UNIT 2 HUMAN ECOLOGY

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2.0 INTRODUCTION

Relationship between nature and culture in human societies becomes the main focus of socio-cultural systems in understanding the sustainability of biological and socio-cultural beings. There are ways in which we conceptualize and think about the interactional patterns of behavior amongst individuals and cultures in societies in their surrounding environment. The reflection of collective human behavioral interaction with material and non-material aspects of culture, and environment becomes the common interest of everybody who wants to see the limits and capability of nature to sustainability from various changes and threats.

2.1 OBJECTIVES

After reading this unit, you will be able to:

- define Human Ecology;
- explain the concept of social ecology, cultural ecology and political ecology; and
- describe the interactional pattern of man and environment through different aspects.

2.2 CONCEPT OF HUMAN ECOLOGY

The term Human Ecology is defined as the complex relations between people and environment including biotic and abiotic factors (Figure 2.1). It is the study of how humans interact with their social and biophysical environments. It is the

interactional pattern of humans and environment and its subsequent impact on land, climate, plants and animals and the reciprocal impact on humans. Human ecology deals with the population shaping its environment and vice- versa.

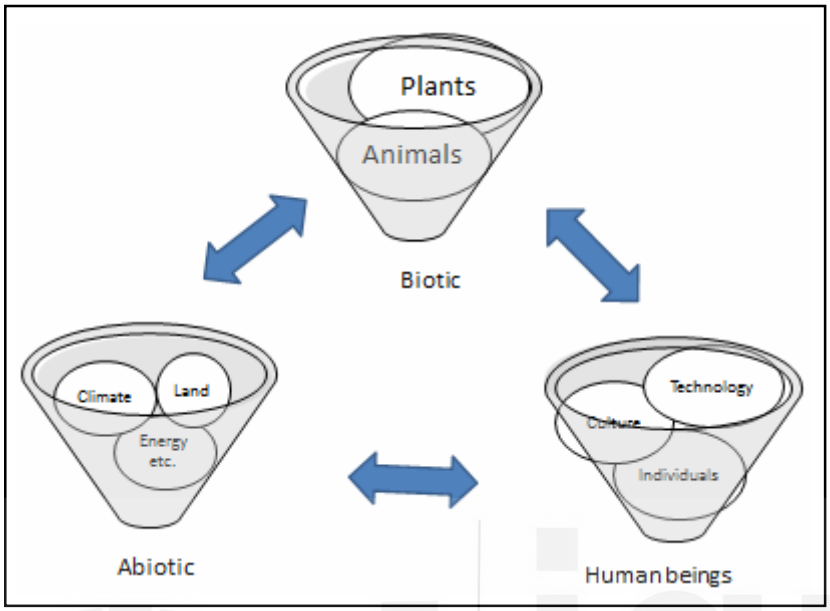

Fig.2.1: A Simplified Diagram of Human Ecology

The core idea of human ecology is adaptation. Adaptation itself is the process of modifications of certain systems so as to enable man to adapt to wide range of environmental conditions and adjust according to the conditions. It is a relationship with reference to space and time and depends on the nature of environment as well as the ability of man to adjust. This adjustment brought a successful evolution of society and culture in particular regions of the world. Many societies evolved, developed through such relationship of what we called Human ecology. However, besides various evolutionary changes, the developmental history of mankind and society continues. This is in accordance with the virtue of the nature of adaptation that the groups of people have, which are not at the same stage of evolution. In this process, there remain groups of people who still follow the earlier ways of interaction and lifestyle besides adopting the new means which brought about overlapping in the developmental history of mankind's society. This is a way to sustain and likewise man undergoes several relationships with the process of adaptation.

