtained?
  - What are the costs of these materials?
  - What are environmental impacts of using these materials?

# Classification of Raw Materials and Supplies



## 1. Unprocessed and semi-processed raw materials

Includes the following types of items:

- i. Agricultural products:* cereals, oil seeds, flowers, sugar canes and sugar beets, etc
- ii. Livestock and forest products:* meat, milk, fur, leather/skin, horn, teeth, etc of animals (both domestic and wild), timber, gums, etc.
- iii. Marine products:* fishes, the water itself, plants in the water , salt, etc.
- iv. Mineral products:* both metallic (gold, phosphate, iron, etc) & nonmetallic (oil, gas, coal, clay, etc)

## 2. Processed industrial materials and components



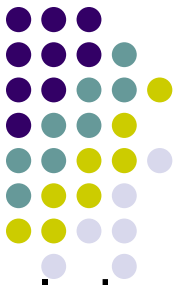
Such inputs can be generally classified under:

- i. Base metals:* copper, aluminum, etc
- ii. Semi processed materials:* sheets, tubes, round bars, etc
- iii. Manufactured parts, components and sub-assemblies:* electronic equipments, seal frame, engine, etc

## 3. Auxiliary materials & factory supplies

Do not become integral part of finished product

- Chemical additives, packaging materials, containers, crates, paints, varnishes, oils, grease, cleaning materials, etc



## 4. Utilities

- Electricity, water, fuel, steam, etc
- A detailed assessment of the utilities required can only be made after analysis and selection of location, technology and plant capacity.

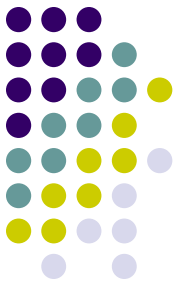
## 5. Spare parts

- Numerous small items & major components and parts of machinery or equipment.

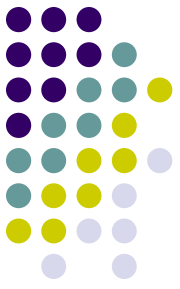
## 6. Supplies for social and external needs

- not directly related to project operation
- E.g. for a project in a remote area:
  - For employees & their families: food stuffs, medicine, clothing, education materials
  - For the local community: road & environmental cleaning materials

# Specification of Requirements



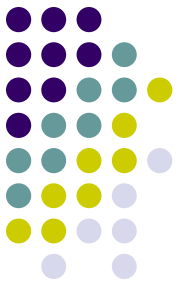
- In specifying the type, quality and quantity materials required, the following factors are considered:
  - Technical factors- such as technology and production process, type of machinery and equipment, production capacity and program etc
  - Commercial and financial factors- such as market demand regarding products quality, competition for materials etc
  - Socio-economic factors- such as skill of work force, environmental policies and regulations, culture of the people etc.



### 3.3. Locations and Site Selection

- Location and site are often used synonymously but must be distinguished.
- **Location** refers to a fairly broad area like a city, an industrial zone or a coastal area.
- **Site** refers to a specific piece of land where the project would be set up.
- The selections of location & site may be made separately or together.

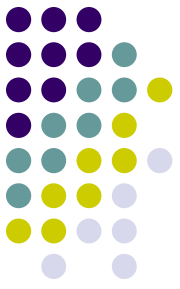
# Location Analysis



- Location choice is made from a wide geographic area within which several alternative sites may have to be considered.
- Qualitative as well as quantitative considerations are to be taken into account
- Factors determining choice of location:
  - Proximity to R.M. & market
  - Infrastructures
  - Government policies
  - Environmental impact
  - Labor situation
  - Climatic conditions & ecological requirements
  - General living condition



# Factors determining choice of location



## 1. Proximity to R.M. & Market

- The optimal location is the one with minimum total costs of products sold
  - Total costs products sold = R.M transp. Cost + production costs + distribution costs + allowance for socio-economic & environmental factors
- i) for resource-based projects: the one close to source of R.M
- ii) for a project based on imported R.M: the one close to a port
- lii) for projects producing perishable & bulky products: the one close to the center of consumption



# Factors determining choice of location

## 2. Infrastructures:

- Availability, cost, and reliability
- *i) Technical Infrastructure:* Water, electricity, insurance, banks, academic institutions etc
- *ii) Transport and Communication:* Transport facilities such as by water, rail, air, or road available for the inflow of various inputs and for the marketing of products & good communication facilities including telex ,telephone, internet, etc

## 3. Government policies

- Identification of industrial zones
- Incentives to encourage investments
- Fiscal and legal regulations



## 4. Environmental impact

- Environmental impact assessment (EIA) is an assessment which aims at ensuring that development projects are environmentally sound (friendly).
- To see the positive & negative impacts of the project
- i) Negative impacts
  - Throwing gaseous emissions
  - Disposal of wastes to river
  - Causing noise, heat, etc
    - May need to acquire environmental protection devices
    - Government may impose high taxes
- ii) positive impacts: additional benefits to the society
- Subsidies or prizes may be given by government



## 5. labor situation

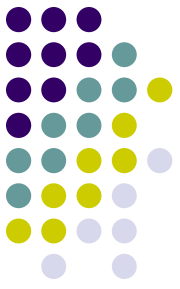
- The availability of skilled, semiskilled and unskilled labor
- Labor rates (past trends, current, and projected)
- Labor strikes (frequency and severity)
- Labor productivity

## 6. Climatic conditions and ecological requirements

i) Climatic Conditions: temperature, humidity, sun shine, rainfall, wind, snow, dust, earthquake, etc

- There may be direct impact on the project costs of such factors as dehumidification, air conditioning, refrigeration, or special drainage.
- Climatic conditions can also determine the success of a project in an indirect way. E.g. Skilled labor force is reluctant to work in areas with extreme climatic conditions.

# Factors determining choice of location

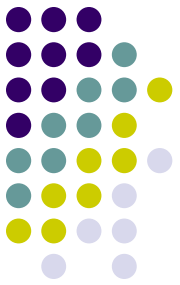


- ii) ecological requirements
  - Some projects may not have a negative environmental impact themselves. But they may be sensitive to such effects.
  - An agro industrial project clearly depends on the use of raw materials that have not been degraded by contaminated water and soil.
  - Management and labor may be reluctant to work in a factory located in a polluted area with health risks.

## 7. General living conditions

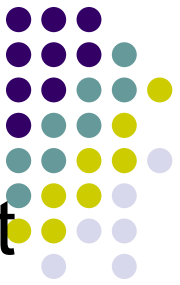
- Cost of living
- Housing
- Facilities (education, recreation, transport, and Medicare, etc)

# Evaluating Location alternatives



- Factor rating
- Location CVP analysis: determine the location that will have lowest total costs (or highest profits)
- Center of gravity method: locating a distribution center that minimizes distribution costs or travel time to various destinations

# Factor Rating



General approach to evaluating locations that includes both qualitative and quantitative inputs

## Procedure:

1. Identify factors relevant for rating
2. Assign weights to each factor
3. Decide on common scale for all factors (0 to 100)
4. Score each location
5. Compute weighted score ( $wt \times score$ ) for each location
6. Sum up the weighted scores and get composite score
7. Select the location with highest composite score

- Clothing chain is considering two different locations for a new retail outlet. They have identified the four factors listed in the following table as the basis for evaluation, and have assigned weights as shown on the left.

Factor	Weight	Sululta	Bishoftu	Weighted score	
				Sululta	Bishoftu
Proximity to raw materials	0.40	60	40	24	16
Community growth potential	0.25	80	100	20	25
Availability of public transportation	0.15	80	100	12	15
Labor cost	0.20	60	40	12	8
Composite score				68	64





# Choice of Site

- Once the location or alternative locations are decided upon, a specific project site or alternative sites should be defined
- The feasibility study should analyze and assess alternative sites on the basis of key aspects and site specific requirements
- Qualitative as well as quantitative considerations are to be taken into account like that of location selection.

# Factors determining choice of site



## 1. Ecological conditions of sites

- soil type, site hazards, history of natural calamities etc

## 2. *Environmental impacts*

- the nature of the project in relation to restrictions, standards and guide lines of the government concerning noise, air pollution, effects if it is close to residential areas etc.

## 3. *Socio-economic conditions*

- restrictions, incentives, requirements

## 4. *Costs of land*

- cost of land differs from site to site depending on of course its proximity to main streets and other transport facilities, major markets, customers etc



## *5. Infrastructure*

## *6. Site preparation and development costs*

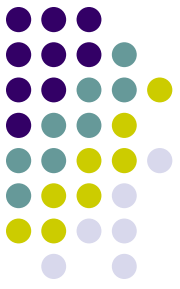
- some areas are more appropriate for construction without much preparations and development efforts while other areas may need several works to make them ready for use

## *7. Strategy of the projects such as future expansion*

## *8. Degree of “friction”*

- how well the site is linked to its environment.
- traffic flow inward or outward (goods, services, or people)

## *9. Cost of utility lines extension*



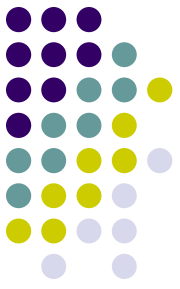
## 10. Number of sides of a land parcel

- A multi-sided parcel is more suitable for retail
- One-side parcel is more suitable for residential

## 11. Nature of goods (products) produced (perishables or not)

## 12. *Distance to seaport (import and export)*

## 3.4. Technology and Engineering



### 3.4.1 Technology Analysis

- An integral part of engineering at the feasibility stage is
  - The *selection of an appropriate technology*, and
  - Planning of the *acquisition and absorption of this technology* and the corresponding know – how.
- Technology = Technical process + Know-how
  - Technical process = Hardware + software
  - Know-how = Knowledge of how to use them
- Two or more technologies may be available
  - Define technology required for a particular project through the evaluation of all alternatives and selecting the most appropriate.



# Factors Determining Choice of Technology

## 1. Plant capacity

- To meet a given capacity requirement, only a certain production technology may be available.

## 2. Principal inputs

## 3. Investment outlay and production cost

- Over period of time & per unit of production

## 4. Product mix

- That results in a wider product mix including saleable byproducts is preferable

## 5. Latest developments

- Must be based on latest developments to minimize the likelihood of obsolescence in the near future



## 6. Use by other units

- must be fully proven and utilized in the manufacturing by others

## 7. Ease of absorption

## 8. Labor condition

- In countries with a shortage of & expensive labor - capital intensive
- In countries with a excessive & cheap labor - labor intensive

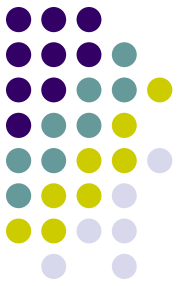
## 9. The Environmental impact

- Investments in environmental protection devices

## 10. Implication in terms of foreign participation

- Foreign: labor, raw materials, aid, etc

# Technology acquisition & Transfer



## A. Industrial Property Rights:

- Where a desired technology is patented or covered by registered trademarks, it is necessary to secure industrial rights from their holders.
  - patents, trade marks, copyright and proprietary technology
  - un-patented know – how that is available from only a limited number of sources
- The acquisition of technology in such cases involves negotiations and contractual arrangements for technology licensing and transfer, apart from purchase of equipment for particular technological processes.

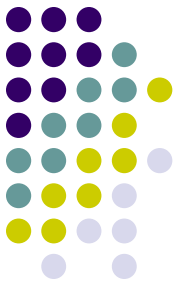




## **B. Means of Technology acquisition**

### **1. Technology licensing**

- Gives the licensee the right to use patented technology and get related know – how on a mutually agreed basis.
- Efforts should be made to acquire only the essential components of the technology package offered by the licensor
- May be appropriate when
  - There is continuous technology improvement
  - The firm uses only some elements of the technology package



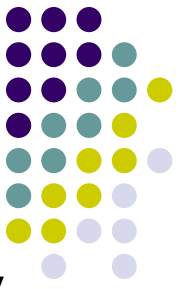
## 2. Purchase of Technology

- Obtain the full ownership of technology through outright purchase
- May be appropriate when
  - There is no possibility of significant improvement in technology in the foreseeable future
  - There is hardly any need for technological support from the seller of technology

## 3. Joint Venture Arrangement

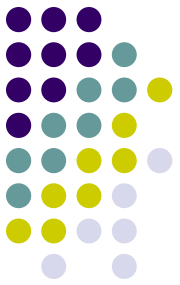
- The supplier of technology may participate technically as well as financially
- May be appropriate when
  - Continuing technical assistance & supply of inputs from technology supplier are necessary

## 3.4.2. Machinery & equipment Selection



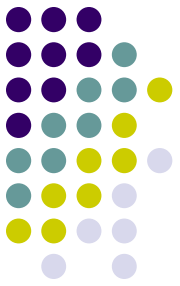
- The selection of equipment and technology are interdependent
- Technology choice & equipment selection may be made together or independently
- Types of equipments are:
  - Plant or process equipment
  - Mechanical equipments
  - Electrical equipments
  - Instruments
  - Control devices
  - Internal transportation equipments

# Factors in selection of equipments



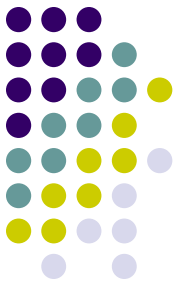
- Plant capacity
- Production technology
- Infrastructural constraints
- The length of time required for training
- Investment outlay required
- The availability of foreign exchange for imported equipments
- Maintenance requirements and the availability of maintenance facilities
- Government policies such as import controls
- The degree of automation required
- The availability of spare parts

# Factors in selection of suppliers of equipments



- The desired quality of machinery
- The level of technological sophistication
- The reputation of the suppliers
- The expected delivery schedules
- The preferred payment term
- The required performance guarantee.

## 3.4.3. Structure and Civil Works



- may be divided into three categories:

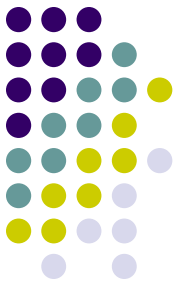
### 1. Site preparation and development

- Grading & leveling of site
- Removal of existing structures
- Relocation of existing pipelines, cables, roads, power lines
- Draining & removal of standing water
- Extension of utility lines

### 2. buildings and structures

- Factory buildings
- Ancillary buildings (stores, laboratories, maintenance centers)
- Administrative buildings
- Staff welfare buildings (cafeteria, medical centers)
- Residential buildings

### 3. Out door works



- Supply & distribution of utilities
  - Handling & treatment of emissions
  - Transport & traffic arrangements
  - Out door lighting
  - Landscaping
  - Enclosure & supervision (fencing, gates, doors, etc)
- 
- The plans and estimates for civil engineering works should be detailed for costs estimates and implementation scheduling.

# CHAPTER FOUR

## FINANCIAL ANALYSIS

### 4.1. Objectives of Financial Analysis

#### *I. Assessment of financial impact*

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



## *II. Judgment of efficient resource Use*

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

## *III. Assessment of Incentives*

- ❖ *The financial analysis* is of critical importance in assessing the **incentives** for **different participants of the project**.
- ✓ *Will participants have **an incremental income large** enough to compensate them for the **additional effort and risk** they will incur?*

✓ Will private sector *firms* earn a sufficient return on their *equity investment* & *borrowed resources* to justify making the investment the project requires?

✓ For *semipublic enterprises*, will the return be sufficient for the enterprises to maintain *a self-financing capability and to meet the financial objectives* set out by the society?

#### IV. *Provision of sound financial plan*

- ❖ *The financial plan* provides a basis for determining the
  - *amount and timing of investment,*
  - *debt repayment capacity, and*
  - *also helps to coordinate financial contributions.*
- ❖ *Assessment of financial management competence especially for large projects,*
  - *financial analysis* will enable the analyst
    - *To judge the complexity of the financial management &*
    - *The capability of managers so that he can judge.*

## 4.2. Market and Demand Analysis

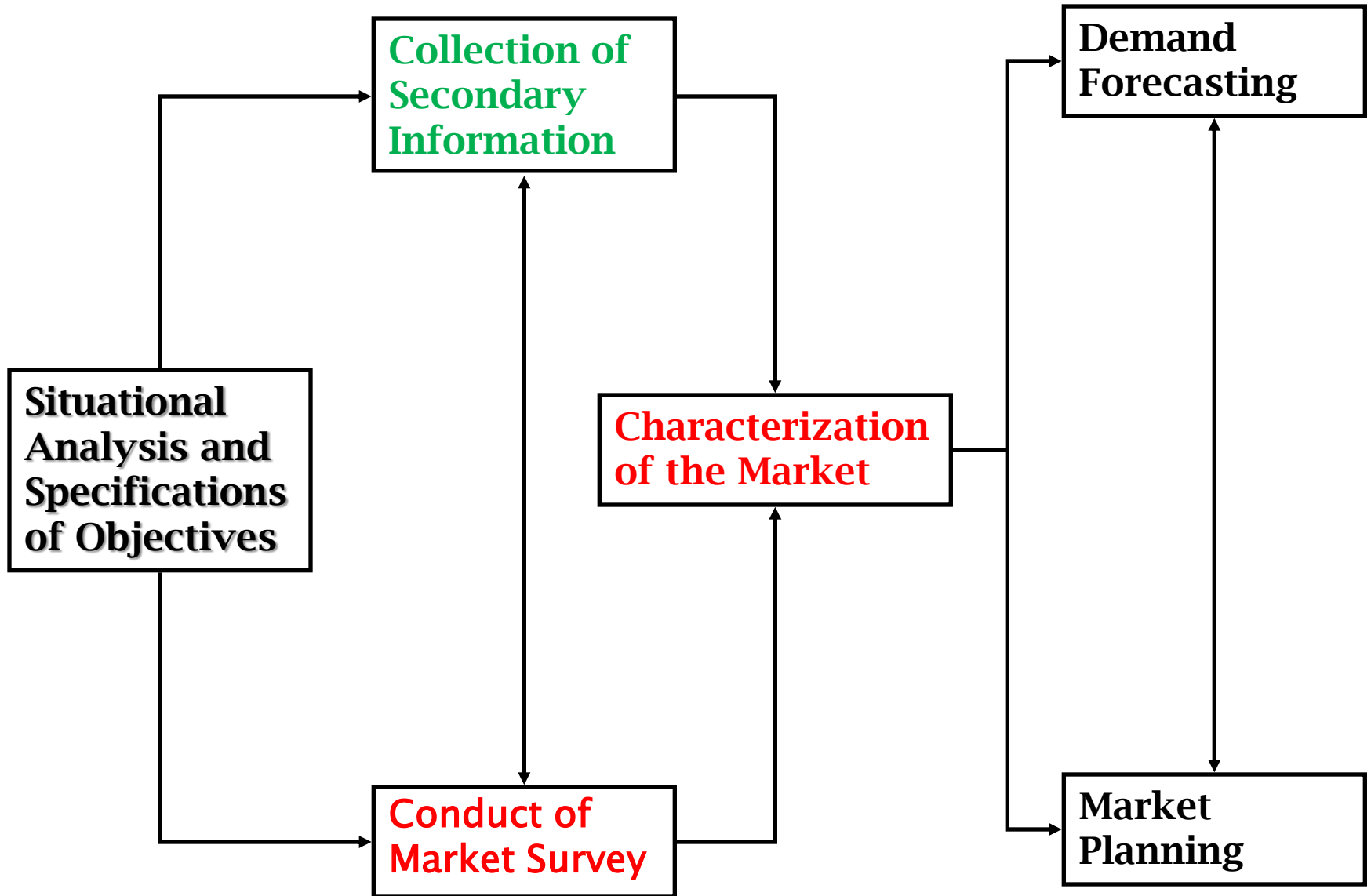
- The market analysis is also concerned with *the arrangement for marketing the output to be produced* and *the arrangement for the supply of inputs needed to build* and *operate the project*.
- Market analysis usually *ranks top* in the sequence of the core chapters of a feasibility study.

### 5.2.1. Role of market and demand analysis

- *A market* is any place where *the sellers can meet with the buyers* where there is *a potential for a transaction to take place*.
- *Marketing* is a business activity of *presenting products or services* to potential customers in such a way as to make them eager to buy.
- *Market analysis* is a process of *assessing the level of demand* for the *product or service to be produced* by the project.

- ▶ *Analysts who have to calculate* the socio – economic costs and benefits of a project,
- *can only start their job*, if market analyst delivers sales forecast and market strategy.
- ▶ *Market analysis* is obviously *more ambitious and risky* in comparison to the other parts of a feasibility study, as it has to fight with the future.
- ▶ *The marketing demand and sales forecast* is necessarily *subjective and vague*, since, in the final end it has to deal with the behavior of human beings.

## Steps In market and Demand Analysis



## A. Situational analysis and specification of objectives

- ✓ An **informal survey** of what information is available in the area.
- ✓ **In order to get a feel** for the relationship between the **product and its market**,
  - The project analyst may **talk to consumers, competitors, middlemen, and other in the industry.**
- ✓ Look at:
  - **The preferences and purchasing power of consumer's** ,
  - **Actions and strategies of competition and**
  - **Practices of the middlemen.**
- ✓ If such **a situational analysis generates** enough data to measure the market and **get a reliable projection** of the **demand and revenues** a **formal** study may not need to be undertaken.
- ✓ In order to carry out such a study it is necessary to **spell out its objective clearly and comprehensively.**

✓ A helpful way of *spelling out the objectives* would be to *structure the objective in the form of questions.*

**Example:** suppose a given project aims at producing *wheat* in a given locality.

❖ *The project initiator and implementer need information about where and how to market their product.*

❖ The objective of the market and demand analysis in this case may be to answer some of the following questions.

✓ *Who are the buyers of this product? (Consumers)*

✓ *What is the total current demand for wheat*



- *How is the demand distributed temporally /pattern of sale over the year and geographically?*
- *What price will the consumers be willing to pay for the product?*
- *How can consumers be convinced that wheat could be substituted for other foodstuffs?*
- *What channels of distributions are most suited for the product?*
- *What trade margins will induce distributors to carry it out?*
- *What are the possible immediate sales?*

## B. Collection of secondary information

- The *market study* information *may be*:
  - *obtained from secondary or primary sources.*
- ✓ *Secondary information* is information *that has been gathered in some other context and is already available.*
- ✓ *It is the base and the starting* point for market and demand analysis.
- ✓ *General Sources of Secondary Information.*
- ✓ *Industry Specific Sources of Secondary Information.*
- ✓ *Evaluation of Secondary Information.*
- ✓ It includes what is known and often *provides clues for gathering primary information* required for further analysis.

## ❑ *SECONDARY SOURCES OF DATA*

- 1. Ethiopian Economic Survey*
- 2. Census of Ethiopia*
- 3. Reports of Export Working Groups on Various Industries*
- 4. Census of Manufacturing Industries*
- 5. Monthly Statistical Bulletin*
- 6. Annual Report of NBE*
- 7. Annual Survey of industries*
- 8. Guidelines to Industries*
- 9. Publications of Advertising Agencies*

## **Evaluation of Secondary Information**

## C. Conduct Market study

- ❖ Secondary information though useful, *often does not provide a comprehensive basis for market and demand analysis.*
- It needs to be *supplemented with primary information gathered* through a market survey, specific to the project being appraised.
- *Market survey may be a census or a sample survey.*
  - Some Problems
    - ✓ Heterogeneity of the Country
    - ✓ Multiplicity of the Languages
    - ✓ Design of Questionnaire

▪ **The information sought in market survey may relate to one or more of the following.**

- ❖ **Total demand and rate of growth of demand**
- ❖ **Demand in different segments of the market**
- ❖ **Income and price elasticity's of demand**
- ❖ **Motives for buying**
- ❖ **Purchasing plans and interventions**
- ❖ **Satisfaction with existing products**
- ❖ **Attitudes towards various products**
- ❖ **Socio economic characterization of buyers**

## D. Characterization of the market

Based on the secondary sources and through the market surveys the market for the product /service may be described in terms of the following;

- *Effective demand in the past and present*
  - *Production + Imports – Exports – Change in stock level.*
- *Breakdown of demand*
- *Nature of the product*
- *Prices*
- *Methods of distribution and sales promotion*
- *Consumers group*
- *Supply and competition*
- *Government policy*

## E. Demand Forecasting

- After gathering information about various
  - ❖ aspects of the *market and demand* from primary and secondary sources,
  - ❖ *an attempt may be made to estimate future demand.*
- A wide variety of forecasting methods is available to the market analyst.

