University of Gondar

College of Social Science & the Humanities

Department of Geography & Environmental Studies

Lecture Note for Economic Geography

Target Group: Third Year Students of Population Studies Department

Academic Year: 2019/20

Semester: II

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Chapter One: Introduction

1. The Field of Economic Geography

1.1. Definition, Scope and Approaches

It is difficult to forward a definition acceptable to all geographers at all times and places because of the dynamic nature of the discipline and the changes in its scope and method of study. However, the following may be accepted as a working definition.

Geography is the science that studies the spatial variations of physical, biological and human phenomena, and their interrelationships and dynamism over the surface of the Earth.

There are various misconceptions and vague notions about geography. Many people outside the field assume geography as:

1. Solely the study of physical environment and all place name recognition, which is practically impossible. This is because:

- There are too many places
- Place names can duplicate
- There are two or more places which have one/common name
- Place names may change from time to time

2. The drawing/making of maps— but geographers use more maps than other fields and hence geographers are more map users not map makers to analyze spatial distribution, interaction and variation of the phenomena.

Geography is made up of two words; Geo means '*earth'* and graphia means '*study'*. Therefore, geography is the study of the earth's surface and its relationship to man and his activities because human activities are highly influenced by the surface of the earth. That is, certain environments are typical to certain plants and animals.

1.1.2. Scope of Geography

Geography has now acquired the status of science that explains the arrangements of various natural and cultural features on the Earth surface. Geography is a holistic and interdisciplinary field of study contributing to the understanding of the changing spatial structures from the past to the future. Thus, the scope of Geography is the surface of the

Earth, which is the very thin zone and is the interface of the atmosphere, lithosphere, hydrosphere and biosphere, which provides the habitable zone in which humans are able to live.

Geography is a science that studies the law of spatial distribution of physical and cultural phenomena, the dynamics of their distribution and the reciprocal influence between human population and the environment. Geography as a science follows scientific procedures. Spatial comes from the word space. Hence geography is a spatial science--- its concern is place.

Geography is the scientific study of the earth, which describes and analyses the spatial variations of phenomena that occur on the surface of the earth and treats their interrelationships and significant regional patterns (areal arrangements). Geography includes description—all places can be described by their particular characteristics because no two places are exactly alike.

Geography is a synthesizing, integrating field-synthesizing knowledge from many disciplines and integrating it into geographical context. It is recognized as a single discipline, unified not by its subject matter but rather by its point of view and its method.

The field of geography arises out of two fundamental human qualities. One is the need to know something about the local geography in order to carry out economic, social and political activities. It is important to know how individuals and groups behave within their local geographic environment and why. Secondly, there is a natural curiosity that people have about distant places.

Geography can be approached by considering two continua a **human-physical continuum** and a **topical-regional continuum**. The topical (systematic) fields of geography view particular categories of physical or human phenomena as distributed over the earth: while regional geography is concerned with the associations of all or some of the elements and their interrelationships within the territorial limit of a place/region. Geography focuses its attention on the surface of the earth which is the interface of the atmosphere, lithosphere, hydrosphere and biosphere which provides the habitat in which humans are able to live.

Geography can make us better informed citizens more able to understand the important issues facing our communities (country, world) and better prepared to contribute solutions. To be geographically illiterate is to deny oneself not only the ability to comprehend world problems but also the opportunity to contribute meaningfully to the development of policies for dealing with them.

- Geography enables individuals to know the basic features of the world in which they live the great varieties of lands and peoples and complex interrelations of humans with resources.
- Geography provides explanations of the distribution of physical, biological and human features on the earth and their complex chains of interconnection.
- It is useful in resource management, understanding problems of the environment, (pollution, flood…) in analyzing natural hazards.
- It is crucial for land use planning and housing.

Geography has five themes namely location, place, human-environment interaction, movement, and region.

Location

Location is defined as a particular place or position. Most studies of geography begin with the mention of this theme of geography. Location can be of two types: absolute location and relative location. In the former case, the location of a place is defined by its latitude and longitude or its exact address.

Place

Place refers to the physical and human aspects of a location. This theme of geography is associated with toponym (the name of a place), site (the description of the features of the place), and situation (the environmental conditions of the place). Each place in the world has its unique characteristics expressed in terms of landforms, hydrology, biogeography, pedology, and the characteristics and size of its human population, the distinct human cultures. The concept of “place” aids geographers to compare and contrast two places on Earth.

Human-Environment Interaction

Humans have always been on ceaseless interaction with their natural environment. No other species that has lived on our planet has a profound effect on the environment as humans. Humans have adapted to the environment in ways that have allowed them to dominate all other species on Earth. Thus, human-environment interaction involves three distinct aspects, dependency, adaptation, and modification. Dependency refers to the ways in which humans are dependent on nature for a living. Adaptation relates to how humans modify themselves, their lifestyles and their behavior to live in a new environment with new challenges. Modification allowed humans to "conquer" the world for their comfortable living.

Movement

Movement entails to the translocation of human beings, their goods, and their ideas from one end of the planet to another. The physical movement of people allowed the human race to inhabit all the continents and islands of the world. Another aspect of movement is the transport of goods from one place on the Earth to another. The third dimension of movement is the flow of ideas that allows the unification of the human civilization and promotes its growth and prosperity.

Region

A region is a geographic area having distinctive characteristics that distinguishes itself from adjacent unit(s) of space. It could be a formal region that is characterized by homogeneity in terms of a certain phenomenon (soil, temperature, rain fall, or other cultural elements like language, religion, and economy). It can also be a functional or nodal region characterized by functional interrelationships in a spatial system defined by the linkages binding particular phenomena.

Economics Vs Economic Geography

The relationship between the two has been dynamic and affected as it is by the dynamics of the evolution of human culture. Between the 15^{th}c and 19^{th} c centuries the two developed in isolation from one another though they were ***complementary***. This was the age of European commercial expansion. They moved towards one another, i.e., from complementarity to cooperation during this present urban-industrial age.

Economics-is study of how societies choose to use scarce productive resources that have alternative uses, to produce commodities of various kinds, and to distribute them among different groups. All societies have more wants than resources [the factors of production], so that a system must be devised to allocate these resources between competing ends. Economics is divided into two broad divisions-macroeconomics and microeconomics on one hand, and traditional and political economy on the other hand.

Macroeconomics and Microeconomics- macroeconomics studies the functioning of the economy as a whole while microeconomics analyses the individual components such as households, firms and industries of the economy.

Traditional Economics and Political Economy- another distinction is made between traditional economics and political economy. *Traditional economics* is concerned primarily with the efficient, least –cost allocation of scarce productive resources and with the optimal growth of these resources overtime so as to produce an ever expanding range of goods and services. *Political economy,* on the other hand, goes beyond traditional economics to study, among other things, the social and institutional processes through which certain groups of economics and political elite influence the allocation of scarce productive resources now and in the future either exclusively for their own benefit or for the larger population. *Political economy* is a science, which studies the social relations that evolve between people in the process of production, distribution, exchange and consumption of the material benefit.

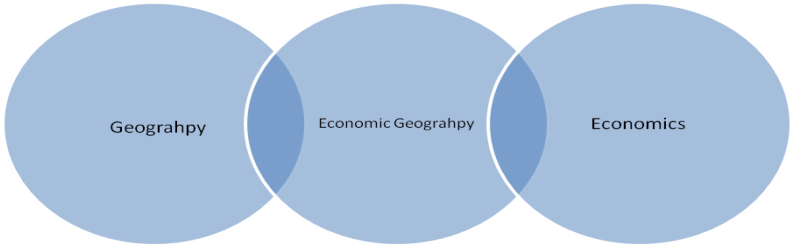
Economic Geography-adopts and combines the two definitions above to achieve its specific objectives. The following three definitions are examples among many others. Economic geography is the branch of geography dealing with the interaction between geographical and economic conditions, with the production, spatial distribution, exchange and consumption, of wealth and with the study of economic factors affecting the areal differentiation of the earth's surface [Clark, 1991]. Economic geographers are concerned with the economic processes especially as manifested in particular places modified by the phenomena with which they are associated [James & Jones,1954]. Economic geography is the science of the formation, development and functioning of the socio-economic territorial systems and the management of these systems. The territorial

systems are the systems of settlements like inter connected inhabited centers, industrial areas, agricultural enterprises, processing plants economic regions and railway systems [Suaushkin, YuG, 1980].

Even though there are different definitions of economic geography, the definition given by Hartshorne (2004) may be considered as better for our intended purpose. According to him:

"Economic geography is the study of the spatial variation on the earth's surface of activities related to producing, exchanging and consuming goods and services."

Figure 1.1 the relationship among Geograhpy, Economics and Economic Geograhpy



The economic geographer wishes to show the spatial distribution of economic activities and understands why they are located as they are and recognize how economic activities are interrelated in particular areas and how the activities are tied to other economic activities at other locations.

1.1.3. Scope of Economic Geography

The scope of economic geography is man and environment interaction in the process of production, exchange, and consumption of goods and service. As a human geography, involves all phases of human social life in relation to the physical earth. The scope of Economic Geography is determined among others by: a) the *intensification* of economic activities related to the cultural development of mankind, and b) the *ideology* or philosophy that a given society follows. The topics included in this course indicate the broad nature of the discipline. Thus, natural resources, as well as the interactions between the two are

studied. Because of the broad nature of the subject, many state that economic geography is not a research discipline.

People-Environment Interaction- production of materials and cultural wealth is impossible without the interaction of man with his/her environment.

People- in man-environment interaction, people are the consciously active part. In the process of interaction, the following attributes of population are important. The ***size*** (number) of the population related to a given resource mass has significant positive or negative impact on the level of living of the population. The population can be too much, or too little, or just optimal with regard to a given resource under a given technological mix. The age and sex structure, growth rates, migration, levels of education and training, as well as customs and traditions have considerable impact on the sustainable use of resources.

The natural environment- the elements of the natural environment that are the objects of man's labour in his/her effort to produce material and cultural wealth are the ***lithosphere*** (the crust of the earth), the ***hydrosphere*** (the waters of rivers, seas, lakes, ocean and some aspects of climate), the ***atmosphere*** (the blanket of air that envelopes the earth), and the ***biosphere*** (all living things- people, animals, plants). The four elements of the natural environment can be abused. Hence, we need to use them carefully.

The elements of the natural environment exhibit certain characteristics. Some can, under normal conditions, be used without manifesting sign of exhaustion. Others can be used only for a limited period of time. Therefore, the natural environment has to be used taking their unique characteristics in mind.

As a result of man-environment interaction, the production of material and non-material goods is going on with an ever-increasing rate. The objective is to satisfy man's material and cultural needs though that objective may be missed at times. Economic geography owes its substance and development to the interaction, more specifically to the spatial manifestation of the interaction between man and his/her natural environment.

The sub-fields of economic geography are:

1. **Agricultural geography**: deals with the spatial distribution and variation of agricultural production or the growth of plants and animals for human use;
2. **Transport geography**: deals the exchange and interactions. The establishment of transportation facilities, trade routes, and resort areas also frequently depends on the results of geographic studies;
3. **Industrial geography**: dealt with the location of industry and the industrial use of the geographic environment. Manufacturing industries rely on geographic studies for information concerning raw materials, sources of labor, and distribution of goods;
4. **Tourism geography**: recreational geography;
5. **Geography of resources**: deals with the distribution and spatial variation of resources. Natural resources such as mineral and oil deposits, forests, grazing lands and farmlands are studied with reference to their position, productivity, and potential uses;
6. **Geography of minerals**: studies about the distribution and spatial variation of minerals;
7. **Geography of marketing**: Marketing studies concerned with plant locations and sales potentials are based on geographic studies.

1.1.4. Approaches to Economic Geography

Positivism: it employs the scientific method to interpret and understand issues in economic geography. The scientific approach is based on empirically verifiable and commonly agreed upon evidence through replication of analytical results. It involves hypothesis testing leading to empirical generalizations and theories. It uses statistical and mathematical techniques and Geographic Information Systems (GIS).

Structuralism: It assumes (posits) that what we see in the world doesn't reveal the cause of what we see. The structure of the economy cannot be directly observed and we should develop ideas and theories that will help us understand what we see and experience. For example consumption of a product cannot be merely related to distance and price in market but social class and political plight also maters.

E.g.:- Marxism- focuses on the social class structure and struggles between the forces of labor and capital. Structuralist geographers emphasize studies in industrial geography where conflicts between management and labor have been keen.

Humanism: Knowledge is gained personally and individually and the focus is on human thinking and feeling. Humanism values subjective experience and disdains (disregards) scientific objectivity as impossibility.

1.2. Historical Development of Economic Geography

Economic Geography has four developmental periods.

1. The period of commercial Geography
2. The period of Environmental determinism
3. The period of areal differentiation
4. The period of locational Theories

1. The Period of Commercial Geography (15thc – 19thc)

During this period economic geography was known as commercial geography. It develops during European exploration time. The government wants to know the resources of future colonial territory. Merchants know about demand and supply.

2. The period of Environmental determinism (4th quarter of 19th c – 1930s)

Economic differences were occurring due to environmental difference. It emphasize on the relationship between economic activity and physical environment. Environment determines economic activity. In 1888 the term economic geography used in USA In 1920's the field was well established. In 1925 special journal appeared.

3. The period of areal differentiation (193 –1950s).

Inquiry investigation: The primary focus was differences rather than similarities between areas. For example, "X" and "Y" are different areas they have different economic activities

4. The Period of Locational Theory (post 1950s)

Emphasis on formation of hypothesis and the search for theories, in general location theory seek to explain the basic universal factor determine the location of all kinds of economic activity.

1.3. Classification of Economic Activity

The classification of economic activity is done based on stage of development and degree of specialization. Economic activities differ in different parts of the world because of uneven distribution of natural resources. Thus, people in different corners of the world are involving in different economic activities. There are two ways of classifying economic activities.

1.3.1. Conventional Classification of Economic Activities

Primary activities: have direct linkages to natural resources with no qualitative change in production. For example, agriculture, forestry, mining, fishing and quarrying. Their outputs are cheaper.

Secondary activities: in this economic sector there is input on one side and out put on the other side. Industrial outputs are more expensive than those of primary economic sector outputs.

Tertiary activities: include all service giving processes with no involvement in the production processes. This sector facilitates the movements of material production and consumption.

1.3.2. Hartshorne and Alexander's Classification

Hartshorne and Alexander classify economic activities into five. These are:

1. Primary (Red-Collar) Economic Activities

It involves the extraction, harvesting and utilization of resources in which humans and the environment come into direct physical contact. That is, it involves in the production of food and raw materials. It includes hunting and gathering, agriculture, forestry, fishing, mining, quarrying- extraction of building materials.

2. Secondary (Blue-Collar worker) Economic Activities

This are activities engaged in processing, transforming or assembling wide range of primary products or goods, ranging from the simple handicraft industries to modern automobile or space shuttle.

3. Tertiary (Pink-Collar worker) Economic Activities

This sector makes available to consumers all kinds of goods and services. It is a link between producer and consumer. It involves retails and whole sale activity, personal services like clerks, barbers, beautifiers, laundry services, etc.

4. Quaternary (White-collar worker) Economic Activities

In this sector, activities taking place in office building environments. In the most highly developed countries, it is increasingly recognized with the explosion and the growth in consumption of information related services (all professionals involving in planning, managing, marketing, accounting services for large corporations and governments, working in schools, theatres, office buildings environment specialists are under this category). These are mostly intermediate classes.

5. Quinary (Gold-Collar) Activities

It is a high level of management and professionals; it is more restricted in size than the other categories. It includes chief executive officers, top managers, researchers, ambassadors, and financial advisers.

All of these activities are integrated or connected by transportation and communication, not grouped under one but common for all. Relative proportion of all these economic activities determines economic structure of a country. This economy carried out to solve economic problems.

1.4. Types of Economic System

To achieve the economic growth and development various countries employ different economic systems. That means a country or a regional economic problems can be solved in various ways. The economic system of a country describes the relationship that exists between consumers, producers and the state. That is, patterns of production and consumption and the location of economic activities within each system. Economists recognize the following types of economic systems practiced in the world based on resource allocation, property ownership, and decision making.

1. Traditional Economic System

This is also mostly known as the third world socio-economic system characterized by a subsistence economic type, a non-monetary system based largely on subsistence with limited exchanges conducted through bartering. Only the most isolated societies in the world remain in this category.

It is primitive type of economic activity which is culturally directed and mostly characterized by hunting and gathering using backward tools. But now days, it is practiced in small area.

2. Commercial Economic System

This is also mostly known as the first world socio-economic system/ developed or capitalist or western world/. It is a system runs entirely by private enterprises with no public ownership. This is a theoretical concept as no national economy has ever reached this extreme, but the United States is generally recognized as the nearest country to a free market economy. Market economy is characterized as complex, advanced economies, hierarchically and spatially linked in patterns of consumption, production, exchange of goods and services.

The ultimate objective of the free market economic system is to maximize profit through:

- comparative advantage (skill labor, environment, resources)
- Intervening opportunity
- Distance decay and accessibility
- Specialization even in agriculture
- complementarities
- interdependence

In this economic system producers produce for market and decisions are made based on the laws of demand and supply and market competition. Most resources are privately owned and decision is made by individual.

3. Planned or Command Economy System

This is an economic system where the state decides what is to be produced, where production will be located and what can be consumed. Such a system, denying private ownership, is associated with socialist countries or communist states. Although another theoretical extreme, many countries, the former Soviet Union in particular before the fall of communism, came very close to it. Central planning is needed to achieve government-determined objectives; government agencies control supply/price; decide where to locate industries and crops to grow on social (not profit) criteria.

4. Mixed Economic System: Where some sectors of the economy are in public ownership and others in private. The nations of Western Europe are classic examples of this type of economic system. In terms of spatial distribution**,** most countries show combinations of each system using dual economies - rural versus urban. Technology systems also affect geography of economic development and systems.

1.5. Themes in Economic Geography

1.5.1. Production and consumption

I. Production

Primary and secondary economic activities are production sectors. People are producers and consumers of wealth. Some people who engage in these economic activities produce more than one kind of commodity or service. Productive activities are usually concentrated at places where they can most easily be carried on as physical conditions of climate, soil and other resources differ over the face of the earth. The major factors of production are:

A. **Labor:** It is of primary importance since without it productive processes cannot be fully accomplished. Some activities require relatively few labours in relation to the scale of the operation while others employ a great deal of labor in proportion to the value of the product (labor extensive and labor intensive activities). The reward to labor for the work performed is related to output. Labor varies in its capacity to perform work as some tasks call for higher skills than others commanding higher wages.

B. **Capital:** it refers to the tools and equipment and other materials to carry out production activity. Some activities require little (very small) capital while others are carried out with expensive (very large) mechanical equipment. Some of the capital is fixed- like factories and machines which are used until their useful life is over. The volume of output generally increases with the size of the capital investment. Therefore, power driven mechanized production yields a higher return to each unit of labor employed than a process carried out by hand.

C. **Land:** Every productive process takes place in geographical space (land). The amount of land required varies depending on the nature of the activity (agriculture, commerce, manufacturing…….).

Generally, the more abundant the land, the more adequately will the other factors of production be employed.

N.B 1. Factors of production can be combined in any activity in different proportions

2. Factors of production can in some measure be substituted for one another. (e.g. mechanization and floating labor), intensive use of land (scarce).

II. Consumption

It refers to the final use of goods and services to satisfy human needs. Some forms of consumption devour goods quickly like the consumption of non-durable goods while others do it gradually like in the case of machines and still other forms of consumption like tourism may not diminish the quantity or quality of an item consumed (e.g. gazing at a mountainous scenery or skiing).

Some people consume a great deal of goods and services more than others and some other, may consume less than they wish and still others (in fact many of them) less than what is normally considered necessary to maintain life. The producer may consume the greater part of their produce or sell off it into the market. That is, graduation is possible from the near self-sufficiency of many smallholder peasants to the narrowly specialized production of a worker on a factory assembly line. However, no individual or family can live entirely to itself as each is part of a wider community. There is a world of interdependence where one depends on the other. Usually consumers and producers are widely separated which necessitates the flow of information and of goods between them by a network of lines of communication and transport. Exchange increases the value of an item because of the services provided. All in all the analysis of the spatial pattern of production and consumption and of the linkages between them forms the substance of economic geography.

1.5.2. Locational Analysis and Location Theory

Geographers use theories to explain why activities are located as they are. Locational analysis in economic geography involves not only explanation of activities already present on the landscape but may also involve the selection of a future location for an activity.

Location theory: seeks to explain the basic and universal factors that determine and influence the location of all kinds of economic activities. It offers general explanations and may not apply exactly to all locational decisions. It is constantly being modified through

deductive and inductive analysis. It provides a conceptual framework that helps us understand particular and individual elements of the economic landscape.

I. Spatial Patterns

The distribution of economic activities over the earth's surface or within a region may be viewed as forming a pattern, or spatial distribution.

A pattern may be recognized when the category of economic activity is represented by a series of nodes or points, **Point Pattern**, which answer the basic question where and provides a starting point for spatial analysis. A point pattern implies that relative location is given due emphasis in the description and analysis and that the actual area (site) that the phenomenon occupies is not significant at that level of spatial analysis. (E.g. house, factory, city although they occupy space).

Linear Patterns: any type of movement or connection between places may be viewed as part of linear pattern whether or not there exists an observable physical facility connecting the places.

Linear patterns are not independent of point patterns in location and layout. E.g. roads, frequency of telephone calls and fax messages among offices form linear flow pattern.

Combining linear and nodal concepts, we may define a nodal region which consists of an area in which the activity focuses on a single node. For example, a major city organizes the activities of the surrounding area. Nodal region is an area focused on anode or point away from which movement to or from the node occurs. To delimit the extent of a nodal region, one must know where the intensity of focus or the magnitude of movement drops below a defined threshold. Often, the node is a city and the movement involves the flow of goods or services to or from the city. The boundary of the nodal region is drawn at the point where the attraction to another node becomes stronger. E.g. news paper circulation, commuting (labour shed) milk shed (movement of milk from rural to urban areas).

Uniform region: - is a homogeneous area defined on the basis of common characteristics that serve to make areas within the region more internally similar than areas outside its boundary. Dairy farming, cash grain farming and goat herding are examples of uniform regions.

II. Spatial Processes

Spatial process involves, changes within some or all of the elements of spatial economic systems, and is mapable as they may occur at different rates at different places over time. The concept of spatial process is used to explain spatial patterns (activity distribution frozen at a point in time) as it refers to a causal chain of events that produce change over time. A pattern existing at one moment of time is the result of the operation of processes. Hence, pattern answers the question where, process answers the question why?

Economic patterns change because of human decision which may depend on different economic goals, different perceptions of economic alternatives, different preferences and cultural systems.

Different processes operate on the economic landscape at different times. The observed cross-sectional pattern is a composite of influences, some continuing to operate and others having ceased far in the past.

In addition to human behavior as a direct spatial process, technological change brings about conditions broadening or reducing the range of human choice. For example, distribution of manufacturing in a metropolitan area may be the result of many past and present spatial processes i.e. clustering near the center and spreading to the suburbs. The two spatial processes responsible for the development of these patterns are centralizing influence in the past having to do with accessibility at a given level of transportation technology (road, river, canals) and a decentralizing factor (current impact) related in part to the motor truck as a transport agent.

III. Spatial Interaction

The concept spatial interaction refers to the movement process exhibited by the flow of goods and services and people over space. Movement of goods and people is essential to any economic system whether traditional or highly developed. The spatial interaction principles involve the nature and function of connections among places on earth. The connections may be seen as the geographic layout of routes like street map of a city or can be represented by information on the volume of movement or flow among places such as number of telephone calls among different locations.

The principle of least effort generally accounts for the length and intensity of movement. This principle is based on the notion that one minimizes distance and selects the shortest path when moving between two points. Underlying this conceptualization is the notion of friction of distance when refers to the resistance to movement over space.

I= M/D where I = interaction, M=mass or attraction and D= distance. The greater the mass or attraction and the shorter the distance, the greater the level of interaction. The mass or attraction variable is based on the number of people in an area.

The bases for Spatial Interaction

The Geographer Edward L. Ullman (1950) suggested that for spatial interaction to occur, three interrelated conditions must be satisfied: complementarity, transferability and intervening opportunity.

Complementarity: refers to the need for a supply and demand relationship to exist before any movement occurring between places i.e. the first area has a surplus of an item demanded by the second area. Complementarity arises from regional variation in human and natural resources. Another way of looking complementary is through the concept of place utility- the act of transporting the resource to a point of demand. E.g. a mineral resource has a certain value or utility as a result of its being mined and smelted (from utility) & act of transporting it to a point of demand gives it place utility

Transferability: refers to the ease with which an item may be transferred between two places. The basic consideration to the transferability of an economic good is the distance between two points in terms of time and cost of movement. The transferability of an item generally reflects its value per unit of weight and its cost of transportation. Bulky products are the least transportable over long distances, hence product substitution becomes commonplace with such goods. On the other hand, high value added products (like electronic goods) can withstand large transportation charges as they are so valuable per unit of weight and product substitution is rarely required.

Generally, for many kinds of movement, the interaction between places is inversely dependent on the distance between the places. Other factors which affect interaction include political barriers, the quality of transport route, the degree of congestion, ruggedness of the terrain, and level of technology.

The operation of the transferability principle on the economic landscape usually leads to a phenomenon of distance decay (decrease in interaction, trips flows, with increasing distance between the origin and destination).

Intervening opportunity: concept assists in an understanding of the source of supply for a particular item. When more than one source of supply exists, the nearest source to the final destination (intervening opportunity) will be chosen.

N.B Complementarity, transferability and intervening opportunity- act simultaneously to determine spatial interaction. They are more useful for the study of migration of people and commodity movement.

Recent study by Wheeler & Mitchelson suggests that these concepts are less useful to the study of modern information exchange.

Bases for Information Flow

1. *Information genesis:* information flows are based primarily on supply rather than demand. Information is sent out from a source of supply that is not demanded at the destination but is merely received.

2. *Hierarchy of control:* suggests that information flows are largely conditioned by the size of the sending and receiving metropolitan area i.e. the largest center (say New York) will be the leading sender of information within the hierarchy of all centers (e.g. los Angeles, Chicago).

The largest centers dominate because they contain corporations, institutions and agencies generating the greatest volume of highly specialized, technical, and perishable information.

3. *Distance independence concept:* unlike migration and commodity flows, distance will play a relatively minor role in the flow of information over space.

IV. Comparative Advantage

It is usually difficult to find an ideal site for any economic activity in the sense of satisfying all the requirements at all times i.e. there are good sites and less good sites. However, there can be region of optimum conditions for an activity which accommodates most of the requirements for the successful cultivation of crop or management of a factory. For example, if two neighboring regions have optimal physical conditions for two different crops A&B respectively, an increase in demand and price of crop A may lead to the cultivation of crop A

on less suitable lands of region to which physically is suitable for crop B. Hence, A enjoys comparative advantage over B under existing market conditions.

V. Perception

In our activities as producers and consumers we may not react to actual events and phenomena in the real world, but to reality as we perceive it. We look in to the world through ideas drawn from our history and traditions, social class, education, and concepts of what pleases us and make decisions in the light of these perceptions. For example, for an individual found at equidistance between a large town (with many alternative more shops, services) and small town, he may choose the small town considering traffic, location and cost of parking, and pollution. Similarly, a more distant town any seem nearer because the road is better or more attractive.

CHAPTER TWO

2. PRIMARY ECONOMIC ACTIVITIES

2.1. Primitive Activities

Primitive activities are hunting, gathering (collecting), pastoral nomadism (primitive herding) and primitive agriculture (shifting cultivation). For this sub-sector, we usually use the word primitive because the activities are extremely traditional or backward. But they are becoming extremely rare in the world due to the transformation of people from traditional to modern ways of life or production. The general characteristics of primitive economic activities are:

- **Subsistence in nature**: productivity per unit person is extremely low—there is no surplus production. The major objective is to supply food.
- **Extensive in nature:** need wider or broad areas
- Oldest or earliest economic activities.