These relationships become complex in different ecological niche, because of the complex nature of culture. This brought a considerable effect to the biology of man and his evolution in the society. Some of these adaptations are expressed in terms of modifications of body size and shape which later on gets inherited. For example, the hunter gatherers of arctic region who have short limbs and compact bulky body size helps them to keep the body warm for a long time while east African people have long limbs and greater body surface that helps in dissipating the body heat. The African people maintain a fair body temperature through sweating and same is the case with the Inuk people. These adjustments with nature brought certain changes in the blood vessels and other body parts. They contribute adaptation by different processes like body type, houses, sweating etc. to protect them from the environment. Figure 2.2 illustrates the nature of adaptation mentioned above.

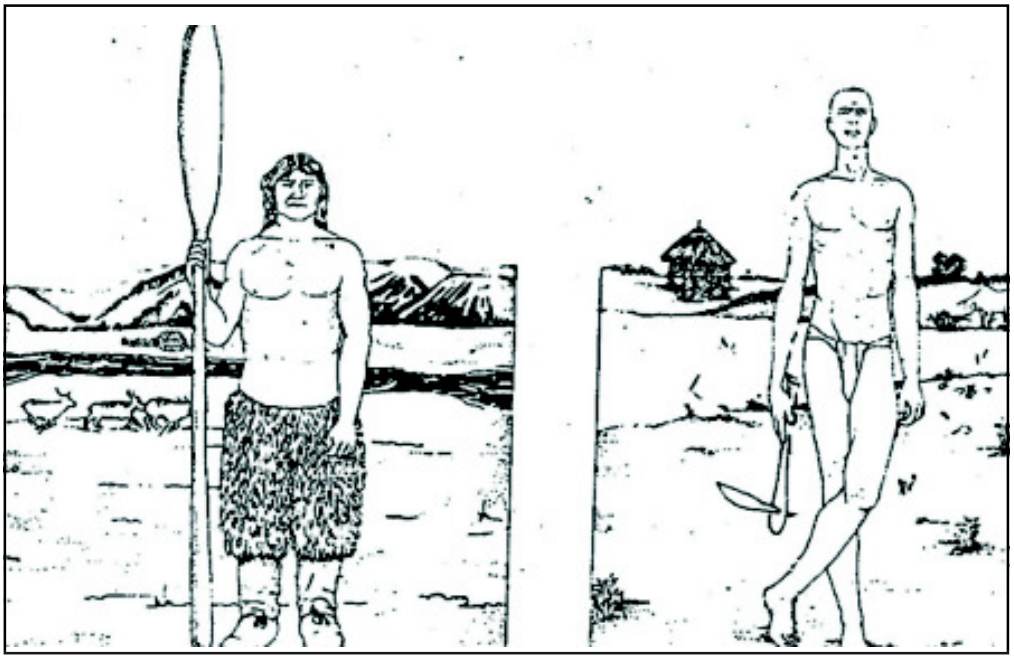

Fig. 2.2: Differences in body size and shape reflect genetic adaptation to climate. The African's long limbs help dissipate heat, while the arctic hunter's bulky body conserves the heat. The dwellings constructed by these men illustrate cultural adaptation to climate (Source: McElroy & Townsend; 1985: *Medical Anthropology in Ecological Perspective*. New Delhi, Westview Press, Inc.)

Similarly, the practice of shifting cultivation or Jhum Cultivation in the north eastern region of India is an adaptation process of cultivation to the slopping terrains of hill ranges. This includes cultivation of food crops by burning herbs, shrubs, small twigs and trees. After cultivation for few years it was left fallow for 15-20 years and shifted to the other forested sites for new cultivation and then returned to the former site once again to start the cultivation process. This was associated with the collection of food from forests providing year round food security. However, this practice has now become a challenge and raises the question of sustainability due to population increase in this region. The land becomes infertile due to its top soil lost and reduction of nutrient values by the short cycle of 2-3 years repeated cultivation instead of leaving the land fallow for 15-20 years. Such practice of relationship becomes much more complex in the process of adaptation. Same is the case with the trans-humane groups of people like the Gujjars and the Gaddis in the Himalayas.

