
UNIT 4 RESOURCE USE AND HUMAN SOCIETIES

Structure

- 4.0 Introduction
- 4.1 Nature of Resources & Social Use
 - 4.1.1 Renewable Resources
 - 4.1.2 Non-renewable Resources
- 4.2 Resource-Use Practices and Their Impact
 - 4.2.1 Pre-agricultural
 - 4.2.2 Agricultural
 - 4.2.3 Iron Age
- 4.3 Summary
- 4.4 Exercises
- 4.5 Suggested Reading

4.0 INTRODUCTION

Growth of human societies has been linked inextricably with various resource-use practices. Each important stage in the growth of human societies has discovered and used new resources and adopted practices to facilitate the extraction of resources from the nature. Unlike other species of animals, the man has been especially endowed with a prowess for using nature's resources in innovative ways. This has given rise to relationships between human societies and environmental resources that sustain on a delicate balance and have the propensity of yielding disastrous results in the eventuality of excesses being committed on either side. The special place acquired by man in nature and the emergence of social forms that have adopted resource-use practices making an impact on eco-environmental systems has been a major historical development. The present Unit focuses on this historical development. The main areas examined here relate to the:

- 1 understanding of the nature of environmental resources that have been brought into social use;
- 1 analysis of resource-use practices with reference to their impacts on human societies;
- 1 crises resulting from reckless use of environmental resources; and
- 1 growth of the concept of resource conservation.

The unit prepares the ground work for a more detailed analysis of the distinct stages of social evolution and the emergence of related resources-use practices. This analysis becomes the subject of study in the next two units of this Block and in the subsequent Blocks.

4.1 NATURE OF RESOURCES & SOCIAL USE

The basic source of all our material goods is natural resources.

Natural resources are raw materials and energy obtained or derived from the environment.

Natural laws govern the occurrence and development of natural resources. The resources renew themselves over various lengths of time. For example, it takes millions of years for minerals to form, hundreds of years for soil to develop, and tens of years for trees to mature.

Earth is a unique planet as it contains natural resources that have given rise to numerous life forms and have created an environmental system that has sustained and is compatible with this diversity of life forms. The reserves of these natural resources on the earth are enormous and along the route of the progress of human societies different kinds of resources have been harnessed by the man. There has, in fact, been a complex interactive relationship between human requirements in accordance with specific stages of culture and the development and use of natural resources. During the course of this interaction the ambit of 'natural resources' has been constantly changing and with that the relationship between man and his environment (use of gender being in the generic sense) has also been changing. The general understanding of the term 'natural resources' until close to the beginning of the modern age was that they consisted of useful, and therefore valuable, commodities. Practically they comprised the raw materials which could be purposefully used by human societies. This meant, essentially, that things like water, air and the light and heat emitted by the sun, and forests, land, wild life, fishes, and minerals were natural resources commonly brought in use by the humans. The modern age broadened this concept to include, as natural resources, the entire natural environment including all living and non-living things. For our purpose, however, a simple classification of natural resources has been adopted that divides them into the categories of renewable and non-renewable resources. In this division the resources which regularly multiply or get renovated are considered as renewable; the resources which are available in a fixed quantity, howsoever large, are considered as non-renewable. Non-renewable resources do not possess the inherent property of multiplication or periodic renovation. We discuss them in the following sub-sections.

4.1.1 Renewable Resources

Renewable resources those which are replenished through relatively rapid natural cycles (e.g. trees). However, even these resources are finite when demand for them outpaces the period necessary for natural regrowth or replenishment

The natural resources which have the ability to regenerate are generally considered as renewable resources. An outcome of this ability is that the use or consumption of such resources is replenished and after a certain time the reserve is again available for use. The renewable resources are mostly the living resources such as plants, forests, wildlife etc. They also include such natural resources as the solar energy, air, and water because of their almost inexhaustible supply.

In addition to the above there are also natural resources that are bestowed with the property of renewal but with a relatively long time taken for accomplishing replenishment. In the context of social use of natural resources they are considered as least renewable resources or may even be considered as non-renewable. The length of time needed for replenishment is known as the cycling time. The resources having a short cycling time are renewable and those resources that have very long cycling time are non-renewable.

