UNIT 1 RESOURCES AND SOCIETY

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1.0 INTRODUCTION

In this unit we shall deal with the historical relationship between resources, technology and society as well as will try to define technology and resource describing their interface with society. You will learn the evolution of ways of acquiring resource from the environment, and how society became more and more organizationally complex, as it increased its resource use based upon increasing technological abilities. At each stage of acquiring ability to exploit more and different resources, human society has undergone transformations in the realm of the political, organizational, economic and cosmological domains. Thus this unit focuses on change in human society in relation to resource use.

1.1 OBJECTIVES

After reading this unit, you will be able to:

- describe the concept of resources; and
- explain the changes in human society in relation to resource use.

1.2 CONCEPT OF RESOURCES

What is a resource? Anything that anyone can use for survival and reproduction is a resource. A resource is not necessarily tangible for example, knowledge is a resource that is most important as humans do not invent technology fresh at every step but use a body of knowledge handed over to them through generations.

For humans resources are not just something that exists in the habitat but things that are culturally produced and socially reproduced. For example every child learns some basic tricks of survival from their elders, usually primary caretakers such as parents and other family members, but these caretakers are part of a group , bonded together to fulfill its task of primary socialization. Such a group can be a boy's dormitory in a tribal society or a school in an urban neighbourhood, once the child has grown out of the infant age, whether it is parents or surrogate parents who teach the child basic tasks and ways of taking care of themselves. Thus while a society provides the institutional structure, the culture provides the know –how.

Human beings depend not so much on materially produced as on culturally produced resources. Marshall Sahlins, a cultural anthropologist has pointed out that for anything to become a resource it must be culturally perceived to be of value, or to be of use. Let us take an example of hunters and food gatherers who may be living in an environment where there are large quantities of minerals buried under the forests that they are using, yet it is of no use to them for they have no requirement for it. Even for the resources normally used by the foragers, not every resource may be used in a uniform manner. For example, although both meat and vegetable foods such as roots, tubers and nuts form a part of their diet, yet as reported animals proteins from hunting form only a small (20-45%) of their diet, a fact that rejuvenated discussions about women's superior position in contribution to subsistence among feminist scholars. However not even all kinds of vegetable sources may be counted as food or be equally valued. Although human beings are actually capable of eating and digesting a large number of species they show themselves to be remarkably choosy about what they identify as food and even more so, what they prefer. For example for most upper caste Hindus, animals are not food, even if they are food for some, not every animal, rather only a few species form edible resource.

Going back to the example of the hunters and food gatherers, Richard Lee who had done intensive work on the! Kung Bushmen in the fifties and sixties, when they were relatively less transformed. The! Kung could identify and name 200 plants and 220 animals in their environment and they considered 85 of these plants as edible and 55 animals. Yet what they really ate as part of their daily diet was 9 vegetable species and then too what they ate in really large quantities was the mongongo nut. Thus what we learn from this example about resources and their use by the human population are the following:

1) Although all resources are more or less all present in our environment something becomes a resource or is used as one when it is identified as a resource by the society and this is culturally determined.

2) It is through culture that our needs for a particular resource are identified, like it is cultural food preference that will determine whether or not something is exploited or used as food. Like any number of animals present in their vicinity do not qualify as food for a vegetarian community, but the milk of some animals may be. Then again for some other group of people like say the Japanese, while meat of cattle may be food but their milk is not.

3) To transform a resource available in raw form into usable form one needs a certain technology. The level and range of technology available to human

societies shows an upward trend over the time scale. In other words human societies have been mastering new technologies over time and thus expanding their range of resource use.

4) Expansion of resource use is determined again more by culture change by which new needs are introduced into the society that trigger off desire for more and more resources. Thus the modern age and its intensified consumerism is seen as the motivating force behind increasing and unmanageable exploitation of natural resources that is now bringing our globe to the verge of an environmental disaster.

5) The evolutionary expansion and intensification of resource use is associated with changes in society, its institutions and the world –view and cosmology that accompanies each social form. Thus societies have been becoming more complex, more interconnected and bigger in terms of size, both in terms of absolute population increase and size of such units as qualify to be called as identifiable societies.

