Wollo University

Department of Agri. Economics

- **Project Planning, management and Identification and Analysis (AGEC522)**

Project Planning, management and Identification and Analysis (AGEC522)

Chapter 1: Introduction

Outline

- The project concept
- Definition of Project
- The linkage between projects and programs
- Project Analysis

1. INTRODUCTION

1.1. 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.

- ***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).

1.2. Definition of Project

- ***A project*** is a complex set of economic activities in which we commit scarce resources in expectation of benefits that exceed the value of these resources. From this definition, it is clear that a project:
  - has specific objective (private or public);
  - involves set of activities (planning, financing, and implementing);
  - involves resource use;
  - deals with future expectations (risk and uncertainty);
  - involves comparing benefits and costs to occur in the future; and
  - has defined period of life;

- Projects, by Gittinger (1994), are defined as the cutting edge of development
- ***Project*** *can also be defined as an investment activity in which financial resources are expended to create capital assets that produce benefits over an extended period of time*.
- A project is a complex set of activities where resources are used in expectation of return and which lends itself to planning, financing and implementing as a unit.
- The basic characteristics of capital expenditure (also referred to as a capital investment or capital project or just project), is that it typically involve current outlay (or current and future outlays) of funds in the expectation of a stream of benefits extending far into the future.
- Capital investment decisions often represent the most important decisions taken by the firm or other decision maker.
- Capital investment decisions have far reaching impact into the future.
- They are also characterized by irreversibility.
- Thus, a wrong capital investment decision often cannot be reversed without incurring substantial loss.
- They also involve substantial outlay of capital.

What is a Project?

- A project is a temporary endeavour undertaken to create a unique product or service, or a known product or service in a unique environment. A set of inter-related and controlled activities with start and finish dates, undertaken to achieve a unique objective conforming to specific requirements, including the restraints of time, cost and resources.
- **It is important to understand that not every work is a project**
- . A project is a temporary and one-time endeavour, with a definite start and an end date, undertaken to create a unique product or service, that brings about beneficial change or added value.
- • **Temporary** means that any project will have a start and an end date (but it has nothing to do with short duration).
- • Project produces **unique** results: meaning the product or service at the end of the project should be some way different than the existing (can be an invention or an innovation.)
- • Projects are characterised by progressive elaboration: due to uniqueness and greater uncertainty, projects cannot be understood entirely at or before project start, and therefore planning and execution of projects is happening many times in separate steps or phases. As project progresses, project team understands next steps, deliverables and way of execution much better. Based on this knowledge, team members elaborate initial draft plans, and execute next phase of the project based on these detailed plans.
- The Project Management Institute, with its PMBOK (Project Management Body of Knowledge) sets a common international standard in terminology that transcends industry sectors and professions. According to PMBOK – which describes the sum of knowledge within the profession of project management, "projects are undertaken at all levels of the organisation. They may involve a single person or many thousands.

- Projects may involve a single unit of one organisation or may cross organisational boundaries as in joint ventures or partnering. Projects are often critical components of the performing organisation's business strategy. Examples of projects include:
- • Developing a new product or service
- • Effecting a change in structure, staffing, or style of an organisation
- • Designing a new transportation vehicle
- • Developing or acquiring a new or modified information system
- • Constructing a building or facility
- • Running a campaign for political office
- • Implementing a new business procedure or process".
- **Projects differ from operations** , because operations are continuous and repeating (projects are temporary), and operations deliver the same or almost the same results (project results are in contrast unique).
- **What is Project Management?**
- Project Management is the planning, organising, monitoring and controlling of all aspects of a project in a continuous process to achieve its objectives, both internal and external.

- Project exist in every field of endeavour, including designing and/ or constructing a house, designing a new product and introducing a new businesses or software product.
- ***Project management*** is defined as managing and directing time, material, personnel/ labour, and cost to complete a project in orderly, economical manner and to meet the established objectives of time, cost and technical and/ or service results.
- A successful project using the project management approach will consist of three stages: -
- ***Planning:-*** understanding what work has to be done including identifying the individual activities and necessary resources to complete the project; then developing a plan of action in a logical order that can be displayed graphically as a project planning diagram (or network).
- ***Scheduling: -*** Validating when the work activities need to be done. This stage details the time allowed for the project and each activity when they are to be started and completed.
- ***Controlling: -*** Monitoring (tracking) progress of the project as it gets underway, analyzing performance, and then resolving concerns. It also manages status report.

and programs

- While a **project** refers to an investment activity where resources are used to create capital assets, which produce benefits over time and has a beginning and an end with specific objectives,
- a **program** is an ongoing development effort or plan 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 into 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.

- From the above discussion it can be seen that the major difference between a project and a program is not so much in objectives stated but lies more in scope, the details and accuracy.
- 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.

1.4. Project Analysis

- All countries, but particularly the developing countries, are faced with the basic economic problem of allocating resources such as labor at all levels of skill, management and administrative capacity, capital, land and administrative and other natural resources and foreign exchange, to many different uses such as current production of consumer goods and public services or investment on infrastructure, industry, agriculture, education and other sectors.
- These different uses of resources, however, are not the final aim of the allocate process; rather they are the means by which an economy can marshal its resources in the pursuit of more fundamental objectives such as the removal of poverty, the promotion of growth and the reduction of inequality in income. Pursuit of one objective (better income distribution) however, may involve a sacrifice in other objective (rapids growth).
- A choice therefore has to be made among competing uses of resources based on the extent to which they help the country achieve its fundamental objectives. If a country consistently chooses allocations of resources that achieve most in terms of these objectives, it ensures that its limited resources are put to their best possible use.
- Project analysis is a method of presenting this choice between competing uses of resources in a convenient and comprehensible fashion.
- In essence, project analysis assesses the benefits and costs of a project and reduces them to a common denominator.

Project Planning, management and Identification and Analysis (AGEC522)

Chapter Two: Project Management

Semester II, 2017/18 Academic Year (2010 E.C)

BY

Hassen Beshir (Dr.)

Desse, Ethiopia

OUTLINE

2.1. The concept and definition of Management

2.2. The Features of management

2.3. Difference b/n Admn and Mangt

2.4. Functions of Management

2.5. Skills and nature of Management

2.6. Elements and Tools of Scientific Management

2.7. Principles, Merits of Scientific Management

Define Management

"Management is the process of designing & maintaining an environment in which individuals, working together in groups, efficiently accomplish selected aims."

- As managers, people carry out the managerial functions of planning, organizing, staffing, leading, & controlling.
- Management applies to any kind of organization.
- It applies to managers at all organizational levels.
- The aim of all managers is the same: to create a surplus.
- Managing is concerned with productivity, this implies effectiveness & efficiency.

Define Organizations :

"Organizations which can be defined as group of people working together to create a surplus."

- In business organizations, this surplus is profit.
- In nonprofit organizations, such as charitable organizations, it may be the satisfaction of needs.

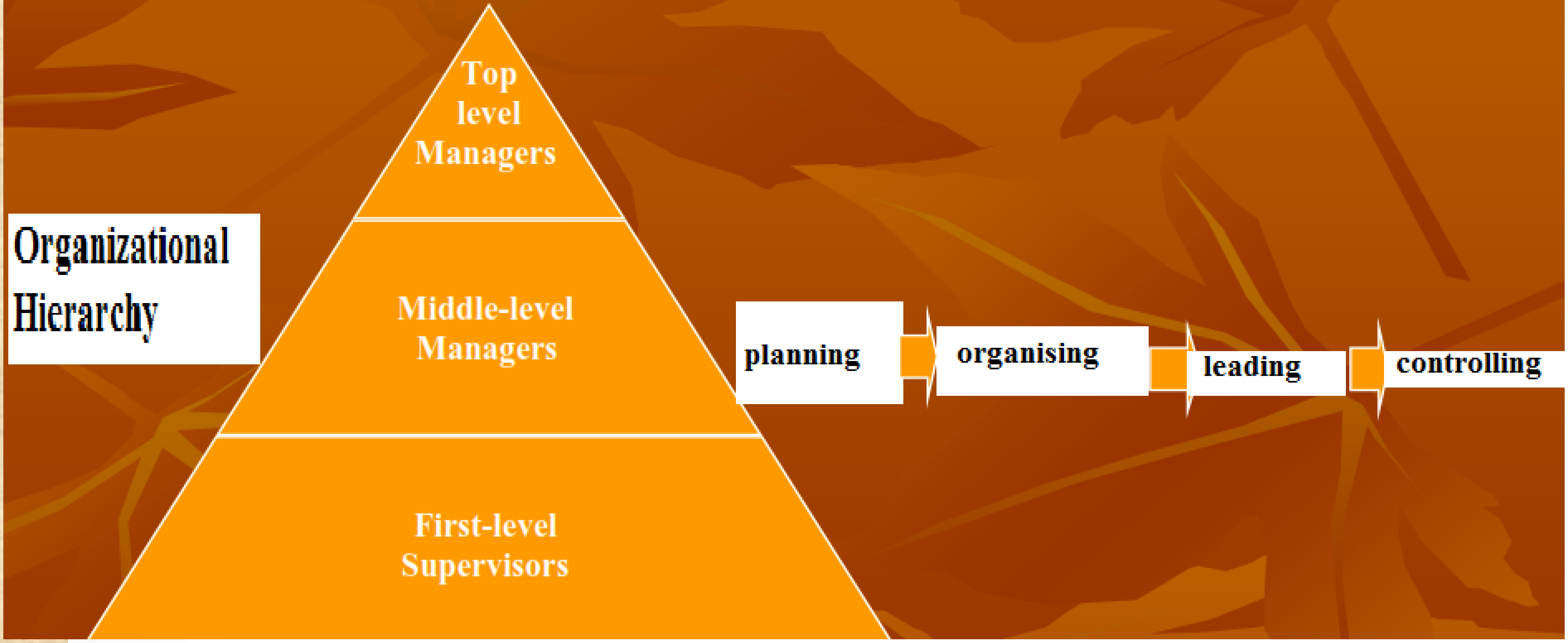
Features of Management :

- Organized activities
- Existence of objectives
- Relationship among resources
- Working with & Through people
- Decision- Making

Difference between administration & management :

	Basis of difference	Administration	Management
1	Level in organization	Top level	Middle & lower
2	Major focus	Policy formulation & objective determination	Policy execution for objective achievement
3	Nature of functions	Determinative	Executive
4	Scope of functions	Broad & conceptual	Narrow & operational
5	Factors affecting decisions	Mostly external	Mostly internal
6	Employer-employee	Entrepreneurs &	Employees

Managerial functions as at different organizational levels .



Importance of Management :

- Effective Utilization of Resources
- Development of Resources
- To Incorporate Innovations
- Integrating Various Interest Groups
- Stability in the Society

Skills of Management :

- Technical skills
- Human skills
- Conceptual skills
- Design skills

Nature of Management :

- Management as an activity (or a process)

I. Planning
II. Organizing
III. Staffing
IV. Directing &
V. Controlling

- "scientific management is concerned with knowing exactly what you want men to do & then see in that they do in the best & cheapest way"

Elements & Tools of scientific Management :

- Separation of planning & doing
- Functional Foremanship
- Job analysis

1. Time study involves the determination of time a movement takes to complete
2. Motion study involves the study of movements in parts which are involved in doing a job & thereby eliminating the wasteful movements & performing only necessary movements

Principles of scientific management :

- Replacing rule of Thumb with science
- Harmony in Group Action
- Co-operation
- Maximum output
- Development of workers
- A more equal division of responsibility between management & workers

Merits of scientific Management :

- More production & higher profits
- Job-satisfaction
- Personality development
- Higher standard of living

Managerial qualities & training :

- Physical (health, vigour , & address)
- Mental (ability to understand & learn, judgment, mental vigour, & capability)
- Moral (energy, firmness, initiative, loyalty, tact, & dignity)
- Educational (general acquaintance with matters not belonging exclusively to the function performed)
- Technical (peculiar to the function being performed) &
- Experience (arising from the work)

General Principles of Management :

- Division of work
- Authority & Responsibility
- Discipline
- Unity of Command
- Unity of Direction
- Subordination of Individual to General Interest
- Remuneration of Personnel
- Centralization
- Scalar chain
- Order
- Equity
- Stability of Tenure
- Initiative
- Esprit de corps

Why Project Management?

- Learn from lessons, success, and mistakes of others
- Better understanding of financial, physical, and human resources
- Successful Project Management Contributes to
  - Improved customer relations
  - Shorter development times
  - Lower costs
  - Higher quality and increased reliability
  - Improved productivity
- Project Management Generally Provides
  - Better internal coordination
  - Higher worker morale

Why Projects Fail

Communications
- Misunderstandings
- Not Talking, Emailing etc.

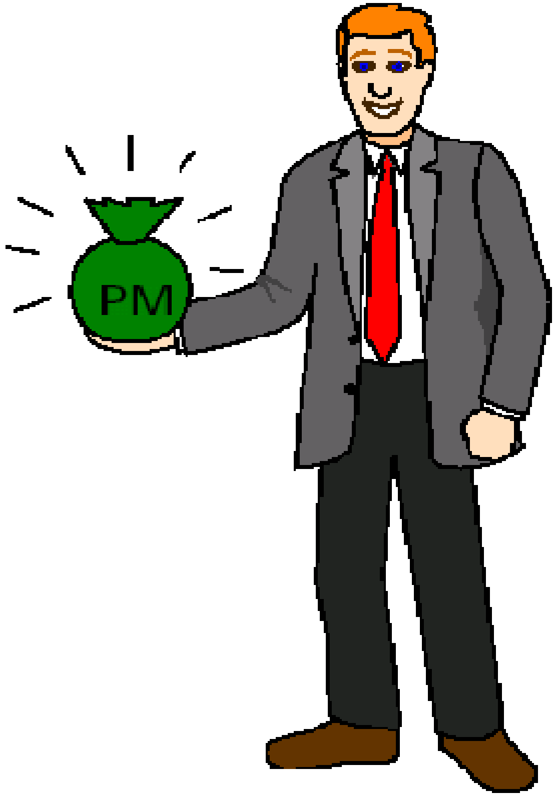
Scope Creep
Poor planning
Weak business case
Lack of management direction & involvement
- Lack of Resources
- Talking and Not Building

Incomplete specifications
- Excessive Specifications

Mismanagement of expectations
- $

Project Management Benefits for the Individual

- Develops leaders in organization with a detailed understanding of multiple areas of the organization
- Cross departmental communication and networking
- Benefits not limited to just the Project
- Manager, Team members get same exposure
- Attention from executive management team
- Reputation of being a team player, problem solver, and a get things done person



Why Project Management?

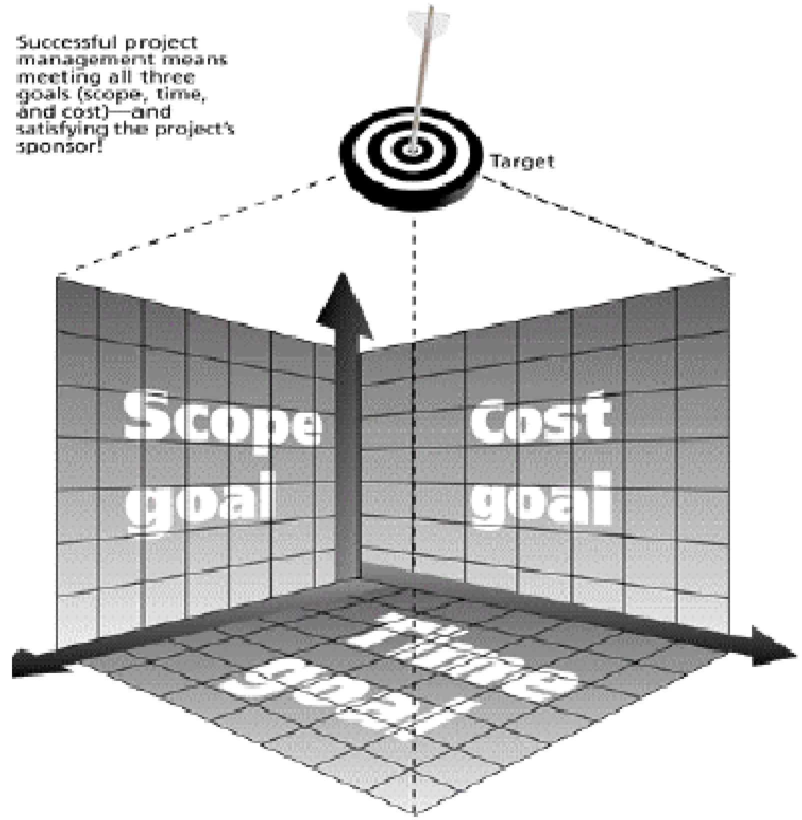
- Better control of financial, physical, and human resources
  - Accountability
  - Learn from mistakes of others!
- Improved customer relations
- More Managed Outcomes
  - Lower costs
  - Higher quality and increased reliability
  - Higher profit margins
  - Improved productivity
  - Better internal coordination
  - Higher worker morale

Triple Constraints Theory

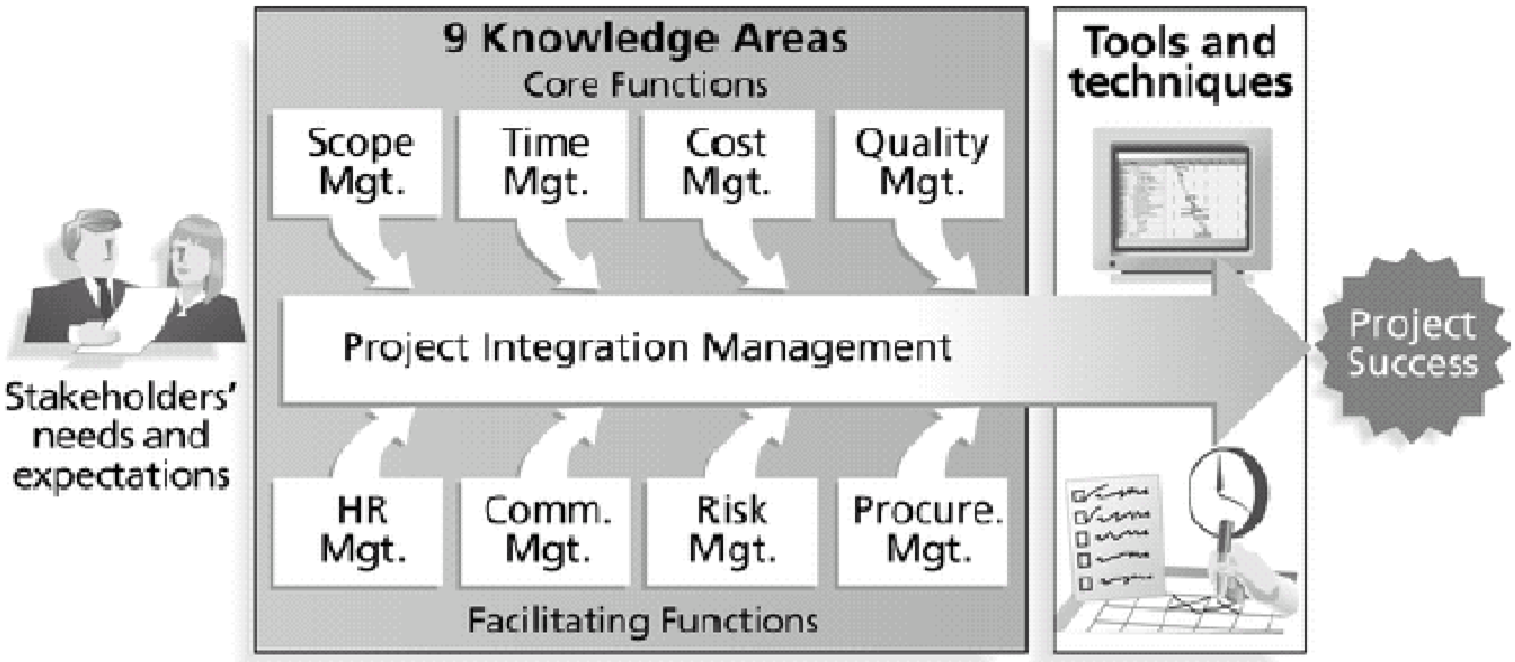
Every project is constrained in different ways by its

- Scope goals: What is the project trying to accomplish?
- Time goals: How long should it take to complete?
- Cost goals: What should it cost?

It is the project manager's duty to balance these three often competing goals



Project Management Framework

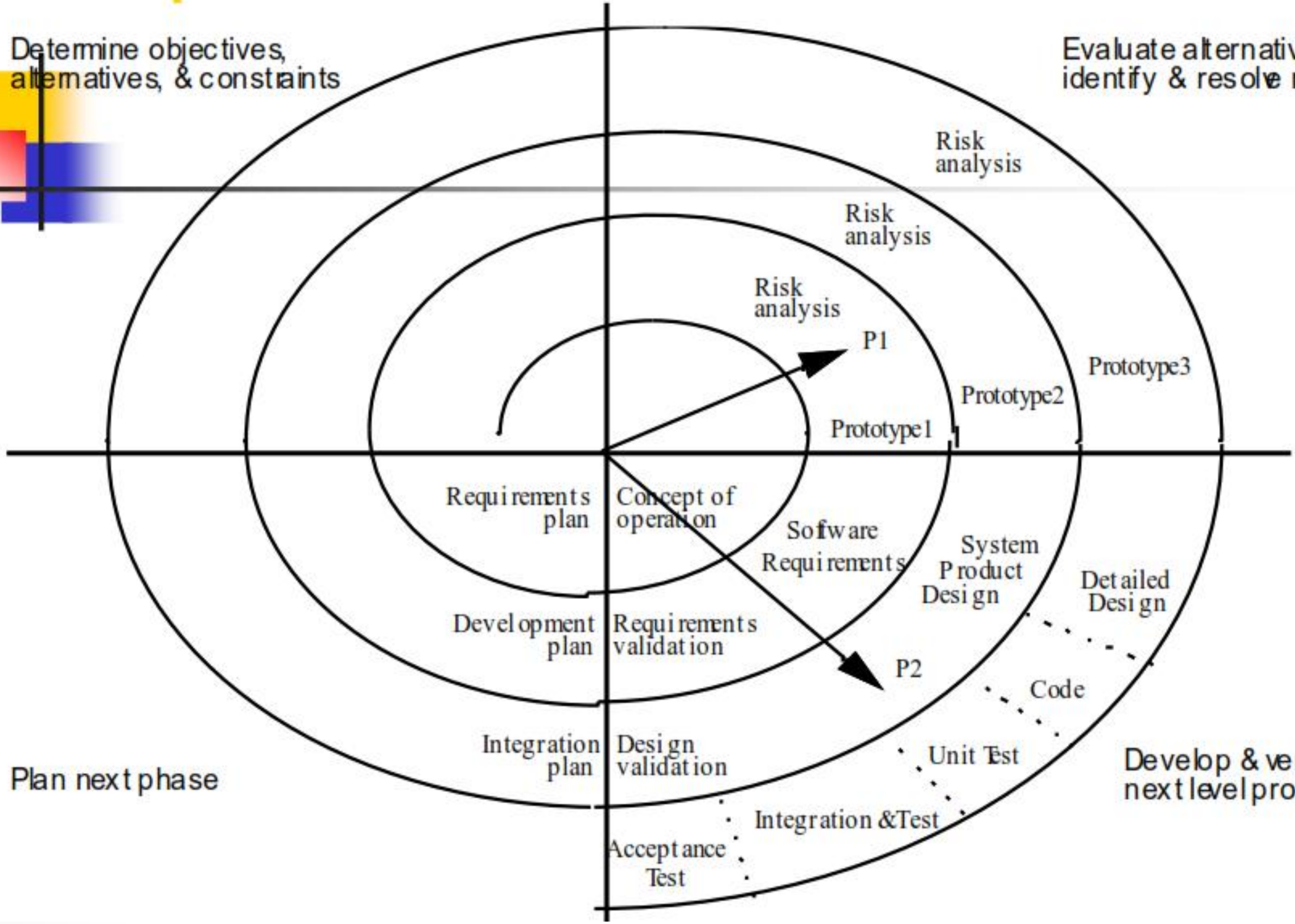


PM Knowledge Areas

Knowledge areas describe the key competencies that project managers must develop

- core knowledge areas lead to specific project objectives (scope, time, cost, and quality)
- facilitating knowledge areas are the means through which the project objectives are achieved (human resources, communication, risk, and procurement management
- knowledge area (project integration management) affects and is affected by all of the other knowledge areas

Spiral



Determine objectives, alternatives, & constraints
Evaluate alternatives, identify & resolve risks
Risk analysis
Risk analysis
Risk analysis
P1
Prototype3
Prototype2
Prototype1
Requirements plan
Concept of operation
Software Requirements
System Product Design
Detailed Design
Development plan
Requirements validation
P2
Code
Integration plan
Design validation
Unit Test
Plan next phase
Develop & verify next level product
Integration &Test
Acceptance Test

Ten Questions to Help You Plan Your Project

- Why is your project being Done?
- Who will you need to Involve?
- What results will you Produce
- What Constraints Must you Satisfy?
- What assumptions are you Making
- What work must be done?
- When will you start and end each activity?
- Who'll perform the project Work?
- What other Resources will you need?
- What could go wrong?

Ten Ways to Hold People Accountable

- Involve People who really have authority
- Be Specific
- Get a Commitment
- Put it in writing.
- Emphasize the Urgency and Importance of the assignment
- Tell others about the person's commitment
- Agree on a plan for monitoring the person's work.
- Monitor the persons work.
- Always Acknowledge Good Performance
- Act as if you have the authority

Ten Steps to Getting Your Project Back on Track

Determine why project got off track
Reaffirm key drivers
Reaffirm Project Objectives
Reaffirm activities remaining to be done.
Reaffirm Roles and Responsibilities
Develop a viable schedule
Reaffirm Personnel assignments
Develop a Risk-Management Plan
Hold a midcourse Kick-off Session
Closely Monitor Performance

Ten Tips for Being a Better Project Manager

Be a "why" person
Be a "Can Do" person
Don't Assume
Say what you mean; Mean what you say
View people as allies, not adversaries
Respect other people
Think "big Picture"
Think Detail
Acknowledge good performance
Be both a manager and a leader

What is a Project Plan?

- Common misunderstanding: Project Schedule
- Introduction or overview of the project
- Description of how the project is organized
- Management and technical processes used on the project
- Work to be done, schedule, and budget information

The Project Planning Stage

PM Knowledge Areas – Relevant Processes

Project Integration Management

- Develop Project Charter
- Develop Project Management Plan
- Direct and Manage Project Execution
- Monitor and Control Project Work
- Perform Integrated Change Control
- Close Project or Phase

Project Time Management

- Define Activities
- Sequence Activities
- Estimate Activity Resources
- Estimate Activity Durations
- Develop Schedule
- Control Schedule

Project Scope Management

- Collect Requirements
- Define Scope
- Create WBS
- Verify Project Scope
- Control Project Scope

Project Cost Management

- Estimate Costs
- Determine Budget
- Control Costs

Project Quality Management

- Plan Quality
- Perform Quality Assurance
- Perform Quality Control

The Project Planning Stage

PM Knowledge Areas – Relevant Processes

Project Human Resources Management

- Develop Human Resource Plan
- Acquire Project Team
- Develop Project Team
- Manage Project Team

Project Risk Management

- Plan Risk Management
- Identify Risks
- Perform Qualitative Risk Analysis
- Perform Quantitative Risk Analysis
- Plan Risk Responses
- Monitor and Control Risks

Project Procurement Management

- Plan Procurements
- Conduct Procurements
- Administer Procurements
- Close Procurements

Project Communication Management

- Identify Stakeholders
- Plan Communications
- Manage Communication
- Manage Stakeholder Expectations
- Report Performance

Project Planning
Develop Project Management Plan

What is Project Management Plan?

A project plan, according to the Project Management Body of Knowledge (PMBOK), is:

"a formal, approved document used to guide both ***project execution*** *and* ***project control****.*
The primary uses of the project plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines.
A project plan may be summarized or detailed."

Project Planning
Develop Project Management Plan

A project charter is a short document that lists the scope, objectives, deliverables, and stakeholders of a project, and delineates roles and responsibilities of each member of the project team.

*What is the difference between **Project Charter** and **Project Management Plan?***

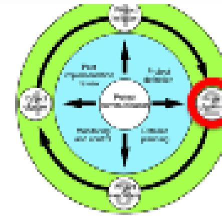
A project plan is a formal, approved document that guides project execution and control. It explains in detail how and when to fulfill the project objectives by showing the major products, milestones, activities, and resources required on the project.

The project charter is the **first deliverable** of the project, used to secure stakeholder approval for the project goals and terms, and **establish authority for the project manager**.

Once the top management **approves the project charter**, the project manager prepares the project plan that **shows how to achieve the approved project goals and objectives**.

Project Planning

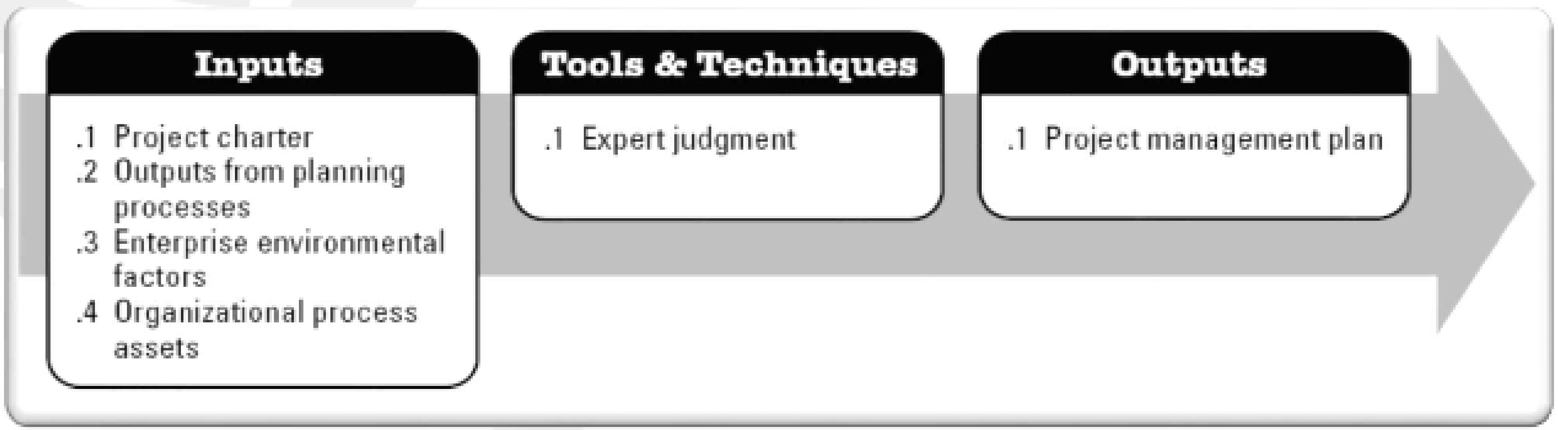
Develop Project Management Plan



This project planning stage includes the processes to:

- Define, integrate, and coordinate all subsidiary plans into one plan
- Revise and update the plan throughout the project lifecycle by Integrated Change Control Process
- Define how the project is: executed, monitored, controlled, and closed

How is the project management plan developed?



Project Planning
Develop Project Management Plan

Project Management Plan determines:

- Project life cycle and processes applied at each phase
- Tailoring results:
  - project management processes
  - Level of implementation for each process
  - Description of the tools and techniques
  - How the selected processes will interact
- How work will be executed
- Change management plan
- How to maintain the integrity of the baseline
- Needs/techniques for communicating among stakeholders
- Key management reviews for open issues and pending decisions

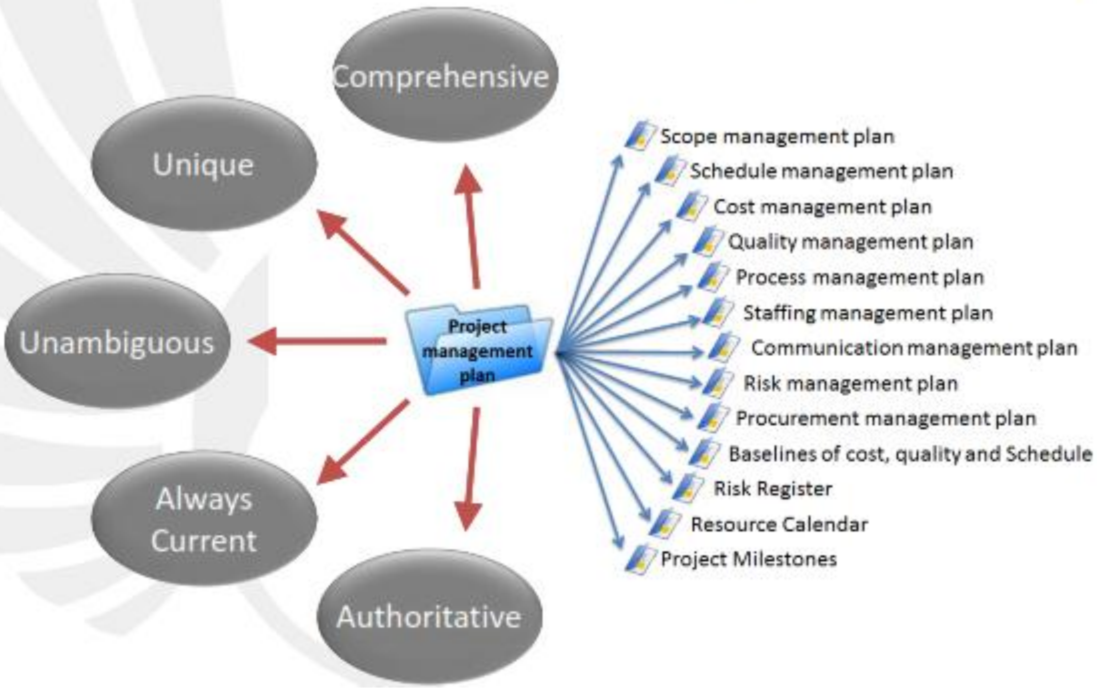
Uses of Project Management Plan

- ✓ Guide project execution
- ✓ Document project planning assumptions
- ✓ Document project planning decisions
- ✓ Facilitate communication among stakeholders
- ✓ Define key management reviews
- ✓ Provide a baseline for progress measurement and project control

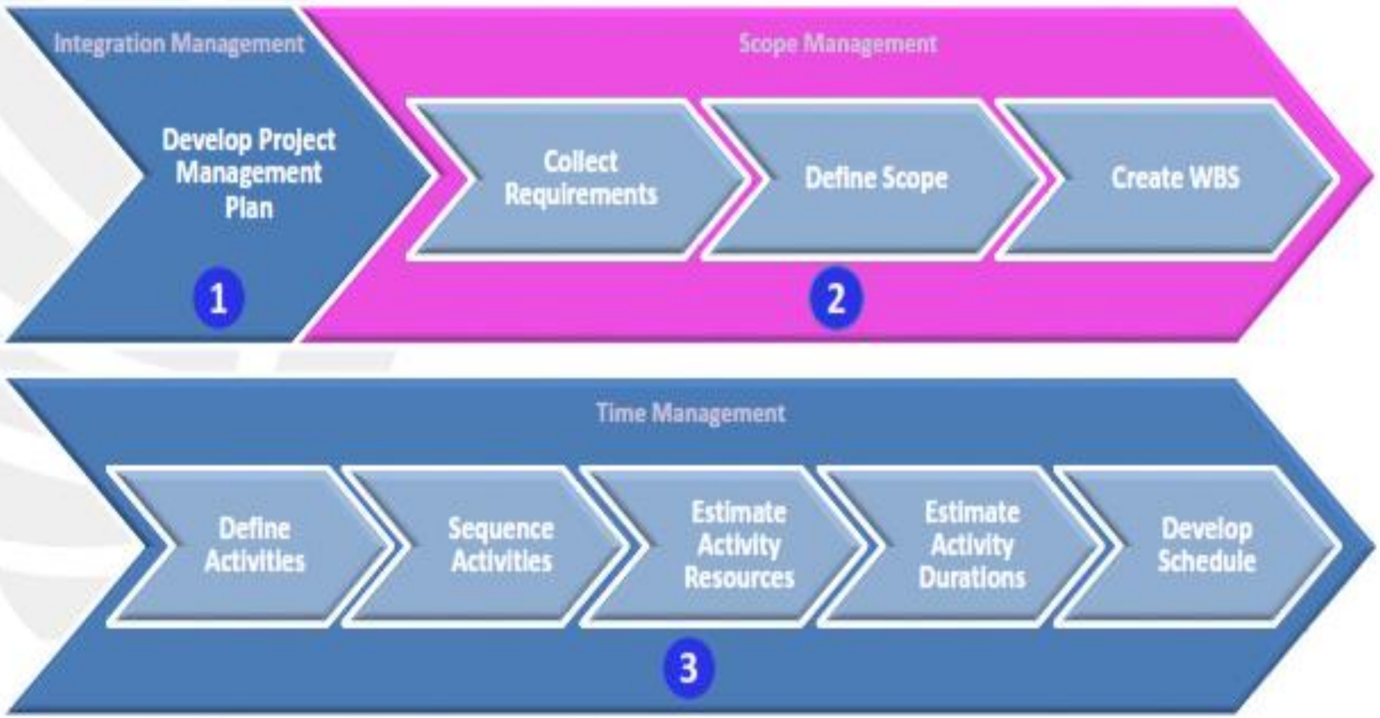

Planning Stage
Project Planning
Components of Project Management Plan
So what does a project management plan include?
Project management plan
Scope management plan
Schedule management plan
Cost management plan
Quality management plan
Process management plan
Staffing management plan
Communication management plan
Risk management plan
Procurement management plan
Baselines of cost, quality and schedule
Risk Register
Resource Calendar
Project Milestones

Project Planning

Characteristics of Project Management Plan

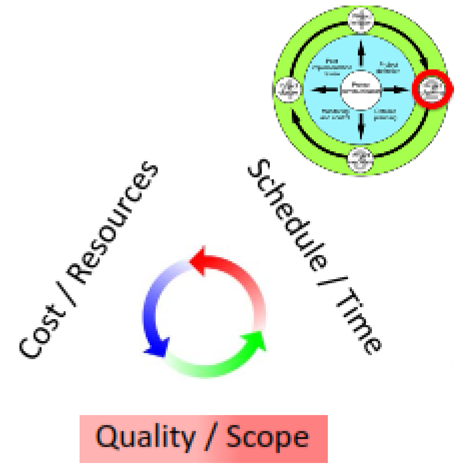


Understanding the nature of projects
Project Planning Stage

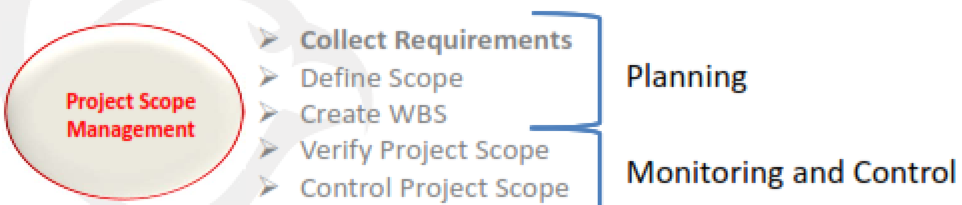


Collect Requirements

Requirements collection is part of Scope Management Knowledge Area, which includes the processes required to ensure that the project includes all the work, and only all the work required to complete the project successfully.