The sustenance of human life and its further growth has been largely dependent on renewable natural resources. The most clearly identifiable natural resources that have enormous regenerative capacity are solar energy, water and air. Life has been dependent on them so much that we generally do not count them in the category of renewable resources. In addition, we have two more renewable resources that have played an extremely significant role in the development of human societies – the plants and animals, and the landscape. We shall discuss them in the context of their use by human societies and shall also examine the resultant interrelationship.

Solar energy, water and air form a triumvirate that has helped the germination of human life as also all other life forms and has been responsible for its further progress in an immeasurable manner. If we take human time scales as our point of reference, we find that solar energy has remained an inexhaustible resource as it has met all human needs since the evolution of human life. It has provided energy in the form of light and heat and has helped regulate a climatic cycle that is the source of all vegetational growth and other support systems found vital for life. Solar energy is capable of being captured directly or through conversion in other forms. It was only after the beginning of science in organized manner that conversion of solar energy in other forms became possible. The solar energy has been available to man so naturally and in such uninterrupted form that any documentation of its social use is almost totally absent. We can only assume that the light and heat emitted by sun have been in perennial use by human societies for daily chores, for drying the ripened crops and for regulating their routine works. In fact human societies have, from immemorial times, recognized sun as the single most important resource for light and for heat. A diversification of the use of this resource, however, could only be made viable in the modern age.

Water is generally considered a perennial natural resource as it meets some of the vital requirements of life on earth. The humans are no exceptions in the matter and use water for sustaining life as also for a variety of other purposes. Considering the critical importance of this resource the nature has been very generous in providing water in ample forms and ways. The growth of human societies had been, for a very long time, contingent upon the natural availability of water. In fact water has been one of those key resources that have been managed by human societies from a very early time in its history. Drinking water and irrigation requirements have more often than not determined the contours and pace of development. In this process man learnt, quite early, the methods of converting non-usable water into usable water. As a natural resource water has also enabled man to generate energy and use this energy to power mechanical devices. As a matter of fact the availability of water has been in such abundance in nature that a kind of recklessness in its use crept in human habits. Over several millennia of the abuse of water resources a situation of supply-crunch has emerged now. Several regions of the world as also of India have been suffering from severe shortages of water.

One of the most important renewable resources has been the plants and the animals. Right from the beginning man has lived on a food consisting of animal meat and the plant fruits. The availability of food in different measures in different regions of the country has determined the pattern of settlement and growth of human societies in those regions. Later, in this process, human societies learnt and developed the art of agriculture and adopted semi-permanent and permanent settlements as habitats. The environmental conditions favouring agriculture determined the emergence of community settlements. These settlements were organized in accordance with specific agricultural conditions. The human endeavour was to grow crops to maintain a regular and adequate supply of seeds and to breed animals with the purpose of not allowing their stock to diminish. Agriculture soon became a basic form of human activity and the land for agriculture became one of the basic resources. It provided food to man and fodder to animals; it provided raw materials for ancillary activities such as clothing and shelter and other agro-activities. The agricultural resources were dependent on environmental conditions such as topography, soils, and water-supply and were regularly replenished through cropping activity. In this process sometimes the environment was allowed to deteriorate and the resources to diminish. This obviously had a major impact on contemporary societies as some even became extinct unable to cope with the changes.

Historically, the location of human settlements was strongly influenced by the environment. They were sited near sources of water and other natural resources, at crucial transportation points and in well-protected or easily defensible areas. The presence of commerce and industry is also a significant factor in the location of settlements.

The practice of agriculture reshaped the man-nature relationship. The supply of food resources was now assured and societies could take up other developmental activities. The landscapes occupied by agricultural societies underwent a major change and in innumerable cases the original vegetation was completely replaced by crops grown by the human societies. All this had a profound impact on the environment and various natural combinations of plant and animal life that had contributed to the original environmental conditions were altered permanently.

4.1.2 Non-renewable Resources

There are some resources that are replenished through extremely slow natural cycles (several thousands of years). Such resources can therefore be considered as non-renewable for all practical purposes. Since the rate of formation of these resources is very slow, each time they are used some depletion in their reserve does occur. The rate at which they are used, therefore, determines whether they are likely to last long or diminish sooner. The main non-renewable resources which human societies have been using since the most remote past are metals and mineral resources and soil. The metals and minerals are sometimes available on or near the surface or otherwise have to be mined. The soil is formed over hundreds of years as a result of a complex inter-action between organisms and the physical surface of the earth. Climate also plays a significant role in soil formation.

