Geography Optional - 2024

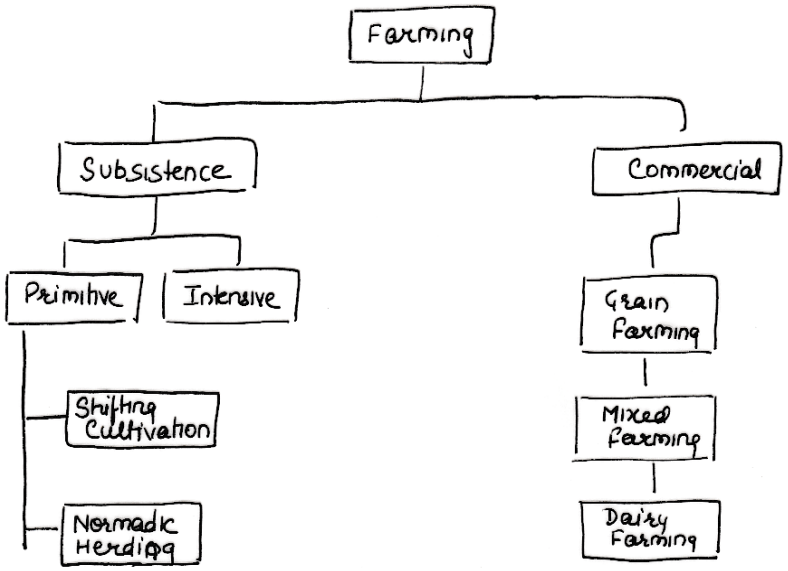
CLASSIFICATION OF WORLD AGRICULTURE

NEETU SINGH

In classifying the world's agriculture, **a four-level frame was recognized by Anderson (1970), namely ecological, subsistence, commercial and collective agricultural systems**. At the ecological or near-ecological level, natives utilize natural plants and breed animals by primitive methods**. 37.3% of the total estimated land is agricultural land is cultivable** At the subsistence level, which may be subdivided into the least primitive and intensive subsistence sub-types, the agricultural produce is raised primarily for consumption at home and very little is traded. Practically none of the farm commodities produced at the subsistence level comes into the world trade. At the commercial level, agricultural production is mainly for sale, since very often little farm produce is consumed at home. These are the three recognized levels of agricultural systems. At the collective level, the systems are similar to the commercial ones in terms of crops produced and livestock raised, but differ markedly in organization and decision-making in the production process. In addition to these four levels, the authors recognize the cash-cropping agricultural system as being a fifth level. It is distinguished from commercial and collective farming in the sense that in the former the entire farm produce is marketed to the outside world.

Derment Whittelsey apart from coining the term **sequent occupance,** which is the study of how different groups who moved into an area affected the cultural landscape,come up with 13 agricultural regions. By basing his classifications on the following factors:

- The combination of crops and livestock common to a particular area.
- How intensively each parcel of land is being used



- How the products from that area are processed and sold
- The amount of mechanization or industrialized agriculture occurring there
- Its buildings and other agricultural structures

Ecological or Near-Ecological Systems

Nomadic Herding Nomadic herding is, at present, concentrated mainly in Saharan Africa, Eastern Africa, interior of Southern Africa, and the southwestern and interior parts of Asia. Unlike commercial grain farming or commercial grazing, nomadic herding is, therefore, an ancient activity, and may also be called an aboriginal form of livestock raising. It is the simplest form of pastoralism in which herds and flocks graze chiefly on natural vegetation. It is mainly confined to the sparsely populated dry regions of the old world. Such vast tracts of the earth are too dry to produce crops but are suitable for rearing or grazing livestock of different kinds. On the whole, it is just a subsistence form of exploiting dry regions in which the use of land is extensive, as several hectares are required to feed one animal.

The driest parts of the world still have characteristic nomadism. But in many parts of the semi-arid regions sedentary herding has been forced and planned by the governments. In the Kirghiz steppe, the government of Russia has eliminated most of the nomadic herders. This, however, does not mean that the raising of livestock is no longer important in this part. It is still a major activity and this region is the most important meat-producing area. The fact is that sheep and cattle are now held in collectivized herds and are carefully looked after by a few herders. The family labour rendered surplus has been permanently absorbed in other occupations.

Shifting Cultivation Shifting cultivation is said to be as old as the history of agriculture itself. Its origin, however, could be traced back to about 7,000/8,000 BC, when man made an attempt to switch to food production from food gathering activities. Infertile soils in the humid lowlands of low latitudes are chiefly responsible for farming of a temporary or shifting character. This type of farming is a primitive form of the utilization of the poor soils of tropical rain forests and bush areas. On the whole, shifting cultivation has long been recognized as the most widespread agricultural system of the tropics encountered in Amazonia *Selva*, the Congo Basin and Southeast Asia.