It is primarily concerned with controlling ***what is*** *and* ***what is not*** *in the scope and serves as input to defining the WBS (Work Breakdown Structure)*



Collect Requirements

- Collect Requirements process involves documenting stakeholders needs to meet project objectives.

How are the project requirements collected?

Inputs	Tools & Techniques	Outputs
.1 Project charter .2 Stakeholder register	.1 Interviews .2 Focus groups .3 Facilitated workshops .4 Group creativity techniques .5 Group decision making techniques .6 Questionnaires and surveys .7 Observations .8 Prototypes	.1 Requirements documentation .2 Requirements management plan .3 Requirements traceability matrix

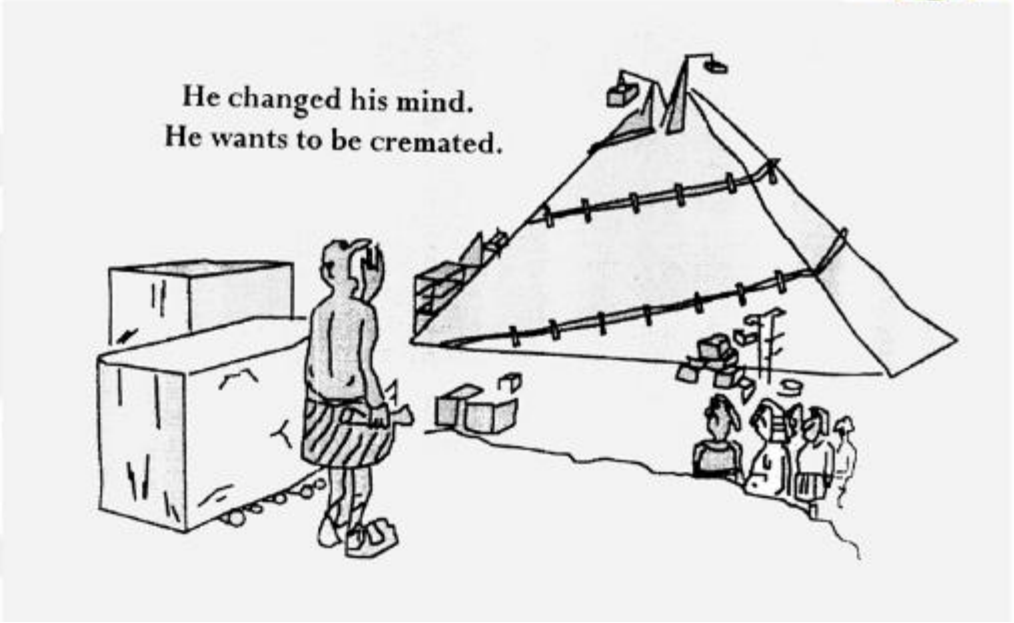
Collect Requirements

Stakeholder Expectations, Wants and Needs	Requirements	Specifications
Needs: the things required by stakeholders to sustain their work *Wants*: additional goods and services that go beyond the sustenance – features and added benefits *Expectations*: what is in the mind of the stakeholders	*Requirements*: what shall the project achieve to meet the stakeholders expectations	*Specifications*: what are the specifics of the solution that can fulfill the requirements

Collect Requirements

Consequences of bad requirements collection

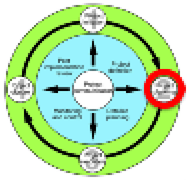
Why is it essential for a project success to properly collect, document and confirm user requirements and expectations?



Define Scope

- Once the requirements are collected, they are then documented thoroughly in a scope statement, which include:
  - ***Justification***: A brief statement regarding the business need your project addresses. This is just to link the requirements back to the project charter.
  - ***Scope description***: The characteristics of the products, services, and/or results your project will produce. This must be detailed and unambiguous.
  - ***Acceptance criteria:*** The conditions that must be met before project deliverables are accepted.
  - ***Deliverables:*** The products, services, and/or results your project will produce
  - ***Project Exclusions:*** Statements about what the project will not accomplish or produce.
  - ***Constraints:*** Restrictions that limit what you can achieve, how and when you can achieve it, and how much achieving it can cost.
  - ***Assumptions:*** Statements about how you will address uncertain information as you conceive, plan, and perform your project.

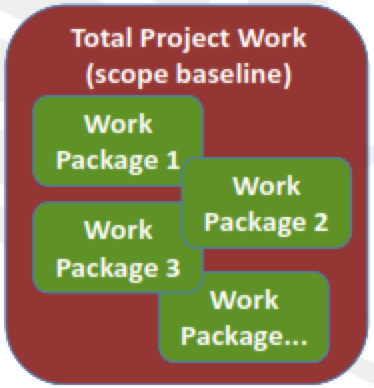
Create WBS (Work Breakdown Structure)



What is a project's Work Breakdown Structure (WBS)?

It is to subdivide the project's deliverables and the project's work into smaller, more manageable components.

"Nothing is particularly hard if you divide it into small jobs"



- WBS defines particularly and exactly "What to do"
- A deliverable-oriented hierarchy
- More breaking down, more detailed definition and information
- Agreed upon WBS Work packages and WBS Dictionary form the project baseline

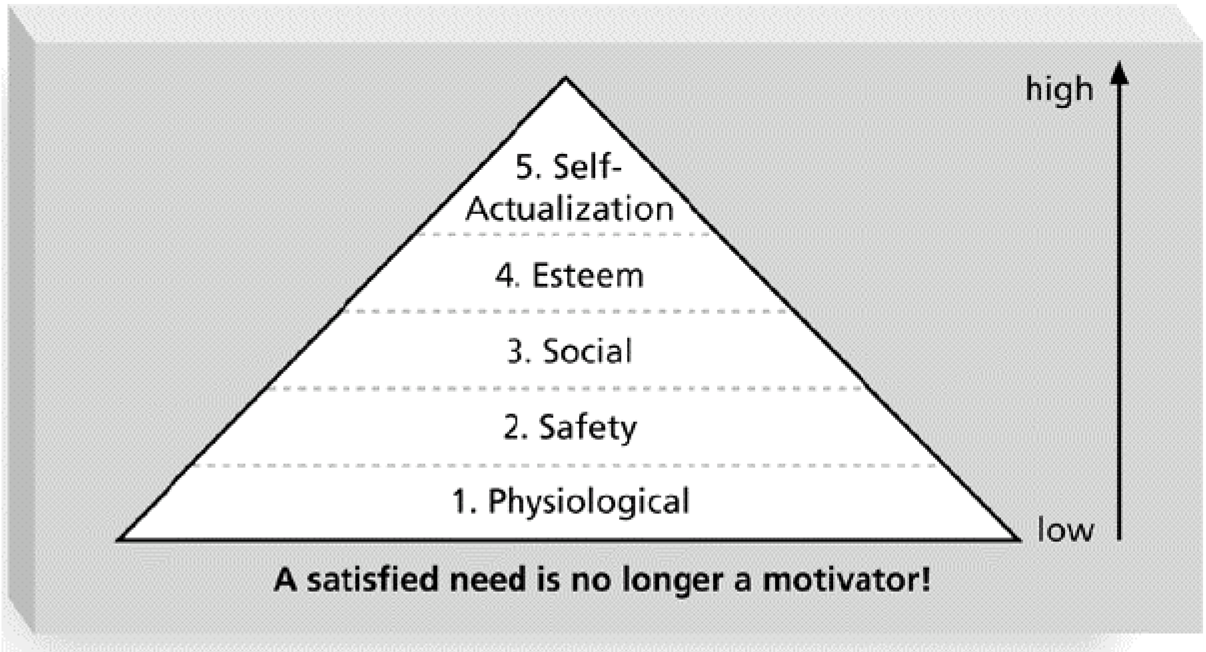
What is quality management?

- The International Organization for Standardization (ISO) defines quality as the totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs
- Other experts define quality based on
  - conformance to requirements: meeting written specifications
    - Has the problem that specifications are not 100% complete or correct
  - fitness for use: ensuring a product can be used as it was intended

Quality Management Processes

- Quality planning: identifying which quality standards are relevant to the project and how to satisfy them
- Quality assurance: evaluating overall project performance to ensure the project will satisfy the relevant quality standards
- Quality control: monitoring specific project results to ensure they comply with the relevant quality standards while identif ways to improve overall quality
- Modern quality management
  - SIX SIGMA
  - requires customer satisfaction
  - prefers prevention to inspection
  - recognizes management responsibility for quality
- Noteworthy quality experts include Deming, Juran, Crosby, Ishikawa, Taguchi, and Feigenbaum

Maslow's Hierarchy of Needs



McGregor's Theory X and Y

- Douglas McGregor popularized the human relations approach to management in the 1960s
- Theory X: assumes workers dislike and avoid work, so managers must use coercion, threats and various control schemes to get workers to meet objectives
- Theory Y: assumes individuals consider work as natural as play or rest and enjoy the satisfaction of esteem and self-actualization needs
- Theory Z: introduced in 1981 by William Ouchi and is based on the Japanese approach to motivating workers, emphasizing trust, quality, collective decision making, and cultural values

Thamhain and Wilemon's Influence on Projects

1. Authority: the legitimate hierarchical right to issue orders
2. Assignment: the project manager's perceived ability to influence a worker's later work assignments
3. Budget: the project manager's perceived ability to authorize others' use of discretionary funds
4. Promotion: the ability to improve a worker's position
5. Money: the ability to increase a worker's pay and benefits
6. Penalty: the project manager's ability to cause punishment
7. Work challenge: the ability to assign work that capitalizes on a worker's enjoyment of doing a particular task
8. Expertise: the project manager's perceived special knowledge that others deem important
9. Friendship: the ability to establish friendly personal relationships between the project manager and others

Power

- Power is the potential ability to influence behavior to get people to do things they would not otherwise do
- Types of power include
  - Coercive
  - Legitimate
  - Expert
  - Reward
  - Referent

Improving Effectiveness - Covey's 7 Habits

- Project managers can apply Covey's 7 habits to improve effectiveness on projects
  - Be proactive
  - Begin with the end in mind
  - Put first things first
  - Think win/win
  - Seek first to understand, then to be understood
  - Synergies
  - Sharpen the saw

Project Identification and Analysis (PPM624)

Chapter Three: Concepts of Project Analysis

Semester II, 2017/18 Academic Year (2010 E.C)

BY

Hassen Beshir (Dr.)

Desse, Ethiopia

OUTLINE

3.1. The concept of project Analysis

3.2. The Need for Project Analysis

3.3. Preparation of projects

3.4. Stakeholder Analysis

3.5. Problem Analysis

3.6. Objectives Analysis

3.7. Strategy Analysis

: Typical structure of a Logframe Matrix

Project Description	Indicators	Source of Verification	Assumptions
Overall Objective – The project's contribution to policy or programme objectives (impact)	How the OO is to be measured including Quantity, Quality, Time?	How will the information be collected, when and by whom?	
Purpose – Direct benefits to the target group(s)	How the Purpose is to be measured including Quantity, Quality, Time	As above	If the Purpose is achieved, what assumptions must hold true to achieve the OO?
Results – Tangible products or services delivered by the project	How the results are to be measured including Quantity, Quality, Time	As above	If Results are achieved, what assumptions must hold true to achieve the Purpose?
Activities – Tasks that have to be undertaken to deliver the desired results			If Activities are completed, what assumptions must hold true to deliver the results?

Key concepts:

- ***Purpose-***the basic reason for the existence of a project- to solve a problem, address a need or take the advantage of opportunity.

- ***Temporary:*** means that a project is something that has a specific start date and a specific end date.
  - The end is reached when the project's objectives have been achieved and effectively handed over to the business

- ***Sequences of Activities:*** the works and the steps we perform and the methods and knowledge we use to achieve the project objective.

Unique Outcome:

- The product or service is **different** in some distinguishing way from all other products or services within an organization
  - Projects are a means to respond to those requests that cannot be addressed within the organization's normal operational limits.
- Identifying and focusing on uniqueness is important to project management.
  - It helps identify new organization risk areas, enabling management to develop and implement timely risk management strategies.

- ***Resources:*** A project utilizes a variety of resources [human, financial, material, information, etc] to carry out the activities or tasks.
- ***Scope-*** *the extent of the problem or opportunity that the project needs to address.*
- ***Organization:*** *is vital to coordinate resources to achieve the project objectives- organizations can be public, private or NGOs.*

- ***Time:*** *any project should be time bounded-it has a start and end time*
- ***Cost:*** *activities consume human, financial and material resources.*
- ***Quality:*** *the project needs to produce quality products to maximize the satisfaction of the users.*
- ***Introduce change:*** *A project is often used as an instrument for change - change for the betterment of the society.*

3.2. Need For Project Analysis

- Project management is the planning, monitoring and control of all aspects of a project and the motivation of all those involved in it, in order to achieve the project objectives within agreed criteria of time, cost and performance.
- *Project management refers to the administration of the project, its supervision and organisation.*
- *It means analyzing the objectives of the project, defining the tasks needed to achieve these objectives and controlling the execution.*

Pro. mgt....

- The PMBOK definition of project management is "… application of knowledge, skills, tools and techniques to project activities to achieve project requirements".
- Project management is accomplished through the application and integration of the project management processes of initiating, planning, executing, monitoring and controlling, and closing"

Project Management Knowledge Areas

a. Project Integration Management

- Integrates the three main project mgt processes of planning, execution & control

b. Project Scope Management

- Includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.
- It consists of authorization, scope planning, scope definition, scope change mgt & scope verification.

Knowledge...........

c. Project Time Management

- The processes required to ensure timely completion of the project.
- It consists of activity definition, activity sequencing, activity duration estimating, schedule development & schedule control

d. Project Cost Management

- The processes required to ensure that the project is completed within the approved budget.
- It consists of resource planning, cost estimating, cost budgeting, & cost control.

Knowledge......

e. Project Quality Management

- The processes required to ensure that the project will satisfy the needs for which it was undertaken.
- It consists determining the required condition, quality planning, quality assurance & quality control

f. Project Human Resource Management

- The processes required to make the most effective use of the people involved with the project.
- It consists of organizational planning, staff acquisition & team development

Knowledge......

g. Project Communications Management

- required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information.
- It consists of communications planning, information distribution, performance reporting & administrative closure

Knowledge......

h. Project Risk Management

- process of identifying, analyzing, and responding to project risk.
- It includes risk management planning, risk identification, qualitative risk analysis, quantitative risk analysis. risk response planning & risk monitoring and control

Knowledge......

i. Project Procurement Management

- to acquire goods and services to attain project scope from outside the performing organization.
- It consists of procurement planning, solicitation planning, solicitation, source selection, contract administration & contract closeout.

Knowledge......

- The body of knowledge can be subdivided into four core elements which determine the deliverable objectives of the project:
  - Quality/Performance
  - Cost
  - Time
  - Scope

Knowledge......

- PMI illustrates project quality through the concept of the triple constraint—project scope, time and cost.
- Project quality is affected by balancing these three interrelated factors.
- The relationship among these factors is such that if any one of the three factors change, at least one other factor is likely to be affected.


SCOPE
QUALITY
TIME
COST

Knowledge......

- **The other knowledge areas provide the means of achieving the deliverable objectives, namely:**
  - Integration
  - Human resource
  - Communication
  - Risk
  - Procurement and contract

Project Planning

- A project can be broken down into a number of subsidiary tasks.
- A number of project management tools exist to allow the scheduling and resourcing of each of these tasks.
- Problems such as bottlenecks or conflict between resources can be identified and dealt with.
- One activity that is central to all of this is *Project planning.*

Project Planning

- Plan is a scheme or method worked out beforehand for the accomplishment of an objective.
- A proposed or tentative project or course of action, systematic arrangement of elements or important parts, a configuration or outline is said to be plan.
- The term **planning** implies the working out of sub-components in some degree of detail and the planned use of all resources.

Planning...

- A project plan can be as simple as a list of tasks that need to be carried out or it can be a complex document involving a number of charts, tables, costing, etc.
- ***The plan is the detail of how the project will be accomplished.***
  - The first stage of planning a project is to define the objectives and goals of the project- understanding the needs of the project and defining clear, measurable objectives.

- Then, the tasks are identified that are necessary to achieve the objectives.
  - *Where a similar project has been carried out before, it is common to adopt many of the tasks carried out by the earlier team.*
- The end result of this analysis is a *Work Breakdown Structure* (WBS).
  - The WBS can be depicted as a chart that shows the primary tasks associated with the project and then the sub tasks that comprise them.

Planning.......

- Project planning is a project management tool that displays the project tasks and the time resources of each task.
- It is also called project scheduling, the process of laying out all the actual activities of the project in the time order in which they are to be performed, keeping in view of the logical sequence of the activities.
- It links the organizations resources to the projects activities.
- Program is a combination of projects

	Project	Program
Differences	Narrow in scope	Wide in scope; can comprise many projects as components.
	Specific and detail	Comprehensive and general
	More precise and accurate in its objectives and features	Broader goal related to sectoral policy
	Possible to calculate the costs and returns	Difficult to calculate costs and returns
Similarities	• Have purpose/ objectives • Require input (financial, manpower, material) • Generate output (goods and/or services) • Operate over space and time	

Projects Vs operations

Organizations perform two types of work: project work and operational work

- Operations are ongoing and repetitive while projects are temporary and unique.

- The purpose of a project is to attain its objective and then terminate whereas the objective of an ongoing operation is to sustain the business.

	Feature	Projects	Operations
Key Differences	Purpose	Attain objectives and terminate	Sustain the organization
	Time	Temporary	Ongoing
	Outcome	Unique product, service, or result	Non-unique product, service, or result
	People	Dynamic, temporary teams formed to meet project needs Generally not aligned with organizational structure	Functional teams generally aligned with organizational structure
	Authority of Manager	Varies by organizational structure Generally minimal, if any, direct line authority	Generally formal, direct line of authority

Definition of Terms

	Definition and explanation	*Agroforestry Examples*
Impact:	Equitable and durable improvements in human wellbeing and social justice. The ultimate outcomes of development and emergency assistance (e.g., improved health status or wellbeing), measured at the individual, social, geographic or administrative level. *Comments:* There are various levels of impact, from more tangible and immediate to broader impact that may not be manifested or discernable until some time later. Programs aim at "higher level," longer-term impact. Projects aim at levels of impact that can be manifested during their lifetimes, given their resources.	Increased income for practicing farmers; improved safety nets for vulnerable households; increased environmental stability; improved diet (from fruit trees or new crop alternatives)
Effects:	Changes in human behaviors and practices as well as systems. Systems changes can include institutional competency (e.g., improved health-care systems), policy change (e.g., new or revised policies, change of enforcement) or service changes (e.g., more effective extension system). *Comments:* Effects result from the successful achievement of outputs but their realization is dependent on the logic of the project hypothesis being sound. Effects are what others (such as beneficiaries) do on their own (influenced by the project's outputs as well as external factors).	Farmers incorporating trees into their agricultural practices; agroforestry committee advocating tree ownership issues to local government; proper tree management by farm households; new policies enacted and enforced on tree tenure; sales of agroforestry goods such as lumber
Outputs:	The goods and services produced through project activities. Outputs include such things as trained individuals, physical structures, documents or newly formed institutions. *Comments:* This is the highest level over which project implementers have direct control.	Viable tree saplings for distribution; trained farmers willing to participate; demonstration farm; agroforestry manuals in local language; agroforestry committees organized
Activities:	The actions or interventions that convert project inputs into outputs (e.g., communicating, training, construction, organization and management).	Farmer-to-farmer training; seedling management training; extension activities
Inputs:	All resources (e.g., money, materials, time, and personnel) needed to undertake a set of activities.	Tree seedlings; participant labor; land for demo farm; plastic sacks; fertilizer, transportation

– Strengths and Common Problems with the application of the LFA

Element	Strengths	Common problems/difficulties
Problem analysis and objective setting	• Requires systematic analysis of problems, including cause and effect relationships • Provides logical link between means & ends • Places the project within a broader development context (overall objective and purpose) • Encourages examination of risks and management accountability for results	• Getting consensus on priority problems • Getting consensus on project objectives • Reducing objectives to a simplistic linear chain • Inappropriate level of detail (too much/too little)
Indicators and source of verification	• Requires analysis of how to measure the achievement of objectives, in terms of both quantity and quality • Helps improve clarity and specificity of objectives • Helps establish the monitoring and evaluation framework	• Finding measurable and practical indicators for higher level objectives and for projects with 'capacity building' and 'process' objectives • Establishing unreaslistic targets too early in the planning process • Relying on 'project reports' as the main 'source of verification', and not detailing where the required information actually comes from, who should collect it and how frequently
Format and application	• Links problem analysis to objective setting • Emphasises importance of stakeholder analysis to determine 'whose problems' and 'who benefits' • Visually accessible and relatively easy to understand	• Prepared mechanistically as a bureaucratic 'box-filling' requirement, not linked to problem analysis, objective setting or strategy selection • Used as a means of top-down control – too rigidly applied • Can alienate staff not familiar with the key concepts • Becomes a 'fetish' rather than a help

Two main phases of LFA

The Logical Framework Approach

ANALYSIS PHASE	PLANNING PHASE
Stakeholder analysis - identifying & characterising potential major stakeholders; assessing their capacity	**Developing Logical Framework matrix** - defining project structure, testing its internal logic & risks, formulating measurable indicators of success
Problem analysis - identifying key problems, constraints & opportunities; determining cause & effect relationships	**Activity scheduling** - determining the sequence and dependency of activities; estimating their duration, and assigning responsibility
Objective analysis - developing solutions from the identified problems; identifying means to end relationships	**Resource scheduling** - from the activity schedule, developing input schedules and a budget
Strategy analysis - identifying different strategies to achieve solutions; selecting most appropriate strategy.	

3.3 Preparatory analysis

- Prior to initiating detailed analytical work with stakeholder groups (field work), it is important that those involved in the identification or formulation of projects are sufficiently aware of the policy, sector and institutional context within which they are undertaking their work. Key documents that should be referenced would include the EC's Country Strategy Papers and relevant Partner Government development policy documents, such as their Poverty Reduction Strategy and/or Sector Policy documents.
- The scope and depth of this preliminary analysis will depend primarily on how much information is already available and its quality. In general, it should not be the work of each individual project planning team to undertake 'new' analysis of development/ sector policies or the broader institutional framework, rather they should access existing information and then work to ensure that the development of the project idea takes account of these elements of the operating environment.

3.4 Stakeholder Analysis

- Purpose and key steps
- Any individuals, groups of people, institutions or firms that may have a significant interest in the success or failure of a project (either as implementers, facilitators, beneficiaries or adversaries) are defined as'*stakeholders*'. A basic premise behind stakeholder analysis is that different groups have different concerns, capacities and interests, and that these need to be explicitly understood and recognized in the process of problem identification, objective setting and strategy selection.
- The key questions asked by stakeholder analysis are therefore 'Whose problems or opportunities are we analysing' and 'Who will benefit or loose-out, and how, from a proposed project intervention'? The ultimate aim being to help maximize the social, economic and institutional benefits of the project to target groups and ultimate beneficiaries, and minimise its potential negative impacts (including stakeholder conflicts).
- The main steps involved in stakeholder analysis are:

1. Identify the general development problem or opportunity being addressed/considered;
2. Identify all those groups who have a significant interest in the (potential) project;
3. Investigate their respective roles, different interests, relative power and capacity to participate (strengths and weaknesses);
4. Identify the extent of cooperation or conflict in the relationships between stakeholders; and
5. Interpret the findings of the analysis and incorporate relevant information into project design to help ensure that (i) resources are appropriately targeted to meet distributional/equity objectives and the needs of priority groups, (ii) management and coordination arrangements are appropriate to promote stakeholder ownership and participation; (iii) conflicts of stakeholder interest are recognized and explicitly addressed in project design.

In the context of development projects, a key purpose of stakeholder analysis is to understand and address distributional/equity concerns, particularly in the context of effectively addressing the needs of vulnerable groups (such as the poor, women and children and the disabled). Gender analysis is therefore a core element of stakeholder analysis, the aim being to help promote equitable access to project benefits. Guidelines on undertaking Gender Analysis are referenced in Attachment 2.

A note on terminology

There are a variety of key words used to differentiate between different types of stakeholder. A summary of the terminology used in the EC context is provided below:

Type of stakeholder

1. Stakeholders: Individuals or institutions that may – directly or indirectly, positively or negatively – affect or be affected by a project or programme.

2. Beneficiaries: Are those who benefit in whatever way from the implementation of the project. Distinction may be made between:

(a) Target group(s): The group/entity who will be directly positively affected by the project at the Project Purpose level. This may include the staff from partner organisations;

(b) Final beneficiaries: Those who benefit from the project in the long term at the level of the society or sector at large, e.g. "children" due to increased spending on health and education, "consumers" due to improved agricultural production and marketing.

3. Project partners: Those who implement the projects in-country (who are also stakeholders, and may be a 'target group').

Tools for conducting stakeholder analysis

There are a variety of tools that can be used to support stakeholder analysis. Some suggested options are described below, namely:

1. Stakeholder analysis matrix
2. SWOT analysis
3. Venn diagrams; and
4. Spider diagrams

In using any of these tools, the quality of information obtained will be significantly influenced by the process of information collection. In this regard, the effective use of participatory planning methods and group facilitation tools can help ensure that the views and perspectives of different stakeholder groups are adequately represented and understood.

The examples shown below, and developed through the subsequent stages of the LFA in this Section of the Guidelines, are based on an issue of river water pollution and its impact on income and health.

– Stakeholder analysis matrix

Stakeholder and basic characteristics	Interests and how affected by the problem(s)	Capacity and motivation to bring about change	Possible actions to address stakeholder interests
Fishing families: c.20,000 families, low income earners, small scale family businesses, organised into informal cooperatives, women actively involved in fish processing and marketing	• Maintain and improve their means of livelihood • Pollution is affecting volume and quality of catch • Family health is suffering, particularly children and mothers	• Keen interest in pollution control measures • Limited political influence given weak organizational structure	• Support capacity to organize and lobby • Implement industry pollution control measures • Identify/develop alternative income sources for women and men
Industry X: Large scale industrial operation, poorly regulated and no-unions, influential lobby group, poor environmental record	• Maintain/increase profits • Some concern about public image • Concern about costs if environmental regulations enforced	• Have financial and technical resources to employ new cleaner technologies • Limited current motivation to change	• Raise their awareness of social and environmental impact • Mobilise political pressure to influence industry behaviour • Strengthen and enforce environmental laws
Households: c.150,000 households discharge waste and waste water into river, also source some drinking water and eat fish from the river	• Aware of industrial pollution and impact on water quality • Want to dispose of own waste away from the household • Want access to clean water	• Limited understanding of the health impact of their own waste/ waste water disposal • Potential to lobby government bodies more effectively • Appear willing to pay for improved waste management services	• Raise awareness of households as to implications of their own waste disposal practices • Work with communities and local government on addressing water and sanitation issues
Environmental protection agency: Etc	etc	etc	etc

Preliminary Stakeholder analysis matrix

		Importance of stakeholder			
		Unknown	Little / No importance	Some importance	Significant importance
Influence of stakeholder	Significant influence	*Name of stakeholder*			
	Somehow influential				
	Little / no influence				
	Unknown				

Stakeholder and basic characteristics	Interests and how affected by the problem(s)	Capacity and motivation to bring about change	Possible actions to address stakeholder interests

Source: Aid Delivery Methods, Volume 1: Project Cycle Management, European Commission, Europe Aid Office, Brussels 2004

SWOT analysis

- SWOT analysis (strengths, weaknesses, opportunities and threats) is used to analyse the internal strengths and weaknesses of an organization and the external opportunities and threats that it faces. It can be used either as a tool for general analysis, or to look at how an organization might address a specific problem or challenge.
- The quality of information derived from using this tool depends (as ever) on who is involved and how the process is managed – it basically just provides a structure and focus for discussion.
- SWOT is undertaken in three main stages, namely:

1. Ideas are generated about the internal strengths and weaknesses of a group or organization, and the external opportunities and threats;
2. The situation is analysed by looking for ways in which the group/organisation's strengths can be built on to overcome identified weaknesses, and opportunities can be taken to minimize threats; and
3. A strategy for making improvements is formulated (and then subsequently developed using a number of additional analytical planning tools).

An example of a SWOT matrix, further analyzing the capacity of Fishing Cooperatives to represent members' interests and manage change, is shown in Figure below:

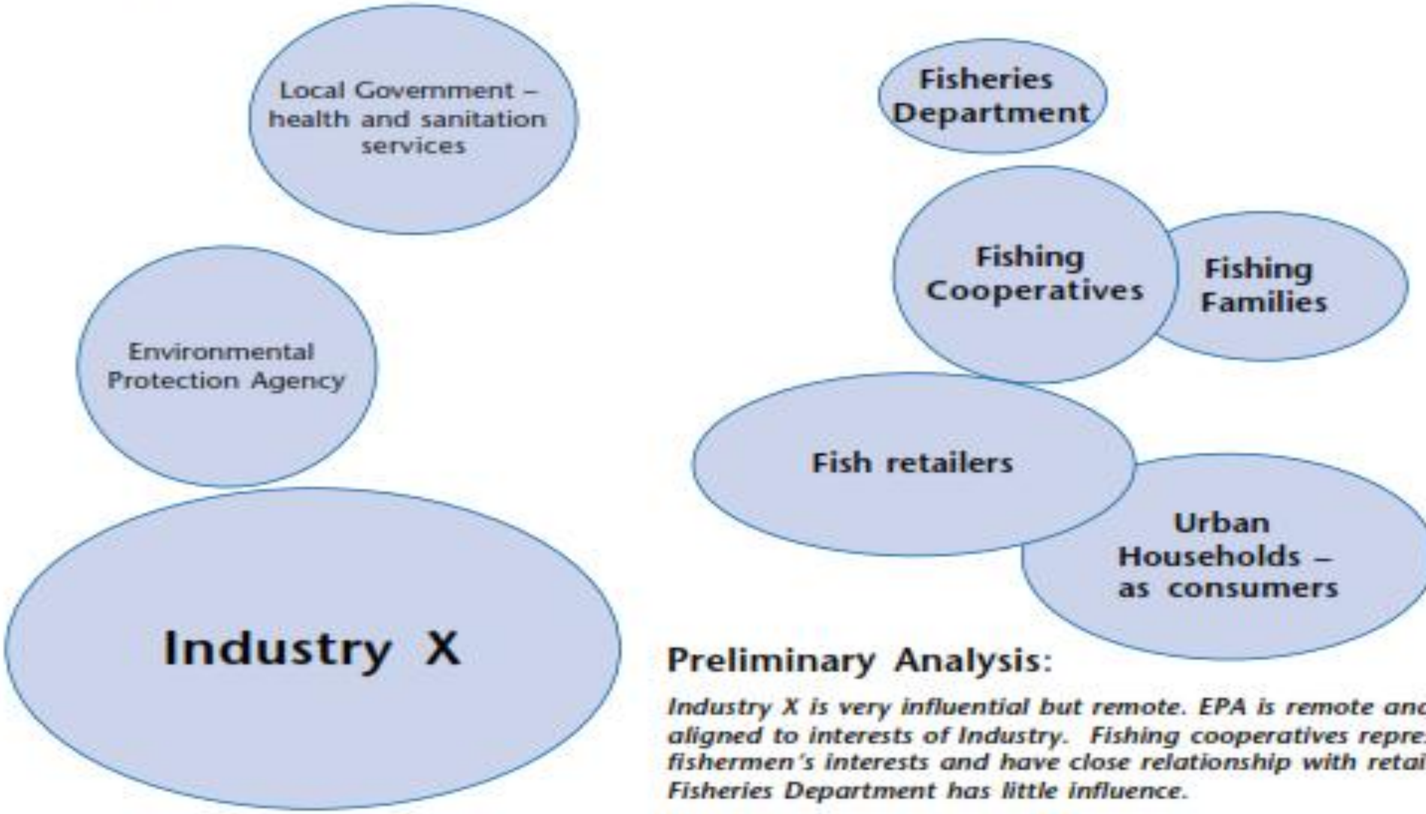
SWOT matrix

Strengths	Weaknesses
• Grassroots based and quite broad membership • Focused on the specific concerns of a relatively homogenous group • Men and women both represented • Provide a basic small scale credit facility	• Limited lobbying capacity and environmental management skills • Lack of formal constitutions and unclear legal status • Weak linkages with other organizations • Internal disagreements on limiting fishing effort in response to declining fish stocks
Opportunities	**Threats**
• Growing public/political concern over health impacts of uncontrolled waste disposal • New government legislation in preparation on Environmental Protection – largely focused on making polluters pay • The river is potentially rich in resources for local consumption and sale • New markets for fish and fish products developing as a result of improved transport infrastructure to nearby population centers	• Political influence of industrial lobby groups who are opposed to tighter environmental protection laws (namely waste disposal) • New environmental protection legislation may impact on access to traditional fishing grounds and the fishing methods that can be employed

Venn Diagrams

- Venn Diagrams are created to analyse and illustrate the nature of relationships between key stakeholder groups.
- The size of the circle used can help indicate the relative power/influence of each group/organization, while the spatial separation is used to indicate the relative strength or weakness of the working relationship/interaction between different groups/organizations.
- Venn diagrams are commonly used as a participatory planning tool with target groups, to help them profile *their concept of such relationships.*
- Venn diagrams can also be used to analyse and highlight potential conflicts between different stakeholder groups.

Venn diagram of stakeholder relationships from perspective of fishing families



Preliminary Analysis:

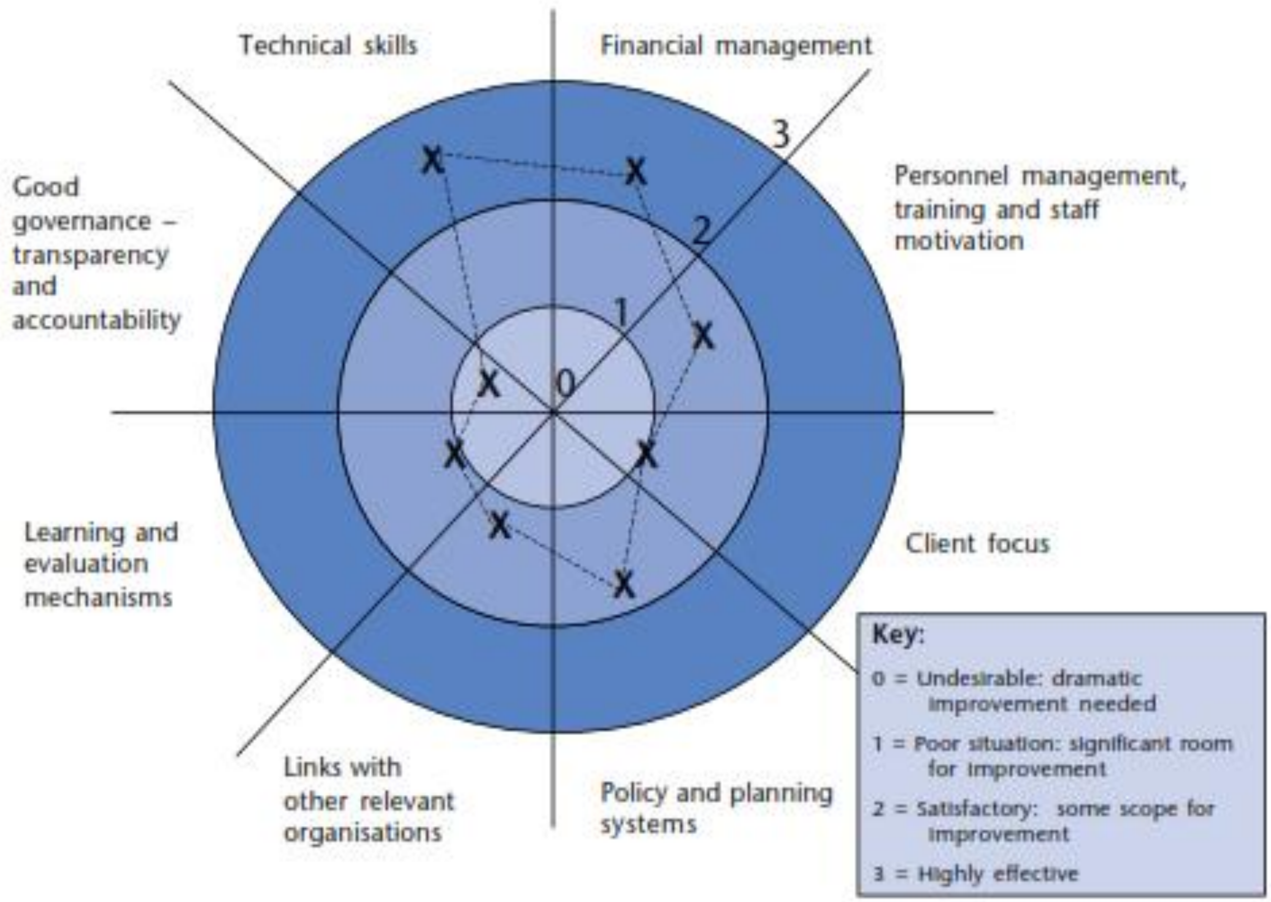
Industry X is very influential but remote. EPA is remote and closely aligned to interests of Industry. Fishing cooperatives represent fishermen's interests and have close relationship with retailers. Fisheries Department has little influence.

Spider diagrams

- *Spider diagrams – stakeholder/institutional capacity*
- Spider diagrams can be used to help analyse and provide a visual summary of institutional capacity.
- The collection of relevant information can be undertaken using a variety of tools, including inspection of administrative record and management reports, interviews with staff and clients, and observation of operations/activities 'on the ground'.
- An example of an analysis of the Environmental Protection Agency is shown in Figure below.
- This indicates that:
  - The agency has relatively strong technical and financial management skills/capacity, and that its policy and planning systems are also fairly robust
  - However, the agency has some critical shortcomings in terms of transparency and accountability, its relationship with other agencies and with its clients.

  This suggests that the critical constraints to the capacity of this agency to contribute to addressing poor river water quality are therefore related more to organizational culture and management priorities than to either technical skills or basic management competencies.
- **Linking Stakeholder Analysis and the Subsequent Steps**
- Stakeholder analysis and problem analysis are closely connected as part of the initial "Situation Analysis".
- Indeed they should in practice be conducted 'in tandem' rather than 'one after the other'.
- All subsequent steps required to prepare a Logical Framework Matrix (or Logframe) should also be related to the stakeholder analysis, making it a point of continuous reference.
- Stakeholder analysis an iterative process that evolves throughout the stages of the LFA, as well as informing decisions at all stages of both analysis and planning/design. Whenever the Logframe needs to be revised the stakeholder analysis should also be re-considered, as the landscape of stakeholders involved in a project evolves over time.
- Thus, stakeholder analysis is not an isolated analytical step, but a process

Spider diagram of organisational capacity – Environment Agency



Key Stakeholders of a project

Key stakeholders who are directly linked to most projects are;

- ***Project manager:***
- The project manager has primary responsibility for the quality of a project's deliverables and its successful completion.
- Project managers can have the responsibility of the planning, execution, and closing of any project and ensuring that the project is successfully completed on time and within budget.
- Key project management responsibilities include creating clear and attainable project objectives, building the project requirements, and managing the triple constraint for projects, which is cost, time, and scope.