Productive soils are complex mixtures of interacting gases, water, minerals, microbes and organic matter.

The metals and minerals are seldom available in pure form in nature and are mostly extracted from below the ground or from the hills in the form of ores. This implies the availability of knowledge and a certain

level of the development of technology of extraction. The earliest use by man of these resources has been documented with the help of archaeology and shall be subjected to a more detailed discussion in the next section. Here we would like to note that rock was perhaps the earliest material harnessed by man for use in daily chores. This period was the longest in the development of human societies and is called as Palaeolithic period. Most of the minerals known to us today have been discovered very recently in comparison to the time period occupied by the stone using human societies. The metals as a resource first became known to man in the period often characterized as the Chalcolithic period. The earliest evidence of the use of a metal by human societies relates to copper and bronze. The use of iron as a resource followed the copper-bronze period. The use of metals was a significant stage in the development of human societies as it became the harbinger to a host of critical developments in the subsequent periods that altered the relationship between man and environment. An important property of the metals is that the use of most of them does not result in any considerable destruction of their resources. The metals constantly change form and their malleability allows their use in a variety of applications.

Soils provide a basic support to most of the terrestrial life forms. They are also an important source of nutrients for aquatic life. The process of soil formation involves the breaking of rocks by natural actions such as that of wind, rain, sunlight etc. The rock particles so obtained then combine with vegetation and animal life to form soils. It is clear that soils at different places are different and they also have varying properties. This variation shows its impact on the fertile properties of soils. The vegetation supported by soils accordingly show a great diversity. The growth of human societies has thus been linked with the nature of soils; in some places the soils have supported crops and have helped the transformation of wandering human groups into settled societies, and at other places the less responsive nature of soils for vegetational and crop support has given rise to nomadic and non-sedentary societies.

Soils have the tendency to suffer from the acts of erosion by wind action or by the rains. Whereas agriculture has been seen as the outcome of a major use of soil resource by human societies, it has also resulted in the destruction of the natural plant cover thereby exposing the soil to erosion. In such cases the desert like conditions spread and agricultural area begins to dwindle at varying pace. Soils have also been degenerated from incessant human activities without any consideration for permitting regenerative lean periods so vital for recuperating the fertile properties. The grimness of the situation resulting from this degeneration can be ganged from the fact that human settlements have been forced to abandon the place and resort to migration. The problem of the loss of soil fertility has been faced by humans from a very early time and various solutions have been practiced to combat the situation. Coterminous with these solutions have been the different stages of the growth of human societies as will be discussed in **Block 3**. As a natural resource, therefore, soils have been of critical significance to the humans and

Mineral resources are continually being formed by geologic processes, but the rate is so slow that we can rely only on those deposits already in existence. The current rate of mineral use far exceeds the rate of formation. Mineral resources are thus considered non-renewable.

Land is an essential component of environment. It harbours soil, water, air, life form and the systems within which they interact. Land is an important source of food and water. It is the structural component of all terrestrial habitats.

In tropical countries certain types of soil, when exposed to the sun for extended periods, can turn into laterite, a rock-like earth covering, unsuitable for agriculture.

Severe soil erosion by wind or water has affected many areas of India. Soil erosion can be controlled through a variety of forestry and agricultural practices. Planting trees on barren slopes, contour cultivation, strip cropping, terracing and building diversion channels are some examples of such practices.

have been subjected to a widespread and diverse use by human societies from very early in human history.

4.2 RESOURCE-USE PRACTICES AND THEIR IMPACT

We have seen above how natural resources are distinguished between renewable and non-renewable categories. We have also noted the fact that human existence and the growth of human societies has been contingent upon the use of these natural resources. Over a long period of time human societies had developed different practices for use of natural resources. These practices varied from place to place and invoked, from long experience of resource-use, several sub-processes that helped human societies in their further development. We discuss these sub-processes briefly before taking up a historical sketch of resource-use practices by human societies and their impact.

Perhaps it had become evident to human societies, through repeated acts of resource extraction and observation, that a purposeful resource-use involved the application of one or more sub-processes for better reclamation of natural resources. Broadly there were five sub-processes that could be applied singly or in combination with others depending upon the specific requirements of the local conditions. These are described below:

- 1 Adoption of measures that enhanced the reclamation of the resource and at the same time prevented any wastage of the resource taking place;
- 1 Adoption of techniques that allowed reclamation of a resource that had not been rendered useful until then;
- 1 Organising systems that ensured the most appropriate uses for specific resources thereby optimizing their utility;
- 1 Discovering more viable replacements/alternatives in place of rare and scarce resources; and
- 1 Inventing methods and techniques that helped the reprocessing and reutilization of by-products or once wasted resource materials. The resource-use practices adopted by human societies were in different measures mediated by these sub-processes at different times. We shall study them in a historical sequence in the ensuing sub-sections.

