



Indira Gandhi
National Open University
School of Social Sciences

MANE-005
Environmental
Anthropology

Block

3

ECOLOGY AND SUBSISTENCE PATTERNS

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BLOCK 3 ECOLOGY AND SUBSISTENCE PATTERNS

Introduction

Human culture and civilization of the earlier periods can be explained and understood in terms of meeting the demands made by the ecology and environment. There is close relation between ecology and subsistence pattern. Anthropologists like Clark Wissler employed 'culture area' concept to associate certain geographical areas with subsistence patterns and cultural traits, which is considered as simplified form of 'environmental determinism'. The survival of human society at any given point of time revolves around three major aspects: i) the environment, ecology and the resources available in it, ii) the population size and, iii) the cultural apparatus evolved and available to harness the resource base. However environment is not a determining force in shaping a culture. Different cultural organizations can exist in the same environment. Environment becomes a limiting factor in production, as the specific resources available in an environment have to be made use of through the organizational apparatus of the society. Environment is mostly relevant in determining the mode of subsistence, but is not important in shaping institutions like religion or social organization. However the way in which people subsist on resources available, influence their level of social and political organization. With better technology, humans are able to overcome the restrictions imposed by the environment in getting a living. While early man's life was drastically restricted by environment, modern man is able to drastically alter his environment, even going to the extent of damaging it. How humans deal with the exigencies of environment is known as adaptation, which functions as an interface between humans and their environment. Adaptation is basic to human existence and survival, as it enhances the chances and choices of survival. For, example, the small size of the hunter gatherers can be explained as an adaptation to the carrying capacity of the land i.e. the number of people who can be supported, with the available techniques. Hunting and gathering formed the major source of survival for man, for a long period of time in human history. Hunting and gathering people show similarities in their social groupings and political integration. Pastoralism is an adaptation to grass lands, deserts etc. which are not suitable for horticulture and agriculture. Pastoralism began after the domestication of wild animals by man. But, in comparison to the number of animals domesticated, the numbers of plants domesticated are numerous. Rooted in the domestication of plants, the origins of agriculture resulted in significant changes in human society, well known as food producing revolution.. But, this so called food producing revolution is, in fact, a slow process of evolution starting from upper Paleolithic to Neolithic period through Mesolithic period. The production processes in hunting and gathering, pastoralism, and agriculture are organized by dividing the work among males, females, adults and children which is known as division of labour. Considerable technical skill and environmental knowledge are required in apparently simple activities such as hunting and gathering, pastoralism and agriculture.

The units in this section deal with the three different modes of subsistence patterns, i.e. hunting and gathering, pastoralism, and agriculture, existing in different ecological settings. The origins of these practices, the regional and cross cultural diversity, the adaptations and cultural practices, the technologies and skills involved, the importance of indigenous knowledge have been covered, Also dealt with are contemporary concerns such as resource degradation, sustainability, and conservation.

UNIT 1 HUNTING AND FORAGING

Contents

- 1.1 Introduction
- 1.2 Defining Hunter-Gatherers
- 1.3 Hunter-Gatherer Classification
- 1.4 Settlement and Subsistence
- 1.5 Tools, Techniques and Method
- 1.6 Social Organization
- 1.7 Cultural Ecological and Natural Resource Management
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- 1.9 Summary
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Suggested Reading

Sample Questions

Learning Objectives



After going through this unit, you will be able to:

- define silent features and classify the hunter-gatherer cultures based on settlement/subsistence system practiced by the group;
- to gain insights into the interface between environment and socio-cultural features of hunting-gathering communities;
- describe various types of tools and techniques used in hunting and gathering in utilization of natural resources; and
- depict the moment of social organization and their relations with other groups.

1.1 INTRODUCTION

The hunting and gathering peoples of the world represent the most ancient and also the most successful human adaptation. Until around 12,000 years ago, primarily all human beings lived as hunters and gatherers. Over 99 percent of human history is characterized by hunting and gathering mode of subsistence which reflects its resilience. Lee and Devore (1968) have pointed out that the hunting and gathering mode of life is more stable and persistent adaptation to the environment in view of the apparently uncertain future of agricultural and industrial societies threatened by ecological crisis and war effected massive destruction.

Anthropologists have long been interested in studying hunter-gatherer communities, even though hunter and gathering communities are fast transforming and the existence of a pure hunting-gathering people is no longer a reality. There are several reasons for this persistent interest:

- a) Hunter-gatherers stand at the opposite pole in contrast with urban life;
- b) They may provide insights or answer to some crucial questions about human life, social life, politics, gender, diet, technology, world view etc;

- c) They lived and are living without an organized political system yet have managed their affairs themselves;
- d) They lived for hundreds and thousands of years without destroying environment even though they lived in a wide range of environments, some rich in resources and others with precarious resources;
- e) With relatively simple technology, they were able to meet their material needs with minimum energy expenditure;
- f) According to Sahlins (1972), the hunter-gatherer societies were the “original affluent” societies which is a tempting proposition to anthropologists to understand them more critically.
- g) Hunter-Gatherers studies facilitate testing general anthropological and archaeological theories.
- h) Beyond the academic interests, hunting gathering people face urgent social, economic and legal issues which need to be addressed.

More intrinsically, the hunter-gatherer life would provide insights not only about past ways of life but also about long-term human future.

In the following pages, we will be learning various aspects of hunter-gatherers life. The student is reminded that this lesson endeavors to place the hunter-gatherers in the larger context of the Environmental Anthropology. Each of the aspect discussed below have some adaptive value towards the environment, though hunter-gatherers life can be understood from other perspectives like cosmology world view and social life etc.

1.2 DEFINING HUNTER-GATHERERS

Hunting-gathering has been largely defined in economic terms. It is regarded as chiefly a mode of subsistence based on hunting wild animals, gathering wild plants and fishing with no domesticated plants or animals except dog. However the contemporary hunter-gatherers also depend upon other subsistence modes like gardening, herding and trading in forest produce etc.

On the other hand, defining hunter-gatherers also depend upon social organization, cosmology and world view in view of the fact that these aspects form an integral part of the hunting-gathering mode of subsistence. In a majority of hunter-gatherers populations, the band or a local group form the basic unit of social organization. This group comprises 15-50 people related by kinship and usually occupy a territory which is gleaned for food. The band organization is characterized by egalitarianism, mobility, fission, fusion and a communal ownership of land just as common property regime. However these features are not universal.

Regarding interpersonal relations, sharing in the form of generalized reciprocity (giving something without an expectation of a return) play a very significant role that binds the group together. Even though the family constitutes a production and consumption unit, it is often cooperation and collective action, of small groups of persons through which food is procured and distributed.

Hunter-gatherers identity is closely tied to ontological relation in which supernatural beings become a part of their kindred group. Animals are considered as kin, dissolving the ontological boundaries between the hunter-gatherers and animals. There is a distinctive spirit and attitude towards their environment which Bird-David (1990) phrased as ‘giving environment’ where it is conceptualized as a home of spirits and source of all good things. In their conception, the cosmic world is animated with moral and mystical forces.

The major controversy in defining hunter-gatherers is a certain ethnocentric conceptualization that they are “pure”, “original” and “isolated without any contact with outsiders”. However several studies have conclusively proved that it was not so. The problem is too much emphasis on subsistence pattern and neglecting other features. Even in features like social organization, world-view, sociality etc. differences are seen.

The divergencies are briefly discussed in the next section though it is devoted to classification of hunter-gatherers which take into consideration some differences.

1.3 HUNTER-GATHERER CLASSIFICATION

In anthropological literature, hunters-gatherers are classified in several ways. Very broadly speaking the hunter-gatherers can be categorized into two by taking time line as criteria: (1) Pleistocene communities and (2) contemporary communities.

Hunters and gatherers can be classified into simple and complex. Many hunter-gatherers' social organization was simple comprising small mobile local groups without much differentiation among their people. Such hunter-gatherers are called simple communities as in the case of Australian aborigines, the Kung Bushman (South Africa) the Chenchu, the Birhors etc. However, some communities like the Indians of Northwest coast of North America and many prehistoric peoples comprised large semi-sedentary settlements with chiefs, commoners and slaves with basic foraging patterns of concentration and dispersion, summer camps, dependence on wild food etc. Such societies are called complex hunter-gatherer communities.

Further the hunter-gatherers can be divided into immediate return and delayed-return societies. Both of these societies are organized as band societies. However, in the immediate-return societies, food consumption is almost immediate soon after its procurement. In the delayed-return societies, food and other resources are stored over longer periods.

Hunter-gatherers can be divided into broad-based foragers and specialized foragers. The former extract a variety of seasonally and spatially available resources. The latter concentrate more on a few specialized resources.

Another classification is based on historical contacts and development. Some hunter-gatherers maintained the tradition of ancient hunting gathering people (what Sahlins calls hunters in a world of hunters). Examples are the Australian Pintupi, Warlpiri, North American Eskimo, Shoshone and Cree, the south American Yamana and the African Ju/hoansi (or the Bushmen)

Another category comprises hunter-gatherers people who lived in contact with non-hunting societies. For example, the Pygmies of central Africa were in patron-client relation with the settled villages. The Nayakas (in Karnataka) and the Birhors (in Bihar) lived in economic symbiosis with the Hindu villages providing magico-religious services and traded forest produce.

Another category is a number of hunting people who could not succeed as agriculturists and consequently reverted or readapted or devolved to hunting mode of subsistence. The classical examples are the Siriono of South America and the Veddas of Ceylon (Sri Lanka).

The above indicates that though there are some common features, there are also special features which are determined by environmental conditions, societal factors, demographic factors, food abundance which necessitates sedentary life-styles, formal leadership, technological advancement for intensified production etc.

Activity: Name any two hunter-gatherer communities from India

1.4 SETTLEMENT AND SUBSISTENCE

a) *Geographical distribution*

The contemporary Hunter-gatherers are widely distributed throughout the world. During the past 10,000 years, their numbers have dwindled mainly due to acculturation under the impact of the expanding agricultural communities. Presently most of the hunter-gatherers are found in relatively isolated geographical regions such as the arid and semi-arid regions in Australia, the central rainforests and southwestern desert regions of Africa, in some parts of south Asia and South east Asia, North America, the Arctic etc.

The following statement gives region-wise hunting-gathering populations:

1) North America

The James Bay Cree

The Inuit Eskimo

The Shoshone

2) South America

The Ona

The Yamana

The Toba

The Paraguayan Ache

3) North Eurasia

The Khanti

The Chukchi

4) Africa

The Ik

The Pygmies (Mbuti, Aka)

The Fuga

The Hadza

The San or Bushmen

5) South Asia

The Vedda (Sri Lanka)

The Nayaka (kerala)

The Palian (Tamilnadu)

The Irula (Nilgiri)

The Hill Pandaram

The Birhor (Bihar)

The Chenchu (A.P)

The Onge, the Jarwa, the Sentinalese (Andaman)

6) South east Asia

The Batek

The Penan of Sarawak

The Agta

The Ainu

The Semang

7) Australia

The Pintupi

The Arunta

The warlpiri

The Tiwi

In the above list only a few populations are given, though there many more populations.

b) *Subsistence*

Hunting and gathering mode of subsistence is characterized by obtaining food from hunting wild animals including fishing and gathering wild plants. At least this used to be practice of human beings before agriculture is invented. This subsistence mode continued into the contemporary times by some societies. It must be remembered that hunter gatherer subsistence differed between different societies. The present account refers to the contemporary hunter-gatherers in the sense of 'ethnographic present'. This sub-unit includes the following topics: nature of food-base, diet selectivity, seasonality, extent of dependence on hunter-gatherers mobility: fission and fusion, camps: size and composition; the composition of the workforce; work and leisure time.

c) *Nature of food-base*

It is often held that the hunter-gatherers live in harsh environment and their subsistence base is precarious, uncertain and fragile. However, in the past 50 years, several studies have pointed out that the subsistence base of hunter-gatherers is not all that dismal. On the contrary even the marginal areas provided adequate subsistence resources.

