UNIT 3 AGRICULTURE

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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
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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 Patnaik, 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. Netting 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

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<tbody>
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<tr>
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<td><strong>China</strong></td>
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<td>Millet</td>
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<td>Rice</td>
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<td><strong>Mexico</strong></td>
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<td>Corn</td>
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<td>Plants</td>
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<td>Animals</td>
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<td>Animals</td>
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<td><strong>Eastern North America</strong></td>
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<td>Plants</td>
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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 Malaysian 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, kotu 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 Easter Boserup and Roy Rappaport comes to mind who have contended two different approaches, first, by Easter 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 Khartiyas, 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 polices 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.

3.11 REFERENCES


Suggested Reading


Ecology and Subsistence Patterns


**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