To understand this process, let us first examine one by one the various levels through which human societies have passed. In each of these we have to understand the relationship between technology, economy and the exploitation of resources. While technology is an aspect of culture and refers to a body of knowledge, economy refers to the set of social relationships through which the technology is operationalized. The economy has three major aspects, production, consumption and exchange. In more complex societies, we also have distribution of resources that is an aspect of power relationships, therefore as societies become more complex, the economic relationships become part of the political issues.

Thus according to Ellen 1994, a mode of subsistence is "the aggregate of extractive processes characterizing a particular population". The variables that are included may be listed as:

1) Technical practices
2) Environmental modifications
3) Long term genotypic changes in plants and animals.
4) Movement Strategies
5) General Cultural information
6) Population Control
7) Specialization of skills and knowledge
8) Exchange practices, including outside trade.

Let us begin from the simplest and earliest form of human society.

1.3 HUNTING AND FOOD-GATHERING OR FORAGING

This was the way by which humans have lived most of their existence as *Homo sapiens* and even before that. The food procuring activities of proto-humans goes back to almost 2.5 million years. The human population who foraged for a living was initially found in the savannas and open forests of the Old world.

They were mostly located where food in the form of edible species of animals and vegetation was abundant. However as the human population expanded and Man searched for more resources and entered different parts of the globe by crossing over an earlier existing land mass into the New World and into Australia by crossing the sea. The expansion of human populations led to increasing use of biomes of all varieties and that is why we find such a diversified resource base of even foraging communities as they range from hot deserts, like the !Kung bushmen , to rolling grasslands of Australia like the Australian Aborigines and cold deserts like the Tundra, inhabited by the Eskimos. Thus even by the simplest and earliest technology, humans were able to exploit a variety of resources.

The ability to expand, a process that Mashall Sahlins has described as adaptive radiation is based upon the capacity of humans to make and use tools for extracting resources from the environment and be able to transmit and accumulate the knowledge of tool making. Thus the human ability to communicate using symbols, in other words speech has been one factor that has enabled them to enrich their resource base far beyond that of any other species.

Although hunters have been understood as relatively static yet there has been considerable transformation undergone by them over the huge time span that this mode of subsistence has existed on this earth. There is evidence to show that prehistoric hunters who depended on very large games had more complex social organization than modern day foragers. The later day foragers may also be such populations that have been pushed out of earlier more complex modes of subsistence like agriculture or even urban cities by conquest or other historical factors like famine, floods, etc. A fact that supports such a view is that most contemporary foragers are found in marginal habitats, populations that either fled political oppression or were spared centralized control because of their frontier locations.

1.3.1 Technology of Foraging

Foraging or hunting food gathering is what may be called as an acquisitive economy, in other words the technology is just enough to enable people to procure food and other things from the environment without transforming them in any way. Thus hunting may range from trapping small animals to hunting larger game yet the dependence is on the naturally occurring animal species as they exist in the wild. True, the nature of weapons required to kill game may depend on the nature of animals hunted and the type of habitat. Like the famous boomerang of the Australian Aborigines, used to track down kangaroos in rolling grassland where the boomerang was able to hit the prey because of the open expanse. The boomerang is a curved piece of wood so cleverly made that it has the perfect aerodynamics to float through the air and stun its prey. The returning variety even returns back to the thrower.

Thus one thing that we must note is that when we say a technology is simple it does not refer to the efficiency or the skill involved. As Ellen (1994: 197) puts it, a restricted tool kit does not indicate a ‘primitive’ technology. The know- how that a hunting society uses to explore its environment may be way beyond the capacity of even the most accomplished scientist. What we mean by simple is that the process of transferring resource from its natural to its consumable stage is direct. Like in foraging, there is only one step between the resource and its

utilization; that is its procurement from the environment by the producer. Thus all a hunter has to do is to throw his boomerang and hit the prey, and then consume it. Compare this to the manufacture of a motor car and you can see the difference. The number of steps involved in getting together the variety of raw materials and to transform them through many stages is a highly complex process though not necessarily more skilful than making a trap or a boomerang. Thus some traps collected from the Australian Aborigines were so complicated that it became very difficult for the scholars who had collected them to decipher how they actually worked.

