UNIT 1 NATURE-HUMAN INTERFACE

Structure

1.0 INTRODUCTION

The humans represent the most developed stage of life form on earth.They, however, appear on earth at a considerably late stage in a long process of evolution. This process of evolution began with the formation of earth some 4600 million years ago and involved the evolution of life forms and nature, both. Many living organisms have come and gone in this process and many changes in nature have simultaneously occurred. A closer examination of this process reveals that there has always existed a close relationship between life forms and the nature surrounding those life forms. With the emergence of humans this relationship assumes a qualitatively different form. It is our attempt to present in this Unit an outline of nature-human relationship. Admittedly nature-human interaction has been a complex process and involves a basic understanding of the different dimensions of nature as well as the unique ability of humans to influence and mould the nature in tune with their own needs. It also involves a similar understanding of human adaptability to the peculiarities and pressures of nature.

As we start on an exploratory tour of nature-human interface in the context of the geographical boundaries loosely set by the Indian sub-continent we begin to see a few features emerging so clearly as not to be able to miss them at all. We see the relationship between human groups and the environment/s assuming the character of interchange i.e., reciprocal exchange between humans and nature, where each influences the other and also gets influenced by the other. We also see the environment of the Indian sub-continent providing a diversity of situations, from deserts to regions of high rainfall and from vast alluvial plains to high mountains and rocky table-land. There is also visible a clear divide, between north India receiving highly productive soils as a result of a continuous process of soil erosion and south India, with fewer deposits of alluvial material and therefore showing greater stability.

It is also to be understood that the historical evidence for the study of nature-human interface has been somewhat irregular with a few periods extensively examined while a few others having not received adequate attention.We have attempted to paint a general picture of the relationship between humans and their environment/s with the help of available archaeological and historical material. The narrative in this Unit begins with the emergence of human groups using stone artefacts and closes with the rise of modern industrial societies when a marked shift in nature-human interface occurs. In discussing human interchange with nature it will be useful to obtain a basic understanding of nature, which, commonly speaking, is used as a term inter-changeable, with environment.

1.1 DEFINING NATURE

Nature is not an easy term to define as it incorporates most of the visible manifestations of geography. Raymond Williams defines nature as, 'the material world itself, taken as including or not including human beings.' Tracing the history of the term he suggests that 'nature' has often been used to describe the 'countryside', the 'unspoiled places', as also 'plants and creatures other than man.' (*Keywords*, 1976, Fontana, pp.184-189). Surely the general sense in which nature has been described relates to environment, where even the human has been an integral component. In the context of our discussion, thus, nature and environment convey nearly the same meaning.In exploring human-nature/environment relationship we consider the natural conditions and influences that affect and sometimes determine the actions of human groups. Over a long period of time in history this relationship operates at two different levels; at one level it wields influence as a widespread ongoing process, and at the other it acquires the form of the relationship of specific human groups to their "immediate environments". For our purpose we do not especially favour any one of the two and provide a narrative that tends to draw information from both as the situation demands.

In the case of the Indian sub-continent a very wide range of climatic and topographic situations prevail to influence the environment.As a result a delicate balance is maintained between extreme environmental conditions which is comparatively easily disturbed and we experience varying degrees of uncertainties extending over one or more climatic zones.In the context of nature-human interface these environmental changes have had their role in determining the development of human history.We shall discuss this in detail in the following section.

1.2 LOCATING MAN

In providing an identifiable status to man vis-à-vis environment our objective has been to start at a point where human groups become discernible as a collectivity.The question of the origin of humans is not our primary concern here.In fact an understanding about the process of evolution of humankind is more important to us as it helps us grasp the simultaneous evolution of man-nature relationship.

