3

MAN-ENVIRONMENT RELATIONSHIPS

3.1 APPROACHES TO THE STUDY

The study of relationships between man and environment has always been, in one way or the other, a focal theme in geography but the concept of geography as environmental science and facets of man-environment relationship changed through time with the development of human society and the dimension of environment. In the beginning of the process of evolution of man and his society physical elements of the planet earth e.g. terrain, soil, water, climate, flora and fauna formed man's environment and man was basically a 'physical man' because of his limited wants, requirements and total dependence on nature. As the man became social, economic and technological man, he broadened his environment by creating his own environment (built environment) through his design and skill to have provision for better food, shelter, access and comfort. The man-environment relationships, thus, can be perceived and evaluated in a variety of ways and approaches.

1. Environmental Deterministic Approach

This approach is based on the basic tenet of made man' and pays more attention on the complete control of physical environment on man and his activities. In fact, according to deterministic perspectives of man-environment relationships, man is subordinate to natural environment as all aspects of human life viz. physical (health and comfort), social, economic, political, ethical and aesthetic etc. not only depend but are dominantly controlled by physical environment. Though this deterministic or environmentalistic approach blossomed in the writings of E.C. Semple (1910) in the second decade of the 20th century but its seeds were already sown in the second half of the nineteenth century. In fact, the publication of 'The Origin of Species' of Charles Darwin in 1859 laid the foundation stone of the concept of environmental influences on man and other organisms.

Fredrich Leplay demonstrated the effects of physical environment on society through his dictom, place (environment)-work-folk, which shows that environment (place) conditions the type of work, and work shapes, atleast in part, the social organisation (folk) (George Tantham). The concept was further elaborated with the tone of firm determinism by Demolins (1901 and 1903). He postulated that *'society is fashioned by environment'*. He attempted to analyse social structure in terms of 'geographical environment'. Three American geographers e.g.

W.M. Davis, E.C. Semple and E. Huntington strengthened the concept of environmentalism. W.M. Davis, though more known as a geomorphologist, attempted to link nature with man. His two essays published in 1903 and 1906 clearly demonstrate that human activities, racial characteristics and cultural elements are related to greater extent to the environment. He classified human elements in terms of physical elements and pleaded for the control of physical elements over human elements but later on he modified his earlier concept of man-environment interrelationships as the main subject matter of geography and treated description of regions of the earth as the core of geography.

The concept of environmentalism culminated in 1910 when American geographer E.C. Semple published her book 'Influences of Geographic Environment' wherein she opined that 'man is the product of the earth's surface. This means not merely that he is a child of the earth, dust of her dust, but the earth has mothered him, fed him, set him tasks, directed his thoughts, confronted him with difficulties that have strengthened his body and sharpened his wits, given him his problems of irrigation and navigation and at the same time whispered hints for their solutions' (E.C. Semple, 1910, pp.1-2). Deterministic/environmentalistic approach was fully organised on scientific plane by E. Huntington. His 'Civilisation and Climate' (1915), 'The Human and Habitat' (1927), ' Season of Birth' (1938) etc. clearly demonstrate the influences of physical environment on man. His postulation that 'climate not only influences human life but also his birth' proves that he was a strong advocate of environmentalism.

It is apparent that the deterministic/ environmentalistic school advocating control of nature on man dominated the geographic thoughts upto 1920. According to Grossman (1977) the first two decades of the twentieth century was influenced by three aspects of contemporary scientific thoughts. (i) Darwinian concepts of natural selection, adaptation and survival of the fittest. Darwin's argument that 'gradual modification and diversification of organisms stems from a process of natural selection and adaptation to environmental factor both being slow but ongoing over long period of time' (C.C. Park, 1980, p. 113) is fully reflected in 'Ratzels' social Darwinist concept of geography as the study of man's relationship to his environment' which had held sway-whether it was with emphasis on the role of human choice (as in the possibilist tradition of French geography) or on influences and controls exerted by nature on the course of development of human societies (as visible, for example, in the works on Ellen Churchil Semple in U.S.A. and A.J. Herbertson in U.K.) (R.D. Dikshit, 1985, p. 69). (ii) Application of deductive approaches to scientific enquiry, and (iii) Acceptance and application of Newtonian concept of cause-effect relationships.

