UNIT 4 DOMESTICATION OF ANIMALS AND ORIGINS OF AGRICULTURE

Structure

4.0 OBJECTIVES

In Block l, you learnt about the various phases through which human beings and their culture evolved. The emergence of new social activities with new modes of production played a crucial role in this process. Agriculture as a mode of production marks an important phase in the evolution of human society. In this unit we shall try to learn about the importance of agriculture. After studying this unit you will be able to know:

the process of transition of mankind from food-gathering to settled agriculture through domestication of animals and cultivation of plants,
the nature of the climatic and ecological factors which contributed to this development,
the nature of archaeological and historical evidence which establishes the pattern of this evolution.
the social consequences of settled agriculture, such as settled community life or sedentism, attachment to land, cooperative activities and growth of complex social forms etc., and
how the origin of settled agriculture led to the sophistication of technology and growth of a new political organisation.

4.1 INTRODUCTION

Human beings slowly evolved their economy from the stage of food-gathering to cultivation of plants about 10,000 years ago. This development was achieved first in Western Asia, in Turkey, Iraq, Iran, Syria and Palestine. In the Indian subcontinent, rice cultivation originated in Belan Valley in the Vindhya Plateau and wheat-barely cultivation in the North-Western region of Afghanistan and Pakistan. The wheat-barley cultivation preceded the rice cultivation. The evidence for wheat-barley cultivation goes as far back as 6500-5000 B.C., whereas the rice cultivation in the Ganga Valley started around 2000 B.C.

The archaeological evidence in the form of domesticated animals, seeds, household equipment-specially the ground stone tools and pottery etc. suggest this process of evolution. Settled agriculture and domestication of animals went hand in hand. The growth of agriculture led to major social changes. It brought about settled village communities, contributed to the growth of agricultural technology including the use of hoes and ploughs. These led to greater control over nature. It also introduced new social institutions such as cooperative activities, kinship organisation, political institutions of chief tainship and various new cultural practices and beliefs. The emergence of agriculture was thus a beginning of the flowering of a more complex civilisation later.

4.2 MAN AS HUNTER/GATHERER

Mankind, as we discussed earlier, has been on earth for about 1.75 million years. For more than 99% of this period, human beings have been hunters and gatherers. It was only about 10,000 years ago that they began to change over to farming and keeping animals.

As hunters and gatherers, human beings lived off the resources of their environment. They collected roots, fruits and seeds for food and killed or caught animals, birds and fish with the aid of stone tools, fibre nets, bone harpoons or traps.

Skeletons and stone tools of the earliest hunters were found in Tanzania and Kenya in eastern Africa. As one can imagine, the earliest stone tools were simple in shape and rough in workmanship. It took human beings hundreds of generations to develop more sophisticated tools. As the human being became a more efficient hunter, human groups very gradually migrated into Europe and Asia, and later into northern America and Australia, so that by about 8,000 B.C. there were groups of hunters and gatherers in almost all parts of the world. In each region human societies adjusted to vastly different environments so that stone tools and food depended on locally available resources.

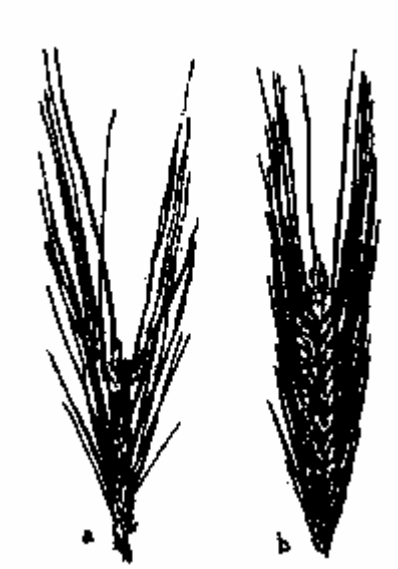
Social Organisation of Hunting-Gathering Society

As hunter and gatherer the human being had a distinctive social organisation. Although hunting was necessary for food, some individuals like pregnant women, women with small children and youngsters could not hunt. On the other hand, gathering was less arduous and could be done by most people. Thus, only those human groups might have survived and proliferated who had worked out an efficient division of labour.