*Two main types: qualitative and quantitative*

### A. Qualitative (Subjective) Methods

- ❑ These methods rely essentially on the **judgment of experts to translate qualitative information into quantitative** estimates
- ❑ Used to generate forecasts if historical data are not available (e.g., introduction of new product)

*The important qualitative methods are:*

- Jury of Executive Method
- Delphi Method

## **B. Quantitative (Objective) methods**

❖ Employ one or more mathematical models that *rely on historical data and/or causal/indicator variables* to forecast demand.

***Major methods include:***

- ❖ Time series projection methods
- ❖ Causal models



# ***JURY OF EXECUTIVE OPINION METHOD***

## ▶ **Rationale**

- ***Upper-level management has best information*** on latest product developments and future product launches.

## ▶ **Approach**

- ***Small group of upper-level managers*** collectively develop forecasts

## ▶ **Main advantages**

- Combine knowledge and expertise from various functional areas

- *People who* have best information on future developments generate the forecasts

## Main drawbacks

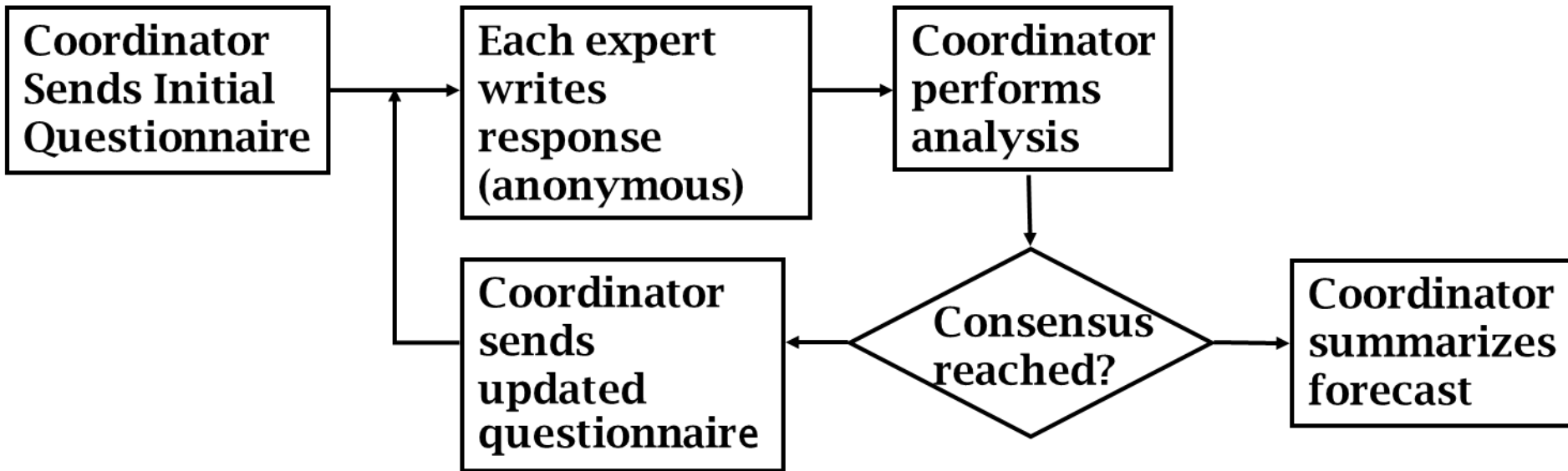
- Expensive
- No individual responsibility for forecast quality
- Risk that few people dominate the group

## *DELPHI METHOD*

### ► Rationale

- *Anonymous* written responses encourage honesty and avoid that a group of experts are dominated by only a few members.

## ➤ Approach



### ▶ Main advantages

- ❖ Generate consensus
- ❖ Can forecast long-term trend without availability of historical data

## ▶ Main drawbacks

- ❖ Slow process
- ❖ Experts are not accountable for their responses
- ❖ Little evidence that *reliable long-term* forecasts can be generated with Delphi or other methods.

## Quantitative (Objective) methods

- ▶ Employ *one or more mathematical models* that rely on historical data and/or causal/indicator variables to forecast demand.
- ▶ *Major methods include:*
  - Time series projection methods and
  - Causal models

# I. ***TIME SERIES PROJECTION METHODS***

- ▶ These **methods generate forecasts** on the basis of an analysis of the historical time series.
- ▶ ***The important time series projection methods are:***
  - A. **Trend Projection Method**
  - B. **Exponential Smoothing Method**
  - C. **Moving Average Method**

## A. **Trend Projection Method**

- ▶ Used for forecasting ***linear trend*** line
- ▶ Assumes relationship between response variable, ***Y, and time, X, is a linear function***

□  $Y = a + bx$  where,

- $y$  = Computed value of the variable to be predicted  
(Dependent variable)
- $a$  =  $y$  - axis intercept
- $b$  = Slope (the rate of change in  $y$  for given changes in  $x$ )
- $x$  = Independent variable
- ▶ Estimated by least squares method
  - ▶ Minimizes sum of squared errors
- ▶ Slope ( $b$ ): Estimated  $Y$  changes by  $b$  for each 1 unit change in  $X$
- ▶  $b = \frac{\sum XY - n \bar{x} \bar{y}}{\sum x^2 - n \bar{x}^2}$
- ▶ Y-intercept ( $a$ ): Average value of  $Y$  when  $X = 0$  ;  $a = \bar{y} - b \bar{x}$

- *With a series of data overtime, the computations can be reduced if the values of the X- variable (time) are transformed to simpler numbers that sum to zero.*

Year	Time Period (X)	Generator Sales (Y)	X <sup>2</sup>	XY
1981	-3	74	9	-222
1982	-2	79	4	-158
1983	-1	80	1	-80
1984	0	90	0	0
1985	1	105	1	105
1986	2	142	4	284
1987	3	122	9	366
	$\Sigma X = 0; X = \Sigma X/n = 0$	$\Sigma Y = 692; Y = \Sigma Y/n = 98.86$	$\Sigma X^2 = 28$	$\Sigma XY = 295$

Then, the computations are as follows:

$$b = \frac{\Sigma XY - n\bar{X}\bar{Y}}{\Sigma X^2 - n\bar{X}^2}$$

$$b = \frac{295 - 7(0)(98.86)}{28 - 7(0)}$$

$$b = \frac{295}{28}$$

$$b = \underline{\underline{10.54}}$$

$$a = \bar{y} - b\bar{x}$$

$$a = 98.86 - 10.54(0)$$

$$a = \underline{\underline{98.86}}$$

- ❖ Hence, the least squares equation is  $Y = 98.86 + 10.54X$ .
- ❖ To project sales in 1988, we first denote the year 1988 in the new coding system as  $X = 4$ .
- ❖  $Y (\text{Sales in 1988}) = 98.86 + 10.54(4) = 141.02 \text{ or } 141$   
*Generators.*



# Exponential Smoothing Method

- forecast results are *modified in light of observed errors* in the past
- Requires smoothing constant ( $\alpha$ )
  - ◆ *Ranges from 0 to 1*
  - ◆ *Subjectively chosen*
- Involves little record keeping of past data
- $F_t = F_{t-1} + \alpha(A_{t-1} - F_{t-1})$ 
  - ◆  $F_t$  = Forecast value
  - ◆  $A_t$  = Actual value
  - ◆  $\alpha$  = Smoothing constant

## Illustration:

You want to forecast sales for 2012 using exponential smoothing ( $\alpha = .10$ ).

The 2007 (made in 2006) forecast was 175.

### Actual data:

2007	180
2008	168
2009	159
2010	175
2011	190

$$F_t = F_{t-1} + \alpha (A_{t-1} - F_{t-1})$$

Time	Actual	Forecast, $F_t$ ( $\alpha = .10$ )
2007	180	175.00 (Given)
2008	168	$175.00 + .10(180 - 175.00) = 175.50$
2009	159	$175.50 + .10(168 - 175.50) = 174.75$
2010	175	$174.75 + .10(159 - 174.75) = 173.18$
2011	190	$173.18 + .10(175 - 173.18) = 173.36$
2012	NA	$173.36 + .10(190 - 173.36) = 175.02$

### 3. Moving average method

- MA is a series of arithmetic means
- Used if little or no trend, seasonal, and cyclical pattern
- Used often for smoothing
  - ◆ Provides overall impression of data over time
- Equation

$$MA = \frac{\sum \text{Demand in Previous } n \text{ Periods}}{n}$$

**You're manager of a museum store that sells historical replicas.**  
**You want to forecast sales of item (123) for 2012 using a 3-period moving average.**

2007      4

2008      6

2009      5

2010      3

2011      7

Time	Response $Y_i$	Moving Total ( $n=3$ )	Moving Average ( $n=3$ )
2007	4	NA	NA
2008	6	NA	NA
2009	5	NA	NA
2010	3	4+6+5=15	15/3=5.0
2011	7	6+5+3=14	14/3=4.7
2012	NA	5+3+7=15	15/3=5.0

# Weighted Moving Average Method

- Used when trend is present
  - ◆ Older data usually less important
- Weights based on intuition
  - ◆ Often lay between 0 & 1, & sum to 1.0
- Equation

$$WMA = \frac{\sum (\text{Weight for period } n) (\text{Demand in period } n)}{\sum \text{Weights}}$$

## II. Casual methods

- ▶ ***Casual methods*** seek to develop forecasts on the basis of ***cause-effects relationships*** specified in an explicit, quantitative manner.

***I. High-Low method***

***II. Chain Ratio Method***

***III. Consumption Level Method***

***IV. End Use Method***

***V. Leading Indicator Method***

***VI. Regression analysis***

## I. High-Low method

- ▶ it uses only the *highest and lowest observation* values of the dependent and independent variables.
- ▶ The demand function is estimated by *using these two points to calculate the slope coefficient and the constant or intercept.*
- ▶  $b$  = difference between the *highest demand and lowest demand* in the past divided by the difference between the highest and the lowest of the independent variable.
- ▶  $a = Y - bX$  (take either highest or lowest observation values for  $X$  and  $Y$ )



The following data were about *sales of a certain product and no. of households* of over the past five years. Use no. of households as determinant for demand.

$$\text{Slope} = b = \frac{\text{highest demand} - \text{lowest demand}}{\text{highest independent variable} - \text{lowest independent variable}} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{Slope} = b = \frac{162,000 - 110,000 = 52,000}{710 - 450 = 260} = 200 \quad b = \bar{y} - b\bar{x} = 136,000 - 200 \times 580 =$$

$$136,000 - 116,000 = 20,000, \quad y = 20,000 + 200x$$

Year	No. of house holds	Actual sales in thousands
2006	500	120
2007	450	110
2008	600	135
2009	660	140
2010	710	162
	$X = 710 + 450 / 2 = 580$	$Y = 162 + 110 / 2 = 136$

## II. *CHAIN RATIO METHOD*

### ▶ Market Potential for Men leather coats with fur in Ethiopia

- Population next year(U)= **100,000,000**
- Proportion of U that are age over 18 (A) = **75%**
- Proportion of A that are men (M) = **50%**
- Proportion of M that have annual incomes over Br 65000 (I) = **50%**
- Proportion of I that live in cold areas (C) = **50%**
- Proportion of I that are fashion conscious (F) = **30%**
- Proportion of F that are early adopters (E) = **10%**

- Average number of coats purchased per year (Y) = 0.5 coats
- Average price per coat (P) = Br 2000
- ❖ What is *potential demand for this product next year?*

### ***III. CONSUMPTION LEVEL METHOD***

- ▶ This method is used for those products that are directly consumed. This method measures the consumption level on the basis of elasticity coefficients. The important ones are
  - *Income elasticity of demand*
  - *Price elasticity of demand*

➤ **Income Elasticity**: This reflects the *responsiveness of demand to variations in income*. It is calculated as:

➤  $E1 = [Q2 - Q1 / I2 - I1] * [I1 + I2 / Q2 + Q1]$

➤ **Where**

➤ *E1 = Income elasticity of demand*

*Q1 = quantity demanded in the base year*

*Q2 = quantity demanded in the following year*

*I1 = income level in the base year*

*I2 = income level in the following year*

- ▶ The aggregate demand is estimated using the following formula:

Agg. dd = **Proj. Popn** (present per capita dd) ( 1+ (per capita change in income level x  $E_i$ ))

- ▶  $Q_1=120$ ;  $Q_2=140$ ;  $I_1=1000$ ;  $I_2=1200$
- ▶ ***Increase in per capita income*** level next year = 10%
- ▶ Present per capita demand for coffee = 3kgs
- ▶ Projected population next year = 120 million

Calculate the aggregate demand for coffee next year.

Soln

- ✓  $E_i = 0.851$
- ✓ **Aggregate dd** for coffee next year = 390.6 millio

## ***IV. END USE METHOD***

- ▶ This method forecasts the demand based ***on the consumption coefficient of the various uses of the product.***

- ▶ Is mostly used for intermediate products:

***It involves the following steps:***

- Identify the possible uses of the product
- ***define the consumption coefficient*** of the product for various uses
- project the output levels for the consuming industries
- derive the demand for the product

- **Illustration:** *A specialty wheat flour is used by four industries.* The Consumption Coeff., the projected output levels for these industries and the projected demand for *specialty wheat flour for next year are shown below.*

Projected Demand for specialty wheat flour			
	Consumption Coefficient	Projected Output next year	Projected Demand for sp wheat flour next year
Alpha	2.0	10,000	20,000
Beta	1.2	15,000	18,000
Kappa	0.8	20,000	16,000
Gamma	0.5	30,000	15,000
		<b>Total</b>	<b>69,000</b>

## V. LEADING INDICATOR METHOD

- ▶ This method uses *the changes in the leading indicators* to predict the changes in the lagging variables.
- ▶ **Two basic steps:**
  1. Identify the *appropriate leading indicator*(s)
  2. Establish the *relationship between the leading* indicator(s) and the variable to forecast.

## UNCERTANITIES IN DEMAND FORECASTING

- ▶ **Data about *past and present* markets.**
  - ☐ Lack of standardization
  - ☐ Few observations



❑ Influence of abnormal factors

▶ ***Methods of forecasting***

- Inability to handle unquantifiable factors
- Unrealistic assumptions
- Excessive data requirement

▶ ***Environmental changes***

- Technological changes
- Shift in government policy
- Developments on the international scene
- Discovery of new source of raw material

## IIV. Regression Analysis

- *Regression analysis* is a **causal forecasting model**, which usually considers several variables that are related to the variable being predicted.
- Once the related variables have been found, **a statistical model is built** and used to forecast the variable of interest.
- *Regression analysis uses the least squares* approach on **one or more independent variables to develop a forecasting model.**

- **Assume that Triple A:** Construction Company renovates old homes. Overtime, the company has found that their dollar volume of renovation work is dependent on the Albany area payroll.
- **The figures for Triple A's** revenues and the amount of money earned by wage earners in Albany for the years 1982-87 are presented below.
- **Now, Triple A wants to establish a mathematical relationship that will help predict sales.** Least squares regression analysis may be used to establish the statistical model.

- The same basic model applies:  $\hat{Y} = a + bx$  and the calculations for a and b follow.

Sales (Y)	Payroll (X)	$X^2$	XY	$Y^2$
2.0	1	1	2.0	4.0
3.0	3	9	9.0	9.0
2.5	4	16	10.0	6.25
2.0	2	4	4.0	4.0
2.0	1	1	2.0	4.0
3.5	7	49	24.5	12.25
$\Sigma Y = 15.0$	$\Sigma X = 18$	$\Sigma X^2 = 80$	$\Sigma XY = 51.5$	$\Sigma Y^2 = 39.5$

$$\bar{x} = \frac{\sum x}{n} \Rightarrow 18/6 \Rightarrow 3$$

$$\bar{y} = \frac{\sum y}{n} \Rightarrow 15/6 \Rightarrow 2.5$$

$$b = \frac{\sum xy - n\bar{x}\bar{y}}{\sum x^2 - n\bar{x}^2} \Rightarrow \frac{51.5 - (6)(3)(2.5)}{80 - 6(3^2)} \Rightarrow \frac{51.5 - 45}{26} \Rightarrow \frac{6.5}{26} \Rightarrow \underline{\underline{0.25}}$$

$$a = \bar{y} - b\bar{x} \Rightarrow 2.5 - 0.25(3) \Rightarrow \underline{\underline{1.75}}$$

Therefore, the estimated regression equation is:

$$Y = 1.75 + 0.25X; \text{ i.e., Sales} = 1.75 + 0.25 (\text{Payroll})$$

Lastly, we have to measure how strong the linear relationship is between the two variables, which are the sales and payroll, by using the correlation coefficients for Regression Lines (r):

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Four values of the correlation coefficient:

- a) Perfect positive correlation when  $r = 1$
- b) Perfect negative correlation when  $r = -1$
- c) Positive correlation when  $0 < r < 1$
- d) No correlation when  $r = 0$

Then the correlation coefficient for Triple A Construction Company is:

$$\begin{aligned} r &= \frac{n\sum xy - \sum x \sum y}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}} \\ &= \frac{(51.5) - (15 \times 18)}{\sqrt{[6(80) - (18)^2][6(39.5) - (15)^2]}} \\ &= \frac{309 - 270}{\sqrt{(408 - 324)(237 - 225)}} \\ &= \frac{39}{\sqrt{(156 \times 12)}} \\ &= \frac{39}{\sqrt{1872}} \\ &= \frac{39}{43.27} \Rightarrow r = 0.901, \end{aligned}$$

This r-value appears to be a significant correlation and helps to confirm the closeness of the relationship of the two variables.

## ► Market Planning

*Marketing plan is product specific, market specific , or company-wide plan that describes activities involved in achieving specific marketing objectives within a set time frame.*

*It has the following key components*

1. *Current marketing situation*: market situation, competitive situation, distribution situation, macro-environment, etc.
2. *Opportunity and issue analysis*: SWOT analysis
3. *Objectives*: clear-cut, specific, and achievable.

4. ***Marketing strategy***: Target segment, positioning, product line, price, distribution, sales force, sales promotion, advertising, etc.
5. ***Action program***: what will be done, when it will begin or be completed, who will accomplish the tasks, etc.



### 4.3. Pricing Project Costs and Benefits

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

#### 4.3.1. Finding Market Prices

- ❖ Project analysis characteristically are built *first by identifying the technical inputs and output for a proposed investment*,
- ❖ Then by *valuing the inputs and outputs at market prices* **to construct the financial accounts**, and finally by adjusting the financial prices so they better reflect economic values.

- ✓ ***The first step** in valuing **costs and benefits** is finding the market prices for the **inputs and outputs**.*
- ✓ *The project will have to consult many sources such as merchants, consumers, experts, published statistical bulletins, etc.*
- **Point of first sale and farm-gate price**
- ❖ *In project analysis*, a good rule for determining **a market price** for agricultural commodities produced in the project is to seek the price at the **“point of first sale”**.
- ❖ The increased value added of the product as it goes to higher markets in the channel arises as a payment for marketing services.
- ❖ If the project includes such **marketing services** in its design, we can take these higher prices.

- ❖ *Even in this case*, the analyst **must make the project as small as possible** and *try to analyses the marketing service* component independently of the production component .
- ❖ If the product is sold only in **central markets**, no local market, then the analyst must **find out the value of marketing service** to arrive at price at project site.
- ❖ *Prices for some products like agricultural products* generally are subjected to substantial seasonal fluctuation.
- ❖ If this is the case as it may often is **some decision must be made** about the price in the seasonal cycle at which to choose the price to be used for the analysis.

- ❖ **A good starting point** is the farm-gate price at the peak of the harvest season.
- ❖ This is probably close to the lowest price in the cycle.
- ❖ The reasoning is that the rise in price is due to marketing services.

### ➤ *Predicting Future Prices*

- Since project analysis is **about judging future returns from future investment**, we have to judge what the future prices of inputs and outputs may be.
- **The best starting point** is to **see the trend of these prices over the past few years.**
- Having this data, the project analyst **can forecast the price with certain degree of precision.**

- However, even then **judgment is important to arrive at what price we have to use to value inputs and outputs of the project.**
- Moreover, **we have to keep in mind that**, as projects involve distant future, the prediction power of the model will decline as we go far from the present.

#### 4.3.2. Change in prices

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

##### ➤ *Change in relative price*

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

$$\frac{P_{X0}}{P_{Y0}} \neq \frac{P_{X1}}{P_{Y1}} \neq \frac{P_{X2}}{P_{Y2}} \dots$$

**Changes in relative prices have** a real effect *on the project objective* and *must be reflected in project accounts* in the years when such changes are expected.

➤ For instance, **the price of agricultural products to price** of inputs (manufactured) may rise over time.

➤ This would have **a real effect** on the **net benefit** of the firm.

❖ ***Inflation (an increase in general prices of goods)***

■ **Inflation** is common for every country although the magnitude may vary between countries.

■ The approach most often taken is to **work the project analysis** in constant price.

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

- *It is assumed that inflation will affect most prices to the same extent so that prices retain their same general relations.*
- The analyst then need only adjust future price estimates for anticipated relative changes, not for any change in the general price level.

#### 4.3.3. Financial export and import parity price

- ❖ Financial analysis will be made **based on market price**.
- ❖ The project may use **imported inputs and export its output**, to foreign markets.



- If there are **domestic markets for these inputs and outputs**, and if the firm is free to sell or buy at the domestic or world market, **we take the domestic price with appropriate adjustment to reflect the price at the project site.**
- If, on the other hand, commodities of the project are produced *only for foreign market* or *if the domestic demand cannot absorb the firm's output*, we will take export-parity and import-parity prices even in financial analysis.
- In financial analysis, we use **export and import parity (uniformity) prices** if the project **will export its output to and import inputs** from foreign markets.

- **A project for several reasons** may use imported inputs or export outputs even though there are domestic markets.
- *In both cases what we need to determine* is **the amount of income the project receives from its exports** or *the amount the project pays for imports at the project location.*
- Suppose a project *exports coffee to Canada*, we start with *c.i.f.* price at Canada port.

### ❑ *Export Parity Price*

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

Deduct- unloading at **point** of import

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

Deduct – insurance

## **Equals – *f.o.b.* at point of export (Djibouti port)**

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

Deduct –tariff (export duties)

Add - subsidy

Deduct - local port charges

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

## ***Equals export parity price at project boundary***

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

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

- If port charge is in terms of foreign currency, we deduct it before it is multiplied by OER.

## **□ A parallel computation leads to the import parity price.**

- ❖ Here the issue can be *finding the price of project's output* that is intended to substitute previous imports.
- ❖ If this import substitute would have to compete with foreign products when it is sold in the domestic markets.
- ❖ In this case we need to determine the **import parity price of the project's output.**

- Similarly if a project uses an imported **input in bulk**, we may want to know the **import parity price**.

In either case, **the import parity price can be derived as follows.**

### □ *Import Parity Price*

**F.o.b.** price at point of export

Add-freight charges to point of import

Add-insurance charges

Add- unloading from ship to **pier at port**

**C.i.f.** Price at the **harbor/port** of importing countries

Convert foreign currency to domestic one (multiply by OER)

Add-tariffs (import duties)

Deduct-subsidies

Add-local port charges

Add-transport & marketing costs to relevant wholesale market

### **Equal price at wholesale market**

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

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

❖ **If the project produces import substitutes**, this must be deducted because the project is will to have to compete with import substitutes.