2. Teleological Approach

Teleological approach is based on religious faith of man being superior to nature and all other creatures. This school emanated from the teachings of Judeo-Christian religious tradition which preached that 'man is superior to all creatures and every thing is created for his use and enjoyment'. This ideology of man-environment/nature relationship fostered the man to exploit natural resources and to subdue nature without considering the after-effects of reckless and uncontrolled plundering of natural resources. This approach of man-environment relationship led to excessive and rapid rate of exploitation of natural resources in North America and Western Europe as well as in other parts of the world which were their colonies. A host of scientists and environmentalists have held this religious tradition responsible for present-day ecological crises.

This approach of thinking of man towards nature and environment stimulated Europeans to spread out all over the world in search of unexplored land and resources. Consequently numerous colonies were established in all of the inhabited continents. After 1750 there began a race for rapacious exploitation of natural resources and widespread industrialization in Europe and America. The process continued for the last three centuries and created most of the present-day environmental problems.

3. Possibilistic Approach

Possibilistic approach to the study of man-environment relationships emerged through the criticism of environmental determinism and overtone of teleological approach. Right from the very inception of the school of environmental determinism there was dissenting voice raised by those who

believed that 'no doubt physical environment influences man and his activities but there is ample scope for man to change the environment so much so that it becomes suitable for man and his society'. The German philosopher Hegal, fed up with physical determinism remarked, 'Don't talk to me about environmental determinism. Where the Greeks once lived, the Turks live now, that settles the matter.' While reviewing man-environment relationships, Kirchoff concluded that 'man is not an automation without a will of his own. The suggestions thrown out by the nature of his birth place some times find him a docile, some times a different people'. A group of people did not approve the principles of environmental determinism. Though they did not discord the berriers of environment but they gave due weightage to active man. They believed in the capacity of man to modify and mould the nature in their own ways. This concept of possibilism was founded by Febvre who has remarked, 'man is a geographic agent and not the least. He every where contributes his share towards investing the physiognomy of the earth with those 'changing expressions' which are the special charge of geography to study'.

Two French geographers, Vidal de la Blache and Jeans Bruhnes and American geographers Isiah Bowman and Carl Sauer founded the school of possibilism which is based on the philosophy of possiblism in nature at every stage in a given space and time as remarked by Febvre, 'There are no necessities, but every where possibilities and man as a master of these possibilities is the judge of their use'. Possibilists were quite aware of the limitations of freedom of man to dictate terms to 'nature' and thus they did believe that man cannot fully tame the nature and is not always victorious. Febvre, a staunch believer and advocate of possiblism has accepted that 'Man can never entirely rid themselves, whatever they do, of the hold their environment has on them. Taking this into consideration they utilize their geographical circumstances more or less according to what they are and take advantage of their geographical possibilities. But here as elsewhere there is no question of necessity'. Jeans Brunhes also accepted the limitations of man's control over nature as is evident from his writings, "The power and means which man has at his disposal are limited and he meets the nature bounds which he cannot cross. Human activity can within certain limits vary its play and its environment, but it cannot do away with its environment, but it can often modify it but it can never suppress it and will always be conditioned' (Jeans Bruhnes).

Possibilists replaced more deterministic terms 'control' by 'influence' and 'influence' by more moderate terms 'response' or 'adjustment'. G. Tantham while bridging the gap between environmental determinism and possibilism maintained that 'the maxim should not be conquest of nor submission to, but cooperation with nature'. *Harlan Barrows* (1923) presented an alternative approach and defined geography as 'human ecology' wherein he pleaded for the study of mutual interaction between man and environment, the study of human societies in relation to their environment and environmental adaptation in place of environmental control.