Till recently, up to the post-enlightenment era, the concept of a divine origin of nature and humans had been in prevalence.The human beings were also subject to an evolutionary process was a theme strengthened by the theory first proposed by Charles Darwin (1809-1882 A.D.). In his work *The Origins of Species*, Darwin argued that different species had undergone to process of evolution and this evolution was the result of minor variations in the characteristics of the individual members of species. These features were inherited by the successive generations and as a result of this long sequence of inheritance new species were able to evolve and emerge distinctively. Darwin also proposed that the adaptive capacity of species influenced the chances of their survival and he termed it as the process of the 'survival of the fittest'. The evolutionary model had made another important contribution towards our understanding of man as a 'unique animal', an animal who could adapt to different natural conditions and most importantly could modify the nature/environment for its survival.

The process of human adaptation to environmental conditions was accompanied foremost by the introduction of tools and their use by the primitive man. The significance of tools in the study of the evolution of humankind can be realised from the fact that this entire process has been classified in terms of the quality of tools and the nature and quality of the material used in making the tools. Thus the earliest period in human history, also called pre-history, has been termed as Paleolithic. This was followed by Mesolithic, Neolithic, Chalcolithic, Iron Age, and so on. For the convenience of also accounting for implements other than tools, we term this process as the development of artefacts and begin our investigation of man's relationship with nature during this important phase of human activity.

1.2.1 A Maker of Artefacts

The human beings are endowed by nature to be reflective and active. Their biological evolution has given them the capacity to establish adaptive relationship with nature. However, we can only be speculative about the factors and adaptive impetus responsible for the development of human ability to forge artefacts. Indeed this ability must have evolved over a very long period of time and would have begun with the local materials that were easily available and were suited to serve the purposes intended by the objects.

We know from archaeology that the first artefacts made by humans were of stone and had made their appearance more than two million years ago. This had marked the beginning of the Palaeolithic Culture. It was a remarkable occurrence and showed "a high level of forethought and knowledge of materials" on the part of the Stone Age Man "suggestive of acute powers of observation and deduction and of a sensitive awareness of much of the available potential of the world around". Like other animals, the initial mode of sustenance for humans was hunting and gathering. Most of these artefacts were made with the objective of assisting them in their quest for food, hunting and gathering. Stone tools

were used primarily for cutting plants, digging root crops, scrapping wood and obtaining honey. There were two broad groups of stone tools for the period: 'core' tools and 'flake' tools. Core tools were those tools which were made from the larger blocks of stone. Flake tools were those tools which were made from the small bits or flakes which would come off a block of stone when it was hit probably for making core tools.The most important core tool was hand-axe. Hand-axes were basically used for processing of meat and did reflect great physical dexterity. In the making of the stone tools here was a definite evidence of the beginning of man's attempt to adapt to the nature by applying his mind and making use of locally available material for better functioning. The appropriation of natural conditions was still confined to the most rudimentary stage, yet the act was very significant for it heralded the process of modification of natural conditions for better management of natural resources.

The Palaeolithic developments were followed by the growth of microlithic tools and this stage is termed as Mesolithic Culture.We are now witness to a greater control of man over the tool-making industry as the tools now become lighter and more efficient.In addition to stone we now find more variety in the use of materials for making microliths.Bone, animal horn, bamboo and wood make an appearance. The quality of artefacts produced during this period is suggestive of an improved technological competence. It is logical to assume that such competence would also have helped grow several other skills of working on materials other than stone e.g., wood, bamboo etc. The knowledge of using fire for clearing grasslands and forests along with these additional skills was a definite advance over the previous stage in so far as the management of natural resources was concerned.

It is around this time that early rock art specimens become available. An analysis of the depictions made in these specimens brings out the fact that the humans had by this time become acutely aware of the animal world and had begun to show signs of seeking refuge, even if temporarily under rock shelters, mounds and other natural sites. This should be considered a significant development in nature-human interface.Here was the beginning of the process of domesticating animals and utilising their power in the service of the mankind.

