E-CONTENT

GRB GE 203

MODERN CONCEPT IN GEOGRAPHY
(B.A./ B.Sc. II, Generic SEMESTER)

COMPiled AND DESIGNED
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Definition of Idiographic and Nomothetic:

Idiographic and nomothetic methods represent two different approaches to understanding social life.

An idiographic method focuses on individual cases or events. Ethnographers, for example, observe the minute details of everyday life to construct an overall portrait of a specific group of people or community.

A nomothetic method, on the other hand, seeks to produce general statements that account for larger social patterns, which form the context of single events, individual behaviours, and experience. Sociologists who practice nomothetic research are likely to work with large survey data sets or other forms of statistical data and to conduct quantitative statistical analysis as their method of study.

The nomothetic approach involves trying to make generalizations about the world and understand large-scale social patterns.

The idiographic approach involves trying to uncover a great deal of detailed information about a narrower subject of study.

Sociologists can combine both idiographic and nomothetic approaches to develop a more comprehensive understanding of society.

Historical Background:

Nineteenth century German philosopher Wilhelm Windelband, a neo-Kantian, introduced these terms and defined their distinctions.

Windelband used nomothetic to describe an approach to producing knowledge that seeks to make large-scale generalizations. This approach is common in the natural sciences and is considered by many to be the true paradigm and goal of the scientific approach.
With a nomothetic approach, one conducts careful and systemic observation and experimentation to derive results that can be applied more broadly outside the realm of study.

We might think of them as scientific laws or general truths that have come from social science research. In fact, we can see this approach present in the work of early German sociologist Max Weber, who wrote about the processes of creating ideal types and concepts meant to serve as general rules.

On the other hand, an idiographic approach is one that is specifically focused on a particular case, place, or phenomenon. This approach is designed to derive meanings particular to the research target, and it is not necessarily designed for extrapolating generalizations.

Nomothetic and idiographic are terms used by Neo-Kantian philosopher Wilhelm Windelband to describe two distinct approaches to knowledge, each one corresponding to a different intellectual tendency, and each one corresponding to a different branch of academe.

Nomothetic is based on what Kant described as a tendency to generalize, and is typical for the natural sciences. It describes the effort to derive laws that explain types or categories of objective phenomena, in general.

Idiographic is based on what Kant described as a tendency to specify, and is typical for the humanities. It describes the effort to understand the meaning of contingent, unique, and often cultural or subjective phenomena.

The problem of whether to use nomothetic or idiographic approaches is most sharply felt in the social sciences, whose subject are unique individuals (idiographic perspective), but who have certain general properties or behave according to general rules (nomothetic perspective).

Often, nomothetic approaches are quantitative, and idiographic approaches are qualitative, although the "Personal Questionnaire" developed by M.B. Shapiro and its further developments (e.g. Discan scale) are both quantitative and idiographic. Personal cognition (D.A. Booth) is idiographic, qualitative and quantitative, using the individual's own narrative of action within situation to scale the ongoing biosocial cognitive processes in units of discrimination from norm (with M.T. Conner 1986, R.P.J. Freeman 1993 and O. Sharpe 2005).
In psychology, idiographic describes the study of the individual, who is seen as a unique agent with a unique life history, with properties setting him/her apart from other individuals (see idiographic image). A common method to study these unique characteristics is an (auto)biography, i.e. a narrative that recounts the unique sequence of events that made the person who she is. Nomothetic describes the study of classes or cohorts of individuals. Here the subject is seen as an exemplar of a population and their corresponding personality traits and behaviours. It is widely held that the terms idiographic and nomothetic were introduced to American psychology by Gordon Allport in 1937, but Hugo Münsterberg used them in his 1898 presidential address at the American Psychological Association meeting.[1] This address was published in Psychological Review in 1899.[2]

Theodore Millon (1995) states that when spotting and diagnosing personality disorders, first we start with the nomothetic perspective and look for various general scientific laws; then when you believe you have a disorder, you switch your view to the idiographic perspective to focus on the specific individual and his or her unique traits.

In sociology, the nomothetic model tries to find independent variables that account for the variations in a given phenomenon (e.g. What is the relationship between timing/frequency of childbirth and education?). Nomothetic explanations are probabilistic and usually incomplete. The idiographic model focuses on a complete, in-depth understanding of a single case (e.g. Why do I not have any pets?).

In anthropology, idiographic describes the study of a group, seen as an entity, with specific properties that set it apart from other groups. Nomothetic refers to the use of generalization rather than specific properties in the same context.

**Chorographic Science**

A Science of Places Chorology in very simple words means the areal distribution of geographical phenomena over a particular region on the surface of the earth. The interrelationship (including causal) among the different phenomena spread over a specific and particular region, present a maze of
complicated design attached to that particular region. Study of areal distribution of geographical phenomena is what we know as a regional approach in geography. Chorology, as well as the areal differentiation, are essential and indispensable components of Regional geography. Precisely, for this region, many geographers of the repute consider chorology as regional geography. The concept of chorology is the cardinal theme of the theoretical and conceptual basis for the strong foundation of the regional geography. Along with the Areal differentiation, a term coined and popularized by Richard Hartshorne, chorology focuses on the variation in the distribution of geographical phenomenon, attributes, and events in the space. It also highlights the causal relationship among the spatial distribution and location of the phenomena among themselves. The bird’s eye view of the pattern of spread, location and distribution of phenomena on the surface of the earth in the space, the interrelationship amongst the phenomena and variations within a place, are the essence of chorology. The phenomena occurring on the surface of the earth are variable in nature creating distinct and unique areas/ regions though similar or homogenous within differing from another significantly. The interspace/ region variation in the distribution of the phenomena (Uniqueness) and similarities in spatial location of phenomena in one place along with the causal relationship within the intra and inter-regional distribution are the central and cardinal theme of the chorological study. The concept of areal differentiation or chorology gave birth to ‘Region’, which could be defined as a unit on the surface of the earth or in the space of a given area having homogeneity in one or more than one geographical attribute / events / phenomena which are interrelated or are interwoven intrinsically within a boundary making it unique in itself. A region is a manifestation of interdependence between man and nature evolved gradually over a period of time in a given area. This relationship between man and nature resulted in physical phenomena and Human features are interwoven indistinguishable and recognizable yet unique interrelated phenomena and features. The growth of chorological science gradually evolved into regional geography initiated another controversy or debate in geography also known as a dichotomy in geography. This debate was between systematic geography Vs. Regional Geography, which interestingly, further strengthened Geography as a dynamic discipline. The debate which was spearheaded by Richard Hartshorne in favour
of regional geography and Prof. Schaeffer defending the systematic approach to the study of the subject. Unlike other dichotomy or debate regional vs. systematic was a debate of methodology, about how to study the subject.

**Chorography Development of Geography as a Chorographical Science:** The term chorology traces its origin in the Greek etymology which means the ‘science of places’. Chorology stems from the Greek word χώρος for “place” or “space” and the suffix -logy for the study of. The term chorology is also known as ‘Areal Differentiation’ is in vogue in the geographical study since the days of Strabo (64 BC to AD 24). Ptolemy (AD 87-150) a Roman Geographer believed that geography should concentrate on the study of the earth in a holistic manner considering the earth as a unit. According to Ptolemy, the regional analysis is like describing only the certain features of a whole and leaving aside the rest, thus not bringing forth the complete picture. He differentiated among geography as the study of universals, topography as the study of localities, and chorography as integrating the two. The author of the seminal book ‘Geographia Generalis’ in 1650, Varenius (1622-1650) started a debate in geographic academic circle regarding the Special/specific Geography and General Geography. According to him, specific geography is interested in studying the unique and specific feature or character of the places, whereas general geography is concerned with universal laws. This division of geography between special and general later on became the rallying points for propagators of Regional Geography and Systematic Geography, thus providing a renewed thrust in the regional vs. systematic geography dualism or dichotomy. Immanuel Kant (1724-1804), contributed significantly to historically shaping up of the evolution of the concept of geography as a chorological science. Kant provided substantial theoretical and conceptual framework for the development of the concept of chorology and was inspirational for the Geographers like Hettner and Hartshorne, who further popularized the concept of geography as a chorological science. Kant was of the view that Geography is descriptive while History is analytical. He believed that unlike theoretical sciences History and Geography are concerned only with Empirical and Unique. Kant pointed out that there are two ways to classify empirical phenomena, one in synchronization and accordance with the nature while other in accordance with their arrangement or location in time and space. The disciplines like Zoology, Botany, Chemistry, and likes are grouped in
the former category whilst History and Geography in the later. The temporal occurrence of events is chronologically studied in History whereas phenomenon lying side by side in the space is chorological and studied in Geography. Paul Vidal de la Blache (1845-1918) based his study on the edifice of regional geography( chorology) in his study of pays (Small French homogeneous rural areas) and their genres de vie (lifestyles) in France. His study becomes very relevant and significant in the regional study of France in the light of largely homogenous climatic conditions prevailing in the country but varying lifestyles from place to place. Alfred Hettner is known for his many distinguished accomplishments is also credited to have pushed the chorology concept to some new academic vistas, upon which Richard Hartshorne built up the edifice of his idea of ‘Areal Differentiation’. The concept of Areal Differentiation became the backbone of the regional approach in geographical inquiries. Interestingly, Richard Hartshorne in his celebrated work ‘The Nature of Geography’ (1939) attributed the coinage of the term to B. Varen (Varenius). Alfred Hettner the first Professor in a German university after Carl Ritter was influenced by the Richthofen, his teacher who infused in him the idea of chorology. According to him ‘The goal of the chorological point of view is to know the character of regions and places through comprehension of the existence together and interrelations among different realms of reality and their varied manifestations, and to comprehend the earth surface as a whole in its actual arrangement in continents, larger and smaller regions, and places.’

Chorology is the study of causal relations between geographical phenomena occurring within a particular region. Chorology also interchangeably used as areal differentiation a term coined patronized and largely associated with the American geographer, Richard Hartshorne who was not only a prolific writer but also credited with adding new dimensions to the way geography is being studied. The famous book of Hartshorne ‘The Nature of Geography’ is considered as the classic case of Geography as a chorographic science. Alfred Hettner who further developed the concept of chorology from what he inherited from Kant and Humboldt. Hettner defined Geography as the chorological science of the earth’s surface. It is concerned mainly with the interplay between man and nature, an evaluation of spatial (Raum) relation. (Adhikari)
Hettner believed that reality is a three-dimensional space which cannot be comprehended in a holistic manner unless studied from three points of view. Points of view include relationships among the phenomena, their arrangements, and division in the space. He further claimed that systematic approach to understand the three-dimensional reality is not adequate and may result in distorted and faulty observation. In a sense, Hettner was opposed to the spatial science or systematic geography. The spatial and temporal relationship in the pursuance of the science is overlooked by advocates of systematic sciences, whose focus lies in the fact of objective likeliness of the subjects they are interested in. Hettner, on the other hand, maintained that temporal or chronological perspective is required to understand the process the spatial sciences or chorology is necessary to assess the arrangements of phenomena in the space. According to Hettner the spatial arrangement of the celestial objects in the outer space as well as the spatial arrangements on the surface of the earth are two distinct example of chorology, the former comes under the purview of Astronomy while the latter under the fold of the Geography. Hettner in his book ‘Geography: Its History, Character, and Methods (1927) argued that if the spatial distribution of the phenomenon were independent of each other with no causal relationship whatsoever existed among them, no chorological conception was needed. However, since this is not the case chorological study is required to understand the spatial distribution of geographical attributes and phenomena. The strong inclination towards the chorology made Hettner a staunch opponent of the environmental determinism, a school of thought found strong footholds in German Geographical academic circles and which soon spread to the other parts of the globe. The essential criteria expressed by Hettner include the feature concerned varies from one region to another, the variation forms a system, or systems, in which there is spatial association of the phenomena in terms of their location in reference to each other forming an areal expression and there is causal connection between the variations of the feature or element and those of other elements, and their different phenomena are united at one place. Richard Hartshorne another geographer of repute took over the Kantian concept of chorological science from where Hettner has left. Hartshorne is considered as one of the greatest champions of the regional geography who spearheaded the debate in favour of the regional approach in
the brainstorming highly engaging debate cum controversy in geography; Regional Geography vs. Systematic Geography. He gave new fervor to the concept of chorology particularly in his book The Nature of Geography in particular and throughout his academic career in general. Richard Hartshorne attributed the term to B. Varen (Varenius) and provided a critical reconstruction of the ways in which such a definition of the subject had been historically negotiated and legitimated (Johnston). Hartshorne believed that chorology is synonymous with Regional Geography or it is science regions/places. The causal relationships, as well as the interdependence within and among the phenomena tied to a particular region, are what chorology focuses upon. The concept of chorology, chronologically traced in the writings of Strabo continued up to Hartshorne, the most ardent and vocal propagator of the idea, covering a sojourn of many centuries. The chorology, some of the polemical opponents of the concept considered chorology as a methodology not as a subject matter. Hartshorne defined ‘Geography as a discipline concerned to provide accurate, orderly descriptions and interpretations of the variable character of the earth’s surface’. The science of chorology in the writings of Hartshorne was subsumed by the concept of Areal differentiation which is the underlying conceptual foundation of Regional geography.

**INDUCTIVE AND DEDUCTIVE APPROACHES IN GEOGRAPHY**

**Deductive Approach:** Deductive approach required the geographers to work from general to specific. The study of specific phenomena is done in relation to the general established laws and theories. In this approach the geographers or researchers start the work with deciding theory for fulfilling the research objectives. Then the theory of narrowed down to more specific hypothesis for testing. To test the hypothesis observation is made which is done after collecting and analysing of data and relevant information. Testing the hypothesis helps the geographers to draw conclusion and make conformation whether to accept or to reject the hypothesis. This justifies the existing theory and its validity. As this approach begins with broad and general idea and brings the geographers to narrow and specific conclusion, this approach is also known as top-down approach.
For example, if the researcher seeks to enquire about the role of education in poverty in a region. He would first look for the existing theories related to poverty. Then he will narrow down his research interest to hypothesis as low level of education results in high level of poverty. Then the researcher makes field observation and collect data for analysis. After analysing the information the researcher test the hypothesis, whether it is true or false to the ground.

The main characteristics of deductive approach are as follows:

1. Deductive approach is aimed at testing the existing theories.
2. This is the continuous process from which the theories based on social cultural changes need to be examined.
3. This method is simple but much more confined to predetermined theory, Areal Differentiation and spatial organization.
4. This approach is believed to be scientific and well managed.
5. Conclusion follows logically from the available facts and can be penalized.

INDUCTIVE APPROACH

Inductive approach is just opposite of the deductive one. When particular example are used to reach a general conclusion about something the approach is considered to be inductive. In this approach empirical observation plays is vital role and the study begins with the scientific observation of the specific phenomena. The researcher or group of researchers collect individual scattered facts, condition or process through field study. Then similarities and pattern are analyzed among the individual phenomenon to prove the tentative hypothesis scientifically in order or sequence. The phenomena are tested regarding it their reality and factualness based on direct observed and experienced event. This leads the researcher to general conclusion and the
theory is developed. This approach is called ‘bottom-up approach’ as the research is done from specific to general information.

For example, in inductive approach the researcher first would observe the study area. He will collect information related to poverty and education in the field survey. He will assemble the individual information to find out the pattern of similarities. Analyzing the data a tentative hypothesis would try to find how level of education is related to the level of poverty. Suppose the study finds most of poor population have low education, then this will lead to the conclusion making general theory that low level of education result high level of poverty.

The main characteristics of inductive approach are as follow:

1. Inductive approach is concerned with the generation of new theory emerging from the data.
2. This approach is more scientific based on empirical observation.
3. This approach is meant to explore the nature and helps to build theory based on ground reality.
4. The process from particular to general prioritizes the study of events as these are happened and possible to happen in general /public life,
5. This approach clearly shows the cause effect relationship,

ENVIRONMENTAL CONCEPT

Introduction: Everything that surrounds or affects an organism during its life time is collectively known as its environment or simply put everything surrounding a living organism like people; place and things constitute its environment which can be either natural or man-made. The word environment has been derived
from a French word ‘environner’ meaning to encircle or to surround. In the beginning, environment of early man consisted of only physical aspects of the planet earth such as land (lithosphere), air (atmosphere) and water (hydrosphere) along with biotic communities but, with the passage of time and advancement of society man extended his environment to include his social, economic and political functions too. At the organismic level it is essentially physiological interaction which tries to understand that how different organisms are adapted to their environment in terms of not only survival but also reproduction and propagation of their population. All organisms (from virus to man) are obligatorily dependent on the environment for various essential needs such as food, shelter, water, oxygen etc. The surrounding that affects an organism during its lifetime is collectively known as its environment. In another words “Environment is sum total of water, air and land inter-relationships among themselves and also with the human being, other living organisms and material goods”. It comprises all the physical and biological surrounding and their connections. Environmental studies give an approach towards understanding the environment of our globe and the impact of human life upon the environment and vice-versa. Thus environment is actually universal in nature and it is a multidisciplinary subject counting physics, chemistry, geology, geography, history, economics, physiology, biotechnology, remote sensing, geophysics, soil science and hydrology etc.

Environment belongs to all the biotic and abiotic components and therefore is, vital for all. Consequently, everyone is affected by environmental issues like global warming, depletion of ozone layer, dwindling forest, depleting energy resources, loss of biodiversity etc. Environment also deals with the analysis of the processes in hydrosphere, atmosphere, lithosphere, and organisms which leads to pollute biosphere. Environment helps us for setting benchmark for safe and healthy natural ecosystem.

**Definition**: The surroundings or settings in which a human being, animal, or plant lives or operates or it is a set of conditions of a living being all the natural forces which provide settings for development and growth as well as danger and damage. In a comprehensive form the environment may be defined as “sum total of living, non-living components; influences and events, surrounding an organism.” Environment is defined more comprehensively by others ‘as a
holistic view of the world as its functions at any point of time, with a multitude of spatial elemental and socio-economic systems distinguished by quality and attributes of space and mode of behaviour of abiotic and biotic forms.’ (K.R. Dikshit, 1984)

Environment means: The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature behaviour and the growth, development and maturity of living organisms’ (Douglas and Holland). ‘Environment refers to the sum total of all conditions which surround man at a given point in space and time’ (C.C. Park) The entire range of external influence acting on an organism, both the physical and biological, and other organisms, i.e. forces of nature surrounding an individual. (Encyclopedia Britannica) Total environmental system including not only the biosphere, but also his interactions with his natural and manmade surroundings (US Council on Environmental quality).

Environment is argued as an inseparable whole and is constituted by the interacting systems of physical, biological and cultural elements, which are interlinked individually as well as collectively in myriad ways. Physical elements (space, landforms, water bodies, climate, soils, rocks and minerals) determine variable character of the human habitat, its opportunities as well as limitations. Biological elements (plants, animals, micro-organisms and man) constitute the biosphere. Cultural elements (economic, social, political) are essentially manmade features which go into the making of cultural milieu (Savindra Singh and A. Dubey, 1983). Thus, environment is defined as ‘(1) the circumstances and conditions (physical conditions) that surround an organism or group of organisms, or (2) the social and cultural conditions that affect an individual or community. Since human inhabit the natural world as well as the ‘built’ or technological, social, and cultural world, all constitute part of our environment’ (W.P. Cunnigham and M.A. Cunnigham, 2004).