☑***Project sponsor:***

- ✓ The project sponsor can be a public or private entity and should have the influence to ensure that the project has sufficient priority to enable success.
- ✓ The sponsor is also responsible for providing the funding and staffing resources to complete the project successfully.
- ✓ The project sponsor usually represents the recipient of the project’s end result.

- ***The user:***
  - The user is the person or organization using the product of the project.
  - End users are responsible for ensuring that their needs are expressed and for verifying that a completed project meets those expressed needs.
- The ***contractor:***
  - typically builds a unique project in a very competitive environment.

- ***Performing organization:***
  - The enterprise whose employees are most directly involved in the work of the project.
- ***The project team members:***
  - The group that is performing the work of project

3.5. Problem Analysis

- Problem analysis identifies the negative aspects of an existing situation and establishes the '*cause and effect' relationships between the identified problems.*
- It involves three main steps:
  1. Definition of the framework and subject of analysis;
  2. Identification of the major problems faced by target groups and beneficiaries (What is/are the problem/s? Whose problems?); and
  3. Visualisation of the problems in form of a diagram, called a "problem tree" or "hierarchy of problems" to help analyse and clarify cause–effect relationships.
- The analysis is presented in diagrammatic form showing effects of a problem on top and its causes underneath.
- The analysis is aimed at identifying the real bottlenecks which stakeholders attach high priority to, and which they wish to overcome.
- A clear problem analysis thus provides a sound foundation on which to develop a set of relevant and focused project objectives.

How to Establish a Problem Tree

Creating a problem tree should ideally be undertaken as a participatory group event. It requires the use of individual pieces of paper or cards on which to write individual problem statements, which can then be sorted into cause and effect relationships on a visual display.

Step 1: The aim of the first step is to openly brainstorm problems which stakeholders consider to be a priority. This first step can either be completely open (no pre-conceived notions as to what stakeholder's priority concerns/problems might be), or more directed, through specifying a 'known' high order problem or objective (e.g. improved river water quality) based on preliminary analysis of existing information and initial stakeholder consultations.

Step 2: From the problems identified through the bainstorming exercise, select an individual starter problem.

Step 3: Look for related problems to the starter problem

Step 4: Begin to establish a hierarchy of cause and effects:

- Problems which are directly causing the starter problem are put below
- Problems which are direct effects of the starter problem are put above

Step 5: All other problems are then sorted in the same way – the guiding question being 'What causes that?' If there are two or more causes combining to produce an effect, place them at the same level in the diagram.

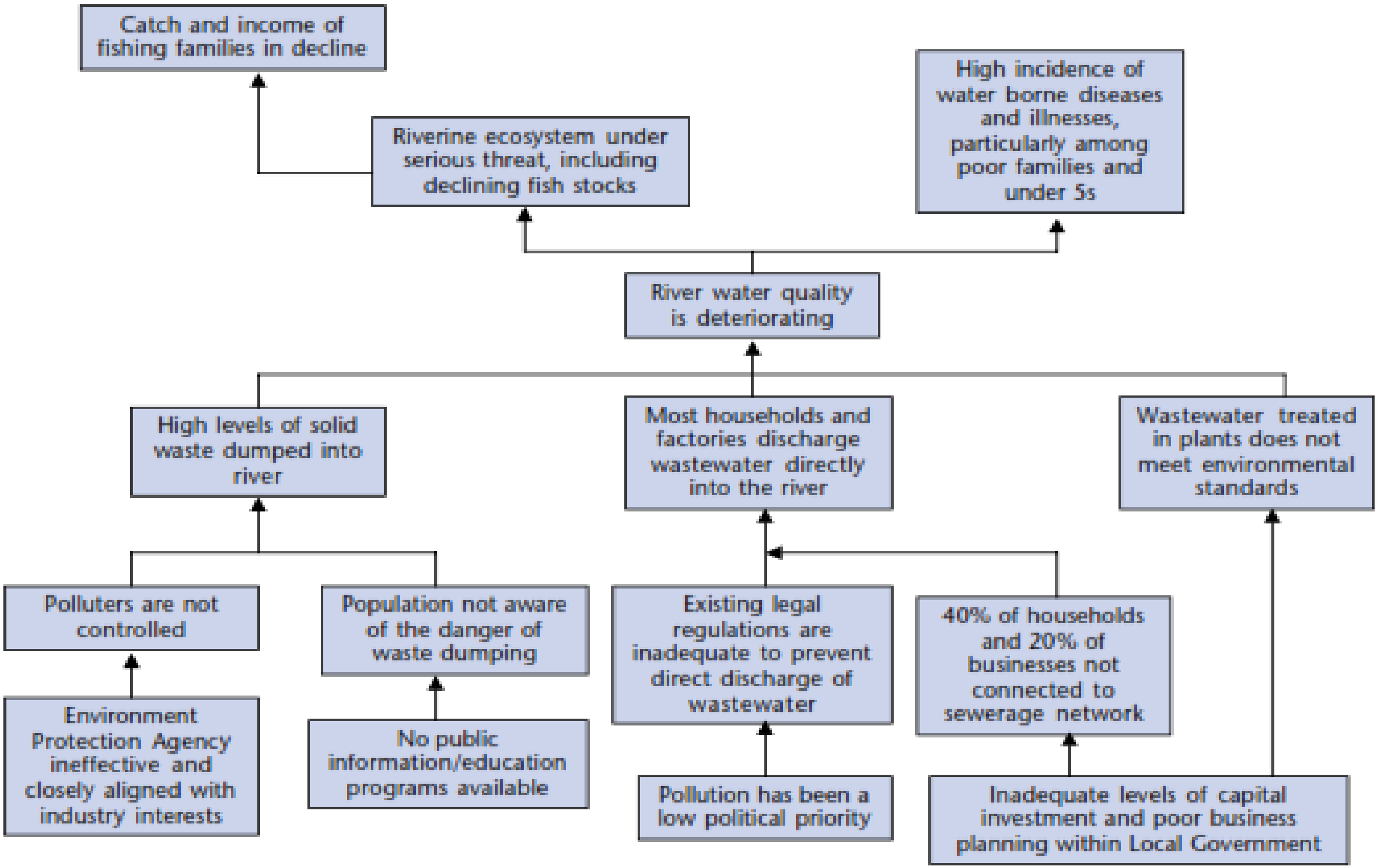
Step 6: Connect the problems with cause-effect arrows – clearly showing key links

Step 7: Review the diagram and verify its validity and completeness. Ask yourself/the group – 'are there important problems that have not been mentioned yet?' If so, specify the problems and include them at an appropriate place in the diagram.

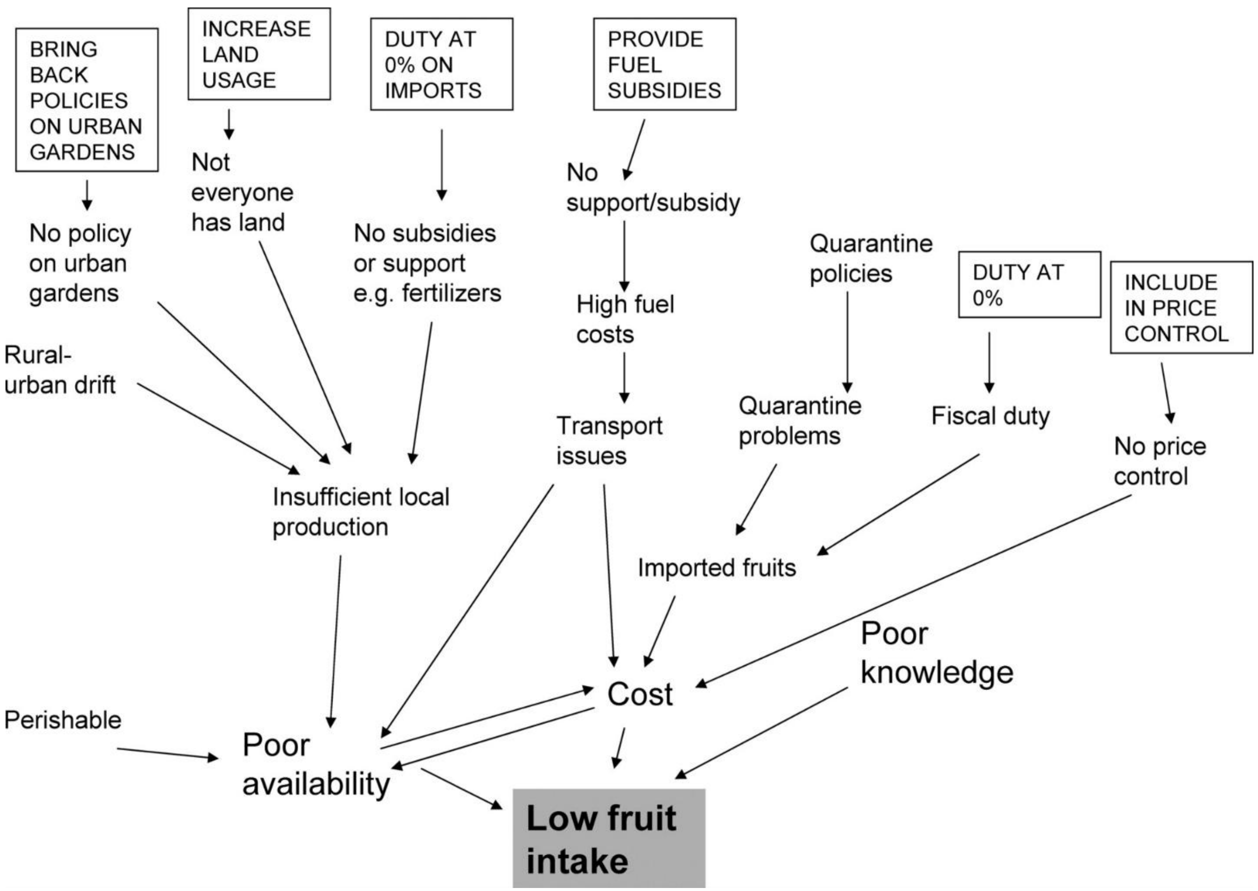
Step 8: Copy the diagram onto a sheet of paper to keep as a record, and distribute (as appropriate) for further comment/information

- Important points to note about using the problem tree tool are:
  - The quality of output will be determined by who is involved in the analysis and the skills of the facilitator. Involving stakeholder representatives with appropriate knowledge and skills is critical;
  - A workshop environment involving groups of up to 25 people is an appropriate forum for developing problem tress, analyzing the results and then proposing next steps;
  - It may be appropriate to undertake an number of separate problem tree analysis exercises with different stakeholder groups, to help determine different perspectives and how priorities vary;
  - The process is as important as the product. The exercise should be treated as a learning experience for all those involved, and an opportunity for different views and interests to be expressed; and
  - The product of the exercise (the problem tree) should provide a robust but simplified version of reality. If it is too complicated, it is likely to be less useful in providing direction to subsequent steps in the analysis. A problem tree cannot (and should not) contain or explain the complexities of every identifiable cause-effect relationship.
- Once complete, the problem tree represents a summary picture of the *existing negative situation.*
- In many respects the problem analysis is the most critical stage of project planning, as it then guides all subsequent analysis and decision-making on priorities.

Problem analysis – river pollution



PROBLEM TREE



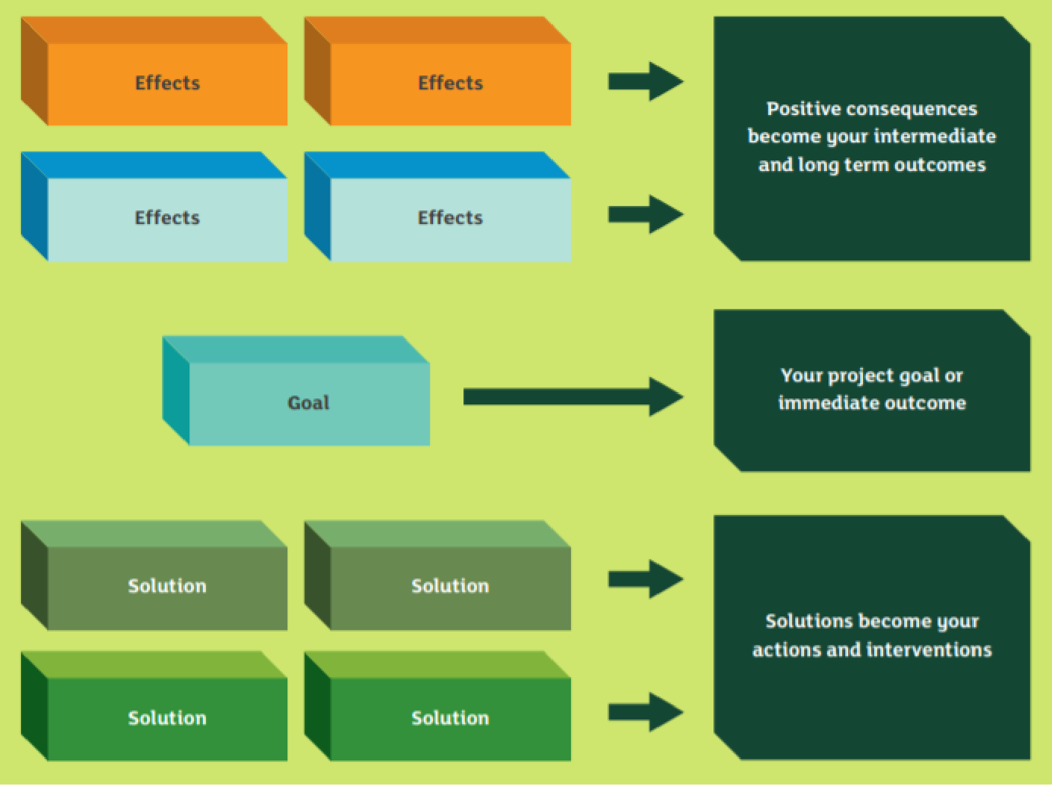
From: Problem and solution trees: a practical approach for identifying potential interventions to improve population nutrition

Health Promot Int. 2008;23(4):345-353. doi:10.1093/heapro/dan027

SOLUTION TREE

- A solution (also called objectives) tree is developed by reversing the negative statements that form the problem tree into positive ones.

- For example, a cause (problem tree) such as "lack of knowledge" would become a means such as "increased knowledge". The objectives tree demonstrates the means-end relationship between objectives.



- Use the solution tree to identify opportunities and support project design : Developing a solution tree helps to visualize possible actions and outcomes, and may present a number of separate or linked interventions to solve a problem.

SOLUTION TREE

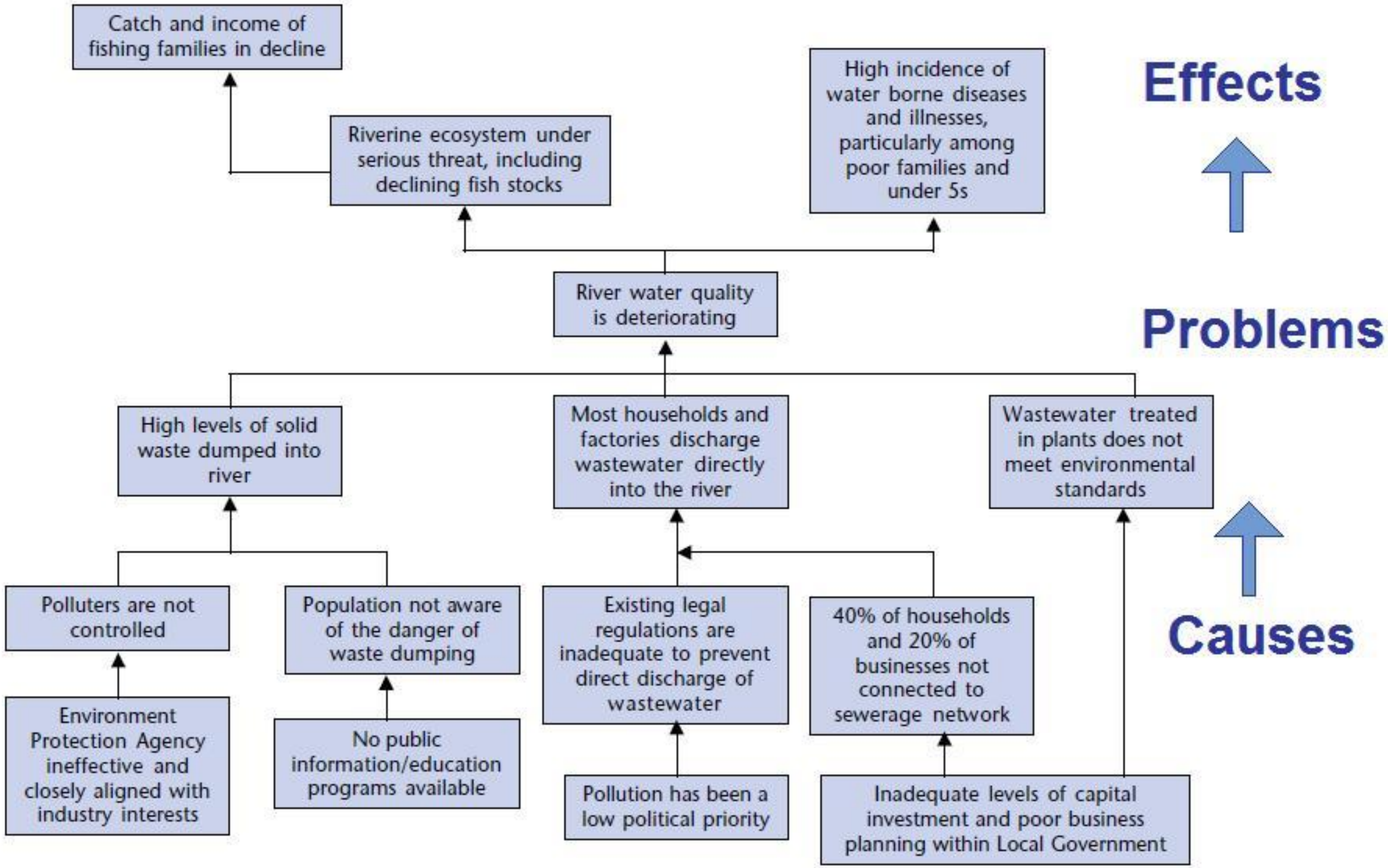
BEAR in MIND!!

"In this stage, participants discuss the possible actions identified in the solution tree to select preferred interventions. "

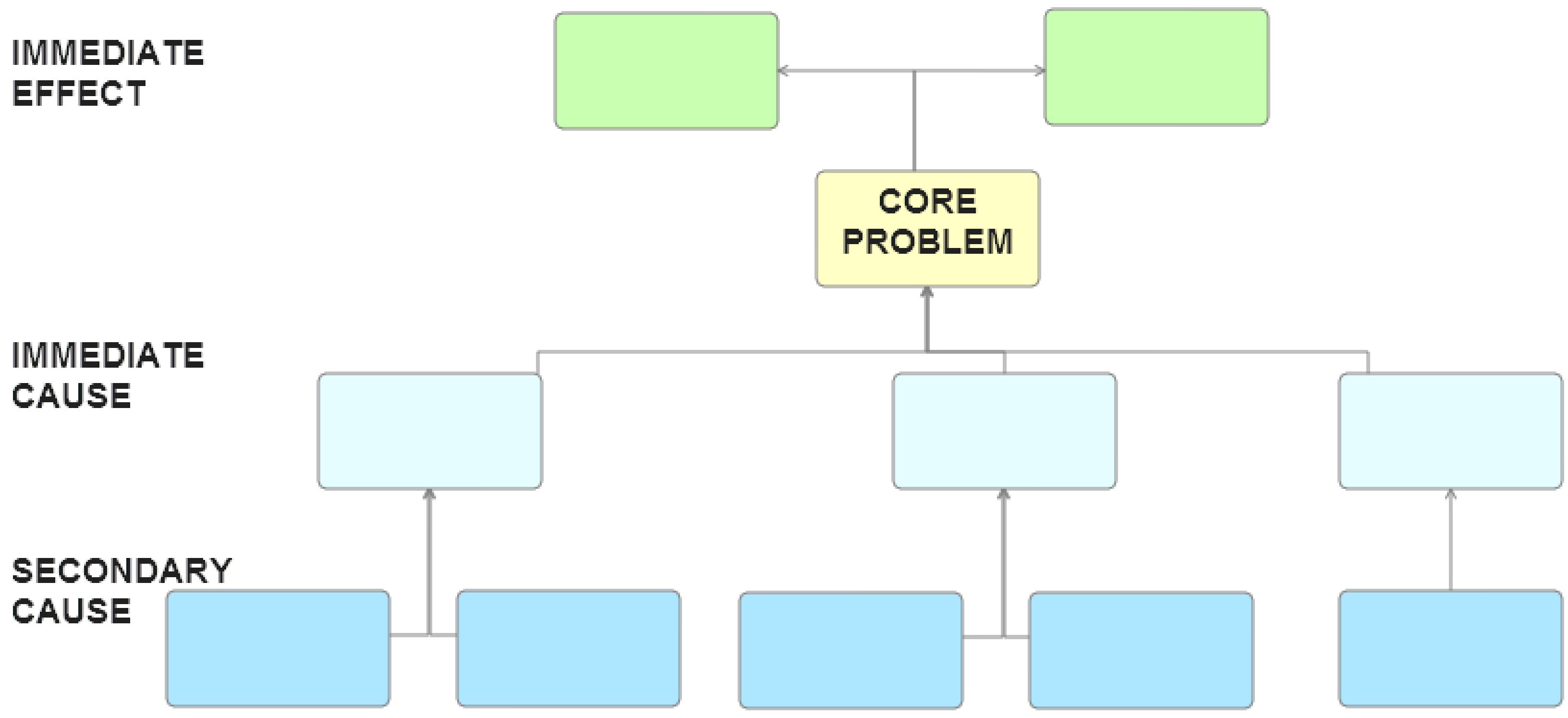
"Bear in mind that your selected intervention may not be able to tackle all of the causes identified in the analysis – consider project funding available, timeframes and relevance."

"It is also important to consider which solutions are within the scope of the Local Authority to affect and action, and which will require engagement and buy-in from other stakeholders."

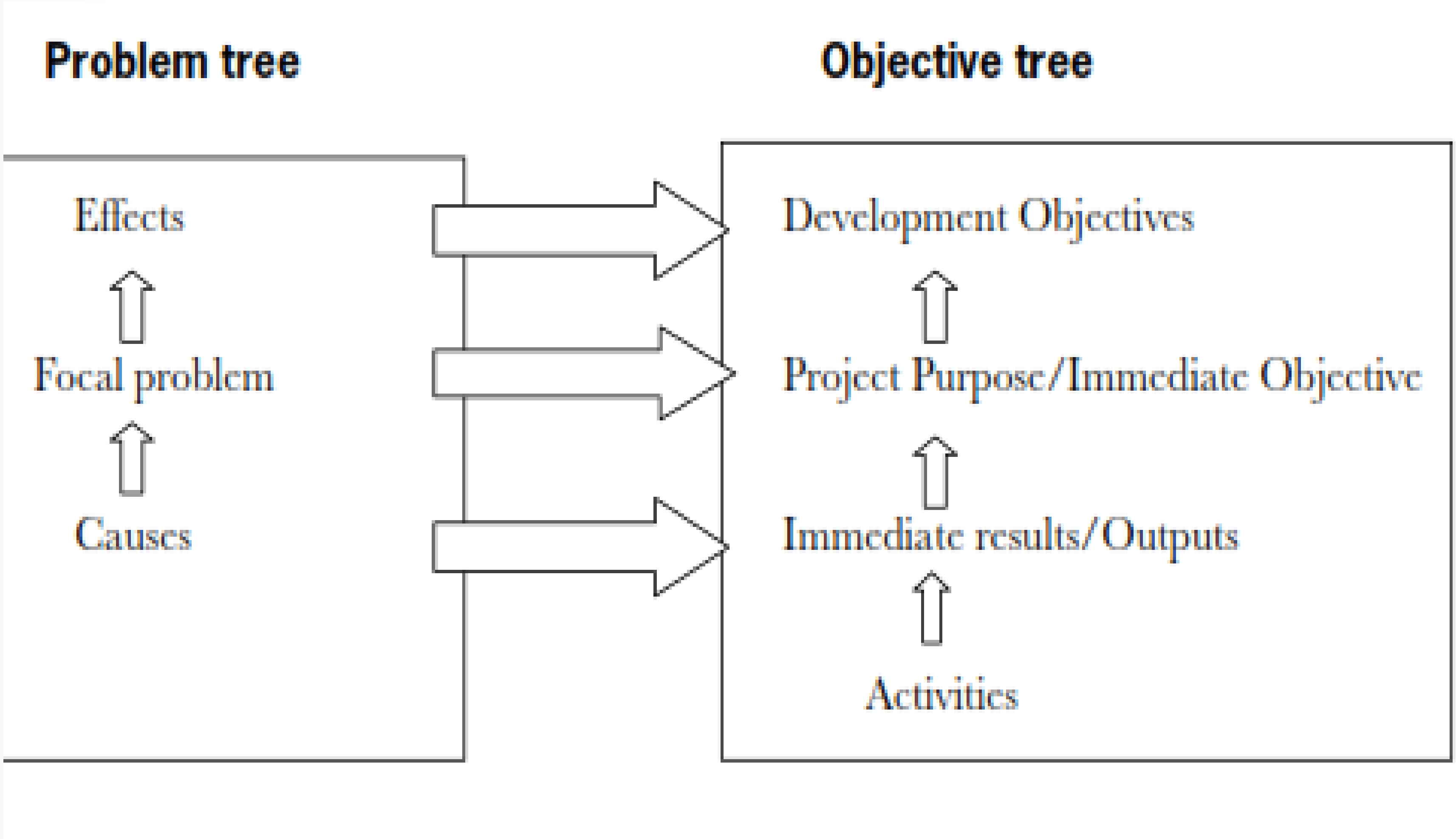
PROBLEM TREE, A SAMPLE



PROBLEM TREE, NOW IT'S YOUR TURN

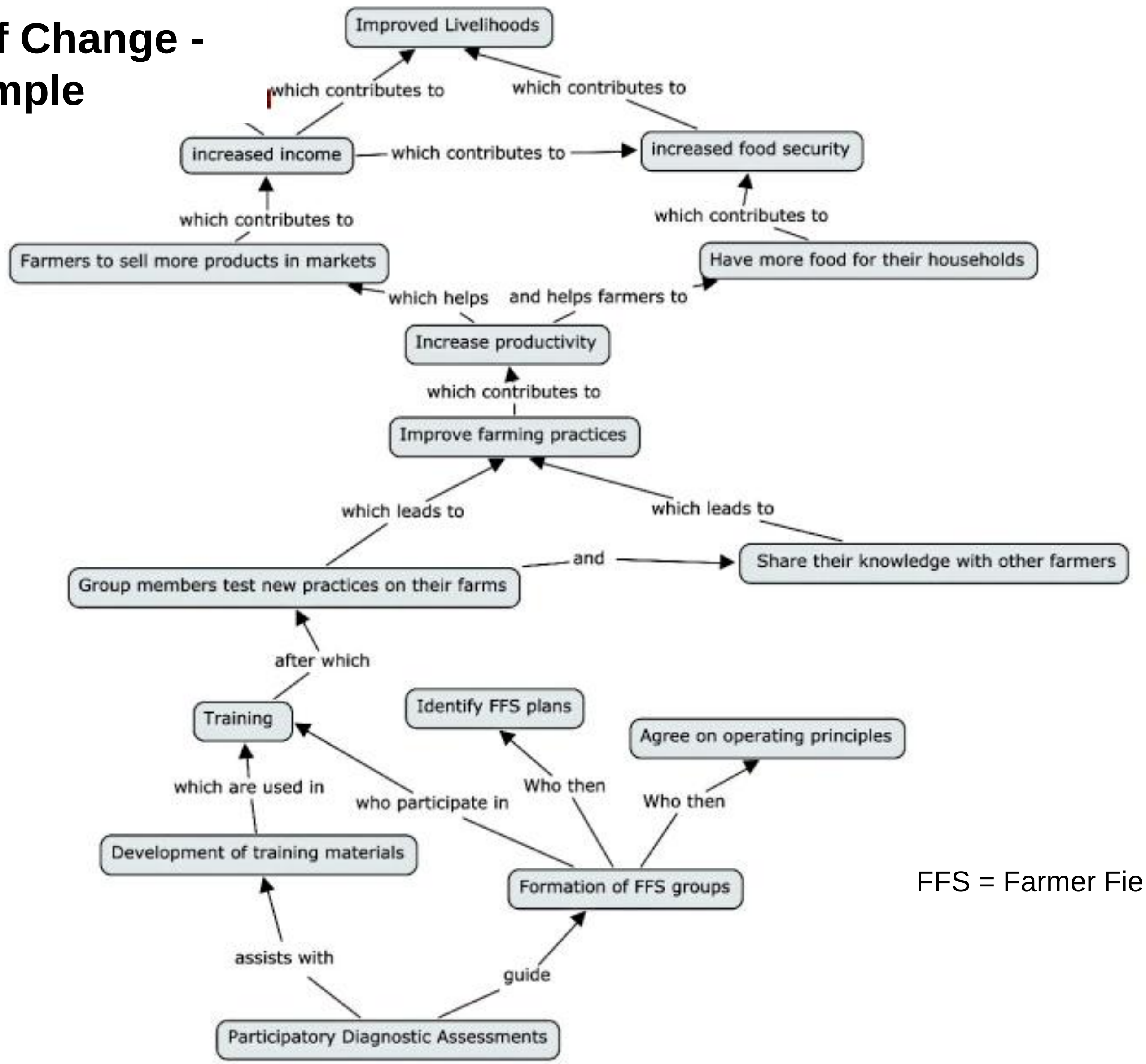


The relationship between the problem analysis and the objective analysis



THEORY OF CHANGE (TOC)

Theory of Change - Sample



FFS = Farmer Field School

Example of SWOT Matrix Analysis

Internal Factors / External Factors	**Strengths (S)** • Quality culture • Wide experience in mapping operations • Availability of hard/software • Well trained personnel/staff development	**Weaknesses (W)** • No marketing structure • Divisional structure • No flexible system • Lack of operations management
Opportunities (O) • Growing number of new customers • Established copyright legislation • Growth of E-commerce • Enabling power of GI technology	**SO Strategies** • Use internet for easier/cheaper product dissemination • Optimise production system making use of available technology and staff • Certify products protected by copyright	**WO Strategies** • Develop marketing mechanisms to better identify customer's requirements • Re-engineer production system using GI technology + ops. mgt. Techniques to enable product diversity for E-commerce • Develop business units
Threats (T) • Cut in government budget • Dissatisfaction of user community • Growing competition from private sector • Easy access to easy/cheap technology by competitors	**ST Strategies** • Find new market niches to recover part of costs (new users, new products) • Make use of culture, capabilities and experience to satisfy users and to enter competition • Do not oppose but cooperate with private sector (partnership)	**WT Strategies** • Develop marketing mechanisms to better identify customer's requirements • Re-engineer production system using GI technology + ops. mgt. Techniques to enable product diversity to better compete

2. Theory of Change (ToC)

3. PROJECT DESIGN MATRX (PDM)

PDM can be prepared in the reversed order from project process: Impact – Outcome – Output – Activities - Inputs

General Sequence of Completion

Narrative Summary	Objectively Verifiable Indicator (OVI)	Means of Verification (MOV)	Assumptions /Risks
1 Goal/Impact	10	11	Assumption/ Risk 9
2 Purpose/ Outcome	12	13	Assumption/ Risk 8
3 Outputs	14	15	Assumption/ Risk 7
4 Activities	Inputs 5		Pre-conditions 6

3. Project Design Matrix (PDM)

Box 1: Output Tips

(i) Include major products and deliverables of the project.

(ii) Ensure that together, outputs will be sufficient to achieve the outcome, given risks and unadministered, parallel partner financing.

(iii) Include an output for each set of activities, except project management activities that do not produce an output.

(iv) Phrase outputs in the past tense as already achieved, e.g., "rural roads in the southern districts constructed." Include the action word (e.g., constructed, rehabilitated, established) at the end if the statement.

(v) Outputs must be fully consistent with the cost estimates and financing plan, and the project definition in schedule 1 to the loan or grant agreement.

Box 2: Outcome Tips

(i) Include only one outcome statement describing the immediate and direct benefits from using or applying outputs.

(ii) Phrase the outcome in the past tense as already achieved, e.g., "mobility of rural residents increased." Include the change word (e.g., increased, improved, enhanced) at the end if the statement. Time frames and names of beneficiary groups can come after the change word.

(iii) Do not include any cause-and-effect links. Outcome statements cannot use the words "through," "by," or "in order to," because these words imply cause-and-effect links; e.g., corporate performance improved through capacity building, graduation rates increased by reducing dropouts, crop yields improved in order to increase farmer income.

(iv) Do not join two separate outcome statements using "and" to create a single outcome.

3. Project Design Matrx (PDM)

Box 3: Activities Tips

(i) List key activities for each output. Do not list sub-outputs.

(ii) Link design and monitoring framework activities with "B. Overall Project Implementation Plan" in Section II of the project administration manual.

(iii) Show completion date and milestone per activity.

(iv) Group and number activities by the output they relate to.

(v) Tag activities that represent drivers of change with the acronym in brackets at the end of the activity statement.

(vi) Policy-based lending does not require activities.

(vii) Activities for results-based lending should be priority actions from the program action plan.

(viii) Include project management activities as appropriate, such as procuring goods, hiring consultants, reporting, monitoring, accounting, and auditing, at the end of the activities row, without a number.

(ix) Do not include indicators at the activity level.

(x) Include primary data collection undertaken for the project under project management.

Input Tips

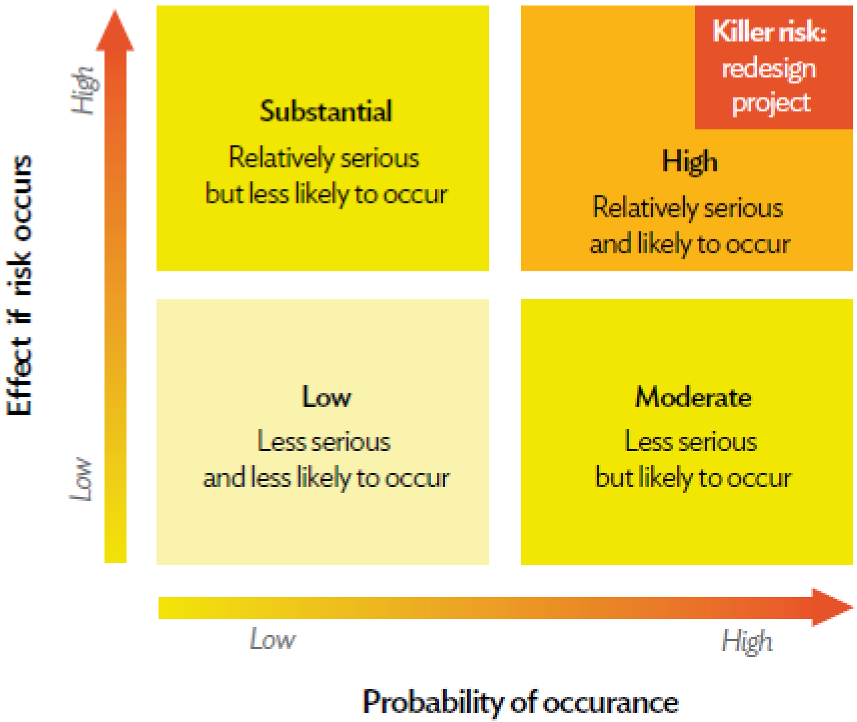
Include a summary of the main resources needed to carry out the activities.

Group inputs by financier.

Include direct cofinancing.

Include in-kind contributions for technical assistance by source of funding (except for regional technical assistance).

3. Project Design MatrIx (PDM)



Box 5: Mitigation Tips

Mitigation refers to actions undertaken to reduce or remove the effects of a risk occurring, or the likelihood of occurrence. Mitigation does not remove the risk. The project can only remove the risk through redesign. Not all risks can be mitigated.

Source: Asian Development Bank, Strategy and Policy Department.

Box 6: Risk Tips

(i) Include a minimum of one risk at activity to output and output to outcome levels.

(ii) Risks can be linked to specific outputs if desired.

(iii) DMF risks must be negative, uncertain, outside the project's control and with the vertical logic of activity to output to outcome.

(iv) Do not include factors that the project controls, loan covenants, or risks eliminated through redesign as risks in the DMF.

(v) Only include risks from the risk assessment and risk management plan and report and recommendation of the President.

Box 8: Tips on Performance Indicators with Targets

(i) Include at least one indicator for each output and outcome. No indicators are required for impact.

(ii) Align indicator to the output or outcome. Ensure that the indicators do not measure the next level of results above or below.

(iii) Assign a letter to each output indicator; e.g., 1a, 1b, 2a, 2b.

(iv) Use stakeholder input where appropriate, especially from beneficiaries, to specify indicators and set targets. For nonsovereign operations, this will be done during the due diligence stage.

(v) State the baseline for each dimension of performance measured by the indicator: current performance level, zero, binary, or not applicable.

(vi) Specify a target for each dimension of performance measured by the indicator using one of the six target types.

(vii) Disaggregate any indicator that measures people into female and male for baselines and targets.

(viii) Specify indicators quantitatively, even if measuring qualitative dimensions.

(ix) Limit the number of indicators to the minimum possible.

(x) Use "need to know" indicators, and avoid "nice to know" indicators.

(xi) Use existing indicators where possible, but do not use an indicator that does not measure the result just because it exists.

(xii) For results-based lending, the design and monitoring framework does not have to include all the disbursement-linked indicators

Project Design Matrix (PDM)

In theory PDM can be prepared in the reversed order from project process (Impact – Outcome – Output – Activities – Input), but in practice Input and Output set first.