We must draw a word of caution here before the almost euphoric feelings at having managed nature in an efficient manner than the preceding Palaeolithic stage leads us astray.The fact was that in spite of these developments the humans were even now at the mercy of their immediate environment and were "in a very real sense dominated" by it. What seems closer to reality is a situation that exhibits, on the part of the human groups, a conscious awareness of the environment based on a close relationship with the environment. This relationship was fostered by activities such as "hunting and gathering animals and plants for food; lighting fires for cooking, warmth and protection; perhaps felling trees to make further wooden artefacts (as people are known to have done with stone tools elsewhere in the world); perhaps also burning grasslands

and forests to facilitate their hunting activities or improve the grazing for their favoured food animals".

1.2.2 Social Animal

The relationship between nature and man was redefined with the advent of agriculture. Till the beginning of agriculture, the sources of food had only been naturally available and man had no control over these sources. An important contribution of agriculture has been the cultivation of cereals. The fact that the shelf-life of cereals is very long whereas fruits and meat have a limited shelf-life must have added immensely to human capabilities.It is also significant to note that this property of cereals encouraged accumulation which was one of the principal causes for social stratification to emerge and with it a complex society to emerge with many different communities existing within and interacting with each other.

In the initial phase the agriculture was highly unreliable and as a regular source of food did not meet the demands of man. In fact transition from the hunter-gatherer stage to the agriculture stage was a long drawn process. The development of technology/tools to increase the production was also a gradual process and it was only after the development of irrigation technology that agriculture acquired a key role in food production.Initially the agriculture was confined to highly favourable locations with natural irrigation.With the growth of population, however, man was forced to migrate to less-favourable locations necessitating the development of irrigation facilities that demanded larger social participation and better skills of management.

Food security and greater control over agriculture enabled man to have some spare time as agriculture had been a seasonal activity. At the same time demand for better tools for agriculture and technology for irrigation to ensure greater production as well as a relative shortage of raw material for tools (as man moved away from foothills to open plains) forced man to look for other sources/ kinds of materials.This gave rise to the use of metals and their extraction through metallurgy.With the beginning of metallurgy thus, a new stage of development was attained.The discovery of metallic ores once again liberated man from the dependence over nature. The major advantage of metal tools over stone was their reusable character: stone tools once broken could not be used again whereas metal tools could be remolded. However, relative scarcity of ores together with the resources needed in processing the ores, right from procurement to transportation and extraction, made the making of metal tools a labour intensive and in many ways an expensive proposition. An important feature of metallurgy had been the requirement of highly specialised knowledge and expertise thus making it a full-time occupation. Such specialists could be sustained with the help of the available agricultural surplus. In this process we clearly see the emergence of a section of population that was not directly involved with the process of food production, yet was able to sustain itself on the labour produce of others.The "parasitic" character of this section of

population had in fact given rise to the possibility of sustaining solely on the basis of the acquisition of special skills without having to participate directly in the process of agricultural production.

The character of the agriculture based societies could now be defined in terms of complex social formations having stratified social and occupational groups within. The growing ability to manage the nature for social needs allowed agricultural societies to start systematic exploitation of natural resources for the benefit of the larger community giving, in turn, rise to socio-politico-economic hierarchies.In this process a gradual alienation of man from the immediate environment was quite perceptible.

It should be noted here that though the emergence and subsequent growth of agricultural societies was a gradual and steady process indicating man's control over nature, there were still numerous instances of the vagaries of immediate environments affecting this growth and thus creating troughs and peaks in the graph of agricultural development in place of an imagined smooth line only indicating consistently onward march. The few archaeological sties that have been investigated in detail yield interesting information. The earliest site is at Mehrgarh located on the Bolan river in Baluchistan.The down-cutting and lateral movements of the distributaries of Bolan are possibly "the outcome of the natural instability of the region" and "due to pressure on the environment caused by human activities such as harvesting grain, collecting firewood, felling trees and herding animals in the immediate locality and in the mountainous areas that form the head waters of the Bolan river". Almost similar is the case of the cities of the Indus civilisation.It is generally accepted that the region has not seen any major shift in the climatic conditions since the emergence of Indus civilisation.Yet "evidence of a period of somewhat increased humidity coinciding approximately with the high urban phase of the Indus cities (c. second half of the third millennium BC)" has also been noted. A point of great significance here is that the return to rather more arid conditions, like the present, appears to coincide approximately with the collapse of Mohenjo Daro, and apparently also with the failure of the wider infrastructure of the Indus urban world".