Environmental knowledge is a multidisciplinary knowledge whose fundamental aspects have a direct significance to every segment of the planet. Its main characteristics include:

- Conservation and natural resources.
- Maintenance and management of biological diversity.
• Controlling and managing environmental pollution to permissible limit

• Stabilisation of human population and environment.

• Development of alternate sources of renewable energy systems

• Providing new dimension to nation’s security through conservation, protection, management and **maintenance** of environment.

It also deals with vital issues like safe and clean drinking water, hygienic living conditions and pollution free fresh air, fertility of land, healthy food and development of sustainable environmental laws, administration, environmental protection, management and environmental business are coming up as new opportunities for environment protection and managements. The relationship and interaction between organism and environment are highly complex and multidimensional. No organism can live alone without interacting with other organisms or other biotic/abiotic forms. So each organism has other organisms as a part of its environment. Each and everything with which we interact or which we need for our sustenance forms our environment. In fact, environment is visualised in different ways with different angles by different groups of people but it may be safely argued that ‘environment is an inseparable whole and is constituted by the interacting system of physical, biological and cultural elements which are interlinked individually as well as collectively in myriad ways. The environment is not static; rather it’s a very dynamic entity. Various factors (biotic & abiotic) are in a flux and keep changing the environment continuously.

**Types of Environment:** On the basis of basic structure the environment may be divided into

• Physical/abiotic environment

• Biotic environment

• Cultural environment

1. **Physical/abiotic environment**- on the basis of physical characteristics and state, abiotic or physical environment is subdivided into:

   i. Solid i.e lithosphere (solid earth)
ii. Liquid i.e hydrosphere (water component)

iii. Gas i.e atmosphere (gaseous component)

These environment can be termed as lithospheric, hydrospheric, atmospheric environment which can be further broken into smaller units based on different spatial scales like mountain environment, plateau, plain, lake, river maritime, glacier, desert environment etc. The physical environment may also be viewed in terms of climatic conditions providing certain suits of habitat for biological communities like tropical, temperate and polar environment etc.

2 Biotic environment: biotic environment consists of flora and fauna including man as an important factor. Thus the biotic environment may be divided into:

Floral environment

Faunal environment

Further all the organisms work to form their social groups and organisations at several levels and thus is formed social environment, where in, the organisms work to derive matter from the physical environment for their sustenance and development. This process generates economic environment. It may be pointed out that of all the organisms man is the most skilled and civilized and hence his social organisation is most systematic. It is significant to note that three aspects of man, physical, social and economic have different characteristics and functions in the biotic environment. As ‘physical man’ is one of the organismic populations or biological community and thus requires basic elements of physical environment (habitat, air, water, food etc) like other biological populations and releases wastes into the ecosystem; ‘social man’ establishes social institutions forms social organisations, formulates laws and policies to safeguard his existence, interest and social welfare and ‘economic man’ derives and utilises resource from the physical and biotic environments with his skills and technologies. These may be termed as physical, social and economic functions of man. It is the third function which makes the man and environmental process because he transports matter and energy from one component of the ecosystem to the other.
2. Components of Environment The basic components of the environment are atmosphere or the air, lithosphere or the rocks and soil, hydrosphere or the water, and the living component of the environment or the biosphere.

Atmosphere:
- the thick gaseous layer surrounding the earth.
- It spreads up to 300 km. above the earth’s surface.
- Apart from gases there are water vapor, industrial gases, dust and smoke particles in suspended state, micro organism etc.

Lithosphere: The word lithosphere originated from a Greek word mean "rocky" + "sphere" i.e. the solid outmost shield of the rocky planet. The Earth is an oblate spheroid. It is composed of a number of different layers. These layers are:
- The Core which is around 7000 kilometers in diameter (3500 kilometers in radius) and is situated at the Earth's center.
- The Mantle which environs the core and has a thickness of 2900 kilometers.
- The Crust floats on top of the mantle and is composed of basalt rich oceanic crust and granitic rich continental crust.

Hydrosphere:
- The hydrosphere includes all water on or near earth surface and includes oceans, lakes, rivers, wetlands, icecaps, clouds, soils, rock layers beneath surface etc.
- water exist in all three states: solid (ice), liquid (water), and gas (water vapor)
- 71% of planet surface is covered with water
- Freshwater- 2.53%
- Freshwater in glaciers-1.74%
- Water as water vapour in atmosphere-12,900 km³.
- Living organism contain- 1100 km.

Since the environment includes both physical and biological concept, it embraces both the abiotic (non-living) and biotic (living) components of planet earth. Thus, on account of basic structure the components of environment may be classified into two basic types:

2.1 Abiotic Components (Non living): these are the most important determining factor of where and how well an organism exists in the environment. Although these factors interact with each other, one single factor can limit the range of an organism thus acting as the limiting factor. These factors can be categorised into following groups:

a. Physical factors: the major components are temperature, Water (Rainfall), Light (Energy), Soil, Atmospheric pressure.
Temperature: Temperature is the most ecologically germane environmental factor. It’s a very well-known and an established fact that the average temperature on land varies seasonally, decreasing progressively from the equator towards the poles and from plains to the top of mountains ranging from sub-zero levels to >50°C in polar areas/high altitudes and tropical deserts in summer respectively. There are, however, unique habitats like thermal springs and deep-sea hydrothermal vents where average temperatures exceed 100°C. It is commonly known fact that mango trees do not and cannot grow in temperate countries like Canada and Germany, snow leopards are not found in Kerala forests and tuna fish are rarely caught beyond tropical latitudes in the ocean. A few organisms can tolerate and thrive in a wide range of temperatures without having effect on their internal environment (they are called eurythermal), but, a vast majority of them operate within a narrow range of temperatures (such organisms are called stenothermal).

Water (Rainfall): Subsequent to temperature, water is another most important factor influencing the life of organisms. In fact, genesis of life on earth is attributed to water without which life is unsustainable. Its availability is too scarce in deserts. Due to this scarcity only special adaptations by plants and animals of this region make it possible to survive there in such an unusual living conditions. The productivity and distribution of plants is also profoundly dependent on water. One might believe that organisms living in oceans, lakes, rivers and other water bodies should not face any water-related problems, but it doesn’t hold true. For aquatic organisms the quality (chemical composition, pH) of water becomes crucial and one of the most determining factor for their survival. The saline concentration (measured as salinity in parts per thousand), is less than 5 % in inland waters, 30-35 % in the sea and >100 % in some hypersaline lagoons. Some organisms are tolerant to a wide range of salinity(referred as euryhaline) while others are restricted to a much narrow range of salinity (referred as stenohaline). Many freshwater animals cannot survive for long in sea water and vice versa because of the osmotic problems which would subsequently lead to their death.

Light (Energy): One can quickly and easily understand the importance of light/energy for living organisms, particularly autotrophs since they produce/manufacture food through photosynthesis, a specialised process
which is only possible with the availability of sunlight as a source of energy. Many plants are also dependent on sunlight to meet their photoperiodic requirement for flowering. For many animals too, light is essential as they use the diurnal and seasonal variations in light intensity and duration (photoperiod) as cues for timing their searching food, reproductive and migratory activities. The availability of light on land is in close association with that of temperature since the sun is the source for both. But, deep (>500m) in the oceans, the environment is perpetually dark and its inhabitants are unaware of the existence of a celestial source of energy called Sun.

Soil: The nature and properties of soil in various places vary to a great extent depending upon the climate which includes temperature and humidity, the weathering process, whether soil is transported or sedimentary and how soil development occurred. Various physical characteristics of the soil such as soil composition, grain size and aggregation determine the percolation and water holding capacity of the soil. These features along with chemical parameters such as pH, mineral composition and also topography determine to a large extent the vegetation in any area. This in turn indicates or rather determines the type of animals that can be supported on a particular soil area. Similarly, in an aquatic environment, the sediment-characteristics often determine the type of benthic animals that can thrive there optimally.

2.1.1 Responses to change in abiotic factors Abiotic conditions of many habitats may vary drastically in time, which raises an essential question –how do the organisms living in such changing habitats adapt themselves with stressful conditions? But, prior to delving into answering this inevitable question, one should perhaps ask first why a highly variable and ever changing external environment should create an inconvenience to an organism after all. One would expect that during the course of millions of years of their existence, many species would have evolved a relatively constant internal (within the body) environment that enables all biochemical reactions and physiological functions to progress with maximal efficiency and thus, enhance the overall ‘fitness’ of the species.

2.2 Biotic Components (Living): it consists of the living parts of the environment, including the association of a lot of interrelated populations that belong to different species inhabiting a common environment. The populations are those
of the animal community, the plant community and the microbial community
The biotic community is divided into:

a. Autotrophs,

b. Saprotrophs, and

c. Heterotrophs

**Autotrophs (from Greek):** auto - self, trophos - feeder are called producers, transducers or convertors, as well. Those are photosynthetic plants, normally chlorophyll bearing, which synthesize a high-energy complex organic compound (food) from the inorganic raw materials utilizing the aid of the sun, and this process is called photosynthesis. Autotrophs form the core of all biotic systems. In terrestrial ecosystems, autotrophs are usually rooted plants. In the aquatic ecosystems, the floating plants referred to as phytoplankton and the shallow water rooted plants – macro phytes - are the main producers.

**Heterotrophs (from Greek):** heteros - other; trophs - feeder are the consumers, normally animals that feed on the other organisms. Consumers are also referred to as phagotrophs (phago - to swallow or ingest) while macroconsumers are normally herbivores and carnivores. Herbivores are called First order or primary consumers, for they feed directly on green plants. For example, Terrestrial ecosystem consumers are cattle, deer, grass hopper, rabbit, etc. Aquatic ecosystem consumers are protozoans, crustaceans, etc.

**Saprotrophs (from Greek again):** sapros - rotten; trophos - feeder are called the reducers or decomposers or osmotrophs. They break the complex organic compounds in dead matter down (dead plants and animals). Decomposers don’t ingest the food. Instead they secrete a digestive enzyme into the dead, decaying plant or animal remains and digest this organic material. The enzymes act on the complex organic compounds in the dead matter. Decomposers absorb a bit of the decomposition products to provide themselves with nourishment. The remaining substance is added as minerals in the process of mineralisation to the substratum. Released minerals are utilised or reused as nutrients by plants - the producers.
Concept of Sustainable Development

It is safe to state that there is not a single, commonly accepted concept of sustainable development, how to measure it, or even less on how it should be promoted. There are, in my opinion, two major views on the subject. On one hand, we have the ecologists' view that associates sustainability with the preservation of the status and function of ecological systems. On the other hand, we have economists that consider that sustainability is about the maintenance and improvement of human living standards. In the words of Robert Solow "if sustainability is anything more than a slogan or expression of emotion, it must amount to an injunction to preserve productive capacity for the indefinite future" (Solow, 1999). Hence, while in the ecologists' view natural resources have a value that goes beyond their productive use and cannot be substituted by other forms of capital, within the economics view natural resources can be consumed and substituted by other forms of capital, as long as productive capacity is maintained (see the discussion in Chapter 1, Section 2).

The World Commission on Environment and Development (Bruntland Commission) defined sustainable development as "development that meets the needs of the present without compromising the need of future generations to meet their own needs" (Bruntland Commission – see World Commission on Environment and Development, 1987). Toman (1999) better describes the reaction of both economists and ecologists to this definition:

"[...] If one accepts that there is some collective responsibility of stewardship owed to future generations, what kind of social capital needs to be intergenerationally transferred to meet that obligation? One view, to which many economists would be inclined, is that all resources - the natural endowment, physical capital, human knowledge and abilities - are relatively fungible sources of well being. Thus, large scale damages to ecosystems such as degradation of environmental quality, loss of species diversity, widespread deforestation or global warming are not intrinsically unacceptable from this point of view; the question is whether compensatory investments for future generations are possible and are undertaken. This suggest that if one is able to identify what are determinants of these "needs" and what types of resources
are required to satisfy these needs, one should in principle determine[which] resources to transfer. An alternative view embraced by many ecologists and some economists, is that such compensatory investments often are unfeasible as well as ethically indefensible. Physical laws are seen as limiting the extent to which other resources can be substituted for ecological degradation. Health ecosystems, including those that provide genetic diversity in relatively unmanaged environments, are seen as offering resilience against unexpected changes and preserving options for future generations."

One approach to bring the views of economists and ecologists together is to assume that individuals derive welfare from, and have preference for, consumption, environmental quality, and social health, thus ruling out perfect substitution. This being the case, it is plausible to postulate the existence of a social welfare function that incorporates indicators of consumption, environmental quality and social stability. Then a sustainable development path can be defined as the one that maximizes the present value of the intertemporal social function (see Gillis et al., 1992). In other words, a given set of economic, environmental, and social indicators would be aggregated into a single indicator that becomes a universal measure of sustainability. Policies could then be evaluated with respect to the impacts that they have on the indicator. An example of this type of indicator is the Human Development Index (HDI, see United Nations Development Program, 1991). This indicator essentially represents the average of life expectancy, literacy, and income per capita, and is published annually in the Human Development Report (see United Nations Development Program, 1995). The HDI is often used by national governments and international organizations to set policy goals and allocate public resources (see Murray, 1993). This implies that indicators like the HDI, in principle a positive or descriptive indicator, become normative or prescriptive indicators. Then, implicitly, the indicator is reflecting some set of "preferences". But given the way that indicators are usually constructed, these preferences are not likely to be "social preferences". Hence, maximizing the HDI may not be as desirable as maximizing some other weighted measure of life expectancy, literacy, and income per capita. Even worse, there may be other dimensions, currently omitted, that individuals consider important and that should therefore be included in any indicator of sustainable development. One of these dimensions is certainly the environmental dimension.
Therefore, coming up with a social function that aggregates social preferences may be an impossible task. The existence of such a social function depends on strong assumptions regarding agents' preferences and functional forms (see Harsanyi, 1953; Arrow, 1963; Bailey et al., 1980; Atkinson, 1980; and Lambert, 1993), and as suggested by Goodin (1986) in most cases may not exist. But even if it does, how do we go about measuring its components? In an attempt to approximate what could be interpreted as a set of universal social values about an indicator of sustainable development, I conducted a simple e-mail survey. The survey asked questions about individuals' preferences for three dimensions of sustainable development: economic growth, environmental quality, and income redistribution. The summary of weights that individuals place on each of these three dimensions is summarized in Appendix 8.1. Although the sample of individuals is not representative of the population, the results illustrate the high variance in individual preferences and give an idea of how difficult it would be to come up with a consensus regarding what is the appropriate social function to assess sustainable development.

These results convinced me to abandon the use of a social welfare function and opt instead for a measure that could be more transparent, and enjoy almost universal acceptance. In his work on common values, Bok argues that a minimalist set of social values is needed for societies "to have some common ground for cross-cultural dialogue and for debate about how best to cope with military, environmental, and other hazards, that, themselves, do not stop at such boundaries" (see Bok, 1995). Common values are not simply the values of the majority. Rather, they are a set of minimal values that nearly everyone in a society recognizes as legitimate for their own, but that have never been universally applied in society. Minimal values constitute a set of values that can be agreed upon as a starting point for negotiation or action. They represent the "chief or more stable component" of what individuals can hold in common. As stated by Murray (1993) "if many individuals after deliberation hold a preference or value then this value should be considered seriously".

Serageldin and Steer (1994), and Toman (1999) suggested a set of common views about sustainable development. The idea is that sustainability is about preserving and enhancing the opportunities available to people in countries around the world, and that these opportunities depend on a nation'
accumulation of wealth. This wealth has three components: the stock of produced capital, the stock of natural capital, and the stock of human capital. The main difference with this approach and Solow's is that a sustainable path needs not only to preserve productive capacity, but also access to a minimum level of environmental services and ecological diversity.
UNIT II