- ❖ ***OER (official exchange rate)*** is the rate at which one currency (say, Birr) is exchanged for another currency (say, Dollar).
- ❖ It is official because **it is the rate established by monetary authorities of a country not by the market mechanism.**
- ❖ In financial analysis the ***OER*** would always be used.
- ❖ Before calculating the ***export or import parity price at the project site***, we need to forecast the future ***c.i.f. or f.o.b. price at the border.***
- ❖ This may require assessment of the ***past trend of this border price.***
- ❖ After we determined the future ***c.i.f. or f.o.b.*** price, we then continue to calculate export parity price.

## 4.4. Farm Investment Analysis

- **Farm investment analysis** is undertaken to determine *the attractiveness a proposed investment to framers* and **to other participants, including the society as a whole.**
- It projects **the effect and farm income of a particular** investment and **estimates the rectum** to the capital engaged.
- The analysis is **projected over the useful life of the investment.**
- The **initial** investment is shown *at the beginning of the projection*, and **a residual value at the end.**
- In general, the analysis is **cast in constant prices**, although **allowances** may have to be made for **inflation.**
- **Off – farm income** is included.



- Farm investment analysis can be *prepared for farms of any size.*
- *Large commercial farms & plantation* how ever are more like other **business enterprises** than they are like small, family – operated farms.
- **In considering small farms**, the analysis will be particularly concerned with the effect of the project on the total income of the farm family.
- The basic difference between small farm family and the business firm is on *their fundamental objective.*
- ✓ *The fundamental objective* of the business firm is **profit maximization** though there are other *subsidiary objectives.*
  - Like increasing market share.

- *Customer satisfaction creation of good public image, etc.*
- **The fundamental objective of a farm family**, however, could be different and it depends up-on *the cultural setting and risk environment*.
- *The analysis must assess the attitude of the farmer towards many aspects to identify the fundamental objective of the household.*
- **Maximizing just net income** of the household may not come out as the fundamental objective *rather securing food for the household or minimizing risk* could be the **main objective**.
- **Farmers are price responsive** as confirmed by many empirical researches, but this should not be interpreted as if they are profit maximize.

- **The analysis** must take the **cultural and risk environment** into account **in the investment analysis**.
- **Backed by this understanding of the particular cultural environment**, the analyst will prepare **the farm investment analysis as realistic as possible** to determine what the family gains by participating in the project.
- ***The effectiveness of the proposed new technology*** on small farms must be **realistically assessed**, and the technological assumptions must be checked to ensure that they reflect **on-farm conditions** and not those of an experiment station.

- The analyst must form a judgment about **how rapidly farmers will be willing to adopt new practices.**
- The analyst must **test the effect of risk** on family income by *undertaking sensitivity analysis.*
- He must ask such questions as *what will happen to their income, if price fall below expectation.*
- If the expected output is **not realized**, if input requirement, if farmers face bad weather condition etc.
- **Sensitivity analysis** must be done for both technical as well as price deviations.

## **Principal elements of farm investment analysis farm resource use.**

**Land use** – allocation of each piece of land (cultivated area and crop type pasture, forest houseplant, etc.).

**Land use** calendar when will the piece of land be used for what purpose?

### **Labor use**

- Annual labor requirement by crop operation for 1 ha
- Labor distribution by crop & month per hectare
- Labor requirement by crop & month
- Hired labor by crop and month
- Off-farm labor

## **Farm Production**

- **Crop and pasture**

**Yield and carrying capacity**

**Crop & pasture Production**

- **Livestock**

**Herd Projection**

**Herd composition, purchases & sales**

**Herd productivity**

**Feeding period & daily ration**

**Feed requirement and production**

**Yield per animal**

# **Valuation**

**Farm gate prices**

**Value of production**

**Crops**

**Livestock**

**Incremental residual value**

**Farm inputs**

**Incremental**

**Physical**

**Foreign exchange component**

**Value of investment**

**Operating expenditure**

**Crop**

**Livestock**

**Incremental working capital**

**Farm Budget**

**Without project**

**With project**

**Net benefit before financing**

**Debt service**

**Net benefit after financing**

**Cash position**



- **Herd productivity** - it is a measure of the efficiency of the herd.
- It relates the number of head sold plus the increase in heard size to the number of head carried at the beginning of the year.

$$\text{Herd Productivity} = \left( \frac{\text{Stock at the end} + \text{head Sold} + \text{head consumed} - \text{head purchased} - \text{stock at begining}}{\text{Stock at the begining}} \right)$$

**Yield per animal - milk, egg, etc. which are animal products per head for each type of animal must be calendared to determine the benefit.**

## **5.5. Computing Debt service**

*In many farm budgets there will be a credit element*, and **the analyst will have to calculate the amount of the debt service.**

### 4.5.1. Simple interest rate

$$P_t = P_o (1+rt)$$

**P<sub>o</sub> - initial loan, principal**

**r - Interest rate**

**t - Time**

**P<sub>t</sub> - final amount**

- If the farmer borrowed **5,000** Birr at interest rate of 10 % *per year repayment can be made in different ways.*
- The following table shows two types of installments/repayment or debt servicing.
- **Repayment** of **equal amounts** of **principal** (using simple interest rate).

Year	Loan Receipts	Out stand balance	Debt service (1)			Debt service (2)		
			Princip al	Intere st	Total	Princip al	Interes t	Total
0	5000	5000	-	-	-	-	-	-
1	-	5000	-	-	-	-	-	-
2	-	5000	-	-	-	-	-	-
3	-	5000	1000	1500	2500	1000	300	1300
4	-	4000	1000	400	1400	1000	400	1400
5	-	3000	1000	300	1300	1000	500	1500
6	-	2000	1000	200	1200	1000	600	1600
7	-	1000	1000	100	1100	1000	700	1700
Total			5000	2500	7500	5000	2500	7500

Case (1) - interest calculation on the **out standing balance** (declining interest payment)

Case (2) - interest calculation **on the principal** for the nth year

- **Year 0 to year 2** - are considered as grace periods (a period in which the borrower need not pay principal & sometimes the interest depending on their agreement).
- *The simple interest rate is commonly applied for short-term credits lent for seasonal expenses.*

#### 4.5.2. Compound interest

- This method is common in long-term credits which are lent by formal financial institutions; banks & similar credit institutions.
- The basic difference between simple and compound interest is that in the latter, the calculation of interest after year one (i.e. year two and then after), **will be based on the total outstanding principal plus interest of the previous year.**

- ❖ In short, interest calculation in year two will be (***outstanding principal plus interest of year one***) multiplied by interest rate.
- ❖ This means we calculate interest for the outstanding interest in addition to the principal.
- ❖ **The formula can be presented as follow**

$$P_t = P_0(1 + r)^t$$

- ✓ *P<sub>0</sub> - Principal*
- ✓ *r - Interest rate per period*
- ✓ *t - Period or time*
- ✓ *p<sub>t</sub> - total amount*

A loan of 5000 at interest rate of 10% that will be paid starting from year 3 can be calculated as:

Year	Loan receipt	Outstanding balance	Debt service (1)			Debt service (2)		
			Principal	Interest	Total	Interest	Principal	Total
0	5000	5000	-	-	-	-	-	-
1	-	5000	-	-	-	-	-	-
2	-	5000	-	-	-	-	-	-
3	-	5000	1000	1655	2655	1000	331.0	1331.0
4	-	4000	1000	400	1400	1000	464.1	1464.1
5	-	3000	1000	300	1300	1000	610.5	1610.5
6	-	2000	1000	200	1200	1000	771.6	1771.6
7	-	1000	1000	100	1100	1000	948.7	1948.7

**Case (1) interest on outstanding balance or declining balance.**

**Case (2) interest on the principal paid at the  $n^{\text{th}}$  year.**

- The first 2 years are called grace periods
- The above calculation is on the assumption that the compounding period is a year.
- But if the compounding period is less than year; **such as monthly, quarterly or biannually, the formula may be formulated as:**

$$A_t = P_0 \left(1 + \frac{r}{c}\right)^{tc}$$

$A_t$  = total amount including principal

$r$  – Interest rate per year

$c$  – Compounding period

$t$  – Number of years

If for example the compounding period is monthly, we divide the interest rate by 12 and multiply the time by 12. In the above case, for the 3<sup>rd</sup> year

$$A_t = 5000\left(1 + \frac{0.1}{12}\right)^{3 \times 12}$$

### *Equal installments with interest being capitalized*

- In some loan transactions, the lender can agree to "**capitalize**" the *interest due during the grace period*.
- *This means, the borrower need not pay any interest during the grace period;* the interest due is, in effect, added to the principal of the loan.
- When repayment begins, the amount borrowed plus the interest added to the principal during the grace period is then repaid in a series of equal installments.



## *Capitalization*

$$A_t = 5000(1+0.1)^2 = 6050$$

The interest for the **grace** period is included with the principal. Starting from year 3, the project is expected to repay its total capitalized debt of 6050 in a series of installments. The annual repayment can be calculated as follows.

$$A_m = \frac{P^* (1+r)^t \times r}{(1+r)^t - 1}$$

Where  $r$  - is interest rate

$T$  - Time or period

$A_m$  - annual payment of interest plus principal

$P^*$  - capitalized principal

$$A_m = \frac{6050(1+0.1)^5 \times 0.1}{(1+0.1)^5 - 1} = 1596.0$$

- Accordingly, the annual payment will be **1596.0 for 5 years**.
- **This method of installments** is common in many formal financial institutions.

**It has the following advantages:**

- 1. It balances the interest between borrower and lender*** in that it is in between the two compounding methods presented in case 1 and case 2.
- 2. It is suitable for both the borrower and the lender because*** it eases both computation and the collection and repayment of the loan.

## 4.6. Financial Ratios

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

### 5.6.1. Efficiency Ratios

#### *Inventory turnover*

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

It can be computed as

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

- ❖ The *inventory turnover* can also relate to the average length of time a firm keeps its inventory on hand.
- ❖ A low ratio may mean that the company with large stocks on hand may find it difficult to sell its product, and this may be an indicator that the management is not able to control its inventory effectively.
- ❖ Thus a low ratio, though good, may indicate cash shortage & the firm might sometime be forced to sell by forgoing sales opportunities.

### *Operating ratio*

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

$$\text{Operating ratio} = \frac{\text{Operating expenses}}{\text{revenue}}$$

## 4.6.2. Income ratios

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

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

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

### Return on equity

- It is an amount received by the owner of the equity.
- It is obtained by dividing the net income after taxes by the equity.
- Equity - an ownership right or risk interest in an enterprise.

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

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

### ***Return on assets***

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

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

### 4.6.3. Creditworthiness Ratios

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

#### Current ratio

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

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

## Debt-equity ratio

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

$$\text{Equity Ratio} = \frac{\text{Equity}}{\text{Equity} + \text{Longterm liability}}$$

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

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



- It tells us, of the total capital, how much proportion is equity & how much is debt.
- If for example liability ratio is 0.40 and equity ratio is 0.60, it means that of the total capital 40% is debt and 60% is equity.
- Then debt equity ratio is 1.5 to 1.
- For each one birr liability a project has 1.5 birr equity.
- In general strong equity base is good for a project to overcome risk & uncertainty.
- Especially in some risky projects, low ratio of long-term liability to equity is a necessary condition.

## *Debt service coverage ratio*

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

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

- It tells us how a project can absorb any shocks without impairing the firm's ability of meeting obligations.
- In contrary to this it can also tell us how the firm chose an appropriate credit term. Normally, financial institutions regard a debt service coverage ratio of 2 as satisfactory.

## CHAPTER FIVE . ECONOMIC AND SOCIAL ANALYSIS

### 5.1. Purpose of Economic Analysis

- **The main purpose of *project economic analysis*** is to help design and select projects ***that contribute most to the welfare of a country.***
- When used solely, **economic** analysis serves only a very limited purpose and hence should not be the only basis **for financial decision.**
- **Optimal decision** must be made based on the **relative merit** of all aspects **financial, economic, fiscal** impact, environmental impact, etc.
- ***The tool of economic analysis can help*** us answer various questions about the project's impact on ***the entity undertaking the project, on society, on the fiscal impact*** and **on various stakeholders**, and ***about the projects risks and sustainability.***

## 5.1. Identification of winners and losers: who enjoys the music? Who pays the piper?

- **A good project contributes** to **the country's economic output**; hence it has the potential to **make everyone better off**.
- Nevertheless, normally not every one benefits, and some one may lose.
- **Groups** that *benefits* from a project are not necessarily those that incur the costs of the project.
- Identifying **those who will gain**, **those who will pay** and *those will lose gives* the analyst insight into the incentives that various stake holders have to see that the project is implemented as designed.

## Environmental impact

- A very important difference between **society's point** of view and the **private point** of view concerns **costs (or benefits) attributable** to the project but not reflected in its cash flows.
- **The effects of the project on the environment**, both negative (costs) and positive (benefits), should be taken into account and if possible, quantified and assigned a monetary value.
- The impact of **these costs and benefits** on spearfish groups within **socially is borne in mind.**

### 5.3. *Financial, economic and social CBA compared*

❖ Depending on *the nature and objective of the project*, project appraisal can be done at three levels:

A- ***Financial / Private CBA***: In financial CBA market prices (nominal prices) of ***inputs and outputs are used***;

➤ The analysis is made ***from the point of view of the investor***;

➤ It is done for **profit oriented** projects; and

➤ ***Costs and benefits*** are only those which can be ***expressed in money terms***.

➤ This reason, is also called ***analysis at market prices***.

***B- Economic / National CBA:*** Unlike financial CBA, economic CBA uses **economic prices (accounting prices) or shadow prices**; and

- It is done **from the point of view** of the **national economy**.
- For this reason, it is also called ***analysis at efficiency prices***.
- Economic analysis of projects is similar in form to financial analysis in that ***both assess the profitability of an investment***.
- The financial and economic analyses are thus ***complementary***.
- **In summary, the most important differences between economic and financial analysis include.**

**Prices:** In financial analysis, *market prices are normally used*.

❖ Market prices are also called *financial prices* or *nominal prices* and or / *private prices*/.

❖ **In economic analysis**, however, some **market prices** may be changed so that they *more accurately reflect economic values*.

❖ *While financial feasibility uses market prices*, **economic feasibility utilizes economic prices**.

❖ **Both financial and economic analysis** use projected prices and hence both rely on hypothetical prices.

❖ Unlike financial analysis, all accounts used in project economic analysis are **calculated in real prices**.



❖ **For successful shadow pricing**, the level of accuracy in the estimation of **costs and benefits** at market prices should be reasonably good.

❖ **Shadow price** adjustments to *an inaccurate market price* figure *will not necessarily improve decision making*.

**A. Treatment of transfer payments:** In economic analysis taxes and subsidies are treated **as transfer payments** whereas market prices take into account **taxes** (duties, income taxes, excise taxes, depressed export prices, and sales or purchase taxes) and **subsidies** (export subsidies, provision of services below cost, interest rates below the market interest rate, purchased farm inputs, mechanization services provided at concessionary prices and so on).

- **In financial analysis**, **taxes** are treated as a cost and subsidies as a return.
- From the **national economy point of view**, subsidy is an expenditure of resources that the economy incurs to operate the project.
- While impinging on the financial situation of the enterprise or the farmer, **taxes do not represent new claims on the country's resources.**
- The same applies to dividend payments to shareholders.
- While these are considered as **costs in the financial analysis**, they are **not deducted from the income stream in the economic analysis.**

- The deciding factor, as to whether an item is included in *the economic analysis or not*, is *whether it makes a direct claim on the resources of the country or whether it merely represents a transfer of ownership of the resource from one group or entity or individual to another.*
- Both **tariffs** and **subsidies** represent neither costs nor benefits.
- **Economic transfer is neither a benefit nor a cost** to the society but only a shift of resources within the society.
- That is, **income** is neither created nor expended; it is only redistributed.
- *Direct transfer payments are payments that represent not the use of real resources but only the transfer of claims to real resources from one person in the society to another.*

- **In agricultural projects**, the most **common** transfer payments are taxes, direct subsidies, and credit transactions that include loans, receipts, repayment of principal, and interest payments.
- **Two credit** transactions that might escape notice are *accounts payable and accounts receivable*.
- All these entries should be taken out before the financial accounts are adjusted to reflect economic values.
- **From the national point of view**, income taxes are excluded as costs.
- **Benefits** can **calculated** at the consumer **price** and **costs** as those for investment and operation exclusive of excise taxes.
- **If excise taxes are sufficiently high**, investment will appear very attractive, indicating that the government should promote the investment.

- In its role as **guardian** of **broad public interests**, government passes along many benefits to society in the form of economic transfers.
- These show up in various ways including free education, medical care, and unemployment assistance; provision of economic infrastructure such as transportation, power, water, sewerage, and telecommunications whenever fees are **less than the cost of service**; and
- **Regulated prices of basic commodities** at *below free-market prices in the hope of controlling the cost of living* and **thereby checking inflation.**
- **Economic transfer** to producers (subsidies) may include basic research to **develop new technologies**, **price supports** (above world prices), and **provision of low cost inputs** (fertilizers) and so on

- **Private producers** receive a subsidy whenever the *full costs of these inputs, services, and facilities are not recovered through government changes or when price supports exceed world market prices.*
- *In contrast to taxes*, subsidies are included in the economic analysis, since they represent a cost to the country as a whole and are part of the country's investment in resources allocated to the project.
- If fertilizers, for example, are *imported*, their real cost to the economy is the *c.i.f.* import price plus **the costs of handling and delivery to the farmers.**
- **Many important subsidies** in agriculture operate not by means of direct payments but through mechanisms that change market prices.

- These subsidies are *not direct subsidies* treated as *direct transfer payments* but rather are *indirect* subsidies.
- *In evaluating services and infrastructure projects*, **benefits and costs** are normally considered from the national point of view since the government is the main provider of these services.
- Benefits are frequently **difficult to measure**, however, since **the value of many services is not set in the market place**.
- In carrying out projects of this type, benefits may have to be imported or else target levels of service set and cost-effective procedures applied.

❖ ***Participants***: While financial feasibility is undertaken from the **point of view of the private investor**, economic feasibility is undertaken from the point of view of the national economy.

❖ While **the participant** (s) in financial CBA is (are) the private investor (s), the participants in the economic CBA are all individuals within the national economy.

***Numeraire***: While the ***numeraire in financial CBA*** is the unit of domestic currency, the numeraire in economic analysis is the unit of national income in **domestic currency**.



- *Treatment of interest:* In economic analysis **interest on capital** is **never separated and deducted from the gross return** because it is part of the total return to the capital available to *the society as a whole and because it is that total return, including interest, that economic analysis is designed to estimate.*
- **But interest inputted or ‘paid’** to the entity from whose point of view the financial analysis is being done is **not treated as a cost because the interest is part of the total return to the equity capital contributed by the entity.**
- It is a part of the **financial return** that entity receives.

**C- Social CBA (SCBA):** Social CBA is *concerned with the evaluation of policies, programs and projects* by *government* or *public sector agencies*.

The analysis is done here **from the point of view of the society**; **intangible benefits** and **costs** (education, health, pollution, externalities, environmental issues and so on) are *explicitly* entertained; **poverty and income distribution are taken care of**; and **monetary** and **non-monetary** costs and benefits are accounted for.

**In social CBA**, a cost or a benefit of **100 Birr incurred** (earned) by the poor is given a higher weight as compared to the same cost or benefit incurred (earned) by the rich.

- The prices used in **SCBA** are called **social prices** and for this reason the analysis is also **called analysis at social prices**.
- When we talk about the **project appraisal** decision making criteria, we have to make a distinction among: financial, economic and social *NPW*; financial, economic and social *IRR*; financial, economic and social *B/C ratio*; financial, economic and social payback period; financial, economic and social **net benefit investment ratio**.

## **5.4. Two approaches of measuring economic costs & benefits of a project**

There is conceptual difference between **social costs - benefits** and **economic cost - benefit analysis**.

- The *results of social cost-benefit analysis* may *diverge from the results of economic cost-benefit analysis*.
- **Economic costs and benefits** when they are adjusted to consider other objectives of society as **distributional consequences & other objectives**, *they become social costs & benefits of a project*.
- This depends on the method used in the analysis.
- **If the market prices are adjusted** only for **market distortions of various kinds**; direct transfer payments & externalities, it is simply economic cost-benefit analysis.
- If on the other hand this adjustment process systematically considers other objectives as distributional aspects, it will become **social cost-benefit analysis**.

- ❖ **Economic costs-benefit analysis** limits itself only to the analysis of effects of a project on **real national income** of the country.
- ❖ Some analysts simply *adjust financial cost & benefits into* efficiency prices and leave other social aspects for **subjective judgments**.
- ❖ Particularly **Squire & van der Tak (1992)** recommend **evaluating proposed projects** first by using essentially the same efficiency prices then by further adjusting these prices to **weight them for income distribution effects** & for **potential effects** on further investment of the benefits generated.

❖ **Still some others, Little and Mirrlees (1974), & UNIDO Guidelines for project evaluation (1972a)**

- **Propose** evaluating the **project first by establishing its economic accounts** in efficiency prices then by adjusting these accounts to weight them for income distribution and saving effects.

**A. UNIDO Approach**

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

- ✓ **If commodities are traded**, first all these traded goods will be **adjusted for any distortions in the domestic markets**.
- ✓ **After this adjustment is made** the adjusted domestic price will be multiplied by **SER** to make domestic resources be comparable with foreign resources.
- ✓ The easiest way for adjusting domestic market distortions is **to use border prices**, *c.i.f.*, for imports and *f.o.b.* for exports and then multiply this border price expressed in foreign currency by **SER** to arrive at economic border prices.

- If the commodities are non-traded, i.e. *if f.o.b. prices are less than domestic prices* & domestic prices less than *c.i.f.* prices and if the market prices are good estimates of opportunity cost or willingness to pay, we directly take the market price as economic value of the item
- But **if the prices of non-traded items** (goods and services or factors of production) are **distorted**, we will adjust the market price to eliminate distortions and then use these estimates of opportunity cost as **the shadow price to be entered in the economic analysis**.
- Suppose we have **a project producing export item** that uses both foreign & domestic inputs.
- **The net benefit (ignoring discounting)** would be estimated as:



$$\text{Net benefit} = \text{SER}(X - M) - D$$

Where  $X$  - *border price of exports in foreign currency*

$M$  - *Border price of imported goods in foreign currency*

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

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

### ➤ **Shadow Exchange Rate**

The need to determine the foreign exchange premium arises because in many countries, as a result of national trade policies (including tariffs on imported goods & subsidies on exports), people pay a premium.

- This premium is not adequately reflected when the price of traded goods are converted to domestic currency equivalent at the official exchange rate.
- The premium, thus, represents the additional amount that users of traded goods, on average & throughout the economy are willing to pay to obtain one more unit of traded goods.
- The premium people are willing to pay for traded goods, then, represent the amount that, on average traded goods is missing priced in relation to non-traded items when the official exchange rate is used to reconvert foreign exchange prices in to domestic values.

The derivation is as follows:

$$SER = \frac{P_d}{P_w}$$

Where  $P_d$  - domestic price

$P_w$  - world price in foreign currency

To derive an average and representative, estimates of SER that can be applied across all traded goods, we need to take the weighted mean of relative value of all imported & exported goods. Thus:

$$SER = \sum_{i=1}^n f_i \left( \frac{P_{di}}{P_{wi}} \right)$$

$f_i$  - The weight of the  $i^{\text{th}}$  good.

The weights ( $f_i$ ) are a function of the quantities imported and exported and of the elasticity's of demand for the various imports and the elasticity's of supply for the various exports.

## Little-Mirrlees Approach

- The other method of adjusting market prices into economic prices is the Little-Mirrlees approach (see Little & Mirrlees, 1969, 1974),
- **In this approach benefits and costs may be measured at world price to reflect the true opportunity cost of outputs and inputs** using public saving measured in foreign exchange as the *numéraire* (that is, converting everything into its foreign exchange equivalent).
- The fact that foreign exchange is taken as a *nureraire* does not mean that project accounts are necessarily expressed in foreign currency.