From the above examples it is clear that some of the adaptability criteria become absorbed, inherited/transferred to the respective societies of world community along with the process of development and change to such an extent that it represents one of their own. Mention may be made of the African people and their body structure and composition but, it is not so in all the cases of adaptation. It is also obvious that people learn the process of adaptation from others and we call it as cultural transmission. Almost all the adaptive processes are based on learned behavior. For example, when a child grows he learns to eat food, speak, avoid danger, protect from environment, use tools for many activities etc. All these become parts of a society through the process of cultural transmission. These interactional processes of man and its environment are therefore learned under the title Human Ecology.

Next, we will try to look at two broad categories of studying people and environment viz., social and cultural ecology. Social ecology is the study of man and nature from various aspects of society. It deals with the roles and responsibilities of various social institutions in understanding the man-environment relationships. According to Guha (1994) social ecology has five basic components which can't be considered as separate entity. The five components are ecological infrastructure (soil, water, forests, etc.), economy (forces of relations of production and trade), social structure (family and kinship, caste and community), polity (relations of power, law, and the state) and culture (the arts, religion, and ideology). Thus social ecology is the environmentally orientated sociologists' ideas of environment. It has been understood as the restoration of the relationships of society and environment along with the ecological aspect. Guha addresses four important issues in the study of reciprocal relations between ecological infrastructure and the other four points mentioned above. He stresses on the ecological conflicts, the use and abuses that society has inflicted upon by the class influences, institutional roles in the man-nature interactions and the cultural influences.

Social ecology emphasizes on the need for harmonizing various social institutions to bring man-nature interactions meaningful. This is not exactly different from the ecology dealt by the anthropologists or what is called as cultural ecology (to be discussed in detail). The two terms and its components are part and parcel of a single unit of understanding the relationship of man and its environment.

2.3 CONCEPT OF CULTURAL ECOLOGY

There are different terms employed by different disciplines of social science in understanding the interaction between man and environment. The term social ecology is predominantly found in the sociological studies while the term cultural ecology is common to anthropological studies.

The term cultural ecology was coined by Julian steward in his book "Theory of culture change" in 1955. He expressed cultural ecology as the relationships between environment and technology, the behavior patterns involved and other cultural feature affected by the behavioural pattern of the use of technology to environment. He has emphasized the concept of cultural core to the economic activities which are essential for subsistence, considering that it is more directly related with environment rather than other factors of cultural institutions. It is the branch of ecology dealing with the interaction of human society and the natural environment.

According to Kay Milton (1996), cultural ecology was based on the assumption that cultures have evolved within their local environments, and that a close analysis of the relationships between specific cultural institutions and their local environmental features will reveal how and why those institutions originated and persisted.

A society and its cultural values are affected by the mode of adaptations experienced by man in its environment. It is human nature and capability to utilize its surrounding environment that changes the cultural and social apparatus of an area. In due course of time it becomes distinct or recognized as a separate entity. The study of the basic adjustments brought about by such adaptive nature of man can be called cultural ecology.

Check Your Progress 1

Note: a) Use the space given below for your answer

b) Compare your answers with those given at the end of the unit

1) Define Human Ecology.

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2) How do you understand the interaction between man and environment from the cultural ecological perspectives?

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2.4 APPROACHES TO CULTURAL ECOLOGY

The cultural ecology can be studied on the basis of environment and culture and on the basis of how environment and culture interacts. Many studies respond to different aspects however, there is always common points among them. We are going to discuss the three main approaches of understanding cultural ecology. They are environmental determinism, cultural determinism and mutual interaction. In short, it explains different views of ecology, in which environment determines culture, culture determines environment as well as the reciprocity of these two determinants. Let us discuss one by one in the following manner.

2.4.1 Environmental Determinism

Determinism deals with the role of environment in determining human society and culture. It is the prime mover in bringing human affairs into the form of a culture and its organization. It brings a structure or changes in religion, government, material culture, personality, family, marriage, kinship etc., a consequence of the interplay between environment and culture. The idea is that environment plays an active role in shaping culture and cultural pattern of a society whereas, the culture remains a passive actor.