IN THEORY AND EXECUTION LEVEL

- Step 1 — Select project sector and set **Goal and Purpose**
- Step 2 — **Set Indicator**
- Step 3 — Decide **target level** according to goal or purpose should consider baseline data and be reflected experts opinion
- Step 4 — Prepare **Action Plan** for Achieving target
- Step 5 — **Assumption** OR **Risk**

IN PRACTICE AND IMPLEMENTATION

- Step 1 — Set total **Budget** (Input)
- Step 2 — Decide **Output**
- Step 3 — Organize **activities** and group **components**
- Step 4 — Set Outcome and **Impact**
- Step 5 — **Monitor Target**

Project Design Matrix (PDM) : Sample

Rural income increase with the establishment of tomato value chain

Narrative Summary	Objectively Verifiable Indicator (OVI)	Means of Verification (MOV)	Risks
Impact Rural economy vitalized and income increased	By +5 years, - Household income increase by 100%	Local socio-economic data	Externalities (election, climate change)
Outcome Rural revenue creation by tomato sales	By +2 years, - Tomato sales volume increase by 20% - Revenue increase by 30%	Beneficiary survey	Market domination by existing market kings
Outputs 1. Completed irrigation system 2. Established marketing plan 3. Trained farmers	1. XX m YYY capacity of water supply 2. Marketing Plan Report 3. XXX trained	Project Completion report	Delays in construction
Activities 1. Irrigation system building 1.1... 1.2… 2. Marketing planning 2.1... 2.2… 3. Farmer training 3.1. .. 3.2…	**Inputs** KOICA grant $5,000,000		

3.6. Analysis of Objectives

- Analysis of objectives is a methodological approach employed to:
  - Describe the situation in the future once identified problems have been remedied;
  - Verify the hierarchy of objectives; and
  - Illustrate the means-ends relationships in a diagram.
- The ‘negative situations’ of the problem tree are converted into solutions, expressed as ‘positive achievements’. For example, ‘river water quality is deteriorating’ is converted into ‘quality of river water is improved’. These positive achievements are in fact *objectives, and are presented in a diagram of objectives* showing a *means/ends hierarchy (see Figure).*
- *This* diagram aims to provide a clear overview of the desired future situation.
- The main steps in the process are summarised below:

Steps in objective tree analysis

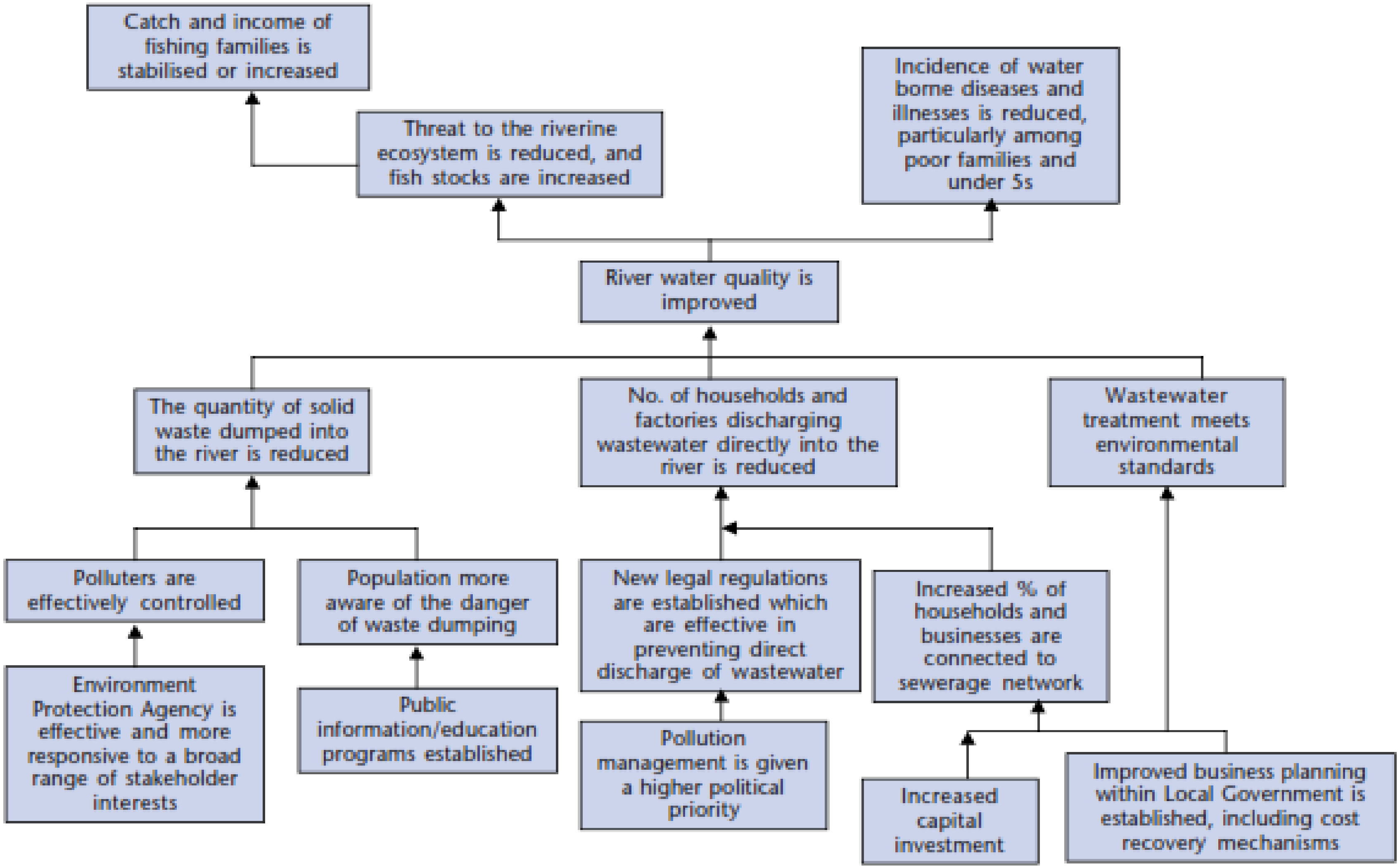
Step 1: Reformulate all negative situations of the problems analysis into positive situations that are:
- desirable
- realistically achievable

Step 2: Check the means-ends relationships to ensure validity and completeness of the hierarchy (cause-effect relationships are turned into means-ends linkages)

Step 3: If necessary:
- revise statements
- add new objectives if these seem to be relevant and necessary to achieve the objective at the next higher level
- delete objectives which do not seem suitable or necessary

- Once again the analysis of objectives should be undertaken through appropriate consultation with key stakeholder groups. Information previously gained from undertaking stakeholder analysis (including institutional capacity assessment – see also
- This should help in terms of:
  - Considering priorities;
  - Assessing how realistic the achievement of some objectives might be; and
  - Identifying additional means that might be required to achieve desired ends.
- Once complete, the objective tree provides a summary picture of the desired future situation, including the indicative means by which ends can be achieved.
- As with the problem tree, the objective tree should provide a simplified but robust summary of reality.
- It is simply a tool to aid analysis and presentation of ideas.
- Its main strength is that it keeps the analysis of potential project objectives firmly based on addressing a range of clearly identified priority problems.

Objective tree – river pollution

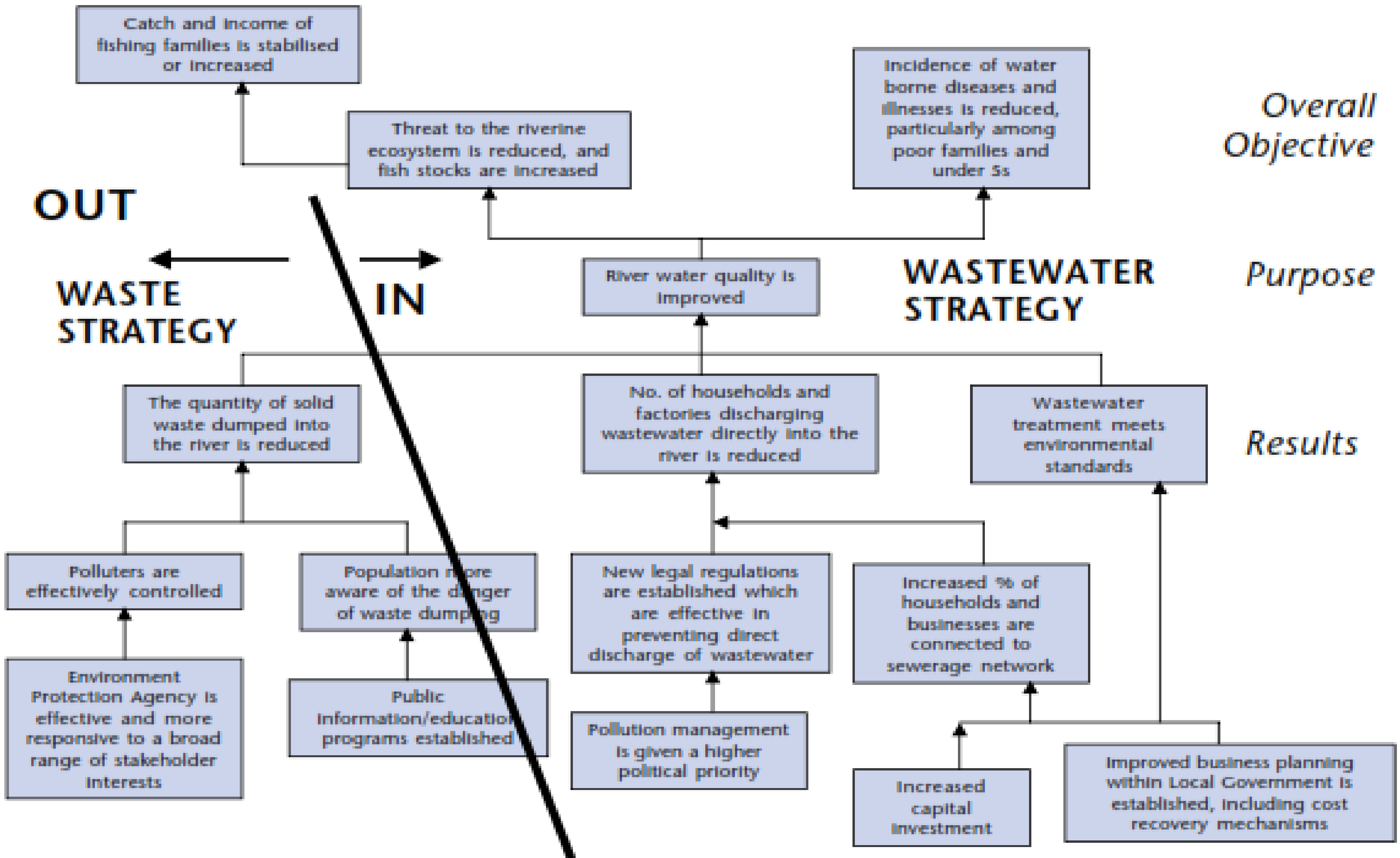


3.7. Analysis of Strategies

- During the process of stakeholder analysis, problem analysis and the identification of potential project objectives, views on the potential merits or difficulties associated with addressing problems in different ways will have been discussed.
- These issues and options then need to be more fully scrutinized to help determine the likely scope of the project before more detailed design work is undertaken.
- The type of questions that need to be asked and answered at this stage might include:
  - Should all the identified problems and/or objectives be tackled, or a selected few?
  - What are the positive opportunities that can be built on (i.e from the SWOT analysis)?
  - What is the combination of interventions that are most likely to bring about the desired results and promote sustainability of benefits?
  - How is local ownership of the project best supported, including development of the capacity of local institutions?
  - What are the likely capital and recurrent costs implications of different possible interventions, and what can realistically be afforded?
  - What is the most cost effective option(s)?
  - Which strategy will impact most positively on addressing the needs of the poor and other identified vulnerable groups?
  - How can potential negative environmental impacts best be mitigated or avoided?

- This analytical stage is in some respects the most difficult and challenging, as it involves synthesising a significant amount of information then making a complex judgment about the best implementation strategy (or strategies) to pursue.
- In a number of compromises often have to be made to balance different stakeholder interests, political demands and practical constraints such as the likely resource availability.
- Nevertheless, the task is made easier if there is an agreed set of criteria against which to assess the merits of different intervention options.
- Key criteria for strategy selection could include:
  - Expected contribution to key policy objectives, such as poverty reduction or economic integration
  - Benefits to target groups – including women and men, young and old, disabled and able, etc
  - Complementarity with other ongoing or planned programmes or projects
  - Capital and operating cost implications, and local ability to meet recurrent costs
  - Financial and economic cost-benefit
  - Contribution to institutional capacity building
  - Technical feasibility
  - Environmental impact
- Using these criteria will help to determine what should/can be included within the scope of the project, and what should/cannot be included.
- The selected strategy will then be used to help formulate the first column of the Logical Framework, particularly in helping to identify the project Overall Objective, Purpose and potential Results.

Strategy selection



Model Village Agricultural and Rural Development Conceptual Strategic Framework

Model Agricultural and Rural Development Conceptual Framework				
Systemic Concept Sustainable development Approach	Rural Teritories	Agro-Food Value Chain	Policy System	Strategic Objectives
Economic (Production and Trade)	I. Promote Competitive Rural Enterprises	II. Linking and Integrating to Chain and Market to enhance productivity	III. Build an enabling Business environment	Competitiveness
Ecological (Environment)	IV. Promote good environmental Practices	IV. Promote integrated environmental Management	VI. Build a pro-Eco-Institutional Frameworks	Sustainablity
Social (Culture and Human)	VII. Facilitate Improved Quality of Life and Access to Services	VIII. Develop Capabilities, Expertise, Creativity and Innovation	IX. Promote Policies to Improve Lives and Livelihhood Options	Equity
Political (Institutional)	X. Strengthen Public and Private Sector Partnerships	XI. Strengthen Dialogue, Interrelationships and Commitments	XII. Promote National Policies and External Cooperation	Governance
Strategic Objectives	Rural Prosperity + Food Security + Happiest Society			Fast Sustainable Development of Agriculture and Rural Life

4. IDENTIFYING PROJECT COSTS AND BENEFITS

- We undertake economic analysis of projects to compare costs with benefits and determine which among alternatives project have an acceptable economic return and we do the same for financial analysis.
- The costs and benefits of a project therefore must be identified. Further more, once costs and benefits are known they must be priced and their economic value determined.
- **Objectives, cost and benefits**
- In identifying costs and benefits of a project, objectives play important role.
- In project analysis, the *objectives* of the project provide the standard against which cost and benefits are defined.
- Simply put, a cost is anything that reduces an objective, and a benefit is anything that contributes to an objective.

- The problem with such simplicity, however, is that each participant in the project has many objectives. For example;
- A farmer has the following objectives
  - Increase household income/ Net incremental benefit
  - Educating children
  - Reducing work hours (consuming more leisure)
  - Paying debt
  - Reducing risk
  - Meet social obligations
- etc
- All these considerations affect a farmer's choice of cropping patter and thus the income generating rapacity of a project.
- Yet all are sensible decisions in the farmer's view.
- However, since it is difficult to incorporate all objectives, we will judge the effect of a project on the incremental income & thus, on the new income generated by the project.

- A private business firm can have objectives such as:
  - Maximizing net income (profit)
  - Increasing market share
  - Improving customer satisfaction
  - Reducing risk, etc.
- A society or a nation as a whole may want to achieve the following objectives as:
  - Increasing national income (growth objective)
  - Ensuring equitable distribution between persons, regions, generations, etc. (distributional objective)
  - Improving balance of payments
  - Improving regional integrity
  - Reducing inflation
  - Reducing unemployment
  - Maintaining environment, etc.
- However, the problem with such a number of objectives is there is no formal analytical system for project analysis that could possibly take into account all the various objectives of the society or private business firm.

- Thus, we will take maximization of net incremental income (profit) for a private firm and maximization of national income for a nation as the *fundamental objectives* in the analysis of a project.
- In financial analysis, which is conducted from the viewpoints of the private project-operator, we will evaluate the project in terms of its contribution to the net income (profit) of the private owner (which is usually considered to be the fundamental objective of the private business firm).
- The project that will generate the highest profit for the owner will be given priority to other alternative projects.
- In contrast to this, in economics analysis, which is conducted from the standpoint of the society as a whole, we will evaluate a project in its contribution to the national income - the value of all final goods and services produced during a particular period, usually a year.
- All other objectives, if very important, can be considered in a separate decision or if possible we will include in the analysis.

- Thus, project that contributes the highest to the national income and also that makes a significant contribution to other social objectives will be selected.
- E.g. If two projects contribute equal income to national income, we will choose one that favor equitable distribution or the one that creates the most jobs, etc.
- Of course, there are analytical techniques, proposed by Squire and van derTak (1992) and Little and Mirrlees (1977), that incorporate especially distributional objectives into the analysis.
- Therefore, when we come to identification of costs and benefits in economic analysis, anything that *reduces* national income is a *cost* and anything that *increases* national income is a *benefit*.
- Hence the analyst task in economic analysis is to estimates the amount of this increase in national income available to the society, i.e. to determine whether, and by how much, the benefits exceed the costs in terms of national income.
- In the economics analysis we will assume that all financing for a project comes from domestic sources and that all returns from the project go to domestic residents, thus we identity cost and benefits b/n terms of GDP instead of GNP.

economic analysis

- The projected financial revenues and cost are often a good starting point for identifying economic benefits and costs but two types of adjustments are necessary. First it is necessary to include (or exclude) some costs and benefits. Second it is necessary to revalue inputs and outputs at their opportunity cost.
- Financial analysis which looks the project from the perspective of the implementing agency identifies the project's net money flows to the implementing entity and assesses the entities ability to meet its financial obligations and to finance future investments.
- Economic analysis, by contrast, looks at a project from the perspective of the entire economy ("society") and measures the effects of a project on the economy as a whole.
- The important difference between financial and economic analysis is in the price that the project entity uses to value the inputs and outputs.
- Financial analysis is simply based on the actual prices that the project entity pays for inputs and receives for outputs.

- The prices used for economic analysis, however, are based on the opportunity costs to the country.
- The economic values of both inputs and outputs usually differ from their financial value (market prices) because:
  - There are different market imperfections;
  - There are government interventions of various kinds (taxes, subsidies, tariff, price control, etc, and;
  - Some goods are public goods by their nature (may not totally have market or the price consumers are willing to pay are less).
- The divergence between financial and economic prices and flows show the extent to which some one in society, other then the project entity, enjoys a benefit or pays a cost of the project. And hence enable the analyst to identify ‘gainers’ and ‘losers’.
- The magnitudes and incidence of transfers are important pieces of information that shed light on the project's fiscal impact, other distribution of costs and benefits and hence on its likely opponents and supporters. By identifying the groups that benefits from the project and groups that pay for its costs, the analyst can extract valuable information’s about the incentives that these groups have to see to it that the project implemented as designed.

1. Costs of inputs

- ***Physical goods*: -** construction materials, raw materials, etc. Here valuation is not a problem but the problem is associated with planning the required amount of input.
- ***Labor*: -** skilled and unskilled. Here the problem of valuation may arise when the project uses family labor.
- ***Land*: -** it is not difficult to identify. The problem is with valuation of land because of the very special kind of market conditions that exist when land is transferred from one owner to another.
- In financial analysis, we directly take the market price if the use of these inputs involves cash outlays. If there are no cash payments for some of these inputs, it will not be considered as a cost. In economic analysis, however, since the use of these inputs is related with the use of real resources, they will be valued at their economic price and entered into economic accounts.

2. Direct transfer payments

- Some entries in financial accounts really represents shifts in claims to goods and services from one entity in the society to another and do not reflect changes in national income. These are the so-called direct transfer payments, which are much easier to identify if our definition of costs and benefits is kept in mind. Common transfer payments in projects are: taxes, subsidies, loans, and debt services (the payment of interest and repayment of principal).
- **Taxes**
- Payment of taxes is clearly cost in financial analysis. When a firm pays a tax, its net benefit is reduced. But the firm's payment of tax doesn't reduce the national income. Rather it transfers income from the firm to the government so that this income can be used for social purposes presumed to be more important to the society than the increased individual consumption (or investment) had the firm retained the amount of the tax. Thus, in economic analysis we would not treat the payment of taxes as a cost in project accounts. Of course, no matter what form a tax takes, it is still a transfer payment - whether a direct tax on income or an indirect tax such a sales tax, an excise tax, or a tariff or duty on an imported input for production. But some conation is advisable here. Whether a tax should be treated as a transfer payment or as a payment for goods and services depends on whether the payment is a compensation for goods and services needed to carryout the project or merely a transfer, to be used for general social purposes, of some part of the benefit from the project to the society as a whole.

- **Subsidies**
- Subsidies are simply direct transfer payment that flow in the opposite direction from taxes.
- If a farmer is able to purchase fertilizer at a subsidize price, that will reduce his costs and there by increase his net benefits thus it is a benefit but the cost of the fertilizer in the use of the society's real resources remain the same.
- Again it makes no difference what form the subsidies takes.
- One form is that which lowers the selling price of inputs below what otherwise would be their market price.
- But a subsidy can also operate to increases the amount a firm receives for what he sells in the market, as in the case of a direct subsidy paid by the government that is added to what the firm receives in the market. In other cases, the market price may be maintained at a level higher that it would otherwise be by, say, levying an import duty on competing imports or forbidding competing imports altogether.
- Although it is not a direct subsidy, the difference between the higher controlled prices set by such measures and lower price of competing imports that would prevail without such measures does represent an indirect transfer from the consumer to the firm. In all these cases, subsidies are simply transfer payments and will not be included as a benefit in economic analysis.

- **Credit transactions**
- Credit transactions are the major form of direct transfer payment in projects.
- From the standpoint of the project owner, receipt of a loan increases the production resources he has; payment of interest and repayment of principal reduce them. But from the standpoint of the economy, these are merely transfers of control over resources from the lender to the borrower. The financial cost of the loan occurs when the loan is repaid, but the economic cost occurs when the loan is spent.
- It is important to note one point here. Financial analysis of projects is based on cash flow analysis.
- For every period during the expected life of the project, the financial analyst estimates the cash likely generated by the project and subtracts the cash likely to be needed to sustain the project.
- The net cash flows result in financial profile of the project. Because the financial evaluation of a project is based on cash flows, omits some important items that appear in profit-and-loss statements.
- In economic analysis, debt service is treated as a transfer within the economy even if the project will actually be financed by a *foreign loan & debt service* will be paid abroad. This is because of the convention of assuming that all financing for a project will come form domestic sources and returns from the project will go to domestic residents. Thus convention separates the decision of how good a project is from the decision of how to finance it.
- **Depreciation allowances**
- Depreciation may not correspond to actual use of resources should therefore be excluded from the cost stream in economic analysis. The economic cost of using an asset is fully reflected in the initial investment cost less its discounted terminal value.

3. Contingency allowance

- Sound project planning requires that provision be made in advance for possible adverse changes in physical conditions or prices that would add to the baseline costs. Contingency allowance may be divided into those that provide for physical contingencies and those for price contingencies.
- In turn, price contingency allowances comprise two categories, those for relative changes in price and those for general inflation.
- ***Physical contingency allowance*** is a real cost & will reduce the final goods and services available for other purposes, i.e. it will reduce the national income and, hence, is a cost to the society. To the extent that physical contingency allowance is a part of the expected value of the project costs, it should be included in the economic analysis.
- ***Price contingency (Change in price)***
- In most practical cases, in project cost estimation it is assumed that there will be no relative changes in domestic or international prices and no inflation during the investment period. It would clearly be unrealistic to rest project cost estimates only on the assumptions of stable price.
- ***Relative changes in price* -** A rise in the relative cost of an item implies that its productivity elsewhere in the society has increased, that is, its potential contribution to national income has risen. Thus, costs that may be incurred due to possible relative changes in prices will be considered as a cost in both financial and economic analysis.

- If the market is perfectly competitive, allocation of resources to alternative uses will be at a point where the MVP of that resource is equal in alternative uses.
- $MVP_X = MPV_Y$ = -----
- Resources will then have been allocated through the price mechanism so that the last unit of every good and service in the economy is in its most productive use or best consumption use. No transfer of resources could result in greater output or more satisfaction. But if there are any changes in relative price, the value of commodities will change as the marginal utility in consumption changes. The same holds true for resources.
- ***General change price (inflation),*** however, does not affect national income in real terms & in project analysis the most common means of dealing with it is to work in constant prices, on the assumption that all prices will be affected equally by any rise in the general price level. If inflation is expected to be significant, however, provision for its effects on project costs needs to be made in project financial plan so that an adequate budget is obtained.

4. Sunk costs

- Sunk costs are those costs incurred in the past upon which a proposed new investment will be based.
- When we analyze a proposed investment, we consider only future returns to future costs; expenditure in the past, or sunk costs, ***do not appear*** in both financial and economic accounts.
- Money spent in the past is already gone; we do not have as one of our alternatives not to implement a competed project.
- However ill-advised they may have been, such costs have already been incurred and can no longer be avoided.
- Ignoring sunk costs sometimes leads to seemingly paradoxical, but correct, results.
- If a considerable amount has already been spent on a project, the future returns to the costs of completing the project may be extremely high, even if the project should never have been undertaken. 'Bygones are bygones', only costs that can still be avoided matter in this regard.

Tangible benefits of projects

- ***Increased production*: -** increased physical production is the most common benefit of projects. Whether the increased output is marketed or consumed at home, it represents the benefit of a project.
- ***Quality improvement*: -** to account as a benefit in both financial and economic analysis this must be reflected in the market price of the good.
- ***Change in time of sale*: -** In some projects, especially in agriculture, benefits will arise from improved marketing facilities that allow the product to be sold at a time when prices are more favorable. (Marketing function that adds time utility), the benefits of these projects arise out of the change in "temporal value".
- ***Change in location of sale*: -** Such projects as investment on transport facilities to carry products from the local area where price are low to distant market where prices are higher. The benefits of such projects arise from the change in "location value".
- ***Change in product form (grading & processing)*:-** projects involving agricultural processing industries expect benefits to arise from a change in the form of the agricultural products.
- ***Cost reduction (through mechanization)*:-** The classical example of a benefit arising from cost reduction in projects is the gained by investment in agricultural machinery to reduce labor costs. In other industries also use of improved technologies that substitute labor could be an incremental benefit from the reduction in cost of labor as compared to the 'without' condition.
- ***Losses avoided*: -** The '***with and' without'*** project analysis tends to point out such costs avoided by the project. Similarly risks avoided or reduced can be considered as benefits; sometimes such benefits are reflected by output increment through loss reduction.
- Since all these benefits are real increase in value of commodities or reduction in costs, they will be considered in both analyses.

Externalities

- Secondary costs and benefits

- Projects can lead to benefits created or costs incurred outside the project itself.
- Economic analysis must take account of these external, or secondary, costs and benefits so they can be properly attributed to the project investment.
- It is not necessary to add on the secondary costs and benefits separately; to do so would constitute double counting.
- Thus, instead of adding on secondary costs and benefits, we have to adjust the market prices into 'economic' prices there by in effect converting them to direct costs and benefits.
- Although using efficiency prices based on opportunity cost or willingness to pay greatly reduces the difficulty of dealing with secondary costs and benefits, there still remain many valuation problems related to goods and services not commonly traded in competitive markets.
- Price effects caused by a project are also part of externalities. The project may lead to higher prices for inputs it requires and lower price for the outputs it produces.

- What are known as "forward linkages effects" thus may occur in industries that use or process a project's output, and backward linkages in industries that supply its inputs, in that such industries are encouraged or stimulated by increased demand and higher prices for their output or lower prices for their inputs.
- Conversely, other producers may loose because they now face increased competition, and other users of inputs required by the project may have to pay higher prices.
- The project may have wide-ranging repercussions on demands of inputs and outputs and cause gains and losses for producers and consumers and other than those involved in the project itself.
- *Examples of such costs and benefits are:*
  - Technological spill-over or technological externalities
  - Negative or positive ecological effects in construction of dam: - it can increase spread of schistosomiasis and malaria, it can increase/decrease in fish catches, many down-stream effects, etc
  - Multiplier effects of projects - if there had been excess capacity

Intangible costs and benefits

- Almost all projects have costs and benefits that are intangible. These may include creation of job opportunities, better health and reduced infant mortality, better nutrition, reduced incidence of disease, national integration, national security, etc. These benefits do not, however, lend themselves to valuation.
- Likewise in the cost side, a project may displace workers, it may increase disease incidences, it may increase regional income inequality, it may destroy or reduce the scenic beauty of an area, etc. All these are intangible costs of the project, which are not captured by or not reflected in the market prices. All these intangible benefits and costs must be carefully identified and where possible, be quantified although valuation is impossible.
- These costs and benefits will not usually appear in financial accounts and are excluded from financial analysis. However, they should be included in the economic analysis at least in qualitative terms if they are significant and measurable. Whether or not externalities are quantified, they should at least be discussed in qualitative terms.
- In practice, it is not feasible to trace all externalities arising from such market imperfections: the analyst can only hope to capture the grosser distortions on more immediately affected changes in output. Externalities of various kinds are thus clearly troublesome, and there is no altogether satisfactory way in which to deal with them. There is no reason simply to ignore them and if they appear significant, to measure them. In some cases it is helpful to internalize externalities by considering a package of activities as one project.

International effects

- Some external effects of projects may extend beyond the borders of the country concerned.
- Effects on world prices of traded goods (favorable or adverse), environmental effects, etc such external effects on other countries are similar in nature to the externalities within the country and raise similar problem.
- Whether accounts should be taken of these benefits accruing to, or of costs imposed on, other countries depend on value judgment.

comparison

- Project analysis tries to identify and value the costs and benefits that will arise with the proposed project and compare them with the situation as it would be without project.
- The difference is the incremental net benefit arising from the project investment.
- This approach is not the same as comparing the situation **''before'' and ''after''** the project.
- The before-and-after comparison fails to account for changes in production that would occur without the project and thus leads to an erroneous statement of the benefit attributable to the project investment.

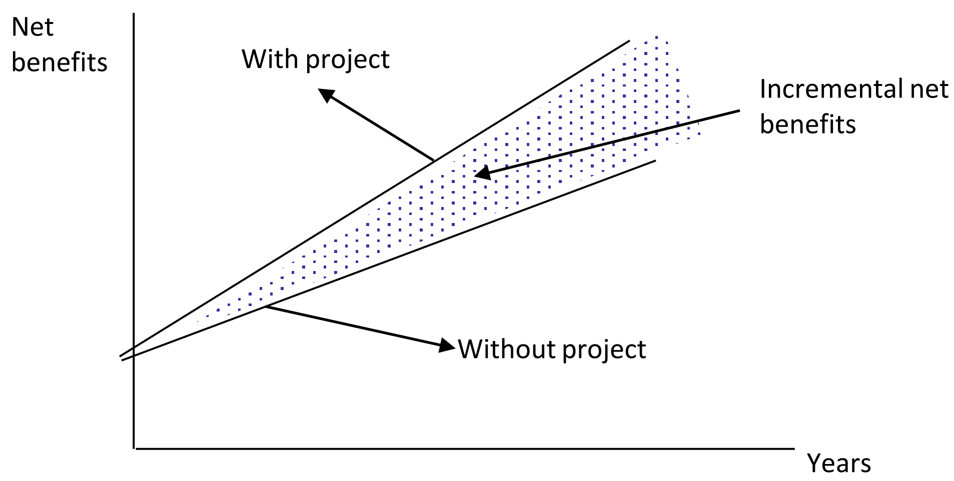


Fig. 1.1 The with/without project comparison

The above figure illustrates a change in output can take place if production is already increasing (decreasing) and would continue to increase (decrease) even without project. Thus, if production without the project were to increase at 3% per year and with the project at 5% per year, the project's contribution would be an increase of 2% per year. A before/after comparison would contribute the entire 5% increase in production, and not just the incremental benefits, to the project. Of course if production were to remain stagnant, the before/after comparison would yield the same result as the with/without comparison.

In some cases, an investment to avoid a loss might also lead to an increase in production, so that the total benefit would arise partly from the loss avoided and partly from increased production. Again a simple before-after comparison would fail to account the benefits realized by avoiding the loss (Fig 1.2. depicts this situation).

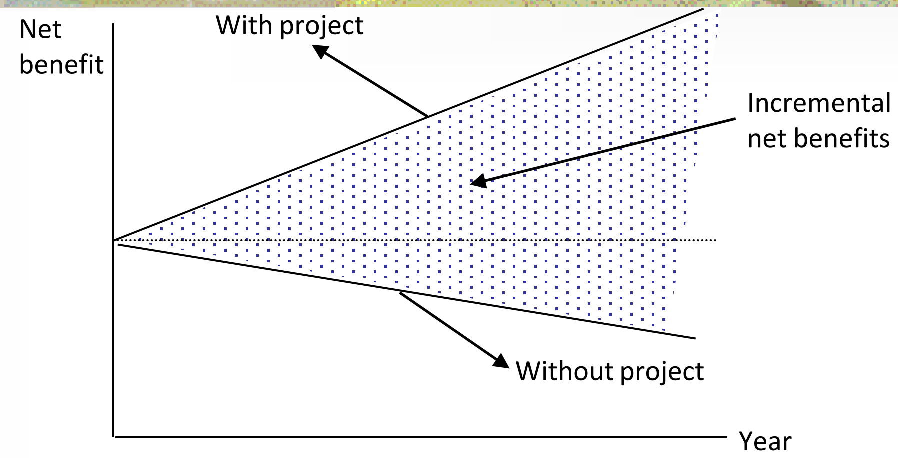


Fig. 1.2 With/without project comparison

Separable Components

- Sometimes a project consists of several interrelated subprojects or components.
- When the components are independent of each other, each component must be treated as if it was a separate project and the analyst must determine whether each component increases or decreases the project's net total present value.
- Any component that has a negative net present value should be dropped, even if the total net present value of all the components is positive. In other words, each separable component must justify itself as a marginal part of the overall project.
- Appraising such a project requires several steps. First, each separable component needs to be appraised independently. Second, each possible combination must be appraised. Finally, the entire project, comprising all of the separable components, must be appraised as a package.

Project Planning and Analysis (AgEc522)

Chapter Five: Project Appraisal and Analysis

Semester II, 2017/18 Academic Year (2010 E.C)

BY

Hassen Beshir (Dr.)

Desse, Ethiopia

OUTLINE

5.1. Situation Analysis

5.2. Technical Analysis

5.3. Institutional, Organizational and Managerial

5.4. Market Analysis

5.5. Financial Analysis

5.6. Economic Analysis

5.7. Social Analysis

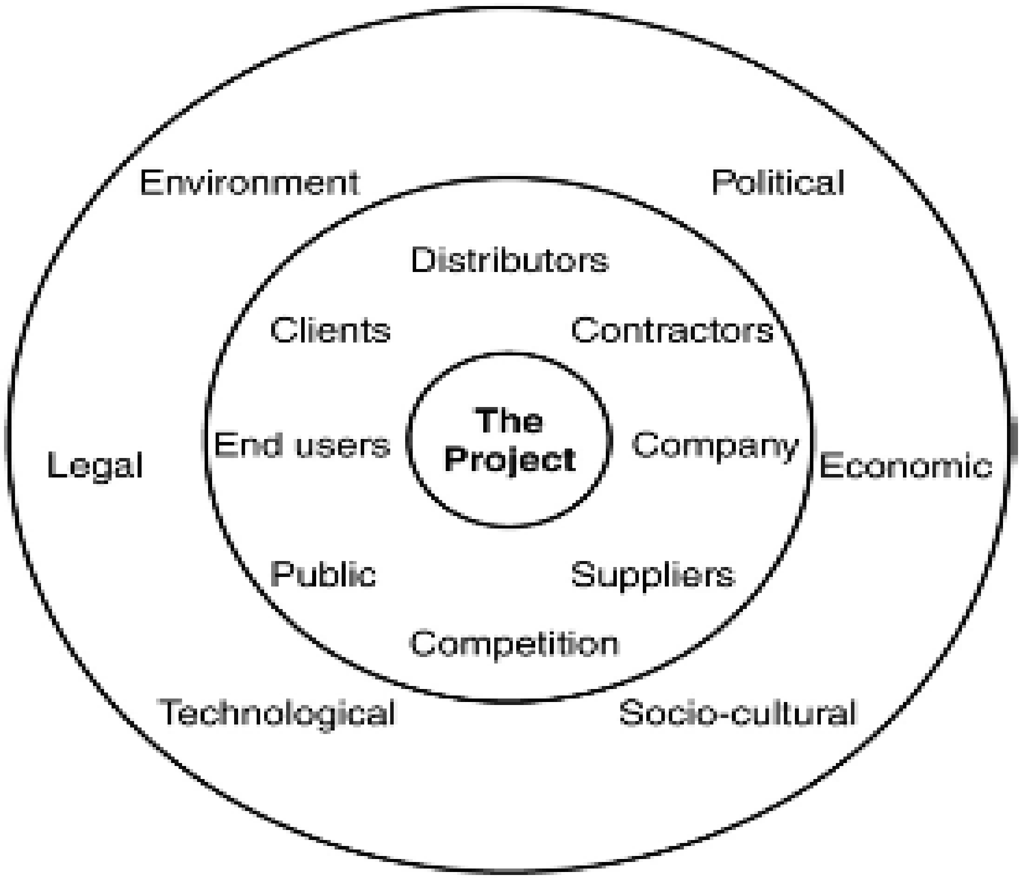
5.8. Environmental Analysis

5.9. Political Analysis

5.10. Risk Analysis

- Projects are influenced by a multitude of factors which can be external or internal to the organization responsible for its management and execution.
- The important thing for the project manager is to recognize what these factors are and how they impact on the project during the various phases from inception to final handover, or even disposal.
- These external or internal influences are known as the *project context or project environment.*
- The external factors making up this environment are the client or customer, various external consultants, contractors, suppliers, competitors, politicians, national and local government agencies, public utilities, pressure groups, the end users, and even the general public.
- Internal influences include the organization's management, the project team, internal departments, (technical and financial), and possibly the shareholders.

The project environment



Feasibility	Business Plan
The feasibility study provides an investigating function.	The business plan provides a planning function.
Answers the question: is the project viable?	Lays out the actions to be taken to bring the 'ideas' to 'reality'.
The feasibility study outlines and analyses several alternatives or methods of achieving project success. Therefore it assists to narrow the scope of the project to identify the best project scenario(s) to about two or three.	The business plan focuses on only one alternative or scenario.
The feasibility study is conducted before the business plan.	A business plan is prepared only* after the business venture has been deemed to be feasible.
It is a decision point; to continue or not based on the outcome.	The outcome does not provide information to continue or drop the project.
Feasibility provides information to choose the 'blue print' or 'roadmap'.	The business plan provides a 'blue print' or 'roadmap'.

- Some argue that:
- ‘We know it’s feasible. An existing business is already doing it.’
- Feasibility has been done a few years ago so there is no need to do another one.
- Feasibility studies are just a way for consultants to make money.
- The business is too small for a feasibility study.

- Some argue that:
- The market analysis has already been done by the business that is going to supply the equipment.
- By hiring a general manager, the study can be accomplished.
- Feasibility studies are a waste of time. Money is to be spent on building, tie up the site and bid on the equipment; why spend money on feasibility.

Reasons For Feasibility

- Once decisions have been made about proceeding with a proposed business, they are often very difficult to change. An entrepreneur may have to live with these decisions for a long time.
- Successful businesses thoroughly examine all of the issues and assess the probability of business success first before going into it.

Reasons For Feasibility

- Feasibility studies gives focus to the project and outline alternatives and narrow project alternatives
- Feasibility studies bring to the fore new opportunities through the investigative process.
- They identify reasons not to proceed.
- They enhance the probability of success by addressing and mitigating factors earlier on that could affect the project.

Reasons For Feasibility

- Feasibility studies provide quality information for decision-making.
- They help to increase likelihood of finding funds and investors for the project.
- And provide documentation that the business venture was thoroughly investigated.