2.2. Agriculture

2.2.1. Definition and Historical Development

The term agriculture is derived from the Latin words *ager* and *cultura*. *Ager* means, field or soil and *cultura* mean culture or tilling. So agriculture refers to the art of raising plant life from the soil. It is not merely tilling of land, but implies a conscious and determined effort on the part of man to utilize the soil for his benefit. Agriculture has been differently defined by different scholars/institutions as presented hereunder:

Agriculture is the science or art of cultivating the soil, producing crops and rising of livestock (Webster).

The care of and work on the soil for the purpose of producing plants and animals to satisfy human needs. (CERM).

Agriculture is the cultivation of the land including horticulture, fruits, crop and seed growing dairy farming and livestock breeding (Dictionary of Agriculture).

Generally, agriculture is defined as the purposeful tending of growing crops and rearing of livestock, whether for the subsistence purposes or for sale/exchange. It has replaced hunting and gathering as economically the most significant of the primary activities.

In sum, it is an art, science, and industry of managing the growth of plants and animals for human use. In a broad sense agriculture includes cultivation of the soil, growing and harvesting crops, breeding and raising livestock, dairying, and forestry.

Origin and Domestication of Agriculture

Viewed in the perspective of total human history, farming is a recent innovation, its beginning date back to Mesopotamia around 12,000 years. The First Agricultural Revolution achieved plant and animal domestication and passive adaptation to the environment through hunting and gathering was replaced by active utilization of the resources in the surrounding environment, which enable Neolithic humankind to gain the upper hand over the physical habitat. Domestication has been a very slow and long continuing process, which enabled people to advance beyond a subsistence level of existence as surpluses could be produced.

With increasing control of the environment and steady supply of food, people become more restricted in their movement and occupational division of labor developed and the first urban settlements came into existence. Therefore, civilization, agriculture and the city are closely related. The first civilizations grow out of the revolution in agriculture of domesticating plants and animals; the technological change in agriculture was necessary for the growth of cities. After centuries of comparative stagnation and lock of innovation, farming in 17th & 18th century in Europe underwent significant change where by tools of agriculture were modified; method of soil preparation, fertilization, crop care and harvesting improved; organization of agriculture, food storage and distribution were made more efficient (second Agricultural Revolution). In the Third Agricultural Revolution (Green Revolution), new, high yielding strains of grain and other crops developed in laboratories by modern technologies of genetic engineering (biotechnology).

Preconditions for Domestication of agriculture

- The use of fire to process food
- The use of grindstone to make flour
- The improvement of basic tools for catching, killing and preparing animals, fish, birds and reptiles.

2.2.2. Factors Influencing Agricultural Systems and Land Use Pattern

I. Physical Factors

Agriculture is constrained by the changing physical conditions than most other human activities. The physical conditions set limits within which the farmer operates and farmer considers the physical conditions together with the market opportunities.

A. Soil: Farming depends on depth, water retaining capacity, texture, structure, ph, leaching and mineral content of the soil. The main problem in agriculture is the maintenance of soil fertility which is a medium for germinating seeds and growing crops. Since every crop removes nutrient materials from the soil of a continuing cultivated pot, returns will eventually decrease unless nutrients are put back into the soil as are taken out.

The principal elements essential for plant growth include nitrogen, phosphorus, potassium, calcium, sulfur, magnesium and iron. The proportion of the vital elements of the soil vary from place to place due to different composition of the rocks from which soils are derived, climatic conditions by hastening or retarding breaking down of rock constituents, leaching and erosion.

Possible solution

There should be a mechanism of maintaining soil fertility in order to offset the losses due to cropping. Good agricultural practice replaces what it takes from the soil. Activities like fallowing-allowing the land a year's rest-cure' to recover what it has lost, crop rotation and restoring to the land excreta of animals and humans can be important methods. Good farming should preserve and increase the natural fertility of the soil and keep (retain) it in site. It should pass on its soil and fertility unimpaired to the next generation.

B. Climate: It is a greater constraint on agriculture as it can present an absolute barrier as most members of grass family cannot grow if temperature is below $6^{o}c$ (critical temperature in temperate latitudes) and are killed by frost (Growing period -the number of days b/n the last severe frost of spring and the first of autumn /frost free days/) and amount of rainfall are all obstacles.

Climatic fluctuations

Deviations (abnormal conditions) occurring in climate at a local or regional scale can be beyond the capacity of plants to resist. For example, they can be frozen or affected by frost,

rotted by abnormal rainfall or prevented from ripening by cool summer; drought and flood can also affect them. Such catastrophes give rise to scarcities, high prices and famine in regions of subsistence agriculture.

Possible Solution

i. Adaptation of plants to a wider climate

Practice of plant breeding enabled an increased level of return from plants and developed varieties that are able to withstand more severe physical conditions. Crops are being bred with useful characteristics such as stronger stalk & greater resistance to fungus &pests, and are made to grow and ripen shorter in short growing period (temp, rainfall).

ii. Environmental modification to accommodate wide variety of crops

Even though not at a greater scale, climatic modifications on local scale like cloud- seeding, warding off frost from citrus groves by spreading blanket of smoke, raising soil temperature in glass houses to prolong growing period of plants, dry-farming methods in regions of small and unreliable rainfall have been tried. However, these methods have overcome the vagaries of the weather at high cost in labor and capital. And hence they can be used only for crops for which there is strong demand & higher prices.

The most important and widely practiced environmental modification is irrigation. It has two modes: accumulation of water during the rainy season for use during the dry season; and the abstraction of water from rivers or reservoirs for crops in areas where rainfall is insufficient at any time.

Conditions (technical and economic)

Like the need for a certain skill and huge supply of labour of primitive irrigation with the difficulty to expand the irrigable area (say India, china); whether irrigation is a private venture or government, undertaking with gain to yield a reasonable interest on the capital invested and ensure profit, poor soil conditions and to prepare of the irrigable land, problem of siltation of reservoirs, salinization are major constraints.

II. Cultural or human factors

Cultural preference and perception, some cultural groups would rather serials than to eat taboo food. Example - Many African do not want to eat protein rich chickens and their egg.

- Hindus abstain eating all meat especially beef.
- Muslims and Jewish abstain eating pork.
- Chains and some eastern nation abstains drink milk and eat milk product.

Land tenure system

- Farmers may be land owner, but vary with economic system.E.g. in capitalist countries farmers are profit oriented. Land is private- commercially oriented.
- In socialist countries, land is state owner. E.g. former USSR,
- In Ethiopian traditionally land is common property.

Farm size

- If farm size is larger farmer tends to be agricultural businessmen.
- If the farm size is small farmers tends to operate at subsistence level or below, self satisfaction only.

III. Economic factors

- *Transport*- type of transport and cost.
- *Technology*- hybrid animal, better crop, specialized and mechanization.
- *Capital*- developed capital use intensive production system. Using more capital to increasing production. Government, subsidies financial give loan to farmers. Developing countries system of production is labor intensive because farmers have not well to do; poor not get subsidies, low capital.
- *Government*- affects agricultural production by planning and policy.

2. The land Factor in Agriculture

Land as a factor of production has unique characteristics. It is finite in quantity, its quality varies from place to place and its food-producing capacity can be diminished by improper use.

i. Diminishing returns

In the use of factors of production, a continued increase in their application may not bring about an infinite increase in the level of production. The additional increment of the inputs gives a smaller increase in yield until the point of no increase is reached.

As we use more and more units of some factors of production while keeping one or more factors fixed, we get less and less additional output from each additional factors used.

ii. Margin of cultivation

Under certain circumstances agricultural production is enhanced because areas satisfy physical conditions (ideally suited). Here the profit of producing the commodity will hit a maximum but the land may be of high value which would cut into his profits. In other cases, production spreads beyond their areas which conditions can only be satisfactory whereby yields are lower and farm income smaller but the valve of the land is less and rents are lower. If demand is great enough, production will spread into land which is increasingly unsuitable, until a point is reached where the land is no longer cultivated or the farming may be carried on at a loss under prevailing market conditions. If prices rise, the margin will advance and if it falls it retreats.

iii. Land Rent

The highest rents are charged for the land offering the best conditions, and rents per hectare might be expected to decline as one move outwards from this land to the less valuable land. For example if prices fall, the income per hectare falls and farming in the less suitable lands becomes unprofitable and the margin shrinks. Hence, beyond the margin it doesn't pay to use the land and the land can have no rental value.

Iv. Marginal Farming

a. Economic margins to farming

Marginal farming (*economic margin*) occurs at a point where the farmer had difficulty in covering his costs. For example, many problems are associated with the distance from a central market although, the farmer may try to compensate for increased transport costs by cutting down on other costs and farming extensively, but there may be a point beyond where farming is no longer viable. However, falling transport cost, subsidy on some costs, rising revenue due to an increased demand and rising prices encourage farmers to move out of the margin and take-in more land. Or can allow the outer economic margin of farming to be pushed. The optimum is the zone of greatest profit and the limit or economic margin is a point at which net income is the minimum, required to keep a farmer form switching from crop A to a more profitable alternative.

b. Physical margins to farming

Farming activity is constrained by environmental conditions of temperature, precipitation, soil quality, topography and other physical variables that must be satisfied in order to

production to occur. Within the possible production area, the most favorable locations are where there are beneficial environmental conditions forming the physical optimum. Outside the physical limit, the crop cannot be raised. However as demand for agricultural products increases, there is a temptation to push agriculture in to regions with harsh physical conditions. Similarly modern irrigation, fertilization and other agricultural technology allow the extension of physical limits to include formerly unfavorable areas when returns are higher.

2.1.3. Types (Classification) of Agricultural Activities

1. On the Bases of Supply of Land

1.1. Intensive Agriculture

This is system of cultivation using large amounts of labour and capital relative to land area. Large amounts of labour and capital are necessary for the application of fertilizer, insecticides, fungicides, and herbicides to growing crops, and capital is particularly important to the acquisition and maintenance of high-efficiency machinery for planting, cultivating, and harvesting, as well as irrigation equipment where required.

Optimal use of these materials and machines produces significantly greater crop yields per unit of land than extensive agriculture, which uses little capital or labour. As a result, a farm using intensive agriculture will require less land than an extensive agriculture farm to produce a similar profit. In practice, however, the increased economies and efficiencies of intensive agriculture often encourage farm operators to work very large tracts in order to keep their capital investments in machinery productively engaged. But the case in Ethiopia is beyond this reality; probably this is widely practiced in USA.

On the level of theory, the increased productivity of intensive agriculture enables the farmer to use a relatively smaller land area that is located close to market, where land values are high relative to labour and capital, and this is true in many parts of the world. If costs of labour and capital outlays for machinery and chemicals, and costs of storage (where desired or needed) and transportation to market are too high then farmers may find it more profitable to turn to extensive agriculture. However, in practice many relatively small-scale

farmers employ some combination of intensive and extensive agriculture, and many of these operate relatively close to markets.

1.2 Extensive Agriculture

This is a system of crop cultivation using small amounts of labour and capital in relation to area of land being farmed. The crop yield in extensive agriculture depends primarily on the natural fertility of the soil, terrain, climate, and the availability of water.

Extensive agriculture is distinguished from intensive agriculture in that the latter, employing large amounts of labour and capital, enables one to apply fertilizers, insecticides, fungicides, and herbicides and to plant, cultivate, and often harvest mechanically. Because extensive agriculture produces a lower yield per unit of land, its use commercially requires large quantities of land in order to be profitable. This demand for land means that extensive agriculture must be carried on where land values are low in relation to labour and capital, which in turn means that extensive agriculture is practiced where population densities are low and thus usually at some distance from primary markets.

> ***Extensive agriculture*** *takes up a large area of land relative to the amount of produce. The profit per hectare is not expected to be high. The farmer or rancher hopes to make a good profit with a relatively low investment in labour. Labour costs can be kept down by using mechanical tending and harvesting equipment, or by selecting livestock that require little tending.* ***And intensive agriculture*** *takes up a smaller area of land relative to the amount of produce. The profit per hectare is expected to be high, which makes the farmer or rancher willing to invest in relatively high levels of labor and other expenses. The intensive work may be accomplished by lots of manual labor, such as hand-picking blueberries, or sophisticated mechanization, such as a computer-controlled greenhouse.*

Summary of intensive and extensive farming

	Intensive	Extensive
Labour input	High	Low (usually relies on high capital inputs)
Capital Input (high use of machinery, money, fertilizers, pesticides, growth hormones etc)	High	High
Yields	High	High
Size	Smaller area	Larger area (mid latitudes)
Eg.	Feed lot (factory farming)	Cattle Ranch
	Market garden (non-tropical fruits, vegetables and wines eg Orchard, greenhouses)	Wheat Farm

High labour is required as people are too poor to afford technology or other capital inputs. If however, labour is high and technology is low but Yields are high, then it can be called intensive and extensive farming can have low yields if in a poorer nation which cannot afford the capital inputs.

	Situation	Labour	Capital	Yield
A	1	Low	High	High
B	2	High	High	High
C	3	High	Low	Low
D	4	Low	Low	Low

2. On The Bases of Cropping System

2.1 Monoculture, Double Cropping and Multiple Cropping

A crop-production strategy can be either one of monocropping, a method of crop production in which only one crop is grown annually in the same parcel of land; or multiple cropping, a method of crop production in which several crops are grown annually in the same parcel of land.

Mono-cropping is typically practiced in large extensive areas where a given land under cultivation is more suitable to a particular type of cropping system. But this type of cropping system is more will make farmers more vulnerable in times of disaster. Because there may not have other options other than that single type of cropping pattern.

On the other hand, double cropping is a cropping system in which two crop varieties are grown in the same plots of land. This is more of diversified way of cultivation.

Multiple cropping is producing more than two crop varieties in the same plots of land. The better emphasis is given to multiple cropping systems because diversification of cropping varieties is becoming the most widely used and recommended ways of cultivating crops to expand the livelihood options of farmers and to prevent different shocks.

Importance of multiple cropping

The rapidly increasing population and the dwindling area of new lands that can be cultivated in the humid tropics, multiple cropping is expected to gain more importance. Some of the reasons for this are that:

- ✓ The *multiple-cropping index* is generally *higher with smaller farm size*. With the expected decrease in farm size, the intensity of land use is expected to increase.
- ✓ Multiple cropping is a simple and inexpensive strategy for absorbing the rapidly increasing number of farm laborers. Labor requirement per hectare usually increases as the number of crops grown per year is increased The addition of one more crop to the paddy rice, for example, could absorb an additional 100 to 200 man/days of labor per hectare.

  Conditions to use multiple cropping

  a. With the rainfall pattern in the humid tropics characterized by excess water during the rainy months and too little water during the dry months, multiple cropping is a natural strategy for maximizing land use through the proper choice of crop species to fit to these cyclical changes in water regimes.
  b. With the already large, and still increasing, number of rural population and the inadequate capital resources in the developing countries of the humid tropics,

multiple cropping is an excellent alternative to capital-intensive industrialization for increasing the income among the least privileged rural population.

Types of Multiple Cropping

a) Sequential cropping

Sequential cropping refers to the growing of two or more crops in sequence on the same field within a 12-month period, with the succeeding crop planted only after the preceding crop has been harvested, such that a farmer manages only one crop at any one time in the same field. The different types of sequential cropping are: double cropping, a sequential cropping with two crops; triple cropping, a sequential cropping with three crops; quadruple cropping, a sequential cropping with four crops; and ratoon cropping, a sequential cropping with a ratooned crop (i.e., the cultivation of regrowth from the cut stalks of the previous crop).

b) Intercropping

Intercropping is the growing of ***two or more crops simultaneously on the same field such that the period of overlap is long enough to include the vegetative stage***. There are two types of intercropping techniques: mixed intercropping, an intercropping with no distinct row arrangement; and row intercropping, an intercropping where at least one crop is planted in rows.

c) Relay Cropping

Relay cropping refers to the growing of ***two or more annual crops simultaneously in the same field such that one crop is planted after the other has flowered***.

3 On The Bases of Supply of Moisture or Water

3.1. Humid, Dry And Irrigated Farming

The humid tropics, unlike temperate regions where the crop growing period is limited by low temperature during the winter months, are characterized by a temperature regime that is favorable for crop production year round. In addition rainfall intensity is high and its distribution is uneven and periodic so that effective sunshine is low during the rainy months. The level of agricultural productivity in the humid tropics is greatly dependent upon these

two most critical factors -rainfall and solar energy. High rainfall leads to heavy erosion, leaching of nutrients, rapid loss of fertility, and rapid growth of weeds. The low level of solar energy (300 to 350 cal/cm2/day) during the rainy months, the period in which most crops in the tropics are grown, is about half of that available to crops grown during the summer months in the temperate regions.

Average yield of a crop in the humid tropics is generally lower than that of the same crop in the temperate regions. However, since the annual growing season in the tropics can be much longer than that in the temperate regions, the low yield per crop in the tropics can be offset by growing not only one crop, but as many as possible. The type of farming system in humid areas is intensive farming and multiple cropping is most widely practiced.

Irrigated Farming

Irrigation, artificial watering of land to sustain plant growth. Irrigation is practiced in all parts of the world where rainfall does not provide enough ground moisture.

In areas of irregular rainfall, irrigation is used during dry spells to ensure harvests and to increase crop yields. Irrigation has greatly expanded the amount of arable land and the production of food throughout the world. Irrigated land represents about 18 percent of all land under cultivation but often produces over twice the yield of non-irrigated fields. Irrigation, however, can waterlog soil, or increase a soil's salinity (salt level) to the point where crops are damaged or destroyed. This problem is now jeopardizing about one-third of the world's irrigated land.

Methods of Irrigation

The four main methods used today to irrigate fields are ***flood, furrow, sprinkler, and drip, or trickle, irrigation***. Flood irrigation is used for close-grown crops such as rice and where fields are level and water is abundant. A sheet of water is allowed to advance from ditches and remain on a field for a given period, depending on the crop, the porosity of the soil, and its drainage. Basin flooding is used in orchards, with basins built around trees and filled with

water. Furrow irrigation is employed with row crops such as cotton and vegetables. Parallel furrows, called corrugations, are used to spread water over fields that are too irregular to flood. Sprinkler irrigation uses less water and provides better control. Each sprinkler, spaced along a pipe, sprays droplets of water in a continuous circle until the moisture reaches the root level of the crop. Center-pivot irrigation uses long lines of sprinklers that move around a circular field like the large hand of a clock. It is used especially for feed crops such as alfalfa, which, when irrigated, furnish several mowing a year.

Drip, or trickle, irrigation delivers small but frequent amounts of moisture to the root area of each plant by means of narrow, plastic tubes. This method, which is used with great success in the United States, Israel, and Australia, ensures a minimum loss of water through evaporation or percolation into the ground.

Problems Arising From Irrigation

The chief problem caused by continuous irrigation is that of salt accumulating in the upper layers of the soil and stunting or preventing plant growth. Good drainage systems, therefore, which keep the water table well below the root level and allow water to flush salts through the topsoil, are now understood to be a crucial aspect of a successful irrigation system.

Nearly all irrigation water, whatever its source contains some salt, which percolates down to the water table and makes it increasingly brackish. Where drainage is bad and the water table approaches root level, the concentrated salt makes plant growth impossible. Increased salinity due to poorly-drained soil began to ruin rich lands of the southern Tigris-Euphrates Valley in Mesopotamia as early as 2100 BC. By 1700 BC yields from these lands dwindled to one-fourth of their once abundant harvests, and the great Sumerian cities that depended on them went to ruin. Pakistan's huge irrigation project in the Indus Valley has the same problem, with one-fifth of the land severely affected by 1960. Measures have been taken to lower the water tables by means of tube wells and allowing waters to flush the salts through the topsoil.

Although the world's irrigated area grew by 3 percent a year in the third quarter of the 20th century, this rate fell in the last quarter, largely because most of the economically feasible opportunities for large-scale irrigation development had already been exploited. Also, as greater demands are now being made on limited water resources, efficient use of available surface and groundwater supplies is becoming crucial.

DRY-FARMING

Dry-farming, as at present understood, is the profitable production of useful crops, without irrigation, on lands that receive annually a rainfall of 20 inches or less. In districts of torrential rains, high winds, unfavorable distribution of the rainfall, or other water-dissipating factors, the term "dry-farming" is also properly applied to farming without irrigation under an annual precipitation of 25 or even 30 inches.

There is no sharp demarcation between dry-and humid farming. When the annual precipitation is under 20 inches, the methods of dry-farming are usually indispensable. When it is over 30 inches, the methods of humid-farming are employed; in places where the annual precipitation is between 20 and 30 inches, the methods to be used depend chiefly on local conditions affecting the conservation of soil moisture. Dry-farming, however, always implies farming under a comparatively small annual rainfall.

DRY-VERSUS HUMID-FARMING

Dry-farming, as a distinct branch of agriculture has for its purpose the reclamation, for the use of man, of the vast unirrigable "desert" or "semi-desert" areas of the world, which until recently were considered hopelessly barren. The great underlying principles of agriculture are the same throughout the world, yet the emphasis to be placed on the different agricultural theories and practices must be shifted in accordance with regional conditions. The agricultural problem of first importance in humid regions is the maintenance of soil fertility; and since modern agriculture was developed almost wholly under humid conditions, the system of scientific agriculture has for its central idea the maintenance of soil fertility. In arid regions, on the other hand, the conservation of the natural water precipitation for crop production is the important problem; and a new system of agriculture must therefore be

constructed, on the basis of the old principles, but with the conservation of the natural precipitation as the central idea. The system of dry-farming must marshal and organize all the established facts of science for the better utilization, in plant growth, of a limited rainfall. The excellent teachings of humid agriculture respecting the maintenance of soil fertility will be of high value in the development of dry-farming, and the firm establishment of right methods of conserving and using the natural precipitation will undoubtedly have a beneficial effect upon the practice of humid agriculture.

4 Other Methods of Classification

4.1 Mixed Farming

Cultivating of crops together with rearing of livestock is refered as mixed farming, for example:-. Ato Bekele had a cow, a pig, a horse, a dog, and chickens. To feed all those animals (and his family) he probably also had a vegetable garden, several hectares of grain and hay, and some pasture. Until this century, mixed farming was the norm all over the world. It's still common in many regions. *Mixed farming has many advantages:*

• If disease or poor economic conditions strike one crop or one species of farm animal, the others will pull the operation through.

• The system takes care of itself. Livestock and poultry manure are good fertilizers for the soil, so the grains and grasses grow well. Because the grains and grasses grow well, there is plenty for the animals to eat.

4.2 Plantation Farming/Specialized Farming/

A specialized operation focuses on one area of agriculture. This may be raising cows and calves, producing eggs, or growing cherries. There are two main advantages to specialization:

• *Since the entire operation is geared toward producing one or two commodities, it can become very efficient.*

• *The farmer can focus on developing skills in one area, and can invest money in equipment specifically designed to handle the product. This usually means a higher volume production at a lower cost.*

Specialization has its own problems, however. It's easy to over-produce one commodity, and the economy of entire regions can come to depend on one crop. For these reasons, the areas that are most specialized in agriculture require the greatest amount of government regulation to keep the income to the farmer and the supplies to the consumer at the same levels all the time. Poultry, dairy, and grain producers are examples of specialized, highly regulated agricultural activities.

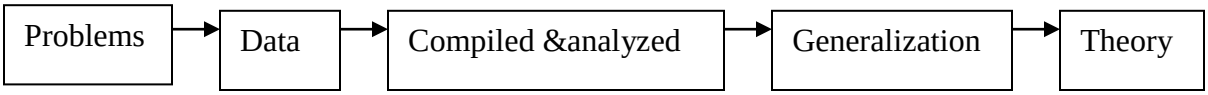
After several decades of increased specialization, we're also no longer able to ignore the environmental problems caused by this method of agriculture. The problems are:

• The specialized grower must purchase large quantities of manufactured fertilizer.

• The crop farmers who take the manure from specialized livestock or poultry raisers have greater challenges in using the manure in ways that don't pollute the ground water or surface water.

• Monocultures (operations that produce one crop only) drain the soil of whatever nutrients the plant likes best, and encourage the build-up of insect populations, disease, and other pests such as rodents.

2.1.4. Agricultural Location Theories and Concepts



From its basis, any theory is the result of certain problems and then researches. For location questions, there are prominent scholars, who developed their own theories. In the past geographical analyses of the territorial division of labor tended to concentrate on abstract models of economic landscapes. Examples include the work of Von Thünen, Alfred Weber, Hotelling, Christaller and Lösch.

Quantitative methods have been particularly useful in applications of location theory, a branch of geography that studies the factors that influence the location of geographic elements, such as towns or factories. Location theory was introduced by the German agriculturist Heinrich von Thünen in the early 1800s. Weber's industrial location theory and the German geographer Walter Christaller made great contributions to location theory during the 1930s by analyzing the location of urban centers.

1. Vonthunen's Agricultural Land Use Theory

Although the subject of geography existed for several thousands of years, the systematic study of the sub discipline of economic geography is attributed to the works of J. Heinrich Von Thunen (who owned a large state near the town of Restock) as a pioneer. His analyses remains applicable to the spatial arrangement of food production and his model provides the starting point for contemporary studies of spatial organization of land use in the urban built up environment.

Much of agricultural geography has been concerned with patterns on a regional and local scale based on Von Thune's theory, which is concerned with how agricultural land -use patterns change with distance from a centrally located market, and published his ideas in a book entitled ***The isolated state:*** It highlights how changes in supply and demand relative to cost and price variations are reflected in spatial changes in land - use within the area serving the market. I.e. if environmental variables are held constant, farm product that achieves the highest profit will outbid all other products in the competition for location. Hence, a product with a high expected return and high rent-paying ability outbids a product with a lower profit level and modest rent - bid ceiling. Von Thunen was the first to propose the idea of opportunity cost.

• The amount of a commodity that society must give up in order to release just enough resources to produce one more unit of another commodity.

Assumptions

1. Existence of an isolated state in which there is only a single urban market (central city) whose needs are supplied by the surrounding agricultural hinterland, which is cut off from the rest of the world. All farmers received the same price for a particular product at any one time.

2. Existence of an extensive plain of cultivable land of uniform (homogeneous) physical character i.e. identical climate and soil conditions.

3. A uniform transportation surface on which movement cost increase equally with distance and transport was equally easy in every direction. The market is served by one mode of transport-horse and cart.

4. The farmers acted as economic men wishing to maximize their profits and all having equal knowledge of the needs of the market.

Von Thunen also assumed farmers would respond to changes in the market situation. In addition to the visual presentation of concentric rings of different land -use around the central market, he conceptualized that changes in market demand will bring change throughout the pattern of farming around the market and the nature of the farming system of the zone of land use. e.g. like the effects of a secondary market introduced in to a region & another transport (water transport). Cultivated land and its zones of land-use extend with increasing population in the central city which results in increasing demand for agricultural foods. Hence, the concept of change lies at the heart of von Thunen's theory making his work of direct relevance to current discussions of farming patterns & systems.

Problem Posed

A. Why intensity of production varies with distance from the market?

B. Why agricultural land use type varies with distance?

Principles

Von Thunen emphasized on the relationship with three variables (factors):

1. Distance of farms from the market.

2. Selling price of products at the market.

3. Cost of transport and cost of production together.

Thus, the nearer the farmer to the market, the greater his returns from sales of his produce is. The high returns from land near the market and the greater competition for such land raising its price, encourage farmers to make the most use of land as intensively as possible with intensity decreasing with distance from it. Similarly, less intensive use of land away from the market arises because transport costs increase with distance and farmers may not afford to put considerable inputs into farming which is necessarily to give higher yields.

Economic rent (locational rent) concerns with returns which could be obtained by putting land to a particular use. Hence, return of economic rent is calculated by subtracting production and transport costs from revenue (price) obtained from selling the produce at the market.

Locational rent is the profit from a unit of land and should not be confused with actual rent which is that paid by a tenant to a land owner.