1.3 NATURE-HUMAN INTERFACE: CHANGING CONCERNS

We have hitherto been describing the nature-human interface in the context of human adaptation to the limits determined by the nature.Till the advent of agriculture the relationship between man and nature was highly tilted in favour of nature, where man was mostly the recipient of the benevolence of the nature. Tools of the lithic ages-Paleolithic, Mesolithic or Neolithic were basically instruments of facilitation towards the benevolence of nature. Man had to manage with the subsistence offered by the nature and could do little to influence the processes or patterns of nature. The subsistence pattern of this age was termed as

'hunters and gatherers' and life-style was nomadic. The society was moving from simple social structure to complex social structure gradually.

A fully manifest complex social structure emerged with the advent of agriculture that helped generate surplus and began the process of urbanisation. Upto this time the relationship between man and nature was to a considerable extent determined by the harshness/benevolence of nature to existing levels of technology.

A qualitative and epoch-making shift in the nature-human interface became evident with the onset of industrial age. The level of technology of industrial age liberated man from physical labour and introduced the exploitation of abiotic sources of energy that replaced human and animal energy. Since ancient past thermal energy had been used in direct applications, but during industrial age it was used to mechanise tools. Industrial age introduced the conversion of thermal energy to mechanical energy, hence expanded the possibilities of its exploitation.The ever increasing demands had also led to the search for newer forms of energy and to the discovery of hydrocarbons, i.e., coal, petroleum products, etc., as their principal source.Unlike earlier renewable sources of energy, though, hydrocarbons, are non-renewable. The introduction of non-renewable sources of energy redefined the relationship between nature and man and the concept of the conservation of natural resources came into existence.

A phenomenal growth in production possibilities and abundant availability of finished goods were two major features of industrial age. The replacement of animate forms of energy with the inanimate forms presented huge possibilities of harnessing natural resources. The technological advancement facilitating better and commercial use of new forms of energy expanded the demand for raw materials as also the markets for finished goods.

Another area where a major impact had occurred due to an extensive use of energy was that of agricultural production. Increased productivity and food security gradually led to a sizeable increase in population. Due to extension of cultivation and population there was now a major strain on forests and other natural resources.It was not that human civilisation had not witnessed the growth of population in the past; but the magnitude of this growth in the eighteenth century was fraught with serious implications.Braudel has attempted to define it in terms of an ecological watershed, i.e., the end of a natural regime that was determined by the characteristics of pre-industrial societies."What was shattered" wrote Braudel, "with the eighteenth century was a biological 'ancien regime', a set of restrictions, obstacles, structures, proportions and numerical relationships that had hitherto been the norm". (Ferdinand Braudel, **Civilisation and Capitalism 15th-18th Century, Vol- I: The Structures of Everyday Life-The Limits of the Possible,** tr. Sian Reynolds, London, 1985). The relationship of harmony and a tacit co-existence with nature now gave way to human endeavour to completely harness and exploit natural resources.

The ever-increasing mechanisation of even the day-to-day activities increased the demand for energy to new heights.An almost reckless use of energy sources of the fossilized form and blind growth of industries of all kinds gave rise to problems of environmental pollution. We are today faced with serious environmental threats like the 'green house effect'.

Another major cause of concern in this regard has been the development of materials not naturally available in the world, i.e., the polymers. The chemical revolution of the 1930s and 1940s developed an artificial material which was not biodegradable, thus difficult to destroy and decompose. At the same time, the wider applications of the material at industrial and domestic front at low cost of production encouraged its wider circulation. Similarly, the question of the viability of nuclear fuel as a source of energy has been a major issue of debate. The production of non-natural radioactive substance for energy production has been a major scientific and technological development but again the decay or the proper and cost effective decomposition of residue has been a major technological failure.