4.2.1 Pre-agricultural

The most important natural resource put to a widespread use by the humans was stone. At a very early stage in the evolution of human societies the use of stone as a material for shaping some of the basic tools was discovered. We do not know the precise time when this discovery was made. But we now know with some certainty that the early tools crafted from the naturally available stone consisted of hand-

axe and the cleaver (a tool used for breaking the grains), and various types of chopping tools. As stated by Allchins, “We still have very little general cultural information, as tools of this period have only rarely been found in caves in the Indian sub-continent, and almost never with the kind of occupation deposit which indicates regular habitation” (Bridget and Raymond Allchin, *The Birth of Indian Civilization*, England, 1968, p.53).

The main sites from where finds of early tool making stage have come are at Soan valley in Pakistan, Narmada valley in Central India (Adamgarh, Jabalpur and Maheshwar), Nevasa in Godawari valley in Maharashtra, Gundla-Brahmeshwaram area in Pennar valley in Tamil Nadu, and Attirampakkam and Gudiyam cave near Chennai in Tamil Nadu. It is evident that these sites are few and scattered far between. The main occupation of early stone tool societies was hunting animals and gathering fruits and seeds for food. The human groups using such tools were ably assisted by their implements in their occupation. The tools were of a crude nature but seemed to work well in the given situations. The types of stones used in making these tools were mainly sandstones, quartzites and shales. Regional variations are noticeable both in the incidence of different varieties of stone tools and in the types of stones used in making these tools. The process through which the tools were made has been described by Allchins: “In order to make tools large flakes or pieces of quartzite had been removed from the parent rock. It was not always clear whether this had been done by striking the rock with another stone – an operation which would require great strength – or by fire-setting, that is lighting a fire against the rock and so causing large pieces to breakaway from the main body. Perhaps both methods were used. Some tools, usually cleavers, can be seen to have been made from flakes which had been struck off larger blocks of raw material (no.3 & 4 in the figure given here). But in the case of many tools all traces of a primary flake surface or a bulb of percussion, if they were ever there, have been lost in the removal of further flakes, in the process of giving the tool its final form” (Bridget & Raymond Allchin, *op.cit*, pp.63-4). In the early stone tool manufacture the chief resource-used was quartzite. It seems where quartzite was not available in good supply, other varieties of rocks were used. It is also evident from the process described above that reprocessing and reutilization of wasted resource was a common sub-process employed in tool making. The flakes, which were the by-products of the manufacture of core tools, were utilized on a large scale. In the subsequent stages of stone tool making the flakes were used as the main objective of the tool makers and they became the intrinsic part of stone tool manufactures. This stage, obviously, focused on tools that were smaller in size and therefore used mainly rocks called crypto-crystalline silica, commonly called agate and jasper or chalcedony. Stones of this type give flakes of smoother surface. One of the main sources of this stone was the river pebbles. We could now relate the sites of stone tool making settlements as being located in river valleys. An important point for our consideration relates to the manufacturing process of these tools. According to one particular view the flakes from pebbles could only be obtained by using a wooden hammer, in

which case the resource-use practice seems to undergo a definite shift as it employs a combination of materials.

The flake using stage of stone tool making was followed by the microlithic tradition. Here the tools were mainly made of blades of stones. These blades were parallel-sided and were prepared from cores. They were attached to wooden pieces in different combinations to make a variety of tools. The shapes of these blades leave little doubt that they were made by chiselling the core stones with the help of a bone or hard wooden point struck with a hammer. Clearly, at this stage the human societies had become conversant with the use of natural resources other than rocks or stones. This other natural resource was wood and it had begun to be used for more purposes than merely for fuel. The sites using microlithic devices were no more confined to a few places or regions. A wider dispersal of this tradition had taken place as microliths were also found from eastern parts and deep south.