P=V-(E+T) Where: V=value of revenue from the product

E= production cost

T = Transport cost

P= net return profit or economic rent

Since market revenue or price of any product varies like production and transport costs, returns or economic rent also varies. Thus the farmer chooses the crop or combination of agricultural produce which gives the best economic rent. The economic rent for any agricultural produce falls with distance from the market (cost of production and price at market remain constant) until a point is reached when it is not worth using the land for that crop. Since Von Thunen assumed that all farmers got the same price (revenue) from their crops and the cost of production were equal for all farmers, the only variable was the cost of transport which increased proportionally with distance from the market.

Relationship between Locatinal (economic) Rent and Distance from the Market

LR=Y(m-c- td), where: LR = locational rent

Y= yields per unit of land

m=market price per unit of commodity

c= $prod^n$ const per unit of land

t= transport cost per unit of commodity

d= distance from the market

Since **y, m, c, t**, are constant, it is possible to calculate by how much the locational rent for a community decreases as distance from the market increase. LR will be at its maximum at the market where there are no transport costs and decreases away from it unit the farmer ceases production at the ingrain of cultivation b/c revenue and costs are the same i.e. there is no profit.

- **Location Rent for a single crop grown at different intensities.**

L.R. directly related with market accessibility. Intensity of production is a measure of the amount of inputs per unit of land. The higher LR obtained with great accessibility is an incentive to increase output per unit of land by increasing input of capital and labour. The incremental output for each additional unit of input of labour and capital is not uniform.Based on the low of diminishing return, as successive unit of variable input, say capital are added to fixed input land total product (output) passes through three stages.

1. Total product increase at increasing rate out put

2. Total product increase at decreasing rate out put additional

3. It declines output will decline production.

❖ Location rent for competing crops

The most important contribution of Von Thunen studies was determination of special organization of agriculture.

Table2.1. Locational Land use of Three Commodities, Competing Classes Place to the Market.

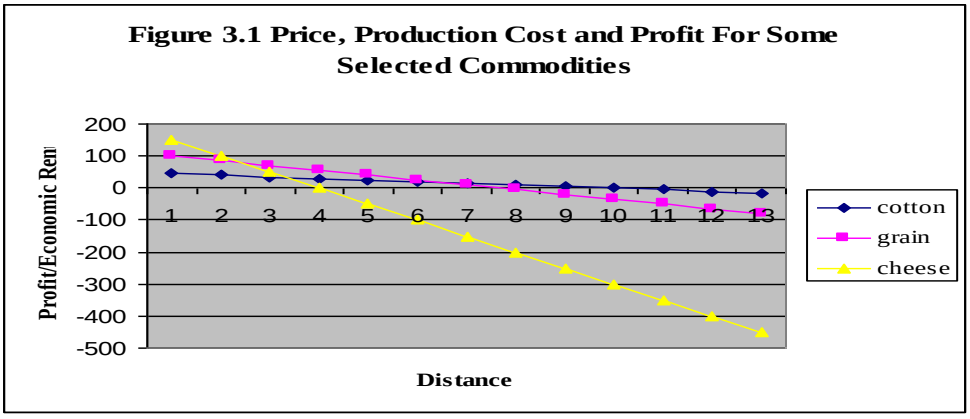
Crop Type	Unit price	Production Expense	Transport cost/Kms
Cotton	65	20	5
Grain	200	100	15
Cheese	300	150	50

Table2.2. LR, profit gained by producer after transport and production cost for selected commodities

Distance from market	**Cotton**				**Grain**				**Cheese**			
	V/MP	PC	TC	P	V/MP	PC	TC	P	V/MP	PC	TC	P
0	65	20	0	45	200	100	0	100	300	150	0	150
2	65	20	5	40	200	100	15	85	300	150	50	100
3	65	20	10	35	200	100	30	70	300	150	50	50
4	65	20	15	30	200	100	45	55	300	150	50	0
5	65	20	20	25	200	100	60	40	300	150	50	-50
6	65	20	25	20	200	100	75	25	300	150	50	-100
7	65	20	30	15	200	100	90	10	300	150	50	-150
8	65	20	35	10	200	100	105	-5	300	150	50	-200
9	65	20	40	5	200	100	120	-20	300	150	50	-250
10	65	20	45	0	200	100	135	-35	300	150	50	-300
11	65	20	50	-5	200	100	150	-50	300	150	50	-350
12	65	20	55	-10	200	100	165	-65	300	150	50	-400
13	65	20	60	-15	200	100	180	-80	300	150	50	-450

Location of different crop depends up on gaining profit. Location rent near market potato 70, at 4km potato replaces 30 by wheat 33. At 8km wheat replace 21 by wool 22.5.

Figure 2.2. Economic Return at Varying Distance from the Market



Bid-Rent Curve is a line showing the economic return at varying distance from the market.. As can be seen from the table and the figure above, up to 3 kms cheese is profitable, the upper limit for grain is 7 kms whereas, for cotton it is 9 kilometers. The Bid-rent curve for cheese is highly stepper than other two products because transport cost for cheese is higher than other products. Therefore, items with high cost of transportation are expected to be produced around the market centers whereas items with low cost of transportation are expected far away from the market center. That is, heavy products and perishables would be produced close to the town, while lighter and goods that are more durable could be manufactured on the periphery. Because it would cost more to transport goods to areas distant from the city centre, the returns to the outlying areas land would diminish until, at a certain distance, land rent would become zero. Moreover, methods of cultivation would vary—with land cultivated more intensively near the city, because the more valuable land near the city would demand a high rate of return. Subsequent writers have often built upon the model that Thünen devised.

Patterns of land use round the market

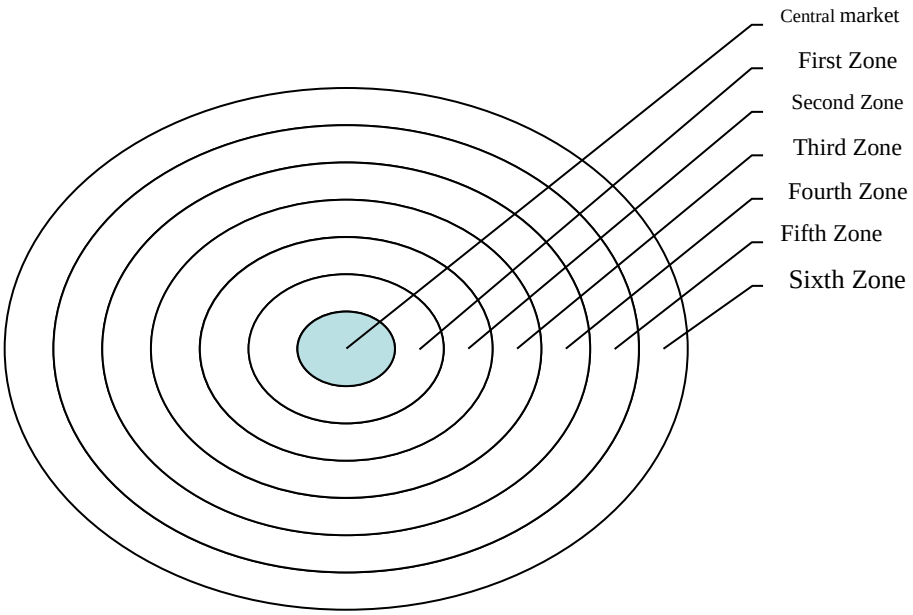
The pattern of land use is dependent on the relative returns with each agricultural product commands with distance from the market. At a certain distance agricultural products giving the highest returns (push) relegate (give a lower important rank) other usages to an outer zone. In the zonations, there is not only a difference in what is produced but also the system under which production occurs. Farming becomes more extensive with distance from the market, to compensate for increased transport cost i.e. use of inputs to the farm haves to be

reduced. This leads to lower yields per unit area of land farmed. However, the farmer could still maintain his ever all profit by farming more land (possessing larger farms) as land is cheaper and more plentiful away from the market and by reducing costs of production.

Von Thnen Original Crop System

He suggested that bulky, perishable and intensive crop product should be produced near the market on the basis of his assumption, therefore, he develop by original model that had six concentric zones (rings) the ring should be area of maximum profit for specific product.

Figure 2.3 Von Thunen's Agricultural Land Use Zonation



Features of each agricultural land use zone

1. First zone: Intensive market gardening and dairying -fresh milk and vegetables are required constantly in the city. As a result of perishability and slow means of transport, they have to be produced close to the market. Prices have to be high enough to make them profitable, or to give the highest economic rent.

2. Second zone: In von Thunen's time wood was used constantly for fuel, building and other purposes and also because of the cost transporting such a bulky goods, it occupied the second zone.

3. In the third Zone: Intensive crop farming without fallow (e.g. rye for bread).

4. In the fourth zone: lies less intensive crop farming with fallow.

5. In the fifth zone: there is Extensive farming.

6. The last zone: i.e. the outer most edge of the cultivated land became an area of extensive live stock ranching (livestock for meat were sent on the hoof, thus saving transport cost and dairy products (cheese, butter) are small in bulk and cheap to transport).

❖ Criticism to Von Thunen's Land Use Theory

1. There is no isolated state without any interaction and communication.
2. Markets are reflections of demand; if there is high demand there will be large numbers of markets.
3. There is no isotropic plain in this world. The world is characterized by different physical and human elements.
4. It is difficult to identify relationship between cost of transport and distance. There is no always positive relationship between cost of transport and distance.
5. According to him forests (wood land) are found in the second Zone, but there is no one particular place for forests.
6. Improved technology can change the transport system of the world.
7. The model works only for free ownership land tenure system.

The Value of Von Thunen's Work: *A short summary*

Times and methods of farming have changed but some of the important principles recognized by Von Thunen remain. Different markets have to be sensed not one; transport methods and accessibility varied; outside completion is being felt to the potential market; physical variations interrupt the ideal zonations of land use.

Distance from market still influences the relative location of different agricultural products. For example, there is still a tendency for liquid milk production and market gardening to dominate where there is quick access to markets. And extensive farming of non perishable crops is mainly carried out at further distance from markets.

Von Thunen also indicated that any particular crop can still be grown under different farming systems with production inputs being changed to compensate for other increased costs. For example, wheat is intensively cultivated under a mixed arable system in Western Europe monoculture system more extensively in the poorer lands of continental interiors with lower

yields but compensated by lower production costs and larger size of farm holding Changes in market demand brought changes in methods and the overall pattern of farming.

Von Thune clearly indicated that as population raised the growth in demand could only be met in two ways: firstly yields could be increased on existing agricultural lands by improvement in farming and secondly new land could be taken in with successive zones of cultivation being pushed progressively out wards.

2. J.C. Ricardo's Economic Rent

J.C, Ricardo is an economist, who developed his theory of agricultural land use or productivity. All his assumptions were based on Von thunnen's assumptions. The only difference is that according to J. C Ricardo fertility of soil is different in different regions. Because of low fertility the cost of production is the same as the market price. Such soils according to Ricardo are known as marginal soils - the least fertile soil which gives low productivity. Economic rent is the same as cost of production if the marginal product is Zero. Economic rent according to Richardo is proportional to the fertility of soil. That means if the fertility of soil is high , there will be high production and vice-versa.

Weakness: agricultural production is not only affected by fertility of soil but also by many other natural conditions.

3. Game Theory

It is mathematical theory to find best strategy primarily concerned with determining an optimal strategy for situations in which there is competition or conflict, e.g. in business activities or military operations. Game Theory is a mathematical analysis of any situation involving a conflict of interest, with the intent of indicating the optimal choices that, under given conditions, will lead to a desired outcome. Although game theory has roots in the study of such well-known amusements as checkers, tick-tack-toe, and poker—hence the name—it also involves much more serious conflicts of interest arising in such fields as sociology, economics, and political and military science.

Although there is no full evidence where and when this theory was started, some literature asserts that aspects of game theory were first explored by the French mathematician Émile Borel, who wrote several papers on games of chance and theories of play. The acknowledged father of game theory, however, is the Hungarian-American mathematician John von Neumann, who in a series of papers in the 1920s and '30s established the mathematical

framework for all subsequent theoretical developments. During World War II military strategists in such areas as logistics, submarine warfare, and air defense drew on ideas that were directly related to game theory. Game theory thereafter developed within the context of the social sciences. Despite such empirically related interests, however, it is essentially a product of mathematicians.

Game theory considered rain-fed farmers and natural environments for optimum allocation of agricultural land for different crops. The theory asks if all the inputs are constant on the farmers' side do we expect the same amount of output in the same year? or if the mean annual rainfall is 1000mm and temperature is 26 degree centigrade, do we expect the same amount of crop production? The answer is no, because the intensity and duration of rainfall and temperature varies from time to time and from place to place. The distribution of rainfall is also affected by altitude, latitude and temperature conditions. Thus, this affects crop production. According to the theory natural conditions are always uncertain difficult to make relatively precise. Because of this uncertainty, the farmers should adjust him/herself according to the changing unreliable environmental conditions. If there is occurrence of drought in order to get better production, one has to adjust by selecting better and short maturing crops, irrigation and others. Therefore, this theory is called Game Theory because it tries to adjust between nature and human activities – crop production

If the farmer is assuming to produce sorghum and rice, the following calculations can be used.

Table 2.3 The variation of the yield from the mean expressed in terms of the total percentage variation for Rice and Sorghum

Crop	Production Season/qt/hecta		$\bar{X}$	X- $\bar{X}$	$\frac{\sum X - \bar{X}}{\sum\sum\left(X - \bar{X}\right)}$	Crops to gain
	Wet season	Dry season				
Rice	63	43	53	20	$\frac{20}{50} X100 = 40\%$	60%
Sorghum	28	58	43	30	$\frac{30}{50} X100 = 60\%$	40%

The variation of the yield from the mean expressed in terms of the total percentage variation. Whether it is wet or dry the variation from the expect product is 40% thus we are sure that the yield is 60% for rice, and 40% for sorghum. Therefore when the farmers try to adjust their agricultural land, they should give 60% for rice and 40% for sorghum with uncertainty.

Exercise

Compute the mean, mean variation, percentage variation and crops gained and decide for which type of crops larger agricultural lands should be allocated using the given table below.

Crop type	Production Season/qt/hectare			$\bar{X}$	$X - \bar{X}$	$\frac{\sum X - \bar{X}}{\sum\sum\left(X - \bar{X}\right)}$	Crops gained
	Kiremt	*Belg*	*Tseday*				
Maize	30	25	10				
Teff	25	30	20				
Sorghum	20	25	30				
Wheat	15	20	25				

D. Diffusion Model

Diffusion model was developed by Torsten Hägerstrand, who was a Swedish geographer and an agricultural economist. He was born in 1916, in Moheda (Sweden). A professor at the University of Lund, Sweden, he is most known for his studies of the diffusion process, by which an item (such as an idea or a disease) spreads in a given area over a period of time. His work, *Innovation Diffusion as a Spatial Process* (1953; trans. 1968), was influential in its application of statistical methods and models to solve geographical problems.

Diffusion is the process by which ideas, new technologies, fashions, diseases and human racial characteristics distributed in a given area over a period of time. These events collectively are known as *innovations*.

In geography, for diffusion, we have to consider two important points:

1. Any thing that moves across geographic space must be carried on in some way—it has spatial variation

2. The rate at which something moves over space will be influenced by other things that get in their way (diffusion barriers) which might be either physical or social barriers or both. Torsten Hägerstrand first applied his model for solving agricultural problems that is why we include it as one of the agricultural models. According to him there are three forms or types of diffusions.

- **Expansion diffusion:** in this type of diffusion the innovations may start at a single point and spread to all directions over an increasingly larger geographical areas through time (see the diagram below). This type of diffusion is undertaken through contact but not by man. It is mostly uncontrolled and the whole population is affected by expansion. Contingent diseases can spread through this type of diffusion.

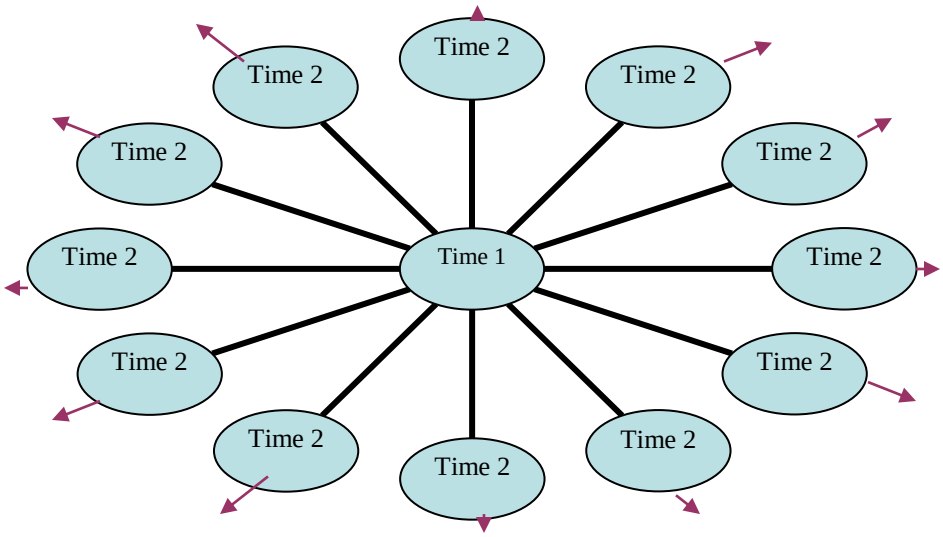


Figure 2.4 Expansion Diffusion

- **Relocation Diffusion:** this diffusion is said to be commenced when the source item changes or leaves one location for another in order to disseminate new innovation. It is mostly related to migration and the spread of fashions because in this movement there is changing of location to be replaced by others. By this diffusion all people could not get the information and spreads from any source not fixed from a single source.

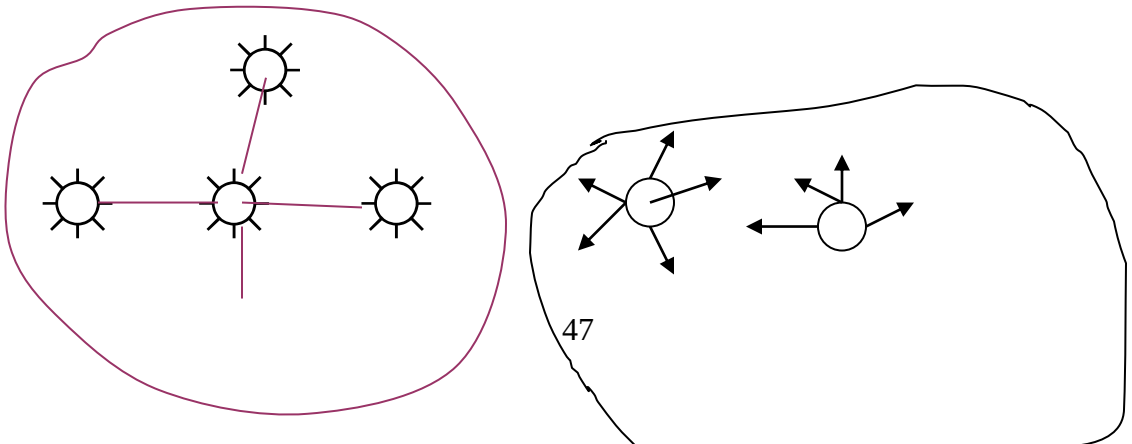


Figure 2.5 Relocation Diffusion

- **Hierarchical Diffusion:** in this type of diffusion the flow of information must in the hierarchical orders. Through a certain control channel. The flow of government policies, laws and orders are typical examples for this type diffusion. The following diagram is the hierarchical diffusions of government policies in Ethiopia. Diffusion starts from the central government to the regional states, from regional states to zone administrations, from zone administrations to districts and then to kebeles and finally to villages and individuals.

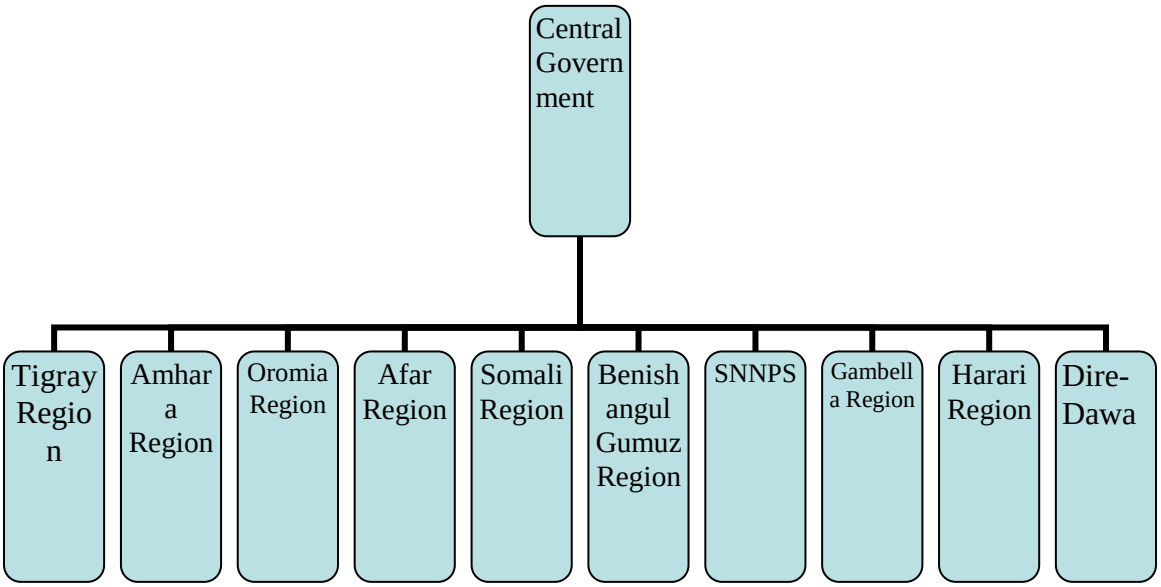


Figure 2.6 Hierarchical Diffusion

Generally, according to Torsten Hagerstrand for diffusion to take place there should be direction.

Stages of Diffusion

Stage-I: in this diffusion stage, only a person or the individuals around the innovator is adapting the innovation.

Stage II: it is known as diffusion stage because new innovations start to operate distant locations.

Stage III: this is known as condensing stage there is relatively declining of adaptations equally everywhere.

Stage IV: this is the last stage which is known as saturation stage. The diffusion declines and the potential adaptors are going to receive information.

2.2. Forestry

Forestry is a management of forestlands for maximum sustained yield of forest resources and benefits. Although forestry originally concerned mainly timber production, it now also involves the management of grazing areas for domestic livestock, the preservation of wildlife habitats, watershed protection and the development of recreational opportunities. The management of forestlands therefore helps to ensure that wooded areas are used for maximum benefit according to their nature.

Forests are close associations of plants. According to Allen and Sharp "*it is a community of trees and associated organisms covering a considerable area; utilizing air, waters, and minerals to attain maturity and to produce itself; and capable of furnishing man and land with indispensable products and services.*"

2.2.1. Economic Importance of Forests

Forestry and forest based industries still play a key role in some parts of the world. Numerous people are solely dependent on forest products. All countries be it developed or developing are engaged in forestry. The function of forest can be grouped in to two types

I. Direct function

- *Food*- through gathering forests provides food to its inhabitants.
- *Clothing*- provides materials used to produce cloths and other materials.

- *Shelter*- used for construction of houses, halls, rooms and other buildings.
- *Fuel*- third world countries still use forest wood as a major source of fuel heating and cooking, because of absence of fossil fuel or its high cost. On the world scale half of the consumption occurs as fuel. In the tropics fuel use is predominant. (> 80% in Brazil, Indonesia, India and many other Asian and African countries).
- *Raw materials for industries*- paper industry, card board, match box, poly wood etc. to produce furniture, materials for ship rail and other transport equipment, to produce charcoal- a good substitute of coal- used in different industrial activities.
- *Medicinal plants*- forest provide useful medicinal plants. For instance, quinine can be produced from plants.
- *Ecological balance*-increase environmental beauty and environmental balance, stability and equilibrium.
- Other necessary products- sandal wood, oil, cinnamon, etc.

II. Indirect functions of forests

- *Influence on climate*- water budget of the area is influenced by transpiration process and extraction of underground water through roots.
- *Influence on soil*- hold soils firmly, help for the formation and renewal of soils.
- *Influence on natural disasters*- it is a natural protection of an area from any natural calamities.
- *For tourism*- forests are natural attraction to tourists and support the economy.

2.3.2. Lumbering Industry

It is the most wide spread and dominant type of forestry activity of the forest. It is broadly known as the gathering of tree products. Almost all the forest regions of the earth has developed its own lumbering industry which is markedly different from one another.

The major activities in lumbering industries are:

- *Preparation of the land*- survey of the area, identification of useable trees and finding out the transportation route.
- *Felling*- cutting and felling process is done with the help of either machines or manual labor.

- *Extraction*- this process is concerned only with the removal and transportation of trees from the forest to the market. The entire method is complex one. Considering the pattern of the forest it may require: Traditional methods, Mechanized method, Floating and sliding method.
- *Afforestation and replanting*- becoming the most important aspect of lumbering for the restoration of ecology with in forest areas. Efforts are being made to regenerate forests through re plantation so that sustainable development can be archived in lumbering industry.

2.3.3. Major Forest Regions of the World

The world occupies an immense area along lower and higher latitudes. The factors of size, relief, climate and natural resources make the world geographically diverse. Commercial forests also occur in two huge global belts.

- Tropical equatorial zone including large part of S. America and Africa.
- Higher latitudes of northern hemisphere (Eurasia and North America).

1. Lumbering in Tropical Forests

Despite having innumerable tree species untouched dense forest of tropical rain forest, lumbering industry has not yet been properly developed. Several reasons liable for this:

a. *Innumerable species*- problem to select valuable trees.

b. *Unhygienic and hostile conditions*- moist, swampy and unhygienic forests, great variety of pests, insects, flies and wild animal, tropical diseases and epidemics create health hazard and sanitary problems. The forest is dense and impenetrable.

c. *Backward and age-old methods*- technological backwardness and traditional methods of extractions a root cause for backwardness of the industry. Inaccessibility of the terrains and scattered location of trees prohibit mechanization on large scale.

d. *Lack of demand*- as compared to temperate soft woods tropical hard woods cannot be used in paper or match box industry as the countries are underdeveloped. Also lack of demand from the hinterland resists further development of the industry.

e. *Non- generation of tree*- most of tropical trees require much longer period for generation. After cutting 30-35 old years are required for regeneration.

f. *Transportation*- due to inaccessibility's nature of the terrain, large vehicles and machineries cannot be operated. Besides, most of the logs are very heavy and do not float in water. So, natural transportation though river is not possible

g. *Migratory cultivation*- shifting cultivation devastates valuable forest resources which require many years for generation.

h. *Soil erosion*- caused by shifting cultivation ultimately leads changes to river course sliding of boulder, earth quakes etc.

2. Lumbering Industries in Temperate Regions

Nearly 80% of lumbering products are obtained from temperate coniferous forests of North America and Europe through integrated, coordinated and well managed or organized ways. Scale of operation and number of people in this industry is massive. Various geographical, socioeconomic and cultural factors have contributed significantly for its origin and development.

The factors responsible for this development are:

• *Homogeneity*- forests in these regions are uniform and the species are almost similar.

• *Easy transportation*- trees are unbranched, shorter and lighter.

• *Mechanization*- for cutting and felling, machines is used instead of manual labor.

• *Cheaper power*- power-particularly hydroelectric power is cheaper in this region and incentive to sawmill.

• *Steady demand*- demand of soft conifer woods increase day by day. Eg. For preparation of pulp in paper industry and cellulose for synthetic textile industry.

• *Development of forest management*- careful management and afforestation.

• *Climate*- conducive for lumbering, workers can continue their activities longer without much tiredness.

• *Ready market*- adjacent countries temperate coniferous forest are large highly developed and industrially prosperous. Their purchasing power and great requirement of wood accelerated lumbering industry in this part of the globe. Finland, Sweden, Norway, U.S.A. and Canada earn sizeable revenue to their national export of lumbering products.

• *Government policies*- governments are playing crucial role to increase environmental awareness through proper forest management and also giving assistance to forest research projects.

• *Other products*- hums, fruits, oils, etc other than woods this makes lumbering more profitable.