While according due importance to the role of new technologies in the portrayal of a comprehensive picture of human-environment interface, we must not neglect the socio-political considerations. Until 1700, the rights and rewards of exploitation of the natural world lay largely in the hands of an elite aristocracy. The democratic revolutions of the late 1700s, including the American Revolution of 1775-76 and the French Revolution of 1789-1799, triggered a restructuring of the framework of society throughout most western societies. With this change came increasing access of individuals to productive resources, and an increased ability to use them for improving economic and social status. The legitimate rights of exploitation of nature were now extended to individuals at large in society. The 1800s were the culmination of a period of worldwide spread of western culture through colonialism and establishment of world trade. The western system of environmental exploitation was thus spread widely, so that it became the operational system even in areas where the basic philosophical view of human and nature was quite different. (Ranajit Guha, *History: At the Limit of World History*, New Delhi, 2003.)

Human acts were henceforth seen as socially constructed and man got located at the centre of creation. As a result the relationship between nature and man was redefined. The breakdown of 'biological regime' led to an exponential growth in human population. Initial demand of labour by the early industrial revolution and relative food security sustained this growth.At the same time, scientific knowledge along with technological development provided a world vision where technology was portrayed as a solution to all human problems especially hunger and poverty.

These are the few concerns that tend to redefine nature – human interface.We, however, cannot afford to remain insular to these

developments in the name of preserving a pristine man-nature relationship.We must be open to new perspectives in our understanding of society and scientific developments. Daniel B. Botkin (*Discordant Harmonies*: *A New Ecology for the Twenty-first Century*, New York, 1990) says that 'We must distinguish between merely the persistence of some kinds of life and the maintenance of a biosphere that is desirable to human beings' (p.182), inherent in it is his vital question that nature is not constant and even the change is not constant, thus the only way to interact with nature is to enlarge our understanding of environment and its functioning at the same time to realise the limitations of human capabilities to manage nature according to his wishes.

1.4 SUMMARY

Most of the writings on environmental history deal with the interaction between society and environment through the analysis of socio-economic impacts. We now know that interaction between environment and society has also been mediated by the technology, which helps in the appropriation of environment for social/individual good. It is the level of technological development, which influences the extent of human intervention in the functioning of environment, and determinates the nature of human comprehension of their environment.

Since the beginning of universe and more so with the evolution of mankind as thinking animal we have been witnessing the change in nature's landscape caused or at least influenced by humankind. Some of the important technological introductions influencing the environment have been the beginning of agriculture and discovery of iron. These introductions led to far reaching changes in the landscapes and thereby influenced the functioning of environment. Similarly, industrial revolution has been a landmark technological introduction for the appropriation of environment. It is in this way that a comprehensive picture of man-nature relationship should be investigated. At the same time it is also true that even at the present level of scientific development we cannot claim that we have been able to comprehend fully the functioning of environment.

1.5 EXERCISES

1) Describe the features of nature-human interface during Palaeolithic and Mesolithic Cultures.

2) In what ways did the beginning of agriculture influence the man-nature relationship? Discuss

3) Why is the beginning of the industrial age considered as marking a major shift in nature-human interface? Elaborate.

1.6 SUGGESTED READING

Daniel B. Botkin, *Discordant Harmonies: A New Ecology for the Twenty-first Century*, New York, 1990.

Ranajit Guha, *History: At the Limit of World History*, New Delhi, 2003.

F. Braudel, *The Perspectives of the World* and *The Structures of Everyday Life*, Vols. I & II respectively of *Civilisation and Capitalism 15th-18th Century*, tr. Sian Reynolds, London, 1985.

Ramchandra Guha, *Environmentalism*, Delhi, 2000.

D.K. Chakrabarti, *India, An Archaeological History*, Delhi, 1999.

[All the quotations in this Unit, unless otherwise noted, have been gratefully taken from *Bridget Allchin*, 'Early Man and Environment in South Asia 10,000 BC-AD 500' in *Nature and the Orient*, ed. Richard H. Grove, Vinita Damodaran, Satpal Sangwan, Delhi, 1998.]