Thus in a tropical rain forest the more common weapon is a bow and arrow as the arrow can find its prey even through a thicket. The Eskimos use harpoons to hunt seals and large fish in the Arctic seas. The foragers use whatever raw material is found in their vicinity and they are also limited by the nature of their habitat that they are unable to transform. Thus the Eskimos for example depend mostly on hunting and have little access to vegetable foods in their icy environment. The Bushmen of Kalahari are organized around water holes that are the key resources in the desert. They have little use for weapons to hunt large animals and depend upon traps to hunt small game. The foragers have technology to hunt, trap, gather and collect and their material culture reflects that apart from hunting, cutting and digging tools they have containers for storing water and food. Common containers use naturally occurring resources to be transformed into carriers, like ostrich egg shells in the Kalahari and gourd containers in Middle India.

Although foragers leave least impact on the environment, yet the presence of any human groups is bound to be felt on the environment; and so it is for hunting societies. The very fact that they gather fruits and tubers and hunt, leads to a progressive depletion of these resources in their vicinity. There is a pile up of garbage in the form of waste generated by the camp. The animals tend to run away from this region fearing for their life and also feeling the impact of the human presence. There are seasonal changes in availability of resources, so that the only available strategy for the group is mobility. There have been very few societies that have been able to maintain a sedentary life style using this mode of subsistence, the only exception being the N-W coast Indians because of an abundance of resources in their locality. Most others are what we term as nomadic. They have to use movement as part of their adaptive strategy to keep up the adequate flow of resources. For this, such groups have a specialized kind of social organization and population limits.

1.3.2 Social Organization of Hunters and Food Gatherers

The foragers live in what we call as bands. These are small familial groups but not necessarily families as such that live together and exploit the environment. Each member of the band has the responsibility to share food and cooperate with all other members of the band. Thus sharing and cooperation is the basis of their social organization. Poly Wiessner has shown how the! Kung Bushmen have the institution of Hxaro to teach small children how to build up relationships by exchanging gifts. Such relationships that cross cut and augment kinship relationships, have the advantage of a quick setting up of relationship when required, thus adding more flexibility to resource options. Since foragers can neither store food nor modify their environment according to their needs they

invest in what may be called social capital, or relationships to tide them over their food crisis. Such crisis may occur because of famines, pests or any other conditions that deplete natural food and water supply. In deserts where water holes are the most important resource, Weissner has shown how any individual has a number of links to a particular water hole, by rights inherited through grandparents, and parents, of self and of spouse and also by association or residence.

In short the greatest tool for adaptability under foraging conditions is flexibility, something that is achieved by living in bands whose composition is very flexible. Although scholars like Julian Steward had given the concept of patrilineal bands, yet data from actual foraging societies has shown that bands are only loosely based on kinship for any kind of lineal rule would impose too much restriction on band composition, that would make it impossible for it to adapt to the changing resource availability in the environment. For optimum advantage in adaptation the band size and its composition has to continuously adjust to environmental conditions. Thus if resources are abundant in any area, the band can take in more members and people can evoke any kind of link like kinship, or friendship or ritual to join in. The sizes of bands vary according to the general resource availability in any region. They may range from as few as a ten to as many as fifty, yet the limit is put by the requirements of mobility and potential availability of food and water.

1.3.3 Demography

The foraging societies for technological reasons are unable to support large populations. They have certain cultural mechanisms for controlling population and some may be induced by their life style and environment. Marjorie Shostak , in her biography of a !Kung woman, Nisa describes how mothers have a choice of keeping or discarding their infants when they go alone to the bush to give birth. Some other means of spacing is by prolonged periods of breast feeding because there is little weaning food in the bush. Also since all movements are by foot, nomadic populations cannot have too many children who are below the walking age. Women who are constantly on the move may also lose larger numbers of foetuses.