- The unit of account can remain the domestic currency, but the values recorded are the foreign exchange equivalent that is, how much net foreign exchange is earned.
- If world prices are used, the economic price at which to value a project's output is its export price if it adds to exports, or its import price if domestic production leads to a saving in imports.
- On the cost side, the price at which to value a project input is its import price if it has to be imported, or export price if greater use leads to a reduction in exports.
- But if the goods or inputs in question are non-traded goods, the analyst needs to use conversion factor to translate domestic prices into their border price equivalent.

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

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

- **So the economic price for a non-traded good** is its market price multiplied by the conversion factor.
- How are conversion factors derived?
- The true cost of any good is its marginal cost to society.
- **To find the world price of non-traded goods**, each good could be decomposed into its **traded and non-traded components** in successive rounds - backwards through the chain of production.

- **It is not feasible to differentiate conversion factors** between all non-traded goods and only special outputs (and inputs) are treated this way because the procedure is difficult, time consuming and costly.
- Shortcuts are, therefore, needed that provide a reasonable approximation.
- All the shortcuts involve some degree of averaging for a group of **non-traded items** and, therefore, some degree of error if average or standard conversion factor is applied to a particular non traded good rather than its own specific conversion factor.
- ***The derivation is as follows:***

$$SCF \cdot P_d = P_w \cdot OER$$

$$SCF = \frac{P_w(OER)}{P_d}$$

**Where**  $P_d$  = domestic price in domestic currency

$P_w$  = world price foreign currency

$OER$  = official exchange rate

$SCF$  = standard conversion factor

$$SCF = \frac{1}{P_d / P_w(OER)}$$

$P_d / P_w$  is the shadow exchange rate i.e., the price of goods in domestic currency relative to their world prices

$$SCF = \frac{1}{SER / OER} = \frac{1}{PF}$$

$SER / DER$  is the shadow price of foreign exchange (PF)

$$PF = \sum f_i \left( \frac{P_{di}}{P_{wi}(OER)} \right)$$



Where  $f_i$  - Weights for the  $i^{\text{th}}$  commodity

$P_{di}$  - domestic price of the  $i^{\text{th}}$  commodity in domestic currency

$P_{wi}$  - world price in foreign currency

PF - shadow price of foreign exchange

Taking the following example can summarize Little-Mirrlees approach of adjusting domestic prices into economic prices. A project that produces export goods can be assessed as follows.

$$\text{Net Present Value (NPV)} = \text{OER} (X-M) - \text{SCF} \cdot D$$

Where -OER - official exchange rate

X - Exported goods in foreign currency

M - Imported goods in foreign currency

SCF - standard conversation factor

D - Price of non-traded goods in domestic currency

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

## Chapter Six

### 6. Measures of Project Worth (for Financial Analysis) or Project Appraisal

- **When costs and benefits have been identified quantified and priced (valued).**
- The analyst is trying to determine **which among various projects to accept**, which to reject.
- There are *two methods for measuring the worthiness of projects*
  - **Undiscounted &**
  - **Discounted methods.**

## 6.1. Undiscounted measures of project worth

### A. Ranking by inspection

❖ The analyst can sometimes simply choose one project among alternatives projects by examining the following:

1. Total cost of investment and investment period;
  2. The structure, & amount of costs and benefits;
  3. The structure & total amount of the net incremental benefit;
  4. The lifetime of the project, etc.
- *The problem with this method* is that the selection *lacks objectivity*.

## B. Payback Period

- **The payback period (PBP)** is the length of time from the beginning of the project until
  - The **sum of net incremental benefits of the project** equal to **total capital investment**.
- **It is the length of time** that **the project requires to recover** the investment cost.
- **If a project generates constant annual cash inflows**, the payback period can be computed by dividing the initial cash outlay by the annual cash inflow.

$$PBP = \frac{\text{Cashoutlay(investment)}}{\text{Annualcashinf low}}$$

- **If the cash inflow is not uniform, the pay back period is calculated by totaling the inflows starting from the first year and equating it with the initial outlay on the project.**
- **Decision rule the firm has to pre-determine the acceptable pay back period than the acceptable.**
- **If the PBP is shorter PBP, the project is accepted. Otherwise it is rejected.**
- The method is very simple and it is a good measure **when the project has problem of liquidity.**
- *The pay-back period is also a common*, rough means of choosing among projects in business enterprise, especially when the choice entails high degree of risk.

- Since risk generally increases with **futurity**, the criterion seems to favor projects that are *prima facie less risky*.
- This method has two important weaknesses:
  - **First**, *it fails to consider the time & amount of net benefits after the payback period.*
  - **Second**, *it does not adequately take into account the time value of money even in the payable periods.*
  - The **only concern behind the payback period** method is *the recovery of initial capital*.

Consider the following alternative projects

Alternative projects	Year	Investment cost	Net incremental benefits	Commutation net incremental benefits
I	1	2000	-	29000
	2		2000	
	3		8000	
	4		12000	
	5		9000	
II	1	20000	-	

	2		200	
	3		12000	
	4		8000	
	5		12000	32000
III	1	20000	-	37000
	2		1000	
	3		5000	
	4		6000	
	5		8000	
	6		10000	
	7		5000	
	8		2000	

Note that the incremental net benefit could be financial or economic incremental net benefit



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

## ***C. Rate of return on investment***

- ***The rate of return***, also referred to as ***the average rate of return***, ***has many variants due to differences in how it is computed.***
- **All the variants, however, have two features in common;**
  - ✓ Use of accounting concepts ***in calculating benefits*** and
  - ✓ Not adjustment for ***time value of money***.

### **1. Proceeds per unit of outlay**

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

## 2. Average annual proceeds per unit of outlay

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

## Average income on book value of the investment

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

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

## 6.2. Discounted measure of project worth

### *Time value of money*

- **Money has time value.**
- **A birr today** is more valuable than a birr a year hence. **Why?**
- Individuals, **in general, prefer current consumption to future consumption.**

- **Capital can be employed productively** to generate **positive** returns.
- ***An investment of one birr today*** would **grow to  $(1+r)$**  a year hence ( **$r$**  is the rate of return earned on the investment).
- **In an inflationary period** a birr today represents a greater real purchasing power than a birr a year ***hence/future.***
- **Present values** are better than the same values in the future and earlier returns are better than later.
- **This shows that money has time value.**
- Most financial problems involve **cash flows occurring at different points of time.**
- ***These cash flows have to be brought*** to the same point of time for the purpose of comparison and aggregation.

- Thus, *to include the time dimension in our project evaluation, we have to use discounting methods.*
- **Discounting** is essentially a technique that **‘reduces’** future benefits and **costs to their ‘present worth’**.
- *The rate used for discounting is called discount rate.*
  - Suppose someone promises to give you *Br. 1,000 three years hence.*  
What is the present value of this amount *if the interest rate is 10%?*
  - *The present value can be calculated by discounting Br. 1000, to the present point of time, as follows:*

Value three years hence = Br 1000

Value two years hence = Br 1000 (1/1.10)

Value one year hence = Br 1000 (1/1.10) (1/1.10)

$$\text{Present value} = \text{Br } 1000 (1/1.10) (1/1.10) (1/1.10)$$

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

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

$A_t$  = total amount after t years

r = interest rate

t = time

$$\begin{aligned} A_5 &= 1567.05 (1 + 0.05)^5 \\ &= \underline{\underline{2000 \text{ B}}} \end{aligned}$$



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

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

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

### 1. Net Present Values

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

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

- NPV- net present value
- $A_t$  = net cash flow for the year t
- K - Cost of capital
- n- Life of the project

**If the investment period is longer**, the investment cost must also be **discounted**. **Thus the formula must be modified as:**

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

## ➤ Choosing the discount rate

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

$$r = \frac{\text{Equity}}{\text{Total cap}} \times \text{return needed to attract capital} + \frac{\text{Borrowed capital}}{\text{Total capital}} \times \text{borrowry rate}$$

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

- **In ranking mutually exclusive project** (if one is chosen, the other cannot be undertaken), ranking based on NPV depends on the discount rate used.
- **That is if we have two mutually exclusive projects, projects project A and project B** - project A may be ranked first in some ranges of discount rates but may turn out to be second in some other ranges.

Assume a project has the following investment cost, operating cost and benefit streams (Table 7.1.)

Year	Investment cost	Benefit streams	Cost streams	Net benefits	Discount factor	Present value
0		-		-40000	1.000	-40000
1		-		-50000	0.990	-49500
2		-		-25000	0.980	-24500
3		75000	70000	5000	0.971	4855
4		80000	70000	10000	0.961	9610
5		90000	75000	15000	0.951	14265
6		100000	95000	20000	0.942	18840
7		110000	92000	22000	0.933	20526
8		120000	95000	25000	0.923	23075
9		130000	105000	25000	0.914	22850
10		120000	100000	20000	0.905	18100
	<b>NPV</b>					<b>18121</b>

## Internal Rate of Return (IRR)

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

$$I = \sum_{t=1}^N \frac{A_t}{(1+r)^t}$$

$I$  – investment cost

$A_t$  – Net benefit for year  $t$

$R$  – IRR

$N$  – Life of the project

Illustration: Suppose a project has the following net benefit flows of its project life of 4 years.

Year	Net Benefit
0	-100
1	200
2	400
3	500
4	700

**The IRR can be calculated as:**

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

**r** can be found **through trial & error method**.

- When **r = 23.068** percent the value in the above equation in the right hand side will be equal to about **1000.00** which is equal to the value in the left hand side.
- **The problem with this method is that the value of r (IRR) can *only be found by trial and error*.**

The procedure can be described as follows:

1. Select an arbitrary value of r;
2. Calculate the value of the right hand side equation with this value of r.



- **If the RHS** value is lesser than the value in the left hand **reduce the value of  $r$ .**
- *If the RHS is greater than the LHS*, increase the value of  $r$ ; continue until this the *RHS is very close to the LHS.*
- *When the RHS is more or less equal to LHS*, it is that value of  $r$ , which is the IRR
- A project may result **more than one possible IRR though it is extremely rare.**
- **This can only occur when a project has negative net returns after successive positive returns**

- This can arise, for instance, when there is a replacement investment around the mid way in the life of the project.
- In such instances, a project will have positive return then after.
- This condition may give rise to two IRR.
- This is one of the criticisms of IRR method since no similar problem exists with the other methods.

### 3. Benefit Cost Ratio

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

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

▪

Where -  $B_t$  - are the benefits in period  $t$

$C_t$  - are the costs in period  $t$

$n$  - project life

$r$  - discount rate

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

# 1.Net Benefit - investment Ratio

- This criterion is **suitable and convenient for ranking projects** especially when sufficient budget is not available to implement all projects that satisfy other criteria.
- **Two or more projects may all have a positive NPV, IRR that exceeds the discount rate, both financial and economic discount rates, and a benefit-cost ratio of greater than one.**
- In this case, ranking could be made using **net Benefit - investment ratio.**
- This can be calculated as:

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

- Where -  $B_t$  Benefits,  $C_+$  - costs,  $I$ - investment,  $r$ -discount rate,  $I$ - investment cost
- *It is simply the present value of net benefits divided by the net present worth of the investment.*
- The formal selection criterion for *the net benefit - Investment ratio* measure of project with is to accept all projects *with a ratio of 1 or greater* when they are discounted with appropriate rate - in order, beginning with the largest ratio value and proceeding until available investment funds are exhausted.
- *This ratio determines* if project will have a net benefit greater than the investment at some stated amount of return on capital.

- In the previous example, *using 12% discount rate, project A & B result NB 1 ratio of 1.298 and 1.266, respectively.*

## 1. Comparisons among Discounted Measures

□ *The above measures of project worth may give different ranking* if

projects that are being comparing are different in their:

1. Cash flow structure
2. Magnitude of costs and benefits
3. Life time
4. Some projects may give high return in the early stage of the project & decline thereafter & some other projects may give lower return in the early stage & grow later in the life of he project.

1. The former will be **less sensitive to changes in discount factor** as compared to the latter.
2. For some projects the **costs & benefits** could be large in magnitude than other projects.
  - In this case ranking based on NPV & IRR may not give same result.
3. Some projects have **shorter life than others**. Here also the ranking could be different in different erasures.
  - *If a firm or government has unlimited funds, **which is rare in reality**, these differences have no significant implication in the decision.*

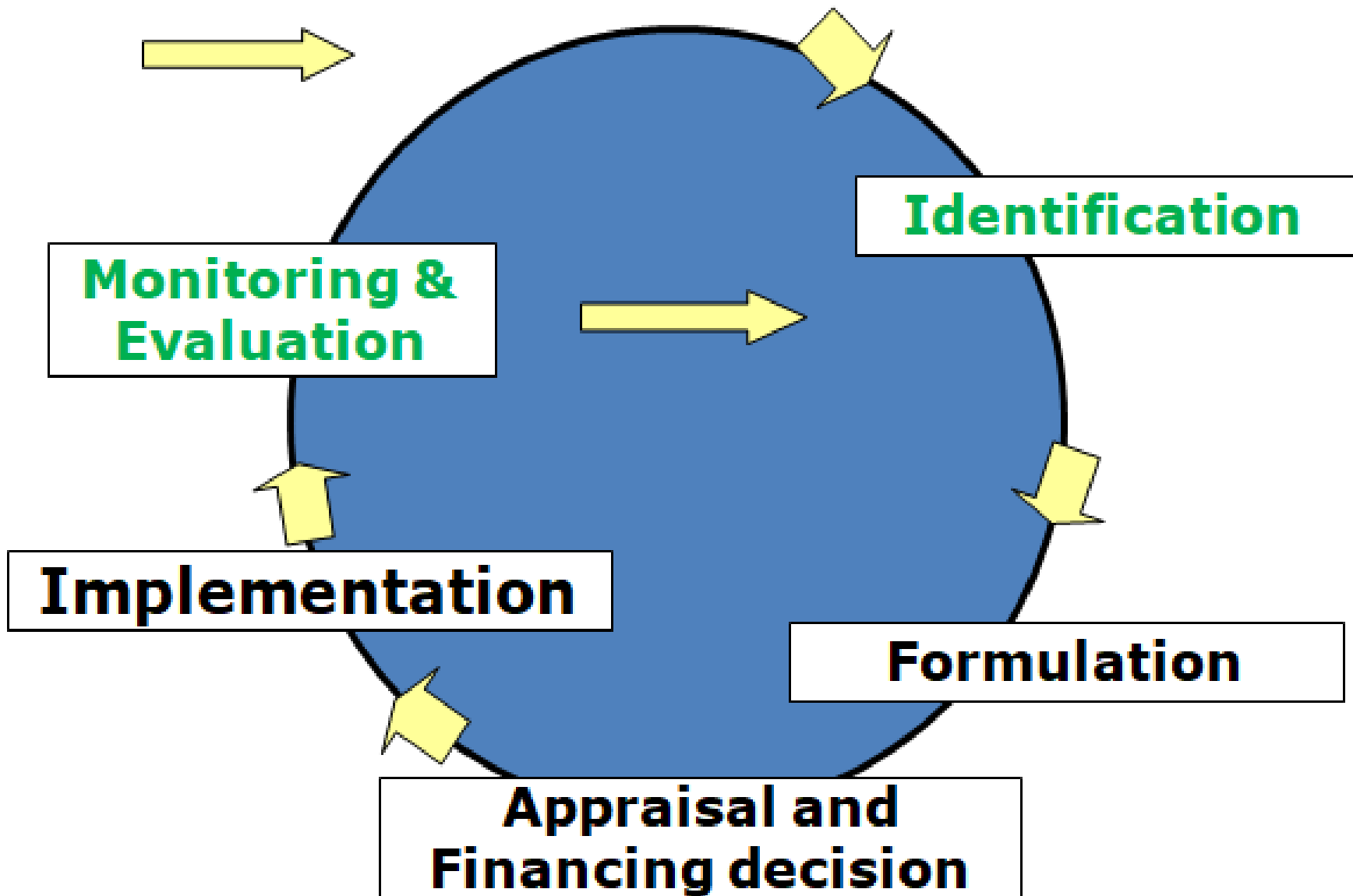
- In such cases,
  - ✓ Projects with a positive NPV,
  - ✓ *The IRR value of greater than opportunity cost of capital (discount rates),*
  - ✓ *The B-C ratio & Net return-investment ratio of greater than **one** will all be chosen.*



# **CHAPT EIGHT**

## **Project Monitoring and Evaluation**

# The project cycle: Project M and E



# 1. Monitoring

- ❖ “**Monitoring** is the systematic and continuous assessment of the progress of a piece of work over time.”
- ❖ “It is an internal project activity designed to **provide constant feedback** on the progress of a project, **the problems it is facing** and **the efficiency with which it is being implemented**”
- ❖ The following are **approaches** of project Monitoring:

# Approaches 1. Project **physical** progress

**Three approaches** can be used in measuring physical progress.

1. **Quantifying Output** of the activity in absolute terms.  
For example number of wells constructed for a water supply project.

$$\frac{\text{Work Performed}}{\text{Work Planned}} \times 100 (\%)$$

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

$$\frac{\text{Value of work done}}{\text{Total Value of work planned}} \times 100 (\%)$$

3. **Using time spent** on the project/activity.

$$\frac{\text{Time spent to date}}{\text{Total time to complete}} \times 100 (\%)$$

## Approach 2: *Financial Progress /Expenditure/ Monitoring*

- **Once the budget has been prepared and the project is underway,** the **project manager will need a cost reporting and monitoring system to provide information on actual costs.**
- *From the information obtained we need to check whether the cost of the project activities and outputs* (for each component) has been as **per budget estimates**, **less than the budget estimates**, or **more than the budget estimates?**
- If there is a variation, we can raise and answer similar question like the above one.

### Approach 3: *Project Quality Monitoring*

- Quality monitoring varies from project to project.
- In the case of **physical construction** there will be **established system of supervision, testing and checking against the original specification.**
- *Where as in programs/projects with institutional* outputs such as **new service delivery systems, trained personnel, children and orphan support and the like there is a need to develop specific systems and specifications of quality checking.**

- In general, **project managers are responsible to ensure** that the **outputs produced or services provided by the program/project are *as per the standards or specifications established in the program/project design.***

## 2. Evaluation

- “**Evaluation** is the assessment at one point in time of the impact of a piece of work and the extent to which the stated objectives have been achieved.”
- “mainly used to help in the selection and design of future projects.
- Evaluation studies can assess the extent to which the project produced the intended impacts and the distribution of the benefits between different groups, and can evaluate the cost-effectiveness of the project as compared with other options”.



# Monitoring Vs Evaluation

Characteristics	Evaluation	Monitoring
<b>Subject:</b>	<ul style="list-style-type: none"> <li>usually focused on strategic aspects</li> </ul>	<ul style="list-style-type: none"> <li>addresses operational management issues</li> </ul>
<b>Character:</b>	<ul style="list-style-type: none"> <li>incidental, flexible subject &amp; methods</li> </ul>	<ul style="list-style-type: none"> <li>continuous, regular, systematic</li> </ul>
<b>Primary user:</b>	<ul style="list-style-type: none"> <li>stakeholders and external audience</li> </ul>	<ul style="list-style-type: none"> <li>program management</li> </ul>
<b>Methodology:</b>	<ul style="list-style-type: none"> <li>rigorous research methodologies, sophisticated tools</li> </ul>	<ul style="list-style-type: none"> <li>rapid appraisal methods</li> </ul>
<b>Primary focus:</b>	<ul style="list-style-type: none"> <li>focus on relevancy, outcomes, impact and sustainability</li> </ul>	<ul style="list-style-type: none"> <li>focus on operational efficiency and effectiveness</li> </ul>
<b>Objectives:</b>	<ul style="list-style-type: none"> <li>to check efficiency, effectiveness, outcomes / impact, verify developmental hypothesis</li> <li>to document successes and lessons learned</li> </ul>	<ul style="list-style-type: none"> <li>to identify and resolve implementation problems</li> <li>to assess progress towards objectives</li> </ul>

# Why monitor and evaluate?

- To measure progress;
- To collect information;
- To look at costs and benefits;
- To solve problems (**not to criticize or to blame anyone**);
- To help the project team see where they are going and if they need to make any changes.
- To improve performance
- To improve *day-to-day* decision-making
- To enhance impact
- To provide early warning of problems
- To empower stakeholders
- To build understanding and capacity

# Evaluation Components

- In evaluation, the emphasis is on five main general components.
- Together, they represent the most important points to be taken into consideration in connection with decision on development projects:
  - Efficiency
  - Effectiveness
  - Impact
  - Relevance
  - Sustainability

**These evaluation components build directly on the elements in the LFA matrix:**

**Efficiency:** mean a measure of the **outputs of the project-qualitative and quantitative** – **in relation to the total resource input**: in other words, how economically the various inputs are converted into outputs.

**Effectiveness:** is a measure of whether the purpose of the project has been achieved, or how likely it is to be achieved. **This then is a question of the degree to which the outputs contribute to achieving the intended purpose.** It thus also says something about the content of the project and whether it contributes to development in the expected direction.

**Impact:** of the project are both the foreseen and the unforeseen consequences to society; **positive and negative**. Assessment must take as its point of departure the goal and purpose of the project, but goes much farther than simply ascertaining whether these have been achieved.

**Relevance:** an overall assessment of whether the project is in keeping with the overall goal, the donor and recipient policy, as well as with local needs and priorities.

**Sustainability:** is an overall assessment of the extent to which the positive changes achieved as a result of the project can be expected to last also after the project has been terminated? This is the question of the relation between the necessary local resources and how recipients view the project.

## Types of Evaluation

**Four types of evaluation;**

1. Ex-ante Evaluation (Start up Evaluation),
2. Mid-term Evaluation or On-going Evaluation/ Formative Evaluation/
3. Terminal Evaluation (Summative Evaluation); and
4. Ex-post Evaluation (Impact Assessment).

# Designing Monitoring and Evaluation Instruments

## M & E design has five components

1. Clear statements of **measurable objectives**

e.g. providing more equitable access to health services.

2. **A structured set of indicators**

Types of Indicators:

**a. Input Indicators-** are quantified and time-bound statements of resources to be provided.

E.g. Vehicle operating costs for the crop extension service

**b. Process indicators** - measure what happens during implementation.

E.g. latest date for delivery of fertilizer to farm stores

**c. Output indicators** - show the immediate physical and financial outputs of the project: physical quantities, organizational strengthening, and initial flows of services.

E.g. cost per kilometer of road construction

**C. Impact** - refers to **medium or long-term** developmental change.

e.g. (education) continuation rates from primary to secondary

education by sex, proportion of girls completing secondary education

e. **Exogenous indicators-** are those that cover factors outside the control of the project but which might affect its outcome  
e.g. currency exchange rates

### 3. Provision for Collecting Data and Managing Project Records

- so that the **data required for indicators** are compatible with existing statistics, and are available at reasonable cost.
- Indicators of inputs and processes will come from project management records originating from **field sites**.
- To measure output and impact may require the collection of data from **sample surveys** or **special studies**.



4. **Institutional arrangements** for gathering, analyzing, and reporting project data, and for investing in **capacity building**, to sustain the M&E service.

5. **Proposals for the ways in which M&E findings will be fed back into decision making.**

## **Monitoring and Evaluation Report**

**Report** is a document in which certain issues **are examined** for the purpose of:

- conveying information,
- communicating findings/results,
- putting forward ideas or proposals and,
- sometimes, making recommendations.

❖ **Reporting** on the other hand, **is a systematic activity of processing and distributing information to partners and stakeholders depending on the type of information they require.**

❖ enables the assessment of progress and achievements and helps focus audiences on the results of activities, enabling the improvement of subsequent work plans.

❖ helps form the basis for decision-making and learning at the project/program level.

❖ helps to communicate how effectively and efficiently an organization is meeting its targets & objectives.

# Structure of M & E Reports

- **M & E** reports are tools through which **we know what happened or what we got from project/program activities.**
- While **monitoring** report mainly focuses **on what goes into a project, evaluation** report deals with **what we got out from the intervention.**
- ***Reporting on the other hand happens*** both during monitoring and evaluation and is used to determine if the objectives have been met and impacts attained.
- ***A good M & E report must be*** well planned, systematic and presented in simple, clear and logical manner.