4. Economic Deterministic Approach

This approach is based on the basic ideology of man's mastery over environment and continued economic and industrial expansion through the application of modern technologies. "The basic thesis of the growth (affluence) school is that because economic growth is required for political, social and economic stability, the 'quality of environment' normally assumes lower priority in formulating planning proposals and in long-term planning because the deterioration of the environment is generally protracted and socially less oblique than a deterioration in the economy' (C.C. Park, 1980). In fact, 'economic determinism' based on two fallacious assumptions of (i) positive correlation between the population of a given region and the level of economic development and activity in that region, and (ii) the interactions of people, resources and society being governed by universal economic principles as observed by W.Zelinsky (1966), believes in man's ability to solve environmental problems arising out of continued economic growth and industrial expansion. It may be pointed out that this extreme concept of economic determinism led to rapacious exploitation of natural resources in the western developed countries and thus created most of the environmental and ecological problems of global dimension.

The everincreasing environmental problems, mainly environmental degradation and pollution, the alarming problems of ozone depletion and global warming, consequent upon excessive use of natural

resources in the last century softened the attitudes of economists towards nature and environment which is validated from the emergence of the concepts of 'environmental economics', 'ecological economics', 'steady-state economy' etc. Ecological economics means 'application of ecological insights to economic analysis, incorporating ecological principles and priorities into economic accounting system' (W.P., and M.A. Cunnighan, 2003). It is now believed by the economists that for sustainable development and steady-state economy the maintenance of environmental quality and ecological balance is a prerequisite condition.

5. Ecological Approach

Ecological approach to the study of man-environment relationships is based on the basic principle of ecology which is the study of mutual interactions between organisms and physical environment on the one hand and interactions among the organisms on the other hand in a given ecosystem. Thus, man is considered as an integral part of nature/environment. 'The relationship of man with the natural environment should be symbiotic and not exploitative nor suppressive' (C.C. Park, 1980). This school recognises man, being most skilled and intelligent, as the leader of all biota and steward of the earth. This approach further lays emphasis on wise and restrained use of natural resources, application of appropriate environmental management programmes, policies and strategies keeping in view the ecological principles so that already depleted natural resources are replenished (wherever possible), degraded environment is set right and ecological balance is maintained.

The ecological approach lays emphasis on rational exploitation of resources and optimum utilization through recycling of resources. The following facts should be taken into account while using natural resources :

- that the environment is a closed system,
- that the natural resources are finite,
- that the geological processes of the formation of abiotic resources, such as metals and mineral oil, are exceedingly slow and take millions and billions of years for their formation and accumulation.
- that the natural resources are free gifts of nature which should be used judiciously,
- that the natural resources are public property and hence no country or agency is allowed to misuse them,
- that the environmental/natural system (ecosystem) is governed by in built self regulatory system (homeostatis) which states that any change in any component of the environment effected by natural factors is suitably counterbalanced by changes in other components but if the changes brought in by human activities are so enormous that these exceed the resilience of homeostatic mechanism of the natural system, serious environmental problems emerge, which become lethal to all biota in general and humans in particular,
- that the political and economic stability depends on ecological and environmental stability,
- that the sustainable society and sustainable development may be possible only when the environment also becomes sustainable,
- that the extraction of mineral resources and their processing leave immense quantity of wastes which degrade the environment,
- that the sustainable development, aiming at real upgrading of quality of life of the people and improving human welfare for long-term within the limit of the resources of the planet earth, can be achieved without compromising with the ability of the nature to provide sustainable yield to the future generations and without degrading the environment etc.