2.3.4. World production and trade in Timber and Timber products

A few numbers of countries which have vast forest resources actually dominate the output of timber.

• The former USSR constitutes about 15% of the global output of timber

• United State of America contributes 13% of the global output of timber

• Canada provide 5% of the global output of timber.

• Central Europe- Germany, France, Belgium Denmark, Hungary, Yugoslavia, Romania and Bulgaria

• Baltic States (Estonia, Latvia, and Lithuania), Norway, Sweden and Finland.

• Asia- Japan, China, India, S.E.A- Burma, Thailand, Indo-China, Malaysia, Singapore, Indonesia, Sumatra.

Although about one-fifth of the continent is covered by forest, there is relatively little forest industry in Africa. Most felled trees are cut down to clear land for farms or, to a lesser extent, to supply fuelwood. The most desirable timber trees are mahogany, obeche, iroko, and other tropical hardwoods. Tropical forests rarely offer dense stands of a single species, however, inhibiting massive logging operations. Selective cutting is very expensive, especially in the interior where transport costs become prohibitive.

2.3. Fishery

Fisheries refer to industry of harvesting fish, shellfish and other aquatic animals. Fisheries may be large commercial, recreational, or small subsistence fisheries. The term *fishery* is also used to describe the waters where fishing takes place or the species of fish being harvested.

Fish are an important and predominant source of high quality animal protein in the diet for the world's population. They are important source of food, income, jobs and recreation for people around the world. This is particularly true in island nations such as China, Japan and Iceland where seafood is eaten as a major source of protein. Dependence on fish is heaviest in China, Japan, S.E.A, Sub-Saharan Africa and parts of Latin America. It also serves a growing role in the diet in many developed countries including USA. The developed world also has a high demand for fish meal as an animal food and for fertilizers.

In 1995, total fish catch all over the world was 91 million tons. Although according to FAO estimates and projection total demand for fish would increase to around 120 million tons in 2010, worldwide harvest of fishery products has steadily increased to meet the growing global demand for seafood. In 2001 an estimated 130 million metric tons of fishery products were harvested. China was responsible for the largest harvest, followed by Peru, Japan, India, Chile, the United States, Indonesia, and Russia.

Important fish producers by continents are:

- Europe- USSR, Norway, Denmark, Iceland, Spain, UK etc.
- North America- U.S.A and Canada
- Asia- China, Japan, India, and Korea
- S. America- Peru, Chile etc.

Among these countries per capita food consumption in N. America was highest (22.2kg Compared to 6.8kg in Africa).

Among the continents, Asia registered over 40% of world fish production followed by S. America, Europe and North America.

The increasing demand for seafood has led to a complex, global system of trade in fisheries products. Japan is the largest *importer*, followed by the United States, France, Spain, and Germany. Thailand is the largest *exporter*, followed by the United States, Norway, China, and Denmark.

2.4.2. Major Fisheries

The range of fisheries is immense—over 4,000 aquatic species are harvested worldwide. The shrimp fishery alone includes well over 40 species. Fisheries are located almost anywhere there is water—from the brine shrimp fishery in the Great Salt Lake of Utah in the United States, to the North Pacific Ocean where salmon, pollock, king crab, halibut and many other species are caught. Over 80% of the world's fisheries are located in the coastal and ocean environment, and nearly 20% are found in inland fresh water fisheries. Currently, over half of the world's fishery harvests come from the Pacific Ocean; 25% are from the North Pacific alone.

According to habitat, all edible fish can be grouped in to two distinct categories:

1. Fresh water fish

Several freshwater fisheries are also important. Carp and related freshwater fish are consumed mostly in Asia and parts of Europe. Carp are generally raised in ponds and account for nearly 10% of all fish harvested worldwide. The tilapia, a freshwater or brackish water (mixture of fresh and saltwater) fish native to Africa, is now being raised globally to add protein to the diets of people in less-developed areas—especially in Asia and South America. It is also being sold to meet the growing demand for seafood in countries such as the United States. Tilapia harvests make up a relatively small percentage of the global fish supply, but production is still increasing.

Shrimp are harvested worldwide. Most large and medium-sized shrimp come from the tropical waters of countries like Thailand, India, Ecuador and Mexico. Many small shrimp are harvested from the cold waters of Iceland, Greenland and Canada. Total wild and farmed shrimp harvest accounts for less than 5% of the total world fisheries harvest. Even so, shrimp has a very high commercial value and is the most important species group in world fisheries trade.

Other important fisheries include scallops harvested from Japan, Canada, China and the United States; king crab from Alaska and Russia; clawed lobster from Canada and the United States; and spiny lobster, squid, and octopus from around the world.

Fresh water fish is classified in to two

A. *Inland water fish* – are grown in ponds, lakes, rivers, canals and sometimes in the paddy fields of South East Asia.

B. *Catadromous fish* - a rare type of fish which migrate from fresh water to marine saline water for breeding purpose e.g. Eel.

2. Marine fish-it is classified in to three

A. Pelagic fish: The largest fisheries group is made up of small, *pelagic* (open ocean) fishes such as herring, sardine, anchovy and related species. Over 20% of the world's fishery harvest comes from this group and Chile and Peru are the leading harvesters. These fish have relatively low commercial value and are often used to make feed for poultry, hogs and other animals.

Fish such as tuna, swordfish, marlin and mahi-mahi make up the large pelagic fish category which account for nearly 5% of world harvest.

- Smaller in size (20-60cm) and breed in shallow water (obtained from shallow coastal areas).
- Migrate from place to place in different seasons and take shelter in Shoals (shallow waters),
- Major species include: Herrings (tasty and nutritious), Mackerel, Sardine,

Brisling, menhaden, Anchovies, etc

B. Demershal fish: This is another large category of harvested fishes, accounting for nearly 10% of the world's fishery harvest, is the ground-fish, or *demersal* fish, that live near the ocean floor. These generally white-fleshed fishes include cod, haddock, pollock, and hake. Cod and haddock tend to be relatively high in commercial value.

- Comparatively longer (Usually over 1m.).
- Obtained down to a depth of about 200ms.
- It seldom migrates as the temperature in that depth remains more or less constant.
- Major species include Cod, Haddock, Sole, Halibut, White fish, Sole, Hake, Tuna, etc.

C. Anadromous fish: These types of fish are predominantly live in shallow sea but migrate seasonally to the inland water river for breeding purpose. Salmon belong to the *anadromous* group, meaning they lay their eggs in fresh water but usually spend their adult lives in the ocean. Although the salmon fishery only accounts for about 2% of world fishery harvests, it is one of the most important wild fisheries in Canada, Japan, Russia, and the United States. Salmon are also cultured in farms in many countries, including Australia, Chile, Canada, Norway, Scotland, and the United States. Some species of salmon are also highly prized sport fish. Hilsa is also an important species of anadromous fish.

2.4.3. Major Fishing Grounds of the world

A. Fishing in Temperate Region

- It is the most important fishing region in the world.
- Planktons are rich in temperate seas in northern hemisphere.
- It provides 60% of global marine catch.
- Atlantic and pacific oceans together supply 80% of the catch, Indian Ocean only 4%

- The remaining 16% in this region is collected from inland seas.

Reason for the development of fishing Industry in Temperate Region

Most of the large commercial fishing grounds are located in the temperate regions of northern hemisphere. Very few commercial fishing grounds were developed in the tropical areas and southern hemisphere. The reasons for undisputed supremacy of temperate fishing grounds are:

a. Physical/ geographical factors

b. Social-economic factors.

Physical/ geographical factors

A. *Availability of plankton*: unicellular marine organisms/ phytoplankton and zoo plankton. The growth of plankton requires the following conditions:

i. Shallow seas: because their development is directly related with direct sunlight.

ii. Temperature difference: A cold and warm current meeting is suitable for plankton.

iii. Weathered mineral concentration.

B. *Nature of the continental shelves:* vast, open extension of continental shelf is ideal for fish concentration.

C. *Endented or broken coastal line*: provide natural shelter to fish and easy catch to fisherman. Construction of ports is easy.

D. *Variety and better quality fish:* most of fish are edible, tasty and consumable.

E. *Temperate climate:* temperate cool climate is helpful for its natural preservation for much longer periods.

F. *Topography:* undulation as plain coastal areas favor fishing activities.

G. *Presence of forest*: wood for construction of boats and ferries.

Socio-economic factors

- Preservation facilities
- Skill of fishermen and cheap labor
- Transportation
- Food habit
- Demand and market for products
- Lack of agriculture and other occupations

- Economic development and banking systems
- Lack of alternative protein source

Major Temperate fishing Grounds

Five major temperate fishing grounds are providing bulk of the marine fish in the region. Among these 4 are northern hemisphere regions and another is new southern hemisphere.

1. *The North- West Pacific*: vast stretches of Eurasian region comprising countries like China, USSR. Like Korea, Japan CIS. This region accounts for 16% of the global fish catch. It secured **second** in total fish cutch.

2. *The North- West Atlantic*- secures **fourth** position among fishing regions with the contribution of 9% of the global catch. It stretches from new found land in north to New England state of USA in the South.

3. *The North- East Atlantic*: secures **top** position in total fish catch. It roughly accounts for 21% of the total global catch and stretches from Iceland to Mediterranean coast through CIS, Denmark, Norway, Spain, Iceland, UK, etc known as North West European zone.

4. *North- East Pacific:* in North America continent, stretches from Alaska to California in U.S.A. This is the **5th** largest fish producing area on earth accounting for 7% of the world's fish catch. San Francesco, Los Angeles, Vancouver etc.

5. Temperate fishing grounds of Southern hemisphere: Peru, Chile.

A. South east pacific region: Secures **third** in total fish catch constituting over 15% of the global fish production.

B. South East Atlantic region: is African fishing region from Angola to S. Africa. This region is comparatively new commercial ground which produces nearly 6% of global production and secures **6th** place.

Tropical fishing grounds (300N &S of equator)

Compared to temperate region, commercial fishing in tropical region is insignificant both in quality and quantity. But at present commercial fishing in tropical areas have registering significant growth. The major fish producing countries are China (first in fish production), Peru and Chile (2nd and 4th, respectively).

Disadvantage of tropical fishing

- *Lack of plankton:* hot T_0 condition is not suitable for plankton.

- *High Temperature*: Torrid and Scorching heat all over the year posed problem in fishing activities.
- Ability of workers and preservation is difficult.
- Absence of shallow shelf
- *Lack of indented coast line*- difficult to construct harbors,
- *Transportation bottleneck*, perish ability of fish need speedy transport
- *Unhygienic condition*- infected by epidemics.
- Underdeveloped economy and low investment

Recent Development of Tropical Fishing

In recent years dramatically increase of fish production has been observed due to:

- High internal and external demand
- Abundance of fish species
- Lack of alternative occupation
- Shifting of global fishing agencies.

2.4.4. Over fishing: Tragedy of commons

Today scientists consider many fisheries to be fished beyond the capacity of the resource. Current harvest rates are thought to be unsustainable—that is, unable to be maintained year after year without depletion of the fish stock. Experts believe that increases in world fish supply require better management of the resources as well as the increased use of fish farming or aquaculture.

The increasing global demand for fish over the past several decades has increased the pressure to harvest more and more fish. In the 1970s, most nations enacted laws to protect a 300-km (200-mi) ocean zone along their own coastlines. In the United States and many other places, this eventually resulted in the prohibition of foreign fishing vessels within these protected boundaries. However, in most cases, rather than limiting the amount of fishing, this measure has caused fishing to increase as domestic fishing vessels replaced the foreign fleets. Fishing effort has been consistently increasing for several decades, resulting in world harvests more than 300 percent above 1950 harvest levels.

This increased harvest has had major consequences. Scientists at the Food and Agriculture Organization of the United Nations (UN) consider over one-third of the world's top 200 marine fisheries to be in a state of decline. Because the marine ecosystem is complex and involves the interaction of many species, some scientists are concerned that more-intensive fishing in lower niches of the marine food chain may inhibit the recovery of popular fish stocks. In 2002 the UN-sponsored World Summit on Sustainable Development called for restoring fish stocks by 2015.

Fisheries Management

Fisheries are difficult to manage effectively because they exist in a complex ecosystem and are often considered a *common property resource* (owned by all citizens of a nation). Some management practices include gear control, such as regulating the size and shape of the holes in fishing nets; seasonal fishery openings and closings and critical habitat area closures to protect the breeding grounds of threatened fish; restricting the size of the fish that can be harvested; establishing quotas that limit the number of fish that can be caught; and limiting the number of days that a vessel can fish.

In some fisheries, the total allowable catch for a given area is allocated to harvesters as a quota share. In some places, this share can be bought or sold. This type of individual quota management system is common in New Zealand, United States and Canada.

Aquaculture, or fish farming, in which aquatic organisms are raised under controlled conditions in ponds, tanks or floating net pens is becoming a part of fisheries management. Fish farming may help reduce harvest pressure on the remaining wild stocks. In Japan, fish reproduction and survival is enhanced—to provide the young fish. In fact, aquaculture production is becoming an essential part of the world's fish supply. The share of the total world harvest produced through aquaculture has steadily increased over the past two decades and now accounts for nearly 20% of world harvest.

One of the greatest challenges in fisheries management is the control of by catch, the unintentional killing of species not intended to be caught, such as low value fish, immature

fish, or even marine mammals. Although measures have been taken to protect the wasteful harvest of by catch animals is still a major problem worldwide.

Fisheries are influenced by more than just fishing activity. Fishery managers must also manage activities on land such as agriculture, irrigation, pollution and development, which may impact critical fisheries habitat. Finally, fisheries exist in an environment that naturally fluctuates. Events such as changes in ocean currents and temperatures can dramatically influence the size and health of fish stocks making them more of a challenge to manage effectively.

2.4. Mining

Mining, in its broadest sense is the process of obtaining or extraction of useful minerals bearing substances (ores) from the earth's crust. The process includes excavations in underground mines and surface excavations in open-pit, or open-cut (strip) mines. In addition, recent technological developments may soon make economically feasible the mining of metallic ores from the seafloor. Mining normally means an operation that involves the physical removal of rock and earth. A number of substances, notably natural gas, petroleum, and some sulfur, are produced by methods (primarily drilling) that are not classified as mining.

What is the difference between mining and quarrying? Mining is the extraction of minerals from the deep earth and needs further processing, whereas, quarrying is extraction of Construction minerals from the shallow earth without further processing for direct use.

A mineral is generally defined as any naturally occurring substance of definite chemical composition and consistent physical properties. An ore is a mineral or combination of minerals from which a useful substance such as a metal can be extracted and marketed at a price that recover the costs of mining and processing and yield a profit. The naturally occurring substances are usually divided into metalliferous ores, such as the ores of gold, iron, copper, lead, zinc, tin, and manganese and non-metalliferous minerals such as coal, quartz, bauxite, trona, borax, asbestos, talc, feldspar and phosphate rock. Building and

ornamental stones which form a separate group include slate, marble, limestone, traprock, travertine and granite.

Occurrence of Minerals

Most minerals are found in veins or tabular-shaped deposits of non-sedimentary origin, often dipping at high angles; in beds or seams which are tabular deposits conforming to the stratification of enclosing rocks; and as masses or large ore bodies of irregular shape standing at any angle. Gold, diamonds, tin and platinum are often found in placers or deposits of sand and gravel containing particles of the mineral.

Resources- are naturally occurring, exploitable materials that a society perceives to be useful to its economic and material well-being. Resources can be understood as natural resource, human resources and man-made resources.

- Natural resources are usually divided in to two broad classes.

1. ***Renewable resources*****-** are that can be regenerated in nature faster than they are exploited by society. They can be used over and over again and the supplies are not depleted. However, a distinction can be made between those that are renewable only if carefully managed.

Perpetual resources **-** are inexhaustible resources. Include sunlight, wind, running water, waves, tides and geothermal energy.

Potentially renewable resources: are renewable if left to nature, but can be destroyed if people use them excessively. These include ground water, soil, plants, and animals. If the rate of exploitation exceeds that of regenerations, those renewable resources can be depleted.

Ground water: extracted beyond the replacement rate in arid areas may be permanently depleted.

Soils: can be lost by mismanagement that leads to total erosion and loss of fertility. But through time it can be regenerated using different soil management mechanisms.

Forests: forest covers of the world decline due to human interference- through time it can be recovered by replanting trees.

2. **Non-renewable resources:** are resources which decline through utilization mainly of mineral and fuel resources of different kind. Fossil fuels (coal, crude oil, and natural gas and nuclear fuels (Uranium) and a variety of non-fuel metallic and non-metallic minerals. Although they cannot be replaced, many minerals can be reusable again and again. For

example, Aluminum, lead, zinc and other metallic and non-metallic minerals are non-renewable.

Formation Processes and Modes of occurrence of minerals

Mineral deposit is concentrated natural occurrence of one or more minerals. Mineral deposits can form within any kind of rock and consist of any type of mineral. They are valuable economically because they contain high concentrations of metallic and nonmetallic elements or other valuable materials that are essential to an industrial society.

Minerals occur in four main ways depending on the geological set-up. Geological processes, such as melting and crystallizing of igneous rocks as well as erosion and deposition, sometimes separate and concentrate minerals. At other times, these processes mix and dilute them. Any process that separates and concentrates minerals is called a process of segregation.

Magmatic Processes

During cooling and crystallization of magma, minerals with a high temperature of crystallization form early and may settle to the floor of the magma chamber. These early-formed minerals such as pyroxene or olivine tend to be relatively rich in iron and magnesium and poor in silicon and oxygen when compared to the entire magma. They also typically contain no potassium or aluminum. Consequently, minerals with lower temperatures of crystallization that form later tend to be relatively rich in potassium, aluminum, silicon and oxygen but poor in iron and magnesium. This process, called fractional crystallization, segregates minerals.

Fractional crystallization can lead to valuable mineral deposits because many rare and valuable elements form mineral crystals either early or late in the crystallization process. For example, when magmas have compositions with abundant chromium, the mineral chromite crystallizes early and can form deposits on the floor of the magma chamber. Extensive chromite deposits are mined in the Bushveld Complex of South Africa and in the Stillwater Complex of Montana, United States. In other magmas, the latest-forming mineral crystals may contain a variety of rare elements such as beryllium, lithium, boron, molybdenum and

uranium. These deposits are called pegmatites. Numerous well-known pegmatites are scattered throughout the western United States.

Igneous ore deposits are originated from volcanic activity (magma) with different forms of motamorphization by the application of heat and pressure changed to rocks and crystals. Cracks and fissures in different types of igneous intrusions become sources of metallic minerals of significant economic importance. The number of metallic minerals together with volcanic eruptions are iron ore deposits in northern Sweden (Koruna); copper and nickel deposits in Canada (Ontario) and tin, silver, zinc and lead in different parts of the world.

Hydrothermal Processes

Hydrothermal processes involve the transportation of elements dissolved in hot water and the subsequent precipitation or crystallization of minerals when the water cools. In some cases, the elements precipitate in their native states such as pure gold or copper. More often, however, they precipitate as sulfide minerals, including pyrite (iron sulfide), galena (lead sulfide), sphalerite (zinc sulfide), cinnabar (mercury sulfide) and chalcopyrite (copper sulfide). Hydrothermal processes are particularly effective at segregating minerals because the fluids contain only a small variety of dissolved elements. Hydrothermal processes are responsible for most of the world's metallic mineral deposits such as gold, silver, lead and copper.

Hydrothermal fluids originate in several different ways. Some originate from magmas that have water dissolved in them. As the magma cools and crystallizes, the water is excluded from the growing crystals and separates from the magma. Such fluids are very hot and rich with elements dissolved from the magma. Other sources of hydrothermal fluids include circulating groundwater that comes into contact with hot rock or seawater circulating through seafloor sediments that interacts with newly created volcanic rock on the ocean floor. These fluids migrate away from their heat sources along fractures and cool. This cooling causes some minerals to precipitate.

When minerals form a precipitate within open fractures, the resulting deposit is called a vein. Veins of highly concentrated gold are exploited throughout the western United States.

Besides cooling, other causes of precipitation include sudden decreases in pressure or reactions with the surrounding rock. When precipitation occurs at the earth's surface, the minerals form hot springs deposits.

Evaporation Processes

When water containing dissolved minerals evaporates, the minerals precipitate. Deposits of minerals formed in this way are called evaporites. Evaporite deposits can form on land in enclosed arid basins. Incoming water cannot exit except by evaporation. Because the incoming water also carries dissolved minerals, the basin continually receives additional minerals and the resulting deposit can be quite thick. Land-based evaporites currently are forming in desert lakes in the American states of California, Nevada, and Utah and in the Dead Sea between Israel and Jordan.

Evaporite deposits also form in tropical seas or bays connected to the open ocean through narrow passages. Seawater flows through the narrow passages to replace water lost through evaporation. Because the incoming water is salty, the basin continually receives additional sea salts. If the concentration of salts is high, the minerals precipitate. If the conditions persist for a long time, the resultant deposits can be very thick.

Some examples of common evaporite minerals are halite (sodium chloride), gypsum (calcium sulfate), and borax (sodium borate) and potash salt. Many evaporite deposits are mined for use in table salt, fertilizers, wallboard, plaster, detergents and fluxes.

Residues of Weathering Process

Chemical weathering causes minerals to decompose into clays and other materials. This weathering leads to the removal of all material that does not resist weathering. In regions of intense weathering such as the tropics, everything except oxides of aluminum and iron becomes weathered and is eventually removed. Through this process of weathering and removal of the nonresistant material, aluminum and iron oxides form a concentrated residue. These residues, if extensive, can be mined for aluminum and iron.

Bauxite is a rock made from aluminum oxide residues and is the principal ore of aluminum. The world's leading producers of bauxite, the countries Surinam, Jamaica, and Guyana, are all located in the tropics. Commercial bauxite deposits that occur outside of the tropics, such as in the United States, the former Soviet Union and China indicate that those regions once experienced tropical weathering conditions.

Depositional Processes

Some mineral deposits form in river beds because running water tends to segregate dense minerals. Rivers deposit grains that are either larger or denser first, and then carry grains that are either smaller or lighter farther downriver. Relatively dense minerals or metals, such as cassiterite (a source of tin), diamond, or gold, erode from their sources and get deposited with the heavier, coarser grains. The sites of deposition are most frequently the gravel or sandbars that form on the inside bends of meandering rivers. Mineable deposits of these materials are called placer deposits.

Placer mining has provided humankind with more than half of its gold. Well-known placer deposits include gravels formed about 40 million years ago during the Eocene Epoch. Much of this placer gold originally eroded from hydrothermal vein deposits of gold associated with igneous intrusions. Precambrian deposits in South Africa formed more than 500 million years ago are the largest known placer gold deposits in the world.

These are also known as sedimentary ore deposits. Some minerals occur in horizontal layers or strata in the form of sedimentation. Sand and limestone deposits by transgression and regression of ocean water to land and vice-versa, respectively and iron ore deposits in France, Western Germany, Russia, S. Africa and Brazil.

Alluvial deposits are also categorized under this process. They contain minerals at the bases of hills or valley bottoms. Alluvial deposits are continuous process from high to low lands. It is the outcomes of erosional activities through two sources: movement of waters from the high land to the low land; and intensive erosional activities exposed some minerals when deeply penetrate the surface. For example, gold, tin, diamonds and platinum in S. Africa and Ethiopia in Metekel and Wellega (Yubdo) are formed by this process.

Oceanic mineral resources: both ocean water and its floors are very rich in mineral resources. The problem is its expensiveness to extract. E.g. $2million is needed to extract 1m^3 areas. 60% of Magnesium and 70% of Bromine are derived from oceans.

Stages of Mining Operation

Mining operations generally progress through four stages: (1) prospecting or the search for mineral deposits; (2) exploration or the work involved in assessing the size, shape, location, and economic value of the deposit; (3) development or the work of preparing access to the deposit so that the minerals can be extracted from it; and (4) exploitation, the work of extracting the minerals.

Factors Influencing Exploitation of Mineral Resources

The concentration of a mineral in a mineral deposit is critically important in determining whether it can be mined profitably. For the mining of metals, concentration in a mineral deposit is measured in two ways. A great many physical and economic factors affect the exploitation of mineral resources in various parts of the world.

a. Physical conditions

I. ***Grade***: The grade depends on the percentage by weight of a metal in a mineral deposit. This percentage is measured by dividing the weight of the metal by the weight of the rock. The concentration factor (also called enrichment factor) is the number of times more abundant a metal is in a mineral deposit than it is in average crustal rock. The concentration factor is measured by dividing a mineral deposit's grade by the average grade of crustal rocks for that metal. A concentration factor of ten, for example, means that a metal is ten times more abundant in a particular deposit than in the earth's crust.

II. ***Location/accessibility***-the location of mineral deposits from settlements, roads transport lines and facilities influence mining process. Its location ii jungle forests and valley gorges are obstacles for exploitation.

III. ***Depth from the surface***- important factor in the degree of exploitation minerals. The shallow the depth, the easier the exploitation of minerals, as the depth increases it needs additional cost of production.

IV. *Quantity*- refers to the size or amount of ores sufficiently in the given site.

V. *Quality of the ore*- indicates the proportion of impurities or richness.

b. Human factors/Economic factors

i. The availability of capital

ii. Skilled or trained man power

iii. The development of infrastructure

iv. Political influence and government interference. Government willingness to extract minerals, unstable political conditions also influences mining.

Economic Impacts of Mining

Mining and the processing of minerals extraction exert tremendous impact on the economic well-being of a country in the following ways:

- provide employment opportunities for many people
- attract population to be settled around the mining sites
- stimulate the development of transportation infrastructure
- open new scope for export earnings
- Minerals extend the scope for the development of domestic industries.

2.5. Energy Sources

Energy is the capacity of matter to perform useful work or the power efficiently exerted as the result of its motion or its position in relation to forces acting on it. As development is synonymous with utilization of energy, the importance of energy resources is ever increasing. The term technology is to minimize the human effort and to maximize the use of other machineries by the application of power or energy. As improving technology the degrees of utilization of energy increase including fuels (25%). The energy resources include: fuel (coal, crude oil and natural gas), nuclear energy, geothermal energy, wind energy, solar energy and hydro electric power (HEP).

Fuel resources

The combined production of fuel energy resources constitute

Coal= 28%, petroleum = 38%, natural gas 13% and others 21% Electricity and other traditional energy fuels.

1. ***Petroleum***- evolved from two Latin words, Petra and ileum- Petra denotes rock, ileum denotes oil. It is the latest entrant in the field of fossil fuel. The first oil-well was constructed

in USA in 1859 by Colonel Edwin L. Drake. Soon it surpassed all other traditional sources of fuel. It is considered as a pivot of world energy production as it provides 40% of global energy requirement. The spatial pattern of petroleum use is not uniform. Some African counties (like Senegal, Gambia) are getting its 100% energy from petroleum while Canada and China get 35% and 17%, respectively.

2. ***Coal***- black gold- is the 2nd largest fuel source, contributing nearly 27% of the global energy production. The consumption rate is higher in China (24%) followed by USA (19.8%) and CIS (12%). Europe consumes nearly 10% of the total use.

- USA has the largest coal reserve followed by India in the world. China, S. Africa, Australia, Poland and Germany have largest coal reserves in order of importance.

3. Natural Gas- among all the energy producing, fossil fuel consumption, natural gas is now increasing at a much faster rate. Russia holds the top position in natural gas reserve followed by Iran, U.A.E., Saudi Arabia, USA and Venezuela, respectively.

N.B. 25 % of world population use 75% of world fuel whereas 75% of world population uses 25% of fuels.

4. Nuclear energy: It is generated from Uranium. Nuclear Energy is released during the splitting or fusing of atomic nuclei. The energy of any system, whether physical, chemical, or nuclear, is manifested by the system's ability to do work or to release heat or radiation. The total energy in a system is always conserved but it can be transferred to another system or changed in form.

- Contributes less than 5% of the world's energy production.
- Its growth is static due to its effects of environmental pollution.
- Australia, Canada, USA, and South Africa hold the key of world Uranium reserve.