Studies of hunters and gatherers who still survive in isolated pockets of the world have shown that survival also depends on mobility. Men have to be away on hunting expeditions, sometimes for days at a stretch, while women, children and old people remain behind to arrange plant foods (e.g. fruits, roots, etc.) around their settlement. More important, groups have to adjust to seasonal fluctuations in their environment: pools or lakes can dry up in hot weather in which case camps have to move to permanent water resources. The inhabitants of a camp consumed and exhausted the fruits available in one area and then moved on to another area of the forest. So, within a hunting-gathering society, people may have to live in small and dispersed camps for some seasons of the year, but in large groups in other seasons. As groups repeatedly split up and come together again, individuals can choose the group with which they will move. We will see how these patterns gave way to new ones when people abandoned hunting and gathering as a way of life and adopted agriculture and settled life. First, let us explore how they changed over to agriculture. Where did this happen? If it began to happen some 10,000 years ago, how do we know about it?

4.3 ARCHAEOLOGICAL EVIDENCE FOR DOMESTICATION

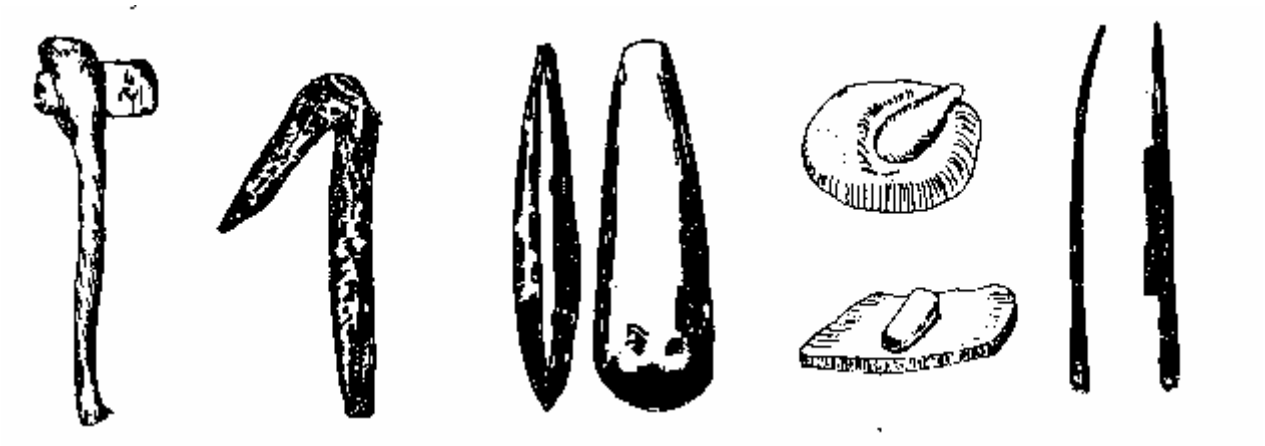
When it is said that human beings 'domesticated' plants and animals for their economic and social needs, it means that they chose certain plant and animal species to produce their food and controlled the growth and reproduction of these species. They sowed the seeds of wild grass in prepared fields and grew plants and crops. They chose the breeds of plants which they thought would grow best in their particular region. Similarly, they captured the young of certain wild animals, kept them in captivity, and controlled their mating. Here too, the human beings selected those species of animals which they thought would be easier to tame or those which would give good milk and food. When breeding of plants and animals is taken up deliberately, the species themselves undergo a physiological change. After generations of breeding, the 'domesticated' plant or animal is very different from its wild ancestor.



(a) Wild and (b) Domesticated Wheat

In the mounds of prehistoric villages, archaeologists find animal bones which they can identify as belonging to a particular animal, wild or domesticated. For example, domesticated sheep differ from wild sheep in the shape of the skull, or the size of the teeth and horns. Seeds could survive in the debris of a prehistoric mound if they were burned and became carbonised. The impressions of seeds can be left in the mud used by prehistoric people for pottery or house plaster, and these impressions can be carefully studied. So it is possible for an archaeologist to tell whether the plant or animal remains of a prehistoric village were domesticated or wild.

Also, the archaeologist looks for household equipment which would be useful for animal herders or farmers. A hunter can break off a portion of an animal and roast it on fire to eat it. But grain must first be ground on a mortar or quern, and cannot be prepared into dough for bread or cooked as porridge unless there are suitable containers. In many parts of the world, therefore, though not everywhere, pottery had developed when agriculture had begun. Farmers must clear the ground for tilling. Then they have to prepare the surface of the ground to sow the seed. So they had to devise stone tools with a long and accurate cutting edge to fell trees or a good sharp end to make neat holes in the ground. This they did by grinding stone tools to gain sharp and accurate working edges. Thus 'ground stone tools' are also indicators of agricultural economy.