In addition we may also consider what scientists have called co-evolutionary processes. Thus Lewontin, a population geneticist has shown that living organisms not only react to their local environments but they also alter their environment by their own activities, thereby creating a reciprocal relationship between organisms and the pressures of natural selection. Thus organisms and their environments co-evolve and co-determine each other by way of their mutual inputs and outputs. Thus over a period of time a genetic change is likely to occur in response to a phenotypically induced feedback cycle between organisms and their environment. Thus a mutual relationship exists between organisms and their environment with the latter often creating the conditions for its own natural selection, like the shorter stature and lighter bodies of populations who live in food deficit areas alike the Kalahari desert. One may also expect reduced fecundity of a population in response to living conditions that do not support density of population. Combined factors indicate low populations among most groups dependent on foraging and only in exceptional cases can high populations be supported.

1.3.4 Political and Economic Organizations

Since the foragers live in almost face to face groups they have little development of hierarchy and no formal authority systems. Their productive relationships are based upon the minimum division of labour that is largely sex and age based. Most adults are capable of any kind of task that is performed by any other person. In this way they need minimal cooperation in productive activities and the sharing and reciprocal relationships are largely directed towards building up of social capital that stands in for storage and investment for future contingencies.

The only way in which law and order problems such as refusal to cooperate or share is dealt with is by informal sanctions such as ridicule, avoidance, denial of social interaction, etc. Only in extreme cases supernatural sanctions may be evoked. Since they have primary group relationships, social ostracization has very strong impact. Scholars working with hunting food gathering society have used a risk model to analyze reciprocal exchange behaviour. It was first put forward by Schaffer in 1978 and then developed by E.A Smith in 1987. This model was used to give a formal shape to the observation that hunter gatherers share food in order to even out the risk of fluctuations in their food supply. Also evolutionary game theory can be applied to describe behaviour such as an egalitarian ethos, the moral insistence on sharing, the rebuke and social ostracization of non-sharers and gift exchange and other social means of cementing social alliances.

However there is considerable variation in degree of sharing and reciprocity and it has been shown that a certain degree of pragmatism is involved in sharing and it is not entirely based on what Sahlins has called as generalized reciprocity or purely altruistic behaviour. In a systematic analysis of reciprocal behaviour involving non-food items Weissner has shown that the! Kung display considerable choice in choosing appropriate partners to exchange. However no such analysis has been done for food as it is too close to survival strategy. Moreover under given environmental conditions it is much more effective to share across bands, than into the same band and the risk covered is much wider in range in inter-band exchange. Yet the cost of such exchange in terms of transport and time may override its advantage.

Thus we find that evolutionary biology uses several formal theories in order to explain the interaction between foragers and their environment. Let us now move on to the question of change and transformation in such societies. The transformation of hunters into settled cultivators or to other modes of production involves two major questions:

1) Why they change ? and

2) What happens when they change?

Reasons for change were earlier largely attributed to external pressures like political force, information overload, etc. But more recent works on for example the Australian Aborigine, often seen as a prototype of Hunter and Food gatherer society, show that the aborigine economy is not static but involves land and resource management of varying intensity and level. These involve producing surpluses for rituals and using kinship relations such as polygyny to achieve such ends. It has been shown that complex technology has been developed to meet the requirements of intergroup politics involving prestige. Thus

transformations are triggered by the needs of social relationships, especially for rituals and ceremonial exchanges, something which we shall examine in greater details in the next levels of subsistence activities, but even for hunters such considerations may have triggered off change and set in motion evolutionary transformations; triggering off a dynamic spiral that may have been self-amplifying. One important indicator for population expansion using optimum foraging techniques was the presence of large game in the vicinity. By using even stone tools hunting of big game gave a much enlarged resource base that could support larger populations. If large mammals are easily available they can yield up to 10,000 to 20,000 K Cal per hour of work, as has been seen in some African regions.

When Hunters change, they may go for settled cultivation or other modes of production like pastoralism. Since all Homo Sapiens were hunters and food gatherers before they became anything else, we may safely presume that any of the next modes of subsistence were preceded by a foraging stage. The reasons why hunters would have looked for alternate technology may be found in the changing environmental conditions especially the disappearance of large games and their habitat and deforestation that would make searching for sufficient game, difficult. Thus in prehistory, sedentary populations are associated with increasing human population, decreasing size and availability of game animals and reduction in foraging territory. The exploitation of seeds that led to cultivation may have begun under such conditions.