5. Hydro-power: are components that transform other types of energy into electrical energy and transmit this energy to a consumer. The production and transmission of electricity is relatively efficient and inexpensive, although unlike other forms of energy, electricity is not easily stored and thus must generally be used as it is being produced.

Hydro-power has high potential but only 16% of the potential or exploitable hydropower has so far been used by the different countries. China has the largest potential hydro-power followed by Brazil, Indonesia and Canada.

Due to its sustainable nature and a growing awareness about environment more stress is now given to the construction of hydro power projects. Per year growth rate of hydro-power is about 3%.

6. Geothermal Energy: energy contained in intense heat that continually flows outward from deep Earth. This heat originates primarily in the core. Some heat is generated in the crust, the planet's outer layer by the decay of radioactive elements that are in all rocks. The crust, which is about 5 to 75 km (about 3 to 47 miles) thick, insulates the surface from the hot interior, which at the core may reach temperatures from 4000° to 7000° C (7200° to 12,600° F). Where the heat is concentrated near the surface, it can be used as a source of energy.

7. Solar Energy: it will be one of the energy sources in the future. Temperature variation, presence of day and night, cloud cover, all these are beyond the possibilities of human beings.

8. **Wind energy:** is contained in the force of the winds blowing across the earth's surface. When harnessed, wind energy can be converted into mechanical energy for performing work such as pumping water, grinding grain, and milling lumber. By connecting a spinning rotor (an assembly of blades attached to a hub) to an electric generator, modern wind turbines convert wind energy, which turns the rotor, into electrical energy.

Wind is created when air that has been warmed over sun-heated land rises, leaving a vacuum in the space it once occupied. Cooler surrounding air then rushes in to fill the vacuum. This movement of rushing air is what we know as wind.

Wind is beyond the capacity of human beings density variation, difficult to control its velocity- speed because of its dense molecules.

Chapter Three

3. Secondary Economic Activities: The Industrial Sector

3.1. Definitions and Concepts of Manufacturing Industries

Manufacturing is the use of machines, tools and labor to make things for use or sale. The term may refer to a range of human activity from handicraft to high tech but is most commonly applied to industrial production in which raw materials are transformed into finished goods on a large scale. Such finished goods may be used for manufacturing other, more complex products such as electrical device or machine that is used for a specific purpose in the home, or sold to wholesalers who in turn sell them to retailers who then sell them to end users - the "consumers".

Manufacturing is the process through which the utility of the product increases and at least some amount of value is added to the raw materials used. The essence of manufacturing process is the conversion of raw materials to finished and semi-finished products and distribution of the final product to the consumers. These transforming operations are undertaken in factories. Modern manufacturing includes all intermediate processes required for the production and integration of product components. Some industries such as semiconductor and steel manufacturers use the term **fabrication** instead.

Manufacturing takes turns under all types of economic systems. In a free market economy, manufacturing is usually directed towards the mass production of outputs for sale to consumers at a profit. The manufacturing sector is closely connected with engineering and industrial design. Science and engineering are required to develop new products and to create new manufacturing methods but there are other factors involved in the manufacturing process. Legal matters such as obtaining operating permits and meeting industrial safety standards, must be adhered to. Economic considerations, such as competition, worldwide markets, and tariffs, control to some degree what prices are set for manufactured goods and what inventories are needed.

3.1.2. History and Development of Manufacturing Industry

In its earliest form, manufacturing was usually carried out by a single skilled artisan with assistants. Training was by apprenticeship. In much of the pre-industrial world the guild system protected the privileges and trade secrets of urban artisans.

Before the Industrial Revolution, most manufacturing occurred in rural areas where household-based manufacturing served as a supplemental subsistence strategy to agriculture (and continues to do so in places). Entrepreneurs organized a number of manufacturing households into a single enterprise through the putting-out system.

3.1.3. The Process of Industrial Revolution

The Industrial Revolution began in England in the middle of the 18th century when the first modern factories appeared, primarily for the production of textiles. Machines, to varying degrees, began to replace the workforce in these modern factories. The cotton gin, created by the American inventor Eli Whitney in 1793, mechanically removed cotton fibers from the seed and increased production. In 1801 Joseph Jacquard, a French inventor, created a loom that used cards with punched holes to automate the placement of threads in the weaving process. The development of the steam engine as a reliable power source, by Thomas Newcomen, James Watt, and Richard Trevithick in England and in America by Oliver Evans, enabled factories to be built away from water sources that had previously been needed to power machines.

The Industrial Revolution was a period in the late 18th and early 19th centuries where major changes in agriculture, manufacturing, mining and transport had a profound effect on the socioeconomic and cultural conditions in the United Kingdom. The changes subsequently spread throughout Europe, North America, and eventually the world.

Starting in the latter part of the 18th century there began a transition in parts of Great Britain's previously manual labor and draft animal–based economy towards machine-based manufacturing. It started with the mechanization of the textile industries, the development of iron-making techniques and the increased use of refined coal. Trade expansion was enabled

by the introduction of canals, improved roads and railways. The introduction of steam power fuelled primarily by coal, wider utilization of water wheels and powered machinery (mainly in textile manufacturing) underpinned the dramatic increases in production capacity. The effects spread throughout Western Europe and North America during the 19th century, eventually affecting most of the world, a process that continues as industrialization.

The First Industrial Revolution, which began in the 18th century, merged into the Second Industrial Revolution around 1850, when technological and economic progress gained momentum with the development of steam-powered ships, railways, and later in the 19th century with the internal combustion engine and electrical power generation.

Economics of Manufacturing

According to some economists, manufacturing is a wealth-producing sector of an economy, whereas a service sector tends to be wealth-consuming. Emerging technologies have provided some new growth in advanced manufacturing employment opportunities and important material support for national infrastructure and for national defense.

On the other hand, most manufacturing may involve significant social and environmental costs. The clean-up costs of hazardous waste, for example, may outweigh the benefits of a product that creates it. Hazardous materials may expose workers to health risks. Developed countries regulate manufacturing activity with labor laws and environmental laws. In Europe, pollution taxes to offset environmental costs are another form of regulation on manufacturing activity. Labor Unions and craft guilds have played a historic role negotiation of worker rights and wages. Environment laws and labor protections that are available in developed nations may not be available in the third world.

The word *industry* comes from the Latin word *industria*, which means “diligence,” reflecting the highly disciplined way human energy, natural resources, and technology are combined to produce goods and services in a modern economy. The term *industry* also refers to a group of enterprises that produce a specific type of good or service. Some industries produce physical goods, such as lumber, steel, or textiles. Others such as the airline, railroad, and trucking industries provide services by transporting people or products from one place to another.

Manufacturing refers to producing goods that are necessary for modern life from raw materials. The word *manufacture* comes from the Latin *manus* (hand) and *facere* (to make).

3.1.4. Classification of Manufacturing Industries

An industry is usually classified either by a major input (good or service used to produce the final product) or by the industry's final product or the technology they use.

Cottage industries	**Manufacturing industry**
▪ Are done manually	▪ Use machineries
▪ Worked by ordinary people	▪ Needs skilled labor
▪ Use less capital	▪ Needs more capital
▪ Less quality in output	▪ Better and refined products
▪ Lot affected by locative factors	▪ Affected by many locative factors

Manufacturing industries are also further divided into two depending on the machineries/ or technologies, the labor, capital and energy they use. These are:

Light Industries: require relatively small capital, energy, skilled labor and machineries. The examples are textile, food processing and beverage industries. They are producers of consumable goods which are mostly characterized in the less developed countries (LDCs).

Heavy Industry: industry that processes large amounts of bulky raw materials and require large capital, energy, highly skilled labor and sophisticated machineries. The notable examples are the iron and steel industry, shipbuilding, chemical, electronics and electrical industries, metallurgy, machine producing industries and aluminum smelting. These are more common in more developed countries and are non-consumable producers. Heavy industries are often located close to their supplies of raw materials.

Generally, manufacturing processes can produce either durable or nondurable goods. Durable goods are products that exist for long periods of time without significant deterioration such as automobiles, airplanes and refrigerators. Nondurable goods are items that have a comparatively limited life span such as clothing, food and paper.

The following are other major manufacturing categories.

- Chemical industry - Pharmaceutical
- Construction industry
- Electronics -Semiconductor
- Engineering - biotechnology, emerging technologies, nanotechnology, synthetic biology and bioengineering.
- Energy industry
- Food and Beverage- agribusiness, brewing industry and food processing
- Industrial design -Interchangeable parts
- Metalworking - smith, machinist, machine tools, cutting tools (metalworking), free machining, tool and die maker, global steel industry trends, and steel production
- Metal casting
- Plastics
- Telecommunications
- Textile manufacturing -clothing industry, sail maker and tent making
- Transportation - Aerospace manufacturing, automobile , bus and tire manufacturing

3.2 Factors Influencing Location of Industries, characteristics and stages of Growth

3.2.1. Factors Influencing Industrial Location

Whether they are light or heavy, there are many components or ingredients of manufacturing industries. Industries use a range of inputs such as capital, technology, natural resources, labor and management to produce goods and services as described hereunder.

1. Raw Materials: Natural resources play a critical role in industrial establishment and growth. Primary industries are directly connected to natural resources and many secondary and tertiary industries rely on the goods that primary industries provide. The nature, quality and availability of that raw material at a desired price influence the establishment and growth of industries.

2. **Capital**: capital is the basic requirement for the establishment of manufacturing units. In order to manufacture products, money is needed to purchase buildings, equipment and

machinery and to pay workers. This money is called finance capital. Buildings, machinery, and other equipment are referred to as physical capital.

3. Labor: refers to workers as a group in an industry who are selling their own labor in exchange for an income they negotiate with the management. Unlike fixed raw materials, labor is very dynamic and spatially unevenly distributed over space and time, quality and skill, wage and availability of labor varies greatly. It is an important pre-requisite, especially in labor intensive industries.

4. **Power**: is one of the pre-requisites in manufacturing unit for the transformation of raw materials to the finished and semi-finished products.

5. Transport: availability and cost of transport is one of the determinant factors in manufacturing location. The transportation of raw materials from the source to the plants and finished goods from plants to markets or consumers involves huge amounts of charge if the raw material is bulky and weight losing.

6. **Market or demand**: demand on a particular commodity determines the existence of survival of the industry. Consumer center or market influences maximum the location of industries. The changing mode of consumer and keen competition with several other similar industries make greater access to establish industries. Industries producing perishable goods are usually established near market centers or customers.

7**. Production technology:** refers to the way capital, technology, natural resources and labor are combined to create final goods. Industries choose these inputs depending on the type and quantity of goods they produce. A production technology that requires many workers and relatively few machines is called a labor-intensive technology. A technology that uses many machines and relatively few workers is called a capital-intensive technology. Generally, as industries grow, they become more capital intensive.

8. Management: Managers supervise, monitor and coordinate the different areas of an industry. For example, financial managers focus on generating and reinvesting finance

capital. Human resource managers help recruit people with desirable skills and place them where they are needed. Marketing managers help sell final goods and services to customers.
All of the above factors are not found at a time, so juxtaposed –impossible. Thus, geographers try to select the appropriate place for establishing industries. The industries may be raw material oriented, market oriented, energy oriented, etc although the degree of influence may not the same.

3.2.2. Interdependence and Characteristics of Industries

Knowingly or unknowingly, manufacturing industries can be located together with interdependence or with out interdependence. The establishment of industries in a given area with direct or indirect interdependence is called *symbiosis*. They are classified into three:

1. **Disjunctive symbiosis:** is where dissimilar industries are situated in same locality without any organic connections or without direct relationships between them. For example, iron melting industry and diary industry are found together which may found for searching for other common denominators.
2. **Conjunctive symbiosis:** is a symbiosis where dissimilar industries are located with certain organic relationships. For example, oil milling industry and diary industry or beef producing industry are located together because the waste products of oil milling industry serves as food for animals; sugar industry and alcohol industry are also located together as the waste products of sugarcane serves as raw material for alcohol production.
3. **Industrialization- cone symbiosis:** is the concentration of a number of industries in a given area in combination with both conjunctive and disjunctive industries with or without organic relations. Two or more components are concentrated together. This condition attracts industries. There are two well known areas of industrialization in the world
    a. The northeastern USA
    b. Western European states

In these areas the reasons to be the major industrialization areas

- ingredients have attracted the industries
- economic advancement

- cycle of industrial advancement

3.2.3. Stages of Industrial Growth

Industrial growth goes through cycles of expansion and contraction. There are three stages in which all industries pass through:

Youth stage:

- Free working of industrial location in any area;
- Efficiency is sacrificed with self-sufficiency;
- The industry may not bother about the quality of the products;
- Out side communication and transport connections are poor;
- Industries are small as well as largely dispersed and disseminated;
- Capital allotment is very low

Maturity stage

- Unskilled labor and labor management have become fluid and have ceased in the location of industries
- In early maturity stage manufacturing industries are located by trail and error;
- The whole stage is an era of increasing centralization of industries
- Most developed countries are found in this industrial stage.

Old age

- A stage in a climax pattern or position for industrial location and arrangements;
- There is an increase in fluidity or variability of power in a locative factor;
- There is increasing mobility of skilled labor for searching better salary and better employment;
- High manipulation of transport rate
- There is expansion of market relations
- Patterns of industries is more dependent on international market whereas local demand is saturated
- Japan and some parts of USA are found in this industrial stage.

3.3. Transnational Corporations and Third World Industries

This section presents about transnational corporations (TNCs) with their merits and demerits, and the characteristics of industries in developed and developing countries of the world.

3.3.1. Transnational Corporations (TNC)

Transnational Corporation sometimes called Multinational Corporation (MNC) or International Corporation, which are private firms and companies that produces or distributes products or services in one or more foreign countries by establishing a branch or affiliate in foreign countries –with legitimate and consent of the host government. A branch is a part of a company that is located in another country. An affiliate is a company partially or entirely owned by another company. They engage in foreign direct investment (FDI) in one country by citizens of another country. They are multiple ties and interactions linking people and institutions across the boarders of nation-states and are also interrelated with international trade, command vast amounts of resources in terms of flow of capital, people, managerial expertise, information, foreign aid and technology transfer in many ways. These firms are on the forefront of product innovation and research and development. TNCs are a modern version of the mercantilist trade but mode of operation is very different.

Most MNCs are very large corporations based in developed countries. About half of the 600 largest MNCs have headquarters in the United States; about a sixth is based in Japan; and about a tenth is in the United Kingdom. Similarly, an increasing number of MNCs now originate from the newly industrialized and developing areas including Hong Kong and South Korea which have been aided by technological improvements in transportation, communications and production processes.

The fundamental concern in the location decision of TNCs is to select locations that minimizing the total cost of production including the total cost of transportation and thus maximize the total volume of profit. Limits present in the domestic market in terms of sales potential and production cost often lead TNCs to branch out from their home countries. Many large companies head quartered in developed countries and have expanded production and market operation widely in the underdeveloped countries. This is due to availability of:

- **Cheap raw materials and natural resources:** this reduces transportation cost, time and other costs.
- **Cheaper labor cost:** abundant blue-collar and white –collar labor force in LDCs.
- **Market opportunities:** LDCs represent large markets for TNC's products owing to their:
    - Large and rapidly growing populations
    - These markets expand western-oriented consumerism and life style.
    - By locating production, distribution and exchange operations in these countries, TNCs can readily capture these large and expanding markets.
- **Labor Unions:** few labor unions and free environments reduce cost of production for them. There are very few or weak labor union organizations in LDCs with weak or no bargaining capacity maximize their profits.
- **Environmental Laws:** Most LDCs do not have strict environmental protection and safety as well as preservation regulations. This makes frees TNCs from costly pollution-abatement measures and other restrictions that prevail in their home countries which raise their production costs.
- **Tax benefits:** to attract TNCs many less developed countries have issued policies that provide tax breaks for these companies which assist for profit maximization. They are not also required to re-invest their profit in the host countries, rather they are allowed to expropriate profits back to their home countries and hence they are foot-loose industries- free to move or out as they wish with out a long-term commitment to any host country.
- **Political Power Structure:** the political power structure by the elites in LDCs who have close ties with TNCs, they have gained a much from their case relations and collaborations with TNCs. Local political leaders receive financial and material benefits. That is, the corrupt political power structure in the LDCs sometimes facilitates the operation of TNCs in these countries.

3.3.2. Transnational Corporations and Third World Economies

Certainly, transnational economic penetrations sustain the operation of the world economic systems. However, the tremendous growth and spread of MNCs has sparked controversy. Some people argue that MNCs play an important role in the development process of LDCs:

- TNCs make direct investment in these countries;
- Transfer capital, advanced technologies and experiences to areas that need it;
- Create job opportunities for their unemployed populations;
- Help them exploit natural resources for people's benefits.

Some counter such arguments by asserting that the projected beneficial results of TNCs economic activities appear shallow when examined critically.

- TNC investments do not routinely produce long-term benefits to the population and local economies of LDCs as they lack broad economic bases.
- Typically, investments in LDCs are selective in terms of both the types of economic activities and location choices. Their location usually confines primarily to occur in large urban areas already experiencing rapid development.
- Corporations invest in those economic activities harness those natural resources which they want and need, not necessarily those fulfill the needs of the host country and its people, and benefits may or may not occur.
- The capital and technology that TNCs transfer to the host countries is very specialized and industry specific with little general application elsewhere because their use is limited to particular firm.
- TNC's production operations are mostly capital intensive, so they create fewer local employment opportunities than anticipated.
- When TNCs flood domestic markets with products manufactured in the LDCs, the demands for products produced domestically by non-TNC declines. This situation weakens the demand for locally produced goods; inhibit the expansion of these industries and reducing employment opportunities in these fields.

3.3.3. Industries in Developed and Developing Countries

Combinations of technology, management, labor, and machines vary significantly among industries and among countries. Economists study the ways different countries assemble these assets to develop an industrial base.

Physical Capital

Countries with well-developed economies possess large amounts of physical capital. On average, each worker in such a country has more machines, plant, equipment, and tools to work with than do workers in countries with developing economies.

Financial Capital

Investments in physical capital can increase production and generate industrial growth. However, enterprises require finance capital in order to purchase the plants, machines and equipment necessary to produce goods and services. Because there is no guarantee that a particular business will be profitable, financial institutions assume a certain level of risk when they lend capital. Developing countries have less established industrial base, less infrastructure and less financial stability and in some cases they suffer from political instability.

Developing countries generally depend on foreign investors for the finance capital that they need. Multinational corporations carry out much of this foreign investment. However, in 2001, 68% of all foreign direct investment went to industrialized countries. Many developing countries also borrow money on international financial markets (by selling bonds), but they usually must pay higher interest rates than developed countries do. In addition, foreign investors may refuse to buy bonds if they fear that a government may not be able to repay its loans.

Training and Education

Developed countries also have more resources than do developing countries to invest in basic and vocational education, training programs and higher education. As a result, workers and managers in developed economies receive more education and training. Adult literacy rates

also reveal educational disparities among countries. In 2005 the adult literacy rate in Japan and the United States was more than 99%, while it was 87.1% in Brazil, 56.6% in India, and 18.7% in Niger.

Disparities in education lead to shortages of skilled workers and educated managers in developing countries. An unskilled workforce is less productive and receives lower wages. Lower wages; in turn encourage highly educated workers in these countries to migrate to industrialized countries to earn higher salaries. This migration, known as the brain drain, increases the scarcity of educated and skilled workers in developing countries

Research and Development

Some economists believe that research in technology contributes more significantly to industrial growth than does any other factor. Scientists and engineers usually conduct technological research in university and other research facilities that are funded primarily by government and business. Like finance capital and education, facilities and personnel for technological research are more scarce in developing than in industrialized economies.

Many developing countries have tried to stimulate economic growth by simply acquiring machinery from developed economies, assuming that the technological knowledge necessary to use the physical capital could be as easily transferred. Many of the developing countries that tried this have not experienced similar economic growth after acquiring equipment and machinery from industrialized countries. Economists believe that the Japanese were successful because their nation already possessed a skilled and educated workforce.

Roles and uses of Natural Resources

In the 19th and early 20th centuries, the industrial nations of Europe established colonies near natural resources to support industrial growth at home. Today, many developed countries still secure access to natural resources located in developing economies. However, large stores of natural resources are not necessary for industrial growth. While countries like Russia, South Africa, Australia, Canada, and the United States have based industrial growth in part on their natural resources (such as timber and petroleum), some industrialized

countries, such as Singapore, Switzerland, and Japan, do not have significant amounts of natural resources.

Industrialized countries consume a disproportionate amount of the world's natural resources. As a result, the standard of living in these countries may be more dependent than that of developing countries on the continued availability of timber and petroleum and other minerals. For example, the developed countries of the world contain only 19% of the world's population but consume more than two-thirds of the world's natural resources. These countries also consume a disproportionate amount of the world's energy.

Government Policies

The type and extent of government involvement plays a strong role in a country's industrial growth. A government may take a free market approach and let industries organize and grow with minimal government intervention. At the other end of the spectrum of government planning and involvement is socialism, a system in which the means of production are owned collectively, in theory, by the whole community. However, these centrally planned economies eventually developed a lack of dynamism and innovation that produced slower growth rates and economic crises.

Shifts in Industrial Development

Since World War II, many developed countries have shifted to varying degrees from goods-producing activities such as manufacturing, agriculture and mining, toward service activities. For example, the number of U.S. workers employed in manufacturing industries decreased by 9.1% between 1980 and 2000, while the number of workers in service industries increased by 72.8% during the same period.

3.4 Industrial Location Theories

3.4.1. Classical Location Principles

With the absence of different components of industries, a number of theories have been proposed by different scholars to select the best location of industries and in turn to maximize profits gained. The most important industrial location theories are presented hereunder.

A. Weber's Least Cost Theory

In order to explain the underlying influence on locations as applied to all industries, Alfred Weber, a German economist (1868—1958) proposed the first theory of industrial location. His theory is general in that he developed it to apply to any political, cultural or economic systems.

He formulated a theory of industrial location in which an industry is located where the transportation costs of raw materials and final product is a minimum. His overall objective was to locate industries in important places to minimize cost of production by reducing cost of transport whereby maximizing profits. The three major factors of location treated by Weber were *transport cost*, *labor* and *agglomeration*. His approach was based on a series of formal assumptions that permit simplifications of the analysis to single out certain location factors for examination when other factors were held constant.

To develop his theory, Weber made the following assumptions:

1. The model is operative in a single, isolated state with homogenous climate, topography, race of people, culture, prevalent political and economic systems and technological skills of the population.
2. Industrial owners are profit makers and are fully rational in seeking the most favorable locations to minimize cost of transport
3. Some natural resources (air, water, sand) are ubiquitous whereas others (coal, iron, etc) are found in fixed locations.

4. Available workers are not ubiquitous rather they are found fixed in specific places at similar wage rates.
5. Markets are fixed at a certain point only people found at the market are expected to consume industrial products. That is, one finished product at a time is transported to a single market location.
6. Raw materials and markets are available to all entrepreneurs in condition of perfect competition.
7. Because of isotropic nature of that state transport costs are directly proportional to distance and weight.
8. Some raw materials are pure (the weight of the product is equals to the weight of the inputs) and some others are gross (loss of weight). He singled out two special cases. In one the weight of the final product is less than the weight of the raw material going into making the product. This is the weight losing case. In the other the final product is heavier than the raw material that requires transport. Usually this is a case of some ubiquitous (everywhere available) raw material such as water being incorporated into the product. This is called the weight-gaining case. These raw materials are measured by Material Index (MI). $MI = \frac{Weigh\ of\ raw\ materials}{weigh\ of\ the\ products}$

    - If the raw material is gross, the material index is greater than one. The weight of the raw material is two times greater than the weight of the product.
    - If the raw material is perfectly pure, the material index is one.
    - If the weight of the raw material is weight gaining, the material index is less than one.

Based on these assumptions, he developed his model and theorized that transport cost would operate in distinctively different ways in different cases. Let us examine the following cases.

Case A: One Market and one Raw Material

If one locality demands the product and if only one raw material is involved in the process, there may be three possible locations for manufacturing industries.

1. If the raw material is ubiquitous, then the industry can locate at the market since at this point the lowest transport cost would prevail on both the raw material and the product.
2. If the raw material is fixed and pure, then the industry can locate in either the market or at the source of the raw materials.
3. If the raw material is fixed and gross, then the industry would locate at the source of the raw materials.

Case B: One Market and Two Raw Materials

When the consumers for product is only in one place and the product is manufactured from two raw materials (R_1 &R_2), then the manufacturing industry tend to locate in one of the following ways:

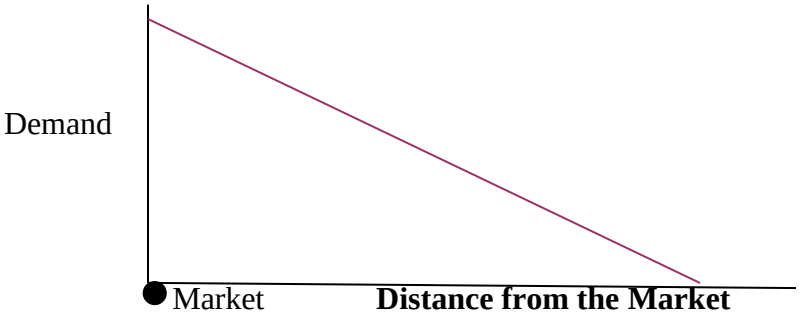
1. If (R_1 &R_2) are ubiquitous, then the manufacturing industry will be located at the market for the same reason as in case A. 1.
2. If R_1 is ubiquitous, and R_2 is fixed elsewhere that at the market, and if both are pure, then the industry will be at the market. Transport cost will have to be paid on only R_2.
3. If both raw materials are fixed and pure, the factory will be located at the market. Both components would give the lowest aggregate transportation cost.

B. Losch's Profit Maximization Theory: Demand

August Losch, a German economist, recognized the least cost versus maximum sales (gross receipts) approach to location theory based on the assumptions and models of Weber. His theory is contained in *The Economics of Location*, which was originally published in German in 1939 and translated into English in 1954. It was widely recognized as the first attempt to construct a comprehensive general location theory based on maximum profit or trade area. He argued that the optimum location was one, which commanded the largest market area and maximized revenue. Assuming that the costs of production are uniform spatially, a location, which maximized demand, would also maximize profit. Losch like most theorists made certain assumptions, the most important of which were:

1) A surface exhibiting the same physical properties in all directions;

2) An evenly distributed population;
3) Transport costs proportional to distance;
4) Uniform production costs;
5) Uniform levels of production for all firms in the same industry;
6) Uniform purchasing power.



The basis for Losch's theory is modified demand curve.

Losch noted that in a free economy the correct location of individual industry lies where the net profit is greatest. Net profit is the difference between sales receipts and maximum costs and the entrepreneurs' solution is to find the location where these differences are the greatest. His approach largely emphasized on demand or sales factors in the process of profit maximization by ignoring cost factors. According to him if there is larger trade area, there will be maximum profit and vice-versa.

C. Smith's Marginal Location Theory

Smith selected the best sides of Weber's and Losch's theories in a more recent attempt to synthesize various elements of industrial location theory, he suggested a spatial margins approach. Recognizing the complexity of the industrial location decision he began simplifying the real world conditions. He observed that production cost vary in space as do revenues. The most profitable location is where total revenue exceeds total cost by greatest amount. A problem with this approach is that costs and revenues are rarely linear. Market demand factors are not uniform with distance due to income, taste and performance variations. The impact of advertising and mass media exposure further complicates demand factors. But the advantage of this approach is that it combines market demand and production cost variables.

3.4.2. Contemporary Industrial Location Theories

Although the classical location theories have a considerable significance from the point of explaining spatial knowledge, they have little significance in relation to the organization and development of economic activities, because of the constantly changing conditions. The contemporary location theories are developed as the classical theories are static in their nature:

- They did not consider social and economic changes;
- Focused on one or two variables as opposed to contemporary theories;
- Assume the existence of absolute location of industries;
- Used a numbers of unrealistic assumptions with their weaknesses

In the 1980s and 1990s, diverse arrays of conceptual models were advanced to characterize geographical systems of production, explain their structure and account for their relative economic performance.