2. Primitive Agricultural Tools

Check Your Progress 1

Note: i) Use the space given below for your answer.
ii) Check your answer with that given at the end of the unit.

1) The domesticated sheep can be distinguished from wild sheep (Check one of the following
for correct answer):

i) as they have large size and weight
ii) as they have smaller teeth and shorter horns
iii) as they have different feeding habits
iv) as they have marked differences in skin cover

2) Write five lines on social organisation of the hunting-gathering society.

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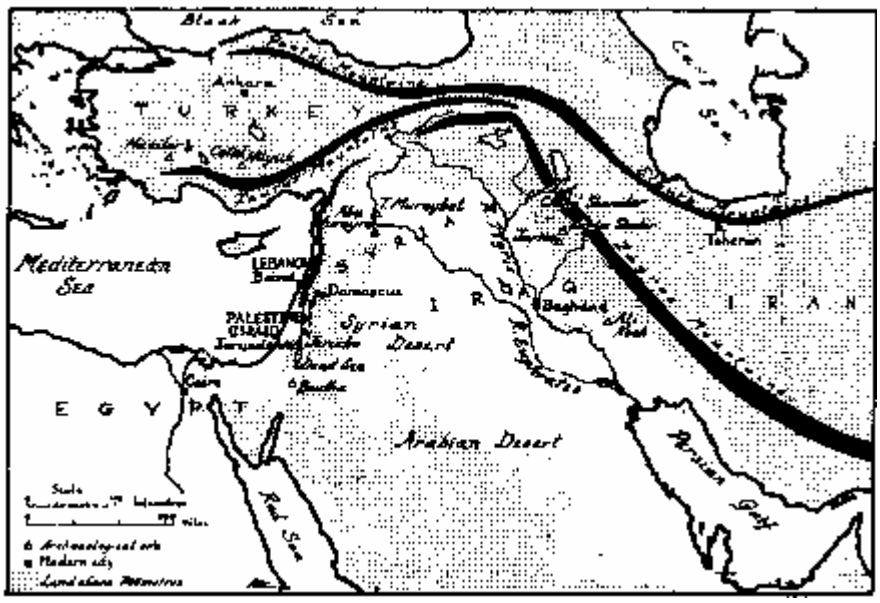
3) How do 'ground stone tools' indicate that society was agricultural?

4.4 THE FIRST FARMERS OF WESTERN ASIA

Western Asia was one of the first regions in the world where domestication began. On the (Map 1), we can locate the modern countries in which the earliest farming villages lie: Turkey, Iraq, Iran, Syria and Palestine. We can see the Zagros mountains and trace their sweep from west to east and then south-east. We can also locate the north-south hill ranges of Lebanon. From the altitude key given in the map, one cam see that east of Lebanon and south and west of the Zagros, lies the low country.

Map 1



In western Asia the amount of rainfall a region receives from the Mediterranean winds depends on its altitude. High mountains receive the most snow and rain, valleys enclosed within the mountain ranges receive a little less, plateau the even less, and the Tigris-Euphrates through the least. The thickness and variety of natural vegetation depends on the amount of winter rainfall. Thus, the high mountain slopes are covered with mixed trees including pine, while the plateau and lowland are covered with mixed trees including pine, while the plateau and lowland are too dry for trees to grow and are only covered by grass. Significant for us are the hill zones, 700 to 1500 meters above sea level, covered with open oak and pistachio forest. Here, wild wheat and barley grasses grow naturally, and this was also the habitat of wild sheep, goat, cattle and pig. This is called the 'natural habitat zone' and it extends into the hill regions of northern Iran and Afghanistan. The animal and plant species mentioned above were to become the first domesticates.

Let us see what information has been gathered by archaeologists about the earliest farming sites of western Asia. The transition to a farming economy was gradual. At sites like Zawi Chemi, Shanidar and Karim Shahir in the oak woodlands of northern Iraq, we have the remains of seasonal camps of hunters who were preparing wild grass seeds.