The subsistence base of hunter-gatherers differs across various regions. Tropical regions possessed varied floral species and faunal species. In arctic and high altitude regions, or coastal areas, animals species dominate and sometime floral species are virtually absent. In parts of South Africa (the Kalahari Desert), the Australian deserts, lower California and North American Great Basin, grass and leaves are in short supply. Herd animals are found in grass lands and thinly forested terrains. Examples include the gray kangaroo in Australia and Tasmania; many species of antelope in East and South Africa, the bison in North America. In the northern regions of Eurasia and North America, open tundra and barren lands also support herds of reindeer and caribou. Some species of sea mammals, like seals, sea lions, walruses, sea elephants, congregate in large numbers during the breeding season.

In India hunter-gatherers living forest regions in Andhra Pradesh (the Chenchus), Kerala (the Cholanaiakans), Tamilnadu (the Kurumba of Nilgiri, the Paliyar, the Naikar, the Malapandaram, the Jenu Kurumba), Bihar (the Birhors), mostly depend upon floral species occasionally supplemental by small game like rabbits, wild pig, iguana and hill sheep, deer etc. The Andaman Islanders' resource base provide aquatic and forest resources.

Depending upon the resource base and nature of resource availability, hunter-gatherers devise subsistence strategies.

d) ***Diet selectivity***

Even though the food base in hunter-gatherers communities is considerably wide, only few species are regularly collected or hunted. For example, among the Kalahari Bushmen, about 85 plant species are available, but 90 per cent of the vegetable diet is collected from only 23 species of which the Mongongo nut is an important food (Lee 1963 p.35). Among the Chenchus of Andhra Pradesh, the most often collected tuber is Chenchugadda among some 15 varieties of tubers.

Diet selectivity is also seen in case of meat eating. Chenchus, during hunting which they undertake occasionally, hunt mainly small animals like rabbit wild pig, iguana, leaf-eating langur.

e) ***Seasonality***

Seasonality is an important factor that influences the subsistence of hunter-gatherer communities. Their activities and mobility are determined by seasonality. According to the seasonal cycles, hunter-gatherer may concentrate on collecting seasonally available food items, make camps or conglomerate in larger settlements. In many hunter gatherer communities, seasonality influences pattern of diet, work effort, group size, mobility, warfare and rituals. Extreme seasonal conditions, like those among the Eskimo, Kalahari Bushmen, the Hiwi of S.W.Venezuela, produce marked seasonal behavior among the hunter-gatherer communities.

f) ***Extent of dependence on hunting and gathering***

In most of the hunter-gatherer living in tropical, savanna regions, temperate zone, dependence on food gathering is high. Only in the arctic and sub-arctic regions, where vegetable foods are not available, hunting of animals is predominant. However in many societies, the preponderance of one over the other is not very conspicuous. Foragers depend both on hunting and gathering to meet their energy or nutritional requirement. Hunting and gathering provide a mixed diet. Hunting consumes more energy and requires the use of efficient tools than gathering. According to Lee and Devore (1963: p.7), barring the arctic regions, in the rest of the world, about 20 to 40 percent of diet is procured through hunting in the hunter-gatherers communities. Lee (1963, p.46, 48) gives the proportions of dependence on gathering, hunting and fishing for different hunter-gatherers communities. The following provides the information for a select few communities.

Percent Dependence on Gathering, Hunting and Fishing

PEOPLE	PERCENT DEPENDENCE ON		
	GATHERING	HUNTING	FISHING
1. Kung Bushman (Africa)	70	30	—
2. Mbuti (Africa)	60	30	10
3. Hadza (Africa)	80	20	0
4. Ainu (Asia)	30	30	40
5. Semang (Asia)	40	30	30
6. Aranda (Australia)	70	30	—
7. Walbiri (Australia)	70	30	—
8. Copper Eskimo (N.A)	0	55	45
9. Tlingit (N.A)	10	40	50
10. Chipewyan (N.A)	0	60	40

g) *Mobility: Fission and Fusion*

Depending upon the abundance or scarcity of resource base, spatial and seasonal availability of various food resources, the hunter-gatherers arrange their mobility in certain defined routes in their territories. Usually they may live in a permanent settlement during winter. In summer, they may move to a camp for foraging. However mobility and stability vary widely among the hunter-gatherers. For instance the Semang of peninsula Malaysia were wandering people in both winter and summer. The Bushman (Kalahari, Africa), the Siriano (Bolivia), the Caribou Eskimo have temporary shelters in winter and wander during summer. At the other extreme, people like the Vedda, the Chenchu, the Kwakiutl of Northwest Coast of North America, the Eskimo (Bering Strait), the Ainu of Japan had permanent shelters in winter and summer, but made short visits to forage away from the permanent settlements.

Binford (1980) distinguished two types of mobility among the hunter-gatherers: residential mobility and logistical mobility. The former refers to movement of all members of a camp from one location to another. Logistical mobility refers to movement of individuals or small groups from a residential location. The duration of stay away from the home base in logistical mobility may vary from one day to a week or more. Residential mobility generally involves any change in the residential locus made during seasonal cycle. A single location can be reoccupied as in the case of winter villages among Northwest coast hunter-gatherers of N. America after residing in camps.

Hunter-gatherers also tend to disperse usually in summer and reassemble at the residential base in winter. This kind of fission and fusion is reported in a several communities.

i) *Camps: Size and composition*

Hunter-gatherer people usually erect camps within the catchment area of the settlement when distance to be travelled increases. Among the Bushmen, Lee enumerated 14 independent camps. One or more camps (1-5 camps) are pitched around one water hole in dry season. However the number of camps at each well and the size of each camp changed during the course of year. Each camp may comprise about 4-10 persons. Usually wife and husband and one or two children and their kin comprise the kin composition. In larger groups, people belonging to different camps may conglomerate around a bigger water hole during rainy season.

j) *Types of foraging*

Anthropologist identified three types of foraging:

(1) Pedestrian (2) Equestrian and (3) Aquatic

Pedestrian is diversified hunting and gathering on foot. The most well known pedestrian foragers are the Australian Aborigines, the Bushman, the Pygmies, and many tribes in India like the Chenchu, the Birhors, Kadar, etc. This type of subsistence is characterized by high mobility.

Equestrian foragers are seen in the great plains of North America (the Sioux, the Crow, and the Cheyenne) and the sparse grass lands of Southern Argentina (the Tehuelche tribe). The former group of hunter-gatherers used horse to hunt bison and buffalo. The latter hunted guanaco. These societies were larger in size, male dominated hierarchical and often indulged in raiding the neighbouring societies to steal horses.

Aquatic foraging includes catching fish, mollusks, crustaceans and marine mammals. Aquatic foraging is most common in North west coast of North America (the Kwakiutl, the Caribou Inuit Eskimo, the Inupiat or Inupiaq). These societies are

specialized in fishing salmon along the rivers and hunting seals and whales off the coast. The exploitation of fish and other marine resources is usually more reliable and productive way of foraging than diversified hunting and gathering of in-land foragers.

Among the Northwest Coast Indians, settlements are usually permanent on the Vancouver Island in Western Canada; the Kwakiutl build large wood home, large community halls for conducting rituals, dance events and giving large-scale feasts.

k) *Division of labour*

Generally speaking, division of labour is based on age and sex through inter change of activities by male and female are reported. Subsistence activities are carried out by expending manual labour with the help of simple tools and equipment. Usually men engage in hunting whereas women collect wild plants, nuts, fruits etc. Children usually do not participate in food gathering though they may playfully indulge in such activities. Among the Dobe Bushmen, children are avoided in gathering and hunting pursuits till they attain 20 years of age. Some anthropologists argue that in band societies, division of labour is unspecialized because of seasonal variation in activities and male-female complementarily indulge in productive activities.

There is a difference of opinion in the question of whom, man or women, contribute more to subsistence.

According C. Ember (1978), in a total sample of 161 hunting gathering communities, it is predominantly men and not women, who contribute substantially more to primary subsistence. On the other hand Lee, after reviewing various hunter-gatherers societies reports that it is women who contribute more than men. Lee has not taken into consideration communities inhabiting arctic and sub-arctic areas whereas Ember has ignored various activities other than primary subsistence.

l) *Work and leisure*

The work effort required gaining subsistence by hunting and gathering is an issue which raised some controversy. Lee (1963) recorded quite low work effort for the Dobe Bushmen: "in all the adults of the Dobe camp worked about 21/2 days a week. Since the average working day was about six hours long the fact emerges that! Kung Bushmen of Dobe, despite harsh environment, devote from twelve to nineteen hours a week to getting food" (Lee 1963). When not at gathering women indulge in resting, doing embroidery, visiting camps and entertaining visitors from other camps. For doing kitchen chores, they spent one to three hours. When not indulged in hunting or gathering, men actively participate in trance-dance or entertain visitors or they themselves make visits to other camps. Besides, on any day, there are hunters who stay back in the camp.

On the other hand, Hill et al (1985) report that the Ache of Paraguay work routinely, full eight hours a day.

m) *Mixed and shifting subsistence activities*

Although the contemporary Hunter-gatherers engage in hunting and gathering, they combine and flexibly shift between, hunting and gathering and various other modes such as trade, live-stock rearing, wage labour, incipient cultivation, and also salaried employment. The following examples provide manifold subsistence activities of few hunter-gatherers communities.

Among the Batek of Malaysia, the practice of small-scale farming and generation of income and food by working for outsiders are reported (Endicott 1984).

Griffin (1984) writes that the Agta of Philippines trade forest products with outsiders and their economy is characterized by fluidity.

The Mbuti of Zaire engage in alternating “trade with begging ; gifts with thievery; wage labour with demands made on religious grounds”...“bring various forest produce (to their neighbours)” and “do day labour” (Hart, 1978).

Among the James Bay Cree Indians of Northern Canada, wage employment is popular and the people take the opportunity of flexible working schedule to hunt animals in the bush (Feit, 1982).

Among the Chenchus of Andhra Pradesh India, hunting and gathering is rapidly getting restricted due to stringent forest laws and erosion of virgin forest base due to large scale plantation of mono crop silviculture. Wage labour in forestry and collection of non-timber forest produce to be traded to Girijan (Hill people) cooperative society in lieu for groceries are gaining importance.

Nurit Bird-David (1992) presents a critique on the ‘traditional’ view of hunting gathering subsistence (of Lee and Devore) by bringing into the fore other subsistence activities in combination with hunting-gathering subsistence. She proposes four inter-related features of the modern hunting-gathering subsistence:

- a) Autonomous pursuit of resource-getting activities: Families and individuals independently change subsistence pursuits in response to circumstances and opportunities.
- b) Diachronic variation: subsistence activities and shifting them do not take place in a regulated way over a period of time. The shifts in subsistence pursuit vary from day to day, month to month etc. Variety and flexibility, in the diachronic perspective, reflect hunter-gatherer subsistence.
- c) Synchronic diversity: Members belonging to local group, kin group or household undertake different activities in any given point of time again reflecting variety and flexibility.
- d) Continuous presence of hunting and gathering: Even while individuals shift subsistence activities diachronically or synchronically, hunting and gathering activities are pursued by individuals every now and then. If someone is not indulged, his/her friends or relatives may pursue hunting and gathering as and when it is convenient or as one desires.

Shifting of subsistence pursuits from one mode to the other largely depends upon contact situation, opportunities, seasonality and reinforcing group behavior. Even though sharing of produce and reciprocity are sometimes disputed in the contemporary context, it is still an essential feature of hunter-gatherer communities which necessitates participation in varied subsistence modes in order that group solidarity is maintained.

Today, almost all hunter-gatherers depend to some extent upon domesticated food sources either produced part-time or traded for products acquired in the wild.

In the above account various aspects of subsistence is touched. The student can very well see the influence of the environment on subsistence activities. In the next sub-section we will learn about the social organization of hunter-gatherers.

Activity: What are subsistence resources hunter-gatherer depend on?