***The following points could be useful in preparing M&E reports.***

- Define the objective of the report
- Identify your audience
- Know what the audience wants to know
- Determine the time frame for reporting
- Design appropriate data collection tools
- Use good formats for reporting
- Carefully select useful information for your target users.
- State conclusions and recommendations (as necessary)
- Circulate the draft report to get comments for improvements
- Review as necessary and prepare summary of main findings, conclusions & recommendation (if your report is big)
- Distribute to those concerned

## Progress monitoring report outline

The following can be used as ***a generic outline for writing progress report.***

1. *Introduction*
2. *Comparison of planned versus actual events*
3. *Administrative review*
4. *Financial review/expenditure report/cost share report*
5. *Performance of the Project (Indicator data)*
6. *Notable lessons, innovations, or quotes*
7. *Issues requiring immediate support/attention by the donor*

The M & E Report could be presented in two forms:

## 1. Narrative Report

The following information should be addressed in a *narrative report*:

- **Introduction.** Significant developments in the reporting period.
  - Objectives and planned activities for the period.
  - Were the objectives and the activities of the project achieved?
  - Did you meet any bottlenecks and/or problems? (If not, why?  
What was done to deal with them?)
  - Were you able to carry out the activities according to schedule?  
(If not, why? What was done to adapt the activities? )

- ✓ Has the target group been reached?
- ✓ Copies or samples of every material produced during the project implementation, like posters, leaflets, study reports, newspaper articles, publications, training lessons and programs, etc.
- ✓ Objectives and planned activities for the next period.
- ✓ Specific recommendations for any action necessary to ensure that the project achieves its objectives.
- ✓

## 2. Financial Reports

**Financial reports should address the following information:**

- **An account of the progress** made towards **the achievement of the project objective.**
- **An overview of expenditures** during the reporting period.
- An explanation of any deviation from the budget and links to actual progress.
- An overview of the budget required for financial activities and expected output over the next 12 months.



# End of the Course

Thank You



for

listening!!

# **Chapter Nine**

## **Logical Framework Approach**

- ☐ **Introduction**
- ☐ **Stages in LFA**
- ☐ **SWOT analysis**

- ❖ Core tool used for **project planning & management**
- ❖ It is an effective technique for enabling stakeholders *to identify and analyze problems*, and
- ❖ To define *objectives & activities* which should be undertaken to resolve these problems.
- ❖ After project preparation, the **LFA** is a key management tool *for monitoring during implementation and evaluation*.
- ❖ It provides the *basis for activity schedules & development of a monitoring system, & a framework for evaluation*.
- ❖ *Stakeholders* should be involved *into a planning* as much as possible.

❖ LFA starts with **an analytical process** & gives structure to present the results of this process

**LFA makes easier to:**

- Set out systematically and logically the level of objectives of projects and the relationship between them.
- Indicate whether they have been achieved.
- Monitor the factors outside the scope of the project which influence its success.

▪ The main results of this process *are summarized in a matrix (the Logical Framework Matrix or, Log frame)* with 16 boxes which shows the most important aspects of a project, summarizing.

- Why a project is carried out (Intervention Logic)
- What *the project is expected to achieve* (Intervention Logic and Indicators)
- How *the project is going to achieve it* (Activities, Means)
- Which *external factors are crucial for its success* (Assumptions)
- Where to *find the information required* to assess the success of the project (Sources of Verification)
- Which **means are required** (Means)
- What *the project will cost* (Cost)
- Which pre-conditions have to be fulfilled before the project can start (Pre-conditions)

# The Logical Framework Matrix

	Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions
Overall Objectives				
Project Purpose				
Results				
Activities		Means	Cost	
				Pre-conditions

## LFA: TWO STAGES

- Projects are designed to *address problems faced by beneficiaries*.
- A properly *planned project addressing* the real problems of the beneficiaries cannot be achieved without an analysis of the existing situation.
- The *LFA* is *an evolutionary, iterative process starting with thorough analysis of an existing situation* as a basis for later planning.
- It involves *two stages* carried out progressively:
  - ❑ *Analysis stage*
  - ❑ *Planning stage*



❑ **The Analysis Stage** (Context/Situation Analysis), during which the existing situation is analyzed to develop a vision of the *'future desired situation'* and

❑ *To select the strategies that will be applied to address problems faced by beneficiaries,* both women & men, as well as to meet their needs and interests.

❖ *There are four steps to the analysis phase:*

✓ Stakeholder Analysis

✓ Problem Analysis (image of reality)

✓ Analysis of Objectives (image of an improved situation in the future)

✓ **Analysis of Strategies** (comparison of different options to address a given situation)

❖ **The Planning Phase** during which the project idea will be developed in operational detail.

# 1. Stakeholder Analysis

- **Stakeholders:** Individuals or institutions that may – directly or indirectly, positively or negatively – affect or be affected by the outcomes of projects.
- *Identifying & characterizing major stakeholders, target groups & beneficiaries, defining whose problems will be addressed by a future intervention.*
- To maximize the *social and institutional benefits* of the project and **minimize its negative** impacts, stakeholder analysis identifies all likely to be affected (either positively or negatively), and how.
- The need to adequately address gender issues- link with project effectiveness & sustainability

- **SA** helps to systematically identify *all gender differences* and the specific interests, problems & potentials.
- **Decisions:**
  - Whose interests & views to give priority
  - Reaching a consensus, compromise

<b>Stakeholder</b>	<b>Characteristics</b> <ul style="list-style-type: none"> <li>• social, economic</li> <li>• gender differentiation</li> <li>• structure, organisation, status</li> <li>• Attitudes...</li> </ul>	<b>Interest &amp; expectations</b> <ul style="list-style-type: none"> <li>• interests, objectives...</li> <li>• Expectations</li> </ul>	<b>Sensitivity to and respect of cross-cutting issues (environment, gender equality, etc.)</b>	<b>Potentials &amp; deficiencies</b> <ul style="list-style-type: none"> <li>• resource endowment</li> <li>• knowledge, experience...</li> <li>• potential contribution</li> </ul>	<b>Implications and conclusions for the project</b> <ul style="list-style-type: none"> <li>• possible action required</li> <li>• how to deal with the group</li> </ul>
<b>fisherfolk</b>	<ul style="list-style-type: none"> <li>• traditionally important source of income for communities</li> <li>• small but active co-operative</li> </ul>	<ul style="list-style-type: none"> <li>• basis for living is maintained</li> <li>• decrease in income is at least stopped</li> <li>• resistance in case rights to catch fish are limited</li> </ul>	<ul style="list-style-type: none"> <li>• very much aware of impact of external pollution on their fishery grounds</li> <li>• Benefits of fishery rather remain with men</li> </ul>	<ul style="list-style-type: none"> <li>• familiar with river and watershed</li> <li>• know pollution hot spots</li> <li>• strong support for pollution control measures</li> </ul>	<ul style="list-style-type: none"> <li>• awareness raising among all fisherfolk</li> <li>• Include pollution control measures</li> </ul>
<b>industry x</b>	<ul style="list-style-type: none"> <li>• important economic factor (strong lobby)</li> <li>• no trade unions</li> <li>• strong lobby &amp; influence on government</li> </ul>	<ul style="list-style-type: none"> <li>• maximise profits</li> <li>• interest in image; strong resistance in case of profit losses</li> </ul>	<ul style="list-style-type: none"> <li>• little awareness of the impact of wastewater on ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• financial resources for new technologies</li> <li>• Resource-saving potential through clean technologies</li> </ul>	<ul style="list-style-type: none"> <li>• raise their awareness on impact of polluted wastewater on region</li> <li>• consider raising their image with project measures</li> </ul>
<b>households</b>	<ul style="list-style-type: none"> <li>• most households discharge waste &amp; wastewater into river, not aware of danger</li> </ul>	<ul style="list-style-type: none"> <li>• get access to wastewater network</li> <li>• get somebody to collect waste</li> </ul>	<ul style="list-style-type: none"> <li>• very little awareness of the impact of waste &amp; wastewater on ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• potentially willing and capable to pay for services</li> </ul>	<ul style="list-style-type: none"> <li>• raise their awareness on impact of polluted wastewater on region</li> <li>• sensitise them concerning cost of environmental protection</li> </ul>
<b>etc. ...</b>					

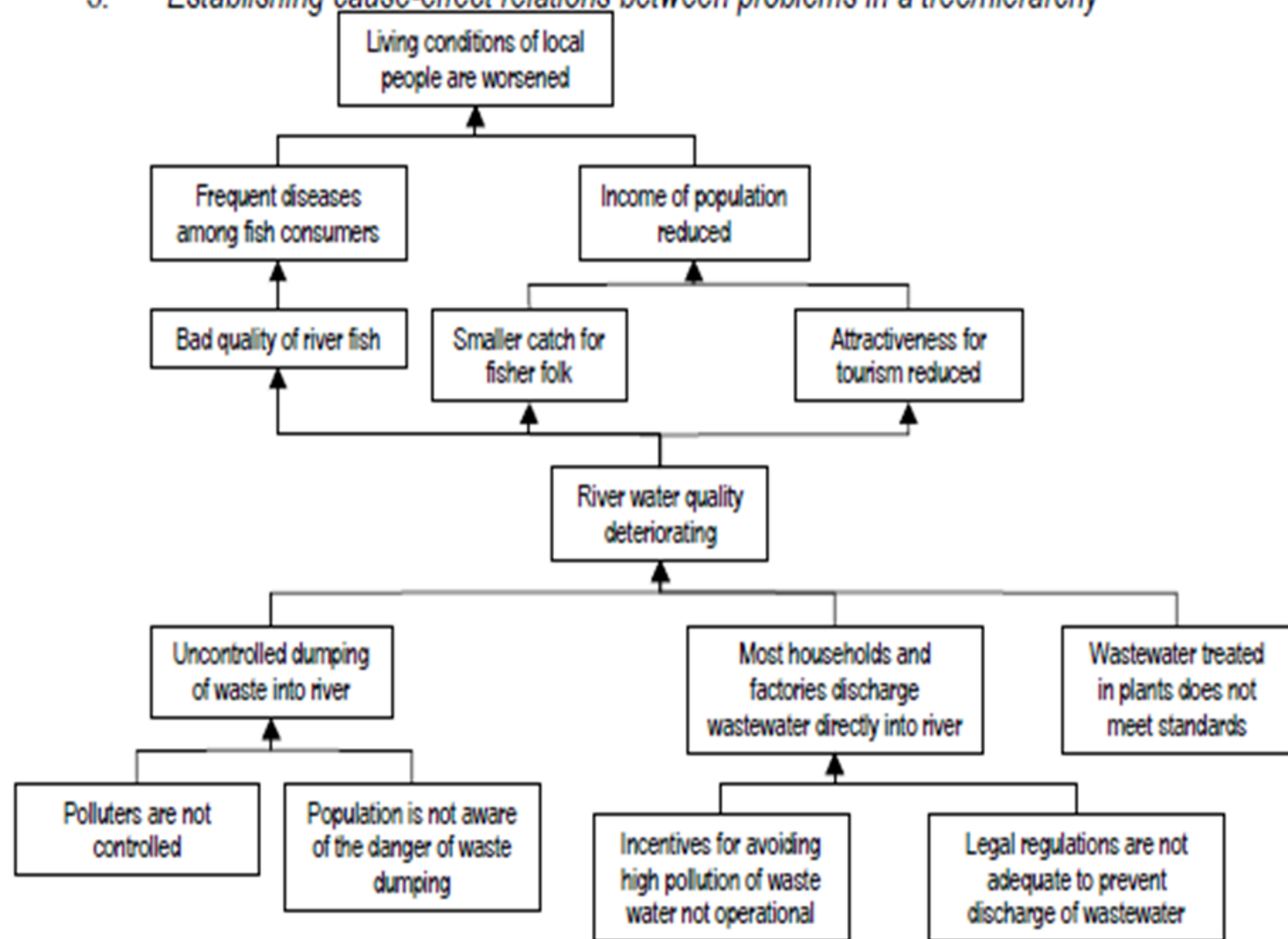
## 2. Problem Analysis

- ❑ **PA-** identifying key problems, constraints & opportunities, determining cause & effect relationships.
- ❑ Problem analysis identifies the negative aspects of an existing situation and establishes the ‘cause and effect’ relationships between the problems that exist. *It involves three steps:*
  - I. Identification of the stakeholders affected by the proposed project;
  - II. Identification of the major problems faced by target groups and beneficiaries (What is / are the problem/s? Whose problems?);
  - III. *Visualization of the problems* in form of a diagram, called “**problem tree**” or “**hierarchy of problems**” *to establish cause – effect R/Ships.*



A procedure which allows to:

1. Analyse an existing situation
2. Identify key problems in this context (=negative existing situations)
3. Establishing cause-effect relations between problems in a tree/hierarchy



Effects

Causes

❑ Two common *difficulties experienced* during problem identification and analysis:

➤ Inadequate problem specification, and

➤ the statement of ‘absent solutions’:

■ *Inadequate problem specification* occurs when a problem is specified in insufficient detail so that it does not communicate the true nature of the problem.

■ *Statements such as ‘poor management’* need to be broken down so that we understand what the problem is, and can therefore analyze & understand what the problem is, and can therefore analyze the underlying causes - *for example, the management problems might include poor financial control, late delivery of key services, etc.*



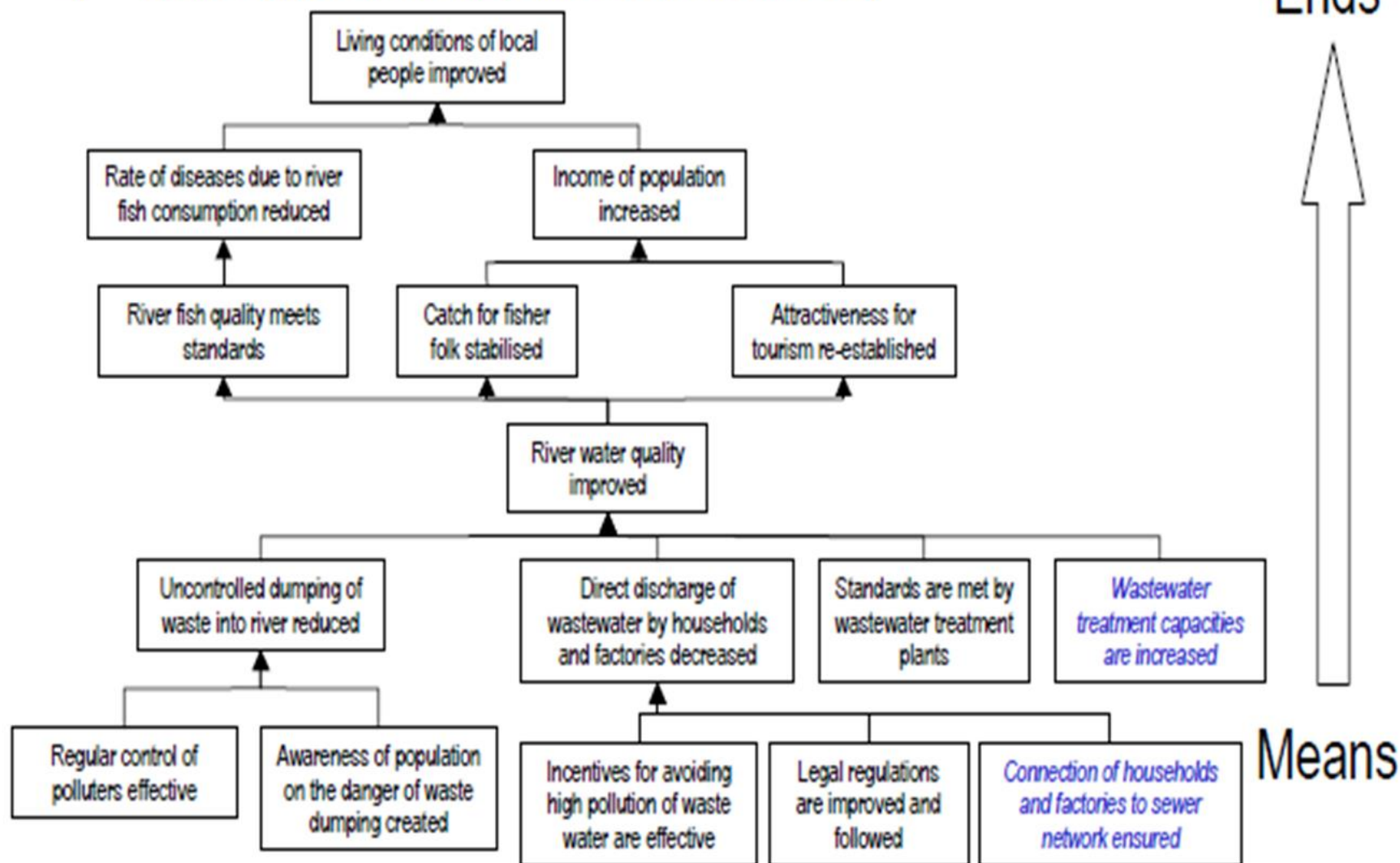
- **Absent solutions** are problem statements that do not describe the current negative situation, but describe the absence of a desired situation.
- For example, ‘Lack of trained staff’ does not describe the specific problem (staff has insufficient or inappropriate skills), and
- risks biasing the intervention towards the absent solution (‘training’) when in fact it might be an issue of recruitment or personnel management.

### 3. Analysis of Objectives

- **AO-** developing objectives from the identified problems, identifying *means to ends relationships*
- Analysis of *objectives is a methodological approach* employed to:
  - *Describe the situation in the future once the problems have been remedied, with the participation of representative parties;*
  - *Verify the hierarchy of objectives;*
  - *Illustrate the means-ends relationships in a diagram.*
- The ‘**negative situations**’ of the problem tree are converted into solutions, expressed as ‘*positive achievements*’.

A technique to:

- 1) describe the future situation that will be achieved by solving the problems
- 2) identify potential solutions for a given situation
- 3) turn the negative aspects into positive ones (desired, realistic)



## 4. Analysis of Strategies

- AS- *identifying the different strategies to achieve objectives; selecting the most appropriate strategy(ies); determining the major objectives (overall objectives & project objectives)*
- *It involves selecting the strategy(ies) which will be used to achieve the desired objectives.*
- Analysis of Strategies involves deciding what objectives will be included **IN** the project, and what objectives will remain **OUT**, and what the Project Purpose and Overall Objectives will be. This step requires:
  - ✓ **Clear criteria for making the choice of strategies,**

✓ **The identification of the different possible strategies to achieve the objectives.**

- In the hierarchy of objectives, the different clusters of objectives of the same type are called strategies.
- One or more of them will be chosen as the strategy for future operation.
- The ***most relevant and feasible strategy is selected*** on the basis of a number of criteria to be agreed upon for each project individually.

❖ *The following are possible criteria:*

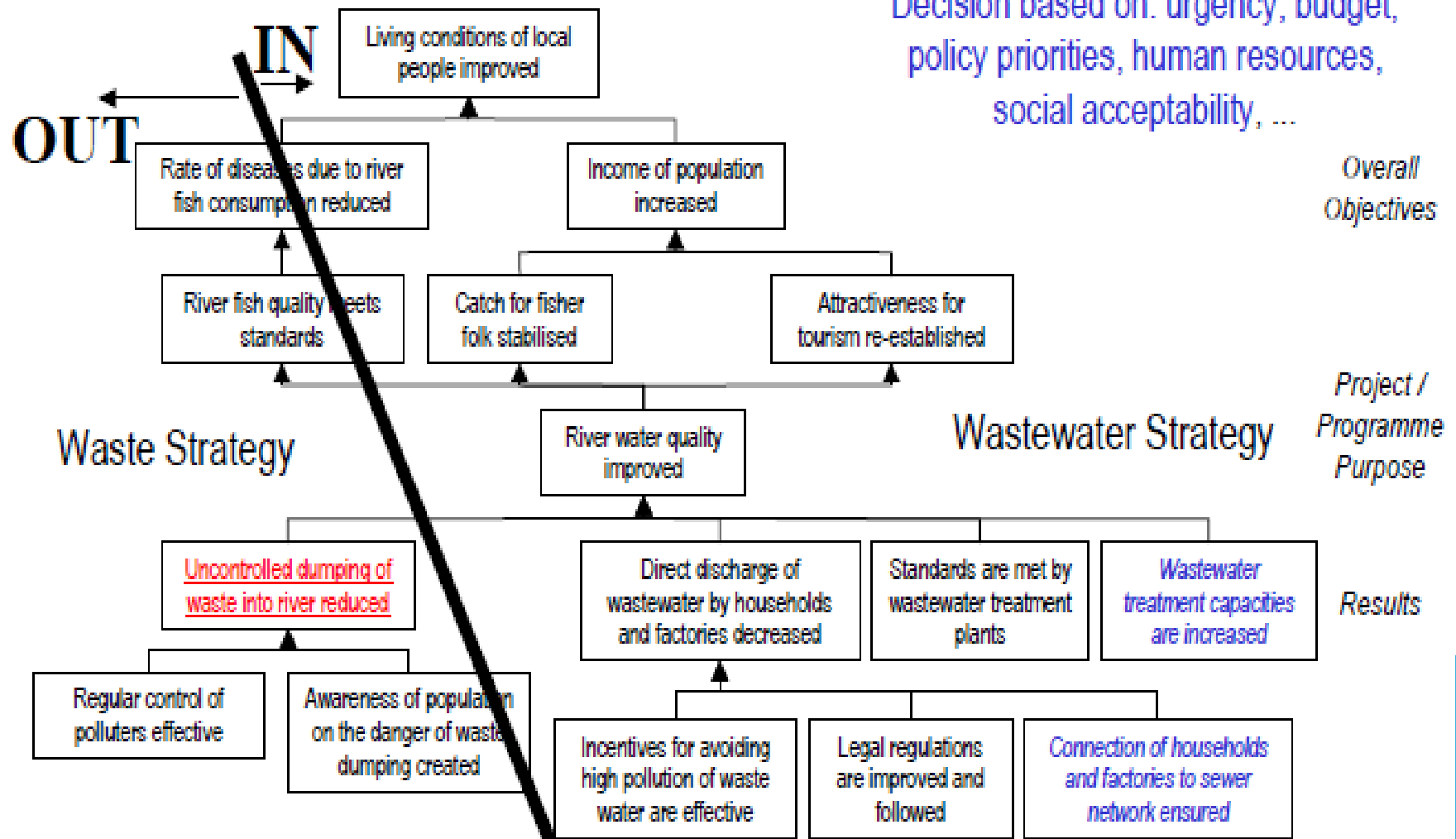
- Priorities of and attractiveness to target groups, *including time perspective of benefits*
- *Resource availability:*
  - *external funds*
  - *counterpart / partner institutions' funds*
  - *expertise required / available*
- Existing potentials and capacities (of target group/s).
- Relevance for sector / agreed strategy between partners and relevance for contribution to overarching policy objectives.

- Relationship and complementarity with other action
- Social acceptability
- Contribution to reduction of inequalities (e.g. gender)
- Urgency

A technique to:

- 1) identify possible solutions that could form a project strategy
- 2) select one or more strategies
- 3) decide upon the strategy to form the project

Decision based on: urgency, budget,  
policy priorities, human resources,  
social acceptability, ...