It may be pointed out following C.C. Park (1980) that the debate on man-environment relationships should be viewed taking into account the multi-dimensional aspects of environmental problems which are the result of complex series of several factors viz. physical, economic, social, political, ethical etc. but any positive approach adopted for the study of man-environment relationships must take into account the fact that there should be harmony and not hostility between man and environment. It is obvious that the relationship between man and environment is two-directional as the environment affects and influences man and in

turn man also influences and modifies the environment. This type of mutual interactions and relationship between man and environment is symbiotic in character.

Man-Environment Interactions

Thus, the interactions between man and environment may be systematically studied on the basis of bi-dimensional aspects of man-environment relationships as follows :

1. Environment and man i.e. environmental controls on human health and activities, and

2. Man and environment i.e. adverse effects of human activities on environmental system vis-a-vis environmental quality and ecological balance.

3.2 ENVIRONMENT AND MAN

The environment affects man through (i) biophysical limitations, (ii) behavioural controls, and (iii) resource availability.

1. Biophysical Limitations

Weather and climate affect human well-being and health. The study of reactions of human body to changes in the atmospheric environment is known as 'human biometeorology' which lays emphasis on to 'establish how much of the overall biological variability is the result of changes in weather, climate and season' (J.E. Hobbs, 1980, p. 60). According to M. Bates (1966) three levels of climatic environment affect human behaviour viz. (i) 'microclimate' (which represents weather conditions surrounding an individual organism), (ii) 'ecological climate' or 'ecolimate' (represents weather elements of the habitat of the organisms, in the case of man the habitat may be his house and working places like factory, office, mine, agricultural farms, pasture or forest), and (iii) 'geographical climate' or 'geoclimate' (weather conditions of larger areal unit and longer temporal span).

Biologically, human body can function properly only in certain suites of environmental conditions in terms of oxygen, heat, light, humidity and precipitation, wind, lightning, fog, clouds, atmospheric electricity and space. Even the survival of human body depends on the above factors. Lack of required amount of oxygen at higher altitudes makes human survival impossible. Excessive heat and humidity retard body and mental growth whereas very high or very low temperature on the one hand adversely affects human body and on the other hand makes food a scarce commodity to support human life. Micro-climate affects leisure, recreation, comfort etc.

Certain non-infectious diseases and medical disorders have been correlated with environmental factors such as geochemistry of rocks, soils and water. Concentration of a few trace minerals in the rocks, soils and water in the Uttarakhand Himalaya causes stomach disorders through diarrhoea, dysentery etc. M. Cole (1971) has shown correlation between certain forms of cancer and cardio-vascular troubles and geochemical properties of soils and water whereas B.E. Davies and R.J.F. H. Pincent's (1975) study of *'minerals and morbidity'* has revealed relationships between stomach cancer and hardening of tissues and arteries of human body (sclerosis) and certain trace minerals in the soils and water.

Certain diseases and illnesses have been related to atmospheric conditions. E.H. Derrick (1965, 1966, 1969) has related seasonal, annual and short-term variations in asthma in Brisbane (Australia) to variations in weather conditions. He has related weeks with high incidence of asthma with decrease in mean and minimum temperature, dew point, relative humidity and rainfall but increase in sunshine hours whereas low incidence of asthma has been found in those weeks which are characterised by higher dew points and relative humidity, more rainy days, low temperature ranges and fewer hours of sunshine. Many more investigators have established evidences to demonstrate close association between asthma and cold e.g. L. Greenburg, F. Field, J.L. Reed and C.L. Erchardt (1964 and 1967, relationship between asthma and temperature change in New York), S.W. Tromp and J. Bouma (1965, increase in asthma among 16 years old children during periods of cooling in the eastern Netherlands), M.J. Spondnik et al. (1996), concluded that airflow resistance of 100 students of Baltimore, U.S.A., increased with decrease in temperature etc.

J.B. Hanesen and S.A. Pedersen's (1972) study of relation between barometric pessure and certain ailments has demonstrated that there is positive correlation between rapid changes in the