During the early occupation of Ali Kosh (about 7500 B.C. onwards) in southern Iran, we have evidence of a winter camp of people who had domesticated sheep and gathered food, but had already begun to experiment with agriculture. For wheat and barley seeds have been found here, and they could not have grown wild in the dry country around Ali Kosh. This dry country, though lacking wild wheat and barley, is excellent grassland in winter and it is felt that animal herders from the upland forests used to descend here in winters to graze their animals. When descending every year they must have brought with

them seeds of barley and wheat to sow in prepared fields around Ali Kosh. Thus, it appears that agriculture had begun about this time and was closely interrelated with animal herding.

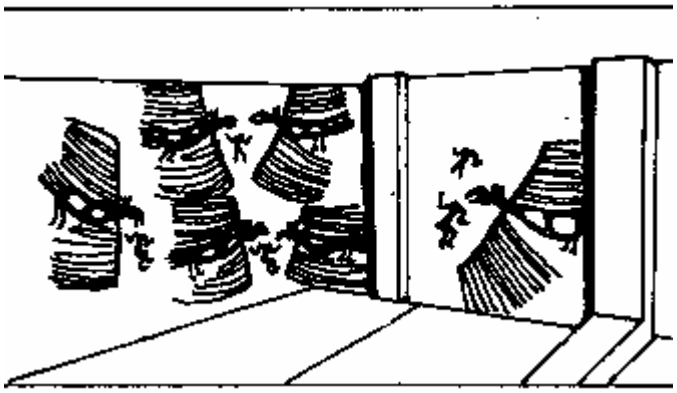
In Syria and Palestine a slightly different process is evident. May early sites have been found in the oak woodland belt and along the coast. These show that people were still basically hunters and gatherers, but appear to have given up seasonal movements from camp to camp. One will wonder how this was possible. It appears that hunters could settle in this region after about 10,000 B.C. because they had begun to exploit their immediate localities with a new efficiency. They took their food from a very great variety of species, large and small animals, snails, all kinds of water creatures, birds, rodents and many plants. Such a wide range of food base removed the necessity of wandering.

At Abu Hureyra in the dry region on the Upper Euphrates, in Syria, 150 km east of the natural strands of wheat and barley, seeds were recovered. People may have brought seeds to sow far from their natural habitat because in this area, a smaller variety of edible plants and animals was available than in the coast and the woodlands.

After this initial stage, we find permanently established farming villages over much of western Asia. For example, Jarmo (6500 to 5800 B.C.) in Iraq was a village of about 20 to 30 mud houses, each with a courtyard and several rooms, and contained ground stone axes, querns and pottery. The people kept sheep and goats and grew wheat and barley. Between 8300 and 7300 B.C., Jericho in Palestine was a large village where agriculture is evidenced, but not animal herding (which was to develop later). Jericho was surrounded by a 2-metre wide stone wall with round towers, one of the earliest instances of fortification in the world. An underground spring bringing water to the surface near the village made early agriculture possible in this very dry spot.

3. Boulder, Foundations of a House at Jarmo

The largest village, however, was Cat Al Huyuk (6500 to 5400 B.C.) in southern Turkey. Here, cattle, sheep and goat were bred and barley, wheat and peas were grown. The two-room mud houses were built back to back, sharing walls, so that there were no streets or lanes. Every house was entered from its roof. No one knows why! Pottery, stone axes, bone tools, simple stone ornaments, basketry and wooden bowls were made and many houses were painted with unusual scenes: leopards, an erupting volcano or vultures dismembering human corpses.



4. Interior of a Room at Catal Huyuk (Painted with Vultures Devouring Headless Human Bodies)

There was a gradual transition in western Asia to a new economy based on raising sheep, goat and cattle and growing wheat, barly and legumes. In some areas farming and herding developed together, in other areas the former preceded the latter but what about India?

4.5 THE DEVELOPMENT OF FARMING AND HERDING IN INDIA

Our subcontinent (See Map 2) contains a great diversity of climates, soils and farming patterns. Therefore, it is not surprising that the earliest domestication, established in different regions and in different periods, was based on different species. The villages were different in their development in various regions:

i) Let us start with the north-western fringes of the subcontinent. We had said that the natural habitat zone extends into Afghanistan. In northern Afghanistan , caves occupied by hunters and gatherers contained the remains of wild sheep, cattle and goat bones. By about 7000 B.C. sheep and goat were domesticated in