MAJOR THEMES IN GEOGRAPHY

Areal Differentiation And Spatial Organization

Areal Differentiation is the study of the distribution of phenomena both human and physical and how they are causally related to other phenomena in proximity, in a geographical region or area expressed in the space. The concept of areal differentiation, which later on translated into a regional approach, is considered one among the three significant approaches to understand or study the discipline of human geography. The other two may be considered as Spatial Analysis and Landscape approach. Both, the spatial analysis is also known as systematic science approach and morphology of landscape approach were quite popular and claimed themselves to be the science of the study of geography. An influential modern statement of geography as areal differentiation, drawing from arguments of Hettner in particular, was made in Richard Hartshorne’s ‘The Nature of Geography’ (1939). According to him the concept of areal differentiation in geography is about showing how unique regions reveal the co-variance of phenomena that can only be understood through identifying regions. A central concept of areal differentiation is that the surface of the earth may be divided into regions, which may be distinguished and categorized using various spatial criteria. The areal differentiation, which is among the few significant classic approaches to study Geography, traces its origin to the ancient period in the works of Strabo to Ptolemy. The idea of variable characteristics of the surface of the earth found a more pronounced expression in the works of Bernhard Varenius substantial work ‘Geography Generalis’. Varenius is credited with the initiation of another debate/ dichotomy or controversy in geography related to the approach or methodology of the subject. This debate between Regional Geography and Systematic Geography continued for long and found new advocates in Richard Hartshorne and Prof. Schaeffer for and against the regional approach, respectively. From Varenius to Richthofen and Hettner the idea of uniqueness found fresh vent in the concept of chorological science. Hettner who espoused and advocated the study of geography as a chorological science found some
resistance from his colleague Otto Schluter. Schluter departing from the popular Hettnerian view claimed that geography should be considered as the science of morphology of the landscape. The concept of landscape graduated from natural landscape concept to the Cultural Landscape of Carl O Sauer, who argued that geography should confine all its field of enquiries to cultural landscape, for it is an all-encompassing concept. Though morphology of landscape idea started off as another form of regional study, it gradually drifted towards the systematic science as it argued for generalized statements having universal applicability and reach, later in its academic persuasion. The chorological outlook of the geography which transformed into regional approach found its strongest champion in the writings of Richard Hartshorne. Regional geography in America reached new heights during the period sandwiched between the First and Second World War. The advent of Richard Hartshorne (1899-1992), who studied under the stalwarts like Hettner and influenced by the Kantian school of thought, on the geographic academic horizon, further contributed to the repository of geography in the form of areal differentiation. His ideas saw the concept of areal differentiation and uniqueness of regions occupied the core or the central position of enquiry in geography. The term is used and popularised by Richard Hartshorne, who defined Geography as the science of the study of Areal differentiation. He viewed that geography is concerned with the differences or variations of different areas/regions of the earth surface. Richard Hartshorne in his seminal work ‘The Nature of Geography’ (1939) emphasized that the fundamental focus of the geographical inquiry is the study of differential characteristics of the earth surface, which he called areal differentiation. According to Hartshorne, the concept of areal differentiation entails three concepts; interrelations of different kinds of phenomena, the variable characteristics of these phenomena and the complex they form, in the different areas of the earth and last but not the least the areal manifestation or expression of phenomena/complexes. Hartshorne is credited with the use, patronage, and propagation of the concept of Areal differentiation, which appeared in his seminal work ‘The Nature of Geography’. Hartshorne maintained that concept of areal differentiation as mainstay of geographical enquiry holds water with common knowledge of the fact that things are different in the different part of the surface of the earth. It is also a common understanding that these
variations enjoy causal relation with each other. Hartshorne’s clear emphasis on the distribution of phenomena and the underlying causal relationship among them on the face of the earth in a given specific/ particular space and indifference and apathy towards the phenomena themselves lead to idiographic interpretations. Areal differentiation, in other words, is about establishing the degree of sameness/homogeneity as well as differences between regions the exponents of the spatial analysis/ systematic science accused him of seeing locations as unique and justifying a traditional regional geography in which areal differentiation dominated geography at the expense of areal integration. (Haggett, 1965). Areal differentiation Unfounded reliance on the idiosyncrasies of the regions at the cost of attendance or focus extensive geographical form and pattern and process as well as the cause of such spatial distribution, made spatial science/ systematic science drag the subject away from a central concern with regions as spatial clusters of linked phenomena. One of the challenges before the geographer is to figure out the nature and characteristics of the difference spatially spread in the different area of the surface of the earth and how these variations are related. The exercise becomes necessary to understand the character of the different areas of the variable earth. The concept of areal differentiation argues that the surface of the earth can be divided into various regions on the basis of spatial arrangements of the phenomena over a piece of land. Demarcation of a geographical region is on the basis of unifying factor of homogeneity in one or more than one geographical attribute or event or phenomena and which is unique in itself. The division of earth surface into regions with an expression of some degree of homogeneity in terms of spatial arrangements of phenomena within the given boundary and which is distinct and unique from other such regions is the central idea of the concept of areal differentiation. Areal differentiation along with chorology became the conceptual and theoretical background for regional geography, by conceptualizing space as consisting of identifiable units that may be distinguished from one another on the basis of a set of phenomena or criteria. These two concepts which are used interchangeably became synonymous with the regional approach in geography. The regional approach focuses on the study of the study of regions which is demarcated on the basis of homogeneity of geographical phenomena spatially concentrated in space/ surface of the earth within a given boundary.
The spatial organization is the study of geography expressed in the pattern and process of the phenomena. It is to understand the form or nature and cause of the areal differentiation or variation on the surface of the earth. American Science Congress 1965 defined geography as the study of ‘Pattern and Process’. This definition is an attempt to reinstate the past glory of time and space perspective in the study of the subject. The concept of spatial organization talks about the spatial dimensions and manifestations of phenomena. The process is the temporal aspect of the result of the certain explicit expression. The face of the earth divided into various units/regions/areas/natural landscape at times cultural and social landscape on the basis of areal differentiation, present a spatial synthesis. Spatial synthesis here concerns the ‘complex whole made up of a number of parts unified. The spatial synthesis of a whole comprises various distinct and unique regions and the spatial processes include spatial arrangements, organization and spatial interaction of the phenomena. The distribution of geographical attributes interrelationships and interdependence among them and the resultant expression in the space thereof forms a region. The spatial synthesis of space requires comprehending distinct individual geographical regions (which have intra regional homogeneity and inter-regional heterogeneity) in one whole, the idea or the concept of spatial organization emphasizes the distribution and arrangements of phenomena in the space. The two distinct enquiries ‘Why’ things are arranged in a manner they are and ‘How’ this arrangement is organized or the pattern of the spatial expression: are two very simple yet challenging posers before the geography. Interestingly, the basic underlying challenge before the geographers had always been to find order in the seemingly chaotic and haphazard distribution of phenomena on the surface of the earth, has the genesis of ‘why’ a certain kind of arrangement and ‘how’ of these arrangements of phenomena. ‘Why’ is related to the process incorporating the time spent or temporal perspective, while the ‘How’ is the form or the pattern, the physical manifestation of the underlying process. The regions are actually the interplay of these two forces which go hand in hand. Spatial organization or spatial interaction is associated with extensive geographical patterns and to the causes of such spatial pattern/form or distributions. So, the areal differentiation focuses on division of the surface of the earth in the form of regions on the basis of sameness or homogeneity in
terms of distribution of phenomena the concept of spatial organization connects and observes differences of different places in holistic and comprehensive perspective. The concept of areal differentiation interchangeably used with ‘chorology’ gradually translated itself into the ‘Regional Approach’ in Geography whilst the systematic approach seems to have evolved and graduated from the concept of spatial synthesis in general and particularly from spatial organisation/integration, leading to one the most celebrated debate in Geography; Systematic Geography vs. Regional Geography.

**Regional Geography vs. Systematic Geography**

**Idiographic vs. Nomothetic**

**Deductive vs. Inductive argument:**

Geography as areal differentiation seeks to describe and interpret the variable character of the distinct and unique regions sprinkled on the face of the earth. Phenomena occur in association on the surface of the earth and exhibit a complex ensemble of the interplay of causal relationships among them, making each location/region or a specific area on the surface of the earth unique simultaneously enjoying a great deal of sameness or homogeneity within the boundary of the region. The uniqueness is in regard of an assemblage of phenomena on individual regions. Regional geography, therefore, attempts to organize the knowledge of all interrelated forms of areal differentiation in localized individual units of the area which it must organize into a system of division and sub-division of the total earth surface. A regional approach is interested in the creation of the division of earth surface into unique areas/regions on the basis of the description of the areal distribution of the phenomena with an ensemble of the complex interplay of the causal relationship among the phenomena, spatially located within a boundary of a region. However, paradoxically within the region, homogeneity and sameness in one or more than one geographical attributes/event or phenomena is the central or cardinal theme of the regional geography. The region is the indispensable component of the approach is homogeneous within its boundary but being unique and distinct differs significantly from others, dissecting the face of the earth in various regions. Regionalization or demarcation of the region is dynamic in nature. Any number of regional divisions can be made owing to the need and requirement of the academic
inquiry, based upon the parameters of Uniqueness, Homogeneity, and bounds and limits (boundary – to demarcate one region from another.). Regional geography investigates the relationships of phenomena in the individual region but at the same time, the explanatory description of features in the past must be kept subordinate to the primary purpose because that facilitates comprehension of the present (Adhikari). Methods of regional geography do not confine to the study of physical environment and forms only but also incorporates human environmental characteristics of individual regions, which includes the demographic characteristics, occupational structure, socio-economic conditions and also cultural and political behavior. To understand the interrelationship of phenomena of a region, the elements of physical and human environments, including socio-economic and cultural shades along with economic activities and occupational structure are identified. The spatial analysis and synthesis of all recognized interrelationships of phenomena help portray the unique picture of the region under consideration. Sometimes the stress is laid over the stability and instability of the regional structure over time to assess that those being described (the spatial distribution and the underlying causal relationships of the phenomena) are static or dynamic in nature. The regional geography is not compatible with the formulation of general laws and universal theories, for it deals with description and elaboration of the complex organization in unique regions. Moreover, nature of geography makes it field science where it is impossible to have only dependent and independent variables without the interference of external variable affecting the outcome. In other words controlled the experimental situation in Geography is not possible, hence, formulation general laws is not possible, according to this approach. A regional approach in lieu of scientific laws seeks to:

1. Describe assemblage of phenomena with precision based on empirical and objective observation. 2. Categories the phenomena into generic concepts

3. Interpretation of phenomena and their spatial pattern in a region on the basis of analysis and spatial synthesis.

4. Arrange these findings in an orderly manner.
Regional analysis encourages the study of all the phenomena and their spatial arrangements in an orderly manner concentrated in one particular place or individual unit/region of a given area. Regional approach divides the world into the distinct regions which are unique on the basis of arrangements of phenomena and the manifestation of the complex as a result of the interplay of the causal relationship among the phenomena. Regionalization is done keeping in mind the academic and intellectual requirement and then thoroughly studying each and every aspect of a particular region is the cardinal method in regional geography. In other words, regional geography attempts to study ‘All about one’ and is diagrammatically opposite to systematic approach which is for ‘One about all’. Systematic geography, on the other hand, is organized in terms of particular phenomena of general geographic significance, each of which is studied in terms of the relations of its areal differentiation with the other. Systematic geography is similar to systematic sciences, for it also explains description and generalization. Systematic geography endeavored to formulate laws on the basis of empirical observation. Such generalization or laws formulated are sought to have universal applicability in terms of significance to areal differentiation. In systematic geography, each particular element or element – complex that is geographically significant is studied in terms of its relation to the total differentiation of areas, as it varies from place to place over the world or any part of it. Systematic geography is concerned with the study of one or few aspects of human or physical environment and analyses their varying performance over space, cutting across the regions. Systematic geography, therefore, is concerned with ‘one about all’. Simply putting a phenomenon or group of phenomena is studied over the whole world or a predefined geographical stretch, notwithstanding the individual units or regions. In other words, the spatial organization over the space connected via the phenomena being studied is the central idea of the systematic geography. Systematic approach as spatial analysis grew in stature a fierce opponent of areal differentiation or regional geography. The basic conceptual difference regarding the way the geography as a subject needs to be studied. Regional approach riding high on the waves of chorology and areal differentiation focused on the study earth’s variation at different places in terms of regions. Whereas, the systematic approach advocated for more holistic all-encompassing spatial organization approach, which subsumed in
 itself not only the spatial interaction and integration but also the areal differentiation in its fold. Geography is concerned as a science by systematic geography and therefore, propagators of this approach advocated for the formulation of universal laws for Geography in line with the other sciences. Laws and universal applicable generalization provide credibility and if geography needs to come out of subjective and empiricism folds it has to frame laws to make the discipline more objective and scientific. It is in this backdrop Prof. Schaeffer vehemently argued for the formulation of laws in geography. According to him ‘it is the spatial arrangements of phenomena or features, and not the phenomena themselves, about which geographer should make a law like statements. Hence geography has to be conceived as the science concerned with the formulation of the laws governing the spatial distribution of certain features on the earth’s surface. (Schaefer 1953). The systematic approach also attempts to frame set of hypotheses, whose confirmation give them empirical validity. Systematic geography staunchly believed in nomothetic approach whereas Regional geography argued in favour of idiographic approach. The nomothetic is concerned with the universal and general. Nomothetic approach states that geography should focus itself on the formulation of scientific laws and should not confined only to the mere application of such laws. On the other hand to the contrary to the nomothetic, idiographic approach is concerned with the unique and the particular. Both the approach came into prominence after the Hartshorne – Schaefer debate over exceptionalism, when traditional regional geography was represented as essentially idiographic and incapable of contributing towards effective generalization. Both these approaches remain relevant with the changing paradigm in geography. The gradual focus shifting towards spatial analysis rather than on clinging to the ‘uniqueness’ saw a revival of the fresh urge to look for generalization and formulation of laws like statements. David Harvey one of the most celebrated social critic and prolific writer leading the galaxy of geographers in the modern period re-emphasized the importance of nomothetic approach by saying ‘by our theories, you shall know us’. Throughout the sojourn of the discipline from the middle of the twentieth century (Hartshorne – Schaefer debate over exceptionalism), there have been sporadic and individual efforts to make a generalization and formulate scientific laws in geography. Such efforts are also met with an equal strong
voice claiming that taking off the ‘Uniqueness’ from geographical enquiry shouldn’t be the objective of the science. Geographers like Guelka believed that human geography does not need their own models and theories, whereas Haggett and Ullman not radically departing from the original concern and definition of geography given by Hartshorne, are best known for postulating models and theories to address the locational studies in geography. The regional geography claim that sense, it is a study of areal distribution of phenomena focused on the uniqueness of the region, cannot have general and universal laws, for it is incapable to study causal relationship in the form of dependent and independent variable, without ruling out the interference of external variable, found compatible with the idiographic approach. However, the nomothetic or the law-making approach found suitability in systematic sciences which strive towards the formulation of generalized and universal laws to make their disciplines more objective and scientific. The regional approach subsumed in itself the inductive logic whereas systematic approach co-opted deductive logic as a potent method and tool to collect information/data. Carl Ritter adopted the deductive logic as a methodology in his regional approach while Humboldt a widely considered a systematic geographer adopted inductive logic as his methodology for information collection. Inductive logic extends from individual to general while deductive from general to individual. In other words, in inductive logic, a general statement or law-like statement is made on the basis of the studies of the individual units/cases. These generalized statements become the precursor for the formulation of theories, general laws, and models thereof, in the social sciences. However, deductive logic speaks of deducing inferences from general statements/theories or universal laws and applying them to the individual units. These two maneuvering of intellectual exercise to study, interpret and analyze the areal differences (Regional Geography) and spatial organization, inseparable component of spatial synthesis and analysis (Systematic Geography) played a significant role in methodology/approach related dichotomy in geography. He further elaborated in his rebuttal through the monograph ‘The Perspectives on the Nature of Geography’ which he intended to be studied as an extension of his earlier work ‘The Nature of Geography’ that by the sheer nature of its subject matter, geography must confine to the description and explanation separate individual cases (regions).
Man And Environment Interaction

**Introduction** Geography as a discipline always had the purpose of gaining logical and useful information about the man and his habitat. This has been from the beginning of the philosophical scholarship of man. To establish my point I would initiate from Eratosthenes, the Greek scholar in the third century B.C who coined the term ‘geography’. The word 'geography' can be divided into two parts, 'geo' and 'graphy.' 'Geo' comes from the Greek word 'go', meaning 'Earth,' and 'graphy' comes from 'graphein', which means 'to describe.' What is more important to know that in what spirit did Eratosthenes coined the term geography? For him, geography was a discipline that studies earth as the home of a man (James and Martin, 1972). This sets the roots for the theme of man-environment relationship within the geographical thinking. The theme became so popularise that it still persists; in the words of Broek (1965) ‘..........................to understand the earth as the world of man...................’. The history of geographical ideas clearly depicts how through ages, the man-environment relationship has been perceived, deliberated upon and established as one of the focal themes in the geographical thinking. The whole idea is to get more and more logical and useful knowledge of the human habitat and human spread over the earth surface. Before we look into the historical background and doctrines established on this theme we need to have a clear perspective on a man-environment relationship which is discussed in the next section.

2. **Man and Environment Relationship – A Perspective** For the understanding of this relationship, one has set the limits how one defines the environment. The most basic definition was given by Einstein who states that the environment is everything that isn’t me. In simpler words, everything beyond me is the environment. Thus one should not debate on the dualism of physical and cultural environment rather take both as two equal halves of the same whole. Both physical (biotic, abiotic and energy) and cultural (mentifacts, socio facts, and artifacts) components influence man’s actions in adapting to the environment to transforming it for satisfying his needs. The basic premise is that this relationship is not direct or static rather it is dynamic and multifaceted as explained in the diagram given below.
1. The environment acts directly on man.

2. The man acts directly on the environment.

3. Each acts directly on the other

4. The reciprocal action is indirect because it is conditioned by man’s culture and knowhow.

5. In reality, the situation is complicated because a large number of factors and their association among themselves influences this relationship.

In the ancient and middle ages, Greek, Roman, Indian, Chinese and Arab geographers attempted to establish a relationship between man and natural environment. Kant, in the latter half of the 18th century, advocated the impact of environment on the lifestyle and physical constitution and lifestyle the equatorial, hot deserts, Mediterranean, coastal and mountainous regions. According to Kant, the inhabitants of Torrid Zone are exceptionally lazy and timid, while the people of the Mediterranean region living in the mild temperature conditions are industrious, hardworking and progressive. The environmental causation continued throughout the 19th century. Humboldt asserted that the mode of life of the inhabitants of the mountainous countries of the Andes mountains differs from that of the people of Amazon basin, coastal plains, and islands like Cuba and West Indies. Ritter attempted to
establish the cause variations in the physical constitution of body, physique, and health of people living in the different physical environmental conditions.

a. Impact of Darwinism

The idea of defining geography in terms of man and environment relationship developed on scientific lines in the latter part of the 19th century after the publication of The Origin of Species (1859) by Charles Darwin. This seminal work gave a new direction to the discipline of geography. The theory of evolution held that all living species have evolved from preexisting forms. His geological observations and theories had one thing in common: the idea that things in nature change with time. Most of the writers in the pre-Darwinian period discussed the man-environment relationship as a cause-effect relationship. They did not ponder into the processes involved in this relationship. Ratzel for the first time took up this issue in the first volume of Anthropogeographie (1882) which was later developed by his students Semple and Demolins. In France, Blache’s ideas dominated so this rigid framework of harmony and relationship was not accepted. But in America, this was carried out by Davis who tried to incorporate this idea of causality into the definition of geography itself. This notion was not accepted by many scholars as they were of opinion that no science can be confined to the study of a specific relationship.