Contemporary industrial location theories are dynamic which have been considering the possible variables that influence industrial locations. Due to their dynamic nature they agree with the absence of absolute locations of industries. Accordingly, the locations can changes through time and space working based on the actual or objective conditions. There are two types of contemporary location theories: behavioral and structural location theories.

I. Behavioral Location Theories

As the name implies, these theories are based on the behavior of individual industries. Therefore, these theories provide alternative on the role of industrial location by focusing on firm decision-making process. Many industries are uncertain and defensive in their behavior, which lead them to be very conservative and consider a shift in the location only as a last resort. Other options more frequently utilize changes. There are different ways of changing industrial location:

- Changing in the firms organizational and managerial structure;
- Changing the product mix or demand of the people;
- Diversifying output or quality of the product.

Some scholars suggest that industrial behavior is governed as much by risk minimization as by cost accountability. The uncertainty associated with risk can be reduced by concentrating

options in larger urban areas because of greater access to supporting services and professional advice an easier access to markets. Uncertainty, normally increase with distance from urban areas. Uncertainty also encourages firm to maintain smaller plant sizes.

Location decision process typically involves top management personnel choosing among alternatives based on available information such as data on the firm operations, forecasts and their own opinion and preferences.

The sources for the uncertainty of industries are the existence of product life cycle.

- **First Stage:** is known as launch phase by which the product is typically involving on slow sales following its commercial introduction into the market place.
- **Second Phase:** is known as take-off stage or phase. In this stage there is growth (the demand of that product increase rapidly).
- **Third phase:** is known as maturity stage. In this stage, an industrial product reaches its climax or maximum stage.
- **Forth phase:** is known as declining stage, the demand of the product starts to decline
- **Fifth stage:** is known as product exit phase, demand withdrawal of the product, the death of the industry.

Factors for the Prolonged Product Lifecycle include:

- The size and stability of the market served;
- The degree of innovations/innovativeness of the product;
- The rate of technological change that affects its use;
- The ability to adapt new applications.

II. Structural Location Theories

This approach focuses on political economy of economic growth and its impact on industrial location and on the structural arrangements of industries to increase efficiency. This efficiency can be achieved through the principles of introduction of more efficient and standardized production technology, which helps to avoid problems of:

- Excess capacity that erodes profit;
- Less productive units;
- Labor cost saving: it helps to efficient utilization of manpower, not only technology. It advises placing the right person at the right place; efficient organization of markets and the component elements as much as possible.

There are two distinctive types of structural approaches:

- **Free-market economy:** here there is high competition that influences the firm with two aspects to be considered: profit motive and high level of market competitiveness by improving the quality of production through the application of modern technologies. It also believes in risk minimization, the absence of absolute location and the location depends on the inherent characteristics of industries.
- **Marxist Ideology (Central economy):** it suggests that all economic activity is controlled by central governments. The free market is to some extent suppressed, competition among firms is reduced, the contribution of competition is minimized by either bringing the quality of different firms together or equal in quality and by assigning different prices produced from different, firms. Still profit is one of the major motives.

Generally, in any of the structural approaches, it is believed that any industry has to be efficient enough in its structure to increase profit as much as possible.

Chapter Four

4. Tertiary Sector Economic Activities

4.1. Definitions and Components of Tertiary Sector

The tertiary economic sector also known as the service sector is one of the three main economic categories of a developed economy, the others being the primary activities (extraction such as mining, agriculture and fishing) and secondary activities (manufacturing). Services are defined in conventional economic literature as "intangible goods".

The tertiary sectors of activities involve in the provision of services to businesses as well as final consumers. Services may involve the transport, distribution and sale of goods from producer to consumers as may happen in wholesaling and retailing or may involve the provision of service such as in pest control or entertainment. Goods may be transformed in the process of providing service as happens in the restaurant industry or in equipment repair. However, the focus is on people interacting with people and serving the customer rather than transforming physical goods.

The service sector consists of the "soft" parts of the economy such as insurance, government, tourism, banking, retail, education and social services. In soft-sector employment, people use time to deploy knowledge assets, collaboration assets and process-engagement to create productivity (effectiveness), performance improvement potential and sustainability.
Typically the output of this sector is content (information), service, attention, advice, experiences and/or discussion (also known as "intangible goods"). Other examples of service sector employment include: transportation, franchising, restaurants, news media, leisure industry/hotels, consulting, healthcare/hospitals, waste disposal, real estate, personal services and business services.

Public utilities are often considered part of the tertiary sector as they provide services to people, while creating the utility's infrastructure is often considered part of the secondary sector, even though the same business may be involved in both aspects of the operation.

The term service economy, in contrast, refers to a model wherein as much economic activity as possible is treated as a service. For example IBM treats its business as a service business. Although it still manufactures high-end computers, it sees the physical goods as a small part of the "business solutions" industry.

Economies tend to follow a developmental progression that takes them from a heavy reliance on agriculture and mining, toward the development of industry (e.g. automobiles, textiles, shipbuilding, and steel) and finally toward a more service based structure. Whereas the first economy to follow this path in the modern world was the United Kingdom.

Historically, manufacturing tended to be more open to international trade and competition than services. As a result, there has been a tendency for the first economies to industrialize to come under competitive attack by those seeking to industrialize later. The resultant shrinkage of manufacturing in the leading economies might explain their growing reliance on the service sector. However, currently and prospectively, with dramatic cost reduction and speed and reliability improvements in the transportation of people and the communication of information, the service sector now includes some of the most intensive international competition, despite residual protectionism.

4.2 Trade

Trade or commerce is involving the exchange of commodities that must be transported from one place to another. In ancient times, transporting commodities over any significant distance was an expensive and risky enterprise and hence restricted to local markets. As transportation networks improved, commerce expanded considerably. Today commerce takes place between neighboring households, between neighboring cities, and between neighboring continents. Reliable international shipping, mail services, and the Internet enable commerce between people in any location in the world.

Trade is the function of demand and supply and was started in 5^{th} millennium B.C between ancient Egypt and Mesopotamia. It is the buying and selling of goods by two or more parties, persons, firms or countries that includes:

- Exchange of goods.
- Involves the movement of goods.

- Involves money transaction.
- Bartering - exchange of goods with goods

4.2.1. Bases of Trade

1) A differentiation of product.
2) A surplus product.
3) A demand for commodities.
4) Difference in culture and technological development.
5) Development of adequate transport facilities.
6) Suitable world condition and peace

Trade can be divided into two: international and internal trades.

Internal trade (domestic trade): is concerned with the exchange of commodities among people within the territory including regional trade within a given country. It is not crossing the international boundaries. It refers to the buying and selling of goods by the individual of the community.

The volume of internal trade is dependent up on:

- Size of a country.
- Variety of its resources.
- Number of population.
- Standard of living of the people.
- Development of communication and transport

International (foreign) trade is the exchange of goods and services across international boundaries or territories among countries or continents. In most countries, it represents a significant share of GDP. While international trade has been present throughout much of history, its economic, social, and political importance has been on the rise in recent centuries. Industrialization, advanced transportation, globalization, multinational corporations and outsourcing are all having a major impact on the international trade system. Increasing international trade is crucial to the continuance of globalization. International trade is a major source of economic revenue for any nation that is considered a world power. Without international trade, nations would be limited to the goods and services produced within their own borders.

International trade is also a branch of economics, which, together with international finance, forms the larger branch of international economics. There are two types of international trade:

1. Export trade: refers to sending of goods to other country.
2. Import trade: refers to bringing of goods from abroad to home country
    - Favorable balance of trade - positive balance.
    - Unfavorable balance trade - negative balance

4.2.2. The Pattern of World Trade

International trade at present is dominated by OECD countries namely USA, western European countries, and Japan. These countries have high national income, high level of machinery, high level of living standard and high degree of specialization. All countries have positive trade balance.

Most OECD countries export coal, livestock feed, grain and wheat from USA and in turn they import vehicles from Japan and China.

1) The developed countries of the Northern hemisphere are the importer and exporters of the world trade which accounts for 72% of world trade.
2) Large percentage of world trade involves movement of primary product- minerals, wood, cotton/ most of which is directed to industrialized countries of the north .from tropical countries and new land of south.
3) A large trading in primary product and secondary goods among industrialized countries. E.g. USA, Japan and Canada, German, Italy.

4.2.3. Regulation of international trade

Traditionally trade was regulated through bilateral treaties between two nations. For centuries under the belief in Mercantilism most nations had high tariffs and many restrictions on international trade. In the 19th century, especially in Britain, a belief in free trade became paramount. This belief became the dominant thinking among western nations since then despite the acknowledgement that adoption of the policy coincided with the general decline

of Great Britain. In the years since the Second World War, controversial multilateral treaties like the GATT and World Trade Organization have attempted to create a globally regulated trade structure. These trade agreements have often resulted in protest and discontent with claims of unfair trade that is not mutually beneficial.

Free trade is usually most strongly supported by the most economically powerful nations, though they often engage in selective protectionism for those industries which are strategically important such as the protective tariffs applied to agriculture by the United States and Europe. The Netherlands and the United Kingdom were both strong advocates of free trade when they were economically dominant, today the United States, the United Kingdom, Australia and Japan are its greatest proponents. However, many other countries (such as India, China and Russia) are increasingly becoming advocates of free trade as they become more economically powerful. As tariff levels fall there is also an increasing willingness to negotiate non-tariff measures, including foreign direct investment, procurement and trade facilitation. The latter looks at the transaction cost associated with meeting trade and customs procedures.

Traditionally agricultural interests are usually in favor of free trade while manufacturing sectors often support protectionism. This has changed somewhat in recent years, however. In fact, agricultural lobbies, particularly in the United States, Europe and Japan are chiefly responsible for particular rules in the major international trade treaties which allow for more protectionist measures in agriculture than for most other goods and services.

During recessions there is often strong domestic pressure to increase tariffs to protect domestic industries. This occurred around the world during the Great Depression. Many economists have attempted to portray tariffs as the underlining reason behind the collapse in world trade that many believe seriously deepened the depression.

The regulation of international trade is done through the World Trade Organization at the global level, and through several other regional arrangements such as MERCOSUR in South America, NAFTA between the United States, Canada and Mexico and the European Union between 27 independent states.

4.2.4. Economic and political Risks in international trade

The risks that exist in international trade can be divided into two major groups:

Economic risks

- Risk of insolvency (collapse) of the buyer,
- Risk of protracted (prolonged) default - the failure of the buyer to pay the amount due within six months after the due date
- Risk of non-acceptance
- Surrendering economic sovereignty
- Risk of Exchange rate

Political risks

- Risk of cancellation or non-renewal of export or import licenses
- War risks
- Risk of expropriation or confiscation of the importer's company
- Risk of the imposition of an import ban after the shipment of the goods
- Transfer risk - imposition of exchange controls by the importer's country or foreign currency shortages
- Surrendering political sovereignty

4.2.5. Trading Restriction and Trading Group

Trading Restrictions: Why they are needed?

- To benefit domestic product

- To generate income from tax

- To make domestic producers competitive in market

- To stimulate domestic producers

These all are important before 1945’

Major Type of Trading Restriction

1. Embargo
2. Tariff: heavy tax on import goods,

3. Fixing quota: The limitation of the amount of goods to be imported determined by importer.
4. Voluntary Export Restrain/VER/: An agreement between two countries where the exporting country will voluntary to restrict the volume of its export.
5. Product Standard Regulation e.g. quality, package
6. Requiring license.
7. Complex Customs Procedure
8. Government involvement, like prohibition and subsidies

Major Trading Groups

The formation of the groups or the union is because of two main reasons, these are:
Protection policy and Free trade policy like No tariff, trade barrier, no restriction at all.

1. *The European Economic Community/EEC*/, which was established in 1958 by 6 members, in 1980 =10 in 1986 = 12

- Now a day became 'EU' with their currency Euro

2. *The European free trade association /EFTA/* in 1960

3. *The North American Free trade association/NAFTA/*, which includes USA, Canada and Mexico

4. Latin America free trade association /LAFTA/

5. The central America common market/ CACM/

6. The organization of economic cooperation and development /OECD/

This organization allows Free trade among the member countries

4.3. Theories Related to the Service Sector

4.3.1. Central Place Theory

Central place theory is an element of location theory concerning the size and distribution of central places (settlements) within a system. It attempts to illustrate how settlements locate in relation to one another, the amount of market area a central place can control, and why some central places function as hamlets, villages, towns, or cities.

The German geographer Walter Christaller introduced central-place theory in his book entitled Central Places in Southern Germany (1933). The theory was based on central place functions within the urban fabrics. The theory was first developed by Walther Christaller

(1933) later Expanded by August Losch (1940), and had been tried to be modified and improved (conceptually) by other like, Berry B.J.L. (1967), Marshall J.U.(1969), P. Haggett (1977)&so on.

The primary purpose of a settlement or market town, according to central-place theory, is the provision of goods and services for the surrounding market area. Such towns are centrally located and may be called central places. Settlements that provide more goods and services than do other places are called higher-order central places. Lower-order central places have small market areas and provide goods and services that are purchased more frequently than higher-order goods and services. Higher-order places are more widely distributed and fewer in number than lower-order places.

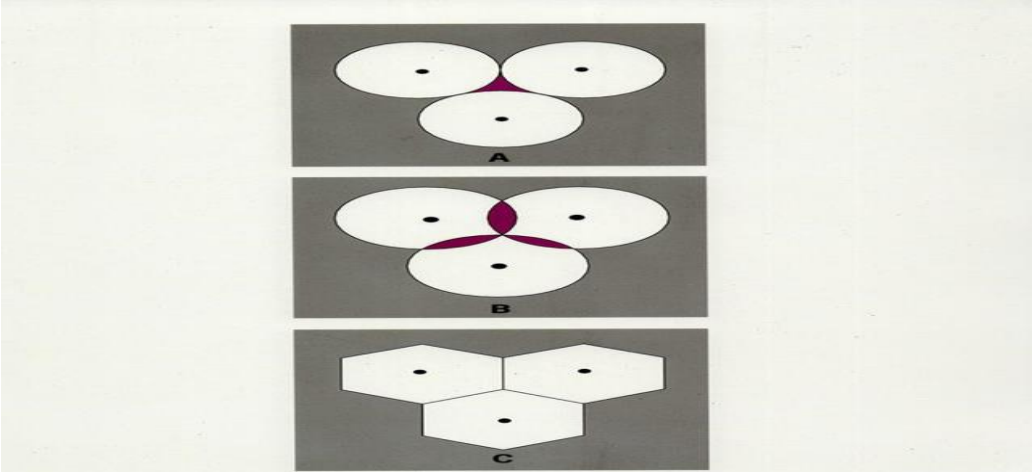


Fig- . Central Place theory development

Christaller's theory assumes that central places are distributed over a uniform plane of constant population density and purchasing power. Movement across the plane is uniformly easy in any direction, transportation costs vary linearly, and consumers act rationally to minimize transportation costs by visiting the nearest location offering the desired good or service.

The determining factor in the location of any central place is the threshold, which comprises the smallest market area necessary for the goods and services to be economically viable. Once a threshold has been established, the central place will seek to expand its market area until the range—i.e., the maximum distance consumers will travel to purchase goods and services—is reached.

Since the threshold and range define the market area of a central place, market areas for a group of central places offering the same order of goods and services will each extend an equal distance in all directions in circular fashion.

The German economist August Lösch expanded on Christaller's work in his book The Spatial Organization of the Economy (1940). Unlike Christaller, whose system of central places began with the highest-order, Lösch began with a system of lowest-order (self-sufficient) farms, which were regularly distributed in a triangular-hexagonal pattern. From this smallest scale of economic activity, Lösch mathematically derived several central-place systems, including the three systems of Christaller. Lösch's systems of central places allowed for specialized places. He also illustrated how some central places develop into richer areas than others.

Edward Ullman introduced central-place theory to American scholars in 1941. Since then geographers have sought to test its validity. Iowa and Wisconsin have been two areas of empirical research that have come closest to meeting Christaller's theoretical assumptions.

4.6.2. International trade theory

Several different models have been proposed to predict patterns of trade and to analyze the effects of trade policies such as tariffs.

A. Ricardian model

The Ricardian model focuses on comparative advantage and is perhaps the most important concept in international trade theory. In a Ricardian model, countries specialize in producing what they produce best. Unlike other models, the Ricardian framework predicts that countries will fully specialize instead of producing a broad array of goods. Also, the Ricardian model does not directly consider factor endowments, such as the relative amounts of labor and capital within a country.

B. Heckscher-Ohlin model

The Heckscher-Ohlin model was produced as an alternative to the Ricardian model of basic comparative advantage. Despite its greater complexity it did not prove much more accurate

in its predictions. However, from a theoretical point of view it did provide an elegant solution by incorporating the neoclassical price mechanism into international trade theory.

The theory argues that the pattern of international trade is determined by differences in factor endowments. It predicts that countries will export those goods that make intensive use of locally abundant factors and will import goods that make intensive use of factors that are locally scarce. Empirical problems with the H-O model, known as the Leontief paradox, were exposed in empirical tests by Wassily Leontief who found that the United States tended to export labor intensive goods despite having capital abundance.

Specific Factors

In this model, labor mobility between industries is possible while capital is immobile between industries in the short-run. Thus, this model can be interpreted as a 'short run' version of the Hecksche-Ohlin model. The specific factors name refers to the given that in the short-run specific factors of production, such as physical capital, are not easily transferable between industries. The theory suggests that if there is an increase in the price of a good, the owners of the factor of production specific to that good will profit in real terms. Additionally, owners of opposing specific factors of production (i.e. labour and capital) are likely to have opposing agendas when lobbying for controls over immigration of labour. Conversely, both owners of capital and labour profit in real terms from an increase in the capital endowment. This model is ideal for particular industries. This model is ideal for understanding income distribution but awkward for discussing the pattern of trade!

New Trade Theory

New Trade theory tries to explain several facts about trade, which the two main models above have difficulty with. These include the fact that most trade is between countries with similar factor endowment and productivity levels, and the large amount of multinational production (ie foreign direct investment) which exists. In one example of this framework, the economy exhibits monopolistic competition, and increasing returns to scale.

Gravity model

The Gravity model of trade presents a more empirical analysis of trading patterns rather than the more theoretical models discussed above. The gravity model, in its basic form, predicts trade based on the distance between countries and the interaction of the countries' economic sizes. The model mimics the Newtonian law of gravity which also considers distance and physical size between two objects. The model has been proven to be empirically strong through econometric analysis. Other factors such as income level, diplomatic relationships between countries, and trade policies are also included in expanded versions of the model.

4.4. Transportation and Communication

4.4.1. The Concepts of Transportation

Transportation refers to means of traveling or of carrying some body or something from one location to another, usually in a vehicle. It facilitates the physical movement of people and goods from place-to-place. The transportation industry is the largest industry in the world. It includes the manufacture and distribution of vehicles, the production and distribution of fuel, and the provision of transportation services. Historically, economic and military powers of a nation have been closely tied to efficient methods of transport. It removes the distance barrier and increases interaction among people, regions or countries; goods produced at one place are readily available at distant places and people move freely throughout the world in every step of our life (Michael, 2007).

Individuals and business firms that engage in such activities are called ***transporters***. Many companies and government agencies that provide transportation to the public and to businesses are known as ***service providers***. They are classified into two major groups: freight and passenger. Freight service providers transport cargo such as manufactured products, raw materials, and food, and are generally hired by businesses. Passenger service providers, move people from place to place and are usually hired by individuals. Both freight and passenger service providers often operate out of a facility known as a terminal (Michael, 2007).

4.4.2. The Importance of Transportation

Transportation is vital to the nations' economy (Michel, 2007). Transport system is usually comparable to the human blood system and according to Hirschman it is a hard-core (the center) to Social Overhead Capital (SOC). Thus, the following are the interrelated worth of transport infrastructure in communication and development.

Means to provide available raw materials to producers: Transport makes possible to carry natural resources (raw materials) from their source to places where they can be processed and assembled into finished and semi-finished products.

Means to provide goods to customers: transport facilitate movement of finished goods from place of production to markets and consumption with great ease and speed. Hence, it is one of the key factors in economic competition and promotes trade and allows a nation to accumulate wealth and power. In the business circle, transportation is considered as an auxiliary to trade as it supports trade and industry Furthermore, consumers spread in different parts of the country have the benefit of consuming goods produced at distant places.

Enhance standard of living: transport facilitates large-scale production at low costs and gives consumers the choice to make use of different quantities of goods at different prices and hence it raises the standard of living and solving dietary problems of the people.

For emergencies and natural calamities: transport allows the movement of soldiers, equipment and supplies needed in the operation in times of national crises due to war and internal disturbance, so that a nation can wage war. The rapid movement of troops, equipment, and supplies can be a deciding factor in winning a battle. Just as mobilizing a nation's military strength is critical to success.

It is a means of creating employment: transport provides employment opportunity to individuals as drivers, conductors, pilots, cabin crew (the staff on a passenger aircraft whose job is to attend to passengers), captain of the ship, etc. who are directly engaged in transport business. It also provides employment to people indirectly in the industries producing various means of transport and other transport equipments. People can also provide repairing and maintenance services by opening service centers at convenient locations.

It increases labor mobility*:* transport helps a lot in providing mobility to workers from our country go to abroad to work in different industries and factories and foreigners also comes Ethiopia to work. In Ethiopia, people also move from one part to another in search of work. Similarly, it is not always possible to have workers near the factory and hence most industries have their own transport system to bring the workers from where they reside to place of work.

Bringing nations together: transport facilitates the movements of people from one country to another. It helps in exchange of cultures, views and practices among the people of different countries. This brings greater understanding among people and awareness about different countries. Thus, it helps to promote a feeling of international brotherhood - a feeling of fellowship and sympathy for other people or an organization of men who are united for a common purpose, e.g. a labor union.

4.4. 3. Transport on Location Decisions

Understanding the role of transport in decisions made by businesses on where to locate or relocate is a crucial element to assess the impact of transport system on people's lives. Transport plays an important role in determining the location of activities like retail trade, manufacturing, and services and is a necessary condition for socioeconomic development. The interaction between transport provision and business is an element of the production cycle. As the markets for production and consumption develop, so do the demands on transport provision and use (McQuaid, et al, 2004).

In economic geography, location theories with a view to explain and predict the location logic of economic activities have been developed by incorporating raw materials, market, institutional and behavioral considerations in various degrees. The majority of location theories have an explicit or implicit role attributed to transport.

Ports and airports*:* faster long distance transport services have propelled/boost the importance of air transport, especially for freight. They are convergences of related activities around terminals, particularly for ports since inland distribution costs tend to be high. Airport transportation center are used for the landing and takeoff of aircraft. Thus, air terminals have become a significant location factor for globally oriented activities, which

tend to agglomerate in the vicinity. Airports provide transportation not only for people but also for freight, such as mail, perishable foods, and other important items. Therefore, airports are among the busiest transportation centers and the business they create is vital to the world economy and individual national economies.

***Roads and railroads**:* have structuring and convergence effect depending on the level of accessibility. For rail transport, terminals have a convergence effect. Transport requirements have proportionally increased in order to organize the related flows. The surge in long distance trade has made logistical functions, namely transport terminals and distribution centers, at the forefront of location considerations. Since accessibility is dominantly the outcome of transportation, namely the capacity of infrastructures to support mobility, it presents the most significant influence of transportation on location. Hence, it appears that location (accessibility) and economic activities are intimately linked. Accessibility plays an important role by offering more customers through an expanded market area, by making distribution more efficient (in terms of costs and time), or by enabling more people to reach workplaces.

Because of the level of accessibility they provide, new transport infrastructures influence the setting of economic activities. It becomes a particularly strong effect when new infrastructure are added to an undeveloped site and thus location decision tend to be simpler and unhindered by the existing spatial structure. The location effects are important when infrastructure is accompanied by social, economic and transformations of space. New infrastructures therefore play a catalytic role, because they are able of transforming space (McQuaid, et al, 2004).

4.4.4. Methods of Transportation

Transportation is usually classified by the medium in which the movement occurs, such as by land, air, water, or pipeline which are called the different ***modes of transport***. Within each of the first three media, different methods are used to move people and goods from place to place (Michael, 2007).

4.4.4.1. Land Transportation

Land transportation refers to activities of physical movement of goods and passengers on land. It is the dominant form of transportation in the world. People can move on land under their own power, either by walking or by other forms of human-powered transportation such as the bicycle. People also use domestic animals as a means of transport, both for riding and for pulling wheeled wagons or carts. Land transport may further be divided into ***road***; ***rail***, ***ropeway*** and ***pipeline*** transport (Michael, 2007).

Road*:** is one of the means of transport that connect one place to others on the surface of the land. Roads can be made differently. Some of them are made of sand; some others may be of chips and still some others of cement. You find different vehicles moving on roads like bullock carts, cycles, motorcycles, cars, truck, and buses all of which constitute different means of road transport. The means of road transport may be divided into three types: ***man driven; ***animal driven*** and ***motor-driven***.

Human-powered transportation relies entirely on human muscle power for movement (such as walking or bicycling). Individuals have been carrying goods on their head or back, or ride bicycles or use rickshaw to travel short distances. People have used domestic animals for thousands of years to help transport goods over longer distances. Pack animals are still used today in many parts of the world, particularly in rugged or hilly terrain where motor vehicles cannot travel. The horse, with its superior speed and range, has been a favorite animal for transportation use. In areas, which are normally covered with snow throughout the year, we find sledges pulled by dogs used to carry both passengers and goods (Michael, 2007).

Motor vehicles make up a broad class of self-propelled land-transportation devices that generally use internal-combustion engines and gasoline or diesel fuel for power. Most motor vehicles are designed to travel on roads. Motor vehicles range from motorcycles and automobiles for personal use to trucks, which can transport large amounts of cargo and buses to carry many passengers (Michael, 2007).

Compared with man-driven and animal-driven means of road transport, motor driven means of transport have become more important over the years. This is due to their speedy movement and larger carrying capacity. Extensions of roads to every corner of the country have also enhanced the use of motor driven transport. Road transports are: *relatively cheaper*

mode of transport; used to *transport Perishable goods at a faster speed over a short distance*; *flexible mode of transport as loading and unloading is possible at any point*; able to *provide door-to-door service*; useful in *hilly areas which are not connected by other means of transport.* But road transport is: *not economical for long distances due to limited carrying capacity*; *costly for heavy/bulky goods*; *affected by adverse weather conditions* (floods, rain, landslide, etc., sometimes block or hinder the route); *noisy, polluting the environment, less safe, and stressful for drivers*; and There may also be potential delays and can be expensive where there are congestion or road charges.

Railways: Transportation of goods and passengers on rail lines through trains is called *rail transport*. Railroads are paths of parallel metal rails that allow a wheeled vehicle to move more easily by reducing friction. The invention of the steam locomotive in 1804 has become the primary means of power. Modern locomotives commonly use electric motors or diesel engines and pull long trains of passenger or freight cars (Michael, 2007).

Rail transport occupies an important place in land transport system and is the most dependable mode of transport to carry goods and passengers over a long distance. The benefits of rail transportation in both speed and carrying capacity made it superior to other methods of transportation in the 1800s. In many developed countries railroad became a major means of cross-country transportation. In Europe and Japan, major cities are connected by high-speed passenger trains (Michael, 2007).

In some countries like India rail transport is available throughout the country except some hilly or mountainous regions. Two types of trains are found there. One is ***passenger train*** (carry both human beings and limited quantities of goods) and the other is ***goods train*** (exclusively used to carry goods). Railroads have had a profound impact on civilization. The efficiency and speed of rail travel speed up industrial and agricultural development. It is: a convenient mode of transport for long distances; faster than road transportation; suitable for carrying heavy goods in large quantities; affected by adverse weather conditions like rain, floods, fog, etc. and safe, more environmental friendly than alternatives, does not add to congestion. But rail transport: is relatively expensive for carrying goods and passengers over short distances; requires large capital investment for construction of railways; not available in remote parts or the mountainous areas; provides service in fixed time schedule and is not

flexible for loading and unloading of goods at any place; and involves heavy losses of life as well as goods in case of accident.