Cont'd

Component parts of feasibility study

- Techniques and stages for feasibility study:
  - Situation Analysis
  - Organizational Analysis
  - Market and Demand Analysis
  - Technical Analysis
  - Financial Analysis
  - Economic Analysis
  - Environmental Impact Assessment Analysis
  - Social Analysis
  - Political Analysis
  - Risk Analysis

5.1. Situation Analysis

- This is a document that describes the problem or situation to be addressed by the LFA process.
- The information source is basically a status quo report from the strategic planning process.
- It could also be a status quo report from a feasibility study, a pre-appraisal report, or a compilation intended specifically for the LFA.
- The situation analysis is a task for an expert, often an external consultant.
- Projects situation /context analysis is done to gain full understanding of a broader situation with in which the project is going to be implemented.
- Hence, Changes/projects are part of a larger context/a situation
  - Which environment will the project be situated in?
  - Which factors are of importance for achieving the objectives?
  - Analysis of context made through a study and/or through making a "SWOT*" analysis
  - A tool for auditing /identifying e.g. an environment, agency, company etc:
- ***Internal/Within us***
- *External/Outside/Around us*
- Strengths /Weaknesses
- Opportunities/ Threats
- *Not LFA, SWOT is a separate method, which may be used for the analysis of the project's context

5.2. Institutional-Organizational-Managerial Aspects

- Project analysis must make a detail analysis of project organization and management.
- This analysis aims at answering the following questions:
- Is the organizational set-up of the project adequate?
- Will the project be provided with competent personnel to manage it?
- The first question is about the proposed organization chart of the implementing agency. The latter question aims at ensuring that adequate project staff can be recruited locally or overseas. The problem of project staffing raises many other questions:
  - Is local manpower market enough to provide the project with the required manpower?
  - Can competent staff be recruited freely?
  - Should they be recruited locally or overseas?
- But even if the right staff is available, their success will depend mostly on the institutional set-up i.e., the relationship between the various organizations involved with the implementing agency. Appraising organization therefore includes appraisal of the project related institutions like subsidiary companies, ministries, headquarters, banks, transport companies and others.
  - What are the regulations or procedures?
  - What are the policies – that favor and disfavor the project?
- Once the right institutions to facilitate project implementation are available, the project should be implemented by competent, responsible and committed managers. This requires arrangement of adequate incentives to attract competent managers. Managerial appointment should be a function of competence and commitment, not a function of race, tribe, creed or political opinion.

5.3. Market and Demand Analysis

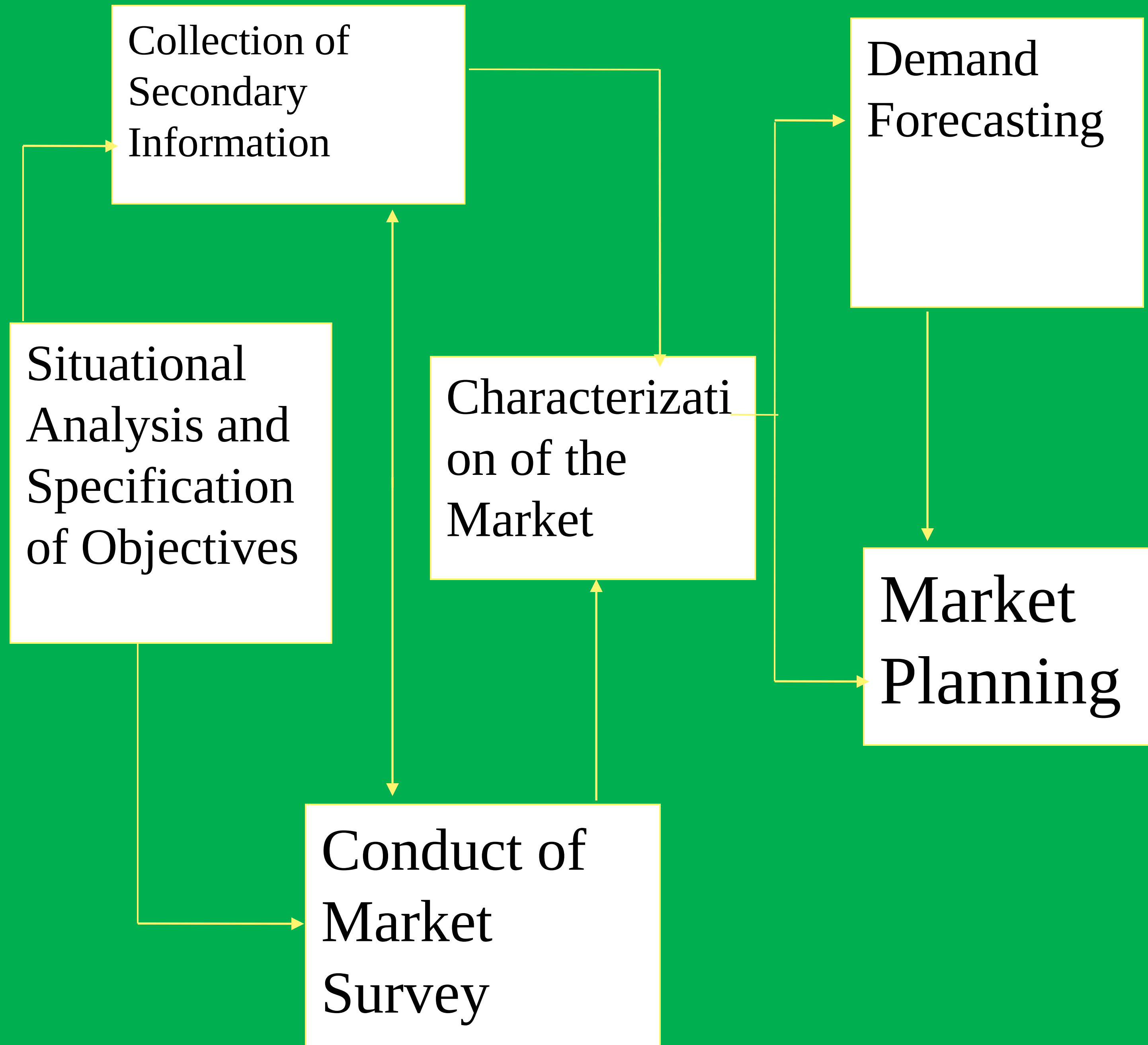
- A market is the arena for interaction among buyers and sellers.
- From seller's point of view, market analysis is primarily concerned with the aggregate demand of the proposed product/service in future and the market share expected to be captured.
- It is a study of knowing who all comprise your customers, for this you require information on:

Cont'd

- Consumption trends.
- Past and present supply position
- Production possibilities and constraints
- Imports and exports
- Competition
- Cost structure
- Elasticity of demand
- Consumer behavior, intentions, motivations, attitudes, preferences and requirements
- Distribution channels and marketing policies in use
- Administrative, technical and legal constraints impinging on the marketing of the product

Cont'd

- Given the importance of market and demand analysis, it should be carried out in an orderly and systematic manner.
- ***The key steps involved in the market and demand analysis are presented below.***


Collection of Secondary Information
Demand Forecasting
Situational Analysis and Specification of Objectives
Characterization of the Market
Market Planning
Conduct of Market Survey

Data collection for a community profile

Data:
* political/administrative structure
* demographic features and population characteristics
* economic activities
* social stratification and power relations
* organisations and their functions and activities
* leadership pattern and its influence
* cultural facets or traditions
* critical issues and problems

Sources of information are:
* documents or files in government offices/NGOs
* reports of surveys
* community members
* informal leaders in the community
* government officials or formal leaders
* NGO personnel
* politicians or local representatives of the area

Methods:
* document review
* questionnaires
* discussions
* interviews
* observations and informal conversations
* listening to people
* brainstorming sessions

Important points to remember:
* There is no single technique that is appropriate to get information from all sources.
* The best option is to use a variety of techniques.
* The most common techniques are questionnaires, interviews and observations.
* Group discussions are frequently used.

Market Analysis

- **Commercial (Market) /Demand and Supply/ Aspect**
- Needs to ensure the existence of effective demand at remunerative price. It also assesses possible means in which the market will absorb the output without affecting the output price and if price inevitably be affected, we would have to assess its magnitude. Similar arrangements need to be done on the input side too (including procurement of equipment and intermediate input supplies).
- Market analysis is basically concerned with two questions:
- What would be the aggregate demand of the proposed product/service in future?
- What would be the market share of the project under study?
- To answer the above two questions the project analyst requires a wide variety of information and need to use appropriate forecasting methods. .

Market Analysis

- The kinds of information required are:
  - Consumption trends in the past and the present consumption level
  - Past and present supply positions
  - Production possibilities and constraints
  - Imports and exports
  - Structure and competition
  - Cost structure
  - Elasticity of demand
  - Consumer behavior, intentions, attitudes, preferences, and requirements
  - Distribution channels and marketing policies in use
  - Administrative, technical, and legal constraints

Market Analysis

- All aspects related to demand and supply of inputs and outputs must be examined.
- **Forecasting**
- A typical project will involve one or two outputs or more of a whole series and definitely inputs. So, we need to project in physical quantity and prices. Calculating the stream of costs and benefits will involves predicting values for each of various elements, for instance:
- Volume of output sold or selling price by the project and also input prices,
- The amount of investment required, labor cost, maintenances cost..
- Out of these elements some require little trouble while others the use of elaborated statistical techniques.

Market Planning

- A marketing plan usually has the following components discussed under.
- ***<u>Current Market Situation</u>***: examines
  - ***Market situation -*** size, the growth, the customer aspirations and buying behavior
  - ***Competitive Situation -*** major competitors, objectives, strategies, strength
  - ***Distribution Situation-*** distribution capabilities
  - ***Macro-environment -*** external variables

Opportunity and Issue Analysis Cont'd

- A SWOT and core issue analysis are conducted for a company before the product are identified.
  - **Strength** - parent company has to launch successfully another product
  - **Weakness** - limited resources
  - **Opportunity** - growth witnessed in the medium-priced segment of a product market at the expense of low-priced same product.
  - Threat - growing acceptance of new product launches
- With the limited resources, launching a product in different areas and whether to use a new brand name or should it extend the existing brand name are the issues to be analyzed

Marketing Strategy

- Covers
  - Target segment,
  - Positioning,
  - Product line,
  - Price,
  - Distribution,
  - Sales force,
  - Sales promotion and advertising.

5.4. Technical Analysis

- The technical analysis is used to establish whether or not a project is technically feasible and provide tentative alternatives to achieve the project's objectives.
- It is an attempt to determine:
  - The technical requirements of the project;
  - Location; and
  - Optimum size of a plant

Technical Feasibility

- This aspect may include the works of engineers, soil scientists and agronomists in case of, say, agricultural projects.
- The technical analysis is concerned with the projects inputs (supplies) and outputs of real goods and services and the technology of production and processing.
- It is analysis of the technical and engineering aspects of a project to be done continuously when a project is formulated.
- Technical analysis seeks to determine whether the prerequisites for the successful commissioning of the project have been considered and reasonably good choices have been made with respect to location, size, process, etc.
- It is from this aspect analysis that all physical quantity of inputs and outputs will be determined for the estimation of costs and benefits.
- Poor technical analysis will result in under- or over- estimation of quantities related to inputs required by and outputs of the project. Further analysis based on these estimates would eventually lead to spurious cost and benefit estimates. Care must also be taken in assessing alternative designs and techniques.

- The project's expected life time must also be determined carefully for it has greater implication on its overall analysis and preparation.
- All these require creative, committed and competent specialists from different fields. It also requires coordination among these specialists, as every technical aspect is interrelated and interacting.
- In general the technical analysis is primarily concerned with
  - Work schedule
  - Location and site
  - Project charts and layouts
  - Structure and civil works
  - Machines and equipment
  - Plant capacity
  - Manufacturing process and technology
  - Material inputs and utilities
  - Product mix

- Is the proposed technology or solution practical?
  - Do we currently possess the necessary technology?
  - Do we possess the necessary technical expertise, and is the schedul reasonable?
  - Is relevant technology mature enough to be easily applied to ou problem?
- What kinds of technology will we need?
  - Some organizations like to use state-of-the-art technology
    - …but most prefer to use mature and proven technology.
  - A mature technology has a larger customer base for obtaining advic concerning problems and improvements.
- Is the required technology available in the information systems shop (i house)?
  - If the technology is available:
    - …does it have the capacity to handle the solution?
  - If the technology is not available:
    - …can it be acquired?

Technical Feasibility

- Project appraisal is an exercise dealing with working out the value, quality and condition of the project

Main Features of Technical Feasibility:-

- Time:- different processes take different time to complete
- Relationship:- the inputs being processed bear a definite relation to each other and with also the resulting outputs, factor-factor and factor-output relationships, respectively
- Economies and diseconomies of scale:- former:- when output increases with an increased scale of a proces, saving of inputs occurs. The latter refers to a situation where scale is increased beyond a point. E.g Irrigation wells.

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Technical Feasibility…

- Choice of processes:-input usage: a) same inputs or b) different inputs
- Technical efficiency:- producing „X“ outputs using less of inputs

Inputs	Project Variants				Input Prices	
	A1	A2	A3	A4	(A)	(B)
1	5	4	4	3	2	2
2	2	3	2	1	4	-
3	3	2	2	1	3	3
4	0	0	0	2	6	6
Output	X	X	X	X		

Which project to choose? Why?

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Exploring Operational Feasibility

- The "PIECES" framework
  - Useful for identifying operational problems to be solved, and their urgency
    - Performance: - Does current system provide adequate response time?
    - Information: -Does current system provide end users and managers with timely, pertinent, accurate and usefully formatted information?
    - Economy:- Does current system provide cost-effective information services to the business? Could there be a reduction in costs and/or an increase in benefits?
    - Control: - Does current system offer effective controls to protect against fraud and to guarantee accuracy and security of data and information?
    - Efficiency: - Does current system make maximum use of available resources, including people, time, flow of forms,...?
    - Services: - Does current system provide reliable service? Is it flexible and expandable?

5.5. Financial Feasibility

- Financial analysis seeks to ascertain whether the proposed project will be financially viable in the sense of being able to meet the burden of servicing debt and whether the proposed project will satisfy the return expectations of those who provide the equity capital.
- Here, the project analyst is concerned with the financial effects of the proposed project on each of its various participants (firms, farmers/workers, government etc.).
- By examining the financial implications of the project for these parties, the analysts need to identify the projects financial efficiency, incentive impact to the participants in the project, creditworthiness and liquidity (say, could the firm have enough working capital?).
- The financial analysis establishes the magnitude of costs of investment, production and overheads and magnitude of benefits. This analysis will be the basis for evaluating the project profitability. Project profitability depends on a comparison of costs versus revenues using realistic market prices of materials, labor and outputs.

Financial Feasibility

- The aspects, which have to be looked into while conducting financial appraisal, are:
  - Investment outlay and costs of the project
  - Means of financing; source of finance, credit terms, interest rates, etc
  - Projected profitability
  - Projected financial position
  - Cash flows of the project
  - Break-even point
  - Investment worthiness judged in terms of various criteria of merit
  - Level of financial risk
- Financial analysis must generate future financial statements such as income statement, balance sheet and uses-and-source-of-fund statement. After these statements are produced, analysts can undertake different financial ratio analysis so as to ascertain financial feasibility. The financial analysis must clearly show fund flows in each period in the project life.

Financial Feasibility

- **Objectives of Financial Analysis**

1. 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.

2. 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.

3. Assessment of Incentives

- The financial analysis is of critical importance in assessing the incentives for different participants of the project.

Financial Feasibility

- 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 semi-public 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?

4. 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 what changes in organization and management may be necessary.

Financial Feasibility

- For project management purposes, there are three fundamental financial statements that can be used to determine the financial status of a project

1. The trading and profit and loss account: - indicates the relative efficiency of the project operations represented in terms of income over expenditure in a given period of time
2. The cash flow: - indicates the physical flow of money through the project over a given period of time, i.e, month-by-month, yearly basis. It indicates the liquidity of the project (its ability to meet cash requirements)
3. The balance sheet: - indicates the net worth and nature of the project in financial terms at a specified point of time. Indicators are: value of assets. The balance sheet indicates how these assets are funded (like from shares, loans, retained profits from previous periods of operation)

- An analysis of the profitability of a project is undertaken from the determination of the profit and loss account. It has three main purposes:
    - To derive indicators of relative efficiency
    - To determine the net profit to be incorporated in the balance sheet
    - To determine the tax liability of the project

Financial Analysis

- You need to lay out the capital you require to start the business.
- The objective of financial analysis is to determine the financial viability of the project.
  - Startup costs
  - Means of financing
  - Projected profitability
  - Cash flow of the project
  - Investment worthiness- using criteria
  - Projected financial position

Cont'd

- Financial analysis and final project appraisal involves
  - the assessment ,analysis and evaluation of the required project input,
  - the output to be produced and
  - the future net benefit ,expressed in financial terms.

Cost of project

- ***Cost of project*** is costs incurred for which the goods (service) are believed to serve the project for a long period of time.
- Cost of project represents the total of all items of outlays associated with a project which are supported by long term funds.
- It's the sum of the outlays on the following.

Financial....

- ***Land and site development***
  - Basic cost of land including conveyance and other allied charges
  - Premium payable on leasehold and conveyance charges
  - Cost of leveling and development
  - Cost of laying approach roads and internal roads
  - Cost of gates
  - Cost of tube wells

Financial....

- ***Building and civil work***
  - Building for the main plant and equipment
  - Building for auxiliary services like steam supply, workshops, laboratory, water supply, etc
  - Go downs, warehouses, and open yard facilities
  - Non-factory buildings like canteen, guest houses, time office, excise house ,etc
  - Quarters for essential staff
  - Garages
  - Sewers and drainage, etc
  - Other civil engineering works.

Financial....

- *Plant and Machinery*
- Cost of imported machinery which is the sum of FOB (free on board) value, shipping, freight, and insurance cost, import duty, and cleaning, loading, unloading, and transportation charges
- Cost of indigenous machinery: this consist of FOR (free on rail) cost, Sales tax, and other taxes, if any, and railway freight and transport charges to the site.
- Cost of store and spares
- Foundation and installation charges

Financial....

- *Technical know-how and engineering fees*
- Technical consultation or collaboration from local and abroad for advice and help in various technical matters like preparation of the project report, choice of technology, selection of the plant and machinery, detailed engineering, and so on.

Financial....

- ***Expense on Foreign Technicians and Training of Citizens***
  - For setting up the project and supervising the trail runs, expenses on their travel, boarding, and lodging along with their salaries and allowance must be shown here.

Financial....

- ***Miscellaneous Fixed Assets***
  - Fixed assets and machinery which are not part of the direct manufacturing process
  - include items like furniture, office machinery and equipment, tools, vehicles, railway siding, diesel generating sets, transformer, boilers, piping system, laboratory equipment, work shop equipment, and so on.
  - Expenses incurred for the procurement or use of patent, licenses, trade marks, copyright, etc

Financial....

- *Preliminary and capital issue expenses*
  - Expenses incurred for identifying the project, conducting the market survey, preparing the feasibility report, drafting the memorandum and articles of association and incorporating the company.

Financial....

- *Pre-operative expenses*
  - Till the commencement of production, pre-operative expenses are incurred like:
    - Establishment expenses,
    - Rent and taxes,
    - Traveling expenses
    - Insurance charges,
    - Mortgage expenses,
    - Interest and commencement charges on borrowings,
    - Start-up expenses.

Financial….

- ***Provision for contingencies***
  - To provide for certain unforeseen expenses, provision for contingencies at 5 to 10 percent of the estimated cost is made.
- ***Margin Money for Working Capital***
  - Certain part of the working capital requirement has to come from long-term sources of finance.

Financial....

- ***<u>Initial Cash Losses</u>***
  - Promoters do not disclose the initial cash losses incurred in the initial years.
  - But, failure to make a provision for such cash losses in the project cost generally affects the liquidity position and impairs the operations.

Financial....

Means of Finance

- To meet the cost of the project the following means of finance are available:
- **Share Capital:** equity capital and preference capital.
  - *Equity capital* represents the contribution made by the owners of business, the equity shareholders
  - *Preference capital* represents the contribution made by preference shareholders and the dividend paid on it is generally fixed.
- **Term loan**: represents secured borrowing which a very important source for financing new projects as well as the expansion, modernization, and renovation schemes of existing firms.

Financial....

- **Debenture capital:** instruments for raising debt capital.
  - Convertible debentures which are convertible, wholly or partly, into equity share.
  - Non convertible debentures are straight debt instrument. Typically, they carry a fixed rate of interest and have a maturity period of 5 to 9 years.
- **Deferred credit**: payment for the purchase of the plant and machinery can be made over a period of time.
- **Incentive source:** the government and its agencies may provide financial support
- **Miscellaneous sources:** a small portion of the project finance may come from miscellaneous sources like unsecured loans, leasing and hire purchase finance.

Financial....

Estimates of Sales and Cost of Production

- ***<u>Sales</u>***
  - The starting point for profitability projections is the forecast of sales revenue.
  - In estimating sales revenue the following consideration should be born in mind.
    - It is not advisable to assume a high capacity utilization level in the first year of operation.

Financial....

- It is not necessary to make adjustments for stock of finished goods.
- The selling price considered should be the realizable price
- The selling price used may be the present selling price- it is generally assumed that changes in selling price will be matched by proportionate changes in cost of production. If a portion of production is saleable at a controlled price, take the controlled price for that portion.

- ***Cost of production***
  - Material cost: cost of raw materials, chemicals, components, and consumable stores
  - Utility cost: power, water and fuel determined
  - Labor cost: cost of all the manpower employed in the factory.
  - Factory overhead cost: expenses on repairs & maintenance, rent, taxes, insurance

Financial....

- **Profitability, Cash Flows and Balance Sheet Projections**

Income Statement

	Items to be included
A. Cost of production	*Material, labor, utility & factory overhead*
B. Total administrative expense	*Administrative salaries, remuneration to directors, professional fees, light, postage, telegrams & telephones and office supplies, insurance and taxes on office property, etc.*
C. Total sales expense	*Commission, packing & forwarding charges, salary of sales staff, sales promotion & advertising expenses & miscellaneous expenses*

D. Total costs and expenses (A+B+C)	
E. Expected sales	*Sales revenue*
F. Gross profit before interest (E- D)	
G. Total financial expense	*Interest on term loans & bank borrowings*
H. Depreciation	
I. Operating profit (F-G-H)	
J. Other income	*Disposal of scrap, income arise from sale of machinery, etc*

K. Profit or loss before taxation (J+K)	
L. Provision of taxation	
M. Profit after tax (K-L)	
Less: dividend on equity capital	
N. Additions to retained profit	

Projected Cash Flow Statement

Operating CF (A): NI (Excluding interest) + Depreciation - Change in Net working capital Net operating CF	
CF from Long term investment (B) - Additions to Fixed Assets	
CF from financing assets (C)	
Notes payable Bond	
Total cash flows A+B+C	

Projected Balance Sheet

Accounts		change	closing balance
Asset			
Current assets=180			215
Cash	20		30
Receivable	80	+15	95
Inventories	80	+10	90
Fixed asset	180	+30 -20(depreciation)	190
Investments	-		-
405			

Liabilities and Capital

Share capital	100		100
Reserves and surplus	20	+20	40
Secured loans	80	+20	95
Unsecured loan9s	50	+10	60
Current liabilities	90		90
Provisions	20		20
			405

Financial sustainability

	Years							
	1	2	3	4	5-9	10	11-29	30
Sources of financing	8,465	75,176	42,890					
Total revenues				11,598	...	12,011	...	12,222
Total inflows	**8,465**	**75,176**	**42,890**	**11,598**	...	**12,011**	...	**12,222**
Initial investment	8,465	75,176	42,890					
Replacement costs						11,890	9,760	
Loan repayment (including interest)					1,789	1,789	1,789	
Total operating costs				5,561	...	5,662	...	5,713
Taxes				604	...	-733	...	651
Total outflows	**8,465**	**75,176**	**42,890**	**5,561**	...	19,341		**5,713**
Net cash flow	**0**	**0**	**0**	**6,037**	...	**-7,329**	...	**6,509**
Cumulated net cash flow	**0**	**0**	**0**	**6,037**	...	**20,726**	...	**133,835**

The cumulated cash flow should be zero (or positive) during the construction phase

Financial sustainability is verified if the cumulated net cash flow row is greater than zero for all the years considered

5.6. Economic Analysis

- The term economic analysis and financial viability are not different for companies.
- However, from the national angle and from the view-point of the economy as a whole, economic feasibility are not considered to be the same.
- Tax revenue, generation of employment, savings of foreign exchange and other factors

Economic Analysis

- The economic aspect of project preparation is primarily concerned with the determination of the likelihood of the proposed project, and hence the committing of scares resources, by justifying the significance of the project from **the whole economy** point of view (the society as a whole).
- In such evaluation the focus is on the social costs and benefits of a project, which may often be different from its monetary or financial costs, and benefits.
- The financial analysis views the project from the participants (or owners) point of view, while the economic analysis form the society's point of view.
- Decision makers here are concerned about the investment of scarce capital and other resources that will best further national objectives. This is true whether the resources committed are being invested by government directly or by individuals within the economy.

Economic Analysis

- While financial analysis uses projected market prices to value inputs and outputs, economic analysis uses ‘economic prices’ or ‘shadow prices’ or ‘efficiency prices’ to better approximate the opportunity costs of an input – the amount the economy must give up if the resource is transferred from its present use to the project.
- Similarly, to value project’s output, economic analysis uses the marginal value of a given output to approximate the real value – the value that consumers place on that commodity.
- Thus economic analysis require adjustment of market prices, which may not reflect the real value of resources and outputs, into economic prices.
- It also require determination of economic prices of those goods that might not have market prices but that involve commitment of real resources.

Economic Analysis

- **Purpose of Economic Analysis**
- Economic analysis is an assessment of a project's costs and benefits from the national point of view and is therefore concerned with the impact of a proposed project on the national economy.
- It can be distinguished from financial analysis in that attention is not confined to the costs and benefits affecting a single group, the focus of economic analysis is on the net return to society.
- In economic analysis the most important question is whether or not the project under study is beneficial to the national economy.
- Economic analysis is, therefore, conducted to identify costs and benefits where there is a significant divergence between market prices and economic costs or values, and its application is important in the selection of economically viable projects for Public Investment Program (PIPs) or Public Expenditure Program (PEP).

Economic Analysis

- Economic analysis can also be useful in the case of private-sector projects since it will assist government agencies to make decisions if they have to give loan guarantees or extend other forms of assistance or if a private sector project has significant implications for wider public interests.
- The aims of economic analysis in the context of project preparation are:
  - To ensure that public investment funds are used only for economically viable projects.
  - To ensure that a convincing economic case can be made for PIP or PEP projects to benefit from external funding.
- Economic analysis is less likely to be needed when:
  - The project is small (unless it is a pilot project likely to be replicated),
  - The project is financially viable and although to producing primary for the local market, is receiving no significant protection and involves no significant negative externalities and no significant use of under valued local resources,
  - The project is financially viable and producing mainly for export with no significant negative externalities and no significant use of under valued local resources, and
  - The project is in a sector where valuation of the benefits is not practical and where there are no issues of cost effectiveness in determining the project design.

Economic Analysis

- **Stages of economic Analysis**
- The starting point for economic analysis is a statement on a year by year basis of costs and benefits at constant market prices. The second stage involves the identification of linkages and externalities.
- The third stage involves the adjustment of prices of goods and services taking into account their relative scarcity or estimation of economic or ‘shadow’ prices.
- Economic analysis of projects involves comparing economic costs with economic benefits to determine which among alternative project proposals have• acceptable returns.
- The costs and benefits of a proposed project must, therefore, be identified. Furthermore, once costs and benefits are known, they must be priced, and their economic values determined.
- In economic analysis, anything that reduces national income (or a wider definition of public welfare) is a cost and anything that increases national income/welfare is a benefit.

Economic Analysis

- Once financial prices for costs and benefits have been determined and entered in the project accounts, the formulators must estimate the economic value of a proposed project to the nation as a whole.
- Financial prices are, therefore, the starting point for economic analysis; they are adjusted as needed to reflect the value to the society as a whole of both project inputs and outputs.
- The principle of opportunity cost underlies all estimation of values in economic efficiency analysis. This principle states that the economic value of a resource is determined by its next best alternative use.
- The idea that the value of a project is determined by the difference between the assumed situations 'with' and 'without' project is an application of the opportunity cost principle. An example of the use of the opportunity cost principle in economic analysis is provided by the case of opportunity
- The opportunity cost of land can be investigated by asking what the alternative use of the land might be. Urban land can be used for houses, offices, shops, factories, and the like. cost of land.

Reasons for undertaking economic analysis of projects

- Basically the reasons for undertaking economic analysis of projects are market failure, government intervention, externalities and linkage effects.
- ***Meaning, sources and implications of market failure***
- In a perfectly competitive market, the opportunity cost of an item would be its price, and this price would also be equal to the *marginal value product* of the item.
- If a non-traded item is bought and sold in a relatively competitive market, the market price is the measure of the ***willingness to pay*** and is generally the best estimate of an ***opportunity cost.***
- In a perfectly competitive market, the opportunity cost of an item would be its price which in turn will equal the marginal value product of the item. Most agricultural projects are expected to meet a growing demand for food or fibre and are small relative to the total agricultural production of the nation.

- If that is the case, in general we can accept the market price directly as our estimate of the economic value of a non-traded item.
- Also, if we are valuing a domestically produced project input that is produced by a supply industry operating near full capacity, we can generally accept the market price of the input as its economic value.
- In a neo-classical world, domestic price is presumed to reflect marginal utility of consumption on the one hand, and marginal production cost on the other.
- The legitimacy of such an assumption is conditional upon certain well-known conditions being satisfied; *i.e.* homogeneous goods (in quality), perfect knowledge of all economic agents, large number of competitors, absence of externalities, acceptance of the ruling pattern of income distribution, ability of consumers to be the best judges of their welfare and so on.
- That some, or all, of these conditions may not hold is widely recognized, particularly in the case of LDCs where income disparities are likely to be very wide, markets poorly articulated, and choice information at a premium. Nevertheless, it has usually been convenient to justify valuation decisions 'as if' such conditions did hold.

- Economic analysis will state the cost and benefit to the society of the proposed project investment either in opportunity cost or in values determined by the willingness to pay. The costs or values will be determined in part by both the resource constraints and the policy constraints faced by the project. Basically, one major argument in favor of economic pricing (against financial analysis of projects) is that of *market failure*. What do we mean by market failure and why does the market fail? Divergence between market and economic price is simply what we mean by market failure. It occurs whenever the market fails to function effectively or when the government intervenes. The market fails when it can't value appropriately project costs and benefits!
- Market failure manifests itself in different forms:
- **a. *Failures of competition*:** the existence of various types of monopoly power in the economy, for example the existence of localized trading monopolies on the supply of consumer goods to rural areas or in the purchase of crops from farmers brings absence of competition.
- **b. *Failures of provision / incomplete markets / missing markets*:** the existence of a class of goods and services that private operators are not prepared to supply because once they are made available it is impossible to exclude individuals from making free use of them (public goods) such as street lighting, police force, road in LDCs, national defense, and so on.
- Where markets fail to produce commodities or services for which there is a private demand at prices above production costs, due to transaction cost and moral hazard, and adverse selection problems is another source of market failure. The credit market and the insurance business with high risks of default and high cost of enforcing the agreement in the transaction are possible cases in point.
- **c. *Open access resources*:** resources of communal access (e.g. forestry for firewood, wild life, fishery, where the private cost of using more of resource is lower than the social cost incurred by the community as a whole, resulting in over - exploitation (*over-fishing*, *over-grazing*, and *over-hunting* and possible permanent damage to the resource) which is the result of absence of well defined property rights is another source of market failure.
- ***d. Failures of information*:** a tendency to under-produce (due to private interest) the type of information to which everyone should have access if markets are to work well (e.g. information on prices and technologies) is another source of market failure problem.
- ***e. Macro-economic problems*:** problems that can only be handled by a central authority, for example, money supply inflation, exchange rate, taxation, balance of payment problems and soon are problems which are never the concerns of private investors from whose point of view financial (traditional) CBA is normally done
- **f. *Poverty and inequality*:** the market outcome may result in a degree of inequality or an incidence of poverty that is regarded as socially unacceptable by the majority of people in society.
- **g. *Environmental problems, futures generation and sustainability*:** these are very difficult, controversial and debatable issues of recent origin in the economics literature. They are hardly dealt by the interplay of demand and supply.
- *Therefore, the market fails due mainly to the absence of coincidence of national and private objectives.*

Externalities and linkage effects

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

- Costs that are not incurred by the private operator but represent dis-benefits to other members of the community, such as the impact on down stream river users of pollution by a private industrial plant **(*negative externality*)**, or benefits that do not accrue to the private operator but represent gains to society, such as the beneficial impact of higher education on the level of skills in the country and workers on the job training **(*positive externality*)** are some of the practical externality problems. Smoke coming from a cigarette smoker in your dormitory is a ***negative consumption externality*.** Waste disposal by a factory to fisherman's river is ***negative production externality*.** The mutual beneficial relationship between the bee keeper and horticulture farmer is a ***positive production externality*** to both economic agents. A garden freely made available to some one by his / her neighbor is ***positive consumption externality*.**
- In addition to the above mentioned ones, externalities may take different forms:
  - Price effects, one form of externality whereby higher price may be the result of undertaking the project for inputs that it requires and lower price for outputs that it produces.
  - For projects that produce an export product or that use an import input, there may be a price externality with an international dimension - effect of the project on world price.
  - Increased competition as a result of the project may be another externality effect
- Unfortunately, externalities are mostly difficult to identify and nearly always difficult to measure. However, whether or not externalities can be quantified, they should at least be discussed some where in the project document in qualitative terms. The general principle in considering externalities in economic analysis is that the effects should be measured and, where possible, valued so that they can be included in the costs and benefits of the project. This is what is sometimes called ***'internalising the externalities'*.** Externalities may be considered as a special class of non-traded goods that may be either positive or negative.

Linkage effects

- Linkage effects occur when the activities of one project cause an increase (or a decrease) in economic activity elsewhere in the economy. To some extent this happens with all projects. Forward linkage effects may occur is industries that use or process a project's output, and backward linkages in industries that supply its inputs. Such industries may be encouraged or stimulated by increased demand and higher prices for their output or lower prices for their inputs.
- For economic analysis, what is important is whether the linkage effect is a necessary consequence of the project. For instance, production and processing of the perishable primary products is the case in point. In Ethiopia, this applies particularly to the sugar and tea industries. Sugarcane has little or no economic value outside the immediate production system in which it is produced unless it is processed in a sugar mill. One can find ***forward (input supplying)* and *backward (output purchasing)*** linkage effects. A project which affects sugarcane production, therefore, necessarily has some consequences for the sugar industry (**a *forward linkage***).
- The economic analysis of a sugarcane production project would, therefore, have to extend the boundaries of the project to include the impact of the project on the sugar industry. The linkage from the sugarcane farm to the sugar mill could be looked at in another way (backward linkage effect) if a new sugar mill were to be established in an area that was previously too inaccessible for sugarcane production to take place. The new sugar mill would not make any sense without a supply of sugarcane and so it would be necessary to include the backward linkage to the sugarcane farmers in the economic analysis of the project.
- The sugarcane example above can be contrasted with the situation in the meat sector. The livestock sector has an export market in the form of live animals. A livestock production project might cause more animals to be sold to meat processing industries but it is not a necessary consequence of the production of the livestock. The decision whether or not to slaughter the animals locally can be regarded as a separate economic decision that depends on whether the meat industry can pay at least as much as the exporters for animals. Since the linkage effect is not a necessary one it would not be included in the economic analysis of the livestock project. Similarly, the decision to establish a meat processing project can be separated from the decision to produce more livestock. If Ethiopia is regarded as a net exporter of livestock, establishment of additional meat processing capacity might have the effect of reducing net livestock exports rather than increasing livestock production. In practice, it is usually only backward linkages that

Government intervention

- As there is market failure, there is also government failure which needs to be taken care of. Government intervention takes different forms - protective trade policies (import taxes, subsidies, quotas, and import licensing); unrealistic rates of fixed exchange rates - overvalued currencies; government controls of interest rates - subsidised interest rate; controls on prices, production, and sales; private monopolist controls of production prices; government or trade union pressure (wage rates exceeding real cost of labor - minimum wage legislation); and so on.
- Therefore, adjustments for all these failures (market failure, government intervention and externality) should be made to market prices. We do these using financial prices as a starting point and then adjust them accordingly depending on the value to the national economy of the item under consideration. The term *'market prices'* is used to refer to prices actually paid for inputs or received for outputs, in contrast to economic values estimated for particular cost or benefit items which are described as *'shadow prices'*. They are also sometimes known as ***'accounting prices' or 'economic prices' or 'efficiency prices' or 'opportunity costs'*** **or** ***'border prices'*** **and/or *real prices.*** They are in most cases estimated; not observed. That is why the term shadow is used. Irvin (1978), arguing that they are observable in the form of '*c.i.f.*' or '*f.o.b.*', prefers to use ***accounting prices*** than ***shadow prices*. As** ***economic value*** is to a project benefit, ***economic cost*** is to a project cost. Economic costs may be larger or smaller than financial costs. By the same token, economic benefits may be less than or greater than financial benefits.
- The process of estimating shadow prices for items that are important in the national economy is often described as the ***'estimation of national economic parameters'*.** The process of moving from financial prices to economic prices is called ***shadow pricing*, or *efficiency pricing* and/or *economic valuation*!** The shadow pricing process can be seen as a way of making allowance to the above distortions (market failure, government intervention, externality, and linkage effects) caused by the production or purchase of goods and services of a project.
- Were markets ideal (no market failure) with no government intervention and externality and no linkage effect, adjustments would not be needed. Market prices would represent the real value of goods and services to society and would equal their shadow prices. In order for the use of shadow prices to be useful it will be necessary for project proposals to provide a fairly detailed breakdown of costs into different categories. Without this it would be necessary to make excessive use of aggregate categories which may not always be representative of the costs involved.

Purpose of Economic Analysis

- **Selection of alternatives**

- 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.
  - **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. Moreover, 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 deigned.
  - **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.

Economic.....

- The government and government agencies calculate the economic indicators of a project before permitting the project or financing it.
- There are two levels of influence:
    - Internal Or Micro-economic: The internal economics relate to the viability of the project and the soundness of the business case.
    - Financial models and proven accountancy techniques are applied during the evaluation phase to ensure the economic viability of the project.

Economic.....

- A typical example is the case of an oil-fired power station which had to be mothballed over halfway through construction, when the price of fuel oil rose above the level at which power generation was no longer economic.
- It is not uncommon for projects to be shelved when the cost of financing the work has to be increased and the resulting interest payments exceed the foreseeable revenues.

Economic.....

- The external economics, often related to the political climate, can have a serious influence on the project.
- Higher interest rates or exchange rates, and additional taxes on labour, materials or the end product, can seriously affect the viability of the project.
- Thus, factors which can affect a project are tariff barriers, interest rate, taxes, temporary embargoes, shipping restrictions.

Difference and Similarity Between Economic and Financial Analysis

Basis	**Financial Analysis**	**Economic Analysis**
Taxes	Treated as costs to the project	Part of project benefit, treated as transfer payments and not to be considered as cost.
Subsidies	Treated as returns to the project	Cost to society because it is expenditure of resources by government thus from society
Prices	Market prices	Prices adjusted to reflect economic or social values; the prices are ‘shadow’ or accounting prices. Subsides and taxes are used in the adjustment.

Basis	Financial Analysis	Economic Analysis
Interest on capital	Treated thus: interest paid to capital suppliers external to the economy is subtracted from benefits. The result is what is available to owners of capital. Interest imputed to the entity from whose dimension analysis is being done is part of total return not cost	Used as quoted. It is total return to society
Viewpoint	Prepared from the viewpoint of an individual; person, company etc.	From the viewpoint of the economy or society as a whole.

Shadow pricing

- When market prices do not reflect the opportunity cost of inputs and outputs, the usual approach is to convert them into shadow prices to be applied to the items of the financial analysis

An illustrative computation of the Standard Conversion Factor (SCF) for a hypothetical country is hereby presented. As shown in Annex III, the simplified formula for the estimation of the SCF is:

$$SCF = (M+X)/ (M+X+TM)$$

where: M is the total value of import at shadow prices, i.e. CIF prices; X is the total value of export at shadow prices, i.e. FOB prices; TM is the total value of duties on import.