4.2.2 Agricultural

The beginning of settled agriculture marks a significant phase in resource-use practice. There is a clear shift in favour of soil as a natural resource and the use of stone for making tools also undergoes a change with much greater variety coming into vogue. In the early stages of agriculture plots of land were cleared of all vegetation and the seeds sown to grow the crops. Since an optimum deposit of soil was necessary for growing the crop on plots of land, agriculture had begun to get localized. Areas where fresh deposits of soil would come periodically either as silts from floods or from decayed matter were obviously preferred. A new resource-use practice in the form of tending the soil now became known to human societies. This was also the beginning of a revolutionary change in the use of natural resources by humans as road to boundless growth had begun to be traversed.

The early evidence of agriculture on the Indian sub-continent comes from Baluchistan. The settlements are small in size and seem to focus on areas where good cultivable soil was richly available. This soil was periodically replenished by the floods in the two main rivers, Loralai and Zhob and the valleys of these rivers were thus available as fertile grounds for practicing agriculture. The beginning of settled life soon resulted in the adoption of the practice of domesticating animals. As a resource the animals could now be reared and used for a variety of purposes in addition to their being a source of food. We have evidence of the domestication of sheep, goats and oxen in the early period of agricultural development. Dog, it may be noted, had already been domesticated. In a subsequent phase we get the additional evidence of the domestication of ass. Clearly plants, grown from seeds periodically on fixed areas and domesticated cattle became the two main natural resources that were now widely used by human societies. From wandering habits of man hunting and gathering food for sustenance there was now a change as fixed settlements of human populations had taken precedence. Man's dependence on stone tools of the earlier period also underwent

a change as the new requirements necessitated the development of smaller tools that were more versatile in their use. The agricultural sites yield tools made of blades of chert, jasper or chalcedony, rubbing or grinding stones, lunates, bone awls (small pointed tool for pricking) spatulas (instrument having broad blades, used for picking up powder etc.) and beads in steatite, lapis-lazuli and frit.

In addition pottery also begins to appear from this period onwards. This pottery was both handmade and wheel-made and was decorated with painted designs. Materials other than stones, such as bones, clay and sand were now used by the man. The realm of resource-use practice got widened and simultaneously, with the growth of a more complex structure of human societies, greater variety of natural resources began to be used by these societies.

The early practice of agriculture opened several new possibilities. Permanent settlements helped develop community life and broadened the areas in which humans could meaningfully engage. In fact the change from hunting-gathering activities, which had occupied the major portion of time, to settled agriculture was a quantum shift. The near assured availability of food supplies gave man time to employ in other activities. Rapid advances were made as semi-permanent dwellings were made, spinning and weaving was practiced and crops were sown, tended to, and harvested and grain consumed as also stored as seeds for the new season agricultural operation. The stage was set for the rise of civilization.

The necessity to expand the agricultural area along the alluvial deposits in river valleys opened the flood plains of such large rivers as the Indus and its tributaries for the civilization to germinate and flourish. In places like Harappa, Mohenjodaro, Dholavira and Lothal large centres of civilization developed. These centres were all urban in character and almost solely dependent for their agricultural supply on the seasonal alluvial deposits of the rivers along which they had grown. They had, however, developed several new resource-use practices. Use of bricks in making houses was a remarkable feature. The bricks were of two types – burnt and mud-bricks. A whole new variety of crops were now grown which included wheat and barley, leguminous plants, field peas and dates. Oil seeds had also become known as there is evidence of the use of sessamum and mustard. In addition to the domestic cattle we have evidence of keeping the domestic fowl. Cotton was also grown and there is evidence of woven cotton cloth. Another remarkable change had occurred in the area of tool making. Early use of metals is most clearly evident. A range of tools made of copper and bronze have been found from the excavated sites. Along with the blades of stone the metal tools seem to have equipped human groups with much greater competence in reclaiming natural resources. We also have evidence that subsidiary tools had been developed such that good skills in craft work could now be achieved. The use of a very thin drill to perforate tiny beads, as seen in Lothal, is a good illustration of craft skills. The seals from the Harappan sites are also of great interest to us. The seals are available in such plenty that seal-making appears to have become an

important craft. According to Allchins, “The seals were sawn from blocks of steatite and cut as intaglios, then toasted in a small furnace to harden and glaze the surface. Their importance was doubtless linked in some way with their role in trading activities, but for the modern observer of even greater interest are the short inscriptions in the unknown Harappan script and the subjects of the intaglio, many representing scenes of a cultural or religious character” (Bridget & Raymond Allchin, *op.cit.*, p 135).