1.5 TOOLS, TECHNIQUES AND METHOD

Hunter-gatherers have survived in diversified climatic regions in which they now live because, aside from knowing how to get their food and cook it, they are also able to develop material culture utilizing the local materials. Tools are important

for the hunter-gatherers in their overall survival. In this sub-section, we will learn various types of tools used in hunting and gathering. Hunting tools are not only many types but are also complex compared to a very few implements used in gathering.

The tools and weapons used directly in hunting includes: clubs, spears, bow and arrow, harpoons, nets and traps, etc. For food gathering, the chief tool is digging stick. Most of the tools are simple generally made of wood, bone, iron, copper etc. Some of the hunter-gatherers are known for using stones, shells, kangaroo incisor teeth etc. Stone tools are no longer seen even though some crude stones are used as and when required. For example, a wounded animal can be stoned to death. During the last century, the Shoshone Indian women made choppers and their men made stone arrow heads.

a) *Clubs*

Clubs are the simplest and perhaps the oldest implement. It is mainly used as a secondary weapon for putting to death wounded or slowly moving animals and for throwing at game from short distances. Tasmanians used waddy (clubs) made of casurina wood. The Tiwi of north Australia use clubs to hunt migratory ducks. The Australian boomerang is a specialized throwing club.

b) *The simple spear*

The simple spear is a primary weapon used to pierce animal's body. It is the oldest one known archaeologically. In recent times, it is used in Australia and Tasmania. Spears are tipped with stone, bone, or sting-ray-barb points which give them greater penetration than can a simple wooden tip.

c) *Spears throwers*

Some of the mainland Australians used a spear-thrower called wommera to increase the efficiency of spear. The spear-thrower is a piece of wood of variable length with a handle at one end and at the other end either a cup or a prong to keep the butt of the spear.

d) *Bows and arrows*

Bow and arrow are more advanced implement than spears because their spring operation rather than on the use of human muscle along. Bows are made of local wood like driftwood, bamboo. Great Andamanese use S-shaped bow made of a special wood which can bend to the extent of 1600. It is equipped with a bow-string of waxed Anadendron fiber. The stave of the bow is round in the section at the grip, but it widens out above and below like a hourglass, narrowing again at each end. The broad upper and lower parts of the stave are planned quite thin and the lower part thinner than the upper part.

Arrow making is relatively more elaborate depending upon material, length, simple or composite, type of arrow head/point, fletching, notch and also on the type of bow-string. The arrow-making among the Ona (now extinct) of Tierra del Fuego (S. America) involved six different materials and seven out of nine kinds of tools they had and fourteen different processes in making an efficient arrow to hunt guanaco-a short, about 4 feet camel like animal weighing about 120 kgs.

Hunter-gatherers like South African Bushmen, the Ainu of Hokkaido, the Pygmies of African rain forest use poisoned arrows. The Bushmen use the pupae of the beetle (*Diamphidia simplex*), the Ainu use aconite from the dried tuberous root of the monkshood plant, and the African Pygmies use a blend of vegetable and animals substances of which strychnine is the principal ingredient.

e) *Harpoon*

In order to recover a wounded sea mammals like seal which sink to the bottom, the harpoon is invented. The harpoon has a detachable head attached to a float equipped with long line, and the casting or thrusting shaft comes loose. The head is barbed so that it remains in the animal's body. The wounded animal can be dragged with the line. The popular harpooners are the Andamanese, the Eskimo, the Chukchi, North Coast Indians, the Yaghans and Alakaluf of the Fuegians country of South America. The Yaghans used simple harpoons, whereas the Eskimos made ingenious harpoons using the ball-and-socket principle with that of the toggle.

f) *Nets and traps*

Nets and traps are used to catch and hold animal alive which operate in the hunter's absence or hiding. Net making require cordage, use of the netting needle and knowledge of the netting knot. Very few hunters made them. The Andamanese used hibiscus-fiber nets to catch sea turtles before they learnt to make harpoons. Net using is also reported among the Alakaluf (S. America), the Eskimo, Mbuti Pygmies and the Birhors (Bihar, India)

Traps include 'bird lime' (smearing sticky substance on tree branches where birds perch as done in Australian aborigines), embedding sharp pointed stakes placed along the routes habitually followed by kangaroos and wallabies in south-eastern Australia and western Tasmania, open pits and concealed pits as among the northern and southern Bushmen, pit trap with a bait and lid as among the Chukchi of the Siberian side of Bering strait, various types of nooses, wolf trap of Eskimos, the spring pole, deadfalls etc.

g) *Hunting methods*

Hunting methods include stalking by tracking, luring (imitating the call of animals), disguising, driving animals into fences and pounds, ambush, group hunting etc.

Activity: What are different tools used for utilization of natural resources?

1.6 SOCIAL ORGANIZATION

a) *Band organization*

Social organization of hunter-gatherers varies considerably across communities and continents. Since a long time anthropologists like Radcliffe-Brown, Elman Service, Julian Steward have tried to arrive at a generalized model of hunter-gatherer's social organization and operation of fundamental jural rules.

To begin with, Radcliffe-Brown considered that patrilineal, patrilocal, territorial, exogamous horde is the fundamental local group or a social group particularly throughout Australia (1931). The horde comprised a group of patrilocally related males inhabiting a totemic estate where they carried out subsistence activities. Each such group exchanged women with other such male-centred groups in the neighbouring estates.

Steward identified three types of group structures namely patrilineal band, composite bands as seen among the Athapaskam, and matrilineal or family bands of Great Basin Shoshoneans (1936, 1955). Steward tried to show that patrilineal bands are most common type among the H-G. He defined patrilineal band as "politically autonomous, communally land-owning, exogamous, patrilocal, patrilineal in land inheritance and consisting of theoretically or actually of a single lineage, which, however, comprises several households or elemental bilateral families. The examples are Northwest Bushmen, Pygmy groups, Australian aborigines, the Ona and various California Indians.

According to Steward composite bands are “non exogamous, bilateral in descent, lacking the rule of residence and consisting of several independent families”. These bands are generally larger in population size compared to patrilineal bands and occupy larger territories. Southern Bushmen, the Andaman Islanders and several Canadian subarctic societies are the examples. Steward did not discuss about matrilineal bands.

Elman service felt that patrilineal band was the basic form of group structure in all hunter-gatherers in the past including Australia (1962). He opined that the composite and family bands were the result of acculturation and breakdown.

Anthropologists (e.g. Hiatt) felt that the patrilineal band was not residential or economic groups but their role was confined to rituals. Further male members of totemic estates did not form into exclusive territorial groups. On the other hand several totemic groups core sided as communities and subsistence activities were carried out in totemic sites other than their own.

It is also contended that patrilocal band was not a universal feature of hunter-gatherers. The Mbuti Pygmies, the Bushmen, the Eskimo, the south eastern Australians are found out to have had composite bands.

However, patrilineal band is also reported among the Ona of South America, the Kaiadilt of Australia and the Birhors of India.

b) *Fluidity in group organization*

Most of the hunter-gatherer social organization is characterized by the fluidity of the basic group unit whether patrilocal band or other types. Membership is not very rigid in the group unit. Particularly in composite bands and family bands, members may leave temporarily or permanently and may choose to rejoin the original group. This type of fluid organization has adaptive advantages in relation to resources, seasonality and group size etc.

c) *Territoriality*

Generally speaking, H-G do not lay emphasis on territorial possession. They consider that the territory belonged to the group that inhabits and more than often neighbouring territories are not rigidly defined or jealously guarded. Conversely, territories may be well demarcated but rigid rules for membership in the resource-exploiting group are not emphasized. In other words, the relationship between territory or resource base and social organization i.e. a group with some control over the resource group (e.g. A patrilineal band) is flexible and in any known case either one of these conditions is lacking.

The patrilineal descent groups in Australia and among the Birhors do not maintain exclusive rights to territorial resources. Among the Mbuti Pygmies, territories are well defined but the membership in the resource-using group is flexible and varies. Among the Chenchus, the settlements comprise multiple surname groups and work groups comprise members from two or more surnames the settlement catchment area (or the resource-territory of the settlement) is exploited either individually or in small group of families without any pronounced individual or group rights over the resources. However in case of honey deposits locally called serri seen in cliffs and gorges are claimed as an exclusive right of ownership by one single surname group or collaterally related two surname groups - of that particular settlement.

In few other cases, the group composition and exploitable resource range may change from season to season.

Thus among the hunter-gatherers, the territory, its boundaries and the group composition are flexibly defined and one single model of patrilineal band is insufficient to capture wide range of possibilities.

e) *Egalitarian and non-egalitarian hunter-gatherer*

H-G communities are generally regarded as egalitarian in the sense that people have equal opportunities to resources, prestige and technology. However, there will be some differences among persons in terms of age and sex and in personal abilities such as hunting skills, knowledge about the resource base, knowledge in medicinal plants and treatment of wounds and diseases, intelligence, judgment capacity etc. According to Morton Fried (1967), in egalitarian societies “there are as many positions of prestige in any given age-sex grade as there are persons capable of filling them” (1967).

Hunter-gatherers do not have social groups which are endowed with differential rights to exercise power. Among the Mbuti Pygmies, inequality is not exhibited either in ritual, hunting, kinship and band relations. They do not have leaders. Individual achievements are not considered for ascription of any privileged status. Communal ownership of economic resources, exchange of tools and weapons from person to person are the norm.

In some societies, like the Kung Bushmen, the Chenchu etc, a headman is seen whose position is devoid of any absolute power. His position is more of an arbitrator and serves as an unifying symbol. Custom guides group members to bestow respect in the headman in such matters like conflict resolution, general guidance in organizing subsistence activities, extending permission as a symbolic gesture to an outsider to use resources in the group's territory etc.

A few hunter-gatherers communities are non-egalitarian like the Northwest Coast groups. These communities are termed as complex hunter-gatherers. They had social hierarchies and even inherited leadership. These positions included prestige, social status and sometime power. Northwest Coast groups had two social classes; slaves and free people. Free people were divided into (1) chiefs and elite, (2) a lower noble group, and (3) commoners.

Task groups (a large group from several villages that build kepel weir) among the Yorok of NW Coast are under the leadership of a person who has special technical and ritual skills and knowledge.

Among the Chinook at the mouth of Columbia, the village had a chief who exacted tribute from his villagers and redistributed it.

The Nootka and the Kwakiutl were structured based on ranking of titles. Formal organizations and discrete social groups like matrilineages, sibs, phratries and moieties are reported among the Tsimshian, Tlingit, Haida.

The complexity of social organization among the Northwest Coast of North America is attributed to great seasonal and local variations in the amount of food potential of their habitat. Food storage, population redistribution in the habitat and redistribution of food necessitates a degree of complex social organization compared to the generalized hunter-gatherers.

1.7 CULTURAL ECOLOGY AND NATURAL RESOURCE MANAGEMENT

Considerable literature exists on hunter-gatherer knowledge system. Knowledge concerning natural world is very much essential for foraging way of life. Of late, there is much interest in this area which has come to be known as “traditional ecological knowledge” (TEK). TEK, though unique to many indigenous communities, hunter-gatherers TEK has certain special features. The hunter-gatherers have developed considerable ideas and precepts concerning the natural

world, and its various components like classification of plants and animal, ecological relationships etc.

a) ***Plant and animal classification***

Classification of living things is an important aspect of indigenous knowledge. Human societies group plants and animals into different categories. The way plants and animals are classified and identified is largely influenced by utilitarian, morphological, symbolic, ecological dimensions.

Comparatively speaking, hunter-gatherer's knowledge about taxonomy is much limited compared to farming societies. Nevertheless many hunter-gatherers communities identify a good number of plants and animals along with additional knowledge like habitat, their end-use, seasonality, methods of extraction etc. The end-uses include a wide variety: food, fuel, fiber, medicine, structural (hut/house construction, fermenting liquor, ornamental, magico-religious, instrumental and equipment making and trade.