1.4 HERDING OR DOMESTICATION OF ANIMALS

The earliest remains of domesticated animals have been found in the Near East. In Europe, Northern Iraq and in Palestine, goat and sheep were found as far back as 8000 B.C. This was also the time when cultivation began in this region, indicating that domestication of both animals and plants began along with a sedentary life style at around the same time. A purely pastoral way of life depending only upon animal husbandry is a specialized adaptation to a specific resource base, namely savannah or rolling grasslands, mountains and semi-arid regions, mostly where permanent cultivation is not possible. The two major resources required by herders are water and fodder for their animals. They mould their life style around these requirements and are mostly nomadic or seasonal movers between two regions, namely transhumant.

The domesticated animals present a stage of greater complexity than the foraging stage as the food or resource has been controlled and is under human care. Herders use the milk, meat and blood of the animals for food and the various body parts such as horns, bones, skin and hair for making various consumable objects. However cattle cannot provide any staple vegetable food which is an important requirement for the human body. Since herders are also closely associated with the natural habitat such as forests and mountains through which they herd their animals, they often supplement their diet by food gathering and even hunting. There are many herders who combine pastoral activities with horticulture or shifting cultivation. The most famous examples are the tribes of the east Africa Cattle Complex. Herding by itself does not support very large populations although much larger populations may be supported by a mixed economy of

shifting cultivation and animal husbandry. As Evans -Prtichard has shown for the Nuer of East Africa cattle complex, they grow millets and maize in one season and live on the stored grain and cattle products the rest of the year. Cattle manure the fields and are fed the stalks of the crops after harvesting, so that there is a biome cycle maintained.

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) What do you understand by a resource? How do humans exploit resources differently from other species?

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2) What mode of subsistence has marked human species for the longest period of time? Is it an efficient mode of adaptation? Support your answer by evidence.

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1.5 SHIFTING CULTIVATION

Shifting Cultivation follows a rotational use of land that makes keeping large herds feasible. The basic technology of shifting cultivation, also known as dry cultivation is to grow crops without help of irrigation or external input of fertilizers. It is rain fed and the vegetation on a piece of land is slashed and then dried and burnt. The top soil is then mixed with the layer of ash that provides the necessary nitrogen compounds that act as fertilizers. The seed is either thrown or dribbled in with a digging stick or hoe. After a certain field has been cultivated it is left to fallow till there is sufficient growth of vegetation to commence with another cycle of cultivation. The key technical features of this mode of subsistence are:

1) It depends on rainfall and hence the timing of slashing, burning and seed broadcasting has to be very accurate. If for example the rain comes while the vegetation is yet to dry and be burnt, then the entire cycle will be spoilt. It must come exactly at the time when the seeds are broadcast.

2) There is therefore a requirement of centralized control of productive activities often performed by the village shaman or magician, aptly described by Bronsilaw Malinowski, in his book Coral Gardens and their magic.

3) There are expanded resources that need community effort to control and manage. Thus the land that is under cultivation at any time is far less than the land that lies fallow. This is a large territory that needs defending by the group.

4) Also the slashing and burning has to be a community effort although individual fields are cultivated by families, usually women are doing all the work of digging and harvesting.

5) It cannot support a very large population and population density has to be small compared to land available. Technically it is highly productive under favourable environmental conditions but in more arid regions, the fallow period has to be very long, up to 10-15 years for the system to be reasonably productive. It is therefore also known as extensive cultivation.

6) It can be productive even where the soil condition is poor like on mountain tops as it makes its own topsoil and does not go deep in the earth.

7) It is marked by mixed cropping where a number of species are interspersed and planted like legumes, tubers, vegetables, fruit trees and grains, all together, each species. Some underground, some over ground, some on margins etc. And also having different cropping cycles. In this there is optimum use of available resources and a horticultural field looks like it is a natural bio-diverse environment except that instead of naturally occurring species, humans carefully replace with their consumable varieties.

8) For these reason it cannot support a very large population and land use is very extensive.