The early, copper and bronze using, civilization, that had held a sway mainly over the north-western and western region of the Indian sub-continent declined by about 1500 B.C. No single cause responsible for this decline has been clearly established. We however speculate that a combination of factors may have been responsible. In this the cause suggesting a change in the environmental conditions of the region definitely interests us. Gregory L. Possehl says: “There was an abandonment, or severe depopulation, of a number of important Indus settlements There was also a disruption in Indus economy. The production of a wide range of special materials, ... was curtailed The art of writing was no longer practiced. Long-distance trade was reduced... (*The Indus Civilization, A Contemporary Perspective*, Vistaar edn., New Delhi, 2002, p.237). A steady deterioration in the climate and environment of the region is often cited as one of the important reasons for the above to happen.

4.2.3 Iron Age

The decline of copper-bronze civilizations and the emergence of iron using human societies should not be necessarily linked sequentially. Significant from the point of view of resource-use practice is the fact that the knowledge of the use of iron almost dramatically changed the scenario of the use of natural resources by human societies. Perhaps the foremost change was effected in agricultural practices. What had, in the earlier period, remained a river-bank bound agriculture was now transformed into open-field based agriculture. We had noted in the preceding section that soil as a resource had been successfully used by human societies in the early stages of the growth of agriculture. But at that time a natural restriction had limited the growth of agriculture – in the absence of a hard material to over turn crusty upper surface of virgin soil only soft alluvial soil could be used for agriculture. Since regular alluvial deposits were mainly a feature of the rivers in semi-arid & north-western and western India, most of the agriculture of that period was spread along river valleys in these regions. The introduction of iron, especially in the plough share, provided man a fresh and new opportunity to work on virgin areas. Consequently agriculture spread in totally new region which afforded irrigation facilities – this region was the Ganga-Yamuna doab. Soon it expanded eastwards and from there to other areas of the country. In the subsequent historical development of human societies in India agriculture mostly remained the principal natural resource and the patterns of its use often determined the course of further developments.

We have in the form of Vedic literature a very rich source providing information on resource-use practices of contemporary societies. It tells us that the range of crops grown had expanded considerably as it included wheat, barley, millet and rice. These crops were grown on newly cleared lands reclaimed from the forests in the plains of Ganga and Yamuna. Such large scale clearance had become possible due to the use of iron. The other metal resources that had become known were tin and lead. Cattle-keeping had been practiced regularly. The pottery was pre-dominantly “wheel-thrown” and a “remarkable degree of standardization” was also achieved (Bridget & Raymond Allchin, *op.cit.*, p.212). The society had become fairly complex and a set of defined code had emerged as the regulating principles of social interaction and conduct. The significance of iron as a resource had remained undiminished and greater possibilities of growth had become associated with the varied use of iron.

4.3 SUMMARY

The resource-use practices discussed above make it dear that for a very long time the general perception of the human societies regarding natural resources was that their reserve in nature was limitless and therefore reclamation of natural resources could be practiced without any serious consideration for their conservation. In fairness to the pre-modern societies, however, it should be said that their resource-use practices were generally not geared at methods of reckless consumption. Irreparable damages were avoided and the general human impact on the ecology and environment was not one of destruction of natural habitats. The resource-use practices clearly show an interrelationship between the nature of resource-use and the form of human societies. We shall study more details of this process in Blocks 3 & 4.

4.4 EXERCISES

- 1) What do you understand by the terms ‘renewable’ and ‘non-renewable’ resources? Discuss.
- 2) Examine the main resource-use practices during the pre-agricultural period.
- 3) What major changes were experienced by human societies in India as a result of the use of iron? Elaborate.

4.5 SUGGESTED READING

Bridget & Raymond Allchin, *The Birth of Indian Civilization, India and Pakistan before 500 B.C.*, England, 1968.

Irfan Habib, *Prehistory in People’s History of India Series*, 1, New Delhi, 2001.

S. Settar, R. Kori-Settar (ed.), *Prehistory in Indian Archaeology in Retrospect Series*, Vol.1, New Delhi, 2002.

D.K. Bhattacharya, *Ecology & Social Formation in Ancient History*, Calcutta, 1990.

Gregory L. Possehl, *The Indus Civilization, A Contemporary Perspective*, Vistaar edn., New Delhi, 2002