The Mbut recognize around 55 edible plants, though, all of these are not considered of equal value. The Kalahari Bushmen identify three categories of animals: edible animals, harmful animals, and inedible and harmless animals. Ethnobiological classification is not only linguistic but also symbolic, functional and spiritual.

b) ***Resource management***

Just as most indigenous cultures, hunter-gatherers use a variety of practices to manage, enhance, augment the diversity and quantity of plants and animals and sustain natural resources. These include burning, trimming or pruning, coppicing, thinning, bark-ringing, selective harvesting and retention, replanting etc. For example the Chenchus are the expert bamboo cutters who do it in such an ingenious way that regeneration and lush growth is ensured. In some parts of New Guinea, the hunting of birds is temporarily stopped if their populations decline. Among the Canadian sub-arctic hunter-trappers-fishermen also such temporary stopping of hunting and fishing is reported. Certain habitat patches are also spared from foraging if yields are known to have declined.

The James Bay Cree Indians of N. America rotate or leave as fallow certain fishing grounds and goose hunting areas in order to create a shifting sanctuary system. They also avoid hunting goose feeding areas during breeding seasons. Another land management practice reported among the James Bay Cree, is that the land is divided into about 300 hunting territories.

Such responses are to restore the balance and to avoid further decline in the resource availability. These practices can also be related to long-term resource conservation and management.

Hunter-gatherers communities have strong relationship with their natural environment. Usually the forest areas where the hunters live, several sub-localities are recognized, basing on topographical features, animal and plant habitat, locations of other resources like honey etc. Besides, some localities are believed to possess mystical qualities and inhabited by spiritual beings. This division of the area into localities and sub-localities facilitate land and resource management. Depending upon the resource densities, net-returns from a locality (decreasing), breeding seasons etc, conservation practices like temporary halting, fallowing, sequential shifting of resource territories are observed.

Hunter-gatherers use plants for various practical purposes such as food, medicine, material culture, ritual etc. The preponderance of plant use for a particular purpose varies across different communities. For example the Ituri forest pygmies use nearly 750 species for ten types of end-uses. Plants used for material culture are

numerically preponderant over plants used for other end-uses. The Huaorani of South America regularly harvested fruits of 152 species (palms, trees, epiphytes etc). The Paliyans (of Tamilnadu, India) plant food comprise fifteen roots or bulbs, two trunks or stems, eight leaves, thirty fruits, eight seed/nuts, five fungi and sap from a vine.

c) *Relationship with plants and animals*

Plants and animals - both edible and non-edible - have varied types of relationships ranging from utilitarian to mystical and supernatural connotations.

Among the Pygmies of Ituri forest, some plants are considered harmful to man and animals when they are cut or burnt. A small tree of Annonaceae family called akobishi (*Uvariopsis congolana*) is one such plant. In the same way if some plants are used with bad intentions they become harmful. It is said that the Pygmies converse with plants to know about their usefulness.

Animals are significant for hunter-gatherers not only as food but also as predators and as hosts of ancestral spirits. Apart from food, animals are also of great value as medicine, material culture, ritual etc. Among the Efe Pygmies, animal skin is used as wrist bands, caps, drum skin, decorating bows and flutes etc. The horn of a duiker (a small African antelope with short backward pointing horns) is used as container for medicine. The teeth of leopard and Hippo, the bone of lion, chimpanzee are used in sorcery.

Animals are considered as active intelligence and can exhibit emotions. They behave like human beings but they are also considered mysterious. In many folk talks of Ituri Pygmies, Kalahari Bushmen, animals interact with men speaking, crying, laughing etc. Many hunter-gatherer communities, through folklore trace origin from animals. The Ituri foragers are affiliated some animals (leopard, chimp etc) through patrilineal descent groups. The Alune, horticulturist-foragers of Indonesia regard the marsupial as an infant Alune boy. The James Bay Cree Indians view that animals offer themselves during hunting as a self sacrificing act to which the Cree in turn oblige to respect them.

1.8 MODES OF TRANSFORMATION

The contemporary hunter-gatherers are viewed as a distinct people with a distinct mode of subsistence and societal type. It has been viewed that the contemporary hunter gatherers possessed the features of the past hunter-gatherers. This view is now questioned by some anthropologists who are designated as revisionists like C.Schrire (1984) Edwin N. Wilmsen (1989). They questioned the notion that the cultural features of recent hunting gathering peoples resembled those hunter gatherers of the past. They argue that hunting and gathering was pursued not only for domestic consumption but also for exchanging for commodities produced by agriculturists, pastoralists and traders. Thus hunter-gatherers were in contact with larger more complex food producing societies. Due to this interaction, the revisionists argue that the social organization of hunting gathering communities possessed some traits of property, class, domination, some kinship features found in the wider society. Further these communities were subjugated under influence of capitalism and modernity which almost destroyed their cultures.

On the other hand some anthropologists like Nicolas Peterson (1991) view that markets and welfare states have only altered the foraging economy and the impacts are absorbed by the foraging communities to ascertain their own identity within wider society.

Apart from this controversy, the hunting-gathering communities world over are undergoing rapid changes in many spheres of their life. John E. Yellen raises a

question: “Why did most hunting gathering societies disappear rapidly after coming in contact with societies that kept domesticated animals and plants”(1990). Particularly referring to the! Kung Bushmen of Kalahari, he says that dissatisfaction with foraging style of life is not correct explanation for the rapid changes. He comes to a conclusion that sudden access to various types goods is the major factor for the changes among the! Kung.

There are several other reasons which could have effected changes in hunting - gathering mode of life. The major transformation recorded was a shift from hunting gathering to herding and cultivation. There are number of factors which might have effected a shift from hunting and gathering to intensive husbandry of animals and plants. These include climatic change, technological innovation, forest policies restricting or prohibiting hunting, large scale plantation activities which rendered extinction of many edible plants, creation of alternative livelihoods particularly wage labour, establishment of cooperative societies to buy NTFP and sell essential commodities, penetration of monetary economy, and introduction of new varieties of animal or plant amenable to intensive husbandry, increasing contact with neighbouring cultivators, displacement and resettlement etc.

It is very difficult to synthesize and draw broad generalizations in the modes of hunter-gatherer transformation because of contextual complexity in which hunter-gatherers are placed. Some broad generalizations can be made:

- 1) Assimilation as occurred among the Kuongs of Yunnan forest of China.

1.9 SUMMARY

Hunters and gatherers, often referred to as foragers, are those people who make their primary living by utilizing wild plants and animals, and until fairly recently, all human groups were hunter-gatherers. Anthropologists have long been interested in studying hunter-gatherer communities, even though hunter and gathering communities are fast transforming and the existence of a pure hunting-gathering people is no longer a reality. Hunter-gatherers display a vast array of structures forms, and adaptations, from very small, simple groups to very large and complex ones. Gathering primarily involves the collection of plant resources while hunting primarily involves the procurement of animals.

Hunting-gathering has been largely defined in economic terms. It is regarded as chiefly a mode of subsistence based on hunting wild animals, gathering wild plants and fishing with no domesticated plants or animals except dog. However the contemporary Hunter-gatherers also depend upon other subsistence modes like gardening, herding, trading in forest produce etc.

In anthropological literature, hunters-gatherers are classified in several ways. Very broadly speaking the hunter-gatherers can be categorized into two by taking time line as criteria: (1) Pleistocene communities and (2) contemporary communities. Hunters and gatherers can also be classified into simple and complex. Hunter-Gatherer are called simple communities as in the case of Australian aborigines, the Kung Bushman (South Africa) the Chenchu, the Birhors etc.

The contemporary Hunter-gatherers are widely distributed throughout the world. During the past 10,000 years, their numbers have dwindled mainly due to acculturation under the impact of the expanding agricultural communities. Presently most of the hunter-gatherers are found in relatively isolated geographical regions such as the arid and semi-arid regions in Australia, the central rainforests and southwestern desert regions of Africa, in some parts of south Asia and South East Asia, North America, the Arctic etc.

Depending upon the abundance or scarcity of resource base, spatial and seasonal availability of various food resources, the hunter-gatherers arrange their mobility in certain defined routes in their territories. Tools are important for the hunter-gatherers in their overall survival. Hunting tools are not only many types but are also complex compared to a very few implements used in gathering. Social organization of hunter-gatherers varies considerably across communities and continents. The hunter-gatherers have developed considerable ideas and precepts concerning the natural world, and its various components like classification of plants and animal, ecological relationships etc. Relationships with other groups, now mostly agriculturalists, are typically strained, and many hunter-gatherer groups are now under intense pressure to drop their livelihood.

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Sample Questions

- 1) Define basic features and classify hunter-gatherers?
- 2) Discuss subsistence pattern of hunter-gatherer?
- 3) What are the different tools and techniques they use for hunting and gathering?
- 4) Briefly describe any one hunting gathering community living in India.
- 5) What are the major changes taking place among the hunting gathering communities

UNIT 2 PASTORALISM

Contents

- 2.1 Introduction
- 2.2 Beginning of Pastoralism/origin and Geography of Pastoralism
 - 2.2.1 Definition
- 2.3 Resource Management/Utilization of Resources
 - 2.3.1 Tragedy of Common
- 2.4 Tools and Techniques
- 2.5 Mobility
 - 2.5.1 Cross-border Pastoralism
- 2.6 Socio-political Organisation
- 2.7 Important Exchanges of Goods and Services
- 2.8 Transformation of Pastoralist
- 2.9 Future Challenges
- 2.10 Summary
- 2.11 References
 - Suggested Reading
 - Sample Questions

Learning Objectives



After reading this unit, you will be able to:

- explain the concept of pastoralism, major activities of pastoralist communities;
- describe the natural resource management patterns among the pastoralist; and
- comprehend socio-economic and political relationship among the pastoralist and also with the neighbouring people.

2.1 INTRODUCTION

The study of pastoralism is one among the interesting topics in studying the evolution of human society in Socio-Cultural Anthropology. In order to understand pastoralism, one needs to cover different dimensions of all the aspect of life i.e. economic, social and ecological dimension of human survival. The holistic approach in studying the subject brings a better understanding of the subject and so one needs to keep an open mind for diverse perspectives of the content.

Ever since Adam Smith, different classifications of economic organization have been made about hunters, pastoralists and agriculturalist. Since the beginning of human being, man needs to feed themselves for their survival. They passed through different stages like hunting-gathering, pastoralism, horticulture and agriculture etc as a mechanism for getting their essential needs for their livelihood. And the surrounding environment and the available resources provide the essential food for survival. These activities enable them to grow the human civilization.

2.2 BEGINNING OF PASTORALISM / ORIGIN AND GEOGRAPHY OF PASTORALISM

“Somewhere around 10,000 to 12,000 years ago, one or more groups of humans in one or more locations discovered that they could control and domesticate certain species for human consumption. Thus, instead of having to roam in search of their food sources, they could bring the sources “home” to them. This is sometimes referred to as the “Neolithic” or New Stone Age revolution, and it was revolutionary not only for how humans worked and provided food but for every aspect of their cultures and social relationships, as well as for the species they fed on. The revolution of domestication actually culminated in not one but two new economic system. The first we will describe as pastoralism. Pastoralism, originating from the word “pasture”, is the production of food predominantly from the exploitation of domesticated animals. It is what might conventionally be called “herding” or “ranching”. Thus, the primary “work” to be done was tending and exploiting – milking, breeding, and slaughtering – such animals as cattle, sheep, goats, llamas, horse, pigs, and other smaller creatures, depending on the locally available species. In the vast majority of these societies – and they were spread across the world, from grasslands of east Africa to the mountains of Central Asia and the plains of North America – the ownership and control of herd animals was the prerogative of men. Women and children might do the day-to-day work of tending the animals - milking the cattle and so on - but it was men who decided when one would be slaughtered or traded or sold for some purpose. Thus, in terms of production and even more so by control of production, pastoralism was a man’s world, and the gender division of labor devolved into a gender inequality. Men’s status was much higher than women’s in typical pastoral societies. Men accordingly tended to be the heads of family and household; again, women might wield real “domestic” power in the home, but their political power was limited compared to men.” (Jack David Eller, 158)

Looking back to the hunting-gathering stage, human being depends directly on the natural environment resources for getting the basic need by collecting or gathering the naturally grown leaves, fruits, roots, etc from the surrounding grown vegetation, and also from hunting, trapping and fishing activities. The nomadic people like the Eskimos, the pigmies, the bushman, the Australian aborigines are some of the examples of people who carried out such activities. With the advancement of human knowledge and skills, human being started taming wild animals and started a semi nomadic life. They started growing vegetation and domesticated animals like sheep, goats, pigs, horse, etc. However, they move from one place to another along with the herds of their animals in search of fodder, vegetation and water. Thus they became herders.