Moreover, this causal relationship provides an unsound methodological approach as the intensity of the influence of environment becomes a major problem. Fluere was deeply influenced by Darwinism and opined that the man-environment relationship should be studied from the physiological point of view and while delineating human regions; he applies Darwin’s ideas of natural selection through environmental influence to human groups. Huntington too looked into this theme and applied it to human population while studying it at the global level. Taylor investigated this idea in his studies on race, population, states, and cities. He concluded that these are directly influenced by environmental factors as their development over time is regulated by these conditions. Determinists, therefore, raised certain questions but could not possibly find suitable answers within the
geographical framework. Hartshorne tries to seek answers by stating that the whole determinist-possibilism debate within the discipline was unreal and futile which led the whole debate on a philosophical level rather than at an empirical level. In America, the concepts of Spencer and Darwin, the survival of the fittest and the struggle for life, respectively were positively used in the disciplines of political science and economics to justify laissez-faire. Darwinism, though, had a limited influence on the classical equilibrium economics. In geography, particularly, political geography, these ideas of struggle and selection were used significantly. Ratzel (1896) applied this concept to his seven laws for the growth of state which later developed as the concept of Lebensraum. He states that as plants and animals struggle for their existence, a nation too, clash for their struggle to capture more territory. The organic analogy derived by Ratzel along with the theme of struggle and selection provided a strong model in analytical political geography which had scientific justification in man’s political behaviour. Sample tried to omit the concept of organic analogy in her writings but it seemed that she was still touched by it, as these themes penetrated in her writings. Kjellen (1942) in his work on states was highly influenced by Ratzelian ideas. His Geopolitik is an example where he writes that states are biological manifestations not only morally but also organically as they experience lust. He was also supportive of Spencer’s writings which are visible in his Staten sam Lifsfarm (1944). The over-dependence of political geography on the organic analogy, the ideas of struggle and Lebensraum brought disgrace to this branch, especially in the 1930s. To sum up, Darwin contributed by making science more empirical and inductive in nature; this dismisses the role of teleology also. The biggest contribution of Darwinism in geography is in establishing man’s place in nature and at the same time making a study of man a scientific learning.

b. The Deterministic Perspective

In the history of geographical thinking, human – nature dialogue has been studied and analyzed from a number of different perspectives and views. The first amongst these approaches to deliberate on the human-nature relationship was determinism. In the words of Platt (1948) determinism, refers to the idea that everything in human life
is caused certainly by preceding events or conditions. The primary initial source of determinists for an explanation was the physical environment, and the theoretical order was centred on the belief that the human activity was solely regulated and controlled by their environment. Determinism, as a paradigm is one of the most significant beliefs, which still continues in one form or other. In the context of this concept, it is believed that due to the difference in the natural environment, the variations in human behaviour in different parts of the world can be described. The spirit of deterministic ideology is that the level of development of history, culture, lifestyle and social group or nation is solely ruled by the physical components of the environment at any scale. Determinists consider humans as a passive agent on whom physical factors are working continuously determining their approach and decision-making process. In short, they believe that most of the activities of man can be elucidated as a response to the environment. In the context of the effect of natural conditions, the first attempt was made by Greek and Roman scholars explaining the physical characteristics and character traits of different people and their culture. At that time, this effort was not contained only among geographers rather included scholars from different fields like the doctor Hippocrates, philosopher Aristotle, and Historians Thucydides, Polybius, and Herodotus. In the Greco-Roman era, regional studies were closely tied with the study of history; Thucydides and Polybius saw Athens's natural conditions and geographical position as factors for its greatness. For example, Aristotle explained the difference between Northern Europe and Asian people in the context of climate causes, while explaining the greatness of Rome, while mentioning similar incidents of Strabo. Strabo argued that the cold weather in Europe was the reason for their bravery. Aristotle thought that people living in hot weather in Asia were wise but there was a lack of soul and therefore time to time subjected to slavery. Because humans often consider their home as the best place, it is not surprising that Aristotle believed that the best combination of all possible worlds was in the center of space, Greece (Glacon, 1967). Aristotle strongly advocated the progress of some
countries is the result of their favorable environmental conditions. In the Middle Ages, Montesquieu explained that in cold weather people are less physically strong, more courageous, clear, less susceptible and less cunning than those in hot weather. He quotes that people in hot weather are terrible, weak in body, dull and inactive. Deterministic approach dominated the writings of Arab scholars. They divided the world into seven terrestrial zones on the basis of climate and highlighted the physical and cultural characteristics of the castes and castes of these regions. Al-Baruni, Al-Masudi, IbnHawkal, Al-Idrisi and Ibn Khaldun attempted to correlate the environment with human activities and living conditions within the conceptual domain of determinism. Deterministic reasoning continued in the 19th century when geography itself was related to other sciences. Carl Ritter, a German geographer adopted an anti-human approach and laid the philosophical base of determinism in geography. Ritter tried to make a difference in the physical constitution of the body, body, and health of men living in the different physical environment. Many of his students considered geography as "a study of the relationship between people's density and the nature of their land". Many geographers of their school had declared that their main task was to identify the influence of physical cultural geographical conditions and the political fortunes of residents of any area in both East and present. Alexander von Humboldt, one of the founders of 'Modern Geography' and a contemporary of Ritter, also said that the life of the residents of a hill country is different from those in the plains. Friedrich Ratzel, the founder of 'new' determinism, supplemented the 'classical' geographical determinism with the elements of 'Social Darwinism' and developed the state's theory as an organism. He believed in the existence of a qualification and saw the 'man' as the end product of development - a development which was natural selection of type according to the ability to adjust itself to the physical environment of the environment. He along with his disciple Ellen Churchill Semple became the most vocal expression of the deterministic approach in geography. Semple in her book Influences of Geographical
Environment (1911) writes: Man is a product of the surface of the Earth; this book had a widespread, long-lasting use in geographic education (Wright 1966). She dominated the environmentalist period of the discipline in the early twentieth century (Hartshorne 1939) and "trained a large proportion of those who became leaders of the profession during the period between the two World Wars" (James, Bladen and Karan 1983). Her methodological statement cannot be questioned as at one time she points out that the influence of climate on man both as a direct and indirect effect cannot be questioned. She further elaborates that man was a passive subject who bears direct environmental influence at early stages of development.

c. **The Possibilistic Perspective**

The doctrine of possibilism tries to explain the relationship of a human being with the environment in a different way; it puts human at a higher level and regards it as an active agent. It is a principle which claims that environment provides opportunities and man being an economic man chooses from those possibilities. Febvre (1932) in ‘A Geographical Introduction to History’ stated ‘there are no necessities, but everywhere possibilities; and man, as the master of these possibilities, is the judge of their users’. The roots of possibilism can be traced back to the works of Plato, who is considered the master of deductive reasoning. Though his idea went into gloom for hundreds of years; the contrasting doctrine of determinism continued to grow and flourished. It got support in the writings of French scholar of the eighteenth century – Montesquieu, who is credited with developing a doctrine analogous to modern paradigm of possibilism. He opined that man possesses free will and has the ability to choose from a series of opportunities. Similar thoughts were also put forward by another eighteenth-century French philosopher, Comte de Buffon. He believed that man was ordered to conquer the earth and even transform it. Their views laid the base for crypto-possibilistic hypothesis (Adhikari, 2010).

It was only in the latter half of the nineteenth century that under the leadership of Vidal De la Blache (1845 – 1918), a possibilistic view of man-environment developed. The focus of this philosophy was
“Nature has set boundaries and has provided possibilities for human settlement, but the way a person responds to these conditions or adjusts it depends on the traditional way of life.” Vidal rejected the concept of material determinism and advocated favourability. He even rejected Durkheim’s opinion of human geography as social morphology rather insisted that man was a partner and not a slave of the environment (Dikshit, 2009). He was critical of Darwinian-Ratzelian heritage which proposed environmental determinism and put forth the concept of possibilism. He sought a scheme for understanding the interaction of nature and culture that eschewed both environmental determinism and radical possibilism to seek answers or solution for the dichotomy between the human and the environment. In the twentieth century, possibilism got stronghold after the publication of Blache’s article in 1913 where he categorically states that geography as a discipline seeks to measure and role of man in modifying the earth surface. This was further strengthened when his book was published in 1921 (English translation in 1926), though posthumously. He observes that nature gives man materials which have their inherent needs as well as limitations thus leading them to limited uses. Possibilism was further flourished by acclaimed historian Lucien Febvre (1878-1956). He puts forward - “Whatever the men do in their own environment, they cannot completely get rid of themselves completely.” Febvre emphasized human initiative and motivation against the environment, destroying the environmental deterministic reasoning and as part of the environment of any group, as well as other humans, because they belong to the next group's cultural surroundings, or the constraints of the environment are influenced by such thinking. He stated that in the view of possibilists, a homogeneous region does not necessarily result in a homogeneous society. This is because people residing in any area have the choice of possibilities time to time and also in the quantity they want. Bruhnes followed Blache’s ideas and took it to next step, he not only transmitted Blache’s philosophy in France but also disseminated it to different parts of the world. In 1910, his monumental work La Geographie de L'Histoire was published. Barrows, in his presidential
address (1922), recommended that relationships in geography should be studied “from man’s adjustment to environment, rather than the reverse”. Hettner (1907) also supported the concept of geography as the study of relationship. Thus, both the physical factors and the human factors (cultural environment) are to be studied in their relations to each other.

d. Probabilism:
The concept of probability was put forward by the O H K. Spat (1957) is the idea that the physical environment does not specifically determine human activities, yet it gives some reaction to others. This word was proposed as a mid-route between Ratzel's complete environmental determinism and a revolutionary prospect of Febvre, Lablache, and Sauer. While the environmental determinants, influenced by the cause and effect of Darwin, said that human activities are controlled by the physical environment, according to the possibilities, the physical environment provides the opportunity for many possible human reactions and enough conscience to choose people is among them. According to Spate, "human action was not said in the case of all or some kind of compulsion, but rather the balance of the possibilities". For example, there is a possibility that the use of land in the Sutlej-Ganga field decreases intensity from market centers; Population density decreases away from metropolitan centers in all directions; With the settlement of the village, the crop yields less than a few walking distances. However, there can be exceptions for each of these generalizations, and in many cases, there is a limit to the boundaries that they keep right. Exception and boundary demand details After this concept, probability theory is considered as an essential component of geographic analysis because "a general mode of discussion" was provided for "the scientific study of the scenario". This view, in fact, is completely consistent with the original Vitalian concept. Geologists started using probability theory to determine human and environmental relations and also carried scientific studies of the landscape. The probability theory was criticized on many grounds. For example, a complete knowledge about the environment cannot
be available; The available data about resources and their use cannot be reliable; The perception about resources (environment) differs from humans to community, community to region, and country to country, prospective model's application, due to these constraints, can be difficult and thus the results obtained cannot be authentic Are close to the ground reality.

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be reliable; The perception about resources (environment) differs from humans to community, community to region, and country to country, prospective model's application, due to these constraints, can be difficult and thus the results obtained cannot be authentic Are close to the ground reality.

e. Cultural or Social Determinism:

Cultural or social determinism emphasizes the human element: "Our thoughts determine our actions, and our actions determine the nature of the world's last" (James, 1932: 318). Since there is a difference in human interest, desires, prejudices and group values, therefore there is a difference in the level of cultural landscape and socio-economic development. The amendment of an environment depends on our perception, thoughts and decision-making processes. This philosophy made by American scholars can be explained in principle, according to which "the significance of man's physical and biological features of his residence is an act of man's own views, objectives, and technical skills". For example, a country that is financed by a hunter's perspective can be poor for an agricultural person; The importance of coal is not the same as those who can not use it. All these truths are self-evident. It is also true that as technology develops, the importance of the environment is not reduced, but the change becomes more complex. The philosophy of cultural determinism is quite broad among American geographers. For example, Eduard Wellman wrote that "the environment is essentially neutral, its role depends on the level of technology, the type of culture and the other characteristics of the changing society". For example, mountain pass estimation, which is for horses, automobiles, airplanes, will be different for them; Assessment of fertility of soil will not be similar to the perspective of a Japanese farmer, on the other hand, or an Amazonian Indian. Similar natural conditions can say different reactions on human part, and in similar circumstances, different cultures can occur. George Carter is out of three fundamental factors in human geography, he has given more emphasis on cultural forces and wrote that "staying as a primary reason for changing the ideas ..., these are the ideas that determine the human use of the physical world We do". He also said that human beings are the decisive factor. After World War II, schools of social determinism became very popular in Austria, Holland, and Sweden. Social geography relates to the spatial distribution of society. This, however, is not able to gain a deeper
understanding of social relations or landscape. Social groups can be isolated in the context of ethnic, religious, professional and some other characteristics, whereas social change is only mentioned, but seldom is associated with any fundamental economic causes or society's class structure. The study of the effect implemented by these groups on the scenario reduces in the definition of purely external factors of the cultural landscape (deployment and deployment of homes, land uses, type patterns etc.), which in the form of morphology and Under the functional changes, boundaries of the same road are infinitely the use of such 'macro regional' research is usually used in the character. Motivated and cannot provide any basis of scientific findings of real importance. Thus social or cultural determinism does not adequately assess environmental factors, that is, the effect of the natural environment on 'cultural geographical differences'. Thus, social determinism is thus rigorous as the environmental fatalism and therefore cannot be accepted in its raw form. To sum up, the major debate among the geographical thinkers is whether people are an active or passive agent in the man-nature relationships. The entire debate revolves around two issues – Firstly, resource exploitation is inevitable for the survival of human beings which means that he will take more and return less. Secondly, there is hope that morality will win as human beings will vote for greater gains than meager personal benefits. The doctrine of sustainable development leads towards both these issues as it is based on the theme that development means meeting the needs of the present without compromising the ability of the future generations to meet their own needs (Report on World Commission on Environment and Development, 1987).


**SPATIAL ANALYSIS**

The quantitative technique in location analysis is known as “spatial analysis” It is sometimes used synonym for the locational analysis. Unwin (1981) presents spatial analysis as the study of the arrangements of point line area and on a map. Foo followers and advocates of spatial science consider human geography as that component of social sciences which focuses on the
role of space as a fundamental variable influencing both society’s organization and operation and the behaviour of its individual members. Spatial analysis got the popularity during the period of quantitative revolution. It is closely associated with the philosophy of positivism.

The got of spatial analysis was building accurate generalization with predictive power by precise quantitative description of spatial distribution, spatial structure and organization and spatial relationship.

The generalization arrived at with the application of spatial analysis could be based on three fundamental component (i) direction (ii) distance and (ii) connection (or relative position).

In the spatial analysis some of the geographers merely apply technique drive from the general linear model to geographical example, while other have argued that spatial data analysis poses particular statistical problems (such as spatial auto-correlation) which means developing procedures specifically designed to counter them.

Spatial analysis for man and environment relationship has been criticised on several counts. One of the main criticism is that spatial analysis focused on spatial determinism, and the logical impossibility of defining spatial variables independent of the context within which they were supposed to operate.

The second weakness of spatial analysis is that it does not take into consideration the cultural values and normative question while attempting to establish the man and environment relationship.

The Marxist and radicalists consider spatial analysis as a device to promote capitalism and exploit workers and environment (see quantitative revolution).

**LOCATION ANALYSIS**

In geography, the new approach became known as “locational” or “spatial analysis” or, to some, “spatial science.” It focused on spatial organization, and its key concepts were embedded into the
functional region the tributary area of a major node, whether a port, a market town, or a city shopping centre. Movements of people, messages, goods, and so on, were organized through such nodal centres. These were structured hierarchically, producing systems of places cities, towns, villages, etc. whose spatial arrangement followed fundamental principles. One of the most influential models for these principles was developed by German geographer Walter Christaller in the early 1930s, though it attracted little attention for two decades. Christaller’s central-place theory modelled settlement patterns in rural areas—the number and size of different places, their spacing, and the services they provided—according to principles of least-cost location. The assumption was that individuals want to minimize the time and cost involved in journeys to shops and offices, and thus the needed facilities should be both as close to their homes as possible and clustered together so that they can make as many purchases as possible in the same place. Likewise, businesses will want to maximize turnover, with people spending as much as possible on goods and services and as little as possible on transport. An efficient distribution of service centres was in the interest of both suppliers and consumers. Christaller showed that this required a hexagonal distribution of centres across a uniform plane (i.e., one that had no topographical barriers), with the smaller centres (providing fewer services) nested within the market areas of the larger.

Other works by non-geographers provided similar stimuli. Economists such as Edgar Hoover, August Lösch (who produced a theory similar to Christaller’s), Tord Palander, and Alfred Weber suggested that manufacturing industries be located to minimize both input costs (including the costs of transporting raw materials to a plant) and distribution costs (getting the final goods to market). Least-cost location was the goal, which could be modelled as a form of spatial economics. Efficient spatial organization involved minimizing movement costs, which was represented by an adaptation of the physicists’ classical gravity model. The amount of movement
between two places should be a function of their size and the distance between them: i.e., size generates interaction, whereas distance attenuates it.
Every science has a goal, i.e. to understand and explain the real world phenomena. Although geography is ‘short on theories and long on facts’, yet development of theory seems to be vital both to satisfactory explanations and to the identification of geography as an independent field of study. Few would deny the fact that the last few decades have been one of the greatest periods of intellectual changes in the trends of geographic development. Most of these changes, the questioning of the past approaches, looking at old problems with new eyes, have been of a methodological nature involving, in virtually every instance, the substitution of quantitative approaches to problems formerly treated in descriptive ways. Today an apparently new perspective has been opened under the impact of so-called quantitative revolution. Statistical methods have been introduced to attain a desired level of objectivity, and search for models and theories and proceed apace. The works of Hartshorne (1939, 1959) may be considered the last in the chain of traditional writers in geography. The concepts of geography elucidated by Hartshorne and accepted by many practicing geographers began to come under attack from the early 1950s onwards.

Another factor that has encouraged this development has been the spread of quantification. A growing number of geographers became aware that mathematics and statistics could be applied to geographical problems. These provide precise tools to test theories and analyze data. The process of intellectual change led geographers to concentrate less and less on describing the differences between particular areas or places and more and more on the study of uniformities and the production of theories about the spacing of phenomena on the earth’s surface. Such an emphasis on Nomothetic approach is in the right direction.
Besides, during the last few decades the focus has also changed to make the concept of the systems of much greater significance, along with that of models and theories. The search for generalizations based on the whole rather than on individual parts is, therefore, a complementary method of modern science known as systems analysis. Since all systems, whether physical or human or a combination of both, consist of a set of objects and the relationships binding these objects together into some organization, it is not surprising that the approach is especially useful in dealing with functional aggregates. Indeed, now the main focus of scientific enquiry has moved away from the study of objects or substances to the study of relationships and organizations. And, as all organizations are recognized as being particularly complex, systems analysis proves to be a particularly appropriate framework of study in geography. The systems approach is not a replacement for the analytic method, but it is an additional line of modern scientific enquiry designated to break down the barriers between inter-disciplinary enquiries. It represents one of the major current research frontiers in geography.

Models, theories and systems analysis provide important tools of explanation in geography in modern times.

**Models:** The practical problem that follows theory –building is how the related information can be presented. One significant and popular way is the employment of model building or analoguetheory1 in geography. The quest for models is a recurrent theme in research and it has become very fashionable in geographic research (Harvey, 1969, 141). In general, model building is concerned with simplification, reduction, concretization, action, extension, globalization, theory formulation, theory testing, explanation, etc. The models link generalizations with theories.

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**Analogy** is the resemblance of relations between some phenomena of the real world in which geographer is interested.

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**Definition** The term ‘model’ is conventionally used in a number of different ways. In its simplest form a ‘model’ is the representation of reality in an idealized form. The process of model building is actually a process of
idealization. The traditional reaction of man to the apparent complexity of the world around him has been for him to make a simplified and intellectual picture of the real world. The mind decomposes the real world into a series of simplified systems. The system is viewed from a certain scale; details that are too microscopic or too global are of no interest to us.

A model is thus a simplified structuring of reality that presents supposedly significant features of relationships in a generalized form. Models are highly subjective approximations in that they do not include all associated observations or measurements, but as such they are valuable in obscuring incidental detail and in allowing fundamental aspects of reality to appear. This selectivity means that models have varying degrees of probability and a limited range of conditions over which they apply. The most successful models possess a high probability of application and a wide range of conditions in which they seem appropriate. Indeed, the value of a model is often directly related to its level of abstraction. However, all models are constantly in need of improvement as new information or vistas of reality appear, and the more successfully the model was originally structured the more likely it seems that such improvements must involve the construction of a different model (Chorley & Hagget, 1967, 22). Scientific models are utilized to accommodate and relate the knowledge we have about different aspects of reality. They are used to reveal reality and more than this to serve as instruments for explaining the past and present, and for predicting and controlling the future. According to another viewpoint, ‘a model is a skeletal representation of a theory’. This implies that a theory may imply more than one model but a model cannot have many theories to be represented. Thus, we can say that models are of lower order than theories. Otherwise, there is no distinction between a theory and a model.

Thus

• A model may be regarded as a formalized expression of a theory.

• A ‘model’ is a simplified structuring of reality that presents supposedly significant features or relationships in a generalized form.