1.5.1 Social Organization

Both shifting cultivation and herding have similar man-land relationships. They have large tracts of land resources, namely fallow land and pasture lands that need community participation to protect and manage. In herding pastures and water sources as well as grazing routes are community resources while animals are usually held and cared for by individual households, and form individual resource. In shifting cultivation the land to be cultivated is parcelled out at the beginning of each cultivation season to individual households, but some productive activities like cutting down of vegetation and setting fire is cooperative effort and women then sow seeds and harvest their individual crops. Because of the significant contribution of women to shifting cultivation, it is also known as female farming and one way to generate surplus is by polygyny or having more than one wife in a household.

The social organization of both pastoral people and shifting cultivation is based on lineage organizations where kinship based groups like clans and lineages often act as corporate resource holding groups. The management of resources and the reproduction of these groups are usually done by the elders of the lineage organizations. In shifting cultivation a clan or village head or a shaman may take the responsibility, not only of distributing common land between constituent households but also to regulate cultivation cycles that may be marked by rituals

and supernatural sanctions. In pastoral communities like the Nuer and Todas (Nilgiri in South India) the access to pasture land and water sources as well as the animals is through membership in clans. The seasonal movement of the animals is also marked by rituals and is controlled by those wielding supernatural authority.

There is thus some degree of structural complexity in shifting cultivators and herders and kinship plays a very important role in organizing relations of production and resource management. However they do not have any centralized political authority and the elders or shamans only play managerial role, managing resources for the welfare of the community, but they do not have power of possession and dispossession. Elders for example may generate surplus, not for their personal use but for community rituals and to get wives for the young men of the lineage. Such modes of subsistence thus may throw up situational leadership but real hierarchy is rarely found.

1.5.2 Trade and External Relations

In both horticulture and herding, a certain amount of goods are traded and market relationships maintained. This is not to say that such trading in resource is not found between hunting food gathering people and settled cultivators. In fact as shown for the Paliyan and other foraging communities of South India, such trading may have been a regular feature over centuries.

The Bhotiya sheep herders on the Himalayan borders had been involved in cross-border trade for centuries. In fact there is no one community of Bhotiya but it is a generic name used for cross border traders engaged in trade across the Tibet border, largely ferrying Tibetan rock salt with staple food and other items from the Nepal and Indian side of the border. Since shifting cultivation is mainly a subsistence producing activity, its every variety of production is directed towards taking care of most of the subsistence requirements of the community, it may be anchored to some cash crop like coffee, cocoa or bananas. Typically a horticultural plot will grow some staples like millets and barely, some underground tubers, vegetables and spices, legumes and also fruit trees, like coconut, or any other fruit that is specific to the region. Thus along with some domestic animals like goats, pigs and cows, the household food and other requirements are usually met. But then they need surplus for other things. In a simpler society a little surplus may suffice and fruits like coconuts, bananas and meat etc. may be sold to nearby communities. But under impact of social change when surplus requirements go up, due to colonization, penetration of market economy and more recently globalization, then the cash crops may take over and people begin to convert more and more land to cash cropping. A very good description of such a change is given by Clifford Geertz in his book "Agricultural Involution" describing the influence of Dutch colonization of Indonesia. Shifting cultivation by itself is not compatible with either population growth or with increasing consumer demands. Yet many communities still continue with shifting cultivation because it provides identity and is associated with ritual and cosmological belief of the people. More over from the point of view of environmental sustainability it is more sustainable than permanent cultivation as it preserves the bio-diversity as well its efficiency if measured in terms of input and output ratio. As Geertz has shown permanent cultivation is extremely labour intensive but has the ability to support a dense population and hence a complex social organization.

1.6 WET CULTIVATION AND THE GROWTH OF THE STATE

In his classic work Oriental Despotism, Karl Wittfogel has shown how irrigation that is associated with both productive water works (irrigation canals) and protective water works (dams) can give rise to a highly structured society with a centralized political system. With food cultivation we find a substantive rise in population which may be caused by the potential for this mode of subsistence to produce surplus food as also other changes triggered off by a sedentary life style such as less spacing of birth, less foetal loss and less infant mortality. There is also a cultural premium on having more children as permanent cultivation requires a very heavy input of labour. A sedentary population with a capacity to produce surplus is usually associated with a non-producing elite that engages in tasks other than food production, giving rise to complex social and political institutional machinery.