Pastoralism, as a means of livelihood by using of extensive grazing on rangelands for livestock production, is an important economic and cultural way of life for between 100 and 200 million people throughout the world. Many pastoralists can be found in Africa; however pastoralism is also practiced in dry and sub-humid lands in the Middle East, South and East Asia, South America and Europe. It can also be mentioned that in sub-Saharan Africa about 16% of the population relies on pastoralism, and in some countries, such as Somalia and Mauritania, pastoralists represent a majority of the population.

2.2.1 Definition

Pastoralists are the people who have strong relationship with herding for their livelihood. Most of the pastoralists are inhabited in the places where potential for crop cultivation is limited due to the lack of rainfall, steep terrain or extreme temperature like desert, etc. They are semi-nomadic or nomadic in nature due the

search of water, fodder, and pasture for grazing their herds. They have different types of livestock like sheep, goats, cattle, horse, yak and camels in Central Asia, Buffalo in South Asia, llamas and alpacas in South America, and reindeer in the Pale arctic region. Close association with their animals is the most important characteristic of pastoralist community. At the same time, the pastoralist identity is also based on their strong association with their livestock that shape key elements of their social and ritual life. So, pastoralism is a highly complicated activity that needs to hold the balance amongst human population, animal population and natural resources.

The Basic Types of Pastoralism defined by Sutton Mark Q and Anderson E.N, 2010, in their book entitle “Introduction to Cultural Ecology” is as follows:

Types	Major Features	Mobility and settlement Pattern	Examples
Primary Pastoral Systems			
Nomadic	Almost all of the resources produced are derived from animals and their products, with some trade for other products	Highly mobile, seasonal round with few permanent settlements	Saami
Seminomadic	The bulk of the resources used come from animals and their products, supplemented by some horticulture, hunting, gathering, and trade	Generally mobile, seasonal round but with some of the population remaining in permanent or semi permanent villages	Maasai
Semisedentary	Animals and their products provide many of the resources used, but horticulture, hunting, gathering, and trade are very important	Some mobility by specialized task groups, most of the population in settled villages	Navajo
Pastoral Components of Larger Agricultural Systems			
Herdsmen husbandry	Animals are important but farming the dominant activity	Animals are raised in pastures distant from the main agricultural centres, task groups tend animals and move them seasonally	Basque, ranchers in the United States
Sedentary animal husbandry	Animals are important but farming the dominant activity	Animals raised in a static location	Dani, dairies in the United States

2.3 RESOURCE MANAGEMENT/UTILIZATION OF RESOURCES

For the survival of human being, man always exploits the available resources like plants and animals from their surrounding environment either in wild state or in a state of domestication. Herskovits has mentioned different economic systems of non-literate people. They are as follows:

Sl. No.	Economy	Foods
1	Food gathering	Plant (wild)
2	Hunting	Animals (wild)
3	Herding	Animals (domesticated)
4	Agriculture	Plant (domesticated)

In order to avoid over exhaustive exploitation of the available resources for further uses, they maintain certain habits that are culturally taboo to them. For example, the Eskimos become food gatherer and taboo eating the flesh of sea mammals during the summer season. The pastoralist avoids eating meat when they get enough food and they became gatherer in order to preserve their economy for the lean season. They gather wild roots, nuts, seeds, and berries, and also trap or hunt small game animals or fowls. They also dried fruits, roots, seeds, meats so as to meet the need of their survival. In Europe, North Africa, etc. wheat, oat, barely are the important crops. Rice is predominant in Asia, Malaysia and Indonesia. However, maize, millet, yams and cassava are the important crops cultivated in Africa.

With regards to the resource management like the fertility of the soil, pastoralists have directly or indirectly helped in maintaining the soil fertility of their neighbouring village farmers. In fact, pastoralist are requested by the local farmers to hold their herds of cattle overnight in their field so that they could get the animal excreta (dung & urine) as a organic manure deposited in the field. Such amount of urine and droppings left during those short stay of night offer sufficient fertilizer to enrich the soil before tilling their field for cropping. Some of the important pastoralist communities in India are Rabaris and Bharwads of Gujarat and Rajasthan in the desert region, the Gujjars and Gaddis of Himachal Pradesh, the Dhangars in Maharastra, Konare in Tamil Nadu, etc.

2.3.1 Tragedy of Common

This is the major challenge among the resource management problems within the pastoralist community. Everyone eyes on the common property resources like the land shared by pastoralist that eventually have pressure due to over grazing and ruin. So, such human disorganized management led to desertification and depletion of the natural resource. In fact, it is a kind of major threat to the ecological balance in Nature. Due to this, there is also major climatic change. And also, due to the rapid urbanization and privatization, there are huge pressures on both the pastoral land as well as the livelihood of the pastoralist community.

2.4 TOOLS AND TECHNIQUES

Human beings have been depending on various tools and techniques for their survival in the history of mankind. Fire was tamed and the techniques of hunting and fishing were also developed with the changes of time. Man learns how to use river and other waterways as means of transport and also developed the knowledge of using wheel. He also learns the techniques of pottery making for various usages

in their domestic life. The domestication of plants and animals led the agricultural activities for them to earn their livelihood. Such activities made them to discover the uses of animal labour with the uses of plough for tilling field, bullock carts for transportation. Then with the discovery of metal working and further improvement of wheel technology, sailing vessels, irrigation, better farming techniques and the more efficient employment of domesticated animals led to the betterment of human being. Subsequently, improvement of cattle herding also took place with the wider connection across the neighboring areas. Herskovits Melville J (pp 81) had mentioned four criteria of domestication:

- 1) Restricted habitat
- 2) Regular supply of specific foods
- 3) Protection against weather and predatory animals and
- 4) Controlled breeding.

Herskovits Melville J also pointed various techniques to control domestication like building of fences, or cages, or makes other devices to keep their animals from roaming. Making barns and other kinds of shelters that protect animals from weather, and watches to see that wild animals do not prey on them. Also avoid casual mating in order to develop and prevent the continuance of the pure lines and control quality of the domesticated animals. They also devised cooking techniques, drying of food material, making of clothes from animal furs or skins.

2.5 MOBILITY

Mobility among the pastoralist is a pattern of movement for exploiting more than one environment for finding grasses, fodders, and water. Such movement creates the people living in the arid region to support their livelihood during the food scarcity season. So, in search of the fodder, vegetation and water, the pastoralists move from one place to the other. Such requirement of grazing for their herds often compelled them to frequent shifts of locations i.e. a nomadic way of life. Nomadic Pastoralists is a type of food-producing strategy with its main base relying on the intensive management of herds for their primary products of meat and skin, and for their secondary products such as wool, milk, blood, dung and transport. Due to different socio-economic and ecological factors, this movement pattern helps in managing the herd. So, the members of the household move along with the herd and engage themselves in their cattle management during their seasonal migration.

On the other hand, the nature and extent of their movement varies from one region to another and so regular seasonal migration happened for the sustenance of their livelihood. Thus, the term "trance humans" is often used for such seasonal migrations along with their herds in search of water and pasture land for grazing. Some pastoralist communities sometime settled for longer period and take up certain secondary activities like horticulture to supplement their livelihood. Such mobility follows the migratory track through the arrangement of local authorities who have control over the land resources. It is accessed through membership of kin group corporation but their live stocks are owned and managed by individual. The fission and fusion of their group depends on the availability of grassland for grazing their herds. Mostly during the scarcity of grazing land, the group divided and headed to different direction in order to avoid the conflict and competition for the pasture. Pastoralist communities often have an area with an approximate radius of 100-500 km. Long dependence induce pressure on the same grassland due to regular overgrazing. Burning is an important mechanism of revitalizing pasture land. Burning of pastures is believed to have an impact on soil fertility, the quality of yield and help reducing unnecessary weeds and bushes.

2.5.1 Cross-border Pastoralism

Frequent movement for the search of pasture for new grazing and trading of their goods is the main nature of pastoralist community. They travel many places and sometimes crossed the border in search of the grazing land for their herd. During their travel, they also have small trading for domestic goods like spices, clothes, grains, etc. and also sometime indulge in smuggling activities. Due to such undocumented trading between the border villages, there is loss of tax revenue and foreign exchange revenue in the country.

On the other hand, such cross-border informal interactions among the people also enhance the solidarity and maintain good relations among the people. It also helps in maintaining the food security within the border villages during the natural calamities like food scarcity period flood, famine, etc.

2.6 SOCIO-POLITICAL ORGANISATION

Pastoralist communities, like any other simple society, are egalitarian. The disputes are solved by their elders and sometimes the dispute within the group led them separate among themselves. The cattle are considered to be their property and their social and economic status also defined by number of cattle they have and they also use them as a medium of exchange. Transferring of animals from one individual to another happens as a gift, loans or marriage payments. Such exchange mechanism serves them to develop their social relationship within their communities.

Different adaptation process occurred in different socio-cultural and ecological environment and so there is no strict social organization pattern associated with the pastoralist community. However, most of the pastoralist people are often considered to be in the “Tribe” as their major source of organizing labour and expenses are from within the family. Majority of them inherit their property through their lineage. The possession of such animal property enables to retain social structure and maintain social relationship within the group to control their juniors who inherit property for the need of marriage payment as bride wealth. Due to the lack of centralized administration with the group and strong social security, the herding animals being easy to be stolen and driven away, raiding and cattle stealing that cause warfare with their neighbouring people became a common issue in the pastoralist community. And also due to frequent mobility, the group happens to split and re-group themselves depending on the availability of resources and their nature of social relationship within the group.

On the other hand, the pastoralist has a very strong symbiotic relationship with the neighbouring farmer or land owners. This is due to the fact that the pastoralist provides precious excreta (dung and urine) of the animals in their field to enrich the fertility of the soil or land and in return the farmers give money to the pastoralist. So, the seasonal movement of the pastoralist along with their herd coincides with the agricultural cycle of the farmers. Hence, pastoralists visit the farmer before sowing of their seed i.e. in beginning of monsoon. In addition to this, pastoralists plan and follow the roads and villages defined by their ancestral route and tradition in order to avoid overgrazing of the available pasture and conflict within the groups.

2.7 IMPORTANT EXCHANGES OF GOODS AND SERVICES

Pastoralist communities follow different form of exchanges of goods and services. There is some degree of specialization, and exchanges are affected that are personal,

direct, and specific. Such specialized form of exchange also happen among the advanced societies. The barter system i.e. direct exchange of goods for goods becomes more important. In addition to this, exchange of goods with the money also happen when there is market facilities. So, face-to-face trading of goods for goods is the most prevalent form of exchange among these communities. Bargaining may or may not be present as the situation demands. For example, North and South America perform intertribal exchange like Tewa of the Southwest trafficked corn, corn meal, and wheat bread for the buffalo hides of the Comanche, or the Choroti of the Chaco bartered dried fish for maize, red paint, and necklaces. However the value of the object may be fixed by negotiation depending on the availability and demand of the commodity. For example, among the Solomons, a bundle of six or seven carrying baskets is traded for a basket full of taro.

2.8 TRANSFORMATION OF PASTORALIST

With the advent of new economic policies, planning and development programs both at the state and the centre, the transformation of socio-economic conditions and livelihood of pastoralist is inevitable. During different Five Year Plans in India, strategy for community development through integrated tribal development programme and tribal sub-plan have provided scope for uplifting the socio-economic conditions of different primitive tribal communities including pastoralist. In addition to economic conditions, the changes in environmental and ecological conditions have too exerted pressure for the traditional pastoralists to look for other alternatives like small scale business, seasonal wage earning, engaging in settle agriculture, etc.