• Models are highly subjective approximations as they do not include all associated observations and measurement, but as such they are valuable in
obscuring incidental detail and in allowing fundamental aspects of reality to appear. The Association for Geographical Studies

- This selectivity means that models have varying degrees of probability and limited range of conditions over which they apply.

- The most successful models possess a high probability of application and a wide range of conditions in which they seem appropriate.

**General System Models** This third category of models represents a newer concept of the times treating the structure of geographical landscape as an assemblage of interacting parts and attempting to represent the process as such. Three subtypes, viz. Synthetic, Partial and Black Box, are discussed below:

Synthetic System Models (i.e. in synthesis): Trying to bring the reality and its representation in perfect harmony or synthesis, such models simulate reality in a structured way, i.e. a perfect correspondence is expected between reality and the model used to represent it. Synthetic systems are artificially built to simulate reality in a structured way and, as Chorley points out, such models may be similar to experimental design models.

Partial System Models: The partial systems are concerned with workable relationships and attempt to derive results without complete knowledge of the internal workings of the system, i.e. there may be some chance of correspondence between reality and its representation through the selected model.

Black Box System Models: The ‘black box’ approach attempts to derive results from a situation in which we have no knowledge of the internal workings of the system. To conclude, the concept of models poses considerable methodological difficulty. There is a multiplicity of model types performing a multiplicity of functions associated with a multiplicity of definitions. Each particular model exhibits a different logical capacity for performing the function required of it. In fact, the type, nature, use, quality and significance of models – all depends on the types of theories to which they serve.
Theories  The quest for an explanation is a quest for a theory. The development of theory is at the heart of all explanations, and most writers doubt if observation or description can be theory-free. To state a fact entirely divorced from theoretical interpretations is not justified. Theories represent generalizations used for explanations. They can make precise predictions. The quantitative techniques can be used effectively if they are supported by carefully constructed theories.

Theories prove that there is ‘some hidden order within chaos’ and the geographers’ task is to search for that order (rule or law). This order may be arrived at in two ways:

1. Empirically Inductive: i.e. induced empirically, or based on personal observations; proceeding for numerous particular instances to universal statements; moving from particular to general.
2. Theoretically Deductive: i.e. deduced theoretically; proceeding from some apriori universal premise to statements about particular sets of events or phenomena; i.e. proceeding from general to particular.

In the latter case, the explanations are based on already established /existing theory (apriori), whereas in the former the explanations arrive at some theory, i.e formulation of a new or original theory (aposteriori).

However, the theories in either of ways are used for explanation and are the highest order generalizations.

Definition: A theory is defined as “a system of ideas explaining something”; or “a system of ideas based on general principles independent of the facts or phenomena to be explained”; or “a scientific statement or a group of scientific statements”. In order to understand the meaning of theory, the difference between a ‘simple’ and a ‘scientific’ statement needs to be made clear. Consider these two statements, for instance:

1. Delhi lies across the river Yamuna.
2. One finds the big cities generally located across the rivers in the world.
Of the above two, the former is a ‘simple statement’, whereas the latter may be called a ‘scientific statement’, because the ‘scientific statements’ are based on generalizations, derived from a number of simple statements (facts).

After searching out some relationship / order, we state it or express it in the form of scientific statements. The lowest order statements are ‘generalizations’ followed by ‘laws’ and ‘theories’ at higher order of explanation. Thus, the theories are the highest order scientific statements or the universal statements. They state some rule of action, behaviour, process or development.

If the form of explanation is empirically inductive, it generates original theories. But in the case of theoretically deduced explanations the process is reversed. In this situation, the theory already exists; only its testing or verification is required. Before the theory is tested and verified in real world situation, it is stated in the form of hypothesis. At times, some new rule or law is also put to test before it gets universal acceptance to attain the status of a theory. At this stage it is only a hypothesis. A scientific hypothesis is a particular kind of proposition that if true, will be accorded the status of a scientific law. Assuming this definition of the term ‘hypothesis’, it appears that the difference between this term and the scientific law is simply a matter of confirmation. After confirmation it becomes a generalized statement or generalization.

The literal meaning of hypothesis is ‘anticipated outcome’.

Structure of a Formal Theory

The scientific theory has a formal structure, which basically includes its Calculus and Text.
The various words that constitute the specific vocabulary of a theory are its ‘terms’. These terms are the Building Blocks of a theory. There are two types of ‘terms’, viz ‘Axioms’ and ‘Derived Terms’.

The ‘axioms’ are the primitive terms that are basic, original and not derived, e.g. ‘point’ or ‘line’ in geometry; and ‘river’, ‘plain’, ‘settlement’, ‘market’, ‘desert’, ‘road’, etc. in geography.

The derived terms, on the other hand, need further definition, as they may have several connotations. They are formed from the primitive terms. The terms like ‘distance’, ‘network’, ‘region’, ‘space’, ‘long’, ‘short’, ‘high’, ‘low’, ‘up’, ‘down’, etc. fall in this category. They are required to be defined and explained within some given context. Their meaning would change or vary in different contexts or references. The original and derived terms combine together to make ‘statements’, the scientific sentences. Again, there are two types of statements, viz. ‘Axiomatic’ and ‘Derivative’.

The axiomatic statements are primitive statements. For example:

‘Delhi lies across the river Yamuna’

or ‘

Thar Desert lies on the western margin of Indian Subcontinent’

The derivative statements are derived from axiomatic statements, and the explanations, at times, are sought from an existing theory. For example:

‘The important cities of the world lie across major rivers’

Or

‘The western margins of continents are deserts’
In addition to the primitive terms and axiomatic statements scientific theories also possess certain Rules or Laws that govern the formulation of the derivative sentences. At least five different types of laws may be formulated by geographers, such as: (i) Cross-Section; (ii) Equilibrium; (iii) Historical; (iv) Developmental; and (v) Statistical (Davies, 1972).

The axioms, statements and rules (laws) make up the ‘Calculus’ of a theory. But a theory is useful in empirical science only if it is given some interpretation with reference to empirical phenomena. Thus in Euclidean geometry, for instance, primitive terms such as ‘point’ and ‘line’ may be interpreted by ‘dots’ and ‘pencil lines’. By elaborating a formal structure we ensure the logical truth of the propositions contained in the theory. These propositions are linked to empirical phenomena by a set of interpretative sentences – called a ‘Text’. The text of a theory tells about its scope, i.e. where and how the theory should be applied and also its limitations in explanation. Thus, the text of a theory performs two important functions, viz:

1. It provides a translation from completely abstract theoretical language to the language of empirical observation. Without such a translation there is no possibility of empirical support for the theory. Or it identifies an abstract symbol with a particular class of real world phenomenon. For example, in a correlation-regression model ‘X’ and ‘Y’ represent the real world phenomena of Independent (e.g. ‘rainfall’) and Dependent (e.g. ‘floods’) variables respectively. 2. Another important function of the text of a theory is to identify the domain of objects and events to which theory can be applied. This domain may simply be defined by a set of spatial and temporal co-ordinates. Domain, in its simplest form is the field of application of theory. It is the section, aspects, reality that the theory adequately covers, including its limitations in application.

2. Types of Theories It has already been suggested that it is comparatively rare for theories in either the natural or social sciences to be stated in a completely formal manner. In some cases this may simply be because sufficient information is not available for such a formal statement to be made. This raises, therefore, the problem of how theories are in fact stated, how far such theories can be partially formalized, and what criteria we need to employ in distinguishing speculative fantasies from scientific theory. In
fact, in a continuum of theoretical formulations, at the one end of which lies the pure formal theory and at the other end lies the purely verbal speculative statement. Thus, there is a whole range of theories in between.

3. Here an attempt is made for a brief classification of theoretical structures according to their degree of formulation, i.e. based on the degree of precision, and the extent to which the theories are structurally complete or incomplete (Harvey, 1967, 96-100). There are four main types and these range from completely formal Type-I theories, through the Type-II theories and Type-III theories which involve pre-supposition and quasi-deduction respectively, to the more nebulous Type-IV theories, which scarcely conform in any respect to the standards of scientific theory.

Type I: Deductively Complete Theories
Type II: Theories with Systematic Presupposition
  1. Elliptical Formulation
  2. Common Sense Presupposition
Type III: Quasi – Deductive Theories
  1. Inductive systematization
  2. Incomplete Deductive Elaboration
  3. Theories With Relative Primitives
Type IV: Non – Formal Theories Verbal Explanations
  Pseudo-theories/ Speculative statements.

QUANTITATIVE REVOLUTION

Introduction: In the 1950s and 1960s, a revolutionary change described as "quantitative revolution" occurred in the discipline of geography. It replaced the ‘idiographic’ approach based on areal differentiation by ‘nomothetic’ one, which had its roots in the search for models of spatial structure and phenomenon. The quantitative revolution led the basis of geography as a spatial science that dealt with the spatial analysis of phenomena that existed on the earth surface. In simpler words, it gave geography a scientific vision through the application of methodology rooted in statistical methods. Some of the elements of positivism, which had previously been not accepted at some point in time, were now accepted open-handedly. In the words of Burton (1963) this school had set out to discover universals, to build models and to establish methods and theoretical bases on which geographical realities could
be erected. Traditionally, geography was a discipline that studied and
described the surface of the Earth, but in due course of time, its definition and
nature have changed. It was now related to providing accurate, systematic,
rational descriptions and explanations of the variations in the geographical
phenomenon that occurred over the Earth's surface. The most obvious change
has occurred due to the quantitative revolution that brought changes in the
methods and techniques used to explain the geographical phenomenon in a
spatial framework.

The movement that led to the occurrence of quantitative revolution in
geography was initiated by natural scientists specifically physicists and
mathematicians. It expanded and led to change physical sciences followed by
biological sciences. By the late 1960s, it became a feature of most of the social
sciences. These include economics, psychology, and sociology; though had
faint impressions in the disciplines of anthropology or political science, has not
occurred in history.

The main objectives of this paradigm in geography were first, to change the
narrative character of the subject (geo + graphics) and make it a scientific
discipline. The second objective was to explain and interpret the spatial
patterns of geographic phenomena in a logical and objective pattern way. The
third objective deals with the use of mathematical and statistical techniques;
fourthly, to make accurate statements (generalization) about location order;
fifthly, to prepare estimates, principles and laws for testing estimates and
estimates and forecasts and lastly to provide a sound philosophical and
theoretical base to geography, and to make it a scientific discipline.

These objectives lead a number of dichotomies within the discipline apart from
the quality dichotomy. Now, these included measurement by instruments
versus direct sense-data; rational analysis versus intuitive perception; cold
scientific constructs developed in the laboratories versus rich daily sensed –
experience from the real world itself; constantly changing phenomena versus
discrete cases; nomothetic versus idiographic, to mention a few. If one tries to
seek answers to these dichotomies he gets trapped within them and is unable
to understand the movement towards quantification in geography. Thus, to
avoid this we shall concentrate on how this movement became part of the
discipline and slowly engulfed it in such a manner that it led to the spread and growth of scientific method in geography.

**Quantitative Revolution in Geography:** Traditionally, Geography has been a "following" discipline; the main streams of ideas had their roots in other disciplines. The doctrine of environmental determinism was represented in the writings of Semple, Huntington, G. Taylor, and Ratzel (if he can be considered a determinist). They were busy with the idea of a causal relationship and were regularly demanding and looking for "laws". A similar mechanical flavor existed in the works by "Quantifiers". It seems as if geography is re-emerging after it got the use and purpose of use of statistical techniques that are quantification became more and more indeterministic.

In geography, the revolution began in the late 1940's and culminated in the period from 1957 to 1960; finally, over in 1963, the year Burton wrote his paper. In between these years, it did gain momentum especially after Ackerman and Schaefer favoured in making geography more theoretical and systematic in nature. Ackerman commented, "although the simplified forms of statistical assistance have been part of geographic distribution analysis in the past; discipline is beginning to move towards more complex statistical methods-a completely logical development'. Burton further commented that both Hartshorne and Spate also agreed on the usage of these techniques in geographical thinking.

The reference of Hartshorne (1959) is being made to his statement, which says, "To raise ... thinking above the scientific knowledge level, it is important to establish generic concepts, which can be implemented with maximum objectivity and accuracy through quantitative measurements which can be subjected to comparisons through the mathematical logic“soaked in ideographic approach, which created a distance between geography and environmental determinism. It seems in some way or other; the quantitative revolution took geography closer to environmental determinism especially as this revolution occurred simultaneously with the upsurge of neo – determinism. The Quantitative Revolution, but natural, was strongly opposed and the dominance of environmental determinism delayed the process of establishment of the scientific basis that the quantifiers wanted to provide. It was vehemently opposed in the United States as determinism had its strongest
base there. Still, new techniques were been used and others were being developed as part of the prevailing probabilistic trend in contemporary science. In the words of Bronowski (1959) in simpler terms, statistics replace the notion of inevitable effect by probable trends. As the revolution progressed.

Spate (1960) in his paper on “Quantity and Quality in Geography”; published in the Annals of the American Geographers seems somewhat skeptical about quantification in geography. The report of a National Academy of Sciences – National Research Council Committee on ‘The Science of Geography’ (1965) also discussed the influence of quantitative revolution in geography. They stated that geographers believe that correlation of spatial distributions, considered both statistically and dynamically, maybe the keys to understanding the development of living systems, social structures and environmental changes that occur over the earth surface. In the past progress was slow and gradual as the number of geographers was less while the problems were numerous. Moreover, the methods of analyzing these multivariate problems were rigorous. It was only recently that systematic concepts and approaches have been adopted to analyze these multifaceted problems.

The Path of the Quantitative Revolution in the Discipline of Geography: The roots of the revolution were in the following publications, which had their significant influence on the incidence and growth of quantification in geography. These are – Neuman and Morgenstern’s Theory of Games and Economic Behavior (1944); Weiner’s volume on Cybernetics (1948); Human Behaviour and the Principle of Least Effort by Zipf (1949) and Stewart’s paper entitled Empirical Mathematical rules Concerning Distribution and Equilibrium of population’ (1947). Stewart’s paper needs special mention as he put forward a new way to raise the old geographic questions.

The effect of quantification began to be felt immediately in geography. Rather its rise has been startling in its suddenness. Quantification did increase in geography and one should accept it as it had a valuable role to play. For example, in 1936, John Ker Rose argued in his paper on corn cultivation and climatic conditions that "the methods of relational analysis would be particularly promising tools for geographical investigation." This call was largely ignored. Strahler initiated an excellent petition when he attacked
Davis’s explanatory and descriptive explanation of geomorphology and supported G. K. Gilbert’s dynamic-quantitative systems.

**Quantitative Revolution in the branches of Geomorphology and Climatology**: Strahler claimed that Gilbert’s paper was more apter than Davis’s work; then what was the reason that it was not accepted as a sign post in geomorphology for future work; rather it has been forgotten and neglected for nearly thirty years. The answer is with Strahler himself who opines that thinks that geomorphology was a part of geography. The physical geographers did not adopt these ideas rather they followed Davis. Some of the prominent followers of Davis include Douglas Johnson, C A. Cotton, N. M Fenneman, and A.K. Lobeck. Strahler finally states these geographers made "excellent contribution to descriptive and regional geomorphology" and has provided a solid foundation for study in "human geography", but did not lay the basis for scientific study within the geographical thinking. This does not mean that prior to Strahler; geographers were not using quantitative techniques in geomorphology. Quam and Woolridge vehemently criticized his views. Quam (1950) states that mathematical formulae and statistical analysis in geomorphology may result in showing an unrealistic picture of reality that might not be accurate and objective. Similarly, Woolridge (1959) critics Strahler’s views and states that although there is the prevalence of a ‘new’ quasi-mathematical geomorphology; it is inadvisable to use mathematics at a higher level as these are not apt in explaining the geomorphologic phenomenon. He further states that whatever the case may be they will continue to regard W. M. Davis as their founder and would criticize all those who do not agree with the methodology of Davis’s interpretations of a different phenomenon occurring over the earth surface.

It is not that geomorphologists did not adopt quantification; Strahler did find his support in L. King (1962) who writes that statistical methods are useful for bulk studies and can be well appreciated if used to study complex phenomenon and processes that constitute a large number of variables or indicators. Although few studies in the branch of geomorphology can apply them, they should be used with great precision so that results are not superficial in nature. Many geomorphologists in addition to Strahler like
Chorley, Dury, Mackay and Wolfman, used quantitative methods and it seemed that the practice would spread.

In the case of climatology, there is little dispute about the use of quantification. This branch of geography whole-heartedly embraced these new statistical techniques to interpret various climatic phenomena. Examples can be cited from the works of Thornthwaite, Mather and Green, Bryson who have successfully implemented quantitative techniques to seek answers for climate problems; thus silencing their critics.

**Quantitative Revolution in the branches of Human and Economic Geography**: So far, the biggest struggle for approval of quantification has been in human and economic geography. It is not surprising that in view of the possibilist tradition; it is here that the revolution runs against the ideas of independence and the uncertainty of human behavior. Here comparisons with physical sciences are useful. Physicists who work at a microscopic level, with quanta and energy, face similar problems that social scientists face with people. Such parallels when recognized are a reason for happiness and not for disappointment. In order to make a reputable place in human society, social science must get direct results in the form of a prediction science that does not need any kind of control, restriction or regiment the person. A social science that distinguishes random behaviour at the micro-level and is even able to foresee results at this level is nothing but the consequence of quantitative revolution.

Several works can be cited which used statistical techniques in a positive manner. Most interestingly large number of debates took place between scholars that appeared in the literature (Burton, 1963). Some of these are worth mentioning – Garrison’s and Nelson debate on Service classification of cities; Reynolds – Garrison’s deliberation on the modest use of quantification in geography. The Spate – Berry argument in Economic Geography that ends on the agreement that statistics are half of a filled glass, the other half is understanding and interpretations. The list is endless but some of the other debates that need to be mentioned include the contest between Zobler and Mackay on the use of chi-square in regional geography and the dispute of Lukermann and Berry on ‘geographic’ economic geography.
The deliberations were done through professional magazines, which got them the much-needed attention. The result was the establishment of the Regional Science Association in 1956 that promoted quantification in geography. Moreover, it made quantifiers an essential part of the geographical thinking and giving them appreciation and approving their work part of the geographical academia.

Although most of the literature cites that, the revolution is over, it has remained active in several sub-branches of geography particularly transport, economic, and urban geography. This is evident from the fact that writings with quantitative methods have been regularly published in acclaimed journals in geography, including Annals of the Association of American Geographers, Geographical Analysis, Environment, and Planning A, The Professional Geographer, Journal of Geographical Systems, Urban Geography, and many others (Kwan and Schwanen, 2009). Although quantitative geography is generally “perceived as a relatively static research area,” it is actually “a vibrant, intellectually exciting, area in which many new developments are taking place” {Fotheringham, Brunsdon, and Charlton (2000); Clark (2008); Golledge (2008)}.