It was the earliest theory used in explaining the nature-man relationships. The ideas of environmental determinism were given by Greek and Roman scholars such as Hippocrates, Pliny and Cicero. In the 18th century, there were questions on the earlier relationship of environment or climate with human as well as with all other living things. After this, a significant change was brought in the 19th and early 20th century. It focused on the process of change of human cultural history

through archeological and ethnological data which was explained by the process of migration and cultural diversity. Environmental determinist supported the idea of superseding environmental forms over cultural forms. Hence, under similar environmental conditions we find similar technology as well as similar socio-cultural systems. This can also be substantiated by the concept of psychic unity of mankind of the early 20th century where, people develop similar mentality, thinking capabilities or culture under the same environmental conditions. Contributions of Ratzel and Huntington, the geographers expressed the effect of nature on human behavior which is direct or one to one relationship between environment and culture. They had given the importance of environment and climate in the successful evolution of culture and economic development. This approach of study was supported by Julian Steward's theory of culture change. He talked about the ecologically determined culture core consisting of features which were clustered around subsistence economic activities that is utilization of environment. This was considered to be directly linked to environmental factors than others. Some cultural features were more closely related to society's environment that it became quite influential in shaping the cultural development. He suggested the shaping of specific cultural features by specific environmental features rather than environment shaping whole cultures.

Many anthropologists and geographers studied the distribution of various cultural traits. Clark Wissler and Kroeber used the concept of culture area and common culture as the basis to categorise the diverse populations existing in similar environmental conditions. Even though many scholars studied environmental features of determining culture, fallacies came up such as emergencies of same culture in different environment and different cultures in same environment. Milton (1996) noted that various aspects of social life, systems of exchange, marriage rules, kinship terminologies, political institutions, and much else differed unpredictably within areas whose topography and climate are more or less similar.

So the propositions of environmental determinism does not hold true in all cases. Environment does not consider playing the entire important role in shaping the culture. The cultural patterns and its analysis are of great importance in the understanding of human society. With the decline of environmental determinism in the 20th century, the focus of explanation of a society and its relation with environment has shifted to the concept of environmental possibilism.

2.4.2 Cultural Determinism

A society's environment has a dynamic nature of settings when people constantly interact with. It is in contrast to the concept of environmental determinism. According to White, the actions of individual persons are determined by their culture. It can also mould a given environment through its power of thought and learned behavior. Here, Franz Boas has given the attributes of historical and cultural influences as determinants of a specific cultural phenomenon. Hardesty has explained the importance of environment in explaining why certain cultures did not occur rather than why they did occur. This concept of explaining culture becomes the hallmark of possibilism. Under possibilism, it is considered that cultures are moulded by environment but not caused by it. The socio- cultural construct of man establishes relationships with organisms and surrounding environment altering the already existed relationship. This new web of life brought certain changes in the cultural behavior of man and his position in the ecological niche.

This theory as opposed to determinism, gives emphasis to the action of man with regard to environment. Man occupies the front seat in the interactional pattern of existence in human ecology provided that the environment gives a set of opportunities or possibilities of scope. This is usually assessed and the possible one has been chosen. However, this mode of selection is always limited even though there is increased level of technological implements and means to handle it.

An example of possibilist approach is the question of environmental factors and effects to the success or failure of a society. A determinist may argue that society keeps on continuing till the moment one gets the limited supply of natural resources. Yet, the possibilist view that human actions result into various institution and cultural product and also maintain to capture the possibilities that still occur in lieu of environmental limitations. This human action is created as a causal factor in the success or failure of a society while, environment acts at the periphery. An example of this could be from Krober's argument on maize cultivation in Native North America.