Despite all above conditions, the transformation among pastoralist is relatively limited and there is no specific developmental strategy for the pastoralist.

2.9 FUTURE CHALLENGES

Pastoralist makes a significant contribution to the economy of developing countries, both in terms of providing employment and income opportunities and in supplying nutrition to the poor. Pastoralist and their animal have developed a very long term mutually benefiting relationship. The pastoralists provide their animals with protection from predator, a balanced supply of food, health care and assured producing their progeny. And in return animals provide meat, milk, dung, wool, labour, and other services and the companionship and the transportation of people for better living. Pastoralist requires vast grassland for grazing their herds.

Besides, India is having a large number of pastoral communities that have very low socio-economic and political profile. They have been sidelined, paying no attention by the government policies, local businessmen, neighboring farmers, etc. even though their large contribution towards the national economy by producing milk, meat, leather, dung, and other products. The biggest challenge ahead to the pastoralist community is the shrinking of the pasture resource base due to establishment of national parks and sanctuaries, expansion of agriculture into marginal areas, etc. have crippled the traditional livelihood of pastoralist community. Consequently, the pastoralist are involved in long standing conflicts with forest authorities and many of them have bitter experience of forceful expulsion from their common traditional grazing areas.

The future of pastoralist in the present situation is sometimes in dilemma. With the rapid growth in urbanization and industrialization, the pastoral land turns into the urban zone or industrial zone. In addition to this, due to Green Revolution and the growing consumption of chemical fertilizers, the cropping patterns of the village

farmer have changed and the dependence of cattle dung for fertilizer also lessens. Such changes in cropping patterns led to the changing attitude of the farmers towards the pastoralists. Many agricultural communities also have huge encroachment for agricultural land in the grassland areas which was used earlier by the pastoralist communities as a grazing field. The symbiotic relationship between the local farmers and the pastoralist communities becomes less functional and ultimately the pastoralist communities are unwelcome to their village. Sometime, conflict arises between the farmers and the pastoralists about pastoralist movement with the herds while crossing the neighbouring villagers.

Also, with the establishment of national parks, wild life sanctuary, construction of heavy dams, wide roads construction also bring another challenge to the pastoralist community. Subsequently, many of the pastoralists are forced to shift their traditional way of earning livelihood of herding to some other mechanism. So, there is an urgent call for government intervention for up-lifting the socio-economic life of the pastoralist community.

2.10 SUMMARY

Pastoralism is the form of agriculture in which domestic animals are emphasized, sometimes to the exclusion of other resources. Pastoralists are people whose livelihood depends mainly on the raising of domestic animals including cattle, camels, goats, sheep, yaks, horses, and donkeys, which are used for milk, meat, wool, hides, transport, and trade; in addition, many pastoralists cultivate crops or have long-standing trading relations with agricultural neighbors. In pastoralism, humans and animals have formed a long-term mutualistic relationship where animals are guaranteed reproduction and protection and humans get food and other products.

Three major types of pastoralism can be defined. These are nomadic, seminomadic, and semisedentary. Two other forms, herdsman husbandry and sedentary animal husbandry, are pastoral components of larger agricultural systems. The primary components of any pastoral system include use and maintenance of pastures, the types of animals (grazers or browsers) herded, composition and size of herds, and the movement of herds.

Pastoralists occupy savannas, arid deserts, high plateaus, or sub-arctic forests and tundra where rain-fed agriculture is difficult or impossible. They also occupy large tracts of communally-shared land and utilize kinship ties for mutual herding and defense. Their herds are often large, in poor condition, but hardy enough to survive periodic drought and sparse vegetation. Many pastoralists practice some agriculture; they may also supplement their pastoral diets with wild plants, game, fish, grains and other food commodities purchased by the sale or trade of livestock, milk products, and hides. Some pastoral societies engage in long distance trade, such as the Tuareg of the Western Sahara, while others such as the Maasai practice localized livestock-keeping in semi-permanent settlements (Fratkin et al. 1994).

Pastoralists have undergone substantial social change, in response to pressures from national governments to sedentarize, and to the problems of population growth and environmental decline. With the advent of new economic policies, planning and development programs both at the state and the centre, the transformation of socio-economic conditions and livelihood of pastoralist is inevitable. The future of pastoralist in the present situation is sometimes in dilemma. With the rapid growth in urbanization and industrialization, the pastoral land turns into the urban zone or industrial zone.

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Sample Questions

- 1) Write a short note on Pastoralism.
- 2) How is pastoralist different from other simple societies?
- 3) Write a brief note on the socio-economic relationship of pastoralist with the neighbouring communities.
- 4) Describe pastoralist mechanism of avoiding overgrazing of pasture and their management of natural resources.

UNIT 3 AGRICULTURE

Contents

- 3.1 Introduction
- 3.2 Theoretical Interpretation
- 3.3 The Origins of Agriculture
- 3.4 Domestication of Crops and Animals
- 3.5 Types of Agriculture
 - 3.5.1 Low Intensity Agricultural System: Shifting Cultivation
 - 3.5.2 Agricultural Intensification: High Intensity Agriculture and Green Revolution
 - 3.5.3 Modern Agriculture: Contract and Corporate Farming
- 3.6 Rejuvenating Indigenous Practices: Indigenous Knowledge in Agriculture
- 3.7 Sustainable Agriculture
- 3.8 Agriculture Among Indian Tribes
- 3.9 Issues in Agriculture
- 3.10 Summary
- 3.11 References

Suggested Reading

Sample Questions

Learning Objectives



After going through this unit, you will be able to:

- describe theories of the origin of agriculture and domestication of crops;
- explain different types of agriculture that was in practice since the origin of agriculture;
- identify the indigenous knowledge that are used in sustainable agriculture; and
- know the changing scope and scale of intensive agriculture.

3.1 INTRODUCTION

Agriculture, one of the greatest inventions by mankind, was fundamental to the development of a civilised society. Nineteenth century anthropologists theorised that mankind had passed through a savage state of hunting-gathering, followed by a phase of herdmanship and nomadism, to the farming stage and civilisation. “Agriculture” is an art that requires skill for its effective practice. Ever since the origin of agriculture in Neolithic period, man has constantly engaged himself in innovating skills and techniques for further improvement in agriculture. Culture, environment, technology, society and agriculture are not isolated components. They work in a close network and often influence each other. Anthropological interest in the study of agriculture began since the time of cultural evolutionists. Cultural evolutionists like Tyler, Morgan and others have discussed about the courses of evolution of culture and the development of agriculture. Julian Steward (1955) while discussing about cultural ecology, emphasised the agricultural zone and

environmental adaptability. Gordon Childe (1951) discussed the origin of agriculture in the history of mankind. He pointed out how mankind began to change its mode of life from food gathering to food cultivation, which is historically a transitional stage towards more permanent agriculture. Leslie White (1959), in his theory of evolution, has indicated that culture evolves as the amount of energy harnessed per capita per year is increased, or as the efficiency of the instrumental means of putting the energy to work is increased, which in due course leads to agricultural growth. Ratzel (1896) regarded that agriculture is an improvement because it forces on man the wholesome habit of the labour and is followed by accumulation of capital, development of trade, and fuller organisation of social ranks. Modern agriculture represented a further advancement over the insecure gardening of primitive agriculture.

3.2 THEORETICAL INTERPRETATION

Most theoretical interpretations of culture in anthropology talk about agriculture as a practice lie within the broader cultural framework. Agricultural practice is inherited through generations. Innovations take place in agriculture leaving space for further growth and development. From simple practice to more complex practice is adopted in agriculture by different societies. Moreover, agriculture is performed under different cultural and geographical complexities. Like culture, environment too acts significantly for the performance of agriculture. Thus agriculture is also studied under the branch of ecological anthropology or cultural ecology. Deriving the idea of Reidhead (1979), Hutterer (Hutterer, 1983) also pointed out that the farmers manipulate environment for growing the crops they are interested for by following methods of artificial seed dispersal (sowing) and other means of propagation (e.g., planting, cutting, etc.). Though it is universal that agriculture and environment influence each other, there is environmental limitation for agriculture growth which is discussed by anthropologists like B J Meggers. The later studies of Conklin (1963) about shifting cultivation, LP Vidyarthi's (1963) study on "The Maler: A Nature-Man-Spirit Complex of a Hill tribe in Bihar"; Clifford Geertz's (1963) study on Agricultural Involution in Indonesia and R.M Netting's (1972) study of agrarian ecology amongst others have focussed more intensively not only the relation between agriculture, environment, technology and society but deeply into other associate factors such as culture and economy.

Under agricultural study, technology, environment, and economy associated with green revolution were largely studied in India. Many studies in India by P.C. Joshi, Daniel Thorner, later Utsa Pattnaik, Andre Beteille and other social scientists have focused on the transition of agriculture from peasant mode of production to capitalistic mode of production and highlighted the implications for social and cultural framework and environment. Agrarian structure is predominantly focussed in the context of both peasant and capitalistic form of agriculture. The study of peasant culture and society is considered to have paramount effect in anthropological work. Karl Marx, Lenin, A V Chayanov, Eric Wolf, and Robert Redfield amongst others have contributed significantly to the peasant studies. Moreover, there are large number of ethnographic studies by anthropologists in India and around the globe, which some way or the other, focuses on the dynamics of agriculture and agricultural production. The study of social organisation in agrarian society, mode of production in agriculture around peasant and other farming societies by early and contemporary anthropologists add more value to holistic approach of anthropology.

There are conceptual differences between so called "agrarian" and "agriculture" with former focuses on the way of life, the socio-economic organisation, and mode of production along with social, cultural and economic value attached with the agricultural practices. However, "agriculture" is a broader concept and focuses on

many other dimensions, where technology, environment and the science or rationale behind selection of crops, technology under different socio-cultural and environmental conditions, etc. become primary focus. Agriculture as a science remains a separate discipline for over centuries where technology is a key and inalienable part.

In twentieth century a separate branch of study in anthropology was emerged called the “Agricultural Anthropology”. Cultural ecologists or anthropologists have tried to see the relation between culture and ecology in agriculture and have focussed that agriculture works under different ecological conditions amongst different societies. Society’s role in agriculture is inevitable in the context of certain ecological conditions, where culture plays significant role. Nettings pointed out that “Anthropologists have seldom taken the deterministic position of some earlier geographers that the natural environment could directly cause a particular type of culture. They have noted the limitations that climate, precipitation, topography soils, and other features could impose on the diffusion and adoption of agricultural complexes”. (Netting, 1974, p.23) in his study has cited the examples from AL Kroeber (1939) and B.J. Meggers (1954) findings how agricultural diffusion is both progressed and constrained by ecological condition. The contemporary focus in agricultural studies by anthropologists addresses the issues of indigenous knowledge and practices by local communities and derives the scientific values for sustainable growth.

Activity: How studies on agriculture find a place in Anthropology?

Discuss different approaches and theoretical interpretations in agriculture by anthropologists.

3.3 THE ORIGINS OF AGRICULTURE

Archaeologists and paleoanthropologists have discussed in detail about the origins of agriculture. Most of the literature shows that agriculture was originated during Neolithic period. Some others say that it was during upper-Palaeolithic period the first agriculture was domesticated. In different regions, agriculture was originated in different periods of time. Broadly it is assumed that agricultural systems appeared between ca. 10000-5000 years and by 2000 ago most human populations were dependent on agriculture . (Flannery, 1973) has discussed how the origin of agriculture took place at different points of time at different places. As far as the question of domestication of crops is concerned, which crop was first domesticated than later, there is no unique and established fact. But the available answers for domestication of crop and the period of cropping in the past can guide us about the cultural behaviour. The crops were domesticated in both plain and riverine areas in different regions. The domestication induced the scope for growth of family (extended), settlement of colonies, strengthening kinship pattern, etc. Whether it is the nature of family that motivated for domestication of agriculture or vice-versa is nothing but chicken-egg evidence. But a few evidences can be better traced from the works of ethno archaeologists, paleo botanists, or paleoanthropologists.