It is assumed that the total value of export at FOB prices and of import at CIF prices, in a given year, including both intra-EU and extra-EU trade of all products and services, are respectively EUR 25,000 million and EUR 20,000 million. In the same year, the national general government and the EU collect EUR 500 million as taxes and duties on imports, excluding VAT. Export taxes, duties and other monetary compensatory amounts on exports are nil, as well as import and export subsidies.

International trade detailed data and main national accounts tax aggregates are provided both by Eurostat and national statistics institutes. Hence, in this example:

M= EUR 25,000 million

X= EUR 20,000 million

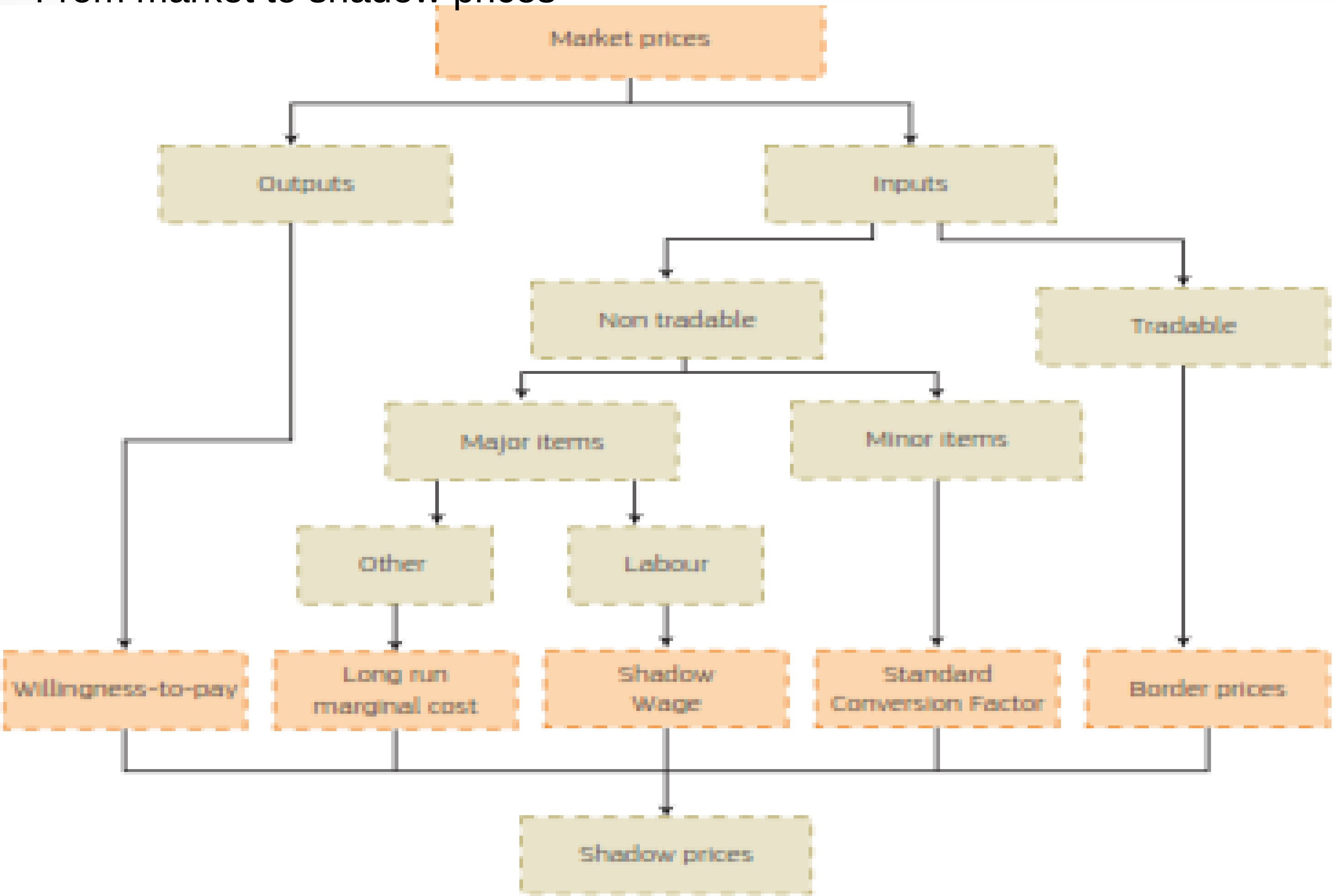
TM= EUR 500 million.

The SCF formula leads to the following result:

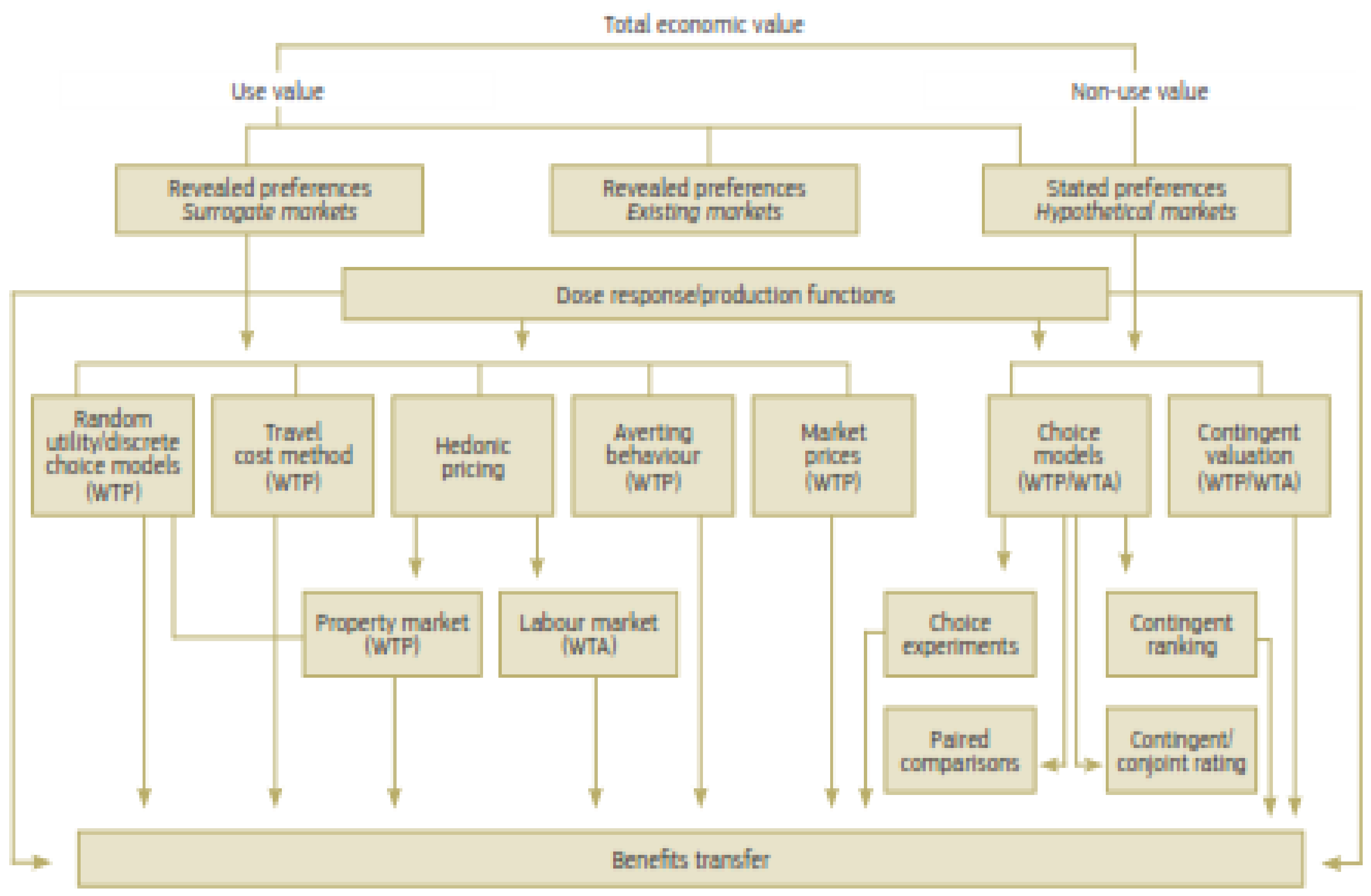
$$SCF = \frac{25{,}000+20{,}000}{25{,}000+20{,}000+500} = 0.989$$

The variables in the SCF formula generally do not undergo significant variations on a yearly basis. For this reason the SCF could be either computed for a single year, or as an average of a number of years.

From market to shadow prices



Main evaluation methods



Example Undertaking the analysis

Cost and Benefit items	**financial prices**	**Adjustment**	**Economic values**
Imports	300,000 x	140%	420,000
Tariffs	100,000 x	0%	0
Unskilled labour	200,000 x	50%	100,000
Skilled labour	200,000 x	120%	240,000
Local materials	200,000 x	100%	200,000
Total Investment cost	1,000,000		960,000
Annual sales			
Exports	500,000 x	140%	700,000
Annual operating cost			
Unskilled labour	120,000 x	50%	60,000
Skilled labour	45,000 x	120%	54,000
Local materials	90,000 x	100%	90,000
Taxes	45,000 x	0%	0
Total operating costs	300,000		204,000

Economic NPW = $-960{,}000 + (700{,}000 - 204{,}000) \times ((1+0.10)^{10} - 1)/ (0.10\,(1+0.10)^{10})$

= +2,088,000.

All figures are in Birr

5.7. Social (or Sociological) Analysis

- Many projects and indeed most construction projects inevitably affect the community in whose area they are carried out.
- The intent, purpose and benefits to the organization and community of the project should be known.
- This may require meetings, exploratory discussions, consultations at various levels and possible trade-offs.

Social Analysis

- The process of development is inherently social, dealing as it does with the improvement of social conditions and working through social structures to achieve these objectives.
- It is, therefore, crucial to integrate comprehensive social assessment into the project formulation process.
- The precise role of social assessment can be defined as ensuring that people, their capacities, values and needs are put at the centre of the development process.
- Project planners must make careful consideration of social factors when formulating projects.
- Experience has shown that ignorance of these factors can lead to project failure.
- Project formulators who have designed projects by applying expert knowledge without stakeholder consultation have often failed to achieve positive results.

Social Analysis

- If social assessment is primarily concerned with ensuring that projects, and consequently the development process, are ‘people- centered’ then the following points must be taken into account in any project formulation exercises. These are:
  - Identifying of stakeholders and target groups.
  - Participation issues.
  - Social impact assessment (SIA)
- Assessing of mitigation measures, strategies and costs of SIA.
- Once the various stakeholders have been identified it is then necessary to consider their interests. These interests should be entered in the second column of the stakeholder table. When identifying stakeholder interests it is important to keep the following points in mind:
- Relate the stakeholders’ concerns to the project objectives.
- Identify direct or indirect benefits which they are likely to receive from the project.
- Consider the costs they are liable to incur directly or indirectly as a result of the project.

Social Analysis

- The aim of participation is to produce a situation where stakeholders are willing to contribute to the successful implementation of the intended project and its future sustainability.
- Participatory approaches, which create an awareness amongst stakeholders of their own situation, of the socio-economic environment they live within, and of measures they can take to begin changing their environment, should be considered during project formulation.
- When dealing with participation as an element of project formulation it is important to think in terms of both quality and quantity that should be related to project objectives.
- This is because the level of participation necessarily varies from project to project and, while participation is important in all projects, some projects may even have participation as an objective in its own right.
- A useful place to begin when analyzing the level of participation expected and actually present in project formulation is with the construction of a participation matrix.

Social Analysis

- Social impact assessment (SIA) is a term used to classify the process of assessing how the benefits (and Costs) of a project are distributed amongst various stakeholders over time. SIA is often used in evaluating the 'winners' and 'losers' of proposed policy reforms but its techniques can also be applied to project analysis. SIA is essentially concerned with three distinct areas:
  - Impact of the project on its stakeholders.
  - Impact of the stakeholders in terms of achieving the project objectives.
  - People's response to the opportunities created by the achievement of the project objectives.
- SIA is inextricably linked with stakeholder analysis; indeed stakeholder identification is the first of five distinct stages which together comprise Social Impact Assessment:
- **Stage 1, Scoping** - This involves stakeholder identification with environmental scoping. If scoping of social impact, determines no significant negative effects then there will be no need to carry out further SIA.

Social Analysis

- **Stage 2, Baseline and impact identification-** This involves a consultative process of information-gathering regarding community baseline data like that undertaken in PRA and a consultative process in terms of identifying the potential social impacts of the project. This process is liable to utilize a variety of techniques such as:
  - Quantitative surveys
  - PRA
  - Qualitative questionnaires
  - Community discussions
  - Ethnographic field research
- Stage 3, Development of mitigation measures- Once the potential impacts have been identified the ‘next stage is to formulate measures to minimize those negative impacts whilst maximizing the positive impacts.
- Stage 4, Production of draft SIA- Once the impacts have been identified and mitigation measures formulated the next stage is to produce a draft of the social impact assessment document which contains this information

Social Analysis

- Stage 5, Production of final SIA and social impact management plan- The final document will consist of a social impact assessment report and a management plan containing details of the mitigation measures and strategies to be undertaken together with their associated costs.
- The time required to undertake SIA can vary greatly dependent on the scale of research and size of sample areas. Due to overlapping data requirements and the need to minimize resource duplication, it is recommended that SIA be carried out simultaneously with stakeholder analysis and institutional Aspect.
- **Assessment of mitigation measures, strategies and costs**
- The success of this stage of the social assessment process is largely dependent on the quality of stakeholder analysis and social impact assessment carried out previously.

Social Analysis

- The assessment of mitigation measures, strategies and costs will form the social impact management plan produced along with the SIA report.
- The analytical work carried out in previous stages of social assessment (stakeholder analysis, participation and gender analysis etc.) is likely to have identified potential options to limit the negative impact on stakeholders.
- These options now need to be studied in more detail in order to develop a comprehensive strategy to mitigate negative impacts.
- Stakeholder consultation is essential in order to suggest both feasible and desirable mitigation measures.
- Both costs and benefits of mitigation strategies should be calculated.

Social.....

- There are always pressure groups who have a special interest and these are given the opportunity to state their case.
- The ability to listen to their points of view and give sympathetic attention to their grievances is essential.
- But as it is almost impossible to satisfy all the parties, compromises may be necessary.
- Enhance the environment and facilities of the community.

Ch. 5.7 Cont'd…

- Social welfare exists as an indispensable aspect of modern social organization because of the nature of man himself.

- Man is a social being whose very survival as an individual and a species depends upon the cooperation and help of other human beings.

- But the processes of development, vastly extend the range and multiply the variety of these situations of mutual dependency.

Ch. 5.7 Cont'd…

- Thus a developing society can neither survive nor advance without including in its developmental processes.

5.7.1. The goals and principles of social welfare

- *Securing basic welfare rights*: Commitment to creating the conditions necessary for the progressive achievement of every citizen's rights to social security and social welfare services
-
- *Equity*: Distributing resources equitably and in a way that addresses racial, gender, geographical, urban/rural and sector disparities;

Ch. 5.7 Cont'd…

- *Non-discrimination*: Service delivery that promotes non-discrimination, tolerance, respect for diversity and inclusion of all groups;
- *Democracy*: The design and implementation of programs in a manner that is informed by participation by all those involved;
- *Human rights*: Designing programs and delivering services in a way that is congruent with human rights and the fundamental freedoms as articulated in the Constitution;
-

Ch. 5.7 Cont’d…

- *Sustainability*: Designing interventions so that the focus is on priority needs and interventions are financially viable, cost-efficient and effective;

- *Quality services*: Striving for excellence in social welfare provision;
- *Transparency and accountability*: Ensuring that welfare organizations and institutions are accountable and transparent at all levels;
-
- • *Accessibility*: Welfare organizations and institutions should be accessible to all those in need and action should be taken to build access for all where there are barriers;
-

Ch. 5.7 Cont'd…

- *Appropriateness*: Social welfare programs, methods and approaches are to be appropriate and responsive to the range of cultural, social and economic conditions in communities; and

- *Humanity*: Developing and adhering to the principle of 'caring for each others' wellbeing'.

Ch. 5.7 Cont'd…

5.7.2. Measuring social development

- The term 'social development' will be used to mean positive changes in relation to any of those issues or activities defined as 'social'

- such as the social characteristics of the area or society;
- the overall quality of life;
- availability of and access to social services; and social justice.

The term 'social characteristics' is used to refer to

-demographic structure (eg. size and density of population, rate of population growth, age and sex structure);

Ch. 5.7 Cont'd…

- ethno-linguistic characteristics (ie. division of the population on the basis of 'physical' characteristics, such as race, tribe, clan or language);
- social structure (eg. leadership structures, division on the basis of class or caste, gender relations, degrees and forms of cooperative activity);
- inheritance systems, including land tenure;
- religious beliefs and practices;

Ch. 5.7 Cont'd…

- other cultural beliefs and practices (eg. particular customs, ceremonies, taboos, prejudices); and
- individual and group attitudes to any aspect of life (including actual or proposed development activities),
- **social development** encompasses a commitment to individual well-being and volunteerism, and the opportunity for citizens to determine their own needs and to influence decisions that affect them.

Ch. 5.7 Cont'd…

- Until relatively recently, social development was conceived in terms of a set of desirable results

  - higher incomes,

  -longer life expectancy,

  -lower infant mortality,

  -more education.

- Recently emphasis has shifted from the results to the enabling conditions, strategies and public policies for achieving those results - peace, democracy, good governance, social freedoms, equal access, laws, institutions, markets, infrastructure, education and technology.

Ch. 5.7 Cont'd…

5.7.3. **Social development planning in rural areas**

- social development planning is a particular type of planning, the aim of which is to ensure that the social aspects of development receive adequate attention in planning.

It incorporates a number of different but related activities,

- planning social services (eg. health, education, housing, social welfare);
- planning specifically to improve the general quality of life of the population, or of a particular sector of the population;
-

Ch. 5.7 Cont'd…

- assessing the way in which the social characteristics of the people concerned are likely to affect the implementation of a particular policy, program or project;
- assessing the likely future and/or actual impact of a policy, program or project on social conditions;
- planning to improve the position of disadvantaged groups of people (eg. the poor, women, children, the disabled; a disadvantaged region of the country); and
- participatory planning - that is, planning in a way which involves the people who will be affected by whatever is being planned.

4.7.4. The social dimension of sustainable development

- Sustainable development is a holistic approach to improving the quality of life.

- It is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Ch. 5.7 Cont'd…

- But while communities and employers play important roles in tackling poverty, the primary responsibility lies squarely with governments. The federal government, in particular, has the appropriate levers to alleviate – if not eradicate - the problem.

Social investment

- Social investment is a prerequisite to economic development; a vibrant economy requires a healthy and educated workforce. Two major areas for social investment are health and education.
-

Ch. 5.7 Cont'd……

Safe and caring communities

- The concept of sustainable development implies that all individuals and sectors have a responsibility to promote human well-being.
- They are the caretakers of each other's welfare – much as individuals and all sectors are seen as stewards of the environment.
- One way that citizens engage with communities is through direct involvement in their institutions and activities, such as schools and recreational, cultural and environmental groups. Another way to encourage meaningful engagement is through community problem solving.

5.8. Political Viability

- There are politics whether governmental, commercial, industrial or academic which manifest themselves in the opinions and attitudes of the different stakeholders in organizations.
- The fact that a project relies on clients, consultants, contractors material and services suppliers, statutory authorities and of course the end user, all of which may have their own agenda and preferences, gives some idea of the potential political problems that may occur.

Political....

- The external politics over which neither the sponsor nor the project manager may have much, if any, control.
- Any project which has international ramifications is potentially subject to disruption due to the national or international political situation.
- In the middle of a project, the government may change and impose additional import, export or exchange restrictions, impose penal working conditions or even cancel contracts altogether.

Political.....

- For overseas construction contracts in countries with inherently unstable economies or governments, sudden coups or revolutions may require the whole construction team to be evacuated at short notice.
- Such a situation should have been envisaged, evaluated and planned for as part of the political risk assessment when the project was first considered.
- The political interplay between national and local government, lobbyists and pressure groups has to be taken into consideration as can be appreciated when the project consists of a road by-pass, reservoir, power station or airport extension.

5.9. Environmental Analysis

- Environmental analysis is a field of growing importance in project preparation.
- Underestimation of the environment has resulted in negative outcomes such as poor human health, social disruption, reduced productivity and, ultimately, the undermining of development. When considering environmental aspects into project formulation exercises there are a number of issues that should be taken into considerations, these include:
  - A clear understanding of the meaning of Sustainability
  - Assessment of the potential environmental impact of the project: landfill, forest, soil, biodiversity, water, fishery
  - To suggest ways in which that impact could be reduced at a reasonable cost.
  - To formulate mitigation strategies and a plan of action.
- **Environmental sustainability of a development project**
- The World Commission on Environment and Development (WCED) defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Environmental Analysis

- This definition leads to the idea of maintaining environmental capital. We should hand on to future generation an environmental capital stock at least as valuable as that which we inherited.
- This proposition raises the problem of defining the economic value of a capital stock. To help resolve the problem and also to provide guidance for the formulators a distinction needs to be clear among the following:
  - Man made capital, which is potentially expandable.
  - Critical natural capital, which is priceless.
  - Other natural capital, which may be nonrenewable and renewable.
- The implications of the above classifications of capital stock are that the project formulators must seek to:
  - Maintain, if possible increase, the value of man made capital.
  - Avoid damage to critical natural capital at all costs.
  - Limit exploitation of renewable natural capital to sustainable level.
  - Internalize the cost of depleting non-renewable resources through some form of compensation measures.

Environmental Analysis

- **Stages of environmental assessment**

1. Environmental screening

- Not all projects will require a full-scale environmental study; nonetheless, it is important to be aware of the potential environmental effects of a project. The first stage in the identification and assessment of environmental impacts is environmental screening. The purpose of this screening process is to assess the type and complexity of environmental analysis techniques, which are likely to be necessary.
- Just as with general project screening the process aims to assess the project against simple criteria, to determine whether more detailed analysis are needed.
- Criteria used in environmental screening may include:
    - Location- projects that are being implemented in environmentally sensitive areas are liable to need further assessment.
    - Type of project- projects such as mines and dams are liable to cause a great deal more damage than social projects.
    - Size- larger projects are more likely to require further, more detailed assessment

Environmental Analysis

- Complexity- a project with a number of disparate components is liable to have a wider range of environmental impacts, which need careful consideration.
- Data used in the screening process may take the form of general estimations or information already gathered from any similar projects. There are two possible results of environmental screening:
- The project can continue as planned with no further environmental impact assessment.
- There is a need to prepare a more detailed preliminary assessment.

2. Preliminary assessment

- The preliminary assessment involves conducting a process of research and utilizing expert advice in order to achieve three objectives:
  - To identify the key impacts of the project on the environment
  - To predict and describe the impacts identified above
  - To assess the potential importance of these impacts to decision makers.

- The information gathered during this preliminary assessment will assist the formulators in deciding whether a project should be cleared, rejected on environmental grounds or submitted to Environmental Impact Assessment (EIA).
- There are a number of useful checklists produced by different organizations, including the Ethiopian Environment Authority (EPA) that can help determine the likely level of assessment required. The formulators are, therefore, advised to refer to the appropriate guidelines or concerned authority.

3. The meaning of environmental impact assessment

- Environmental Impact Assessment (EIA) is concerned with the identification, prediction and evaluation of the impacts of proposed project alternatives and measures aimed at eliminating or minimizing damaging impacts and optimizing beneficial impacts. It is now widely accepted that those projects which incorporate EIA when necessary are more effective and often less costly.

Environmental Analysis

- Not all projects require environmental impact assessment to the same degree and intensity.
- Thus the classification of projects to determine the level of assessment is very useful for project formulation. Many donors/lenders and countries, including Ethiopia have developed four categories of EIA procedures. These are, named as category A, B, C and D.
- **Category "A" projects** are those projects and components that have diverse and significant environmental impacts. These types of projects require full environmental impact assessment. Dams and reservoirs, mineral development, resettlement and urban development are typical examples of such projects.
- **Category "B" projects** are those projects and components that have specific environmental impacts. As the impact is specific limited environmental analysis is appropriate. Typical examples of projects that fall under this category are rural water supply and sanitation, renewable energy and small scale projects.

Environmental Analysis

- **Category "C" projects** are those projects that normally not result in significant environmental impact. These projects do not require environmental assessment. Technical assistance, consultancy, training and workshops are good examples.
- **Category "D" projects** are environmental projects. These are projects with a major environmental focus whose objective can be waste disposal, desalination or wildlife protection etc. This Environmental projects do not require EIA b/se Every Action Improve Benefits minimize costs
- In identifying significant environmental impact assessment, project formulators must consider the following criteria:
- The length of time and geographical coverage over which the effects will be felt.
- The urgency which refers to how quickly a natural system might deteriorate and how long it takes to stabilize.
- The degree of irreversible damage to the environment, natural resources and life supporting systems.

Environmental Analysis

- When conducting the process of EIA there are clearly defined stages or procedures which should be taken into consideration. These are:
- Identifying of the various potential impacts of the project on the environment.
- Predicting of the extent of the environmental changes.
- Assessing of whether or not the identified and predicted changes are of any environmental significance.
- Planning of mitigation measures or alternatives that could reduce the project's environmental impacts.
- EIA will lead to an eventual decision to accept, reject or modify a project.
- If the project is seen to have a potentially serious impact on the environment then it is necessary to prepare an environmental management plan (EMP) with the requirement of financial expenditure.

- **Assessment of mitigation measures, strategies and costs**
- Where potentially negative environmental impacts have been identified as a result of assessments outlined above, it is necessary to consider ways in which these impacts can be overcome. This involves suggesting various measures and strategies to avoid, reduce or overcome these impacts. These various measures and strategies can be defined as forms of mitigation. A general overview of the various types of measures, include to:
- Avoid negative impacts- redesign the project to avoid those areas with the potential to cause significant environmental impact. The most extreme example of this strategy is to abandon the project altogether because the potential impacts are too serious. This is an extreme example, other avoidance strategies may include: changing the project's location; establishing buffer zones around sensitive ecosystems; avoiding transport routes with the potential to disrupt local populations and related activities; and deciding to exclude a certain project component because of its potential impact.

Environmental Analysis

- Reduce negative impacts- this involves introducing mitigation measures to reduce the impact of existing activities. Reduction activities could include: treatment plants to reduce pollution; landscaping and using local materials to reduce the visual impact of new structures; scheduling project activities during the dry season to reduce
- Compensate for negative impacts- in some instances it will not be possible to avoid or reduce environmental impacts entirely. If this is the case then it will be necessary to include compensation for affected populations. This compensation could be financial or in the form of a compensatory project which aims to produce benefits for affected people.
- It is essential that mitigation measures be planned in a coherent and integrated manner to ensure that they work effectively in combination and do not simply transfer the negative impact to another area. In projects where serious environmental impacts have been identified it will be necessary to collate these mitigation strategies in the form of an environmental management plan (EMP).

Environmental Analysis

- **Environmental valuation techniques**
- Valuation of environmental effects includes the measurement of environmental costs and benefits. There are various methods of estimating environmental costs and benefits. These methods can be categorized as:
- Objective Valuation (OV) methods that are based on physical relationships describing cause and effect to value the physical effect.
- Subjective Valuation (SV) methods are based on subjective assessment derived from real or hypothetical market behavior.
- Valuation techniques can also be divided between those that attempt to:
- Value both costs and benefits that can be included in an overall cost and benefit calculation.
- Concentrate on the cost side and might be used in either in cost effectiveness analysis or in some other form of analysis.

Environmental Analysis

- The various approaches to the valuation of environmental effects are described below:
- Those that attempt to based on “OV” include:
  - ✓ Effect on production or changes in productivity approach involves the estimation of the effect of an environmental change on production in the affected/proposed project area. It is mainly applicable in projects affecting natural resources such as forests, fish and soil. Determining the physical effects of a project on the environment and estimating the values of the effects are a straightforward approach to estimate the costs of environmental mitigation.
  - ✓ Lose of Earnings Approach includes the valuation of human life and cost of illness approaches. This applies particularly to air and water pollution. The methodology involves calculating the loss of earnings through sicknesses or premature deaths.
  - ✓ Replacement cost and compensation approach, which take into account environmental damage by compensating or replacing/restoring the damaged asset. These techniques are applicable where the cost of restoration/compensation is less than the value of the resources destroyed.

Environmental Analysis

- **The SVa methods include:**
- **Hedonic methods** attempt to value a particular environmental state based on surrogate markets. These markets use 'property value approach' (e.g. housing) and 'wage differential approach' (e.g. labor). In property value approach, environmental impacts are derived from changes in values. The wage differential is used to estimate the costs associated with the risk of ill health or death at work. These methods are applicable where market efficiencies are strong to justify the assumptions, which will be unlikely for developing countries.
- **Contingent valuation techniques** which are used to establish 'willingness to pay' for environmental improvement or 'willingness to accept' environmental damage.
- It is not possible to provide exhaustive lists/methods of valuation techniques. It is up to the formulators to select those techniques applicable to a project under consideration.
- Whatever strategy is chosen, it will be necessary to consider the associated costs and who has the responsibility to provide funds to cover these costs.

Environmental Analysis

- **Environment management plan (EMP)**
- The Environmental Management Plan (EMP) sets out the various mitigation measures and related monitoring and institutional arrangements to be carried out to reduce the environmental impact of a project. An EMP is not required for all projects, but if serious potential impacts were identified during EIA. Relating this to the project categorization for EIA mentioned above an EMP should be prepared for:
  - All Category ‘A’ projects.
  - Some Category ‘B’ projects.
- A project’s environmental management plan should consist of the following components:
- Mitigation: potential mitigation strategies are identified from the categories described in EIA as mentioned above.
- Monitoring: the EMP must set out arrangements for monitoring of potential impacts and mitigation measures throughout the implementation and operational phases of the project cycle.
- Institutional Arrangements: this may relate to the establishment of environmental units with the specific task of implementing the EMP.

Environmental Analysis

- Implementation Schedule and Costs.
- The EMP must provide:
  - ✓ A project implementation schedule for all aspects of mitigation, monitoring and institutional arrangements.
  - ✓ A detailed breakdown of the costs related to the implementation of mitigation, monitoring and institutional arrangements.
- These costs should be integrated into total project costs tables.
- The environmental management plan should be integrated into the overall implementation plan, budget and project analysis.
- It should not be seen as a separate, external component, but rather as an integral part of the project as a whole.

5.10. PROJECT RISK ANALYSIS AND MANAGEMENT

- Project Risk Analysis and Management is a process which enables the analysis and management of the risks associated with a project.
- Properly undertaken it will increase the likelihood of successful completion of a project to cost, time and performance objectives.
- Risks for which there is ample data can be assessed statistically. However, no two projects are the same.
- Often things go wrong for reasons unique to a particular project, industry or working environment.

- Dealing with risks in projects is therefore different from situations where there is sufficient data to adopt an actuarial approach.
- Because projects invariably involve a strong technical, engineering, innovative or strategic content a systematic process has proven preferable to an intuitive approach.
- Project Risk Analysis and Management has been developed to meet this requirement.

Project risk…..

What Is Involved

- The first step is to recognize that risk exists as a consequence of uncertainty.
- In any project there will be risks and uncertainties of various types as illustrated by the following examples:

✧ the management and financial authority structure are not yet established

✧ a the technology is not yet proven

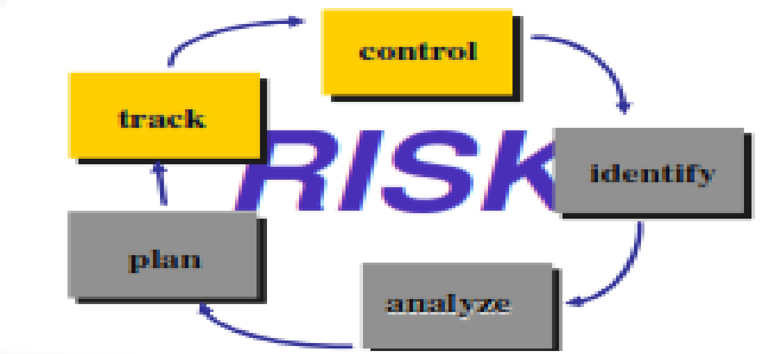
✧ industrial relations problems seem likely

✧ resources may not be available at the required level.

Project risk…..

- All uncertainty produces an exposure to risk which, in project management terms, may cause a failure to:
  - ✧ keep within budget
  - ✧ achieve the required completion date
  - ✧ achieve the required performance objective.
- **Project Risk Analysis and Management is a** process designed to remove or reduce the risks which threaten the achievement of project objectives.

Risk Management Paradigm



Risk (3xM) Mitigation, Monitoring, and Management

- Mitigation — **how can we avoid the risk?**
- Monitoring — **what factors can we track that will enable us to determine if the risk is becoming more or less likely?**
- Management — **what contingency plans do we have if the risk occurs?**

Questions:

- What can go wrong?
- What is the likelihood?
- What will the damage be?
- What can we do about it?

Types of Risk

- *Completion Risks*
- *Permitting Risks*
- *Price Risks*
- *Resource Risks*
- *Operating Risks*
- *Casualty Risks*
- *Technology Risks*

Classification of risks

- *Measurable Risks*
- *Immeasurable Risks*
- *Manageable Risks*
- *Insurable Risks*
- *Investment Risks*

Risk Management Plan

- Risk Identification
- Risks Quantification
- Risk Response
- Risk Monitoring and Control

Project risk…..

- Experienced risk analysts and managers hold perceptions of this process which are subtle and diverse.

Risk Analysis

- This stage of the process is generally split into two 'sub-stages';
  - qualitative analysis 'substage‘ that focuses on identification and subjective assessment of risks and
  - quantitative analysis 'sub-stage' that focuses on an objective assessment of the risks.

Project risk…...
Qualitative Analysis

- A Qualitative Analysis allows the main risk sources or factors to be **identified.**
- **This can be** done, for example, with the aid of check lists, interviews or brainstorming sessions.
- This is usually associated with some form of **assessment** which could be the description of each risk and its impacts or a subjective labelling of each risk (e.g. high/low) in terms of both its impact and its probability of occurrence.
- A sound aim is to identify the key risks, perhaps between five and ten, for each project (or part-project on large projects) which are then analysed and managed in more detail.

Project risk…...
Quantitative Analysis

- A Quantitative Analysis often involves more sophisticated techniques, usually requiring computer software.
- To some people this is the most formal aspect of the whole process requiring:

✧ measurement of uncertainty in cost and time estimates

✧ probabilistic combination of individual uncertainties.

Project risk…..

- Such techniques can be applied with varying levels of effort ranging from modest to extensively thorough.
- It is recommended that new users start slowly, perhaps even ignoring this 'sub-stage', until a climate of acceptability has been developed for Project Risk Analysis and Management in the organisation.

Project risk…..

- An initial qualitative analysis is essential.
- It brings considerable benefit in terms of understanding the project and its problems irrespective of whether or not a quantitative analysis is carried out.
- It may also serve to highlight possibilities for risk 'closure' i.e. the development of a specific plan to deal with a specific risk issue.
- Experience has shown that qualitative analysis - Identifying and Assessing Risks - usually leads to an initial, if simple, level of quantitative analysis. If, for any reason - such as time or resource pressure or cost constraints - both a qualitative and quantitative analysis are impossible, it is the qualitative analysis that should remain.

Project risk…...

- It should be noted that procedures for decision making will need to be modified if risk analysis is adopted.
- An example which illustrates this point is the sanction decision for clients, where estimates of cost and time will be produced in the form of ranges and associated probabilities rather than single value figures.

Project risk…..
Risk Management

- This stage of the process involves the formulation of management responses to the main risks.
- Risk Management may start during the qualitative analysis phase as the need to respond to risks may be urgent and the solution fairly obvious.
- Iteration between the Risk Analysis and Risk Management stages is likely.

Project risk…..

- Risk Management can involve:

✧ identifying preventive measures to avoid a risk or to reduce its effect

✧ establishing contingency plans to deal with risks if they should occur

✧ initiating further investigations to reduce uncertainty through better information

✧ considering risk transfer to insurers

✧ considering risk allocation in contracts

✧ setting contingencies in cost estimates, float in programmes and tolerances or 'space' in performance specifications.

Project risk…..

Why Is It Used?

- There are many reasons for using Project Risk Analysis and Management, but the main reason is that it can provide significant benefits far in excess of the cost of performing it.

Benefits

- The benefits gained from using Project Risk Analysis and Management techniques serve not only the project but also other parties such as the organisation and its customers.
- Some examples of the main benefits are:

Project risk…..

- an increased understanding of the project, which in turn leads to the formulation of more realistic plans, in terms of both cost estimates and timescales
- an increased understanding of the risks in a project and their possible impact, which can lead to the minimisation of risks for a party and/or the allocation of risks to the party best able to handle them
- an understanding of how risks in a project can lead to the use of a more suitable type of contract
- an independent view of the project risks which can help to justify decisions and enable more efficient and effective management of the risks
- a knowledge of the risks in a project which allows assessment of contingencies that actually reflect the risks and which also tends to discourage the acceptance of financially unsound projects

Project risk…..

- a contribution to the build-up of statistical information of historical risks that will assist in better modelling of future projects
- facilitation of greater, but more rational, risk taking, thus increasing the benefits that can be gained from risk taking
- assistance in the distinction between good luck and good management and bad luck and bad management.

Project risk…..
Who benefits from its use?

- an organisation and its senior management for whom a knowledge of the risks attached to proposed projects is important when considering the sanction of capital expenditure and capital budgets
- clients, both internal and external, as they are more likely to get what they want, when they want it and for a cost they can afford
- project managers who want to improve the quality of their work i.e. they want to bring their projects in to cost, on

Project risk…..

What are the costs of using it?

- The costs of using Project Risk Analysis and Management techniques vary according to the scope of the work and the commitment to the process.
- Below are some example costs, timescales and resource requirements for carrying out the process.

Cost

- The cost of using the process can be as little as the cost of one or two days of a person's time up to a maximum of 5-10% of the management costs of the project, even this higher cost, as a percentage of the total project cost, is relatively small.
- It can be argued that the cost incurred is an investment if risks are identified during the process that may otherwise have remained unidentified until it was too late to react.

Project risk…..
Time

- The time taken to carry out a risk analysis is partially dependent upon the availability of information.
- A detailed cost and time risk analysis usually requires anywhere from one to three months depending upon the scale and complexity of the project and the extent of planning and cost preparation already carried out.
- However, as indicated above, a useful analysis can take as little as one or two days.

Project risk…..
Resources

- The minimum resource requirement is obviously just one person within a organisation with experience of using Project Risk Analysis and Management techniques.
- However, if expertise does not exist within the organisation it can be readily acquired from outside consultants.
- It is likely that once Project Risk Analysis and Management has been introduced to an organisation, in-house expertise will develop rapidly.

Project risk…..