1.6.1 Human Population Growth and Social Complexity

What may be called the 'Urban revolution' took place around five thousand years back, its origin rooted near the river Euphrates in Middle East, the very first such civilizations being Mesopotamia (near modern Iraq). This change was triggered off by what scientist have called a broad spectrum revolution, human beings gradually broadened the spectrum of exploitable resources to way beyond what they were exploiting in the earlier periods, that stabilized at around fifteen thousand years ago. These trends are also supported by what we have called the optimum foraging. With the development of technology of storage and sedentary life, instead of people moving around for resources, the resources were being moved around and human settlements were made more for the convenience of trade routes than for availability of resources.

The more classic theory of population growth was linked to technological improvements like Birdsell's theory that populations have self imposed restrictions on population growth that become relaxed when an innovation is made that produces more food. However the agricultural economist Ester Boserup had an alternate theory of population growth. She demonstrated that permanent agriculture makes a more efficient use of space but makes increasing demands on human labour. Thus given a choice most human populations will not convert to settled cultivation unless compelled to do so. She also differently assessed so called 'primitive' technologies as efficient adaptations to low population density and small social scale. Thus a more recent theory of transformation of foragers to producers is of gradually increasing demand rather than innovation in technology. In other words population growth is here seen as independent variable and technology as the dependent one rather than the other way around. Thus as demographer Mark Cohen suggests that people may have settled down not because it was a preferred option but because it was a forced choice under compelling circumstances.

Johnson (1982) has developed a model of 'scalar stress' based upon needs of increasing information flow and organization as groups became too big for face to face interaction. Thus Cohen sums up on increasing demands of population growth by saying that complex social organization involving centralization of trade and leadership (state) were a result of congestion, information overload

and loss of privacy and personal control. Thus states were not based upon concept of increasing human welfare but on needs for control extraction of surplus by non-producing elite. Thus conquest or force may have played a key role in bringing about such changes than technological 'progress'.

Research has also shown that contemporary hunters gatherers like the! Kung San suffer from less parasitic load because of their small population and mobility than dense and sedentary urban populations. They also show better nutritional status than many Third world Countries. Even prehistoric data shows relatively well nourished and disease free population of prehistoric hunters- gatherers as compared to later urban dwellers.

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) What changes occurred as a result of urban revolution?

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2) Is the urban revolution the best thing that happened to the human society? Critically discuss.

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3) What changes will occur when a society changes form a shifting mode of cultivation to settled cultivation?

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1.7 LET US SUM UP

- Inequalities precipitated by more complex civilizations have put a greater load on the environment and its resources.
- Contrary to earlier held beliefs, even archetypical foragers with a Stone Age technology like the Australian Aborigines had a rich culture and philosophical traditions. They also had highly sophisticated technology in terms of basic scientific application.
- Civilization cannot be evaluated within a rational frame of reference and hence we need to re-examine these earlier modes of subsistence with an open mind and even learn lessons from them.
- Critical appraisal of technologies and their sustainability is essential to understand the social and cultural characters of the various forms of technological adaptations.

1.8 KEY WORDS

Resources : Any substance or thing on which one can live for survival and reproduction.

Foragers : People who collected food either by collection or exploitation of natural resources using simple techniques.

Pastoralism : Livelihood based on animal husbandry.

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1.10 KEY TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Your answer must include the following points
   - Everyone uses resources for survival and reproduction
   - Use of knowledge
   - Socio-cultural norms and practices
2) Your answer must include the following points
   - People forage for a living
   - Abundance of natural resources
   - Use simple techniques
   - Knowledge and capacity of tool making
   - Prehistoric hunters and their tools

Check Your Progress 2

1) Your answer must include the following points
   - Sedentary lifestyle
   - Population increase
   - Complex social structure and associated institutions
2) Your answer must include the following points
   - Convenience in trade
   - Technical improvement
   - Population increase and labour insensitivity
3) Your answer must include the following points
   - Population growth
   - Efficient use of space
   - Increase human welfare and technological progress
   - Increased life expectancy