Interestingly, quantification in geography has changed its course in due course of time. It now an ally of critical geographies - for example, the emphasis has shifted from global generalizations to local levels dealing with local relationships in a spatial framework. It has also become sensitive to variables like gender, race, ethnicity, sexuality, and age; and even pays attention to processes which shape individual’s spatial behaviour (Kwan and Weber 2003; Poon 2003; Fotheringham 2006).

Quantitative research is still dominant in the fields of transport, economic, and urban geography in the writings of McLafferty and Preston (1997), Rigby and Essletzbichler (1997), Plummer and Taylor (2001), Schwanen, Kwan, and Ren (2008) and Bergmann, Sheppard, and Plummer (2009). In this regard, Kwan and Schwanen (2009) are of opinion that knowledge in statistical methods is essential for decoding and challenging regressive political agendas; often supported by numbers and quantitative analysis. Quantitative geography, when incorporated with a critical sensibility and used suitably, can be a powerful device for encouraging progressive social and political change.
The Criticism of Quantification in Geography: The quantitative revolution was initially propounded to make the discipline of geography a scientific discipline where the validity of the knowledge that was generated was justified according to the principles of positivism. Although many geographers like Plummer and Sheppard (2001); Kwan (2004); Fotheringham (2006) have argued that quantitative geography does not necessarily have to be based on the epistemological premises of positivism. Whatever the case may be it is to be understood that when positivist epistemology was adopted, the purpose of the geographic research was to seek universally applicable generalizations. The criticisms became more prominent as critical geographers started questioning the relevance and value of spatial science in the early 1970s. Now quantitative geography was labeled as positivist and empiricist because it was based on the principles of scientific objectivity, value neutrality, and the search for universally applicable generalizations. One of the groups that criticized quantification was the group of feminist geographers that was critical of the tendency to draw conclusions based on the principle of universal causality from inferential statistics (Kwan and Schwanen, 2009). Quantification was also criticized for other reasons. For instance, there were those who thought that this method would mislead geography towards a futile course. Some like Stamp argued that quantifiers were too busy in sharpening their instruments that they forgot the real purpose of the revolution. Few opponents also commented on the suitability of statistical techniques for all kinds of geography. They opine that these techniques were appropriate for some branches and not the entire geographic paraphernalia. Another group condemned this revolution on a note that there was a confusion of ends and means. In the words of Spate (1960), ‘it is important to count what can be counted’. Another dichotomy lies in classifying and understanding; classification should never be mistaken for comprehension. Goodall’s (1952) point is worth pondering where he states that quantitative methods or statistical techniques are only adjunct to elucidations or descriptions; they can neither provide explanations nor replace them. Therefore, these methods should be observed only as useful tools and not keys to universal knowledge (Spate, 1960).

These criticisms clearly point out that the quantitative methods have some severe limitations, especially when applied to the study of certain kinds of
phenomena—for example when the purpose is to uncover the complex gendered, racialized or sexualized experiences of individuals or the socio-spatial construction of identities. However, this does not imply that quantification is not in a position to make valuable contributions in the field of geography. The difference lies in the time period if we talk of the 1950s or 1960s maybe this was not possible but in contemporary geographic research, it is possible to reconnect the critical geographies with quantification. Another point of deliberation is that within the discipline of geography several subfields, like transport geography, are historically more quantitative in nature than others; this happened because of the influence of allied fields such as civil engineering and neoclassical economics (Kwan and Schwanen, 2009).

It can be said that the revolution had an early demise; it means that the purpose of the revolution was achieved or not. If seen from the point of view of Burton (1960) its basic purpose was to make geography more scientific and to develop a body of theory. Discontent with the idiographic approach in geography is the root of quantitative revolution; the development of theoretical and model-building geography with a nomothetic approach was the expected result. The basic rationale was to develop scientific method; to develop the theory and to test the theory with the prediction for which the logic of mathematics is the best tool available.

**Conclusion:** The use of statistical or quantitative techniques is one of the most suitable methods for the development of theory in geography. The revolution can never be over until it is able to seek answers and aid the theoretical development of the discipline. Moreover, theory development and its testing are the only ways of creating new knowledge and subsequently verifying it. Models have just formalized ways of descriptions that an author has visualized and represented through his arguments and justifications. In geography, quantification brought this revolution where the ideographic base was replaced by theory building in a nomothetic approach. Geographers started developing theories and created ‘new’ geography that focused on the philosophy as well as methods. These scholars were of the view that mere description, mere quantification, and
mere abstraction were valid to a certain extent; but repeated use of these methods makes one an obscurantist. Theoretical geography got its philosophical base in Bunge’s monograph published in 1962, which identified geometry as the mathematics of space and hence made spatial science the language of new geography. Harvey’s Explanation in Geography (1969) provided a more inclusive channel for the methods and philosophy of new geography. Apart from these scholars, the Department of Geography at Lund University, Sweden became a centre for quantitative and theoretical geography under the leadership of Hagerstrand and Morill. Hagerstrand although based in Seattle provided an academic support to the geographers working in this field at the Lund University. To conclude, whichever method one, the purpose of geography is to seek answers to questions pertaining to problems of quantity and value. Most of our experiences are qualitative in nature and when everything is, reduce to numbers; some essential attributes are lost (Huxley, 1951). Thus one needs to maintain balance as still new worlds are to be conquered and new contributions to be made.

**BEHAVIOURISM**

*Introduction:* By the mid-1960s use of statistical techniques in research for precision has been largely accepted by geographers. The duality of systematic versus regional geography was resolved as both were now accepted as important components of the discipline though interdependent and equally useful. It was increasingly realized by the geographers that the models propounded and tested with the help of quantitative techniques, provided poor descriptions of geographic reality as well as the man-environment relationship. Consequently, progress towards the development of geographical theory was glaringly slow and its predictive powers were weak. Theories such as Central Place Theory, based on statistical and mathematical techniques, were found inadequate to explain the spatial organization of society. The economic rationality of decision-making was also criticized as it does not explain the behaviour of man. It was
a psychological twist in human geography which emphasized the role of subjective and decision-making processes that mediate the association between environment and spatial behaviour of man. It can be said that the dissatisfaction with the models and theories developed by the positivists, using the statistical techniques which were based on the ‘economic rationality’ of man led to the development of behavioural approach in geography.

The axiom of ‘economic person’ who always tries to maximize his profit was challenged by Wolpert. In his paper entitled ‘The Decision Process in Spatial Context’, Wolpert (1964) compared the actual and potential labour productivity of Swedish farmers and came to a conclusion that optimal farming practices were not attainable. He concluded that the farmers were not optimizers but, satisfies. Thus human behaviour was seen to be a product of decision-making and it was a human tendency to have incomplete information, to make imperfect choices and even then be satisfied with sub-optimal options.

1. Behaviourism in Geography

Behaviourism in Geography

Behaviourism is an important approach which is largely inductive, aiming to build general statements out of observations of ongoing processes. The essence of behavioural approach in geography lies in the fact that the way in which people behave is mediated by their understanding of the environment in which they live or by the environment itself with which they are confronted.

In behavioural geography, an explanation for the man-environment problem is founded upon the premise that environmental cognition and behaviour are intimately related. In other words, the behavioural approach has taken the view that a deeper understanding of man-environment interaction can be achieved by looking at the various psychological processes through which man comes to know the environment in which he lives, and by examining the way in which these processes influence the nature of the resultant behaviour.

One of the most interesting and applied aspects of behavioural geography was work examining the human perception of
environmental hazards. The pioneering work by Robert Kates (1962) on floodplain management is one of the bases of this approach. He states the manner in which human beings perceive the uncertainty and unpredictability of their environment play a significant role in the process of decisionmaking. He developed a scheme that had relevance to a wide range of human behaviour. This scheme of Kates was based on four assumptions —
1. Men are rational while taking decisions.
2. Men make choices.
3. Choices are made on the basis of knowledge.
4. Information is evaluated to pre-determined criteria.

Subsequently, Kirk (1952-1963) supplied one of the first behavioural models. In his model, he asserted that in space and time the same information would have different meanings for people of different socio-economic, cultural and ethnic backgrounds living in a similar geographical environment. Each individual of a society reacts differently to a piece of information about the resource, space, and environment. This point may be explained by citing the following example.

The highly productive Indo-Gangetic plains have different meanings for different individuals belonging to a various caste, creed and religion. Jats, Gujjars, Ahirs, Sainis, Jhojas and Gadas living in the same village perceive their environment differently. A Jat farmer may like to sow sugarcane in his field, a Gada and a Jhoja may devote his land to sugarcane, wheat and rice, an Ahir may like to grow fodder crops for the milch animals, and aSaini is invariably interested in intensive cultivation, especially that of vegetables. For a Saini (vegetable grower), even five acres of arable land may be a large holding, while a Jat who uses a tractor considers even 25 acres a small holding. The perceived environment of each of these farmers living in the same environment thus differs from each other both in space and time.

The aspect which was most enthusiastically adopted by geographers from behavioural analysis was the concept of mental maps. The paper of Peter Gould (1966) was the seminal contribution in this
regard. He points out that since decisions on location were guided by the manner in which a human being perceives the environment, it becomes essential for a geographer to have a mental image of how one perceives his environment while making decisions. Therefore, mental maps are not just images or maps but an amalgamation of information and interpretation that a person has on a particular thing as well as how he or she perceives that place (Johnston, 1986). This was further developed by Gould (1966), Downs (1970), Downs and Stea (1973), Gould and White (1974) and Saarinen (1979) through their writings. Gould opines that mental maps are not only means of examining a person’s area of a spatial preference but also provides insight into the processes which led to that particular decision. He states that mental maps may provide a key to some of the structures, patterns and processes of man’s work on the earth surface. The conceptual framework provided by Downs (1970) has been illustrated in Figure 1. This framework proposes that information from the environment (real world) is filtered as a result of personality, culture, beliefs, and cognitive variables to form an image in the mind of a man who utilizes the environment. On the basis of the image formed in the mind of the utilizer about the environment, he takes a decision and uses the resources to fulfil his basic and higher needs. Downs’ framework also suggests that there exist an ‘objective’ and a‘behavioural’ environment.

Environmental Perception and Behaviour (after Downs, 1970)
Pred (1969) presented an alternative to this inductive approach of behaviouralists on theory building on ‘economic man’. In his work Behaviour and Location, he proposes a behavioural matrix (Figure 2) to give a structure in which decisions of locations can be analyzed. The axes of the matrix are quality and quantity of information available and the ability to use that information; man as an economic being is at the right-hand corner. As there is variation in the quantity and quality of the information, the position of man on the axis would also change. His position would reflect his aspiration levels, experience and even norms of the group to which he may belong. His further states, that even same individual would not be in the same position as his decisions may vary over time as spatial patterns are never static in nature.

During the 1970s, a range of related personality assessments, such as personal construct theory and the semantic differential were employed, and in this work geography and psychology became close neighbours (Aitken, 1991; Kitchin, Blades and Golledge, 1997). In particular, this productive interdisciplinary relationship was developed through the annual meetings of the Environmental Design Research Association and in the pages of the new journal, Environment, and Behavior. Since that period, behavioural geography has continued to diversify, even if its position has been less elevated than in the 1960s and 1970s when many disciplinary leaders worked in this sub-discipline. More recent research has included analysis of environmental learning, spatial search, developmental issues in spatial cognition and cartography and Golledge’s (1993) important work with the disabled and sight-impaired. But some of the lustre has left the field. In part, this may be related to the methodological sensibilities of post-positivist human geography. In part, it is due to the growing conviction of the inherently socialized nature of geographical knowledge, which challenges the individualism of psychological models. In part, it emanates from a suspicion of the adequacy of an epistemology of observation and measurement that may leave unexamined non-observable and non-measurable contexts and ideological formations. Nonetheless, behavioural geography has
a continuing legacy, comprehensively itemized and integrated into the massive compilation of Golledge and Stimson (1997).

The objectives of behavioural approach were:

1. To develop models for a human phenomenon which would provide an alternative to the spatial location theories developed under the influence of positivism.
2. To define the cognitive (subjective) environment that determines the decision-making process of humans;
3. To come up with psychological and social theories of human decision-making and behaviour in a spatial framework;
4. To change the emphasis from aggregate populations to the disaggregate scale of individuals and small group
5. To search for methods other than those popular during the quantitative revolution that could uncover the latent structure in data and decision-making;
6. To emphasize on procession rather than structural explanations of human activity and physical environment;
7. To generate primary data about human behaviour and not to rely heavily on the published data; and
8. To adopt an interdisciplinary approach for theory-building and problem-solving.

The fundamental arguments of the behavioural geography to achieve these objectives are that:

(i) People have environmental images;
(ii) Those images can be identified accurately by researchers; and
(iii) There is a strong relationship between environmental image and actual behaviour or the decision-making process of man.

The behavioural paradigm has been shown in Figure 3. In this paradigm, man has been depicted as a thinking individual whose transactions with the environment are mediated by mental processes and cognitive representation of the external environment. In geographical circles, this concept is derived primarily from the work of Boulding (1956) who suggested that over time individuals’ developmental impressions of the world (images) are formed
through their everyday contacts with the environment and that these images act as the basis of their behaviour.

A Conventional Model of Man-Environment Relationship (after Boulding, 1956)

4. Salient Features of Behavioural Geography
The salient features of behavioural geography are discussed in the following section:

1. The behavioural geographers argued that environmental cognition (perception) upon which people act may well differ markedly from the true nature of the real environment of the real world. Space (environment) thus can be said to have a dual character:
   (i) As an objective environment—the world of actuality—which may be gauged by some direct means (senses); and
   (ii) As a behavioural environment—the world of the mind—which can be studied only by indirect means.

No matter how partial or selective the behavioural environment may be, it is this milieu which is the basis of decision-making and action of man. By behavioural environment, it is meant: reality as is perceived by individuals. In other words, people make choices and the choices are made on the basis of knowledge. Thus, the view of behaviour was rooted in the world as perceived rather than in the world of actuality. The nature of the difference between these two environments and their implications for behaviour was neatly made by Koffka (1935-36) in an allusion to a medieval Swiss tale about a winter trave

2. Secondly, behavioural geographers give more weight to an individual rather than to groups, or organizations or society. In other words, the focus of the study is the individual, not the group or community. They assert that research must recognize the fact that
the individual shapes and response to his physical and social environment. In fact, it is necessary to recognize that the actions of each and every person have an impact on the environment, however, slight or inadvertent that impact may be. Man is a goal-directed animal who influences the environment and in turn, is influenced by it. In brief, an individual rather than a group of people or social group is more important in a man-nature relationship.

3. The behavioural approach in geography postulated a mutually interacting relationship between man and his environment, whereby man shaped the environment and was subsequently shaped by it (Gould, 1980). 4. The fourth important feature of behavioural geography is its multidisciplinary outlook. A behavioural geographer takes the help of ideas, paradigms, and theories produced by psychologists, philosophers, historians, sociologists, anthropologists, ethnologists, and planners. However, the lack of theories of its own is coming in the way of rapid development of behavioural geography. Therefore, one can say that the behavioural approach in geography is a fruitful one and it helps in establishing a scientific relationship between man and his environment. The broad scope of behavioural geography is remarkable even by the standards of human geography.
Radical Concept:

Introduction: In the Leftist ideological group, there were two sections – Left-liberal and Left-radical. Both the sections were concerned with inequalities, deprivation etc, i.e. problems pertaining to rich-poor divide. They were against capitalism. They both criticized Positivists because Positivism could not answer the questions of deprivation, dislocation, crime, problems of female issues, class differences etc.

Left-liberals were those people who want minor adjustment in society for the benefits of havenots. But Left-radicals wanted to change the entire social order.

Amid mass demonstrations against government’s social policies, for which people came out on the streets of American cities, political radicalism through the revival of socialist parties happened due to certain reasons, as follows:

1. After the World War-II, there was a steady economic growth for two decades. Then an economic slowdown or slump started to happen. In such a situation, people became conscious of the role of the government – its successful schemes and failed projects. It was widely felt that the fruits of economic growth were not shared equally, and a substantive chunk of society was facing economic hardship. This fueled grievance against the government, and that’s how Civil rights Movements took place in almost all American cities during the late sixties.

2. Another point of discontent was Vietnam War where USA’s aggression was viewed as an imperialist hegemonic pursuit. By and large, it was against the essence of democracy which the USA preached and practiced. It not only led to the destruction of lives and properties of Vietnamese but also led to the death of US soldiers fighting in Vietnam. American people, especially the youth, revolted against the government for Vietnam War. Student protests were not
only limited to its place of origin i.e. USA, but it expanded to several European countries also.

3. Problems of Black population, who lived in the shabby physical environment, started to emerge. Such problems pinpointed the failure of economic growth-centric government policies, which was running under the profit maximization policies.

**Social Relevance Revolution:**

Given this context, a reassessment of purpose and methodologies of natural as well as social sciences began. It was felt that human being and their environment as a part of the earth is the most important subject that natural and social sciences should enquire in details. Geographers, who were working on the themes of “optimum location” of infrastructural facilities, now started to focus on the physical and social environment that surround people. This phase of revolution in geography, after the much-acclaimed quantitative revolution, is known as “radical revolution” or “social relevance revolution”.

**The Radical Stream of the Relevance Movement:**

In fact, “radical revolution” emerged as a critique of quantitative revolution. During the 1950s, the philosophy of positivism and empiricism became very influential. Geographers, while interacting with other disciplines, also started applying various tools and techniques to analyze and explain the spatial variation of man-nature interaction. They got so engrossed in model building, that the theoretical approach towards looking at socio-economic problems was sidelined, and availability of data and application of techniques started to guide research procedures. In such a context, through “radical revolution”, a new discourse started that reminded geographers it is theoretical understanding that shows the path of research through an exploration of suitable dataset and methods, and not the other way round.

Radical viewpoint started through William Bunge’s work who wrote about Radicalist ideas in his book Theoretical Geography in 1962 and who founded Society for Human Exploration at Detroit in 1968. This Society urged geographers to undertake fieldwork in areas where poorest people live or the areas which are most backward and depressed. Such expeditions targeted to
acquire first hand and unbiased information of these areas so that a collective engagement with local people can bring meaningful inputs and bring about sound policy and planning framework. Few expeditions were carried out in Detroit. For providing training to aspirants who shown interest to participate in such expeditions, a course was opened at the University of Michigan. As university officials did not cooperate at the later stages, such expeditions were stopped in the USA. However, the expeditions continued in Toronto (Canada), Sydney (Australia) and London (England). Moreover, the Union of Socialist Geographers (USG) was established in 1974. Members of USG also participated in special sessions of AAG conventions and IBG annual meetings.

Radical ideas flourished in the hands of David Harvey and Richard Peet. Harvey wrote Social Justice and the City where he talked about Black people living in Ghettos. Richard Peet started to publish articles in a famous journal known as Antipode in Clarke University in Massachusetts in 1969. The issues in Antipode were quite revolutionary. They talked about urban poverty, discrimination against Blacks, feminism and cruelty against women, crime, deprivation, problems pertaining to minorities etc. Therefore, geography again got a breakthrough from its original systematic or regional approach when it started incorporating new social issues. Due to increased poverty and inequality, especially poverty among the people of Ghetto and rural areas, Radicalists tried to perceive planning from a new viewpoint i.e. planning with the people rather than planning for the people. According to Harvey, geographers should consider the question as to who is going to control whom, in whose interest the controlling is going to be exercised and if it is exercised in the interest of people, who is going to take it upon himself to define that public interest. Important features and objectives of the radical stream of relevance movement are following:

1. To expose the issues of discrimination, deprivation, inequalities, crimes, issues pertaining to health and mental degradation in the capitalistic society.