- It should be noted that procedures for decision making will need to be modified if risk analysis is adopted.
- An example which illustrates this point is the sanction decision for clients, where estimates of cost and time will be produced in the form of ranges and associated probabilities rather than single value figures.

$$Coefficient\ of\ Variation = \frac{\sigma_x}{E(x)}$$

Economic	**Cashflow**		**Cashflow times**	**Deviation**	**Squared**	**Weighted Squared**
Conditions	**¢**	**Probability**	**Probability**		**Deviation**	**Deviation**
Boom	100,000,000	0.20	20,000,000	56,500,000	3,192,250,000,000,000	638,450,000,000,000
Normal	50,000,000	0.50	25,000,000	6,500,000	42,250,000,000,000	21,125,000,000,000
Recession	-10,000,000	0.30	-3,000,000	-52,000,000	2,704,000,000,000,000	811,200,000,000,000
		E(x)	43,500,000		sigma squared	1,516,000,000,000,000
					sigma	38,935,845

Sensitivity Analysis

- Range of variability of price, yield, cost and revenue are assumed

Chap 6. Tools of **Measuring of Project worthiness**

Hassen

Project Selection

- Project selection is the process of evaluating individual projects or groups of projects, and then choosing to implement some set of them so that the objectives of the parent organization will be achieved
- Managers often use *decision-aiding models* to extract the relevant issues of a problem from the details in which the problem is embedded
- Models represent the problem's structure and can be useful in selecting and evaluating projects

Criteria for Project Selection Models

- **Realism** - reality of manager's decision
- **Capability**- able to simulate different scenarios and optimize the decision
- **Flexibility** - provide valid results within the range of conditions
- **Ease of Use** - reasonably convenient, easy execution, and easily understood
- **Cost** - Data gathering and modeling costs should be low relative to the cost of the project
- **Easy Computerization** - must be easy and convenient to gather, store and manipulate data in the model

Nature of Project Selection Models

- 2 Basic Types of Models
  - Numeric
  - Nonnumeric
- Two Critical Facts:
  - Models do not make decisions - People do!
  - All models, however sophisticated, are only partial representations of the reality they are meant to reflect

- Selection models just explained have different variations that fall into the following three groups
  - Those that further split the net cash flow into components that make up the net flow
  - Those that contain particular terms to acquaint risk (uncertainty) into the assessment
  - Those that widen the analysis to view impacts that the project can have on activities or projects in the company

Nonnumeric Models

- ***Sacred Cow* -** project is suggested by a senior and powerful official in the organization
- ***Operating Necessity* -** the project is required to keep the system running
- ***Competitive Necessity* -** project is necessary to sustain a competitive position
- ***Product Line Extension* -** projects are judged on how they fit with current product line, fill a gap, strengthen a weak link, or extend the line in a new desirable way.
- ***Comparative Benefit Model* -** several projects are considered and the one with the most benefit to the firm is selected

Numeric Models: Profit/Profitability

- ***Payback period* -** initial fixed investment/estimated annual cash inflows from the project
- ***Average Rate of Return* -** average annual profit/average investment
- ***Discounted Cash Flow* -** Present Value Method
- ***Internal Rate of Return* -** Finds rate of return that equates present value of inflows and outflows
- ***Profitability Index* -** NPV of all future expected cash flows/initial cash investment

Information Base for Selections

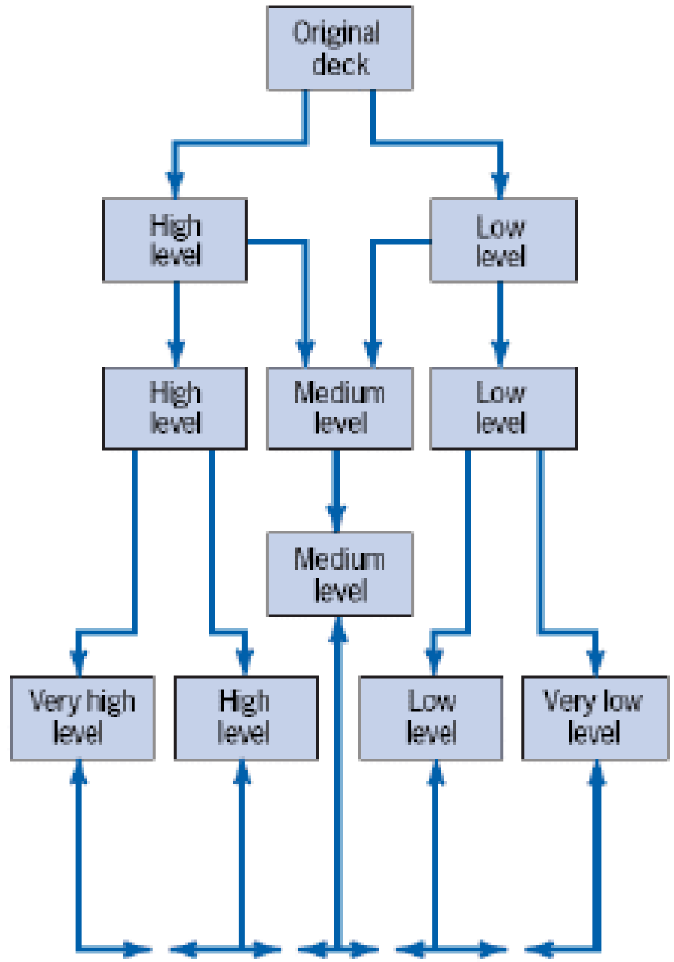
- Accounting Data
- Measurements
  - Subjective vs. Objective
  - Quantitative vs. Qualitative
  - Reliable vs. Unreliable
  - Valid vs. Invalid
- Technological Shock

Q-Sort Model Example

Steps

1. For each participant in the exercise, assemble a deck of cards, with the name and description of one project on each card.
2. Instruct each participant to divide the deck into two piles, one representing a high priority, the other a low-priority level. (The piles need not be equal.)
3. Instruct each participant to select cards from each pile to form a third pile representing the medium-priority level.
4. Instruct each participant to select cards from the high-level pile to yield another pile representing the very high level of priority; select cards from the low-level pile representing the very low level of priority.
5. Finally, instruct each participant to survey the selections and shift any cards that seem out of place until the classifications are satisfactory.

Results at Each Step



Numeric Models of Project Selections

- 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. The arithmetic of these discounted methods, and the way we interpret the measures and their limitations, is exactly the same whether we are using them for financial analysis or for economic analysis.
- Before embarking on the methods, it is important to note two critical points. First, there is no one best technique for estimating project worth; each has its own strength & weakness. Second, these financial and economic measures of investment worth are only tools of decision-making, i.e., they are necessary conditions & are not sufficient condition for final decision. There are many other non- quantitative and non-economic criteria for making final decision of whether to accept or reject a project.
- 6.1. **Undiscounted measures of project worth**

7.1.1. Ranking by inspection

- In some cases, we can tell by simply looking at the investment costs and the 'shape' of the stream for the net value of incremental production that one project should be accepted over another if we must choose. The analyst can sometimes simply choose one project among alternatives projects by examining the following:
- Total cost of investment and investment period;
- The structure, & amount of costs and benefits;
- The structure & total amount of the net incremental benefit;
- The lifetime of the project, etc.
- The problem with this method is that the selection lacks objectivity.

7.1.2. 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. That is,

  PBP = cash outlay(investment)/annual cash in flow
- 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.
- If the PBP is shorter than the acceptable PBP, the project is accepted. Otherwise it is rejected.
- The method is very simple. Moreover, 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	20000	-	
	2		2000	31000
	3		8000	
	4		12000	
	5		9000	
II	1	20000	-	
	2		2000	34000
	3		12000	
	4		8000	
	5		12000	
III	1	20000	-	
	2		1000	37000
	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 benefits

- Project I has a payback period of 0.65 year
- Project II have a payback period of 0.588 year.
- But project III has a payback period of 0.54 years.
- Thus, based on this criterion, project III is selected.
- Therefore, the method fails to consider the time & amount of net incremental benefit after the payback period-
- This method is a measure of cash recovery, not profitability.

6.1.3. 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
- no adjustment for time value of money.
- **6.1.3.1. 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 1.55, 1.7and 1.85, respectively. Hence, according to this criterion, project III will be ranked first.
- **6.1.3.2. 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 0.31, 0.340 and 0.23, respectively. Hence, 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.
- **6.1.3.3. 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 deprecation for all projects, average income on book value can be calculated as follows:

Project	Average net value of incremental benefit	Annual deprecation	Net average income	Average book value	Average income on book value
I	6200	2000	4200	10000	0.42
II	6800	2000	4800	10000	0. 48
III	4625	1250	3400	10000	0.34

$$AD = \frac{\text{Initial cost – Salvage value}}{\text{Useful life}}$$

Book value (the value in the current time period) is equal to the original cost less the total estimated depreciation from purchase date to date of inventory.

Assume salvage value =10000

Project ii is accepted based on this criterion

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.
- 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)
- Present value = 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 of 5% 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
- $A_5 = 1567.05\ (1 + 0.05)^5$
- = <u>2000 B</u>
- Suppose again a project is expected to obtain 2000 B after 5 years. Value of this money today can be calculated as:
- P=At/(1+r)t=2000/(1+0.05)5=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 from 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.

$$r = \frac{Equity}{Total\ \text{cap}}\ x\ \text{return needed to attract capital} + \frac{\text{Borrowed capital}}{Total\ \text{captial}}\ x\ \text{borrowing rate}$$

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.
However, in ranking mutually exclusive project (if one is chosen, the other cannot be undertaken), ranking based on NPV depends on the dissonant 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.) discount rate =1%

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

2. 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.

$$I = \sum_{t=1}^{n} \frac{At}{(1+r)^t} \qquad 1000 = \frac{200}{(1+r)^1} + \frac{400}{(1+r)^2} + \frac{500}{(1+r)^3} + \frac{700}{(1+r)^4}$$

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.
The IRR can be calculated as:

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.

3.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.

4.: Assume that 25% short fall in net benefit yields an NPW of 11,985 Birr and 30% shortfall yields a negative NPW of -14,044 Birr. Hence, a proportionate fall that will make NPW equal zero at 12 percent opportunity cost of capital is 27% [25 + (30-25){11,985 ÷ (11,985+14044)}]. This is just one of the interpolation formula of the IRR.

A project may have the following net benefit.

NPVA=-1000+475X=0→X=2.1052. (See annuity table at the 3rd year.) it is at 20%. Then IRR=20%

NPVB=-500+256X=0→X=1.952. (See annuity table at the 3rd year.) it is at 25%. Then IRR=25%

Then project B gives higher return than A

If the discount rate is 10%. Then both are feasible. Since 20 and 25 are greater than 10%

Year	Project A	Project B
0	-1000	-500
1	475	256
2	475	256
3	475	256

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.

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

Where - Bt - are the benefits in period t

Ct - 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

If such a case exists in a particular project, using either the extended yield method or the auxiliary interest rate method can reverse the analytical problem. For further readings when the cost and benefit streams are discounted at the discount rate, In the case of mutually exclusive projects, the benefit - cost ratio can lead to an erroneous investment choice. The danger can be avoided most easily by using the net present worth criterion for mutually exclusive projects. [1]

[1] If such a case exists in a particular project, the analytical problem can be resolved by using either the 'extended yield' method or the auxiliary 'interest rate ' method. For further readings refer Merrett and Sykes (1973, pp. 158 - 65) and Grand and Ireson (1970, pp. 546 - 65)

4. 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. That is, 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:

Net benefit - investment ratio =

$$\frac{\sum_{t=1}^{n} \frac{(Bt - Ct}{(1+r)t}}{\sum_{t=1}^{n} I/(1+r)^{t}}$$

Where - Bt 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 larges 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.

Discounted Measures

- The above measures of project worth may give different ranking if projects that are being comparing are different in their:
  - Cash flow structure
  - Magnitude of costs and benefits
  - Life time
- 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. The former will be less sensitive to changes in discount factor as compared to the latter.
- 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.
- 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.
- However, if there are limited funds, as is often the case, and if different criterion gives rise to different results, a decision must be made as to which criterion to use for selection. Which criterion is then more appropriate to select among such mutually exclusive projects?

Comparisons among discounted measures of project worth

- In most cases we do not bother ourselves for ranking projects for different reasons. Ranking is false as a country won't have readily prepared bunch of projects on its shelf as project planning and analysis is costly. Moreover, there are other factors (outside the rank by discounted or undiscounted measures) that should be considered such as ability (financial and managerial) of the economy to implement the projects.
- The ranking procedure assumes that the standard of estimation of costs and benefits is uniform. If economic criteria are to be used in ranking projects it is therefore important to insist on a common standard of cost and benefit estimation. The quality of the analysis of projects should be scrutinised carefully before the results presented are accepted.
- For independent projects the four criteria (NPW, IRR, B-C ratio and N/K ratio) will identify exactly the same group of projects for implementation. Unlike others, NPW can be used for mutually exclusive projects. Unlike the others, for N/K ratio, the formal selection criterion is to accept projects discounted at the opportunity cost of capital in order, beginning with the largest ratio value and continuing until all investment funds have been exhausted.
- Different factors determine our choice of the specific decision making criterion:
  - Practice in the country;
  - Preference of the financing agencies (World Bank, for instance, prefers IRR saying that it avoids the necessity for having exact level of the opportunity cost of capital;
  - The nature of the project (s) - size and complexity, mutual exclusiveness, independence, risk and uncertainty involved and so on;
  - Level of analysis being made;
  - Nature of the economy for which the analysis is being made; and
  - The need to compute switching values, and so on.

Summary: comparison of discounted measures of project worth

Item	NPW	IRR	B- C ratio	N/K ratio
Selection criterion	Accept all independent projects with NPW of zero or greater when discounted at opportunity cost of capital	Accept all independent projects with IRR equal to or greater than the opportunity cost of capital	Accept all independent projects with B/C ratio of 1 or greater when discounted at opportunity cost of capital	Accept all independent projects with N/K ratio of 1 or greater when discounted at opportunity cost of capital in order of ratio value until available investment funds are exhausted.
Ranking	Gives no ranking for order of implementation	May give incorrect ranking among independent projects	May give incorrect ranking among independent projects	May be used to rank independent projects
Mutually exclusive alternatives	Accept alternative with largest NPW when discounted at the opportunity cost of capital. NPW is the preferred selection criterion for mutually exclusive alternatives	Cannot be used directly; must discount differences between incremental net benefit flows of mutually exclusive alternative projects	Cannot be used directly	Cannot be used directly
Discount rate	Must determine a suitable discount rate, generally the opportunity cost of capital	Determined internally; must determine opportunity cost of capital to use as a cut-off rate	Must determine a suitable discount rate, generally the opportunity cost of capital	Must determine a suitable discount rate, generally the opportunity cost of capital

7. Project appraisal, risk and uncertainty

- **7.1 Introduction**
- Before becoming involved in a project, owners, sponsors and perspective financiers will want:
  - To be assured project feasibility
  - To assess the possibility of threat to the desired outcome;
  - To consider the consequences of potential project risk and be assured that it can be managed.
- There is an element of risk in all projects. In some, the risks are minimal, while others are highly risk prone. Risk management is a continuous process throughout the life of all projects, beginning with the feasibility stage when foreseeable risks are identified, classified and assessed.
- A serious threat may cause the project to be modified or abandoned but in most cases, planning will be able to provide risk avoidance mechanisms to reduce the probability of trauma and/ or minimize the consequences.

- Up to this chapter unbiased estimates have been assumed for the values of future benefits and costs.
- Relying on single estimates for values making up benefit-cost calculations is known as a ***deterministic approach*.**
- In most cases a single estimate of NPV or IRR will be presented on the basis of which the '***accept*' or '*reject*'** decision is made.
- It is not clear if the single estimate is the mean expected value of possible outcomes, a maximum likelihood estimate, or simply the result of a string of arithmetic computations.
- It does not also indicate whether sophisticated statistical methods have been used to establish some project parameters or others merely been guessed at.
- Whether one is appraising a project from a financial or economic or social point of view, project appraisal remains in essence an exercise in using limited information to make predictions about the future contrasting the 'with' and 'without' project situations.
- Since a typical project will involve one or more outputs and a whole series of inputs, the net benefit stream which eventually emerges will be the result of a string of calculations based on projected physical quantities and prices. In most cases, predicting the 'without' case is more difficult than predicting the 'with' case.

- In project planning, risk is the chance of occurrence of unexpected values of different variables: prices, yield, costs, weather, and year of implementation. Risk is a situation whereby known probabilities can be attached to the outcomes while uncertainty is the plurality of outcomes to which objective probabilities can't be assigned. The formal difference between risk and uncertainty is that risk refers to cases where the nature of probability distribution of future events is statistically known while uncertainty refers to cases where probabilities are only guessed, although on the basis of available information. For instance, consider the definition,

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

- Where, B_t is net benefit,
- r is interest rate, and n is number of years.
- Calculating the net benefit stream (B_t = 1 ... n) will involve predicting values for each of the various elements entering into the definition of profit, viz. volume of output sold, selling price, required investment, labor costs per unit, maintenance costs of machines and so forth.

7.2 The statistical approaches

CBA typically allows for uncertainty in two ways, *i.e. statistical approach (using probabilistic values*) and the *cost benefit approach* (*sensitivity analysis or switching values).* Under the statistical approaches one can mention the expected value approach, the three point distributions, the game theoretic approach and time series analysis. The choice among these depends on the purpose of the analysis and the data available at hand.

7.2.1 The expected value approach

A probability distribution, *P(x),* is merely an enumeration of the various values *(X_i)* which a variable *(x)* may assume accompanied by an indication of the probability of occurrence of each value *(P_i).* The mean of this distribution is called the expected value of the variate (a variable having a probability distribution is called a variate). As probabilistic information is available in this particular case, expected value is an approach to address problem of risk, not uncertainty.

Expected value is just an average value of all possible outcomes weighted by the probability of occurrence. Tree possible situations are commonly encountered when applying the probabilistic approach. All possible outcomes are known such as the case of card and dice games. All possible outcomes are not known - temperatures, rainfall, sunshine etc. However, using historical data, it is possible to estimate probability of individual occurrences in the existence of stable conditions. The third case is when few data exist to mathematically derive estimates of probabilities. However, still some informed guess can be made even though without any statistical support.

Statistical independence occurs when the probability distribution for one of the element is unrelated to the others. Where dependency exists, the statistical analysis becomes rapidly more complex as the number of statistically dependent elements increases. Problems remain in applying the probabilistic approach to project analysis. Nevertheless, an approach that incorporates expected values customarily provides an improvement over the deterministic approach.

Mathematically, expected value of an outcome can be given as $$EV = \sum_{i=1}^{n} P_i x_i$$

$$\sum_{i=1}^{n} p_i = 100\%$$

where p_i is probability of the i^{th} event, x_i is value of the i^{th} event, and

Example: Suppose the relationship between crop yields and rainfall is known, together with the probability of rainfall, the expected value of crop yields can be used in place of a single unbiased estimate. Suppose agronomists say that with a rainfall of 400 mm_s during the growing season, a crop will yield 1400kg/ha; with rainfall of 300 mm_s, the yield falls to 1000kg/ha; and with 200$mm_{s,}$ the yield is only 500kg/ha. Let the probabilities of these levels of rainfall is 15%, 50% and 35%, respectively. Given this information, one can use the mode, the mean or the expected value as a proxy for yield

- To illustrate the application of some of these principles in practice, imagine the case of a firm which is considering whether or not to purchase a second hand machine of given specification and vintage. Because the machine in question is several years old, its operating costs are substantially greater than those of the current model, and it is this stream of extra annual costs incurred over its operating life which will need to be compared to the capital cost savings in order to determine whether the older machine is preferred to the new model.
- The management has calculated that if extra running cost of the second hand machine exceed those of the new one by Birr 2800 per annum, the proposition is uneconomical. Estimates of operating costs of second-hand machines are given below (all figures in Birr x 10^2):

No	**X**	**(X-*X*)**	$(X - X)^2$
1	21	1	1
2	10	-10	100
3	16	-4	16
4	23	3	9
5	21	1	1
6	14	-6	36
7	30	10	100
8	18	-2	4
9	27	7	49
10	20	0	0
11	7	-13	169
12	33	13	169
Total	240		654

- $\chi = \Sigma X/n = 240/12 = 20$
- S^2 (variance) = $\Sigma(X - \chi)^2 /n-1 = 654/11= 59.5$
- S (standard deviation) = S = 7.7 (= Birr 770)
- CV=(7.7/20)*100=38.5%

- From the machine manufacture's records it has been established that 1000 machines were produced in all; unfortunately, only 12 of these can be traced to their present owners. Hence, the operating cost characteristics of the entire population of second-hand machines will need to be estimated from the characteristics of a sample population numbering only a dozen. The true mean (χ) and variance (S^2) of the population of 1000 machines are approximated by calculating the mean (χ) and variance (S^2) of the sample.
- One adjustment has been made in calculating variance, $(X - \chi)^2$ being divided by n - 1 instead of n to allow for small sample size. The computed sample mean is Birr 2000 while the standard deviation is 700 Birr If these sample statistics are unbiased estimates of population statistics, then management can infer that there is approximately an 85 percent chance that the purchased second-hand machine will be more economical than the new one; i.e. that it will have an operating cost of less than Birr 2800. This sample illustrates very roughly how sample information can be used to derive a probability distribution of possible outcomes (through further adjustments could be made here; viz. using student's t -distribution).

7.2.2 Three point distributions

- In some cases, even the sort of information presented above might not be available. A typical situation is where only high (H), low (L) and best guess (B) estimates can be made. This is a typical uncertainty problem. A very useful device is the use of some form of three - point distribution such as the '*triangular*' and the '*Beta*' distributions.
- Suppose that instead of obtaining the above sample information, project management group had only been able to obtain the manufacturer's opinion that operating costs were unlikely to be above Birr 3500 at worst, or below Birr 500 at best, their own best estimate being Birr 2000. Statistics for the triangular distribution are:

$$\chi = \frac{H + 2B + L}{4} \quad \text{or} \quad \chi = \frac{3500+4000+500}{4} = 2000$$

$$S = \frac{H - L}{4} \quad \text{or} \quad S = \frac{3500 - 500}{4} = 750$$

- In the case of the *Beta* distribution, more weight is given to the central value in relation to the extreme point values. Hence, we have:

$$\chi = \frac{H+4B+L}{6} \quad \text{or} \quad \chi = \frac{3500+8000+500}{6} = 2000$$

$$S = \frac{H - L}{6} \qquad S = \frac{3500 - 500}{6} = 500$$

- Comparing these results to those obtained from the sample statistics, it will be seen that the estimates of mean value (χ) coincide while those for standard deviation are smaller, particularly in the case of the *Beta* distribution. The coincidence of mean estimates and the fact that extreme values chosen are equidistant from the best estimates (B) suggests that the manufacturers assumed a normal distribution. However, the fact that the standard deviation estimated from the *Beta* distribution is smaller than that estimated from the triangular distribution reflects the smaller weight given to extreme values in the case of the *Beta* distribution.

- Choice of which of these three point distributions to use when one is working with limited information (uncertainty) will clearly depend on the analyst's judgment of how far high and low estimates encompass the entire range of possible outcomes; i.e. judgments of the form 'Is the high (low) estimate merely an infrequent occurrence or an extremely exceptional occurrence?
- In general, though, such approximations can be extremely useful provided that the general characteristics of the underlying population distribution are understood and proper caution is exercised in applying the results derived.
- It will not be enough to trust in the common sense of the appraiser and hope for a 'reasonable' result.
- The common sense of one appraiser might indicate using conservative estimates for key parameters in all case, while another might argue that optimistic assessments are justified, if only to offset the conservative bias of the engineer or the agronomist. Thus the treatment of risk clearly needs to be handled systematically, if only to establish common standards which make one project appraiser's NPV consistent with another. The basic choice to be made is between presenting a single point estimate of profitability (a central tendency measure) and presenting central tendency and dispersion estimates derived from probabilistic information.

- **7.2.3 Game theoretic approach**
- While the above discussion suggests that much can be done by way of systematically organizing and using probabilistic information in project evaluation, nothing has so far been said about how to choose between projects under different conditions (states of nature). Imagine that we have only four bits of information about projects A and B, notably points A, B, a, and b, and that no associated probabilities are given. Such a situation would be one of uncertainty, there being no way of telling, should project A be chosen, which of the two NPVs, A or a, would be most likely. Suppose that projects A and B represent two different versions of an investment proposal for the construction of a fishmeal processing plant.

	With meager Fish (Birr)	**With good Fish catch(Birr)**
Project A	20,000 (a)	100,000 (A)
Project B	-10,000 (b)	150,000 (B)

- Version B is relatively more capital intensive than A, and turns out to be more economical in those years when the fish catch is plentiful and a high volume of throughput can be maintained. Under such conditions the mean NPV of version B is Birr 150,000 while that of A is only Birr 100,000. However, in years when the catch is meager, version A still manages to realize a small positive return while version B shows a negative NPV.
- Several decision criteria applicable to choice under uncertainty have been developed in the context of games theory, the three best known being the ***maxi-max returns principle, maxi-min returns principle*** **and the *mini-max regret principle*.**
- The ***maxi-max returns principl****e* suggests that alternatives should be evaluated on the basis of the larger maximum return (maxi-max) which can be secured should things go in favor of the project.
- On this basis one would be led to choose project B which yields the maximum return of Birr 150,000 in the event of the most favorable state of nature.
- This is an exceedingly liberal principle since it focuses entirely on maximizing gains a favorable situation and ignores the losses to be incurred under unfavorable situations.

- The ***maxi-min returns principle,*** on the other hand, suggests that alternatives should be evaluated on the basis of the larger minimum return (maxi-min) which can be secured should things go wrong. On this basis one would be led to choose project A which guarantees a minimum return of Birr 20,000 in the occurrence of an unfavorable state of nature. Unlike the previous case, this is an exceedingly conservative principle since it focuses entirely on minimizing losses in an unfavorable situation and ignores the gains to be secured under favorable situations.
- The ***mini-max regret principle*** takes into account potential gains and potential losses under alternative states of nature.
- Thus, in the present case, choice of project B would entail the 'regret' of incurring extra loss of 30,000 (20 - (-10)) in the 'without-fish' situation while choice of project A would entail the 'regret' of sacrificing a potential extra gain of Birr 50,000 (150 - 100) in the 'with fish' situation. If no probabilities can be attached to these alternative states of nature, one must implicitly assume them equally probable, and thus choose B since this choice entails *minimizing 'regret'*.
- Turning now to choice in a situation where probabilities can be assigned to alternative outcomes (choice under risk as opposed to choice under uncertainty), let us suppose that the 'with fish' situation has a 90 percent chance of occurrence while the alternative state has a 10 percent chance. In this case one rule which might be adopted is to choose that version having the highest mean expected value of NPV, or version B.
- Version A: 0.1 (20,000) + 0.9 (100,000) = 92,000
- Version B: 0.1 (-10,000) + 0.9 (150,000) = 134,000
- This rule can obviously be generalized to cover situations where there are more than two discrete outcomes. There are situations, however, when the expected value rule cannot serve as a guide to choice, as for example when two versions of a project have the same E (NPV) but different variance.

- **7.2.4 Time series analysis**
- Here we will try to consider the problems of *prediction* per se; that is, how historical information may be used to make inferences about what is likely to happen in the future. Here one enters the realm of functional relationships which deal with questions of the form ‘How far are changes in one variable’ the dependent variable, caused by changes in some other variables or set of variables, the independent variable(s). Projection (forecasting) is inevitably subject to a high degree of uncertainty about what will actually happen.
- A proper understanding of causality (cause and effect relationship) underlying a given relationship will be critical both to the interpretation of statistical results and to the choice of the tools of the analysis themselves. The simplest and most widely used prediction technique involves looking at historical data for a given variable and inferring from past behavior what future behavior will be.
- For instance, if we assume some form of relationship between, say GNP, and time, this can be expressed as: Y = f(X) where X = time and, Y = GNP. If the form of relationship can be assumed linear, we may write: $Y = a + bX$, where ‘a’ is the y-intercept and ‘b’ the slope. Then by determining values for the parameters a and b, values of Y can be predicted corresponding to desired future values of X (time).
- To determine the values of a and b, one typically uses statistical techniques (simple regression analysis) making assumptions about the characteristics of the data with which one is working, the most important of which is that observations are independent of one another. The following example illustrates the computation of trend line by the use of simple regression techniques. In the example given below, one is concerned to predict the world price of wheat in 1993 using seven observations covering the period 1981 - 1987. Forecasting trend in world wheat price:

Year	**Price of wheat (Birr per ton)**	**Price index (1987 =100)**	**Wheat at 1987 Constant prices**	**X Year**
1981	64.6	93	69.5	0
1982	66.4	94	70.6	1
1983	69.0	94	73.4	2
1984	67.3	95	70.8	3
1985	68.0	98	69.4	4
1986	71.1	99	71.8	5
1987	65.6	100	65.6	6

In column 2, the price of wheat is shown at current prices, and an index of world commodity prices is used to transform the series into constant 1987 prices (in column 4). Y is then regressed on X and *a* and *b* is estimated as follows:

$$y = a + bx$$

$$b = \frac{\sum x_i y_i - n\bar{x}\,\bar{y}}{\sum x_i^2 - n\bar{x}^2}$$

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

Where n = number of observations. This method of obtaining the desired parameters is called the ***'least squares' method*.** In the above case, the estimated trend line is Y = 72.1 - 0.5X, and the predicted value of Y in 1993 is obtained simply by substituting the number of the year (12) for X and solving the equation, which gives us Birr 66.10. One could also estimate confidence intervals (at say, 95 percent probability) for predictions. Finally, one would normally estimate the degree to which variation in the variable Y is explained by variation in X (the coefficient of determination, R^2) as well as test whether the estimated slope coefficient, b, is significant.

7.3 Switching values and sensitivity analysis

- **7.3.1 Switching values**
- The value an element of a project would have to reach as a result of a change in an unfavorable direction before that project no longer meets the minimum level of acceptability as indicated by one of the measures of project worth is called the switching value. When we calculate a switching value, we ask how much an element would have to change in an unfavorable direction before the project would no longer meet the minimum level of acceptability as indicated by one of the measures of project worth. Then those responsible for determining whether to proceed with the project can ask themselves how likely they feel it is that there will be a change of that magnitude.
- **Example 1**: Assume that 25% short fall in net benefit yields an NPW of 11,985 Birr and 30% shortfall yields a negative NPW of -14,044 Birr. Hence, a proportionate fall that will make NPW equal zero at 12 percent opportunity cost of capital is 27% [25 + (30-25){11,985 ÷ (11,985+14044)}]. This is just one of the interpolation formula of the IRR.
- **Example 2**. Think of a hypothetical 1 hectare mango project having sum of present value of benefits equal to Birr 31,278.04 and sum of present value of costs equal to Birr 24093.70. For this particular project, the B-C ratio will be 31,278.04/ 24,093.70 = 1.30. One benefit of the B-C ratio is that it can be used directly to note how much costs could rise (benefits could fall) without making the project unattractive. This is a quick means to estimate switching values because switching value is the amount an element of a project can change before the project becomes an unacceptable investment.

- **7.3.2 Sensitivity analysis**
- Another method popularly thought of as a means of allowing for risk and uncertainty in projects is ***sensitivity analysis*** (also called ***most probable outcome analysis***).
- It is another variant of the switching value.
- This is because they are different ways of asking the same question.
- Sensitivity analysis asks the question 'is the project sensitive to a drop in output price by 30 percent? Computing switching values, on the other hand, needs answering the question 'by how much can prices increase to bring a change from acceptance to rejection or vice versa'. To find switching values for prices, for instance using NPW, substitute 0 for NPW and find corresponding prices.
- As the term clearly indicates the sensitivity analysis is a technique in which the sensitivity of profit (or NPV or IRR) to the change in one particular factor is checked.
- The philosophy that 'only a few factors may warrant management attention' is embedded in the sensitivity analysis.
- The vital few have to be identified, as they make a difference to the success of the project.
- The sensitivity analysis technique is also called 'what if' analysis because it involves a process of recalculating the NPV if a particular factor turns out to be a different level than original estimated.
- The primary reason that sensitivity analysis is important to decision makers is that real world problem exists in dynamic environment.
- Sensitivity analysis essentially involves varying key parameter values, usually one at a time but sometimes in combination, and assessing the effect of such changes on the central tendency estimate of profitability. This can be useful if information about key parameters is such that some common yardstick can be used to assess how far each parameter should be varied; for example, each parameter might be varied by ± 1 standard deviation.
- Unfortunately, it is more common to vary primary parameters by a fixed percentage (viz. 10 %) which tells us nothing useful about the measurement of dispersion associated with (NPV), although varying each parameter separately may tell us something useful about which of these is most critical in explaining dispersion.
- Sensitivity refers to the relative magnitude of the change in one or more elements of an engineering economy problem that will reverse a decision among alternatives. Thus, if one particular element can be varied over a wide range of values without affecting the decision, the decision under consideration is said not to be sensitive to uncertainties regarding that particular element. On the other hand, if a small change in the estimate of one element will alter the decision, the decision is said to be very sensitive to changes in the estimates of that element. '*Elements*' refers to investment cost, output prices, rate of production expansion, physical quantities of outputs produced, operating costs, time and cost of equipment replacement, project life, and so on.

- Combinations of elements can also be changed. That is, instead of holding all values constant except one, changes can be considered for two or more elements in combination. However, the significance of individual elements is not observed when they are tested in groups. Second, the joint probabilities of extreme events for two or more elements normally become quite small and it is doubtful that management can afford to be adverse to such remote possibilities. Sensitivity calculations themselves do not incorporate probabilistic values, but interpretation of results implicitly, if not explicitly, brings probabilistic values into play because once we decide that a given project is sensitive to a given project cost or benefit item, we need to trace back to the probability of occurrence of that change.
- To sum up, one can list the following ***advantages of sensitivity analysis***:-
  - It enables to judge the reliability of a projected (estimated) profitability; it provides more information for judging the merits of investments than single- valued estimates of profitability;
  - It helps to identify key elements of a project for its success so that project designers, evaluators, and administrators can allocate time and effort accordingly;
  - It enables us to alter the projects in ways that will increase the certainty of favorable results; and
  - It enables to identify those factors responsible for wide variances in results and reduce their impact;

8. MONITORING AND EVALUATION IN PROJECT CYCLE

Monitoring

Planning without control is a waste of energy and resources. Monitoring keeps track of how the project aligns itself to the established goals with respect to quality, time and resource.

Monitoring is a management process that systematically seeks to supply to the stakeholders information on the progress of implementation of a project in order to facilitate decision making.

The most important objective in monitoring is not to find fault and villains in instance of delay or overspending. The point of prime importance is that the findings of monitoring process can be utilized to benefit the project.

We Consider	**Causes and consequences of deviations**	**Measures taken and proposed**
Quality: - goals requirement and ambition		
Schedule: - started and incomplete activities		
Costs: - outcome and budget		
Resources: - access and needs		

In monitoring exercise what is monitored is

Effectiveness: – is the degree or the extent to which the project has achieved its outputs, objectives and reached its target people.

Efficiency: - is the ratio of outputs relative to costs incurred.

Relevance: - is the degree/ extent to which the program activity sense to the target factor or the degree to which the rationale and objectives of a project are, or remain pertinent, significant and worthwhile, in relation to the identified priority needs and concerns of stakeholder.

Impact: - the perceived change in the status quo / the degree to which the beneficiaries are affected positively or negatively by a project.

Evaluation

- Evaluation judges the value of activity by comparing actual direct outputs, socioeconomic results and wider eventual impact against those targeted during the planning of the project.
- This judgment should be made systematically and objectively, and for the reason it makes use of criteria or standard (e.g. relevance, efficiency, effectiveness, impact and sustainability)
- **Types of evaluation**
- **Ex-ante Evaluation**
- This typically takes place as part of the process of approving an activity (i.e. it takes place before implementation).
- Example evaluation should examine the following consideration
- The relationship and consistency between global objectives, specific objectives and project actions.
- The existence and relevance of output, result and impact indicators.
- The reliability of the qualification of the objectives.
- **Mid term evaluation**
- A mid term evaluation may be useful to provide feed back and allow adjustment to be made if necessary.
- Such an evaluation focuses on the earliest outputs & results from the project, and by comparing the current context with the baseline it shows the evaluation of the situation, thus facilitating a re examination of the objectives.
- Mid term evaluation should examine the degree of effectiveness achieved on the basis of the indicators collected during the monitoring.
- **Ex – post evaluation**
- This takes place after all the project activities have been implemented and should compare the expected objectives with those actually achieved (including impacts).
- It is concerned with the efficiency of actions and tries to assess utility and sustainability. The results of ex post evaluation may be used to allow future activities to be better designed and so respond to development needs in a more effective fashion.
-

- Why monitoring and evaluation?
- **Accountability: -** evaluation is important when receiving public funds as it is important to prove (account for) the efficient use of money provided. This need applies both to external funds and internal co financing.
- **Feed back: -** for development of improved policy making monitoring and evaluation can play an important role in the development of better policies/ interventions. By reviewing project actions and considering theory in terms of their relevance, efficiency and impact, and especially comparing these impacts with the status quo situation (no project actions), we can determine ways to improve policies and interventions.
- **Legal requirement: -** under certain program/ project evaluation is a legal requirement.
-

8.1 Definition and Scope of Monitoring and Evaluation

- While the project is being carried out, continuous monitoring is required to satisfy project implementers that things are proceeding according to plan. Monitoring typically requires the putting in place of a systematic information gathering and management system that can check the progress of the project according to the plans drawn up and objectives laid out. Once the project is completed (and possibly also several times during its implementation), it needs to be evaluated so as to enable analysts (borrowers or lenders) to assess its performance and outcome.
- The topics covered under this section include definition and scope of project monitoring and evaluation, key benefits and indicators, and result reporting techniques of monitoring and evaluation

- Monitoring is the systematic collection and analysis of information as a project progresses.
- It is aimed at improving the efficiency and effectiveness of a project or organization.
- It is based on targets set and activities planned during the planning phases of work.
- It helps to keep the work on track, and can let management know when things are going wrong.
- If done properly, it is an invaluable tool for good management, and it provides a useful base for evaluation.
- It enables you to determine whether the resources you have available are sufficient and are being well used, whether the capacity you have is sufficient and appropriate, and whether you are doing what you planned to do.

- **Monitoring involves**:
- Establishing indicators of efficiency, effectiveness and impact;
- Setting up systems to collect information relating to these indicators;
- Collecting and recording the information;
- Analyzing the information;
- Using the information to inform day-to-day management.
- Monitoring is an internal function in any project or organization.

- Evaluation is the comparison of actual project impacts against the agreed strategic plans. It looks at what you set out to do, at what you have accomplished, and how you accomplished it. It can be formative (taking place during the life of a project or organization, with the intention of improving the strategy or way of functioning of the project or organization). It can also be summative (drawing learning from a completed project or an organization that is no longer functioning).
- **Evaluation involves:**
- Looking at what the project or organization intended to achieve – what difference did it want to make? What impact did it want to make?
- Assessing its progress towards what it wanted to achieve, its impact targets.
- Looking at the strategy of the project or organization. Did it have a strategy? Was it effective in following its strategy? Did the strategy work? If not, why not?
- Looking at how it worked. Was there an efficient use of resources? What were the opportunity costs of the way it chose to work? How sustainable is the way in which the project or organization works? What are the implications for the various stakeholders in the way the organization works.