Pipelines*:** pipelines are a unique form of transportation used to move liquids, gases, or solid/liquid mixtures over great distances. Pipelines consist of two major components: ***pipes and ***pumping stations***. Pipelines are used to supply water to residential and commercial areas; and transport petroleum and natural gas from one place to anther. This is the most convenient as well as economical mode of transport in comparison to road and rail transport, provided the volume to be transported is large. But the cost of installation and maintenance requires large capital investment.

***Ropeways*:** is a system of cables strung from high supports and used to carry heavy objects such as logs from one place to another through the air. It refers to a mode of transport, which connects two places on the hills, or across a valley or river. In the hilly areas, trolleys move on wheels connected to a rope and are used for carrying passengers or goods, especially building materials, food, etc.

4.4.4.2. Water Transportation

Water transport refers to movement of goods and passengers on waterways using boats, launches (motor boat), and ships to different places within and outside the country. Within the country, rivers and canals facilitate the movement of boats, launches, etc.

Some of the greatest achievements in transportation relate to methods of crossing water. Two-thirds of Earth's surface is covered by water, so the progress of civilization is naturally tied to the ability to move over water. There are two types of water transport such as ***inland water transport*** and ***ocean water transport***. Since the goods and passengers move inside the country using boats, launches, barges, and streamers on rivers and canals, this type of transport is called ***inland water transport***. These routes are used in domestic or home trade to carry bulky goods. Passenger transport through waterways is not so popular in Ethiopia. It exists only in Baro River and Lake Tana.

Ocean Transports are used to carry goods and passengers on the sea route. It plays an important role in the development of international trade and facilitates movements in the

coastal areas. Ocean transport has its fixed route linking almost all countries of the world. It may be of two types: ***coastal Shipping*** which work within the main ports of a country that helps in home trade. Whereas ***overseas shipping*** ply between different countries separated by sea or ocean. It promotes the development of international trade and is carried out on fixed routes according to prescribed schedule connecting the countries. Different types of ships are used. These are ***Liners*** and ***Tramps.*** Liners are passenger or cargo vessels that are belonging to a regular shipping company. ***Tramps*** are cargo ships that do not make regular trips but plies whenever cargo is offered to it. They do not follow a fixed route and prescribed timetable unlike liners. Cargo vessels are special oceangoing ships that are designed exclusively for carrying large amounts of cargo. Different vessels are designed for carrying different kinds of cargo, such as liquids and bulk cargo. Water transport is: relatively economical mode of transport for bulky and heavy goods; a safe mode of transport with respect to occurrence of accidents; less costly of constructing routes as most of them are naturally made; and is promoting international trade by connecting continents.

On the contrary water transport is: affected by the uneven depth and navigability of rivers; very slow mode of transport so that not suitable for transport of perishable goods; adversely affected by weather conditions; inflexible in terms of routes and timetables; affected by port duty/taxes. Sea transport also requires large investment on ships and their maintenance.

4.4.4.3. Air Transportation

Air travel has revolutionized global transportation by dramatically reducing the time needed to travel great distances. Journeys across nations or oceans that might have taken weeks or months can now be made in a matter of hours. With large numbers of people traveling in airplanes, air transportation has become a major part of the world's transportation system. It carries less bulky or of high value goods and passengers using different aircrafts like passenger aircraft, cargo aircraft, helicopters and so forth. In hilly and mountainous areas where other mode of transport is not accessible, air transport is an important and convenient mode of transport. It is most essential for transporting goods and passengers during wars and natural calamities like earthquake and floods, etc (Michael, 2007).

Air transport may be classified as ***domestic*** and ***international***. While domestic air transport mainly facilitates movement within the country, international one is used for carrying goods and passengers between different countries. Air transport is carried out in fixed air routes, which connect the countries. Air transportation is: the fastest mode of transport; very useful in transporting goods and passengers to the area not accessible by any other means of transport; the most convenient mode of transport during natural calamities; It also provides vital support to the national security and defense. But it is expensive mode of transport; not suitable for transporting heavy and bulky goods; affected by adverse weather conditions; not suitable for short distance travel; and in case of accidents, it results in heavy losses of goods, property and life.

When deciding which method of transport to use, you need to weigh the advantages and disadvantages of each mode of transport depending on distance, destination, volume and type of goods deliver.

4.4.5. A Vital Concept for Transportation Planning and Development

There is a growing transportation crisis in many lesser developed countries. Rapid urbanization and a mismatch between the supply of transportation infrastructure, services, and technologies and the mobility needs of the majority of people worsen the problem. The current pattern of transportation and land development in the majority of countries around the world appears to be increasingly unsustainable from both economical and environmental perspective Unsustainable growth in motorization puts increasing strains on environmental quality and many local and national economies, and is increasing social conflict, poverty, and global warming. The concept of sustainable transportation calls for a more holistic approach to policy and investment planning to achieve a diverse and balanced mix of transport modes and a sensible arrangement of land use that enables conservative use of energy and capital to fulfill mobility needs. Sustainable transportation strategies are those that can meet the basic mobility needs of all and be sustained into the foreseeable future without destruction of the local or planetary resource base.

Many factors point to the need for adoption of a new paradigm for sustainable transportation and development in both high and low income countries - burgeoning populations, growing

air pollution, limits on global petroleum reserves, limited physical and economic capacity to expand automobile-based transportation systems without community destruction, and the urgent need to limit global CO2 emissions to slow the pace of global warming.

4.4.6. Towards a Sustainable Transportation Paradigm

Sustainable systems can be described as those that can function for the foreseeable future without collapse or depletion of the resource base upon which they depend. Sustainable systems usually achieve robustness through diversification and decentralization, complex system interconnection and interdependency and high degrees of system specialization to utilize resources efficiently.

The current unsustainable development pattern is largely the product of the mechanistic, linear, reductionist paradigm of the world that has guided Western civilization since the industrial revolution. If human civilization is to evolve towards a sustainable development, this paradigm for transportation and development needs to be replaced with amore holistic paradigm of the world that borrows concepts from biological, ecological, and systems theory, and that places human civilization within, not above nature. It is important for planners and economists to evaluate the paradigms that guide their understanding of transportation and land use systems. Current approaches usually reduce these systems to traffic zones, roads, and bus lines that can be assembled with the whole being the sum of the parts, like a great machine. The emerging paradigm, based on the principles of biological and ecological systems, looks instead at the overall pattern, texture, connectivity, and functionality of land use and the various circulatory and communications structures within the system at various levels from smallest to largest.

The current paradigm for transportation planning seeks to maximize circulatory capacity, travel speed, and mobility. The emerging sustainable transportation paradigm seeks to maximize efficiency in overall resource utilization. This is achieved by increasing modal diversity, paying more attention to the pattern of transportation and land use, and encouraging use of efficient transportation modes whenever practical, charging users the true costs of transportation, and encouraging better connectivity between modes.

Transportation systems are healthiest when they display great modal diversity, offering opportunity for selection of the most efficient specialized mode or combination of modes to

meet different functional and qualitative demands for the movement of people or goods. When less resource intensive modes are marginalized, made unpractical, or unsafe, people have fewer choices about how to travel and must either give up travel or use a less efficient or more resource-intensive mode.

Transportation planning historically has followed the rational planning model of defining goals and objectives, identifying problems, generating alternatives, evaluating alternatives, and developing plans. Other models for planning include rational actor, transit oriented development, satisficing, incremental planning, organizational process, and political bargaining. However, planners are increasingly expected to adopt a multi-disciplinary approach, especially due to the rising importance of environmentalism. The role of the transport planner is shifting from technical analysis to promoting sustainability through integrated transport policies.

Transportation planning is a field involved with the evaluation, assessment, design and sitting of transportation facilities such as streets, highways, sidewalks (footways), bike lanes (narrow streets) and public transport lines. Good transportation planning selects solutions to one problem to solve, or avoid exacerbating, other problems. For example, there are many ways to reduce traffic congestion in a community. Some of these solutions may also help reduce other problems such as parking congestion, pollution and inadequate mobility for non-drivers, while other solutions may exacerbate these problems. The transportation planning should give emphasis on: integration within and between different modes of transport; integration with the environment; integration with land use planning; and integration with policies for education, health and wealth creation.

In line with this the key purpose of transport planning is: to ***plan***, ***design***, ***deliver***, ***manage*** and ***review transport***, ***balancing the needs of society***, ***the economy and the environment***. The following key roles must be done by transport planners:

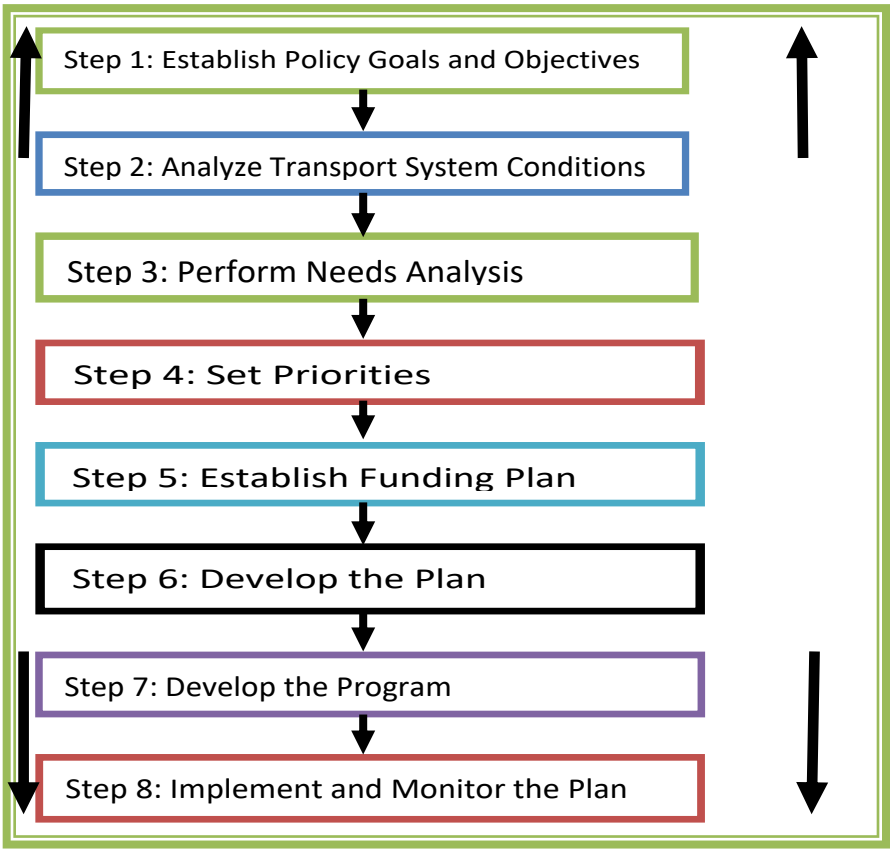
- taking account of the social, economic and environmental context of their work;
- understand the legal, regulatory and resource framework within which they work;
- understand and create transport policies, strategies and plans that contribute to meeting social, economic and environmental needs;

- design the necessary transport projects, systems and services;
- understand the commercial aspects of operating transport systems and services;
- know about and apply the relevant tools and techniques; and
- should be competent in all aspects of management, in particular communications, personal skills and project management.

4.4.7. Basic Steps in Transportation Planning

The most important component of transportation planning which should take place throughout the entire planning process as an integral component of many steps is presented in figure 8 below.

Figure 2: Basic Components of Transportation Planning for a Given Transportation



Source: http://www.fhwa.dot.gov/planning/rural/planningfortrans/appendixa.html

1. Establishing Policy Goals and Objectives: transportation planning is most significant to establish policy goals through the following success factors:

- specified roles in policy decisions and advisory.

- involvement of local officials and stakeholders in developing policy goals and objectives.
- specificity of goals and objectives to guide plan development.
- tied goals and objectives to action and meaningful to stakeholders.
- timeline decisions and mechanisms for modifying and updating policies.
- the mechanisms to determine the local and regional policies coordinate with the state plan.

When developing policy statements for transportation plans, the goals could be to "establish balanced and integrated transportation" that: supports land use and economic development policies; is sensitive to environmental concerns; promotes safe and efficient transportation movement; and supports multimodal transportation uses.

Transportation planning should establish measurable objectives that are aimed to:

- support economic vitality and growth.
- ensure that growth and change in the transportation system within and near local jurisdictions are consistent with the regional and local comprehensive transportation plans.
- provide a tool for communities that guide transportation system development to make it consistent with and supportive of area comprehensive plans.
- ensure consistency with environmental rules and regulations.
- Emphasize on the movement of goods and people rather than the movement of vehicles.
- preserve existing rail lines and reserve abandoned rail lines through compatible use.
- consider the most cost-effective modes of transportation for overall good of the region.
- apply minimum standards for operating conditions, classification schemes, and performance measures uniformly on the regional system.
- identify and implement strategies to resolve constraints to inter-modal connections.
- identify and implement strategies to take advantage of opportunities for new and enhanced inter-modal connections and alternative transportation modes.

Note that every area is of course having different priorities and therefore different goals and objectives. The important thing is that developing them in a consultative and measurable manner is used to guide the design of the plan.

***2. Conditions Analysis*:** it is the process of determining how the community will measure the condition of the system and the service provided for vehicles, transit, and non-motorized modes (bicycles and pedestrians). Service objectives for roadways may include consideration of roadway capacity, design, and safety. Examples of transit service standards are population coverage and frequency of service. Factors for the success of effective conditions analysis include:

- defining the transportation system to evaluate conditions.
- defining what information is needed about the overall system and the different elements of the system. What conditions are most important for economic and social wellbeing of the area?
- determining who is going to use the information, and what they are going to use it for.
- defining which measures of system conditions will be used.
- maximizing the use of existing management systems, analysis tools and data collection procedures to provide measures and data.

***A. Measurement and monitoring of existing conditions**:* the steps involved in measuring and monitoring of existing conditions are: determining data requirements to measure progress towards policy goals and objectives that are set for the transportation system; establishing agreed upon measures and evaluation procedures for system elements based on goals and objectives; and applying condition and performance measures.

Figure 3: Types of condition information by category

Category	Measure
Extent of the rural system - basic inventory	Physical inventory and services available
Use of system	Traffic, ridership, etc.
Physical conditions/performance.	Pavement, bridges, transit equipment
Operational conditions/performance.	Mobility and safety

Source: US Department of Transportation - Federal Highway Administration (FHWA) http://www.fhwa.dot.gov/planning/rural/planningfortrans/appendixa.html

***B. Forecasting future conditions*:** plans are future oriented while they typically respond to a backlog of needs, to address future conditions and plan for them. There are a number of ways to estimate travel demand within transportation planning context. These range from simple techniques such as historical trend analysis to variants of more complex computer models

that require large databases of demographic and socioeconomic information to forecast travel demand. Simplified demand estimation techniques and analysis are appropriate in most rural planning situations.

Historical trend analysis which estimates transportation need by plotting historical demand levels over time and then extrapolating the trend into the future is one starting point for estimation in transportation planning areas. However, there are some drawbacks that need to be kept in mind. First, and foremost, the assumption under this proposal maintains that all factors and relationships affecting demand (such as transportation capacity improvements, demographic shifts, inflation, fluctuations in the price of fuel, etc.) remain constant over time. If one or more of these factors change, there might be a shift in demand. In addition to the historical trend analyses, simplified versions of more complex techniques, which tend to focus on the impacts of a number of key factors influencing transportation demand, are now available and are being used by some transportation planners and consultants. One approach is to take population and economic forecasts for the area and use the relationship between these corridors and travel demand to generate some growth factors.

The demand analysis should identify all perceived mobility issues, impediments, and opportunities in the region. For example, if a section of roadway is thought to be unsafe and safety improvements are proposed, a detailed accident history should be compiled to support the assessment. Or, if the transportation of the elderly and/or disabled is felt to be an important transportation need, then various findings from state, regional, and local transit needs and benefits studies should provide the supporting documentation. This includes such things as traffic volumes, volume/capacity ratios, accident rates, transit ridership and core rail systems.

3. Needs Analysis: transportation system needs are most usefully assessed by evaluating the gap between the goals and objectives that are established for the transportation system and the baseline system conditions. The needs are planned actions for addressing this gap. How much can be implemented over the planning horizon depends on finance levels. A successful needs analysis should:

- provide technical information for goal setting.
- define the costs of meeting plan goals and objectives.

- compare plan needs with available funds.
- provide information to evaluate trade-offs between different needs.

A. Gap Analysis: the needs analysis can be used to determine broad but different categories of need for achieving planning goals. A first step in needs assessment is to measure the gap between the transportation system goals and current objectives and conditions. This requires a set of goals and objectives that can be quantified in the operational and physical condition of the transportation system. The results of this gap analysis are referred to as ***deficiencies***.

B. Evaluation of Alternative Strategies and Actions to Address the Gap: this step is used to assess the cost and impacts on system condition of alternative strategies or improvements that address needs. For long range planning purposes the needs areas can be grouped in different ways. They can be organized for the different elements of the transportation system (roads, bridges, rail, etc.) and different policy goal areas (mobility, safety, preservation, economic development environmental etc.) established in the plan.

C. Select Strategies and Actions: the strategies and actions selected to address deficiencies determine the magnitude of the plan needs. The evaluation of alternative strategies for addressing deficiencies is as technical information to the policy and goal setting process that selects transportation strategies. In this way the plan needs are driven by the overall policy goals and strategies established in the plan.

Once a plan strategy is developed, the cost of implementing this strategy defines the needs. The total cost of the plan improvements is important for determining implementation. This is developed by determining the cost of implementing the selected strategies. On the highway side, there are well-established unit costs that can be applied to develop needs estimates for improvements. Unit costs can be developed and inflation accounted for. For other modes there are less well established methods, however, most states are now working on developing consistent assumptions and a rigorous approach for developing cost estimates for other modes.

4. Set Priorities: since transportation needs typically outweigh expected revenues, it is important to prioritize the needs identified during the transportation planning process. Given the overwhelming number of potential improvements it is important to have an agreed

approach to project prioritization. This approach need to consider the following prioritization methods: (1) sufficiency measures, (2) benefit-cost analysis, or (3) multiple criteria analysis. The success factors for setting priorities are:

- establish formal prioritization criteria and apply it consistently.
- apply the prioritization criteria to all programs and projects.
- make efforts to use the same prioritization criteria in the country.
- the prioritization criteria should consider as many factors as possible in determining program priorities (system, multimodal, environmental, social, and economic factors).

***A. Sufficiency measures*:** it allows the comparison of projects that have different characteristics and used for programming highway and bridge projects. Sufficiency ratings (measures) for highway projects are based upon weightings assigned to different categories of need - this often includes:

- ***Pavement condition*:** based on physical features such as surface condition, structural adequacy, drainage, and ridability.
- ***Safety*:** based on variables such as accident rates, surface and shoulder width, sight distance, and consistency.
- ***Service*:** based on variables such as volume/capacity ratios, operating speed and roadway geometrics.

Scores for each characteristic are added and then projects are ranked relative to their importance; and accordingly weights are assigned to each characteristic. For example, if a ***condition*** has a weight of 40, ***safety*** has a weight of 30, and ***service*** has a weight of 30, then a project receiving 100 points would be in excellent condition, safe, and traffic would move smoothly. In rating sufficiency systems it must be modified to account for projects with critical deficiency in one category and/or social, economic, and environmental considerations.

B. Benefit-cost analysis**:* Benefit-cost analysis typically considers only direct benefits and costs of transportation improvement projects. There are three main factors in traditional calculation of benefit-cost ratios: ***time savings, ***vehicle operating savings***, and ***accident reduction***. Inflation and the time value are accounted for by using ***discount rates***. They are important to benefit-cost analysis because benefits and costs occur at different times, there is

a time value of money, and there is an opportunity cost of capital. A discount rate of 4-8% is typically used in benefit-cost analysis. One of the issues associated with the use of benefit-cost analysis is that it can be criticized for its narrow focus of benefits/costs and excluding externalities or full costs.

C. Multiple Criteria Analysis: evaluates transportation projects based on social, economic, and environmental factors other than strictly to the direct use of the facilities. Once it has been decided on the criteria to use, a decision should then be made as to how each criterion to be weighted. The weight assignments should be determined by assessing the importance of each criterion in meeting the visions and goals of the transportation plan. An example might be to weight "system preservation" with a weight of 15; while assigning a weight of 10 for "inter/multimodal", depending on the plan's vision, values, and goals. The sum of the weights should total 100. In addition to the weighting, a score should be applied to each criterion. The scoring could range from one to three, for example, with 1 representing poor impact and 3 representing good impact. The score is then multiplied by the weight to determine the Total Weighted Points for each project. The projects can then be ranked to represent the priority for project funding consideration.

Figure : Example Criteria for Transport Project Prioritization

Criteria	Description
Public Support	Projects have the support of the transportation stakeholders and the general public as a result of focusing on customer service and obtaining their early and ongoing involvement in the planning of the project.
Congestion	Projects reduce congestion either by reducing demand for trips, shifting the demand to alternative modes, or implementing operational improvements.
Safety	Projects enhance transportation safety by emphasizing the security and safety of the traveler or by addressing existing or potential hazardous or unsafe situations.
Environment	Projects avoid and minimize if necessary, impacts to water, air and other resources; minimize energy use and noise pollution.
System Continuity	Projects address gaps in the transportation system and improve regional connections.
Preservation of System	Projects maintain and preserve the existing transportation infrastructure in order to repair or replace inadequacies or to extend the useful life of a facility.
Economic Impact	Projects support regional economic development goals.
Inter/Multimodal	Projects improve connections between different modes of transportation or support modes other than the single occupant vehicle.
Ability to Implement	Projects should be technologically sound and have achievable acquisition and approval requirements.

Source: http://www.fhwa.dot.gov/planning/

5. <u>Establishing Funding Plan</u>*:* The transportation plan needs to be realistic and fundable. Without reliable funding transportation projects can easily become a "wish list". However, limiting solutions to projects that do not exceed available revenue could result in a lower level of service than the community desires. Principles for developing a funding plan include:

- an analysis of the participating jurisdiction's capabilities of financing needs.
- a multi-year financing plan based on the needs identified in the plan.
- If probable funding falls short of meeting needs, the funding plan should contain a mechanism of rising additional funding, or reassessing to ensure that level of service standard.

A. Financial planning steps: these steps are used to develop transportation finance analysis:

- Identify transportation needs and solutions.
- Develop cost estimates for solutions.
- Assess the capacity to pay for these projects and services.
- Develop financing policies.
- Forecast revenue from existing and potential sources.
- Design a financing schedule by matching projects and services to revenue projections.
- Establish policies to govern the management of the transportation financing program.

These steps are not strictly sequential. For example, forecasting revenue from existing and potential sources can proceed at the same time as identification of transportation needs.

B. Cost estimates: cost estimates are necessary to compare transportation needs with available revenues. Costs should be estimated for: maintenance of the existing and proposed transportation system; designing and building new, expanded, or replacement facilities (roads, terminals, etc.); acquiring new transit vehicles and related capital costs (maintenance facilities, etc.); program costs for operating transportation services such as transit or ridesharing; and general costs associated with administering and planning the transportation system.

It is important to estimate maintenance and operation costs as these likely uses a majority of the existing revenue resources. Estimates can usually be based on existing historic data. The information required is likely to be available from the finance officer of the city/county and the transit agency. Estimates of new costs for facilities and services generally are based on a combination of rough and specific cost estimates. Most of the recommended improvements in a long-range transportation plan need reliable cost estimate based on factors such as typical "per mile" construction costs for different types of roadways or the operating costs for similar transit services in other counties [FHWA, http://www.fhwa.dot.gov/planning].

C. Available funding sources: revenues generated for transportation-related projects originate from a number of federal, state and local sources. Most states allocate a portion of their federal aid to local governments. Each jurisdiction needs to identify current funding

sources, anticipated funds available and any non-funded needs [FHWA, http://www.fhwa.dot.gov/planning/].

6. Developing the Plan: developing plan documents or "putting all together" can be a difficult process if not approached in a systematic fashion. Key factors for developing plans are:

- establish roles and responsibilities for who, how and when the plan be adopted and amended.
- planning team and the public consultation to develop the outline for the plan.
- Ensuring that the plan is strategic and visionary document and not a project list or "wish list".

7. Develop the Program: Programming refers to a series of activities carried out by planners, including data assessment, appraisal of identified planning needs, and consideration of available or anticipated fiscal resources to result in the drawing up, scheduling, and planning of a list of identified transportation improvements for a given period of time. The programming of projects for funding should consider:

- Timing of the need for improvements (when the facility falls below the locally established level of service under assumed growth rates).
- Timing for fund availability.

Often plans require more funds than are available sources traditionally dedicated to transportation funding. This means, agencies engaged in transportation planning should identify funding mechanisms to support implementation of the plan or reassess desired levels of service.

8. Implementation and Monitoring the Plan: to be successful in planned transport objectives, it must be implemented effectively. Transportation planning includes continually monitoring the performance of the transportation system and ensuring that plans are being implemented to meet the intended objectives. Success factors for implementation and monitoring the plan include:

- developing on-going process, known to participants, for monitoring towards plan objectives.
- establishing a process for how decisions regarding implementation are to be made.

- establishing a process for conditions tracking system.
- establishing a well-defined process for how priorities can be set.

Many transport plans have failed as they lack effective implementation and monitoring mechanism.

4.5. Tourism Industry

Tourism is traveling for predominantly recreational or leisure purposes or the provision of services to support this leisure travel. The World Tourism Organization defines **tourists** as people who "travel to and stay in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited". Tourism has become a popular global leisure activity. In 2006, there were over 842 million international tourist arrivals.

Tourism is vital for many countries, due to the income generated by the consumption of goods and services by tourists, the taxes levied on businesses in the tourism industry, and the opportunity for employment in the service industries associated with tourism. These service industries include transportation services such as cruise ships and taxis, accommodation such as hotels, restaurants, bars, and entertainment venues, and other hospitality industry services such as spas and resorts.

Hunziker and Krapf, in 1941, defined tourism as "the sum of the phenomena and relationships arising from the travel and stay of non-residents, insofar as they do not lead to permanent residence and are not connected with any earning activity." In 1976 Tourism Society of England defined it as "Tourism is the temporary, short-term movement of people to destination outside the places where they normally live and work and their activities during the stay at each destination. It includes movements for all purposes." In 1981 International Association of Scientific Experts in Tourism defined Tourism in terms of particular activities selected by choice and undertaken outside the home environment.

The United Nations classified three forms of tourism in 1994 in its Recommendations on Tourism Statistics: Domestic tourism, which involves residents of the given country traveling

only within this country; Inbound tourism, involving non-residents traveling in the given country; and Outbound tourism, involving residents traveling in another country.

The UN also derived different categories of tourism by combining the 3 basic forms of tourism: Internal tourism, which comprises domestic tourism and inbound tourism; National tourism, which comprises domestic tourism and outbound tourism; and International tourism, which consists of inbound tourism and outbound tourism. *Intrabound tourism* is a term coined by the Korea Tourism Organization and widely accepted in Korea. Intrabound tourism differs from domestic tourism in that the former encompasses policymaking and implementation of national tourism policies.

Chapter Five: Globalization & the Third World Economy

5.1. Meaning and Trends of Globalization

In its broader context globalization can be defined as a process of closer interdependence and integration among countries and peoples, facilitated by the enormous reduction of costs of transportation, communication and policy barriers to the flow of goods and services, capital and knowledge. Globalization can be explained in different terms such as interdependence, interference, denationalization, access or openness, linkage and so on.

Globalization is a comprehensive term for the emergence of a global society in which economic, technological, political, social, environmental and cultural events in one part of the world quickly come to have significance for people in other parts of the world. It is to say that globalization is competition among individuals, organizations, continents, countries, regions, etc and it is the process of international integration by which the people of the world are unified into a single society.

The world is linked as never before due to advances in communication and transportation and due also to trade agreements that have lowered or eliminated barriers in the exchange of goods. But this growing interdependence has not come without a price. This Sidebar looks at some of the problems created by globalization.