5. Neolithic House at Mehrgarh

Afghanistan. The western mountain borderlands of the subcontinent are not far. The farming village of Mehrgarh in present day Pakistan was founded between 6000 and 5000 B.C. It contained rectangular mud houses. Not surprisingly, its domesticates were basically the same as those of the western Asiatic villages. Also, these were the same domesticates on which was founded the economy of the Indus civilisation.

ii) But we know that much of the subcontinent receives only monsoon rain and depends on rice. The earliest evidence for rice cultivation in India comes from the Belan Valley. The Belan flows down the edge of the Vindhya plateau to join the Tons river and thence, the Ganga near Allahabad. Originally, this area had thick forest of teak, bamboo and dhak, and was inhabited by tigers, nilgai, chital, and other wild animals. The forest floor was thickly covered with grasses, including wild rice. Camps of hunters as well as early farming villages were found in this region. At Chapani Mando site, the people hunted wild cattle, and prepared wild grass seeds on querns and cooked them in simple handmade pots. At a later site, Koldihwa the archaeologists have found round houses of wooden poles covered with thatch, bones of domesticated cattle and seeds of cultivated rice.

iii) After about 2000 B.C., other rice growing villages emerged within the Ganga valley and along the eastern edge of the Chotanagpur plateau (overlooking the Ganga delta). Cattle were also kept and by now other crops like pulses were known. Even today, wheat is important in the upper Ganga valley, while below Allahabad wheat gives way to rice as the principal crop. This is because the rainfall gets progressively heavier further east. In the iron Age, the Ganges civilisation which ultimately gave rise to the flourishing kingdom of Magadha, was characterised by rice and cattle as the mainstay of the economy. Early kingdoms in Tamil Nadu and coastal Andhra Pradesh also relied on rice agriculture.

iv) On the hilly and generally dry Deccan plateau, some of the most productive lands centre around the Sholapur and Raichur doabs formed by the Bhima, Krishna and Tungabhadra rivers. Many of the first villages of peninsular India, (2400 to 1700 B.C.) were located in and near these doabs. Maski, Tekkalkota and Hallur were villages of wood and thatched houses, with storage bins and stone querns, settled continuously for several centuries. Ground stone hoes were used to raise finger millet (ragi), mung and horse-gram. Some domesticated animals like sheep, goat and buffaloes were kept, and they must have been economically very important. At Kupgal and Kodekal there are mounds upto 3 meter high, composed of ash. Archaeologists found that this ash was produced by the burning of cattle dung. These might have been placed where accumulated dung was set ablaze, perhaps as part of some ritual.

Millets are hardy and coarse plants which have been important crops of villages all over peninsular India, Gujarat, Rajasthan and Malwa. Ragi we saw, was first cultivated at the above mentioned sites. It is still not known whether wild ragi grew in India, or came from Africa. After about 1700 B.C. bajra is known to have grown in peninsular India and Gujarat. The earliest jowar cultivation dates to about 1500 B.C. in Maharashtra, Malwa and Rajasthan.

Check Your Progress 2

Note: i) Use the space given below for your answer.

ii) Check your answer with that given at the end of the unit.

1) Mention the names of farming villages as discovered by archaeologists against each of the following West Asian countries.

	Countires	Villages
i)	Palestine	----------
ii)	Iraq	----------
iii)	Turkey	----------
iv)	Pakistan	----------

2) What important evidence have archaeologists gathered from West Asian villages which indicates the presence of agriculture there?