"...the Southwestern Indians did not farm because nature induced them to make the invention. They did not make the invention at all. A far away people made it, and from them it was transmitted to the South West (SW) through a series of tribal contacts. These contacts, which constitute the specific cause of South West agriculture constitute a human social factor; a cultural or civilizational factor. Climatic or physical environment did not enter into it at all, except to render agriculture somewhat difficult in the arid SW....Had the SW been thoroughly desert, agriculture could not have got a foothold there. But this would be only a limiting condition; the active or positive causes that brought about SW agriculture are its invention farther south, the spread of the invention to the north, and its acceptance there." [A. L. Kroeber, 1923:185, quoted in Vayda and Rappaport 1968]

2.4.3 Mutual Interaction

The relationship between man and environment becomes a debatable issue among various thinkers. There was a dilemma of deciding whether one should go for determinism or possibilism. Suppose, if a man has developed a technique of soil conservation then, has it to be considered as a determinist or possibilist or can it be taken as both? One is that the environment has directed man to develop a technique to control soil and the other is that man has become the expertise in controlling the unpleasant nature's attitude. Whether such an act would symbolize determinism or possibilism is a difficult notion. The approach seeking beyond this relation is how both the actions reciprocate one another.

They interact mutually and this concept has become the only solution to understand the complex relationships of man and environment.

So, instead of considering environment as a detrimental factor or human beings shaping environment via culture, it is understood that man-environment interaction is in mutually constitutive ways. In this process, culture acts as a mechanism through which human beings as well as other organisms interact with one another in a given environment. This is well explained by two models in particular. They are ecosystem approach and direct perception approach.

2.4.3.1 Ecosystem Approach

The term ecosystem was used in the early 1930s and 1940s by the work of Tansley, Odum and others in biology. In 1960s, social scientists started using this concept in various arenas. It has been considered as the interactive nature of relationships between human beings and its environment (Geertz 1963, Rappaport, 1971). Many definitions provided different understandings of the interactional pattern. According to Rappaport (1971), both living and non-living substances are required to exchange materials that are also within a limited territory or biosphere. While, Hardesty (1977) stresses on a dynamic set of relationships between living and non-living things provided that there are energy flow and material exchanges. Ellen (1982) focuses on the process of homoeostasis when exchanging the material as well as energy flow. Homeostasis is the process of maintaining a balance in the material exchange and energy flow during the interactional process of human beings and its environment.

Ecosystem consists of human beings, environment, culture, plants, animals and organisms. The interactional pattern of these components formed a network of relationships that frequently leads to certain dimensions. Human beings always adapt to habitat and try to adjust to the vagaries of environment at his best level. The environment that impinges on human beings consists of biotic (living) and abiotic (non-living) components. Culture becomes a part of man-environment complex and holds a strong position reflecting over the structure. These components become interdependent with one another that a change in one leads to a change in the other. So, it is possible to say that all these individual components function as a single unit through a complex network or what is generally termed as food chain in Biology.

In the ecosystem approach, the most important contribution is the promotion of a holistic nature of studying the interactional pattern between organisms and its environment through exchange of materials and energy flow. It deals with the mutual interaction of components within a system where, an emphasis on a particular species or a component has brought the risk of loosing the nature of homeostasis or the risk of disturbing the already existing stability in the whole structure of network. However, through various studies and opinions, in the study of an ecosystem, human population becomes the principal unit of analysis occupying ecological niche while the concept of culture becomes marginal provided that the ecosystem model was developed and refined by biologists. Although the study of culture in an ecosystem seems to be unnecessary to biologists and might logically emerge to squeeze culture out of reckoning, this has been denied by social scientists posing questions to the understanding of the term culture in human ecology.

The idea here is that culture is present as a part of human contributions to the network. It is the means or activities, human beings employed to continue the process however the concept has been narrowed down to represent human beings involvement. What has been considered marginal acts to understand man's world and suggests their actions. So, the ecosystem approach consists of some essential components besides the material exchange and energy. According to Ellen (1982) the distinctiveness of human about human ecology is culture, the information, people's knowledge and decision –making processes which are considered as the mechanistic explanation of it.

The dynamic concept of ecosystem will be discussed in detail in one of the following units which would help in understanding how environment factors, cultural factors, human beings and others are considered and interrelated with one another and maintain a balance.