There are many hypotheses constructed about the origins of agriculture. A few of them are very briefly discussed below.

- Early views on the origins of agriculture focused on climate change. In the end of Pleistocene, with gradual increasing warmth and dryness in the earth’s climate when vegetation grew only around limited water sources, the **Oasis hypothesis** suggested a circumstance in which plants, animals, and humans would have clustered in constrained zones near water. V. Gordon Childe was one of the proponents of this idea.

- The **Natural-habitat hypothesis** suggests that the domestication of agriculture should have appeared where their wild ancestors lived. Cohen (1977, 2009) argued that the only way for a successful but rapidly increasing species such as land snails, shellfish, birds, and many new plant species, to cope with declining resources was for them to begin and cultivate the land and domesticate its habitants rather than simply to collect the wild produce (Douglas Price, October 2011).
- **Cultural progress hypothesis** assumes that bio-culturally capable humans would inevitably develop agriculture subsistence as part of culturally-mediated progress from simpler to more complex, from arduous nomadic life to comfortable sedentary one, from wild to more and more “civilised and settled state”

Price and Bar-Yosef (2011) beautifully explained the ideas about the origins of agriculture which is categorised as either push or pull models. Push or pull model, where for example, hunter-gatherers are either pushed or forced to become farmers or they are pulled, drawn by the benefits of a new life style. Population pressure approach, for example, force human societies to find way out for domestication of crops or later the agricultural intensification. Social hypothesis usually involve pull, in which members of society are drawn into relationships of inequality in order to benefit from new arrangements and elevate social status by increasing wealth and reduce risk.

3.4 DOMESTICATION OF CROPS AND ANIMALS

Price (1977) pointed out that domestication has taken as the substitution of human selection for natural selection upon a plant or animal population. For domestication to occur, the wild plant or animal must coexist with the human population and presumably comprise a part of the food supply. Some believe, domestication is a step towards cultural progress, the first step of agricultural revolution.

Approximate dates for the appearance of domesticated species in various parts of the world

Place and species	Date of appearance (call BP)
Southwest Asia	
Plants	11,500
Animals	10,500
China	
Millet	10000
Rice	>7000
Mexico	
Corn	9000
South America	
Plants	10000
Animals	6000
New Guinea	
Plants	>7000
South Asia	5000
Plants	8000
Africa	
Plants	5000
Animals	9000
Eastern North America	
Plants	5000

Source: Price and Bar-Yosef (2011) The Origins of Agriculture: New Data, New Ideas

3.5 TYPES OF AGRICULTURE

3.5.1 Low Intensity Agricultural System: Shifting Cultivation

Shifting cultivation is one of the primitive agricultural practices found in many parts of the world including Asia Pacific and Sub Saharan countries. “Shifting cultivation” is the term applied to the system of agriculture in which a plot of land is tilled during a period of time, usually one agricultural season (“year”), and then left fallow for several seasons during which other plots are cultivated in turn, until the first plot may be used again”. Drainage ditches about 9000 years old have been reported from the highlands of New Guinea, a region under intensive clearing for about 5000 years. Pollen records indicate forest clearance possibly 3000 ago in central Africa (Mabberly, 1983:111).

J. D. Freeman (1955) discussion about Malayasian system of swidden cultivation, Geertz (1963), J. E. Spencer (1978) study of shifting cultivation in south eastern Asia, L.P. Vidyarthi's ethnographic studies in India are some classic examples about low intensity agricultural system, the shifting cultivation. This cultivation is also called “swidden cultivation” or “slash and burn cultivation”. In India, this is called by different names such as podu among Kui speaking Kondhs of Orissa and Andhra Pradesh, jhum among north eastern tribes, kothu kadu and kumri among southern Indian tribes, etc. The shifting cultivation practice is adopted in the tropical regions of Asia and Africa and more widespread in hilly tribal belts of north eastern states, Orissa, Madhya Pradesh, Chhattisgarh and Andhra Pradesh in India.

Spencer pointed out that ‘shifting cultivation is one of the processes of transforming wild, forested landscapes into developed cultural landscapes. Despite the criticisms from forest officials, modern agriculturists and other government officials, the importance of shifting cultivation is still in vogue due to nature of organised land use, associate cultural framework, the environmental adaptability, etc. The shifting cultivation practice involves multi factors, aims, cultural traits, habits, multiple complex motivations, etc. rather than much emphasis on productivity, and environment impact (ibid.). Conklin has outlined both cultural and ecological understanding for the study of shifting cultivation. In his model, he has discussed about cultural axis, environmental axis and numerically labelled temporal distinctions. Under environmental axis, he has discussed about climatic, edaphic, and biotic factors; under cultural axis, he has discussed about social, technological and ethno ecological factors. Numerically labelled temporal distinctions refer to the five successive phases of swidden farming such as selecting, cutting, burning, cropping and fallowing. Vidyarthi's (1963) study on Maler's agricultural practice is furthermore comprehensive. He discussed about successive phases more elaborately. Vidyarthi's outline on stages of shifting cultivation and Conklin's topical outlines are more or less same. Vidyarthi has further outlined the stages based on his field experience among Maler in Santhal Paraganas. Worshipping and merrymaking as part of the cultural system, is additionally discussed in his study. He emphasised on total culture, the nature-man-spirit relationship which embodies a network of mutual interaction and intimate interrelations between nature, man and spirit.

The common understanding from ecological point of view is that this agricultural practice is more conservative towards repetitive use of land. The fallow period is a common feature to provide scope for regeneration of soil fertility. The soil becomes porous and water retention capacity of the soil is relatively higher. Further, the tools used in shifting cultivation are simple and labour oriented. Thus group exercise is a common social behaviour. Kinship plays an important role in distribution of land. However, this form of cultivation is conducive to limited population. After certain point of time, the carrying capacity of the soil is reduced. The other features of shifting cultivation are: the land is owned by the community.

There is no concept of private property. As already discussed in previous paragraph, ritual performance takes place during different stages of this practice. Among Juang, Kondh, Maler, Baiga, Kanikkar, and Malayaraya, ritual is a common practice associated with agricultural practice. Shifting cultivation is more precisely explained as a less intensive and primitive agricultural practice but rich with cultural ethics, norms and values. Despite the fact that shifting cultivation upholds simple technical process, this is not continued as a sustainable practice due to conflict in argument and ideologies.

Activity: Explain the anthropological significance of shifting cultivation.

3.5.2 Agricultural Intensification: High Intensity Agriculture and Green Revolution

Agricultural intensification is a common phenomenon around the globe. The tribal communities are too not isolated from this process. There are quite a good number of hypotheses already established. But two important hypotheses by Ester Boserup and Roy Rappaport comes to mind who have contended two different approaches, first, by Ester Boserup, which is later supported by Cohen about establishing the theory of agricultural intensification. Boserup (1965) hypothesised that agricultural intensification, defined as increasing the annual returns from land, is an adaptation to the need to produce more for growing population living in a fixed land area. Boserup and Cohen have logically found the relation between population growth and agricultural intensification while Rappaport found that human desire, role of rituals and religion as compulsion for agricultural intensification. There are large numbers of other anthropological approaches which have contributed directly and indirectly to agricultural intensification.

The hydraulic agriculture which was first spotted in early civilisations of Indus valley and Mesopotamia in Middle East Asia is a step forward towards agricultural intensification. Price suggests hydraulic agriculture or the irrigation agriculture, itself the product of long period of intensification of production, rapidly generated a shift in mode of production, with a long subsequent history of intensification. Its inception effectively represents a second agricultural revolution, altering the relation of population to land and labour and of population segments to each other: from this time onwards, society is not only ranked, but stratified.

In a step towards further intensification, the introduction of green revolution during 1960s is a major shift in agricultural tradition and is a shift from subsistence mode of production to market oriented production. Technology penetration revolutionised the system of production by increasing land productivity. The important components of green revolution such as strengthening irrigation facilities, adoption of new hybrid seed, chemical fertiliser, insecticides, pesticides, etc. could be well penetrated into some regions. However, this has posed several questions about carrying capacity of the soil and other environmental effects and also the impact on socio-cultural network of agricultural societies. Netting (1974) in his work on agrarian ecology has highlighted the growing evidence of the fact that household composition among farmers varies with the type and amount of labour required for effective crop production. For example, in intensive agriculture, nuclear family takes an advantage over extended family. Similarly, extended family in shifting cultivation is a predominant feature.

The typical marginal and small landholding structure in India and other developing countries has certain effect on agriculture. In India more than 80% of landholders are either small or marginal. Therefore, agricultural policy, in general, strongly advocates for application of modern technology, and of course, this is legitimate to maximise production. Green revolution is a means for better technology support for agricultural intensification. The consequence, however, is not always positive.

In the advancement of green revolution, agricultural intensification is supported by heavy mechanisation, application of chemical fertilisers, pesticides, insecticides, HYV seeds and more recently application of further genetic modified crops. In regions where agriculture is supported by uncontrolled modern technology may return high output but the soil lose its natural properties in long run. The case is seen in some parts of Punjab, where agriculture intensification is much higher than other states. The green revolution has affected agrarian relations. The way surplus capital is accumulated in the hands of a few large farmers and industry owners have lead to class formation. Under green revolution, agriculture as commodity is rather used to accumulate capital rather than balancing the social network and social structure in a particular set up. The states of Punjab, Haryana, some parts of Karnataka, Tamil Nadu and in other states, the agricultural intensification takes place in much larger scale. In contrast, there are regions, where agricultural intensification is low, more particularly, in tribal pockets and in plain areas of Bihar, Orissa, Chhatishgarh, and Jharkhand.

‘Green revolution’ is, as such, not a great success in India. Rice and wheat cereals are by and large benefitted from green revolution; this success is again limited to a few fertile belts of Punjab, Haryana, Western Uttar Pradesh and a few other states. The access to modern technology is limited in eastern states like Bihar, Orissa, West Bengal, and eastern UP even after more than six decades of independence. There is no single reason or factor that defines success or failure. Both institutional and technological factors are responsible for this slow progress. Institutional processes like land reforms, cooperative movement, educational support, etc. and technology support and extension, play crucial role in development of agriculture. Green revolution has not resulted high impact due to the above factors. Some studies depict that the lack of proper approach for technology dissemination is also one of the reasons for limited success of green revolution. Initially, there was hardly any effort undertaken to understand local conditions, belief system and practices for technology dissemination. In due course, the ‘farming system research approach’ followed by ‘farming participatory approach’ was advocated for bottom up approach rather than top down approach for technology dissemination in agriculture.

While green revolution has induced for growth in agricultural production, it is not the green revolution alone that results high intensity in agriculture. Apart from over growing population, the desire to produce more and generate capital by exploiting natural resource and other capitals has resulted agricultural intensification. Rapid industrialisation also induces agricultural intensification. The concept of capitalist theory is well suited in the context of agricultural growth in Europe, Russia, America and in recent time in some parts of India. Government policies have played significant role for agricultural change. During different Five Years plans, agriculture has been specially focussed by government. Initially in community development programme, both horticulture and agriculture has been specially looked upon. Through different agricultural plan, agriculture has been emphasised by way of new mechanisms for adoption of modern technology, subsidies in farm implements, irrigation support, etc. Gradually, the new economic policies introduced towards early nineties have serious implications for agricultural development in disadvantaged and backward areas. Both micro and macro policies have influenced agricultural production. The associate policies such as Watershed Development Programmes (WDPs), Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGP), Self Help Group (SHG) Movement through SGSY, etc. have contributed directly and indirectly to the performance of Indian Agriculture.

Activity: Discuss agricultural intensification in the context of Indian Scenario.