# The Planning Stage

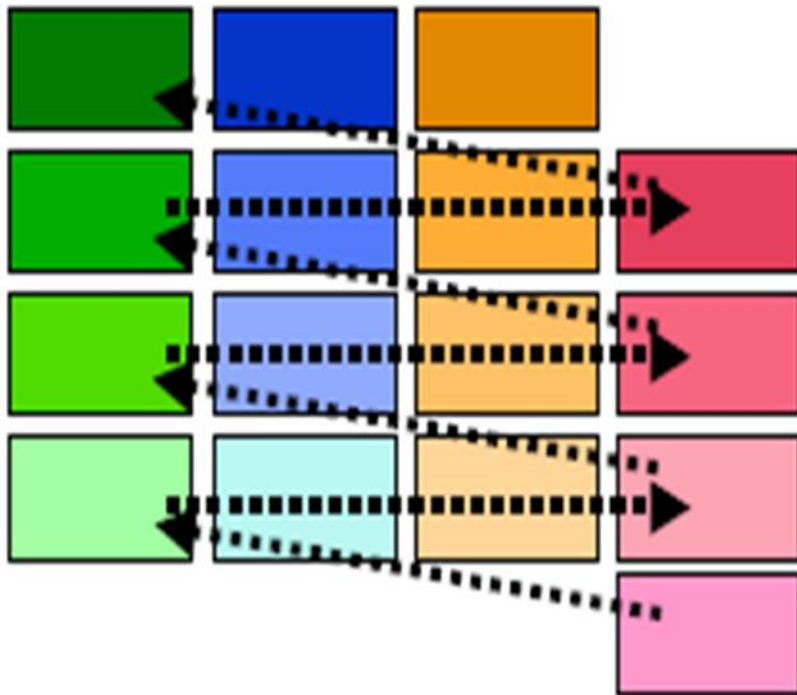
## ❖ The Log frame Matrix

- ❖ *The main output of the LFA* is the *logical framework matrix*. It is a way of presenting the substance of an intervention in a comprehensive form. *The matrix has four columns and four rows:*
- ❖ *The vertical logic identifies what the project intends to do, clarifies the causal relationships and specifies the important assumptions and risks beyond the project manager's control.*
- ❖ *The horizontal logic relates to the measurement of the effects of, and resources used by the project through the specification of key indicators, and the sources where they will be verified.*

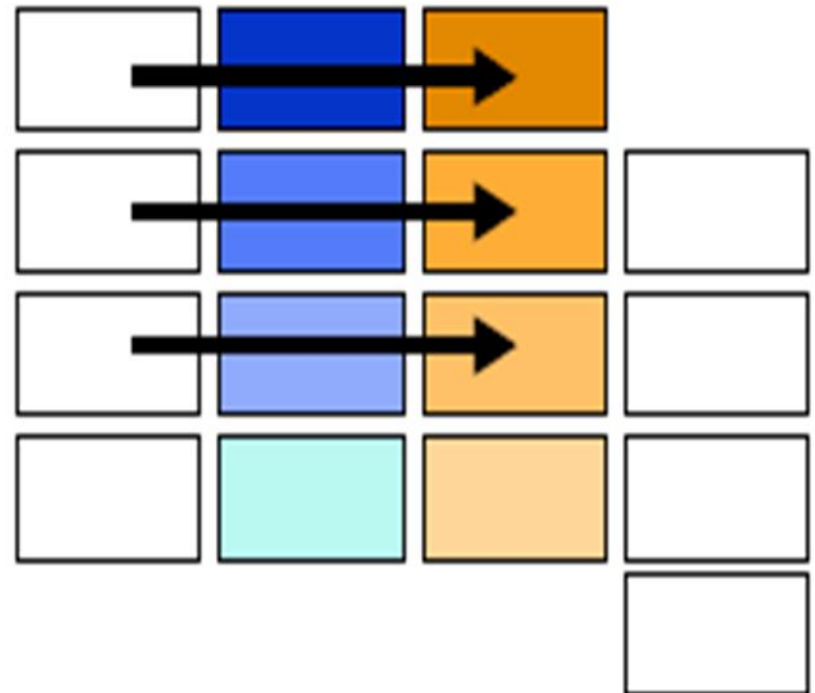
# How to Read the Logframe

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Vertical Logic



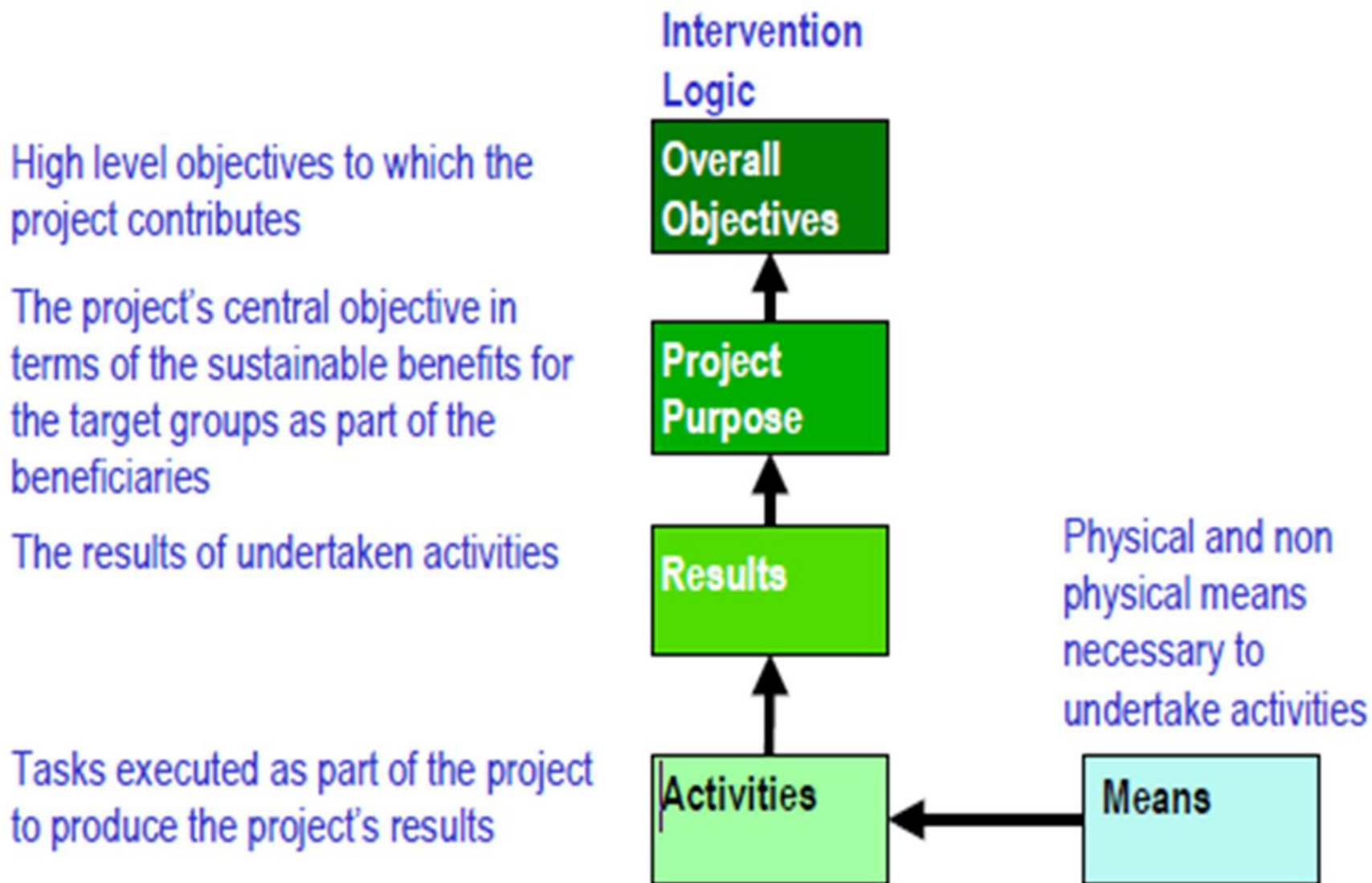
Horizontal Logic



## ***First Column: Intervention Logic***

- The ***first*** column of the Logical Framework is called ***“Intervention Logic”***.
- *It sets out the basic strategy underlying the project:*
  - ✓ *Means (2<sup>nd</sup> column, 4<sup>th</sup> row) - both physical and non-physical - allow to carry out Activities;*
  - ✓ *By carrying out these Activities, the Results are achieved;*
  - ✓ *Results collectively achieve the Purpose;*
  - ✓ *The Project Purpose contributes to the Overall Objectives.*

# Levels of Objectives



## Second Column: OV Indicators

- **They are the detailed description of:**
  - *The Overall Objectives*
  - *The Project Purpose*
  - *The Results*
- *The physical and non-physical Means (inputs) necessary to carry out the planned Activities are placed in the 'bottom' row of the second column, i.e. there are no Indicators for Activities in the logical framework matrix.*
- *A rough estimation of the necessary resources should be presented in this box.*
- *The Activities are related to the different Results.*
- *Indicators for Activities are usually defined during the preparation of an Activity Schedule specifying the Activities in more detail.*

## ❖ *Critical Assumptions*

- *Define the systems environment and sustainability issues*
- *Factors which project management cannot, or chooses not to control*
- *Outside the project's interventions*
- *Essential to project success: necessary conditions*
- ***Results-to-purpose assumptions** are the critical success factors.*



❑ **The vertical logic in the log frame**, i.e. the relationship between the 1<sup>st</sup> and the 4<sup>th</sup> column, works as follows:

- ❖ *Once the Pre-conditions are met, the Activities can start up;*
- ❖ *Once the Activities have been carried out, and if the Assumptions at this level hold true, Results will be achieved;*
- ❖ *Once these Results and the Assumptions at this level are fulfilled, the Project Purpose will be achieved;*
- ❖ *Once the Purpose has been achieved and the Assumptions at this level are fulfilled, contribution to the achievement of the Overall Objectives will have been made by the project.*

# The Vertical Logic

## Intervention Logic

Overall Objectives

Project Purpose

Results

Activities

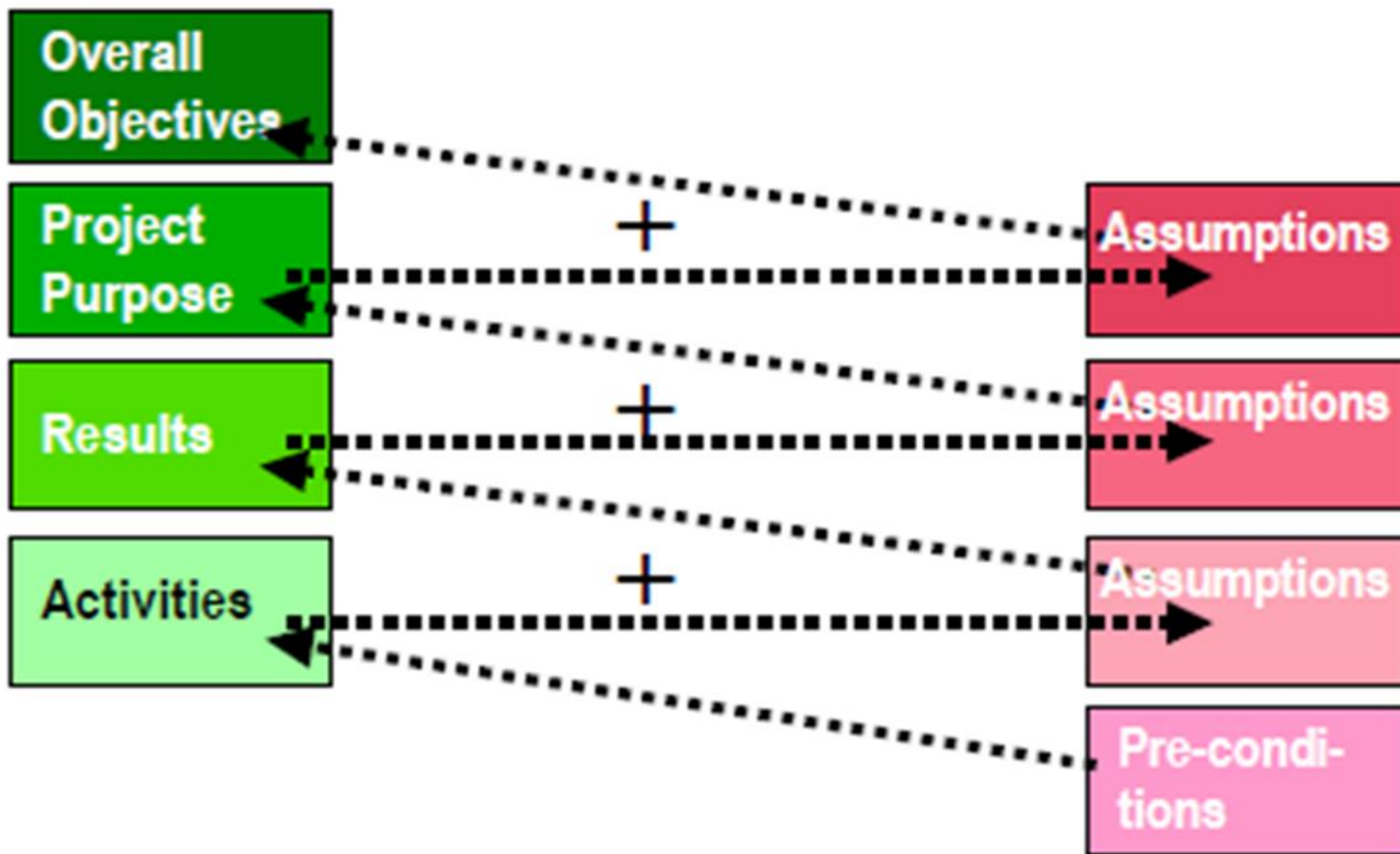
## Assumptions

Assumptions

Assumptions

Assumptions

Pre-conditions





# SWOT/C analysis to establish SMART goal

## SWOT Analysis



Internal

- Poor reputation
- Weak management
- conflict among workers

Weaknesses

Negative

Challenges

- poor market
- Bad governance
- Stiff competition

External

Opportunity

- Strategic alliance
- Government incentives
- Promising market

positive

Strength

- Strong brand
- Popularity
- Cost advantage
- Skilled manpower

SWOC

END!!

## Chapter one continued.....

### THE PROJECT CYCLE

➤ To perform a project *planning and management* activity *effectively & efficiently* we should know

✓ The *natural sequence* of project.

❖ Projects of all type move from *conception* to *reality* .

❑ **The main features** of this process are:

➤ Information and data gathering and analysis, and

➤ Making decision on the basis of the results of the analysis.

*The project cycle concept aims to emphasis two main points:*

- Project development should *pass through a series of consecutive steps* to help ensure that projects are *well planned, properly appraised, adequately resources* and *efficiently implemented*; and that
- *Lessons learned during implementation* should be *feed back* into the planning process to improve the *design and implementation* of future initiatives.

❑ **A project cycle** is a sequence of events, which a project follows.

- ❖ These **events, stages or phases** can be divided into several equally valid ways, depending on the executing agency or parties involved.
- ❖ Some of **these stages** may overlap. There are various models that deal with the project cycle.

### ***1. Lockyer's Four Phase Model***

**Lockyer** describes a **four** phase model of the project process:

- **Conception** - assess the feasibility of the project
- **Development** - prepare the project plan
- **Realisation** - carry out the plan
- **Termination** - close the project

## 2. UNIDO PROJECT CYCLE

- A. The Pre-Investment Phase: *(Opportunity Study; Pre feasibility Study; Feasibility Study; Appraisal)*
- B. Investment Phase: *(Negotiation and Contracting; Engineering Design; Construction; Pre production marketing; Recruitment and Training; etc.)*
- C. Operational/Normalization Phase: *(Expansion and Innovation; Replacement and Rehabilitation; Commissioning and Start-up)*

A. **PRE-INVESTMENT PHASE:** The pre-investment phase includes project activities such as:

- Identification of investment opportunities that normally called **opportunity study**.
- Pre-feasibility study (Preliminary project selection and definition),
- Feasibility study (Project formulation), and
- Appraisal and Decision (Evaluation and investment decision), etc.

## B. INVESTMENT PHASE

*The investment phase includes project activities such as:*

➤ ***Project and Engineering Design***: It comprises of

- ✓ Designs of buildings and other facilities that include ***time scheduling,***
- ✓ Site prospecting and probing,
- ✓ Preparation of blue prints,
- ✓ Detailed plant engineering and
- ✓ A final selection of technology and equipment.



- ***Negotiation and Contracting***: It includes definition of
- The ***legal obligations*** in respect to project financing,
- Acquisition of technology,
- Construction of building and services, and
- Supply of machinery and equipment for the operation phase

- ***Construction:*** It includes actual construction of building, installation of machinery and manpower.
- ✓ It involves site preparation, construction of building and other civil works together with the erection and installation of equipment in accordance with proper programming and scheduling.
- ***Recruitment and Training of Workers:*** It includes local and abroad recruitment and training of workers for the smooth running of operation.
- It should proceed simultaneously with the construction stage and it may prove relevant to the rapid growth of productivity and efficiency.

***Commissioning and Start up***: It requires *handover of the building to project* sponsor or promoter.

✓ ***Start up (delivery stage)*** is brief but technically critical span in project development.

- Its success indicates the ***effectiveness of the planning and execution*** of the project.

***C. OPERATION PHASE***: The operation phase includes project activities such as *expansion and innovation*, *replacement and rehabilitation*, and ***commissioning and start-up***.

The issues in the operational phase need to be considered both from ***long and short-term*** viewpoints.

***i. The short-term view point relates to:***

- Application of production
- Operation of Equipment
- Labour productivity and skill, etc

## ii. The long-term view point relates to :

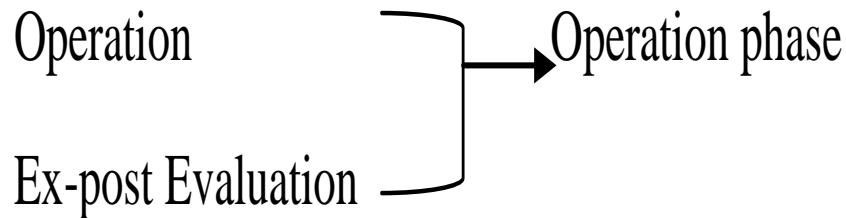
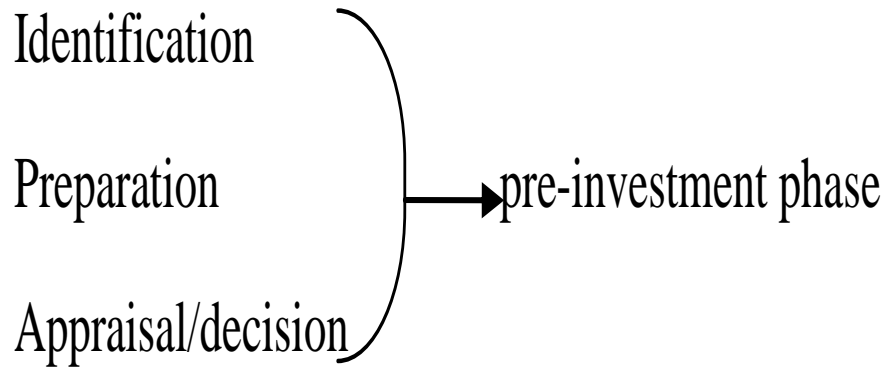
- *Production cost*
- *Income from sales, etc.*

3. ***DPSA'S PROJECT CYCLE:*** According to the Guidelines to Project Planning in Ethiopia (1990) of *Development Project Studies Authority (DEPSA)*, *a project cycle comprises three major phase* .

- ✓ **Pre-investment**
- ✓ **Investment and**
- ✓ **Operation**

Each of these *three phases may be divided into stages*. The guideline has divided the cycle into 6 stages.

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# Baum's model of project cycle

Initiated by **W. Baum** in 1970, was improved in 1978 and has been adopted by the **World Bank** ever since, initially recognized *four main stages*. Evaluation was added in a later version in *1978*, namely:

## **Five phases:**

1. *Identification* (finding the project)
2. *Preparation/analysis* (*Pre-feasibility and feasibility studies*) (Does it have merit?)
3. *Appraisal* (critical review, independent)
4. *Implementation* (getting it started)
5. *Evaluation* (success or failure)

❖ *Capital expenditure decision* is a complex decision process, which may be *divided into six* broad phases:

A. Identification

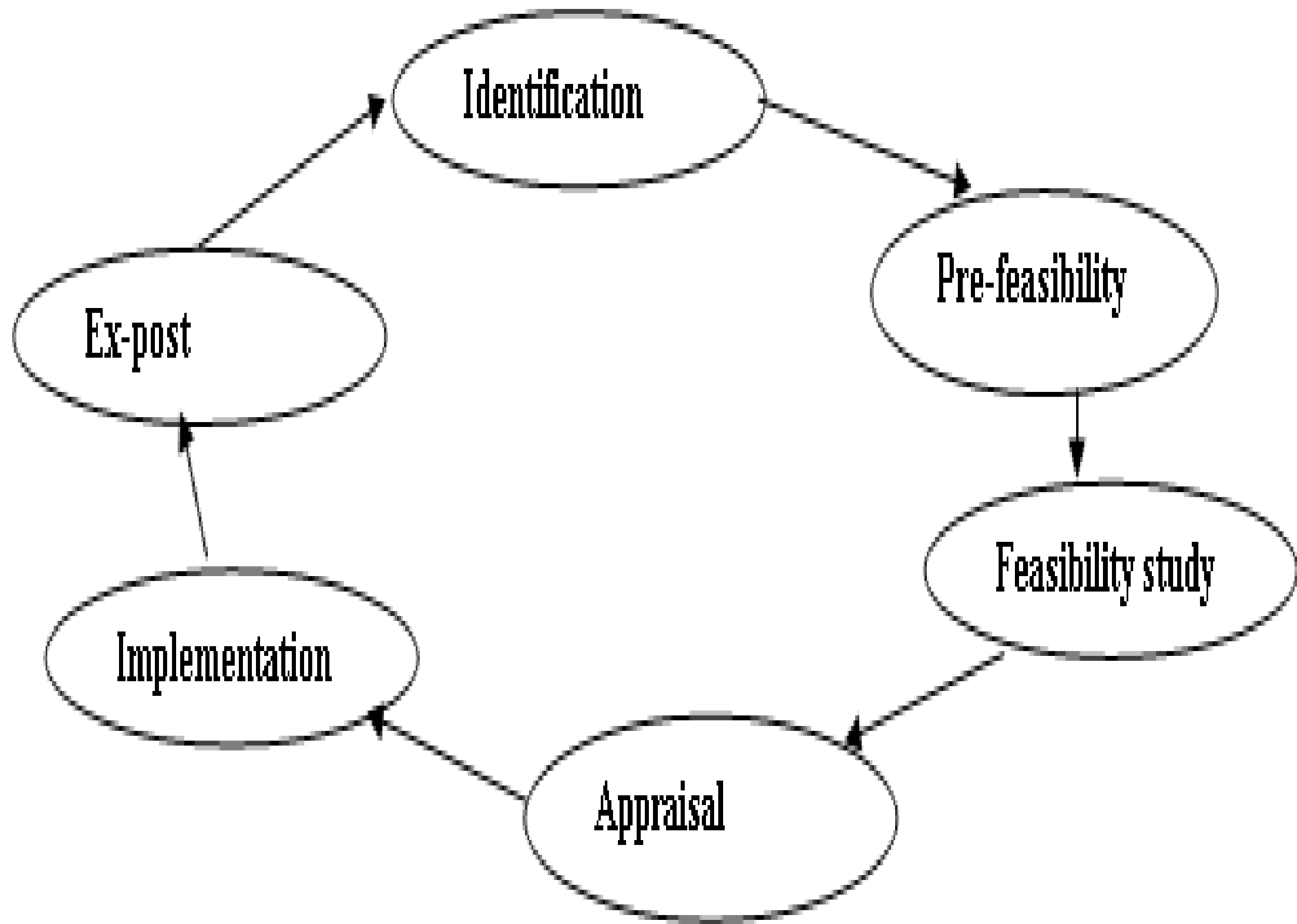
B. Pre-feasibility Study

C. Feasibility (technical, financial, economic)

D. Selection and project design - Appraisal

E. Implementation

F. Ex-post evaluation





# I. Identification

- *The first stage* in the project cycle is to *find potential* projects.
- Identification of *promising investment* opportunities requires imagination, sensitivity to environmental changes, and a realistic assessment of what the firm can do.