2.4.3.2 Direct Perception Model

There are diverse ways of understanding the world. People understand and impose the meaning of world through cognitive processes. There is no meaning for human beings to interact with the environment. This constructivist's nature of culture does not fit to human ecology as it reduces environment into a mere cultural construct. Considerations of environment as perceptions and interpretations of the "constructed idea of culture" by some social scientists create a gap in the understanding of the concept as well as relationship between environment and culture or activities of humans.

According to Tim Ingold (1992), there is no way where, information can flow from real world to perceived world. He suggested that perception should be seen as different from interpretation, people do not need to construct reality in order to perceive it. Rather, perception happens directly through one's active involvement in it. Similarly, people do not need to know the world in order to act in it rather it has been known through one's action, by making use of what has been offered by environment. It is considered that direct perception of environment and people with some cognitive thoughts happen only when there is active involvement in the system. Perception is the creation of knowledge through actions. And the world has been perceived into beings as people act on it.

Culture does not consist of whatever one is supposed to know or believe but it is a means for making knowledge explicit to all. The role of culture in human-environment relations can now be explained as consisting of perceptions as well as interpretations. It does not produce a barrier instead give a place within the world. It is culture which explains the meaning and actions together. So, direct perception model signifies an understanding of man-environment relationships through perceptions and interpretations.

2.4.3.3 Discussion

The nature of interactions between man and environment has been expressed by the use of ecological knowledge. The recognition is that different approaches and theories exist and the understanding and analysis of it really enables us to reach to a conclusion which is applicable to all. The view that environment determines culture or culture determines environment opens a scope for critical analysis at various forums. People overlooked these ideas and started looking for an approach where, both the views are balanced. Mutual interaction provides equilibrium at the level of their interaction and focuses on those approaches which leave culture out of the human-environment relationship either deliberately or by default. The two approaches, ecosystem approach and direct perception approach (ecological functionalism) provides the logic of understanding man-environment relationship through the network of relations involving material exchange and energy flow as well as the active involvement into it to interpret the concept of perception. Here, the point is that even if we marginalize the concept of culture in these approaches, culture is still present in the ecosystem

model in any case represented by the human actions and role in it. Thus, a mutual relationship among the various factors of man-environment relationship gives a homeostasis to human ecology. However, there is still scope of criticism on it especially on the explanation given by ecological functionalism on homeostatic balance of environment through adaptation. The interactive point of view which Steward propounded in man-environment relationship still associates with vague ideas on subsistence overlooking other domains of adaptation and adaptive mechanism.

Later on, various approaches have been developed to understand man-nature relationship such as ethnobiology, historical ecology, political ecology and behavioural ecology. Of these, political ecology and behavioural ecology occupies a prominent place in recent times.

2.5 POLITICAL ECOLOGY

This study of understanding human ecology has been derived from the cultural ecology. As Walker states, "whereas cultural ecology and systems theory emphasize(s) adaptation and homeostasis, political ecology emphasize(s) the role of political economy as a force of mal adaptation and instability" (2005: 74). It is the study of environment from the perspectives of political economy, the relationship of individual economy and political ethos to maintain a social order of important structure. It consists of political economy, institutions and change as well as narratives.

Sutton (2004:311) defines political ecology as "the study of the day-to–day conflicts, alliances, and negotiations that ultimately result in some sort of definitive behavior; how politics affects or structures resource use". It focuses on environmental issues as part of political ground dealing with issues like conflicts of the conservation of natural resources, question to livelihood, etc. The people of India and its tradition of conserving natural resources are undergoing various stages of transformations to come out with a political ecology that is gaining ground in the developmental discourse. We can take the example of conflicts and negotiations that occurred in the process of Narmada Dam construction and the related political ecology. The construction of Narmada Dam displaces large population of diverse culture and tradition. The Narmada Bachao Andolan brought an understanding of natural resources, environment and development as well as the value of human rights. According to Greenberg and Park (1994:1) Political ecology is a "synthesis of political economy with its insistence on the need to link the distribution of power with productive activity and ecological analysis, with its broader vision of bio-environmental relationships". There are various ethical issues of power and conflict whenever question of livelihood, sustainability arises. The extent of environmental change and relationship in India due to growing population, expanding industrial economy and agricultural extension becomes a challenge to development and sustainability. This causes socio-economic injustice particularly to the poor, weaker section of society. While discussing issues like Chipko, a new traditional discourse of understanding the relations between the natural environment, state and society came up representing the ideological basis of relationship women to rural society and ecology. The Chipko movement which would be explained in detail in the following units is represented as one of the important movement for understanding