3.5.3 Modern Agriculture: Contract and Corporate Farming

Contract and corporate farming are some of the recent initiatives towards further reforms in agriculture leading towards more and more intensification in agriculture. The concept of mono cropping is taking a lead which is primarily intended to maximise production both in agriculture as well as industries. Agriculture in twenty-first century is largely influenced by industries. The capitalist growth in agriculture has serious consequence to break traditional agrarian social structure, the relation between tenancy and landlord relations, among large scale, medium scale and small scale farmers, between peasants and capitalist, etc. Agriculture and industry influence each other and they together influence environment as well. Both large and small industries depend on agriculture for supply of raw materials. Thus there is transformation in agriculture. Cash crop production is the result of industrial influence. For example, cotton crops, gherkin, etc. as raw materials is grown to meet industrial need. Thus, intensification is inevitable for supply in large scale for industrial growth. The high tech application in agriculture is seen in many pockets lead to massive transformation of agriculture from a low intensive to high intensive one. The gross application of technology in agriculture influences environment and imbalances climate at both local and global level. Netting and David Cleveland have criticised the mode of production in modern agriculture to balancing the planet and sustainable growth in agriculture that can pose threat to the survival of mankind. The alternative approach to modern agriculture is justified in the context when agriculture shows diminishing returns and gradually deepening the crisis of ecological balance and carrying capacity of the soil.

3.6 REJUVENATING INDIGENOUS PRACTICES: INDIGENOUS KNOWLEDGE IN AGRICULTURE

As already discussed, the social process is not static as the agricultural process. The knowledge, belief system, social processes, technology adoption, etc, is not constant either but is influenced by several factors. There is a gradual shift in tradition. Modernisation has penetrated into all spheres of life including in agriculture. While modernisation is not totally irrational, many environmental scientists, conservationists, ecologists and anthropologists have come forward to protect agricultural biodiversity, Conservation of best practices in agriculture; and, maintain socio-cultural and ecological balance in the backdrop of rapid change towards modernisation and also towards corporatisation and industrialisation of agriculture. It is found that indigenous knowledge plays crucial role in maintaining biodiversity and protecting important species from the threats of becoming extinct.

3.7 SUSTAINABLE AGRICULTURE

The concept of sustainability or sustainable is a vogue word in the twenty first century. We have heard about this as prefix or suffix with livelihood, agriculture, etc. We may say sustainable agriculture or agricultural sustainability, but the meanings are different. While the former talks more about nature, quality, performance and durability for both present and future, and latter primarily talks about long term existence. Quality of life, conservation of nature and environment for future existence and survival in long run are the basic philosophies of sustainability. Sustainable agriculture is thus significant in view of rapid transformation in agriculture and the way modernisation is taking place pushing pressure on land and other natural environment. Sustainable agriculture is an approach for conservation of nature and balancing social as well as natural environment notwithstanding the fact that productivity is least compromised. Thus, integrated approach such as community forest management, maintenance of agro-

biodiversity, cultural diversity and harmonising social and natural environments will be very useful. To do so, indigenous knowledge is considered as a means of survival of nature. Indigenous knowledge is used as a long cherished tradition for maintaining balance in natural resources and livelihood. In recent times, many other practices such as application of bio-fertiliser, organic fertiliser, bio-pesticides, insecticides, indigenous soil conservation approach, and indigenous plant protection mechanisms are adopted. Irrigation, watershed development programmes, joint forest management approach, soil conservation mechanism, etc. are adopted to support the sustainable agriculture initiatives in India and around the globe.

3.8 AGRICULTURE AMONG INDIAN TRIBES

The tribal communities in India follow different economic practices such as hunting gathering by Chenchu, Muduva; pastoralism by Toda, Kurumba, Gujjars, Lambadi etc.; primitive agricultural practices by Maler, Juang, Dongria Kondhs, Baiga, Irula, and many north eastern Indian tribes; and plain agriculture by Bhil, Oraons, Irula (Attapady) Gond, Kondhs, Pradan, Munda, Santhal, etc. Agriculture irrespective of its different nature and practices is by large the backbone of tribal economy. Different cultural practices are inherited by the tribal communities, many of which are largely attached with agricultural practices. Mahapatra's (1982) study on Santhal in Mayurbhanj district of Orissa discussed the role of rituals and their linkage with agricultural production. Santhals celebrate number of festivals and rituals that are associated with the agricultural practices. There are large number of ethnographic studies by anthropologists like S.C. Roy's study on the Mundas, the Orans, the Birhors and the Khariyas, Elwin, Verrier's (1939) work on the Baiga, Haimendorf's study on Rajgonds of Adilabad, Vidyarthi's study on the Maler and many other studies which have discussed tribal agriculture, culture and economy in particular ecological set up.

Agriculture in tribal areas is mainly characterised by low productive and subsistence type. Agriculture is practiced in different ecological set up. Technology used in agriculture is simple. The agriculture is mainly labour oriented. Various rituals are performed during the time of harvesting by different communities. With the introduction of various tribal development programmes, tribal sub plan, and later other integrated development programmes, agriculture in tribal areas is transformed from subsistence agriculture to market oriented agriculture. Horticulture and other cash crops are also grown in tribal pockets with the support of agricultural and horticultural schemes provided by the government. For example, Dongria Kondhs have adopted horticulture in the hilly areas. The Kondhs in Kandhamal district are growing vegetables crops as important cash crops. This has generated better economic support for the tribals. Irrigation and other agricultural schemes are launched in some tribal belts transforming rainfed agriculture to irrigated agriculture. In many tribal areas you will see application of fertilisers, pesticides and insecticides for growing cash crops. But their application is still very limited as compared to their plain non tribal counterpart.

In recent times, both tribal and non-tribal communities in India are influenced by development policies. There is hardly any community which is exclusively isolated from rest of the world. No community solely depends on primitive method of cultivation. The degree of access to modern technology varies among Indian tribes. Some communities in India are well adopting modern technology such as Bhil and Gonds. Similarly, Kondhs also adopt modern technology. While shifting cultivation is looked at in suspicion, and is banned in many areas, the other forms of agricultural practices are taken up in many areas. Terraced cultivation instead of shifting cultivation in north east is gradually being a prominent practice. In some tribal areas, settled cultivation is becoming accepted widely with limited scope for shifting cultivation, population pressure and other income support mechanism. "Wolf argues

that many societies which were habitually treated by anthropologists as static entities (bands, tribes, chiefdoms and states), were in fact produced and constructed in the course of the global expansion of capitalism. Wolf's model of society and culture depicts a continuing process of structuring, change and refashioning. In this process, the involvement of peoples in the expanding world is governed by the capitalist mode of production and is therefore primarily an economic and political process".

Activity: How is agriculture in tribal areas characterised?

3.9 ISSUES IN AGRICULTURE

Despite the fact that there are positive aspects of transformation in agriculture in India and other developing countries, there are also issues pertaining to agricultural transformation. There is lack of proper access to modern technology leading to unequal performance in agriculture in many regions. In some areas, agricultural intensification is so large and difficult to cope up with local environment. The soil loses carrying capacity with excess use of chemical fertilisers, pesticides and insecticides. Moreover, water and air pollution causing environmental degradation is noticed. Further, mechanisation has replaced large number of unaccounted agricultural labourers. In some other areas, the access to modern technology is very limited. In these regions, agriculture is characterised as low productive and less intensive and even does not suffice household requirement. Since the mode of production has changed in agriculture from household labour to hired labour, agriculture is presumed to be non productive and non profitable in many parts.

Further land issues are taking place rapidly with partition and transfer of land, land alienation, illegal encroachment, etc. Land acquisition for development projects is taking place in alarming pace despite many hue and cries. Millions of hectares of land are being acquired for industrial growth, major hydro power and mining projects, wild life sanctuary, and development of real estate sector, road and other infrastructure, etc. Therefore, displacement issues become prominent in some parts of developing countries. This issue of displacement is acute in many tribal areas causing livelihood insecurities for millions of farmers and landholders. Rapid industrial growth is demanding supply of raw materials from agriculture as well. Thus in large chunk of agricultural fields, crops are grown for industrial requirements rather than full filling the requirements food security. In India, the establishment of Special Economic Zones, a model inherited from China has put abundant pressure on land and environment in recent time.

Tenancy and landholding issues remain critical even after six decades of independence. The tenancy laws are not successful despite laws and acts provide support for tenants in many states. There is no maintenance of records about tenancy in many states. Furthermore, concealed tenancy is taking place in states where tenancy is completely banned. Similarly, ceiling laws do not act in proper manner to restrict landholding beyond ceiling limits. There are no proper land records maintained despite introduction of modern approach in the area of land records management. Many areas in tribal belts are not surveyed either. Therefore, the creation of land records is not possible. The land reforms laws in tribal areas though restrict transfer of land from tribals to non tribals in scheduled areas, the illegal transfer of land, land alienation, and land acquisition take place in the scheduled regions displacing tribals in large scale. Further, due to restriction in transfer of land in the tribal areas, the concept of land market relation remains stagnant.

The effect of the new economic policies such as liberalisation, globalisation and privatisation agriculture is apparent. Contract and corporate farming being practiced in many areas. Though liberalisation is still restricted Indian agricultural sector,

the wide liberalisation in allied sectors and moderate liberalisation in agricultural sector has affected sustainability in agriculture. There are problems foreseen in the backdrop of contract and corporate farming or in other high intensive agricultural practices. These are: tenancy insecurity, soil adaptability and soil regeneration capacity, water and air pollution, issues of agrarian structure, etc.

Activity: What are the major issues of agriculture in contemporary scenario?

3.10 SUMMARY

There are large numbers of dimensions such as culture, environment, society, economy, institution, and agricultural policy which play significant role in performance of agriculture. Agriculture works, in each particular ecological niche, has specific cultural and economic significance. Evolutionists have discussed agriculture evolution as a step towards civilisation, but the way transformation in agriculture is taking place, it may pose challenges to the existence of civilisation in long run. Over different periods of time, there are different forms of practices such as shifting cultivation, less intensive plain cultivation, high intensive contract and corporate farming that practices are adopted in different regions at different points of time. Shifting cultivation, hydraulic agriculture, green revolution, contract and corporate farming are different stages of agricultural evolution with transformation from more simple to complex agricultural practices. Similarly, there is transformation from traditional agricultural practices to modern agricultural practices. For all these processes of transformation in agriculture, environment has always played crucial role. Man has tried to control environment with application of modern technologies such as application of irrigation, fertilisers, chemical pesticides, insecticides, etc. This controlled environmental mechanism has lead to agricultural intensification and social and cultural transformation. However, some theorists like Meggers outlined the environmental limitation to change. It is believed that at a certain point of time environment may be constrained to accept any further intensification. The soil may lose carrying capacity. The soil regeneration capacity may take long time that could decline further agricultural intensification. Demography as an effect for agricultural intensification has already been described by many thinkers. Therefore, lack of population control can seriously cause environmental degradation not only due to pressure on land by agricultural intensification, but also by rapid industrial growth, housing, infrastructure, etc. Modern agriculture could be a solution for addressing the issue of food insecurity and economic growth but it can also cause repercussion effect in the form of migration, reverse tenancy, and other issues like class formation, social inequality and environmental degradation. Socio-cultural and environmental reconstruction is not an easy process. This involves needs mass mobilisation for balanced agricultural practices which is an approach towards sustainable agriculture. Anthropologists can certainly play important role to address such issues and provide solution for balancing the planet with effective practices in agriculture.

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Sample Questions

- 1) Discuss various hypotheses about origins of agriculture
- 2) Explain how transformation takes place in agriculture
- 3) Discuss the relevance of indigenous knowledge in sustainable agriculture
- 4) What are the major issues in agriculture in tribal areas?

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- i) Origins of agriculture, the outline of a University of Washington lecture (courses.washington.edu/anth457/agorigin.htm) accessed on 10-1-2012
 - ii) Ibid.
 - iii) The encyclopedia of Indian Tribes (vol.1), ed. by T.M. Menon, The International School of Dravidian Linguistics, 1996
 - iv) http://www.indiana.edu/~wanthro/theory_pages/Wolf.htm