2. To pinpoint the weakness of Positivism and Quantitative Revolution in geography which emphasized geography as a spatial science and did not deal with the human issues.

3. To remove regional inequality
4. Radicalists opposed economic and political concentration, imperialism and nationalism.

5. They opposed superiority of a particular race.

6. They also prescribed revolutionary changes in the work order to develop a tension-free peaceful environment for all.

Radicalism was developed as a critique of existing models, because such models especially those adopting a positivist methodology which was supposed to be value-neutral, was helping the imperialistic forces to maintain the status quo. Geography was a tool for imperialists. Radicalism was critical to this system.

Radicalists always talked from the standpoint of those people who were not in control of means of production (land, labour, capital, organization), and they always supported the downtrodden group of society. Radicalist thinking always went against nationalism. Before Radicalist thinking, geography was a science which protected the ideology of majority who owns the means of production. Radicalists criticized this scenario. It also developed as a protest against data. Radicalists thought of a society which is controlled by all.

Radicalists like James Blaut (1970) attempted to link the issue of imperialism with capitalism. Imperialism denotes domination and subordination of one country to another – be it in economic or political terms. More developed countries had a tendency to control less developed ones, by exploiting natural resources and setting terms of trades often biased against less developed countries. Capitalistic countries, through this control, created a monopoly situation. Another issue was ethnocentrism, where an ethnic group was considered superior to another group(s). European ethnocentrism pointed towards the superiority of Europe over Asia and Africa, the superiority of Whites over non-Whites. It also showed the world how and why development persists in Europe. Blaut was very critical to this unicentric model and explained how Europe progressed at the cost of disrupting African and Asian countries. Imperialistic hegemony, through colonization of many African and Asian countries, paved the way for European countries to access billions of wealth. This led to the progress of Europe, in terms of expansion of industries,
commercial activities, education, and technology. As the entire idea of racial superiority and ethnocentrism was based on certain prejudices, Radicalists opposed it. Radicalists also opposed the way females were oppressed in developing and developed countries. Females were found to have an unequal role in terms of decision-making in households. They were systematically exploited, as their role was defined from a male perspective. They had relatively less mobility, and their role was defined to be restricted within household – cooking and taking care of children and so on.

To a certain extent, Radicalism was linked with anarchism. Anarchism called for the removal of state, and its replacement by voluntary groups of individuals. These individuals could work without external pressure and maintain social order. In a way, anarchism promoted individual liberalism and socialism. Peter Kropotkin and Elisee Reclus elaborated on the way by which such social orders can be maintained. Kropotkin attacked capitalism on the ground that it increased competition and inequalities. He commented that mutual cooperation and support help a community or a society to live peacefully. Cooperation based production, decision-making at grassroots level, the spread of democracy, greater integration of short-distanced workspace and living space were some of the ideals many Radical geographers followed.

**The Liberal Stream of the Relevance Movement:** Liberalism, although beliefs in democratic capitalism, advocates executive actions for minimizing social and spatial inequalities in the levels of human well-being. It shows a commitment towards ensuring a basic minimum level of standard of living for all. In this context, it prescribes state action in helping less privileged section of the human society. Statistical techniques, involving multiple variables, were applied to map levels of human being (Thompson and associates, 1962). The work done by Smith (1973) and Knox (1975) are often referred in geographical literature. Measurement and mapping of variables related to human well-being became important, and such variables were categorized into three subsets- “physical needs” (nutrition, shelter, and health), “cultural needs” (education, leisure, recreation and security), and “higher needs” (through surplus income). Their works show that geographers can play a significant role in informing policy-makers about the spatial implications of inequalities so that better decisions can be taken for improving policies and schemes further.
Another part of these works is raising awareness among citizens so that they become better informed on welfare issues. Cox (1973) and Massam (1976) looked at how efficiently public services can be provided, by redrawing of administrative boundaries or changing the location of public facilities. In his seminal book, Human Geography: A Welfare Approach, David Smith (1977) focused on “who gets what, where and how”, and this reoriented the goal of human geography towards making a society where spatial malpractices and injustices are done away with. Therefore the “distribution” of fruits of economic growth emerged as an important issue.

Moreover, this stream of social relevance movement advocates that our surrounding environment should be looked after well. Therefore, issues like environmental degradation-conservation management are often discussed.

Towards Marxist Geography: A great contribution of guiding geography towards Marxism happened through the works of David Harvey. In his book on Ghettos located in American cities, he pointed towards roots of problems that lie in capitalism. According to him, the capitalistic system created such a marketbased mechanism, that regulate land use, and this is biased against the poor Black population. He argued that once a geographer adopts Marxist approach towards looking social problems, he or she cannot detach himself or herself. That’s why a political awareness is generated within them, and they get actively involved in making a society with more justice. Harvey’s influence was so strong that some practitioners of social relevance research started adopting a Marxist approach. Nowadays, radical geography is more aptly known as Marxist geography. -Criticise: Social relevance movement, especially radicalism was able to usher in some fruitful changes in the methodological discourse of geographical studies. These are:

- From the rhetoric of quantitative technique based analysis of geographical attributes, it reoriented human geography towards prominent social and environmental issues, thereby broadening the scope of geography to interact with other disciplines of social sciences.

- The classical tradition of fieldwork in a small region was altered in the sense that more in-depth and participatory planning oriented studies were
encouraged. This fieldwork entailed a new pattern where respondents were involved in the process of surveying. One needs to understand that this new pattern was quite challenging. The expeditions, promoted by the Society for Human Exploration, could not go on extensively due to multiple reasons (including existing power structure), even though it received a certain chunk of academic interest. Some of the limitations or weaknesses of radicalism are:

- First criticism came from Russians who claimed themselves as true Communists and Marxists. Radicalism was entirely an American enterprise. Though Radicalists in America talked about the social change they never talked about an armed revolution which is a basic component of Marxist ideology.

- The theoretical base of radicalism was very weak. Basically, they were dependent on other social sciences. Whatever Harvey discussed in Social Justice and the City were basically sociological, political or economic analysis.

- Though the topic of radicalism was varied, the techniques and methodologies were not very path-breaking.

- Radicalism gave over-weight to Marxism. Geography, by virtue of its subject matter, is a spatial science. It cannot be explained totally with the help of Marxist thinking.

- The ultimate question was ‘Who will guard the guardians’? Even socialist governments following models of Marx could not solve problems of the oppressed class.

- Humanistic geographers criticized radicalists because the former gave more emphasis on people, not as an ideology like the Radicalists. Humanistic geography says that geography cannot be explained through any generalized theory. It is human-specific.

- Positivists criticized radicalism because they don’t take help from any empirical science.

- After the fall of USSR and East European nations in the end of 1980s, the worldwide impression was that socialism has no value and capitalism has won its final victory. Therefore, geography is essentially a locational science which is based on empirical positivist values, which is the tool of capitalists.
Welfare Approaches

Introduction: Welfare geography is an approach to geography where the emphasis is on spatial inequality and territorial justice. Destined up with the rise of radical geography in the early 1970s, welfare geography stresses the need to identify and explain the existence of crime, hunger, poverty and other forms of discrimination and disadvantage. Welfare geography sought to reveal who gets what, where and how. This early work was largely descriptive and developed the abstract formulation used in welfare economics, grounding it empirically but maintaining the use of algebraic representations. It provided a basis for evaluation. Current welfare configurations, regarding who gets what, where and how, could be judged against alternatives. This preoccupation with description eventually aimed to match, and then superseded, by work on the processes through which inequality is shaped. Marxist economics replaced neo-classical economics as the basis for illustrative analysis, which takes place at two different levels. The first involves understanding how the whole social, economic and political system functions, and teasing out universal tendencies. In the case of capitalism, this level of analysis reveals that inequality is endemic. Uneven development is the spatial imprint, the geographical result of the restlessness of capitalism as a system. The second level of explanation attends to the details of particular social, economic and political systems; for example, how housing policy under capitalism advantages some people in some places and disadvantages other people in other places. The analysis of the politics behind these policies has recently been strengthened as part of renewed interest in the relationship between social justice and the state. Accompanying an attention to the restructuring of the welfare state, which characterizes much of this recent work (Peck, 2001), have been endeavored to theorizing a relational ethics of care. Illustration of feminist theory, this work seeks to uncover the social relations behind construction of care and justice. Understanding politics as an integral part in the daily deed, the emphasis is on the connections and relations rather than the difference between categories, such as private and public, state and market (Smith and Lee, 2004).

Welfare geography focuses on the connection between the spatial variation of need and structures of a provision in the creation of geographies of welfare (Smith 1973). A rather late arrival of welfare approach in humanities
and social sciences and particularly in geography has several political, historical, and psychological reasons, e.g., the Vietnam War, crime explosion, environmental degradation. The manifestation of social, political and economic injustice through these crises in cities and towns led a group of social scientists to come up with a new idea and promote the radical approach. Especially, with geography, the issue of distribution was taking new urgency (Smith, 1977). Before the dawn of the Quantitative revolution, geography, like all the other main sister disciplines from Humanities and arts, faced many philosophical and methodological problems. Geography did not progress as a well-regulated discipline.

In the recent years, geographers have, however, adopted new strategies by restructuring their courses of the study and designed the themes around contemporary issues like socio-economic development, rural-urban studies, making the subject a primary source of awareness of local surroundings and regional milieu.

During the last five decades, the subject matter of geography has experienced immense changes in the subject-matter, philosophy, and methodology. The issues of primary concern on which the geographers are concentrating nowadays include hunger, poverty, racial discrimination, pollution, environmental pollution, social inequality or injustice and use and the overuse of depleting resources, etc.

Some of the leading works and issues which have been useful in the public policy making are Black-Ghetto, Geography of Crimes and Geography of Social Well-being. The quantitative revolution of the 1960’s infused a vigor into geography, which was vastly essential for the indepth and comprehensive analysis required in any public context and the formulation of proposals for public policy.

Scientific revolution paved its way in geography in the early 1960s. The pragmatists introduced the use of scientific methods (positivism) for finding solutions to the problems faced by human beings. It is with this intent that scholars like David M. Smith have embraced the welfare approach while debating the problems, prospects and the future scenario of human geography.
The welfare approach in geography has been defined differently by some eminent scholars of geography. Mishan was of the view that, “theoretical welfare geography is that branch of study which endeavors to formulate positions by which we may be able to rank, on the scale of better or worse, alternatives in the geographical situation open to society.” While Nath has defined welfare geography as that area of geographical study where we can study the possible impacts of different geographical policies for the well-being of society. In the spatial context, Smith defined welfare geography as the study of “who gets what, where and how.”

The geographers whose prime concern are the problems of society and are trying to formulate more realistic plans for public policy by giving the description and explanation of the phenomena. Through such analysis, they evaluate their plans and suggest suitable strategies for the balanced development.

The explanation involves the empirical identification of territorial levels of human development and the human condition. This is a major and instantaneous research area in which astonishingly little work has been done in India and other developing countries as well as developed. Explanation covers the how? It involves in identifying the cause and effect relationship links among the different activities undertaken in society, as they contribute in determining who gets what and where. This is where the analysis of the economic, demographic and social patterns mentioned above logically fits into the welfare structure.

Geographical distance and ease of understanding mean that some people will be enjoying the better place to for advantages or disadvantages, whether the structure is a road, railway, hospital, school, theatre, community hall, cinema, park or a recreational place. Therefore, locational decisions and comprehensive plans for spatial allocation of resources must be made with utmost care and dedication, if the benefits and penalties are found to be proportional among the population in a more or less predictable and reasonable manner. In such public policy decisionmaking, geographers’ role becomes authoritative as they have the necessary expertise in the Spatio-temporal analysis of any such phenomena.
Spatial allocation problems are related to the identification of priority areas, planning routes, the location of factories or other sources of employment, the spatial arrangement of facilities providing medical care, housing complexes, shopping centers and allocation of land for different urban and recreational uses. Each of these decisions could be made in some ways, and every decision can have a different influence. Geographers by their expertise can build up more sophisticated knowledge and models of the process of development. This involves unscrambling and complex networks of economic, social and cultural relationships and also the ecological relationships in equilibrium, so easily disturbed by ill-conceived ‘developmental’ projects. Geographers by sharing out, analysis, and synthesis of space can contribute, successfully, meaningfully and more efficiently to the formation of the policies for the public, property, etc.

In developing countries like China, India, and Brazil there is relatively a high degree of internal inequality. On the other hand in the Third World nations, wealth and power and other facilities of public interest are still largely in the hands of urban elites or big landlords. In India, more than 50 percent of the population is still below the poverty line and on the contrary over 50 percent of the total national assets are in the hands of only a dozen families. Moreover, in India, most of the economic activities are concentrated in metropolitan cores, although still, more than 70 percent of the total population is residing in the rural areas. The urban-based industrial and social infrastructural policy adopted by planners is widening the already wide gap on the one hand, between the rich and the poor and on the contrary between rural and urban population.

The highly advanced and developed countries like U.S.A., Russia, Australia, and Japan also have spatial disparities in levels of human development. In the United States, the overall material standard of living is higher than anywhere else in the world. Millions of Americans, especially Negroes (black people), live in poverty and social denial in ghettos (city slums). In many parts of the rural south of U.S.A. (Texas, Georgia, etc.) the living conditions of some people are as bad as anywhere in the African continent. In these ghettos, the rate of crimes like drug addiction is very high.
The perseverance of widespread poverty in American slums, the most affluent society in the world is a paradox which underlines the failure of economic growth under a capitalist system to uplift the lives of all people to a current standard of decency. In 1976, according to the U.S. Census Bureau, about 12 percent (26 million) Americans were below poverty line. One of the opinions put forward by the capitalist for the existing regional inter-regional and intra-regional disparities is that human beings are not born equal, and hence they cannot be equal in their societies.

This situation gets further serious if the social, political and economic organization is intended or formed with an urban-biased or rich people-centered policy. The planners with the help of geographers can construct general social amenities which can benefit all sections of the society. Geographers, however, cannot be the cure for all the ills, inequalities and socio-economic imbalances that are persistent.

Geographers can analyze the spatial dimension of environmental problems, natural hazards and more particularly they know how to handle, analyze and interpret spatially distributed data. This consciousness of and facility of tackling the spatial dimension, which is a major component of all problems of resource and environmental management, is something not provided by those in other disciplines and have a tendency to be overlooked if a geographer does not arrange it. A welfare society needs better sharing of commodities, better distribution of commodities and better of means of manufacture among individuals (groups or classes) and places. All these things are more easily attainable if geographers who are dealing with the man-environment interface and elaborate the spatial distribution of phenomena are actively involved in the procedure of planning and formulation of public policies at different levels of development, i.e., the local, regional, national and international levels.

In countries like Sweden, the Netherlands, France, Norway, Israel, Denmark, U.S.S.R., Australia and New Zealand where geographers in collaboration with the scholars and scientists of other fields to design public policies. Which is effective and beneficial and reaching all sections of the societies. Similarly, Geographers in India can also provide practical proposals
for solving the various social, economic and infrastructural problems that are caused by rapidly increasing population.

**Feminism**

**INTRODUCTION:** It is very important to find answers to certain queries before going into a detailed discussion about feminist geography as, the key concept of the discipline may be rooted in it. Several statistics across the globe pose certain questions before us as to why there are lesser number of females in certain parts of the globe as compared to males; why the prevalence of illiteracy is more among females than males; why females in younger age groups tend to be more unemployed than their male counterparts; or why females are most often under-represented in governments and politics. In short, whether in terms of birth, education, economy or politics, opportunities and power are unequal between the sexes. It is this ‘inequality’ that forms the subject matter of what is known as ‘feminism.’ The most important feature of feminism is that it challenges the traditional thinking by connecting issues of production with the issues of reproduction; and the personal with the political. The feminist theory is essentially based on three assumptions:

- Gender is a social construct that oppresses women more than men. These constructs are shaped by patriarchy.
- Women’s knowledge about these constructs helps in envisioning a future non-sexist egalitarian society.
- Thus, two relevant concepts that need to be understood here are that of ‘gender’ and, ‘patriarchy.’

The word gender is often used interchangeably with sex, though the two have different connotations altogether. While sex is biological, natural and remains constant over space and time; gender is a social construct that may vary with time, space and culture. Gender is a social classification of the sexes into masculine and feminine. Different masculine and feminine qualities may have their impact on the social and spatial relations between and among the sexes. When such relations are approached by geographers from within the realm of the principles and concepts of feminism, what arises may be
termed as feminist geography. Since feminism always deals with women’s position vis-à-vis men; there may be another simultaneous field of study within geography, that is, the geography of masculinities. Together they constitute what can be precisely called ‘gender geography.’

The term patriarch originally derived from the Old Testament means the rule of the father (pater in Latin meaning father). However, the feminist use of the term was introduced by Kate Miller in her groundbreaking book, ‘Sexual Politics’ in 1970. The term may be well understood in the words of Marilyn French as the manifestation and institutionalization of male dominance over women and children in the family and the extension of this dominance in the society as a whole. The following aspects of women’s lives may be under patriarchal subjugation:
- Women’s productivity and labour power.
- Women’s reproductive capacity and sexuality.
- Women’s mobility.
- Women’s access to economic resources.

The social, cultural and political institutions. To develop a proper understanding of the subject matter of feminist geography, it is necessary first to understand the true meaning of the feminist theory, its development through time, the different schools of thought that emanated within it and how its methods can be used in geography.

**THE CONCEPT OF FEMINISM** Feminism as a concept is often misunderstood as an approach with extreme hatred for men and that a feminist is essentially a female. But in reality, there is no biological pre-requisite to be a feminist—males can also be feminists and in fact some are, just the way some women are not. The feminist theory upholds that inequality exists between the sexes. It has four notable features:
- It is intensely interdisciplinary in nature ranging across various disciplines.
- Certain themes are recurrent in it—reproduction, representation, sexual division of labour.
It imbibes in it new concepts like sexism which are not only created to address the gaps in existing knowledge but also to describe forms of social discrimination.

It draws upon women’s subjective experience to enrich knowledge.

The idea of ‘women’ as a distinct social group dates back to the 18th century. The first full political argument for women’s rights and individual development was inspired by the French Revolution. At that time, Mary Wollstonecraft described in her ‘A Vindication of the Rights of Women’ (1792), the psychological and economic damage experienced by women owing to their forced dependence on men and exclusion from the public sphere. Over time, the ideology of feminism has passed through several waves or phases that resulted in the development of its different variants.