*This phase may take two forms:*

- If the project is largely *a private venture* in a widely market economy context the initiating entity will define *the concept, expectation and objectives of the project*.
- The project idea can also *emanate from government agencies* in the context of government development plans.

- ❖ In the latter case *Sectoral information* (i.e. the direct and indirect demands of sectors) is an important *Source of identification*.
- ❑ *In market economy context anticipated* demand for the projects **output** is important.
- ✓ In addition assessment of appropriate technology, scale of the project, timing of the project etc. are important.
- ✓ All types of specialists' input are required at this stage.
- **The planning phase of a firm's** capital investment is concerned with
  - *The articulation of its broad investment strategy and*
  - *The generation and preliminary screening of project proposal.*

❖ **Four major sources from which ideas or suggestions** for project may come:

- ✓ *Project ideas from technical specialists*
- ✓ *Project ideas from local leaders*
- ✓ *Project ideas from entrepreneurs*
- ✓ *Project ideas from government policy and plans*

❖ **The identification of project ideas** is based on several **aspects** of **development**.

- **Need** - a need assessment survey may show the need for intervention
- **Market demand** - domestic or overseas
- **Resource availability** - opportunity to make available resources more profitable
- **Technology** - to make use of available technology
- **Natural calamity** - intervention against natural calamity such as flood or drought
- **Political** considerations

## II. Project preparation and analysis phase

- Once *project ideas have been identified* the process of *project preparation and analysis starts*.
- ❖ Project preparation must cover the full range of *Market analysis, Technical analysis, institutional, financial analysis, Socio-economic analysis, Environmental analysis, Organization and management analysis*.
- ❖ *Critical element* of project preparation is identifying and comparing technical and institutional alternatives *for achieving the project's objectives*.
- ❖ *Resource endowment* (labor or capital) would have to be considered in the *preparation of projects*.

❖ Preparation thus *require feasibility studies* that identify and prepare preliminary designs of technical and institutional alternatives, compare their *costs and benefits*.

❖ *It involves generally two steps:*

➤ **Pre-feasibility studies**

➤ **Feasibility studies**

## A. Pre-feasibility Study

- ❖ The *identification process* will give the background information for *defining the basic concept of the project*, which leads to the feasibility study stage.
- ❖ Once *a project proposal* is identified, it needs to be examined.
- ❖ To begin with, a preliminary project analysis is done.
- ❖ *A prelude to the full blown feasibility* study, this exercise is meant to assess
  - I. Whether the project is *prima facie worthwhile* to justify a feasibility study and
  - II. What aspects of the project are *critical to its variability and hence warrant an in-depth investigation*.

➤ *At the pre-feasibility study stage* the analyst obtains *approximate valuation* of the major components of *the projects costs and benefits*.

- Availability of adequate market
- Project growth potential
- Investment costs, operational costs and distribution costs
- Demand and supply factors; and
- Social and environmental considerations.

*At pre feasibility :* All possible project *alternatives* are examined.

- The project concept justifies detail study.
- All aspects are critical and need in-depth investigation.
- The project idea is viable and attractive or not

- ❖ If the *project appear viable* form this preliminary assessment the analysis will be carried to the feasibility stage.

## **B. Feasibility Study**

- ✓ The major difference between the pre-feasibility and feasibility studies is the *amount of work required* in order to determine whether a project is likely to be *viable or not*.
- ✓ If the preliminary screening suggests that the project is *prima facie worthwhile*, a detailed analysis of the *marketing, technical, financial, economic*, and *ecological* aspects will be undertaken.



- ❖ The focus of this phase of *capital budgeting* is ***on gathering, preparing, and summarizing relevant information about various project proposals***, which are being considered for inclusion in the capital investment.
- ❖ Based on the information developed in this analysis, the stream of ***costs and benefits*** associated with the project can be defined.
- ✓ At this stage a team of specialists (Scientists, engineers, economists, sociologists) will need to work together.
- ✓ At this stage ***more accurate data need to be obtained and if the project is viable*** it should proceed to the project design stage.

*The final product of this stage is a feasibility report.* The feasibility report should contain the following elements:

- Market analysis
- Technical analysis
- Organizational analysis
- Financial analysis
- Economic analysis
- Social analysis, and
- Environmental analysis

The feasibility study would enable the project analyst to **select the most likely project out of several alternative projects**. Selection follows, and often overlaps, analysis.

This stage involves a systematic review of all aspects of the project in order that decision can be made as to whether to proceed. The following aspects should be covered in the appraisal process:

- **Technical**-*is the project design appropriate and will the project work as expected?*
- **Financial**- *has proper provision been made to cover the financial requirements and obligations of the project?*
- **Economic**- *is the project advantages form the point of view of the economy as a whole?*

- ***Social-*** is the project both advantageous and acceptable to the people affected by it?
- ***Institutional-*** are there suitable organizations in place to implement and manage the project. Is the legal frame work appropriate?
- ***Environmental-*** have the environmental impacts of the project been properly considered.
- ***Sustainable-*** will the project be sustainable in the long term both financially- and institutionally.

- It is considered as an **independent** stage of the pre-investment **phase**, marked by the final investment and *financing* decisions taken by the project promoters, where various parties will handle their own appraisal of the investment project in accordance with their individual objectives and evaluation of *expected risks, costs, and gain*.
- It addresses the question - **is the project worthwhile?** Wide ranges of appraisal criteria have been developed to judge the worthwhile of a project.
- They are divided into *two broad* categories, viz.,
  - ❖ Non-discounting criteria and
  - ❖ Discounting criteria.

- *To apply the various appraisal criteria* suitable cut off values (*hurdle rate(minimum acceptable rate of return), target rate, and cost of capital*) have to be specified. The level of risk pursued influences these.
- Despite a wide range of tools and techniques for **risk analysis** (*sensitivity analysis, scenario analysis, Monte carol simulation, decision tree analysis, portfolio theory, capital asset pricing model, and so on*).
- *Risk analysis* remains the most *intractable/difficult* part of the project evaluation exercise.
- This exercise also involves the undertaking of detailed engineering design; manpower and administration requirement as well as marketing procedures should be finalized.

## Implementation

- After the **project design** is prepared negotiations with the funding organization starts and once source of finance is secured implementation follows.
- **Implementation** is the most important part of the *project cycle*.
- The better and more realistic the project plan is the more likely it is that the plan can be carried out and the expected benefits realized.
- At the project implementation phase *tenders are let* and *contracts* signed.
- Project implementation must be flexible since circumstances change frequently.

- Project analysts generally divide the *implementation phase into three time periods.*
- ✓ **The investment phase**, where the major investments are made. This may extend from *three to five years*.
- ✓ **Development phase**, which may also extend from *three* to five years
- ✓ **The project life**
- The implementation phase for an industrial project consists of **several stages**:
  - I. Project and engineering designs,
  - II. Negotiations and contracting,
  - III. Construction
  - IV. Training, and
  - V. Plant commissioning.



- Translating an investment proposal into *a concrete project* is a complex, time consuming and risk fraught task.
- Delays in implementation, which are common, can lead to substantial cost overrun.

## 2. Ex-post evaluation:

- The *final phase* of the project is the **evaluation phase**. Many usually **neglect this stage**.
- The project analyst looks *carefully at the successes and failures* in the project experience to learn how better to plan for the future.
- In this stage it is important to examine the project plan and what really happened.

➤ Performance review should be done periodically to compare actual performance with projected performance.

➤ *A feedback device is useful in several ways:*

- a. It throws light on how realistic were the assumptions underlying the project;
- b. It provides a documented log of experience that is highly valuable in future decision making;
- c. It suggests corrective action to be taken in the light of actual performance;
- d. It helps in uncovering judgment biases;
- e. It induces a desired caution among project sponsors.

- ***Weakness and strengths*** should carefully be noted so as to serve as ***important lessons for future project*** analysis undertaking.
- ***Evaluation*** is not limited only to completed projects.
- Ongoing projects could also be evaluated to rectify problems when the project is in trouble.
- The project management, the sponsoring agency, or other bodies may do the evaluation.

***End!***





# **Agricultural project planning and analysis**

## **Chapter One**

### **1. The project concept**

Project planning and analysis has a long history in financial and business analysis. Project analysis has always been used as a means of checking the profitability of a particular investment by private firms. Recent experiences show that project analysis has attracted the attention of development economists. Projects are now assessed from the economy's viewpoint instead of only from the firm's perspective. The selection criteria have also included economic criteria on top of financial criteria.

Perhaps the most difficult problem confronting administrators in developing countries is implementing development programs. Much of the failures can be traced to poor project preparation. Especially from development viewpoint, for most development activities careful preparation in advance of expenditure is, if not absolutely essential, at least the best available means to ensure efficient, economic use of capital funds and to increase the chances of implementation on schedule. Unless projects are carefully prepared in substantial details, inefficient or even wasteful expenditure is almost sure to result – a tragic loss in nations short of capital.

Absence of effective and well defined project preparation is one major problem in LDCs. Economic development planners often give little time to the preparation of suitable development projects. However, project preparation is not the only aspect of agricultural development planning. The latter includes identifying national agriculture development objective; selecting priority areas for investment; designing effective price policies, and mobilizing resources.

Public projects, which are not profit oriented, are the main targets of aid-flows coming to LDCs which have their origin in government plans, make demands on government resources and institutions, even though the private sector may be involved in the implementation phase. Example: Road construction projects and electric power generating projects.

The main differentiating feature between agricultural projects and projects in other economic sectors is the biological nature of agricultural pursuits, making it harder to predict input - output relationships. The following are typical features of agriculture which are mainly the outcomes of its dependency: risk and uncertainty, perish ability of products, nature dependence, fixity of gestation period or growth period, sequential order of the growth pattern, unique role of land in production, and time sensitivity.

From all the discussions above one can derive the following more dynamic and comprehensive definition of a project:

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

*A **project*** is people - oriented which responds to people's actions. Example: seeds project is oriented by farmer's response to the improved seed. Hence, projects should forecast the response of their ultimate beneficiaries. A project within the framework of a national development changes plan into action at a micro-level. Hence, a project is undertaken, among other things, for development reasons which may include:

- executing national objectives at the micro level,
- national increases in agricultural production,
- promoting exports,
- employment creation,
- utilizing non-utilized and under-utilized resources - full employment, and
- Pursuing agricultural diversification policies (minimizing risk).

### **1.1 Definition of project**

*The Webster's New World Dictionary defined a Project as follows:*



- ❖ **Project** (praj'ekt, ikt) n. a proposal of something to be done; plan; scheme. an organized undertaking; specifically, a special unit of work, research, etc., as in school, etc., an extensive public undertaking, as in conservation, construction, etc.
- ❖ It originated from a Greek term-**Projectum** which means 'what comes before anything else'.
- ❖ A **project** can be defined as: *"A temporary endeavor undertaken to create a unique products, service, or results."* Here, 'Temporary' means that every project has a definite end. 'Unique' means that the product or service is differentiated in some distinguished way from all similar products or services. **Operations**, on the other hand, is work done in organizations to sustain the business. **Projects** are different from operations in that they end when their objectives have been reached or when the project has been terminated.
- ❖ *Project is generally referred to as a proposed undertaking, a complex set of economic activities in which scarce resources are committed in expectation of benefits that exceed the resources in order that investment decisions are wisely carried out in the area of development plan, formulation and implementation.*
- ❖ *Project* is an investment activity in which specific resources are committed within a given time frame, to create capital assets over an extended period of time in expectation of benefits that exceed the committed resource.
- ❖ *A project* is a unique set of coordinated and controlled activities, with definite starting and finishing points, undertaken by an individual or organization to meet specific objectives within defined schedule, cost and performance parameters.'
- ❖ *A project* is a task of considerable magnitude that must be completed within a budget and by a specific time; usually but not always carried out at once.
- ❖ *A project* is a non-repetitive/ non-routine activity that is goal oriented, that has a particular set of constraints, the output of which is measurable, and that changes something when carried out.
- ❖ *A project* is a set of proposal for investment of resources in to a clearly identified set of actions that are expected to produce future benefits of a fairly specific kind, the whole series of actions being the subject of individual planning and

examination before being adapted and implemented within a single overall financial and managerial framework.

## **1.2. Classification of a Project**

- Based on ownership
  - ✓ Privet sector:
  - ✓ Public sector
  - ✓ NGO's
- Based on the Sources of Finance
  - ✓ Project with domestic financing
  - ✓ Project with foreign financing
  - ✓ Project with mixed financing
  - ✓ Project with financial institutions
- Based on the force behind
  - ✓ Demand driven/need driven
  - ✓ Donor Driven
  - ✓ Political Driven
- Based on the purpose
  - ✓ New projects
  - ✓ Expansion projects
  - ✓ Updating projects
- Based on sector
  - ✓ Industrial project
  - ✓ Agricultural project
  - ✓ Educational and
  - ✓ Health project
- Based on risk involved in the project
  - ✓ High risks projects
  - ✓ Normal risks projects
  - ✓ Low risk projects
- Based on resource requirements of projects
  - ✓ Project with domestic resources

- ✓ Project with foreign resources
- Based on speed required for execution of the project
  - ✓ Normal project
  - ✓ Crash project
  - ✓ Disaster project
- Based on time horizon
  - ✓ Long term projects
  - ✓ Medium term projects
  - ✓ Short term projects
- Based on locality
  - ✓ Regional
  - ✓ National
  - ✓ International
- Based on resource use
  - ✓ Capital intensive projects
  - ✓ Labor intensive projects
  - ✓ Energy intensive projects

### **1.3. Characteristics/features of a Project**

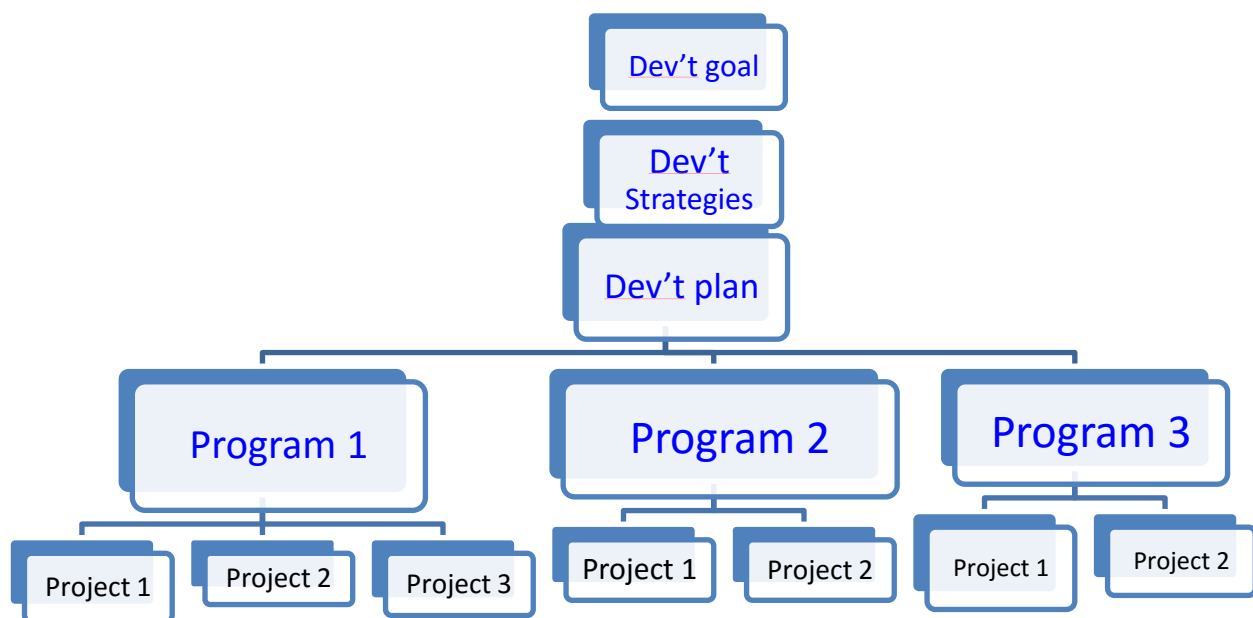
- Project involves the investment of scarce resources in expectation of future benefits.
- Involves a single definable purpose or end-item.
- Every project is unique and non- routine.
- Has a defined life span with a beginning and an end.
- A project is a temporary activity.
- A project utilises skills and talents from multiple organisations and professions.
- Completed by a team of people – Team spirit.
- Dynamic in nature.
- A project has a risk and uncertainty
- Projects are bounded by time, cost and quality constraints.
- A project has a life cycle.
- A project should have a primary customer or sponsor.

## 1.4. Project Levels

Project work in its broadest sense takes place at three levels:

- ❖ At the ***national level***, where national investment plans are formulated, priorities among sectors are established, and the macroeconomic framework of policies for economic growth is put in place.
- ❖ At the ***sector level***, where priorities for investment within each sector are determined and the issues and problems affecting the development of the sector are addressed.
- ❖ At the ***project level***, where individual projects are identified, prepared, and implemented and attention is given to their technical, economic, financial, social, institutional, and other dimensions.

## 1.5. National Development Planning and Project Analysis



### ❖ Development Goal/ objectives

- ☞ statement of intention or aspiration of a government to improve the living conditions of its people

- ☞ It is a comprehensive statement which guides development.
- ☞ For example, growth, equity in income distribution, reduction of unemployment.

#### ❖ **Development Strategies**

- ☞ The general methods of achieving specific objectives at national or organizational levels.
- ☞ describes the essential resources which will be committed to achieve objectives & how these resources will be organized
- ☞ Example, it may ask how to organize the labor force of the organization or the project. It can take different forms such as import substitute, export promotion, ALI etc,

#### ❖ **Plan**

- ☞ a statement of anticipatory decisions, their interrelations and the criteria employed in making them
- ☞ designed as a means to accomplish strategies
- ☞ A national plan covers an entire region, e.g a district or entire economy and it is made up of proposed programs and projects to be implemented over a period of time

#### ❖ **Program**

- ✓ A program is open ended in nature and could be on going investment activities which are not time bound.
- ✓ A series of coordinated, related, multiple projects that continue over an extended time and are intended to achieve a goal.

#### ❖ **Project**

- ☞ a discrete activity aimed at specific objective with a defined budget and limited timeframe
- ☞ Projects often constitute a clear and distinct element of a larger program.

### **1.6. The linkage between projects and programs**

It is necessary to distinguish between projects and programs because there is sometimes a tendency to use them interchangeably.

A **project** refers to an investment activity where resources are used to create capital assets, which produce benefits over time and has a beginning and an end with specific objectives,

A **program** is an ongoing development effort or plan which may not necessarily be time bounded.

- Examples could be a road development program,
- A health improvement program,
- A nutritional improvement program,
- A rural electrification program, etc. A development plan or program is a general statement of economic policy. National development plans are further disaggregated in to a set of sectoral plans.

A development **plan or a program** is therefore a wider concept than a project. It may include one or several projects at various times whose specific objectives are linked to the achievement of higher level of common objectives.

➤ **For instance, a health program** may include:

- A water project as well as
  - A construction of health centers **both aimed at improving the health of a given community**, which previously lacked easy access to these essential facilities. Projects, which are not linked with others to form a program, are sometimes referred to as “**stand alone**” projects.
- ❖ Projects in such context are the concrete manifestations of the development plans in a specific place and time.
  - ❖ One can think of projects as subunits and bricks of programs, which constitute the national plan (usually the direction is from plans to projects).
  - ❖ We have to note that projects could be either **public or private**.
  - ❖ It is the smallest operational element prepared and implemented as a separate entity in a national plan or program.
- A **project** is designed with a high degree of precision and details as regards its objectives, features, calculation of returns and implementation plan.

- **A program** by contrast is general, lacks details and precision and aims at a broader goal often related to a sectoral policy of a country or departmental policy of an organization.

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

### **S – Specific**

A project needs to be specific in its objective. A project is designed to meet a specific objective as opposed to a program, which is broad. A project has also specific activities. Projects have well defined sequence of investment and production activities and a specific group of benefits. A project is also designed to benefit a specific group of people.

### **M - Measurable**

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

### **A – Area bounded**

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

### **R – Real**

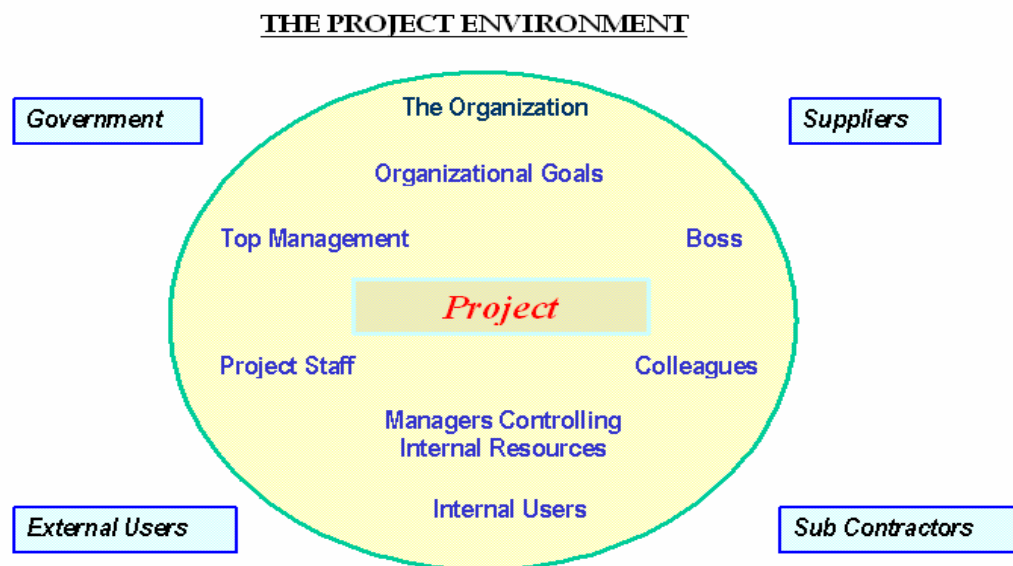
Planning of a project and its analysis must be made based on real information. Planner must make sure whether the project fits with real social, economic, political, technical, etc situations. This requires detail analysis of different aspects of a project.

## T – Time bounded

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

### 1.7. Project Environment and Stakeholders

- All projects are planned and implemented in a *social, economic, technological, political and international context*.
1. **Cultural and Social Environment:** is that how a project affects the people and how they affect the project.
    - This requires understanding of economic, demographic, ethical, ethnic, religious and cultural sensitivity issues.
  2. **International and Political Environment:** refers to the knowledge of international, national, regional or local laws and customs, time zone differences, teleconferencing facilities, level of use of technology, national holidays, travel means and logistic requirements.
  3. **Physical Environment:** is the knowledge about local ecology and physical geography that could affect the project, or be affected by the project.







# CHAPTER SEVEN: Project Implementation

## Project implementation: Overview

- **Once a project has been planned and financial support been secured, implementation can start.**
- **No matter how sophisticated or detail the project preparation work, it has no value unless it is transformed into action or implemented because there is a gap in translating project plans into actual investment and operation.**

## Introduction

- ❑ **Previous project implementation** experiences has shown that there is *continuing difficulties* in many *developing countries* in **transforming plans** or *project studies* into *investment projects*.
- ❑ *So equipping those individuals responsible to implement project with knowledge, skills, and tools of project organization, implementation and management* would significantly contribute for successful project implementation and also sustain the project management process.

## Concept of Implementation

- This phase **involves actually performing the project** and *ensuring that the objectives are met* and **the outputs made** in as much as this is possible.
- *In this phase*, bulk of project **resources** and **time** are utilized on the activities required in order to produce project deliverables.
- **Implementation** can be defined as **a project stage** which covers the **actual development or construction of the project up to the point at which it becomes fully operational.**

## **Implementation includes:**

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

➤ Throughout the implementation of the project, depending on the **modalities** set out in the financing agreement, three major principles apply:

**1. Planning and re-planning.** The initially prepared Implementation Schedule, Log frame and Activity Plans and Budgets need to be regularly reviewed, refined, and updated accordingly.