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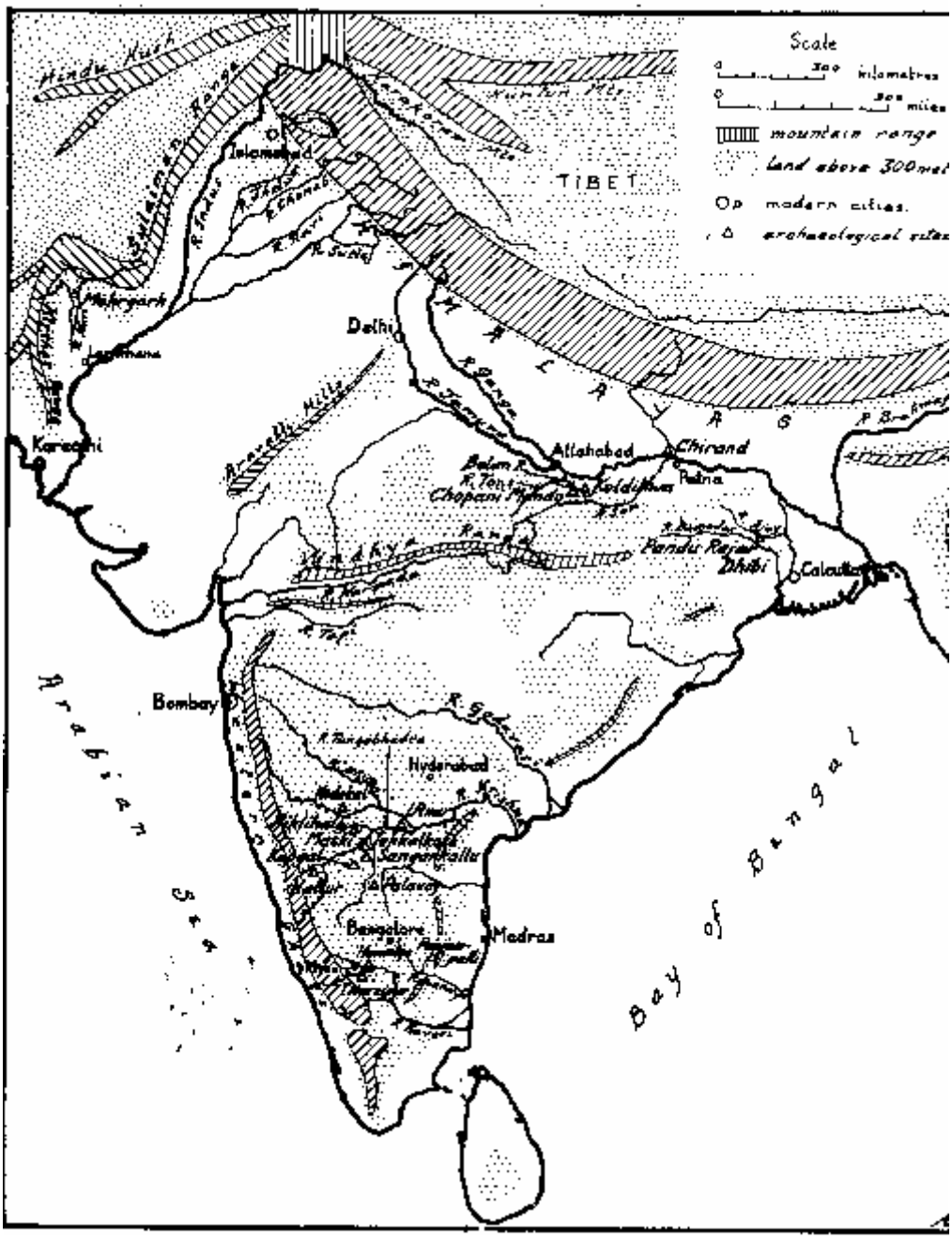
3) Which were the main rice producing areas in India?

Map. 2



4.6 THE CONSEQUENCES OF AGRICULTURE AND HERDING

The shift from hunter and gatherer stage of human evolution to agriculture and farming brought about certain changes in the social organisation of human beings. Here, we shall discuss some of these changes.

i) Animals and Crops

We do not know when exactly specialised animal herding developed in some parts of the world. It seems that in large tracts of land which could not support agriculture, or in areas where the dry season was severe and fodder was not available for a large number of animals, people gave up interest in agriculture and became full time animal herders. They

used to take their animals to pastures in different areas. Until today many communities in western Asia and western India move around with their flocks of sheep and goat. But in other parts of our subcontinent and in Europe, village communities have both tended fields and kept animals.

Even in areas where animal herding became specialised, cattle gradually became important for farmers. This was because as strong beasts, the cattle were capable of drawing heavy ploughs to till the earth, aerate the clods, and draw nutrients into the root zone of the crop from deeper levels. This kind of ploughing make for greater productivity of the soil than the earlier manual digging of individual holes with hoes.