- **Evaluation Type**
- In an evaluation, we look at efficiency, effectiveness and impact. There are many different ways of doing an evaluation. Some of the more common terms you may have come across are:
- 1. **Self-evaluation**: This involves an organization or project holding up a mirror to itself and assessing how it is doing, as a way of learning and improving practice. It takes a very self-reflective and honest organization to do this effectively, but it can be an important learning experience.
- 2. **Participatory evaluation**: This is a form of internal evaluation. The intention is to involve as many people with a direct stake in the work as possible. This may mean project staff and beneficiaries working together on the evaluation. If an outsider is called in, it is to act as a facilitator of the process, not an evaluator.
- 3. **Rapid Participatory Appraisal (RPA)**: Originally used in rural areas, the same methodology can, in fact, be applied in most communities. This is a qualitative way of doing evaluations. It is semi-structured and carried out by an interdisciplinary team over a short time. It is used as a starting point for understanding a local situation and is a quick, cheap, useful way to gather information. It involves the use of secondary data review, direct observation, semi-structured interviews, key informants, group interviews, games, diagrams, maps and calendars. In an evaluation context, it allows one to get valuable input from those who are supposed to be benefiting from the development work. It is flexible and interactive.
- 4. **External evaluation**: This is an evaluation done by a carefully chosen outsider or outsider team.
- 5. **Interactive evaluation**: This involves a very active interaction between an outside evaluator or evaluation team and the organization or project being evaluated. Sometimes an insider may be included in the evaluation team.

Advantages and Disadvantages of Internal and External Evaluations

	Advantages	Disadvantages
Internal evaluation	The evaluators are very familiar with the work, the organizational culture and the aims and objectives. Sometimes people are more willing to speak to insiders than to outsiders. An internal evaluation is very clearly a management tool, a way of self-correcting, and much less threatening than an external evaluation. This may make it easier for those involved to accept findings and criticisms An internal evaluation will cost less than an external evaluation.	The evaluation team may have a vest interest in reaching positive conclusions about the work or organization. For this reason, other stakeholders, such as donors, may prefer an external evaluation. The team may not be specifically skilled or trained in evaluation. The evaluation will take up a considerable amount of organizational time – while it may cost less than an external evaluation, the opportunity costs (see Glossary of Terms) may be high.
External evaluation (done by a team or person with no vested interest in the project)	The evaluation is likely to be more objective as the evaluators will have some distance from the work. The evaluators should have a range of evaluation skills and experience. Sometimes people are more willing to speak to outsiders than to insiders. Using an outside evaluator gives greater credibility to findings, particularly positive findings.	Someone from outside the organization or project may not understand the culture or even what the work is trying to achieve. Those directly involved may feel threatened by outsiders and be less likely to talk openly and co-operate in the process. External evaluation can be very costly. An external evaluator may misunderstand what you want from the evaluation and not give you what you need.

- **Selecting an External Evaluator or Evaluation Team**
- Qualities to look for in an external evaluator or evaluation team:
- An understanding of development issues.
- An understanding of organizational issues.
- Experience in evaluating development projects, programmes or organizations.
- A good track record with previous clients.
- Research skills.
- A commitment to quality.
- A commitment to deadlines.
- Objectivity, honesty and fairness.
- Logic and the ability to operate systematically.
- Ability to communicate verbally and in writing.
- A style and approach that fits with your organization.
- Values those are compatible with those of the organization.
- Reasonable rates (fees), measured against the going rates.

- **When you decide to use an external evaluator**:
- Check his/her/their references.
- Meet with the evaluators before making a final decision.
- Communicate what you want clearly – good Terms of Reference (see Glossary of Terms) are the foundation of a good contractual relationship.
- Negotiate a contract which makes provision for what will happen if time frames and output expectations are not met.
- Ask for a work plan with outputs and timelines.
- Maintain contact – ask for interim reports as part of the contract – either verbal or written.
- Build in formal feedback times.

Different Approaches to Evaluation

Approach	Major purpose	Typical focus questions	Likely methodology
Goal-based	Assessing achievement of goals and objectives.	Were the goals achieved? Efficiently? Were they the right goals?	Comparing baseline (see Glossary of Terms) and progress data (see Glossary of Terms); finding ways to measure indicators.
Decision-making	Providing information	Is the project effective? Should it continue? How might it be modified?	Assessing range of options related to the project context, inputs, process, and product. Establishing some kind of decision-making consensus.
Goal-free	Assessing the full range of project effects, intended and unintended.	What are all the outcomes? What value do they have?	Independent determination of needs and standards to judge project worth. Qualitative and quantitative techniques to uncover any possible results.
Expert judgement	Use of expertise.	How does an outside professional rate this project?	Critical review based on experience, informal surveying, and subjective insights.

- Our feeling is that the best evaluators use a combination of all these approaches, and that an organization can ask for a particular emphasis but should not exclude findings that make use of a different approach.

8.2. Monitoring and Evaluation design

- Good monitoring and evaluation design during project preparation is a much broader exercise than just the development of indicators. Good design has five components:
- 1. Clear statements of measurable objectives for the project and its components, for which indicators can be defined.
- 2. A structured set of indicators, covering outputs of goods and services generated by the project and their impact on beneficiaries.
- 3. Provisions 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.
- 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

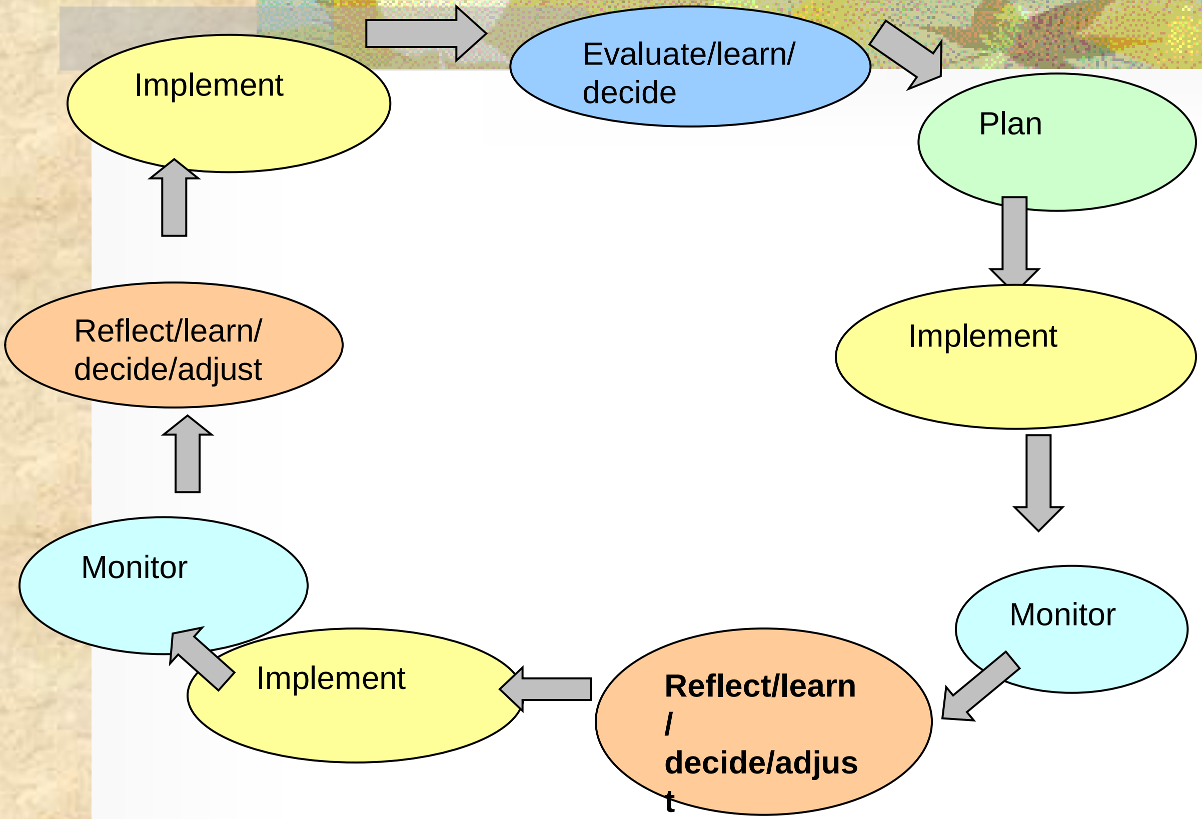
8.3. Key Benefits and Indicators of Monitoring and Evaluation

- Project monitoring and evaluation has different dimensions of benefits for project manager, financer, and beneficiaries enabling to review progress, identify problems in planning and/or implementation, and make adjustments.
- In many organizations, "monitoring and evaluation" is something that is seen as a donor requirement rather than a management tool. Donors are certainly entitled to know whether their money is being properly spent, and whether it is being well spent. But the primary (most important) use of monitoring and evaluation should be for the organization or project itself to see how it is doing against objectives, whether it is having an impact, whether it is working efficiently, and to learn how to do it better. This section basically deals with explaining key benefits of project monitoring and evaluation and indicators.
-

- Monitoring and Evaluation system can provide managers and stockholders with regular information on progress relative to targets and this enables managers:
- 1. Have constant feedback on the extent to which the projects are achieving their goals
- 2. Identify potential problems at an early stage and propose possible solutions.
- 3. Monitor the accessibility of the project to all sectors of the target population.
- 4. Monitor the efficiency with which the different components of the project are being implemented and suggest improvements.
- 5. Evaluate the extent to which the project is able to achieve its general objectives.
- 6. Have guidelines for the planning of future projects
- 7. Influence sector assistance strategy. Relevant analysis from project and policy evaluation can highlight the outcomes of previous interventions, and the strengths and weaknesses of their implementation.
- 8. Improve project design. Use of project design tools such as the logframe (logical framework) results in systematic selection of indicators for monitoring project performance. The process of selecting indicators for monitoring is a test of the soundness of project objectives and can lead to improvements in project design.
- 9. Incorporate views of stakeholders. Awareness is growing that participation by project beneficiaries in design and implementation brings greater “ownership” of project objectives and encourages the sustainability of project benefits. Ownership brings accountability. Objectives should be set and indicators selected in consultation with stakeholders, so that objectives and targets are jointly “owned”. The emergence of recorded benefits early on helps reinforce ownership, and early warning of emerging problems allows action to be taken before costs rise.
- 10. Show need for mid-course corrections. A reliable flow of information during implementation enables managers to keep track of progress and adjust operations to take account of experience.
- Used effectively at all stages of project cycle, monitoring and evaluation can to strengthen the project design and implementation, and stimulate partnership with stakeholders.

- Monitoring and evaluation enable you to check the “bottom line” of development work: Not “are we making a profit?” but “are we making a difference?” Through monitoring and evaluation, you can:
- Review progress;
- Identify problems in planning and/or implementation;
- Make adjustments so that you are more likely to “make a difference”.
- Plans are essential but they are not set in concrete (totally fixed). If they are not working, or if the circumstances change, then plans need to change too.
- Therefore, monitoring and evaluation are both tools which help a project or organization know when plans are not working, and when circumstances have changed.
- They give management the information it needs to make decisions about the project or organization, about changes that are necessary in strategy or plans.
- The effect of monitoring and evaluation can be seen in the following cycle. Note that you will monitor and adjust several times before you are ready to evaluate and re-plan.

Figure : Monitoring and evaluation cycle



Source: Guijt and Gaventa (1998)

- It is important to recognize that monitoring and evaluation are not magic wands that can be waved to make problems disappear, or to cure them, or to miraculously make changes without a lot of hard work being put in by the project or organization. In themselves, they are not a solution, but they are valuable tools. Monitoring and evaluation can:
- Help you identify problems and their causes;
- Suggest possible solutions to problems;
- Raise questions about assumptions and strategy;
- Push you to reflect on where you are going and how you are getting there;
- Provide you with information and insight;
- Encourage you to act on the information and insight;
- Increase the likelihood that you will make a positive development difference.

- **Input indicators** are quantified and time-bound statements of resources to be provided. Information on these indicators comes largely from accounting and management records. Input indicators are often left out of discussions of project monitoring, though they are part of the management information system. A good accounting system is needed to keep track of expenditures and provide cost data for performance analysis of outputs. Input indicators are used mainly by managers closest to the tasks of implementation, and are consulted frequently, as often as daily or weekly.
- **Examples**: vehicle operating costs for the crop extension service; levels of financial contributions from the government or co-financiers; appointment of staff; provision of buildings; status of enabling legislation.
- **Process indicators** measure what happens during implementation. Often, they are tabulated as a set of contracted completions or milestone events taken from an activity plan.
- Examples: Date by which building site clearance must be completed; latest date for delivery of fertilizer to farm stores; number of health outlets reporting family planning activity; number of women receiving contraceptive counseling; status of procurement of school textbooks.

- **Output indicators** show the immediate physical and financial outputs of the project: physical quantities, organizational strengthening, initial flows of services. They include performance measures based on cost or operational ratios.
- **Examples**: Kilometers of all-weather highway completed by the end of September; percentage of farmers attending a crop demonstration site before fertilizer top-dressing; number of teachers trained in textbook use; cost per kilometer of road construction; crop yield per hectare; ratio of textbooks to pupils; time taken to process a credit application; number of demonstrations managed per extension worker; steps in the process of establishing water users' associations.
- **Impact** refers to medium or long-term developmental change. (Some writers also refer to a further class of outcome indicators, more specific to project activities than impact indicators, which may be sectoral statistics, and deal more with the direct effect of project outputs on beneficiaries.) Measures of change often involve complex statistics about economic or social welfare and depend on data that are gathered from beneficiaries. Early indications of impact may be obtained by surveying beneficiaries' perceptions about project services. This type of leading indicator has the twin benefits of consultation with stakeholders and advance warning of problems that might arise.

- **Examples of impact**: (health) incidence of low birth weight, percentage of women who are moderately or severely anemic; (education) continuation rates from primary to secondary education by sex, proportion of girls completing secondary education; (forestry) percent decrease in area harvested, percent increase in household income through sales of wood and non-wood products. Examples of beneficiary perceptions: proportion of farmers who have tried a new variety of seed and intend to use it again; percentage of women satisfied with the maternity health care they receive.
- **Exogenous indicators:** are those that cover factors outside the control of the project but which might affect its outcome, including risks (parameters identified during economic, social, or technical analysis, that might compromise project benefits); and the performance of the sector in which the project operates. The relative importance of indicators is likely to change during the implementation of a project, with more emphasis on input and process indicators at first, shifting to outputs and impact later on. This is a distinction between indicators of implementation progress and indicators of development results.

- **Method of reporting and what is to be monitored**
- **What should you monitor?**
- Status of work being performed compared to the plan
- Volume of work being completed
- Quality of work being completed
- Costs and expenditures compared to the plan
- Attitudes of people working on the project and others who are involved with the project, including customers and management
- **. What monitoring should you accomplish?**
- Communicate project status and changes to other project team members
- Inform management (and clients or customers) about the status of the project
- Provide the justification for making project adjustments
- Document current plans compared to the original project plan
- **Formal and informal ways to tell what's going on Formal:**
- **Reports** – Status reports must be completed by all team members so that progress and problems can be identified easily and early. Use a standardized form at regular, predetermined intervals.
- **Audits** – Usually performed by objective outsiders who review progress, costs and current plans.
- **Project review meetings** – Periodic meeting of key team members, not just managers and supervisors to get together to resolve issues. Frequency will depend on size and nature of project and problems experienced.
- **Informal:**
- General conversations with the team
- Ongoing interaction with stakeholders
- Observations during management by walking around

Reports and administrative guidelines for small and large projects

Action	Daily	Weekly	Monthly	Quarterly
Informal discussions with team	Small	Large		
Staff meetings with managers		Both		
Project review meetings with team		Small	Large	
Status report		Small	Large	
Project audit (optional)				Large
Team building activity			Both	
Report to management			Both	

Small = small projects
Large = large projects
Both = both small and large projects

- Examples of forms for reporting:
- Schedule update form – to inform team members of changes in the work plan so they can adjust their duties to match
- Supply and equipment request form – so that team members can tell you what they need before they need it
- Status reporting forms – give each team member a stack of forms for reporting their weekly and monthly progress. The report must contain the following information:
- Tasks completed since the last status report with dates completed
- Tasks in progress with forecast completion dated
- Tasks planned with expected completion dates
- Budget expenditures
- Issues that need attention
- Recommendations for project improvements or changes
- Questions or items that require other people’s approval or input.

- **Ways to catch predicaments before they turn into disasters**
- Keep in touch
- Start with an open door policy
- Establish an environment of motivation
- Informal meetings and one-on-ones
- Simple, necessary administrative procedures
- Collect only information you will use
- Store ready for access, easy to retrieve when you need to analyze it.
- Remember
- Every report needs a purpose
- Ask '*is this report or procedure the best way to communicate this information?'*
- Every report needs an audience
- Don't overdo it
- Keep people up to date

- **The final report**
- The final report is both a history of the project and a final evaluation of performance. If you keep a project diary, producing a final report is relatively easy. Before you formally evaluate your completed or closed-down project, you need input from your core team. Ask for a brief written report or provide them with a simple questionnaire to complete. Then schedule an informal meeting with key players and ask them their opinions about the project and what they would do differently next time. Take notes so you remember comments and confirm that you value their input.
- **The main things to have in a final report include**
- Overview of the project including revisions to the original project plan
- Summary of major accomplishments
- Analysis of achievements compared to original goals for the project
- Final financial accounting and explanation of variances from the budget
- Evaluation of administrative and management performances
- Team performance (this section should be confidential when it applies to specific individuals and their performance)
- Issues or tasks that require further investigation
- Recommendations for future projects of this type
- Special acknowledgements to team members

- **The least you need to know**
- Each project is a learning experience.
- Once a project ends, take stock of what went right and what went wrong
- On most projects, a final report is required to inform all participant and stakeholders of the project’s results.
- Your daily project log or diary can be a useful tool in looking for problems and assembling the final report.
- Not all report information should be available to team members and outsiders.
- Performance should be formally or informally reviewed when team members depart from the project or when the project is completed.

9. SAM and CGE

- **9.1. Social accounting matrix (SAM)**
- A social accounting matrix (SAM) is a comprehensive, economy wide data framework; typically representing the economy of a nation.
- More technically, a SAM is a square matrix in which each account is represented by a row and a column.
- E ach cell shows the payment from the account of its column to the account of its row.
- Thus, the incomes of an account appear along its row and its expenditures along its column.
- The underlying principle of double-entry accounting requires that, for each account in the SAM, total revenue (row total) equals total expenditure (column total).

- With one exception, it has all of the features required for implementation with the standard CGE model.
- The exception is that in the standard SAM, taxes have to be paid to tax accounts, disaggregated by tax type, each of which forwards its revenues to the core government account.
- The tax types are divided into direct taxes (on domestic nongovernment institutions and factors), commodity sales taxes, import taxes, export taxes, activity taxes, and value-added taxes.
- Also note that, in the standard SAM, payments are not permitted in the blank cells of Table 1.
- Any original SAM that includes such payments should be restructured before being implemented with the standard CGE model.

- Thus the total value of each commodity includes these transaction costs.
- The standard CGE model will also work with SAMs without this treatment of (and these accounts for) transaction costs.
- Third, as noted, the government is disaggregated into a core government account and different tax accounts, one for each tax type.
- This disaggregation is often necessary because the economic interpretation of some payments may otherwise be ambiguous.
- In any given application, the SAM may exclude any (or all) of the individual tax accounts.
- In the SAM, payments between the government and other domestic institutions are reserved for transfers.

9.2. OVERVIEW OF THE STANDARD CGE MODEL

- The standard CGE model explains all of the payments recorded in the SAM.
- The model therefore follows the SAM disaggregation of factors, activities, commodities, and institutions.
- It is written as a set of simultaneous equations, many of which are nonlinear.
- There is no objective function.
- The equations define the behavior of the different actors.
- In part, this behavior follows simple rules captured by fixed coefficients
-

- For production and consumption decisions, behavior is captured by nonlinear, first-order optimality conditions, that is, production and consumption decisions are driven by the maximization of profits and utility, respectively.
- The equations also include a set of constraints that have to be satisfied by the system as a whole but are not necessarily considered by any individual actor.
- These constraints cover markets (for factors and commodities) and macroeconomic aggregates (balances for Savings, Investment, the government, and the current account of the rest of the world).

- **ACTIVITIES, PRODUCTION, AND FACTOR MARKETS**
- Each producer (represented by an activity) is assumed to maximize profits, defined as the difference between revenue earned and the cost of factors and intermediate inputs.
- Profits are maximized subject to a production technology, the structure of which is shown in Figure 1.
- At the top level, the technology is specified by a constant elasticity of substitution (CES) function or, alternatively, a Leontief function of the quantities of value-added and aggregate intermediate input.
- The Leontief alternative is the default. The CES alternative may be preferable for particular sectors if empirical evidence suggests that available techniques permit the aggregate mix between value-added and intermediate inputs to vary.
- Value added is itself a CES function of primary factors whereas the aggregate intermediate input is a Leontief function of disaggregated intermediate inputs.
- Each activity produces one or more commodities according to fixed yield coefficients.
- As noted, a commodity may be produced by more than one activity.
- The revenue of the activity is defined by the level of the activity, yields, and commodity prices at the producer level.
- As part of its profit-maximizing decision, each activity uses a set of factors up to the point where the marginal revenue product of each factor is equal to its wage (also called factor price or rent).
- Factor wages may differ across activities, not only when the market is segmented but also for mobile factors.
- In the latter case, the model incorporates discrepancies that stem from exogenous causes (for example, wage differences across activities resulting from considerations such as status, comfort, or health risks).

Commodity outputs (fixed yield coefficients)			
Activity level (CES/Leontief function)			
Value-added (CES function)	Intermediate (Leontief function)		
Primary factors	Intermediate (Leontief function)		
	Imported	Domestic	

Table 1—The Basic SAM structure used in the CGE model

Receipts	Expenditures								
	Activities	Commodities	Factors	Households	Enterprises	Government	Savings-Investment	Rest of the World (ROW)	Total
Activities		Marketed outputs		Home-consumed outputs					Activity income (gross output)
Commodities	Intermediate inputs	Transaction costs		Private consumption		Government consumption	Investment	Exports	Demand
Factors	Value-added							Factor income from ROW	Factor income
Households			Factor income to households	Interhousehold transfers	Surplus to households	Transfers to households		Transfers to households from ROW	Household income
Enterprises			Factor income to enterprises			Transfers to enterprises		Transfers to enterprises from ROW	Enterprise income
Government	Producer taxes, value-added tax	Sales taxes, tariffs, export taxes	Factor income to government, factor taxes	Transfers to government, direct	Surplus to Government, direct enterprise taxes			Transfer to Government from ROW	Government income
Savings-Investment				Household savings	Enterprise savings	Government savings		Foreign savings	Savings
Rest of the World (ROW)		Imports	Factor income to ROW		Surplus to ROW	Government transfers to ROW			Foreign exchange outflow
Total	Activity	Supply expenditures	Factor expenditures	Household expenditures	Enterprise expenditures	Government expenditures	Investment	Foreign exchange inflow	

MODEL EXTER: AN OPEN ECONOMY WITH GOVERNMENT
SOCIAL ACCOUNTING MATRIX

Receipts → / Expenses ↓	FACTORS		AGENTS					INDUSTRIES				DOMESTIC MARKET				EXPORT MARKET			ACC.	TOTAL
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	(1 to 19)
1. Labour								WL_A	WL_I	WL_S	WL_N									WL
2. Capital								RK_A	RK_I	RK_S										RK
3. Labour endowed households	WL					TG														YH_{HW}
4. Capital endowed households		RK_{HC}			DIV															YH_{HC}
5. Firms		RK_F																		YF
6. Government			DTH_{HW}	DTH_{HC}	DTF							TI_A	TI_I	TI_S		TE_A				YG
7. Rest of the World		RK_{ROW}			DV_{ROW}							IM_A	IM_I	IM_S						R_{ROW}
8. Agriculture												VD_A				EX_A				VX_A
9. Industry													VD_I				EX_I			VX_I
10. Services														VD_S				EX_S		VX_S
11. Non-tradables															VD_N					VX_N
12. Agriculture			$E_{A,HW}$	$E_{A,HC}$				$CI_{A,A}$	$CI_{A,I}$	$CI_{A,S}$	$CI_{A,N}$								IV_A	VXD_A
13. Industry			$E_{I,HW}$	$E_{I,HC}$				$CI_{I,A}$	$CI_{I,I}$	$CI_{I,S}$	$CI_{I,N}$								IV_I	VXD_I
14. Services			$E_{S,HW}$	$E_{S,HC}$				$CI_{S,A}$	$CI_{S,I}$	$CI_{S,S}$	$CI_{S,N}$									VXD_S
15. Non-tradables						G														VXD_N
16. Agriculture							ET_A													ET_A
17. Industry							ET_I													ET_I
18. Services							ET_S													ET_S
19. Accumulation			SH_{HW}	SH_{HC}	SF	SG	CAB													ST
TOTAL (1 to 19)	WL	RK	YH_{HW}	YH_{HC}	YF	YG	R_{ROW}	VX_A	VX_I	VX_S	VX_N	VXD_A	VXD_I	VXD_S	VXD_N	ET_A	ET_I	ET_S	IT	

Legend

$i,j \in \{A,I,S,N\}$	Industries and commodities (A: agriculture, I: industry, S: service tradable services)
$h \in \{HW,HC\}$	Households (HW: labour endowed households, HC: capital endo households)
CAB	Current account balance
$CI_{i,j}$	Intermediate consumption of commodity i in industry j
DIV	Dividends paid to capitalists
DIV_{row}	Dividends paid to the rest of the World
DTF	Direct tax on firm's income
DTH_h	Direct tax on household's h income
EX_i	Exports of commodity i (excluding taxes)
ET_i	Exports of commodity i (including taxes)
$E_{i,h}$	Household h's expenditure in commodity i
G	Public expenditures
IM_i	Imports of commodity i
IT	Total investment
IV_i	Investment in commodity i
R_{row}	Receipts of the rest of the World
RK_F	Capital revenue paid to firms
RK_{HC}	Capital revenue paid to capitalists
RK_j	Return to capital from industry j
RK_{row}	Capital revenue paid to rest of the World
RK	Total capital revenue
SF	Firms' savings
SG	Government's savings
SH_h	Household h's savings
ST	Total savings
TE_i	Tax on exports of commodity i
TG	Public transfers to workers
TI_i	Indirect tax and tariff duties on commodity i
VD_j	Output of industry j sold on domestic market (at producer price
VX_j	Output of industry j (at producer price)
VXD_i	Composite commodity i (at consumer price)
WL_j	Wage bill paid by industry j
WL	Total wage bill paid to workers
YF	Firms' income
YG	Government's income
YH_h	Household h's income

A. Equations (50)

Production

1. $VA_j = v_j \cdot XS_j$ 3

2. $CI_j = io_j \cdot XS_j$ 3

3. $VA_j = A_j \cdot LD_j^{\alpha_j} \cdot KD_j^{1-\alpha_j}$ 3

4. $LD_j = \dfrac{\alpha_j \cdot PVA_j \cdot VA_j}{W}$ 3

5. $DI_{i,j} = aij_{i,j} \cdot CI_j$ 9

Income and savings

6. $YH_{hw} = W \cdot \sum_j LD_j$ 1

7. $YH_{hc} = \lambda \cdot \sum_j R_j \cdot KD_j + DIV$ 1

8. $SH_h = \psi_h \cdot YH_h$ 2

9. $YF = (1-\lambda) \cdot \sum_j R_j \cdot KD_j$ 1

10. $SF = YF - DIV$ 1

Demand

11. $C_{i,h} = \dfrac{\gamma_{i,h} \cdot YH_h}{P_i}$ 6

12. $INV_i = \dfrac{\mu_i \cdot IT}{P_i}$ 3

13. $DIT_i = \sum_j DI_{i,j}$ 3

Prices

14. $PVA_j = \dfrac{P_j \cdot XS_j - \sum_i P_i \cdot DI_{i,j}}{VA_j}$ 3

15. $R_j = \dfrac{PVA_j \cdot VA_j - W \cdot LD_j}{KD_j}$ 3

Equilibrium

16. $XS_i = DIT_i + \sum_h C_{i,h} + INV_i$ 3

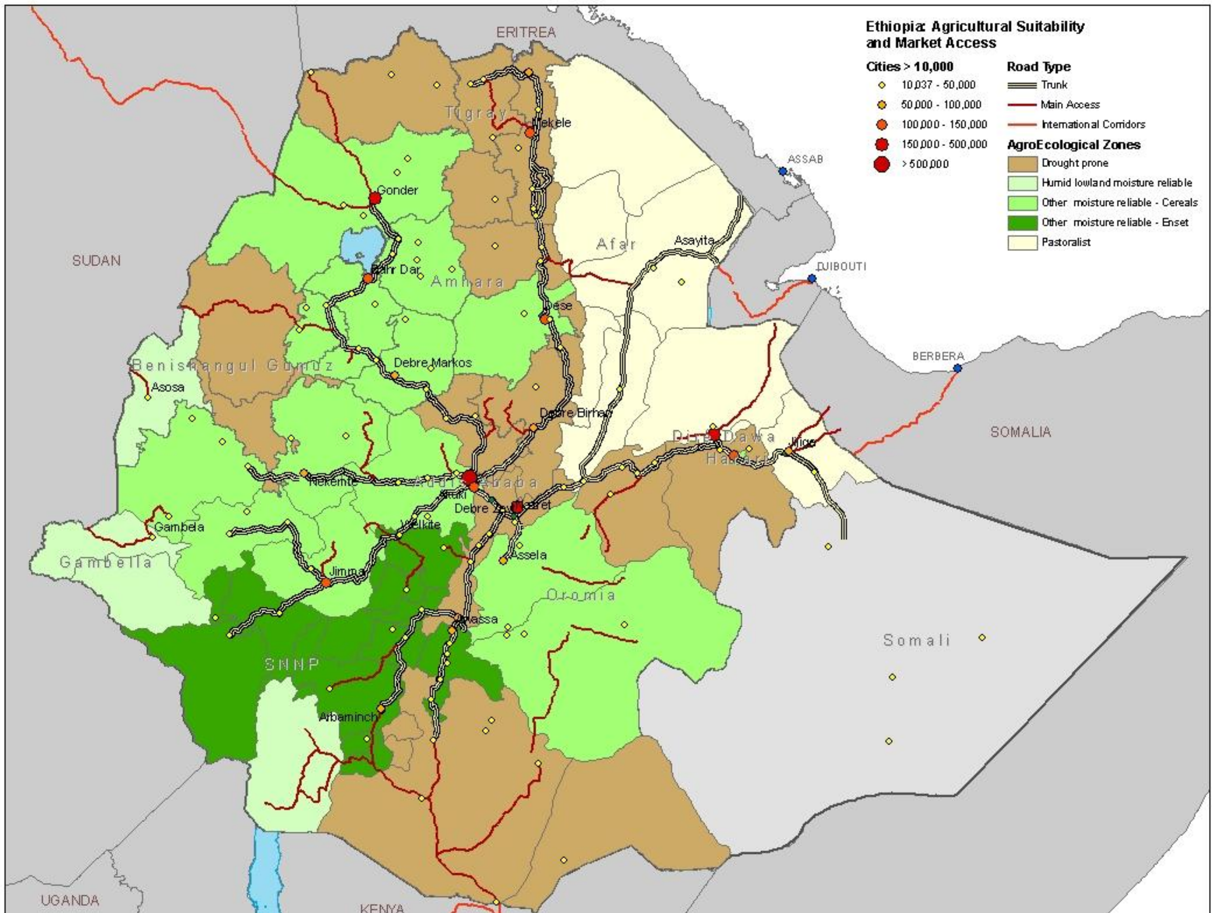
17. $LS = \sum_j LD_j$ 1

18. $IT = \sum_h SH_h + SF$ 1

The Data Base
EDRI Social Accounting Matrix 2004/05

- Constructed as part of a project with the University of Sussex (w/support of IFPRI-ESSP2)
- 65 production sectors (24 agricultural, 10 agricultural processing, 20 other industry, 11 services)
- Regional SAM based on the "3 Ethiopias"
  - Rainfall sufficient, drought prone, pastoralist
  - Rainfall sufficient AEZ disaggregated to humid lowlands, enset-based systems, and other (highland) rainfall sufficient areas
- Poor and non-poor groups in rural and urban areas

Agro-ecological Zones
“Three” Ethiopias



The CGE Model

- Production
  - Value added modeled using constant elasticity of substitution (CES) production functions of factor inputs (land, livestock capital, various types of labor and non-agricultural capital)
  - Intermediate inputs into production are determined as fixed shares of the quantity of output.
- Trade
  - Imported goods are assumed to be imperfect substitutes for domestically produced goods;
  - Likewise, exported goods are imperfect substitutes for domestically produced and consumed goods.

The CGE Model (2)

- Incomes and Consumption
  - Payments from each factor of production is allocated to households and other institutions using fixed shares derived from the base SAM.
  - Household consumption is modeled using a Linear Expenditure System (LES) specification.
- Factors of production
  - Non-agricultural capital is fixed by sector, as is agricultural land.
  - Labor is free to move across sectors, but total labor supply is exogenous and the wage rate adjusts to balance supply and demand for labor.

The CGE Model (3)

- Macro-closure
  - Savings-investment closure with investment fixed in real terms, and with the marginal propensity to save of urban households adjusting so that total savings in the economy is equal to total investment.
  - The consumer price index is fixed at its base level (and so serves as the numeraire)
  - Foreign savings is also fixed, and the exchange rate adjusts to help bring about equilibrium in the market for foreign exchange.
  - In the simulations with foreign exchange rationing, rents are modeled using an implicit tariff for all imports that adds to the cost of the foreign exchange.
  - Rents are distributed to institutions in fixed shares.

Simulation 1: Increased Foreign Exchange Inflows

- Increased (exogenous) foreign savings inflows
  - An exogenous increase in foreign savings approximates the case of "Dutch Disease" effects arising from a surge in exports (typically natural resource exports that use very little domestic factor inputs)
  - The surge in foreign capital inflows in Ethiopia from 2005/06 to 2007/08 was not driven by a surge in export earnings or exogenous increase in capital inflows. Rather, a policy of promoting domestic investment led to an increase in import demand that was **accomodated** by permitting foreign borrowing.

Simulation 1: Increased Foreign Exchange Inflows: Simulation Results

- Increased (exogenous) foreign savings inflows adds to pool of total savings, enabling additional investment
  - Using an alternative closure for savings and investment would shift the composition of savings between consumption and investment, but would not affect the main results regarding the real exchange rate appreciation.
- This increased domestic spending (demand) leads to an increase in domestic prices
  - With a fixed nominal exchange rate, this implies a real exchange rate appreciation

Exchange Inflows: Simulation Results (2)

- Since prices of tradable goods are (somewhat loosely) tied to world prices and the nominal exchange rate, prices of tradable goods relative to average domestic prices (and especially relative to prices of non-tradables) falls.
  - Incentives for production of exportables falls as do exports
- Since many agricultural products are tradable (especially coffee and other export crops), farm incomes do not rise as fast as urban incomes

Simulation 1: Increased Total Investment and Foreign Capital Inflow

	Base (bn 2005/06 Birr)	Increase in Foreign Savings (% change)
Real GDP	128.6	0.0%
Absorption	158.8	5.9%
Consumption	114.8	6.1%
Investment	28.2	8.5%
Government	15.9	0.0%
Exports	16.8	-32.6%
Imports	47.0	8.4%
Real Exchange Rate	1.0	-21.5%
Nominal Exchange Rate	100.0	-21.5%
CPI	100.0	-4.4%
Real HH Incomes		
Rural Poor	21.1	4.8%
Rural Non-Poor	66.0	6.1%
Urban Poor	4.3	4.9%
Urban Non-Poor	23.4	7.5%
Total	**114.8**	**6.1%**

Simulation 1: Increased Total Investment and Foreign Capital Inflows: Sectoral Results

	Base (bn 2005/06 Birr)	Increase in Foreign Savings (% change)
Agriculture	53.0	-0.3%
Cereals	16.9	1.8%
Export Crops	9.0	-7.4%
Other Crops	9.5	1.0%
Livestock	17.6	0.6%
Industry	14.5	0.8%
Services	54.8	-0.2%
Total Value Added	122.2	-0.1%

Effects of a Decline in Foreign Savings with and without Import Rationing

	Base (bn 2005/06 Birr)	Simulation 2 Reduced Foreign Savings with Import Rationing (% change)	Simulation 3 Reduced Foreign Savings with no Import Rationing (% change)	Simulation 3 relative to Simulation 2 (% change)
Real GDP	128.6	-1.2%	-0.5%	0.7%
Absorption	158.8	-3.9%	-3.3%	0.6%
Consumption	114.8	-2.6%	-3.2%	-0.6%
Investment	28.2	-12.9%	-5.6%	8.4%
Government	15.9	2.6%	-0.5%	-3.0%
Exports	16.8	-0.2%	16.7%	16.9%
Imports	47.0	-10.1%	-4.1%	6.7%
Real Exchange Rate	1.0	0.0%	11.8%	11.8%
Nominal Exchange Rate	100.0	0.0%	11.8%	11.8%
CPI	100.0	0.0%	2.1%	2.1%
Real HH Incomes				
Rural Poor	21.1	-5.3%	-3.2%	2.2%
Rural Non-Poor	66.0	-8.4%	-3.2%	5.7%
Urban Poor	4.3	-5.9%	-2.1%	4.0%
Urban Non-Poor	23.4	16.9%	-3.4%	-17.4%
Total	**114.8**	-2.6%	-3.2%	-0.6%

Effects of a Decline in Foreign Savings with and without Import Rationing (Sectoral Results)

	Base (bn 2005/06 Birr)	Simulation 2 Reduced Foreign Savings with Import Rationing (% change)	Simulation 3 Reduced Foreign Savings with no Import Rationing (% change)	Simulation 3 relative to Simulation 2 (% change)
Agriculture	53.0	0.0%	0.1%	0.1%
Cereals	16.9	-0.9%	-1.1%	-0.2%
Export Crops	9.0	0.5%	3.2%	2.7%
Other Crops	9.5	-1.3%	-0.5%	0.8%
Livestock	17.6	1.2%	-0.1%	-1.4%
Industry	14.5	-1.4%	-0.4%	0.9%
Services	54.8	0.1%	0.0%	-0.1%
Total Value Added	122.2	-0.1%	0.0%	0.1%

Caveats

- The modeling results presented here are meant as indicators of the broad magnitudes of the effect of the policies simulated
  - Annual model (no seasonality or within-year effects)
  - No financial sector (real-side only)
  - Need to include changes in exogenous world prices
- Sensitivity analysis needed:
  - Substitution parameters that determine largely determine elasticities of export supply and import demand
  - Alternative distributions of foreign exchange rents

Concluding Observations

- CGE simulations suggest that there are substantial efficiency and distributional effects of foreign exchange rationing.
- Foreign exchange controls:
  - Result in the creation of large rents that likely accrue mainly to non-poor households.
  - Reduce economic efficiency so that real incomes from factors of production (land, capital and labor) decline, as do overall household incomes (except for those who gain large rents).
  - Inhibit depreciation of the real exchange rate, and thus slow or prevent reversal of the real exchange rate appreciation between 2004/05 and 2007/08 that reduced price incentives for exports.

Concluding Observations (2)

- There are substantial costs to both foreign exchange rationing and real exchange rate appreciation in terms of growth (reduced incentives for production of tradables) and income distribution (large rents accruing to the non-poor).
- Policy reforms need not involve full liberalization of the foreign exchange market, however.
    - Various versions of managed floats and controls in foreign capital markets exist that can gradually reduce economic rents, improve incentives for exports and increase overall economy efficiency.
    - Indeed, policies since late 2008 have effectively reduced the earlier appreciation of the real exchange rate.

Thank you very much!