Although most people continue to live as citizens of a single nation, they are culturally, materially and psychologically engaged with the lives of people in other countries as never before. Distant events often have an immediate and significant impact, blurring the boundaries of our personal worlds. Items common to our everyday lives—such as the clothes we wear, the food we eat, and the cars we drive—are the products of globalization.

The process of globalization is not a new phenomenon. It has been an on-going process throughout history – a process which changes its speed and character with the advent of new communication and transport technologies. The global integration of humankind had its beginnings under Portuguese auspices in the 15th century. Hence, the process of globalization had its origins in Europe through the Portuguese, Spanish, Dutch, French and

English territorial and maritime expansion into all habitable continents and included the discovery and colonization of the New World.

The word "globalization" has been used by economists since 1981; however, its concepts did not permeate popular consciousness until the later half of the 1990s. The earliest concepts and predictions of globalization were penned by an American entrepreneur-turned-minister Charles Taze Russell who first coined the term 'corporate giants' in 1897. Various social scientists have tried to demonstrate continuity between contemporary trends of globalization and earlier periods. The first era of globalization during the 19th century was the rapid growth of international trade between the European imperial powers, the European colonies and the United States. After World War II, globalization was restarted and was driven by major advances in technology which led to lower trading costs.

Globalization became a business phenomenon in the 17th century when the Dutch East India Company, which is often described as the first multinational corporation, was established. Because of the high risks involved with international trade, the Dutch East India Company became the first company in the world to share risk and enable joint ownership through the issuing of shares: an important driver for globalization.

Globalization also involves the growth of *multinational corporations* (businesses that have operations or investments in many countries) and *transnational corporations* (businesses that see them functioning in a global marketplace). The international institutions that oversee world trade and finance play an increasingly important role in this era of globalization.

5.2. Reasons for Globalization

Most experts attribute globalization to improvements in communication, transportation, and information technologies. For example, not only currencies, but also stocks, bonds, and other financial assets can be traded around the clock and around the world due to innovations in communication and information processing. A three-minute telephone call from New York City to London in 1930 cost more than $300 (in year 2000 prices), making instant communication very expensive. Today the cost is insignificant.

Advances in communication and information technologies have helped slash the cost of processing business orders by well over 90%. Using a computer to do banking on the Internet, for example, costs the banking industry pennies per transaction instead of dollars by traditional methods. Over the last third of the 20th century the real cost of computer processing power fell by 35% on average each year. Vast amounts of information can be processed, shared and stored on a disk or a computer chip, and the cost is continually declining. People can be almost anywhere and remain in instant communication with their employers, customers, or families 24 hours a day and 7 days a week. When people in the United States call a helpline or make an airline reservation, they may be connected to someone in Mumbai (Bombay), India, who has been trained to speak English with an American accent.

Advances in communications instantly unite people around the globe. For example, communications satellites allow global television broadcasts to bring news of faraway events such as wars and national disasters as well as sports and other forms of entertainment. The Internet, the cell phone and the fax machine permit instantaneous communication. The World Wide Web and computers that store vast amounts of data allow instant access to information exceeding that of any library.

Improvements in transportation are also part of globalization. The world becomes smaller due to next-day delivery by jet airplane. Even slow, oceangoing vessels have streamlined transportation and lowered costs due to innovations such as containerized shipping. Advances in transportation have allowed corporations to subcontract manufacturing to foreign factories.

Advances in information technologies have also lowered business costs. Information platforms, such as the World Wide Web, enable corporations to bid for business where auctions take place and where suppliers and customers stay in constant contact.

Not only do goods, money and information move great distances quickly, but also more people are moving great distances as well. Migration, both legal and illegal, is a major

feature of this era of globalization. *Remittances* (money sent home by workers to their home countries) have become an important source of income for many countries.

5.3. Main Features of the Current Wave of Globalization

5.3.1. Economic and social impacts

A World Bank study shows that with globalization the magnitude of world trade and capital flows have increased considerably. Globalization increases:

- the flow of goods and services- exports plus imports as a proportion of national income or per capita of population. The most dramatic evidence of globalization is the increase in trade. From 1950 to 2001 the volume of world exports rose by 20 times. By 2001 world trade amounted to a quarter of all the goods and services produced in the world.

- Labor/people movements- net migration rates; inward or outward migration flows, weighted by population.
- Flow of capital- inward or outward direct investment as a proportion of national income or per head of population. The most dramatic evidenc in this case is the movement of *capital* (stocks, bonds, currencies, and other investments). As for capital, in the early 1970s only $10 billion to $20 billion in national currencies were exchanged daily. By the early part of the 21st century more than $1.5 trillion worth of yen, euros, dollars, and other currencies were traded daily to support the expanded levels of trade and investment. Large volumes of currency trades were also made as investors speculated on whether the value of particular currencies might go up or down.
- Technology transfer and use - international research and development flows; proportion of populations (and rates of change thereof) using particular inventions (especially 'factor-neutral' technological advances such as the telephone, motorcar, broadband)

To what extent a nation-state or culture is globalized in a particular year has until most recently been measured employing simple proxies like flows of trade, migration, or foreign direct investment, as described above.

5.3.2. Impact on Access to Information and Knowledge

One of the main features of the current globalization process is the on-going rapid exchange of information and knowledge among countries and people, facilitated by the recent technological advance in information and communication via internet, e-mail and satellite television. While the economic and social impacts of globalization continue to be a subject of wide controversy, there is a general consensus that, despite the "digital divide" between developed and developing countries, the benefits of globalization in enhancing access to knowledge and information have been generally significant in many developing countries.

Technological progress in the field of information and communication and the arrival of the internet and electronic communication has offered developing countries considerable opportunities for acquiring information and knowledge at a faster rate than in the past. Internet facilities have brought to the door steps of students, researchers, and policy makers the world over, books, articles and research findings, thus, facilitating the exchange and expansion of knowledge among peoples and institutions. Electronic professional conferences are now more common, and people are no more limited by distance to exchange ideas and to learn from each other.

With the coming of satellite and internet facilities, the speed at which information on current political and social issues in different countries is communicated to the rest of the world has been considerably increased. The links forged by improved communication facilities among various associations (human rights groups, advocacy groups for the weak and the poor, for reducing debt burden, conflict resolution and peace building, and associations of various professional groups such as journalists) have also enabled such groups to build strong solidarity in their respective missions such as fighting against injustice, oppression and discrimination and, by so doing, to strengthen democracy and good governance in situations where they do not exist. Globalization in the area of communication through facilitating endeavors to strengthen democracy, social justice and human rights –foundations for good governance and public accountability - also contribute to creating a favorable environment for accelerating development and the eradication of poverty.

Satellite television and internet facilities have also facilitated quick transmission of information on dangerous human and animal diseases such as the recent emergence of diseases (SARS and bird flu, mad cow disease, etc), allowing countries to prepare in time control mechanisms to prevent such diseases from crossing into their territorial borders. On the negative side, globalization has also contributed to a fast spread of many forms of crime such as drug trafficking, terrorism, money laundering, organized crime, corruption, illegal human and trafficking especially of children. Computer related crimes are also becoming more global in nature.

5.4. Institutions of Globalization

5.4.1. The World Bank

Following Europe's postwar recovery the IBRD became known as the World Bank. Its mission was redirected to help developing countries grow faster and provide a higher living standard for their people. The World Bank made loans to developing countries for dams and other electrical-generating plants, harbor facilities and other large projects. These projects were intended to lower costs for private businesses and to attract investors. Beginning in 1968 the World Bank focused on low-cost loans for health, education and other basic needs of the world's poor.

5.4.2. International Monetary Fund

The IMF makes loans so that countries can maintain the value of their currencies and repay foreign debt. Countries accumulate foreign debt when they buy more from the rest of the world than they sell abroad. They then need to borrow money to pay the difference, which is known as balancing their payments. After banks and other institutions will no longer lend them money, they turn to the IMF to help them balance their payments position with the rest of the world. The IMF initially focused on Europe, but by the 1970s it changed its focus to the less-developed economies. By the early 1980s a large number of developing countries were having trouble financing their foreign debts. In 1982 the IMF had to offer more loans to

Mexico, which was then still a developing country and other Latin American nations just so they could pay off their original debts.

The IMF and the World Bank usually impose certain conditions for loans and require what are called structural adjustment programs from borrowers. These programs amount to detailed instructions on what countries have to do to bring their economies under control. The programs are based on a strategy called neoliberalism, also known as the Washington Consensus because both the IMF and the World Bank are headquartered in Washington, D.C. The strategy is geared toward promoting free markets, including *privatization* (the selling off of government enterprises); *deregulation* (removing rules that restrict companies); and *trade liberalization* (opening local markets to foreign goods by removing barriers to exports and imports). Finally, the strategy also calls for shrinking the role of government, reducing taxes, and cutting back on publicly provided services.

5.4.3. World Trade Organization

Another key institution shaping globalization is the World Trade Organization (WTO), which traces its origins to a 1948 United Nations (UN) conference in Havana, Cuba. The conference called for the creation of an International Trade Organization to lower *tariffs* (taxes on imported goods) and to encourage trade. Although the administration of President Harry S. Truman was instrumental in negotiating this agreement, the U.S. Congress considered it a violation of American sovereignty and refused to ratify it. In its absence another agreement, known as the General Agreement on Tariffs and Trade (GATT), emerged as the forum for a series of negotiations on lowering tariffs. The last of these negotiating sessions, known as the Uruguay Round, established the WTO, which began operating in 1995. Since its creation, the WTO has increased the scope of trading agreements. Such agreements no longer involve only the trade of manufactured products. Today agreements involve services, investments, and the protection of intellectual property rights, such as patents and copyrights. The United States receives over half of its international income from patents and royalties for use of copyrighted material.

5.4.4. Criticisms Directed at the IMF and WTO

Many economists believed that lifting trade barriers and increasing the free movement of capital across borders would narrow the sharp income differences between rich and poor countries. This has generally not happened. Poverty rates have decreased in the two most heavily populated countries in the world, India and China. However, excluding these two countries, poverty and inequality have increased in less-developed and so-called transitional (formerly Communist) countries. For low- and middle-income countries the rate of growth in the decades of globalization from 1980 to 2000 amounted to less than half what it was during the previous two decades from 1960 to 1980. Although this association of slow economic development and the global implementation of neoliberal economic policies is not necessarily strict evidence of cause and effect, it contributes to the dissatisfaction of those who had hoped globalization would deliver more growth. A slowdown in progress on indicators of social well-being, such as life expectancy, infant and child mortality, and literacy, also has lowered expectations about the benefits of globalization.

5.5. The Debate over Globalization

Very few people, groups, or governments oppose globalization in its entirety. Instead, critics of globalization believe aspects of the way globalization operates should be changed. The debate over globalization is about what the best rules are for governing the global economy so that its advantages can grow while its problems can be solved.

On one side of this debate are those who stress the benefits of removing barriers to international trade and investment, allowing capital to be allocated more efficiently and giving consumers greater freedom of choice. With free-market globalization, investment funds can move unimpeded from where they are plentiful (the rich countries) to where they are most needed (the developing countries). Consumers can benefit from cheaper products because reduced tariffs make goods produced at low cost from faraway places cheaper to buy. Producers of goods gain by selling to a wider market. More competition keeps sellers on their toes and allows ideas and new technology to spread and benefit others.

On the other side of the debate are critics who see neoliberal policies as producing greater poverty, inequality, social conflict, cultural destruction, and environmental damage. They say that the most developed nations—the United States, Germany, and Japan—succeeded not because of free trade but because of protectionism and subsidies. They argue that the more recently successful economies of South Korea, Taiwan, and China all had strong state-led development strategies that did not follow neoliberalism. These critics think that government encouragement of "infant industries"—that is, industries that are just beginning to develop—enables a country to become internationally competitive.

Furthermore, those who criticize the Washington Consensus suggest that the inflow and outflow of money from speculative investors must be limited to prevent *bubbles*. These bubbles are characterized by the rapid inflow of foreign funds that bid up domestic stock markets and property values. When the economy cannot sustain such expectations, the bubbles burst as investors panic and pull their money out of the country. These bubbles have happened repeatedly as liberalization has allowed speculation of this sort to get out of hand, such as in Indonesia, Malaysia, and Thailand in 1997 and since then in Argentina, Russia, and Turkey. According to critics, a strong active government is needed to assure stability and economic development.

Protests by what is called the antiglobalization movement are seldom directed against globalization itself but rather against abuses that harm the rights of workers and the environment. The question raised by nongovernmental organizations and protesters at WTO and IMF gatherings is whether globalization will result in a rise of living standards or a race to the bottom as competition takes the form of lowering living standards and undermining environmental regulation. One of the key problems of the 21st century will be determining to what extent markets should be regulated to promote fair competition, honest dealings, and fair distribution of public goods on a global scale.

5.6. Positive and Negative Effects of globalization

Globalization has various aspects both on developed and developing countries which affect the world in several different ways. The impacts can be positive or negative.

5.6.1. Positive Effects

- *Industrial* (alias *trans nationalization*) - emergence of worldwide production markets and broader access to a range of foreign products for consumers and companies
- *Financial* - emergence of worldwide financial markets and better access to external financing for corporate, national and sub-national borrowers.
- *Economic* - realization of a global common market, based on the freedom of exchange of goods and capital.
- Sharing of experience, skill, knowledge, attitudes, primary and secondary products
- Remittances: money transfer through banks, and bank related systems.
- Accelerates voluntary works especially during artificial- war, conflicts, and natural disasters- drought, flood, earth quake, volcanism, etc.
- Promote debt and aid by improving systems
- *Political* - political globalization is the creation of a world government which regulates the relationships among nations and guarantees the rights arising from social and economic globalization. Politically, the United States has enjoyed a position of power among the world powers; in part because of its strong and wealthy economy. With the influence of Globalization and with the help of the United States' own economy, China has experienced some tremendous growth within the past decade. If China continues to grow at the rate projected by the trends, then it is very likely that in the next twenty years, there will be a major reallocation of power among the world leaders. China will have enough wealth, industry, and technology to rival the United States for the position of leading world power.
- *Informational* - increase in information flows between geographically remote locations.
- *Cultural* - growth of cross-cultural contacts; advent of new categories of consciousness and identities such as *Globalism* - which embodies cultural diffusion, the desire to consume and enjoy foreign products and ideas, adopt new technology and practices, and participate in a "world culture"
- *Ecological*- the advent of global environmental challenges that can not be solved without international cooperation, such as climate change, cross-boundary water and

air pollution, over-fishing of the ocean, and the spread of invasive species. Many factories are built in developing countries where they can pollute freely.

- *Social* - the achievement of free circulation by people of all nations.
- *Transportation* - fewer and fewer European cars on European roads each year (the same can also be said about American cars on American roads) and the death of distance through the incorporation of technology to decrease travel time.
- Greater international cultural exchange
    - Spreading of multiculturalism, and better individual access to cultural diversity However, the imported culture can easily supplant the local culture, causing reduction in diversity through hybridization or even assimilation. The most prominent form of this is Westernization, but Sinicization of cultures has taken place over most of Asia for many centuries.
    - Greater international travel and tourism
    - Greater immigration, including illegal immigration
    - Spread of local consumer products (e.g. food) to other countries (often adapted to their culture).
    - World-wide fads and pop culture such as Pokémon, Sudoku, Numa Numa, Origami, Idol series, YouTube, Orkut, Facebook, and MySpace.
    - World-wide sporting events such as FIFA World Cup and the Olympic Games.
    - Formation or development of a set of universal values.
- Technical/legal:
    - Development of a global telecommunications infrastructure and greater trans-border data flow, using such technologies as the Internet, communication satellites, submarine fiber optic cable, and wireless telephones.
    - Increase in the number of standards applied globally; e.g. copyright laws, patents and world trade agreements.
    - The push by many advocates for an international criminal court and international justice movements.
- Sexual awareness – It is often easy to only focus on the economic aspects of Globalization. This term also has strong social meanings behind it. Globalization can

also mean a cultural interaction between different countries. Globalization may also have social effects such changes in sexual inequality, and to this issue brought about a greater awareness of the different (often more brutal) types of gender discrimination throughout the world. Women and girls in African countries have long had to deal with genital mutilation as a form of control enforced by the men in their society.

5.6.2. Negative Impacts/Effects

- **Unequal trade balance between developing and developed countries**. Poorer countries are sometimes at disadvantage: While it is true that globalization encourages free trade among countries on an international level, there are also negative consequences because some countries try to save their national markets. The main export of poorer countries is usually agricultural goods. It is difficult for these countries to compete with stronger countries that subsidize their own farmers. Because the farmers in the poorer countries cannot compete, they are forced to sell their crops at much lower price than what the market is paying.
- **Exploitation of foreign impoverished workers**: The deterioration of protections for weaker nations by stronger industrialized powers has resulted in the exploitation of the people in those nations to become cheap labor. Due to the lack of protections, companies from powerful industrialized nations are able to force workers to endure extremely long hours, unsafe working conditions, and just enough salary to keep them working. The abundance of cheap labor is giving the countries in power incentive not to rectify the inequality between nations. If these nations developed into industrialized nations, the army of cheap labor would slowly disappear alongside development. With the world in this current state, it is impossible for the exploited workers to escape poverty. It is true that the workers are free to leave their jobs, but in many poorer countries, this would mean starvation for the worker, and possible even his/her family.
- **Shift from manufacturing to service work**: The low cost of offshore workers have enticed corporations to move production to foreign countries. The laid off unskilled workers are forced into the service sector where wages and benefits are low, but turnover is high. This has contributed to the widening economic gap between skilled

and unskilled workers. The loss of these jobs has also contributed greatly to the slow decline of the middle class which is a major factor in the increasing economic inequality in the United States. Families that were once part of the middle class are forced into lower positions by massive layoffs and outsourcing to another country. This also means that people in the lower class have a much harder time climbing out of poverty because of the absence of the middle class as a stepping stone.

- **The rise of contingent work**: As globalization causes more and more jobs to be shipped overseas, and the middle class declines, there is less need for corporations to hire full time employees. Companies are less inclined to offer benefits (health insurance, bonuses, vacation time, shares in the company, and pensions), or reduce benefits, to part time workers. Most companies don't offer any benefits at all. Even though most of the middle class workers still have their jobs, the reality is that their buying power has decreased due to decreased benefits. Job security is also a major issue with contingent work.
- **Weakening of labor unions**: The surplus in cheap labor coupled with an ever growing number of companies in transition has caused a weakening of labor unions in the United States. Unions loss their effectiveness when their membership begins to decline. As a result unions hold less power over corporations that are able to easily replace workers, often for lower wages, and have the option to not offer unionized jobs anymore.
- **Spread of drug**-like hashish, **communicable diseases** like HIV/AIDS, prostitution, crime and terrorism;
- **Uncontrolled migration** – is a burning issue especially in Europe due to the migration of people from western and northern African countries through Spain;
- **Destruction of identity** – such as music, culture, clothing, homo-marriage.

To sum up, globalization has both negative and positive aspects. Among the negative aspects are the rapid spread of diseases, illicit drugs, crime, terrorism and uncontrolled migration. Among globalization's benefits are a sharing of basic knowledge, technology, investments, resources, and ethical values.

5.7. Regulating Globalization

The debate over globalization focuses in particular on how it can be regulated to address growing income and wealth inequalities, labor rights, health and environmental problems, and issues regarding cultural diversity and national sovereignty.

5.7.1. Inequalities

By the late 1990s the 20% of the world's people living in the highest-income countries had 86% of the world's income; the bottom 20% had only 1 percent of the world's income. An estimated 1.3 billion people, or about one-sixth of the world's population, have incomes of less than a dollar a day. Inequality is growing worse, rather than better. More than 80 countries had lower *per capita income* (income per person) at the end of the 1990s than they had at the end of the 1980s. In 1960 the top 20% had 30 times the income of the poorest 20%. This grew to 32 times in 1970, 45 times in 1980, and 60 times in 1990. By the end of the 20th century the top 20% received 75 times the income of the bottom 20%. The income gap is even apparent in cyberspace. The top fifth in income make up 93% of the world's Internet users and the poorest fifth only 0.2%.

These inequalities in living standards and participation in the global economy are a serious political problem in an era of globalization. Some countries have been unable to function at even a minimum standard of basic competence in the globalized economy. The only profitable economic activity in some of these countries is linked to criminal behavior, such as the trade in illegal drugs, smuggling, and extortion of various kinds. Governments that are helpless to stop such activity or to collect taxes to meet basic public service needs are characterized as failed states. Sometimes failed states can become havens for terrorists and foreign criminals who use them as bases for activities harmful to other governments and their people. These states may also provide safe haven for mercenary forces that conduct raids into neighboring countries. In parts of Africa, for example, where diamonds and other valuable resources attract criminal despots, mercenary armies have been engaged in mass killing to terrorize local populations into giving them what they want. The international arms trade and easy importation of weapons, which allows such behavior, is a serious problem.

5.7.2. Labor Rights

To stimulate economic development many developing countries have established free-trade zones where investors are given special benefits, such as low or no taxes, and labor unions are discouraged or not allowed. These benefits have led to violations of human rights. For example, the Workers Rights Consortium, supported by many colleges and universities in the United States, has sent inspection teams to developing countries to investigate the conditions under which caps and sweatshirts are made for university sports teams. The consortium found violations of child labor laws, intimidation of workers seeking to have their grievances addressed, and sexual harassment. Because only 1 percent of the projected growth in the world's labor force is expected to be in the high-income countries in coming decades, what happens to the world's lower-income workers in the developing countries takes on added importance. It may well determine whether there will be an overall rise in living standards as productivity gains are widely shared or an overall decline if developing countries compete for jobs by holding down wages and allowing harsher working conditions to attract investment and job creation.

The UN's International Labor Organization (ILO) has tried to level the playing field by endorsing five widely accepted core labor standards. These are elaborated in the ILO's 1998 Declaration of Fundamental Principles and Rights at Work. The first promises freedom of association and states that workers should be able to join together and form organizations of their own choosing. The second is the right of workers' organizations, including trade unions, to bargain collectively with employers and governments. Third is the elimination of all forms of coerced or compulsory labor. Fourth is the effective abolition of child labor. The ILO's Minimum Age Convention sets a basic minimum age of 15, but if a country is less developed or if only light work is involved the minimum age can be lower. If hazardous work is involved, the minimum age is 18. The fifth provision is the elimination of discrimination in employment based on race, sex, religion, political opinion, or national or social origin.

Because the ILO has no enforcement powers, it has proven difficult to achieve these goals. In some countries governments pledge to observe the ILO's standards but then ignore them. Where child labor laws are enforced, government factory inspectors often simply demand

that child workers be fired. Many observers believe that to successfully attack the evils of child labor, child workers should not merely be fired but should be placed in schools and families should be compensated for the loss of income that occurs when children are removed from factories.

5.7.3. Health Issues

Life-threatening diseases represent another facet of globalization. Improvements in transportation that helped usher in globalization also made it possible for infectious diseases to spread rapidly around the globe. In 2003, for example, a deadly form of pneumonia known as severe acute respiratory syndrome (SARS) originated in China and quickly posed a worldwide health threat as airline passengers infected with the virus spread the illness.

The best way to address these health issues often conflicts with the WTO's stand on intellectual property rights, in particular the patent laws that protect medicines made by pharmaceutical companies. This issue is particularly prominent in relation to acquired immunodeficiency syndrome (AIDS). Of the 20 million people who have died of AIDS most lived in poorer countries. In some developing countries the infection rate is above 30 or even 40 percent of the adult population. Today the worst affected countries are in Africa. The disease is also spreading rapidly in countries such as India, China, and Indonesia.

There are other killer diseases found mostly in poorer countries. Although tuberculosis (TB) affects a small percentage of the population in rich countries, more than one-third of the world's population was infected with tuberculosis in 2000. There are 8 million new cases of TB and 2 million deaths a year from this disease, and these numbers are climbing. More than 1.5 million people die each year from malaria, another disease that mainly impacts developing countries. Diseases spread by unclean drinking water and tainted food kill nearly 2 million people a year, mostly infants and small children and mostly among the 1.5 billion people in the world who do not have access to clean water.

In the case of diseases that primarily affect poor people, little or no research is being done to provide new medicines because the people affected are too poor to buy them. A major struggle has emerged regarding AIDS treatment over whether patent laws will continue to

require that people pay high prices for life-saving drugs or whether lower-cost generic medicines can be provided. This issue has been intensively discussed as part of the debate over the WTO's Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs). Western pharmaceutical companies that do the research and development wish to protect their investments and argue that without such protection less will be spent to develop new life-saving drugs. The developing countries argue that scientific breakthroughs should be shared as widely and as inexpensively as possible. They have resisted the extension of property rights.

5.7.4. Environmental Issues

At least since the discovery of the ozone hole above Antarctica in the early 1980s, there has been growing awareness that air pollutants can cross borders and affect everyone living on the planet. The UN's Intergovernmental Panel on Climate Change, made up of the world's leading climate scientists, for example, predicts that by the year 2100 the temperature of the planet could rise by as much as 1.4 to 5.8 Celsius degrees (2.5 to 10.4 Fahrenheit degrees). This global warming is due to the burning of fossil fuels, which occurs mainly in the developed, industrialized world, and the destruction of rain forests, which occurs mainly in the developing world. Already Greenland's ice sheet has thinned and Argentina's South Patagonia ice fields have retreated substantially. Glaciers are melting, and weather patterns may already be changing.

If global warming continues, experts expect deserts to advance, particularly across West Africa, and sea level to rise, flooding coastal areas and submerging a number of Pacific Ocean island states. One-third of the world's most populous countries would be flooded by even a small rise in sea level. While developed countries such as The Netherlands can cope, developing countries such as Bangladesh cannot afford to pay for the kind of dike system that currently protects The Netherlands. Because of such dire forecasts, 160 nations in 1997 agreed to the first-ever binding pact to limit the emissions of carbon dioxide and other so-called greenhouse gases that contribute to global warming. Known as the Kyōto Protocol, the pact represented a modest step in limiting and rolling back harmful greenhouse gas emissions.

Environmentalists argue broadly in favor of sustainable development. By this they mean a pattern of living that favors the preservation of habitat, the conservation of nonrenewable resources, and the increased use of renewable energy sources so that Earth's ecosystems are not harmed beyond repair. Environmentalists favor the principle that polluters should pay for the right to pollute. Concerning genetic engineering, most environmentalists argue for a precautionary principle that emphasizes careful study before new genetically engineered plants or animals are introduced into ecosystems. Genetically modified plants, according to this principle, should not be introduced unless it is clear that no damage will be done. Some politicians and agribusiness corporations believe such a conservative approach would slow growth unnecessarily, lower living standards, and result in greater costs for businesses and consumers. They favor rules based on proven danger and far quicker introduction of genetically engineered products and processes.

5.7.5. Culture

There is widespread disagreement over what, if any, regulation is appropriate in the realm of culture. Some people fear a loss of cultural diversity as U.S. media companies become dominant. Such companies tend to "bundle" their products so that a blockbuster movie is promoted by selling soundtracks, books, video games, and other products. These cultural wares are distributed worldwide, and along with reruns of U.S. television shows, tend to replace local alternatives. The question is whether responses by other nations, such as prohibitions against the English language and government subsidies of national cultural productions, are legitimate restraints of trade or represent an unfair trade practice.

5.7.6. National Sovereignty

In a world that seems to grow increasingly smaller many issues must be considered at a global level and not only at a local or national level. However, at what point does this threaten *national sovereignty*—that is, the ability of a country to be self-governing? Some environmentalists, for example, have argued that environmental laws in the United States can be undermined if the laws are found to violate NAFTA. In effect, they say, the United States has lost the right to make and enforce its own environmental policies.

5.7. Globalization in the Coming Decades

Globalization raises other questions that will be central to the 21st century. What is the proper role for the IMF, WTO, and UN, and how should they be governed? What is the best way to finance development? How much autonomy should countries have when the economic, political, and environmental decisions they make can have global repercussions? To what extent should global institutions be able to constrain what countries can and cannot do in an increasingly globalized world? What is the right way to balance social and cultural values with the need for economic efficiency? As the 21st century progresses, more and more decisions regarding these and other issues will need to be debated.