ii) Sedentism

Whatever the importance of animals, if a group depends on agriculture it tends to be sedentary rather than mobile, unlike hunters and nomadic herdsmen. You must have noticed that all the crops we have earlier described are annual grasses. They have to be sown at one time of the year and are ready for harvest only three or four months later. While they are growing they have to be protected, watered and weeded, Transplantation and weeding in rice fields is especially laborious. When land becomes the object of human being's labour in this way, they become attached to it. When there is only one wheat or rice harvest every year, people have to store grain for eating during the rest of the year and also to use as seeds in the next sowing. This also discourages nomadism. Many prehistoric farming villages were equipped with immovable equipment like storage bins and grinding stones. Many of these sites were occupied continuously for several generations. And a site like Jericho, with its stone defences, must have been a permanent site indeed!

iii) Attachment to Land

When people spend a lot of time as well as their skill and labour on certain plots of land, they are determined not to easily give up this investment. There emerges not only physical but also emotional attachment to land. That is why they are even ready to fight for retaining it.

iv) Ecology

We have also seen that human beings began to introduce certain plants and animals into areas where they were not originally found. Thus, they became conscious agents in the transformation of the ecological balance of earth.

4.7 SOCIAL STRUCTURE OF HUNTING AND FARMING SOCIETIES

Ancient farmers did not necessarily eat better than hunters and gatherers. Neither can we say that farming was the more reliable subsistence, because early farmers would always have to contend with crop diseases, soil depletion, floods or droughts. Nevertheless, agriculture brought about social changes which are more complex.

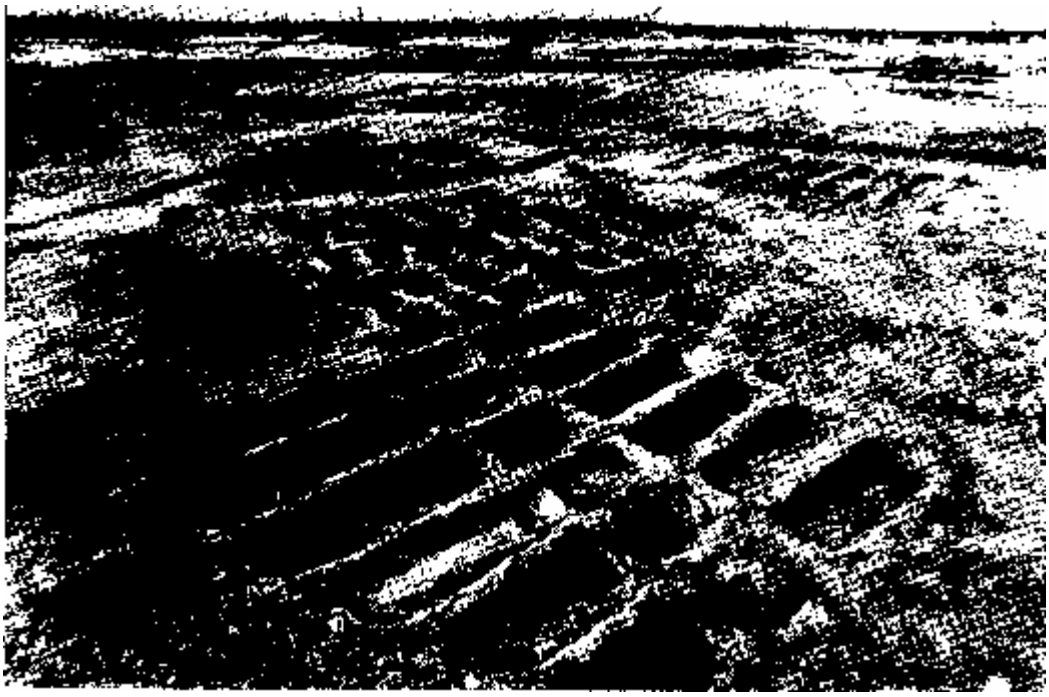
In the first place we had argued that it is important for farmers to be sedentary. We also see that farming groups develop stronger relationship between households than the hunters. The main reason is the nature of cooperation between households. Several people may come together to hunt a large animal. But once the prey is caught and the meat shared, this 'work team' disbands. The next hunt may be carried out by some of the

previous members and some new ones. So in hunting societies cooperation remains ad hoc. But agricultural societies require sustained cooperation over the life cycle of the crop. Where rain-fall and high temperatures are confined to particular seasons, farmers have to complete ploughing, sowing, watering and harvesting on schedule. Thus, several households need to work together to ensure that the schedule is kept. Such 'work teams' cannot be ad hoc because, unlike in hunting, the results are never immediate: they are only gleaned at the harvest. So agriculture brings about more permanent communities and communities with more organic solidarity than the fluctuating groups of hunters.