The first wave of feminism started with the liberal principles of individual rights and freedom for women. The liberal feminists contrasted the concept of servitude of women that was considered as ‘natural’ and protested against all forms of subordination that reduced women to adjuncts of their husbands or fathers. The roots of this stream of feminism can be traced in 17th century British liberalism and the French Revolution. Wollstonecraft, a liberal feminist advocated for the protection of women under civil laws, their right to be politically represented and to be engaged in well-paid work and respected professions so as to reduce their dependence on the institution of marriage. Harriet Taylor argued that women should be allowed to work even after their marriage because, not only will her economic contribution to the family promote her status within it, but it would also enhance her freedom of choice. Domestic violence and the tyrannical behaviour by the husbands was a central theme of focus for John Stuart Mill.

By the 1960s, though the first wave of liberal feminism had achieved its basic goals in Europe, women still suffered from various forms of legal discrimination and were grossly unequal in both economic and political terms. The second wave of feminism thus, that started in Europe towards the end of the 1960s, sought to adopt a socialist and radical standpoint. Since1970s, many feminists
had started questioning the relevance of liberalism as a possible remedy to women’s subjugation. Hence, Marxist feminism emerged as a dominant strand of feminist ideology in the 1970s and 1980s. This variant of feminism, as the name suggests, drew its ideas from the theories of Karl Marx. It attempted to link the situation of women’s oppression to class struggle and economic development. Though Marx himself did not have much to say regarding the situation of women, his methods and concepts were universally accepted and applied. This method argued that the key to comprehend the women’s question is laid in the development of production, that is, economy and technology. Therefore, like any other social organization, the relationship between the sexes is a function of a particular stage of economic development and cannot be altered on its own but only through socio-economic changes resulting from class conflict and revolution. Engels believed that women’s oppression did not exist through time but only started with the creation of private property and a class-based society. Hence, only with the overthrow of capitalism, such oppression would disappear as, women would be no longer economically dependent on men and socialization of housework and childcare would free them from domestic chores. Therefore, women instead of fighting for their own causes should stand by working men for a revolutionary transformation of the society. This strand of feminism ruled out the idea that the interests of working men and women might conflict and that, women can have group interests beyond class lines or gender relations.

By this time, another group of feminists were developing their theories asserting that patriarchy, and not class was the oldest form of oppression. They constituted the radical feminists who originally worked within the Marxist set up in which they found that women’s issues were treated as trivial. They were of the view that Marxism and feminism were not compatible with each other. However, in response to this there were some Marxist feminists who rejected the concept of patriarchy as historical and opined that women’s issues could not be isolated from a wider socialist
movement. They tried to analyse women’s work both in home and in paid employment which eventually gave rise to the domestic labour debate and there was a demand of ‘wages for housework.’ Some of the key ideas associated with radical feminism may be listed as---- (i) unity of theory and practice; (ii) linking the personal with the political; and (iii) the fundamental nature of women’s oppression and subordination.

By the 1990s, there was a deep distrust for any metanarratives or any universal philosophy as Marx’s. This was the beginning of the post-modern era. Jean Francois Lyotard’s The Post Modern Condition (1984), laid the foundation for post-modern feminism which believed that, women like race, class or ethnicity could not be used cross-culturally to describe the practices of human societies and that it was not a universal category. Lyotard criticized the Marxist philosophy for propounding a homogenous society which was believed to be created only through coercion. Post-modern feminism upheld that social identities were heterogeneous and complex, and it was thus impossible to create a totalizing social theory.

**Modernism Post-Modernism in Geography:**

According to the Oxford Dictionary of Geography, postmodernism is ‘philosophical stance which claims that it is impossible to take grand statements – meta-narratives –about the structure of society or about historic causation because everything we perceive, express, and interpret is influenced by our gender, class, and culture and no one interpretation is superior’. “The ‘Post-modern’ is neither a canon of writers nor a body of criticism, though it is often applied to literature of, the last twenty years. The very term signifies a simultaneous continuity and renunciation, a generation strong enough to dissolve the old order, but too weak to marshal the centrifugal forces it has released. This new literature founder in its own hard-won heterogeneity and tends to lose the sense of itself as a human institution. My account is accordingly a survey of attitudes and tendencies, gestures and drifts, alibis and advertisements, clichés and obfuscations, which comprise an institution without a theory’. – (Newman, 1985) The term Post-modernism is ambiguous
and vague. The term in itself is not indicative of what it opens to; however, it becomes a half understood, not clearly deciphered and loosely defined notion. As the name suggests Post-modernism is ahead of modernism, it’s a strong departure from the modernism An ambiguous and difficult coinage, the Post-Modernism is an elusive concept, least understood and loosely defined. The pervasive use of the term across, literature, Arts, Social Sciences, and Humanities is in vogue. The scholars and the intelligentsia, which includes academics, are using the term to express various shades and dimensions. A section of scholars and writers take Postmodernism as a cultural system, whereas others undermine it as a mere intellectual discourse one indulges into to satiate his or her own arguments and give a new dimension to their scholarly pursuits. There is also some section of the scholars and academicians who believe postmodernism is a little understood cultural as well as a stimulating intellectual phenomenon, quickly turning into a movement with a potential to alter the way things are being observed and analyzed and interpreted. The proposed chapter is a small effort to explore and clarify the ambiguity associated with postmodernism and its tacit implication in the fields of contemporary knowledge, particularly geography.

The chapter unfolds in a systematic manner.

1.1 Postmodernism: Trying to clear the ambiguity is it a departure from or one of the manifestations of Modernism.

1.2. Style and Characteristics of Post-modern Architecture

1.3. Shades/ Dimensions of Post-modern

1.4. Postmodern Geography

1.5. Postmodern Geographer

1.1 Postmodernism: is it a departure from or one of the manifestations of Modernism. Handling the most ubiquitous pervading and important quest of what exactly is Postmodernism, different shades of postmodernism its implication in Social Sciences in general and Geography in particular. Postmodernism: As stated earlier postmodernism is a concept not very clearly understood is shrouded in ambiguity and completely lacks the objectivity. Eminent contemporary commentators have viewed and understood postmodernism in their own distinct mannerism. It’s always been compartmentalize itself into what it is
what it ought to be and what it is supposed to be; Advocates of postmodern pioneered the belief that it is hermeneutics involving literature, arts and other established spheres of knowledge. The views expressed though are subtle and diffused do neither contradict nor substantiate, however, there seems to be an agreement among the contemporary thinkers and writers’ cutting across the boundaries of the disciplines, that ‘postmodernism’ is a strong departure from the modernism. Initially appeared in the writings of Arts and Literature, post-modernity pervades through the other streams of knowledge as well as rather rapidly. Characterized by order, rules regulations, pattern, and system, post-modernism is scornful of everything which pertains to modernity. Set against the grand narratives and paradigmatic structuration of modern arts and aesthetics, the new ‘postmodern ‘experiments professed an ironic, playful lightness of being, an eclecticism marked by pastiche and in their more extreme expressions, even a certain degree of nihilism, (c. minca). difficult to define the Postmodernism and Post-modernity from within its own discourse, it becomes paradoxical as postmodern beliefs in instability of meaning and inherently juxtaposed to regularity and established ‘approved’ notions of modernity. It cannot compartmentalize itself into what it is what it ought to be and what it is supposed to be; Advocates of postmodern pioneered the belief that it is hermeneutics involving literature, arts Postmodern not only rejects the epistemologies and associated metaphysics of modernity, it creates an intellectual environ where established assumptions and presumptions of representation of ideas are challenged. The frowning upon of modern ideas of order and established notions to the point of completely negating and discarding with nihilism, advocates of postmodern believe summarizes its basic tenets. Postmodernism not only opposes modernity but anything associated with it, the institutions, the ideas, the schematic order and perhaps the mindset itself. The peculiarity about the postmodernism is that it believes in shattering the older notions and order, however, fails to provide for the new. ‘Deconstruction’ became the central or focal theme of the current postmodernism whose origin can be traced during the 1960s as a revolt to modernism. Figuring in literary theory, postmodernism was pitched against modernism and thus triggering a plethora of academic activities. All the arguments for the postmodernism as a new era/ epoch marshaled along with the notion of deconstruction, which Norris,1982, page 3) lucidly exhorts
‘Deconstruction is avowedly post-structuralist’ in its refusal to accept the idea of structure as in any sense given or objectively there in the text. Above all, it questions the assumption that structures of meaning correspond to some deep-laid mental ‘set’ or pattern of mind which determines the limits of intelligibility. Deconstruction shuns any presumed or taken for the granted notion of communication among mind meaning and concept of method. Though, deconstruction critics, such as Derrida and de Man talked about the writing which according to them with its ‘own dialectic blindness and insight precedes all the categories that conventional wisdom tries to impose on it’ (Norris, 1982), have focused on deconstruction as a hermeneutic device, gels well with grasping the intricacies attached with post-modernism. Deconstruction as a potent ideological base, a precursor to postmodernism, nevertheless, came a long way in breaking the shackles of norms, values, mindset and modern episteme, created a chasm between what shouldn’t and what should be. The biggest challenge was to reconstruct the edifice of modernism severely challenged and hence obfuscating the clear vision, giving rise to ambiguous and complex mélange of comingling. Postmodernism is a leap from the modernism, yet completely unaware and unclear towards what (at least as its proponents and advocates make us believe). Certainly, this gives rise to some valid skepticism in various academic circles, whether it’s a real departure from modernity or one of the many manifestations of modernism itself, is intellectually stirring the academics across the disciplines. Proponents of postmodernism continually seek out new ideas to replace currently held orthodoxy The proponents of philosophically stronger versions of postmodernism maintain that they do not intend to replace any current orthodoxy but instead wish to destabilize the modernist progression from one orthodoxy to another. (Duncan, Nancy). Destabilizing an established and patterned paradigmatic shift of progression of orthodoxy in a cultural system and social understanding ensemble in the epistemology of a particular historical period sans alternative perspectives is one argument pitched strongly against postmodernism. Some salient characteristics of Postmodernism:

1. Post-modernism sometimes interchangeably yet erroneously taken as post-structuralism as proposed by Jacques Derrida summarily rejects and denounces rationality of human beings and their actions, a central and favorite disposition of modern period.
2. Post-modernism respects heterogeneity and diversities, unlike modernism where the emphasis is on generalization theorization in to simplify the complexities of various human dynamics. 3. Lyotard, who is considered as a pioneer in using the term post-modernism in critical social theories of humanities, social sciences and anthropology were opposed to the ‘totalizing idea of reason, for he believed that there is no reason but a set of reasons. Every individual tends to observe and perceive independently, may or may not in synchronization with popular and prevalent belief, thus giving intense rise to subjectivity. 4. Modernism harped on unearthing underlying order, pattern and strived for objectivity, however, post modernism, on the other hand, believed in subjectivity and thus didn’t look for order and hence rejected Metanarratives in totality.

5. Postmodernism shuns the postulations of theories and laws or Meta – narratives like Marxism; instead, it insists particularity and plurality of knowledge. 6. It believes that there could be many competing discourses attached to any aspect of social theory/topic, and none of which could be more correct than the other, hence no one explanation or prior basis to decide what is true.

1.2 Style and Characteristics of Postmodern Architecture The term postmodernism is taken as an architectural departure from the modern style. The spatial expression has again taken a centre stage in the architectural design in postmodernism. The postmodern as a style is very well reflected in the architectural designs. Postmodern urban landscape is a mosaic of vivid expression spewed upon the spatial spread of the city. The urban space is taken up by architectural designs (particularly in the cities of Los Angeles and Las Vegas) representing their own unique style and identity, painting the large canvas of urban space into a collage of postmodern style of architecture. The building cropping up is having witty and cosmetic embellishment in the traditional design. The iconic building becoming self-referential is actually having a curious mix of traditional modern style and postmodern perspective, both satiating the consumers as well as the minuscule number of architects. Each unit distinctly different, don’t adhere to and abide by any established standard of architectural design stereotypical of modernism. Though looking for an order and pattern in the postmodern city in itself is paradoxical and contrary to the antifundamentalism of post modernity,
the urban mosaic does not paint a chaotic and anarchist picture. The city of Los Angeles, often considered as the laboratory of postmodern architectural design from where lessons were adopted in various urban contexts elsewhere, cannot be bracketed in one singular trajectory or style other than post modern. Looking for a generalized blanket adjective for the architectural design of the urban expression of post modern cities actually, undermines the basic tenets of the post modernity itself. The study of the postmodern urban landscape by the different social theorists brings forth two distinct approaches of interpreting the post modern as indicated by C. Minca in his postmodernism / postmodern Geography. He maintained that there were two approaches, first post modern as a distinct era/ Epoch as a phase of advanced capitalism. Second is adopting a new postmodern attitude/approach to look at or study the cities, a specific postmodern way of thinking. Interestingly, the first approach tries to assess, interpret and study new urban landscape as a changing urban reality, where the old modern paradigm in architectural advancement is being broken away giving way to something distinct and unique. The uniqueness in itself has become common and is in use quite regularly. The urban neighbourhood and the isolated dwellings (particularly, in the cities of Las Vegas and Los Angeles; representatives of post modernity) do not follow any rhythmic pattern or adhere to any of the established Meta narratives of modern times, are wired into close propinquity over a hyperspace which is fluid and pervading, through high speed internet and things of internet. The second approach tries to observe urban landscape through post modern perspective. A new adopted attitudinal stance which restricts the ‘observed’ be viewed through a set postmodern perspective, and herein lies the fallacy of post modernity which seems, as many critical social theorists and writers believe to be the pastiche of modernism and histrionics. Minca very succinctly puts ‘ Post modern urbanism can thus be interpreted as the emergence of new forms of urban development, new urban spaces, as well as a new lens, a new logic within which to interpret the urban.’ First appeared in the writings and works of critics in early 1950s, post modern ideas in the form of unconventional logic and their operational designs, not in accordance with the traditional or modern style, influenced every field of inquiries including the architecture. Post modern urban design is derived and built up upon the departure from strict regulation of modernism from a previous movement
called Modern Functionalism, wherein the designs were based upon the utility and feasibility parameters. With the conceptualization of Postmodernism, architects merged arts and functionality in one broad concept. Renewed emphasis upon the uniqueness of style and form is one of the important aspects of the architectural design of post modern. Anything regardless of pattern and feasibility can be incorporated in post modern building design. The application of ‘Anything you want’ in architecture denounces modern phase designing which operated on well established, highly regulated and prevalent opinionated standards/ parameters of building construction technologies. The post modern city did never try to satiate those Meta narratives of the modernity, but also provided concrete alternatives well reflected in the architecture of the city of Los Angeles. Even without following the modern pattern and set standards, the post modern urban design does not present a chaotic picture, rather there seems a certain kind of harmony and orderliness sans any order. Paradoxically, not adhering to any systematic and regulated pattern, the urban mosaic of a post modern city reflects a picture having an unusual kind of harmony and perhaps an order without following the rules of orderliness. Los Angeles is a true representative of a post modern city and it is looked up and analyzed by anybody interested in the study post modern urbanism and urbanization. A few critics considered a separate school of Los Angeles in the study of urban sociology and architecture in line with the Chicago school of thought. The advent of post modern era coinciding with cultural transformation, expressed in a distinct spatial pattern in the urban landscape is ideally represented in the city of Los Angeles. Parallels of post modern urban space were drawn to find similarities in other contemporary cities. The postmodern cities are hence, addressed through two perspectives as the emergence of altogether a new style or form urban landscape and secondly through postmodern logic itself. Post modern cities as Relph believed are not just about the drastic and fundamental change in the architect, however, it’s an attitudinal change on the part of the citizens as well as the authorities in terms of planning with regards to architectural design, urban gentrification and generation. Preservation of cultural heritage along with monuments also constitutes an integral part of urban designing of post modern era. Furthering the same line of argument as of Relph, Michael Sorkin, 1992, picking up the ‘incongruities’ or say ‘fragments’ declares the demise of
traditional old modern cities, characterized by the well planned and chalked out urban designs of the neighbourhood, strong network of lines of communications etc. The emergence of post modern city wired into close propinquity in cyberspace through high-speed internet where spaces fudge and the demarcation between private and public place is blurred. Sorkin highlighted three distinct shades of post modern city. 1. Obliteration and dilution of materials and cultural relations which gave people identity confined/stuck to a specific special location. He fails to further explain this argument. 2. Urban spaces rapidly transforming themselves into specific pockets or enclaves catering to specific identities. 3. Post modern city is infatuated with security concerns and virtual world. Internet and things of the internet have a strong influence on everyday lives, in the post modern cities. Therefore, Sorkin’s idea of post modern city not only celebrates the departure from modernism, it is nonetheless segregated and sequestered into spaces, superficially public but inherently having specific theme based identities.

1.3. Shades of Post modernism MJ Dear analyzed three distinct meaning of contemporary post modernism, the Style, Method and post modernism as an Epoch. A significant amount of ambiguity and haze surrounding the post modernism is also because of the use and implication of all three shades of postmodernism simultaneously in the contemporary writings. The birth of the current postmodernism occurred in the mid-1960s in literary theory. The revolt against modernism sparked a proliferation of activity, including structuralism and mystique of postmodernism (Berman, 1982). Post modernism as a method co-opted ‘deconstruction’ as a central core in the endeavour to gain intellectual prominence. Deconstruction, as propounded by Derrida and others, became the spearhead of the intellectual movement marked as a revolt against the modernism. However, the greatest difficulty with the ideas of post-structuralism/ deconstruction was that of reconstruction. The nihilistic approach with utter disdain for and diabolical renunciation of Metaphysics and grand explanations of modernism, without actually offering the alternatives, left the critical social theorists in a fix. The works of the post structuralist / post-Marxist thinkers and writers actually became the precursor for the advent of post modernism. Post modernity as a method gained further prominence, particularly in geography post-1980s.
1.4. Post modernism in Geography: Postmodernism as an intellectual movement, implications of whose is widely explored by the scholars across in their own respective disciplines are not unanimous in tracing its chronological origin. Postmodernism loosely defined in terms of an era/historical phase, a new cultural and social system and curiously mere intellectual discourse radically denouncing and challenging the Metanarratives of the modernism. Some social theorists traced the origin of postmodernism way back in the works of Hegel, Nihilism of Nietzsche, whereas social scientists like Habermas believed that the period of ‘Modernism’ which started off as the consequence of Enlightenment Project of the eighteenth century, and therefore, present is the advanced age of modernism, postmodernism is still not on the anvil. Lyotard believed that the postmodernism is actually the nascent stage of modernism, leading to a celebrated debate of Habermas and Lyotard, leading to a new and valid skepticism; whether postmodernism is an actual departure from modernism or it’s an extended or just one of the many manifestations of modernism itself. The debate continued for long and set paving stone in order to clear the ambiguity associated with post modernism as an intellectual movement where different sets of interpretation are in vogue. Post modernism has risen to prominence just at a time of peculiar ferment in the social sciences. This ferment has two distinct components: first, a concerted general attack on the legitimacy of social sciences; and second a renaissance in the specific realm of social theory. In the social

nial theory and post modern geography, using the idea of Third space. The ‘postmodern’ perspective rejects, a priori, any paradigmatic closure and is, therefore, more usefully conceived as a particular way of.