Indian environmental history and politics where poor peasant women hugged the trees to protect and prevent from felling, a mobilization of indigenous as well as resistance to unfair and unsustainable economic policies. Political ecology is therefore a means for the study of the interactions between nature which is understood in different paradigms and the politics involved.

Check Your Progress 2

Note: a) Use the space given below for your answer

b) Compare your answers with those given at the end of the unit

1) Explain Environmental determinism with appropriate examples.

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2) Critically discuss the approaches on the interaction of man and environment.

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3) Using your understanding of human ecology analyze the points given and try to come up with certain parameters to create a model of interactional pattern between man and environment.

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2.6 LET US SUM UP

- The study of human beings and its sustainability includes biological, social, and cultural systems.
- Adaptation provides the human beings with various modes of adjustment for survival and evolution. The nature of relationship may be simple or complex depending on the ecological niche of the particular society.
- The term cultural ecology deals with the knowledge of how environment and technology play important role in shaping human behavior.

- Environmental determinism, cultural determinism and mutual interactions are the three approaches explaining human ecology. Environmental Determinism points out the role and capability of environment in controlling human society and culture.

- Culture becomes the hallmark of environmental possibilism where, culture has been moulded by environment but not caused by it. It gives emphasis on the actions of man which provide success and failure of a society while, environment acts at the marginal.

- The mutual interaction is again supported and explained by the ecosystem and direct perception approach that man- environment interaction has been brought to a stage of stability through the material exchange.

- The idea of political ecology gives importance to the equitable resource use, women participation, caste participation, decentralization as well as generation of resource stocks helps in dealing the complex interaction between economics, politics, technology, social tradition and the biological environment.

2.7 KEY WORDS

Human ecology : The study of relationships between human beings and environment (biological, social and cultural).

Adaptation : It is a process of adjustment by which a group of individuals or populations have the ability to adjust at certain area and level.

Cultural ecology : It is the study of relationship between a given society and its natural environment, the relationships between environment and technology, the behavior pattern involved and other cultural feature affected by the behavioural pattern of the use of technology to environment.

Determinism : It deals about the role of environment in determining human society and culture. Environment is the prime mover in bringing human affairs into the form of a culture and its organization.

Possibilism : It is in contrast to the concept of environmental determinism. According to White, the actions of individual persons are determined by their culture.

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2.9 KEY TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Your answer must include the following points
   - Complex relationship between man and nature.
   - Any form of adaptation no matter how it made its adjustment to meet the human needs.

2) Your answer must include the following points
   - Reciprocal impact of man and nature relationships.
   - The behavioural pattern involved.

Check Your Progress 2

1) Your answer must include the following points

- Role of environment to society and culture
- Relationship of environment and technology or mode of adaptation
- An example(try to develop an example of your own using day-to-day experiences or literature available)

2) Your answer must include the following points

- The classical concepts of understanding man-environment interaction using determinist and possibilist thought.
- The cultural ecological understanding of pattern behaviour from the relationship of environment and technology
- The role of political economy as a framework for analyzing the environmental issues.

3) Your answer must include the following points

- Parameters: environment, man, culture, political economy.
- Relationships of these parameters categorizing them into separate heads under the broader aspect of Environment :

  Biotic

  Abiotic

  Cultural

  Human population
- Cyclical or flow of relationships that can be presented in form of diagram.

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