Early agriculturists expressed this solidarity through the idiom of kinship, and therefore are called 'Tribal Societies'. All members of a tribe consider themselves to be descendants of one person, and are therefore, related to one another. All members of a tribe being considered kinsmen, they hold tribal land jointly. Elder and more experienced members have the authority to settle disputes or arrange marriages or decide how fields will be allocated between members, but they do not possess more land than others. Tribes are usually simple societies with little specialisation of occupations. All members work together and are assured of basic resources (land, water rights or herds) for their living.

4.8 DEVELOPMENT OF SOCIAL COMPLEXITY

Once agricultural tribes were established certain further changes started taking place. The first villages were often established in zones where subsoil water made 'wet patch' cultivation easy. Jericho depended on the water brought to its vicinity by underground spring. Other villages may have depended on neighbourhood streams. In such situations fields located close to the source of water would be better than fields further away. As population increased or reliance on agriculture grew, some tribesmen would have no choice but to till marginal, less fertile lands. Those members who had the best lands would be able to produce the biggest harvests and give feasts to others, thereby, acquiring high status and putting others under their obligation. In the mind of primitive man, wealth was due to the favour of the ancestor or gods. Thus, those who



6. Granaries at Mehrgarh

repeatedly had successful harvests could claim to be the closest to the ancestor-gods. These tribal chiefs would, thus, have a new kind of authority. While still kinsmen of all, and not possessors of more land or animals than their followers, they could help families in trouble and organise sacrifices to the gods. This gave them the authority to decide all serious disputes, allocate all lands, manage the cult and round up people for work which would benefit the whole community. The town wall of Jericho could not have been built without a chief to command, regulate and coordinate the work. Again at Mehrgarh, after 3000 B.C. stone carving and shell cutting developed as crafts, and together with ordinary houses there were two distinct storage buildings probably used as granaries. Community storage would indicate that a chief was regulating the collection of produce.

Check Your Progress 3

Note:

i) Use the space given below for your answer.
ii) Check your answer with that given at the end of the unit

1) Agriculture brings about settled communities of human beings because (Check one of the following her correct answer)

i) it involved hard work
ii) it calls for better technology
iii) crops take time to mature and need protection
iv) it leads to better condition of living.

2) The nature of cooperation in hunting societies differs from those in agriculture based societies because (Check one of the following for correct answer):

i) cooperation in hunting society is emotional
ii) cooperation in hunting society is ad hoc
iii) cooperation in hunting society is partial
iv) cooperation in hunting society is magico-religious.

3) Write a short note on the status of chiefs of the early tribal society.

4.9 LET US SUM UP

The transition from food-gathering and hunting to settled agriculture started with domestication of plants and animals. The first farmers who undertook this innovation were from western Asia, where the ecology and climate were conductive to cultivation of wheat and barley on the mountain slopes and river valleys. Sheep and goat were domesticated. The archaeological sights of farming villages in Turkey, Iraq, Palestine,

Iran, Pakistan and India illustrate this process. In India the cultivation of plants took a varied form because of the differences of ecology and climate. The growth of agriculture contributed to settled or sedentary life-style, attachment of man to land and property, replacement of the ad hoc type of cooperation existent among the hunting societies by a more sustained form of cooperation. New kinship solidarity emerged among settled agriculturists and political institutions such as chiefdom and kinship came into existence. The interaction between man and his environment thus brought about changes in both. There is evidence that domesticated plants and animals undergo changes as also changes occur in man's habitat, social relationships and thinking. These changes brought about a complex social organisation, and in course of time it led to the growth of civilisation.

4.10 KEY WORDS

Archaeology: the scientific study of human past or history.
Domestication: to become adaptive to home life
Habitat: physical environment
Kinship: relationship by birth or marriage
Kinsmeo: people of the same kinship group
Mortar: a vessel or pot in which food is pounded, usually of stone
Sedentism: settled, non-migratory
Species: a group of individuals having common characteristic.

4.11 ANSWERS TO CHECK YOUR PROGRESS/ EXERCISES

Check Your Progress 1

1) (ii)
2) See Section 4.2
3) See Section 4.2

Check Your Progress 2

1) See Section 4.4
2) See Section 4.4
3) See Section 4.5

Check Your Progress 3

1) (iii)
2) (ii)
3) See Section 4.7 and 4.8