**2. Monitoring.** Project management has the task of establishing sufficient controls over the project to ensure that it stays on track towards the achievement of its objectives.

▪ This is done by monitoring (internal) which is the systematic and continuous collection, analysis and use of information for management control and decision-making.

**3. Reporting.** The project management or implementing agency will have to *provide reports on progress*.

- *The aim of these reports is to provide sufficiently detailed information to check the state of advance of the project in light of its objectives*, and **the hoped for Results and the Activities to be carried out.**

- **These reports cover also details of budget implementation**, and include the details of the future budgetary provisions for the following reporting period.

- Progress reports are most likely to be submitted on a quarterly basis.

## **Major activities of Implementation phase**

- 1. Project organization**
- 2. Setting goals/objectives**
- 3. Establishing Effective Techniques for Managing Implementation**



# 1. Project Organization

- **Attention should be given to organize strong project implementation unit (organization) depending on the type of the project and the context within which it is actually implemented.**
- **Many development projects, especially those in public sector, are part of investment program of a particular ministry or agency and will be implemented by it.**

**Example:** Road projects by roads Authority; livestock development by Ministry of Agriculture, integrated rural or urban development by the concerned agency or NGO, and so on.

## Project implementation unit/ organization

- ❖ If the project under consideration constitute a relative **small investment**, *it can routinely be implemented as part of the institution's activity.*
- ❖ Projects that are either larger and constitute **multi-component activities** or require an **integrated effort of several organizations**,
  - a **project implementation unit** may be important for the duration of the project.
- ❖ *Therefore, there are **two approaches** in establishing this unit. These are:*
  1. As an **integral part of the responsible agency** and operate under its **general rules.**

2. As a separate project implementation unit, independent from the line agency and operation under special rules, particularly with regard to administrative procedures, use of funds staffing regulations.

- **The second approach** used for complex projects involving several agencies or for projects considered of top priority but *beyond implementation capacity of the line agency.*

- Project organization is followed by selection or appointment of a competent and capable project manager and other key HR of the project.

# Project organizational structure

There are several forms of project organization

The following are the **three basic types used during project implementation** are:

- ✓ Functional
- ✓ Pure project and
- ✓ Matrix

## 1. Functional Organizations

- The main feature of this form of organization is that the delegation of authority is **top - down**.
- Employees working in the various departments or work units of the organization are assigned with part of the project activities that **relates to their departments' work**.
- In this type of project organization the **responsibility of coordinating the project activities usually rests on the shoulder of the general manager**.

## 2. Pure Project Organization

- It is a form of organization where a **separate, temporary and special** purpose organization is **established for the purpose of achieving specific project tasks**.

In such a situation a group of people having the required skills are organized into an **autonomous set-up** with its own leadership, structure and resources.

### 3. The Matrix Organization

■ In a situation where **a regular organization with functional departments** can not execute the kind of work projects with the desired level of *effectiveness* and **efficiency** and where at the same time projects alone may not be able to have the kind of functional support they required from other departments of an organization, **the matrix organization is required.**

■ The matrix organization is **a network of intersections** between the **project team** and the **regular functional departments** or units or elements of the same organization.

**In matrix structure**, **functional** and **pure** project structures are **combined** simultaneously at the same level of the organization.

**It is the most complex of all designs due** to it depends upon **both vertical and horizontal flow of authority** and communication.

## 2. Develop Measurable Objectives for Implementation

- Once the project is organized and ready for implementation **setting standards of performance is a useful start.**
- **We should identify** and **list key result areas or outputs, typical tasks and activities.**
- This could serve as a check-list and it will be less likely to miss something.
- **The list of tasks and activities** for each key result area should be **expressed in measurable terms.**

### How Do We Develop Standards of Performance?

- **A useful technique** for making measurable goals is by goal analysis.
- It is a simple but powerful technique for defining intangible activities.
- The start of the process is to plan how the activities take **shape in terms of timing, resources, budgeting, personnel, etc.**

- Detailed implementation planning need not be rigid.
- Rather it can be flexible and the possibility of making changes can be built in the implementation design.
- The important thing is to establish at the out set are:
  - what outputs expected;
  - what detail activities are to be done;
  - who will do what;
  - when and with whom;
  - what types of inputs needed;
  - a workable schedule, etc.



### 3. Establishing Effective Techniques for Managing Implementation

- **To be effective**, project managers must have a systematic basis for organizing the activities that independently and/or collectively result in the completion of a project.
- A variety of techniques have been devised to assist in **planning, organizing and managing implementation.**

# Planning Process, Tools and Techniques

- ❑ **Planning process represent a set of critical activities that are dependant on each other and are executed in an explicit order.**
- ❑ **The steps of project planning are:**
  1. Defining the Activities or Tasks
  2. Activity Sequencing
  3. Estimating Activity Durations
  4. Estimating the Resource Requirements
  5. Developing the Schedule
  6. Budgeting and Performance planning

# Problems in project implementation



- Project implementation **does not always proceed smoothly** according to the project management plan!
- Many issues and complications can arise which ***need to be effectively addressed*** in order for the project to be undertaken successfully.

❖ **Few projects, especially in developing countries have been highly successful; completed on time, at or reasonably close to the original cost estimates, and with the expected benefits realized or even exceeded.**

**Most projects** are, however, experienced **shortcomings** in one or more of these respects, and some times in all of them.

✓ *There are enormous problems, particularly in developing countries like ours ,*

▪ It can be broadly divided into four categories.

✓ **financial,**

✓ **managerial & institutional,**

✓ **technical and**

✓ **political.**

# 1. Financial Problems

## Financial difficulties include:

- ✓ Inadequate allocation of budgetary funds,
- ✓ shortage of foreign exchanges (for projects constitute foreign components),
- ✓ Delay in budget releases,
- ✓ general price and salary increases,
- ✓ change in tariff and interest rates, and
- ✓ losses due to fluctuations in foreign exchange rates

## Effects of financial difficulties

- delay/interruption of project activities
- cost increase /over-run/
- reduction in the scope of the project

❑ A vicious circle is then start i.e.

- Financial problem ----> implementation delay -----> Delays induce higher costs ---> Budgetary constraints ----> Inadequate funds for project implementation ----> More implementation delays -----> further cost increases-----> .....

## 2. Management/leadership Problems

- This encompasses what are usually considered as **institutional problems**.
- Major problems include:
  - An ill defined organizational set-up;
  - Failure to make timely decisions
  - Lack of relevant skills
  - low salaries and poor staffing policies;
  - lack of coordination among various agencies

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

### 3. Technical Problems

➤ Poor estimates and projections on the project activities and characters during the preparation stage.

**For example:**

- **In engineering area** such problems as difficult soil conditions, poor quality of materials, technical defects in design, mistakes in installation and start-up of equipment, unsuitability of imported equipment for local conditions, etc. and
- **In agriculture, inadequate technical packages,** inadequate awareness of the beneficiary farmers, etc. are some of the frequently observed problems.



## 4. Political Problems

- Lack of government commitment, or weak or changing government
- A rapid rotation of political appointees

## 5. Other problems

- Financer/funder conditional ties,
- lengthy project approval and budget/fund disbursement procedures of financing agencies,
- low community or stakeholder involvement in project planning and implementation, etc.

## Specific factors for project failure

*Because of poor project preparation too many industrial projects suffer in terms of:*

- ✓ *Low capacity utilization,*
- ✓ *Heavy costs overrun,*
- ✓ *Deteriorated financial profitability,*
- ✓ *Lingering illness or the sudden death syndrome,*
- ✓ *overstated returns,*
- ✓ *Underestimated costs,*
- ✓ *Omission of a necessary component*
- ✓ *Optimistic projection (yield, date),*
- ✓ *Failure to consider the variability of climate,*
- ✓ *Optimistic calendar for implementation,*

# How to increase Success in Project Implementation?

## Success in Project Implementation

- The following are some of *the principal factors that could account for successful projects*

### 1. Political Commitment

- Strong and sustained commitment by all levels of the government body to the project's objectives is the first and probably most important reason for success.
- By political or government commitment we mean that the continuing interest and active support of these agencies and individuals who are in a position to influence attainment of the project's objectives whether through the allocation of human, financial and other resources or through the workings of the administrative and political apparatus.

- *Commitment or the absence of it*, will have more effect on some kinds of projects than on others.
- For example, in our country *road and agricultural development projects* have received greater attention and commitment by the present government than the previous regime.
- As a result the success in these sectors is significant.
- *It is strongly advisable that stakeholders participation and consultation during project preparation would help to ensure commitments* i.e. to incorporate the main influencing agencies and actors in the preparation and appraisal process would enhance more the success in implementation.
- **A careful monitoring of the political environment is one of the duties of a good project manager.**

## 2. Simplicity of Design

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

### 3. Careful Preparation

- In some areas there is a wide tendency to start projects before they have been sufficiently prepared.
- Indeed the **extent of preparation that is feasible or desirable varies according to the type of the project.**
- For example, the preparation of an irrigation project is sometimes considered to be completed when a design is prepared.
- During implementation, there may be problems with the farmers in using irrigation water or difficulties in soil salinity which may result in large increase in cost.

- Careful preparations includes;
  - ✓ detailed engineering and land acquisition
  - ✓ technological packages,
  - ✓ socio-economic factors,
  - ✓ environmental issues
  - ✓ organizational and institutional arrangements and
  - ✓ other supporting services.
- **For a big projects**, like that of rural development, **pilot project** is sometimes important **to test proposed activities and approaches under local conditions.**
- This would not **only improve success in implementation** but also help to ***save both time and money that might be unnecessarily spent.***

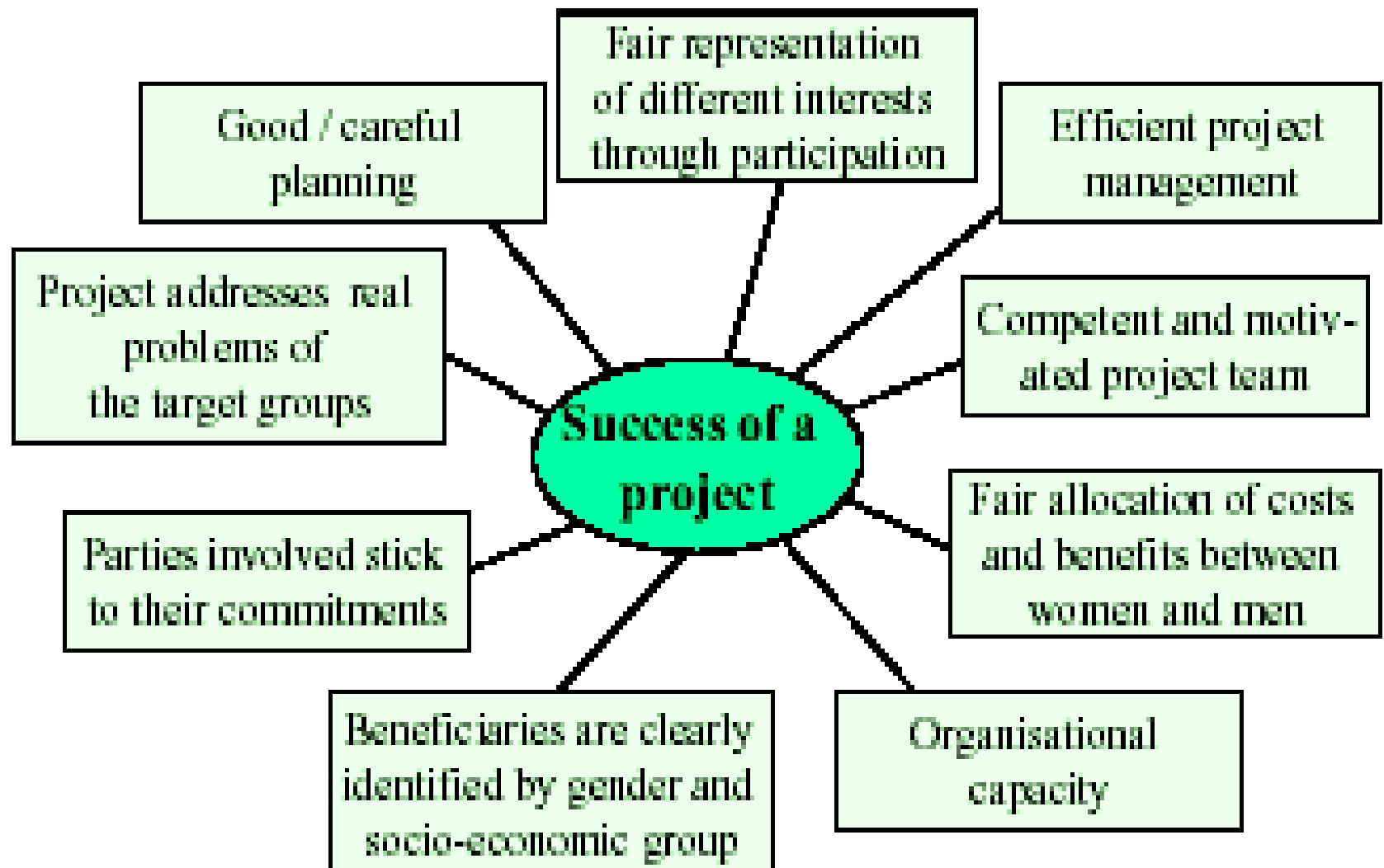
## 4. Good Management

- *The influence of the quality of management on project implementation performance is usually visible.*
- Many projects in serious of difficulty during implementation have been turned around by the appointment of a competent manager.
- What are the qualities of good manager and management?
- Superior performance in managerial job is associated with performing satisfactorily 'key areas' of the job.
- **A 'key area' can be defined as a major component of a managerial job** of such importance that failure to perform satisfactorily will endanger the whole job.



# Success of a Project: Some Factors

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# How to Prevent Project Failure

## Require weekly status reports that include:

- ✓ Project start and completion dates.
- ✓ Which milestones you've passed.
- ✓ Percentage of the project that is complete.
- ✓ Any accomplishments worth mentioning.
- ✓ Important meetings attended.
- ✓ Any threats or potential risks to the projected timeline.
- ✓ Description of any problems you've encountered and resolved.
- ✓ Personnel or equipment limitations and Budget status

## Build an effective team by considering:

- Employee skill, experience, participation ability, the projects they are already working on, and morale.

- Pair newer resources with mentors.
- Set a realistic schedule and stick with it.
- Establish concrete, clear goal planning in project management.
- Ensure senior management ownership and leadership from the beginning.
- Require effective engagement with project stakeholders.
- Ensure adequate skills and proven approach to project management and risk management.
- Pay attention to breaking developments and implementation into manageable steps.
- Evaluate proposals based on long-term value rather than price to secure delivery of business benefits.

- Maintain connectivity with the industry at senior levels.
- Ensure effective project team integration between clients and the supply/resource chain.

***END!***

# Chapter Two

## 2. Project Identification

- ✓ ***Project identification refers*** to *finding project* ideas which can contribute towards achieving ***specified development objectives***.
- ✓ Project identification is the first and the most crucial of the stages in the project cycle.
- ✓ Identification is followed by ***ranking*** and ***selection***.

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

- **Actual project identification**
- **Description of project idea**
- **Screening**
- **Prioritization**

## 2.1 Generation of project ideas

### I. Stimulating the Flow of Ideas

#### A. Clear Articulation of Objectives to initiate the project

- Helps in channeling the efforts of employees and stimulate them to think more imaginatively.
- Operational objectives of a firm may be one or more of the following:
  - Cost reduction
  - Productivity improvement
  - Increase in capacity utilization
  - Improvement in contribution margin etc.

***SWOT/C*** analysis to establish SMART goal

# SWOT Analysis



**S**



**W**



**O**



**T**



Internal

- Strong brand
- Popularity
- Cost advantage
- Skilled manpower

Strength

- Poor reputation
- Weak management
- conflict among workers

Weaknesses

positive

Negative

SWOC

Opportunity

Challenges

- poor market
- Bad governance
- Stiff competition

External

- Strategic alliance
- Government incentives
- Promising market

## A. SWOT Analysis

- Represents a conscious, deliberate, and systematic effort by an *organization/individual* to identify opportunities that can be profitably exploited by it.

### I. Monitoring the Environment

- ❖ The environmental **realities and prospects** determine the potential of any project for success.
  - **Economic Sector**
  - **Governmental sector**
  - **Technological Sector**
  - **Socio-demographic sector**

- **Competition Sector**
- **Supplier Sector**

## **II. Corporate/Organizational Appraisal**

- **Marketing and distribution**
- **Production and Development**
- **Research and development**
- **Corporate resources and personnel**
- **Finance and Accounting**

## 2.2. Major sources of project ideas

We can distinguish two levels from where project ideas are born at: the *micro-level* and the *macro-level*.

### A. At Micro-level project ideas emanate from:

- ❖ unsatisfied demand or needs,
- ❖ Existence of **unused or underutilized** natural or human resources and the perception of opportunities for their efficient use,
- ❖ The need to remove shortages in essential materials, services or facilities that **constrain development** efforts,
- ❖ The **initiatives of private or public enterprises** in response to incentives provided by the government,
- ❖ The necessity to **complement or expand** investments previously undertaken,

- ❖ The **desire of local groups or organizations** to enhance their economic status and improve their welfare,

**A. Macro-level: Project ideas emerge from:**

- ✓ National, sectoral, or regional plans and strategies
- ✓ Constraints in the development process
- ✓ A government's decision to correct social and regional inequalities or to satisfy basic needs of its people
- ✓ Unusual events such as droughts, flood, earthquakes, hostilities, etc.
- ✓ **A government's decision to create local project implementing capacity in such areas as construction, etc.**
- ✓ Project ideas could also originate from foreign firms.
- ✓ Workshops and development experiences of other countries
- ✓ Multilateral agencies or bilateral development organizations

## 2.3. Who identifies projects?

➤ **Development Projects** might be identified by different stakeholders including:

- ✓ **Government sector ministries**
- ✓ **Regional and local government's administration**
- ✓ **Private sector companies (local or foreign),**
- ✓ **State owned enterprises and organizations,**
- ✓ **Development banks,**
- ✓ **Bilateral and multilateral agencies.**

## **Project ideas conceived by:**

- ✦ Individuals**
- ✦ Groups of individuals (community)**
- ✦ Local leaders**
- ✦ NGOs**
- ✦ Policy makers**
- ✦ Planners**
- ✦ International development agencies**
- ✦ Government pronouncements**

## 2.4. Project concept and profile

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



# 1. JUSTIFICATION AND PURPOSE

- ❖ What *goal* is the project contributing to?
- ❖ What is the *purpose* of the project, what does it intend to achieve?
- ❖ What *problem* is the project addressing?
- ❖ What is the *justification* of the project?
- ❖ What demands, needs or opportunities is the project addressing?
- ❖ What are the main alternative ways for meeting the project's objectives?
- ❖ What existing information sources were, or can be used, in identifying and developing the pro

# 2. BENEFICIARIES AND STAKEHOLDERS

- ☐ Who will benefit from the project?
- ☐ Who identified the project?
- ☐ Who has a share or stake in the project?
- ☐ Who will be **positively**, and **negatively**, **affected** by the project?
- ☐ How have project beneficiaries and other stakeholders participated in the identification of the project?
- ☐ Which institutions are the targets of the project?

### **3. RESOURCE AND INSTITUTIONS**

- ❖ What potential resources may be available for *implementing* the project?
- ❖ Which organizations are to be involved in project planning and implementations?

### **4. POLICIES AND PLANS**

- ❖ How does the project proposal fit into any sector or regional plans?
- ❖ Does the project fit into current policies?

### **5. IMPACTS**

- ❖ What are the likely major positive and negative social impacts of the project?
- ❖ What are the likely positive and negative environmental impacts of the project?

### **6. SUPPORT**

- ❖ What is the level of political and administrative support for the project?
- ❖ Does the project have the support of beneficiaries and/or local communities?

### **7. RISKS**

- ❖ What are the chances of the project achieving its objective?
- ❖ What are the main risks associated with the project?
- ❖ That assumptions have been made, e.g., what support is needed for others?

## 2.5. Screening of Project

### Factors of project idea screening

#### 1. Compatibility with the Entrepreneur

- The **idea** must be **compatible** with the interest, personality, and resources of the entrepreneur.
- A real opportunity may fulfill the following **three characteristics**:
  - ❖ *It fits the personality of the entrepreneur;*
  - ❖ *It is accessible to the entrepreneur; and*
  - ❖ *It provides the prospect of rapid growth and high return*

#### 2. Consistency With Government Priorities

- The project idea must be feasible given the national goals and priorities as well as governmental regulatory framework.

### 3. Availability of Inputs

- **The resources and inputs required** for the project must be **reasonably** assured.
- To assess this, the following questions need to be answered:
  - ✦ Are the **capital requirements** of the project within manageable limits?
  - ✦ Can the **technical know - how** required for the project be obtained?
  - ✦ Are the **raw materials required for the project available domestically** at a reasonable cost?

## 4. Adequacy of the Market

- Total present domestic market, Competitors and their market shares, Export markets, Analyze price profile of the product such as competitive product, Sales and distribution system., Projected increase in consumption, Barriers to the entry of new units, Economic, social, and demographic trends favorable to increased consumption., Patent protection.

## 5. Reasonableness of cost

- The following points should be reminded in this regard:
- Cost of material inputs ,Labor costs, Factory overheads, administration costs, Selling and distribution costs, Service costs,

**Economies of *scale***

## 6. Acceptability of Risk Level

- *During preliminary selection, the analyst should eliminate project proposals that:*
  - Are technically unsound and risky;
  - Have no market for the output;
  - Have inadequate supply of inputs;
  - Are very costly in relation to benefits;
  - Assume over – ambitious sales and profitability.

### 3.6. Prioritization, ranking and project Index

- The limited resources available enforce that **effective project identification and selection** at various levels will be essential.

- To decide which projects to support it will be necessary to **set priority**.
- This calls for the ranking of projects using a set of criteria (which varies from organization to organization)
- **Potential criteria for ranking projects are given below:**

## **2.6.1 Criteria for ranking projects**

### **1. Extent**

Number of people affected by the project

Geographic area affected by the project

### **2. Economic and financial benefit**

Potential economic benefits to the country or region, community etc.

### **3. Environmental**

- Conservation of natural resources and more sustainable land use
- Protection of natural resources such as forests

## 4. Social

- Poverty alleviation
- Assistance to disadvantaged groups

## 5. Policy

- Is the project in line with **national and regional** policies?

## 6. Resources

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

## 7. Success or failure (Risk.)

- What are the chances of project successfully meeting its **objectives**?



➤ What *degree* of *risk* is associated with the project that may affect its implementation?

## 8. Support

✓ *Government and community* support and demand for project

### 2.6.2. Project rating index

- When a firm evaluates a large number of project *ideas regularly*, it may be helpful to streamline the process of preliminary screening by employing a project rating index.

**The steps involved in determining the project-rating index are listed as follows:**

1. Identify factors relevant for project rating.
2. Assign weights to these factors (the weights are supposed to reflect their relative importance).
3. Rate the project proposal on various factors, using a suitable rating scale. *(Typically, a 5-point scale or a 7-point scale is used for this purpose).*
4. Multiply the factor rating with the factor weight to get the factor score.
5. Add all the factor scores to get the overall project-rating index.
6. Select the project with the highest rating index

Factors	Factor weight	VG = 5	G=4	A=3	P=2	VP=1	Factor score
Input availability	0.10			✓			0.30
Technical know-how	0.15		✓				0.60
Reasonableness of cost	0.05		✓				0.20
Adequacy of market	0.25	✓					1.25
Investment risks	0.05		✓				0.20
Stability	0.10		✓				0.40
Competition	0.20	✓					1.00
Consistency with governmental priorities	0.10			✓			0.30
Rating index							4.25