When brought under cultivation, laterite soils turn infertile because they leach and erode rapidly with the removal of natural vegetation which exposes them to the sun and rain. After two or three years of producing subsistence crops of land cleared by the *slash-and-burn* technique, the primitive people are forced to move into the adjacent forest. After some years (5 to 12) the tilled arable fields get still further

removed from the settlement, and hence the tribe moves to a new site in the deep forest so as to come closer to the tilled fields.

Shifting cultivation is carried on chiefly in regions with a tropical forest climate. It is widely spread in it and along its borders. The tropical regions of the Americas, central Africa, and southeastern Asia (including Indonesia) may be identified as the home of shifting cultivation. The agriculture here is known as migratory, primitive, cut-and-burn, slash-and-burn, or bush fallow agriculture. In different parts of the world shifting cultivation is called by different names. For example, it is designated as *ladang* in Indonesia, *caingin* in the Philippines, *milpa* in central America and Mexico, *ray* in Vietnam, *conuco* in Venezuela, *roca* in Brazil, and *masole* in the Congo and central Africa. It is known as *jhum* or *jum* in northeast India, *kumari* in the Western Ghats, *watra* in southeast Rajasthan and *Penda, bewa*r or *dahia* and *deppa* in different pars of Madhya Pradesh.

In shifting cultivation, the farmer selects a patch of forest, in which he fells a few trees with crude hand tools, leaving only the larger and economically useful plants untouched. He clears the undergrowth with a short one-edged sword having a slightly curved blade (cutlass), and burns the residue. Crops are sown in the clearing or *swidden* with little preparation. *Swidden* cultivation is practiced in areas which are cleared during the brief dry season (December and January). The burning process takes two or three days resulting in only the partial destruction of the cleared vegetation, much of which still lies on the surface when the crops are planted.

Despite a large number of papers on different aspects of shifting cultivation, such as ecological and anthropological investigations, topical and geographical or regional coverage is very small. It was only in the fifties and sixties that it began to receive attention from students of *swidden* cultivation, who conducted their studies, more actively in the tropics of Southeast Asia and Africa than in the tropical regions of North and South America. The fundamental difficulty faced by researchers in the geographical investigation of *swidden* cultivation is the length of stay required in the field to determine a complete agricultural cycle, from the initial clearance through cultivation and fallowing to recultivation of the same site. Such a cycle is commonly completed in ten years or more; as yet no detailed study of a complete cycle at any one site appears to have been made in any part of the world.

The crops receive only cursory attention during the growth period. After the first harvest, they are sown again for a year or two, and thereafter the land is left fallow. Colonization by natural vegetation is allowed while another patch of land is cleared for cultivation. Ideally the first clearing is not used for cultivating

crops again until it has been under a natural fallow for some years and the soil fertility restored. Thus, the most striking features of shifting cultivation are:

- its scattered rather than concentrated distribution, and small patches of tilled land commonly surrounded and separated by sufficiently broad stretches of forest;
- rotation of fields rather than crops as short periods of cropping alternating with sufficiently long periods of natural fallow;
- a common method of slash-and-burn so as to clear the natural vegetation; and
- fertility of the land being maintained by allowing the natural vegetation to regenerate.

Subsistence Systems

Rudimentary Sedentary Tillage In many parts of the world, agrarian communities practice *subsistence cultivation* to some extent, that is, cultivation of crops for consumption by the family itself. In other words, subsistence farming is the cultivation of crops and the raising of animals to feed the farmer and his family members. It is normally practiced in environments not very suitable for commercial livestock rearing and crop production. There are some regions in the world where cultivators operate within a completely subsistence economy although such groups exist in regions isolated from the commercial world by topographical and vegetational barriers.

The general farming practice of the rudimentary sedentary cultivator and the nature of his products are almost similar to those of the shifting cultivator, except that the former does his job more carefully in clearing and preparing the land, and in cultivating and harvesting the crops. His greater interest in tilling the soils demands better tools. He employs methods which are often not much more advanced than are those used by shifting cultivators. He also builds his dwelling like his migrant ancestors, but it has a roof of corrugated iron sheets. Thus, one can easily distinguish between two broad groups of primitive subsistence cultivation, namely, shifting and sedentary. The differences between the two are readily observable. However, on small-scale maps the separation of the rudimentary sedentary from the *swidden* (clearing) cultivation (shifting cultivation) is difficult. There are others in the stage of transformation which are moving from the shifting to the sedentary pattern and cannot be identified immediately with certainty. But the changes can be noted by an experienced geographer if he stays in one such area long enough.

Though shifting cultivation is a typical feature of the tropical rainforests, in scattered areas many families and even groups who till the same piece of land year after year are being settled in one single area. They practice rudimentary sedentary tillage mostly in the tropical rainforests. They remain permanently sedentary

unless some unforeseen calamity sets them wandering. Shifting cultivators tend to rely on a more primitive and less reliable system of agriculture than their sedentary counterparts. They also require a greater area of land. Beyond these generalizations, distinctions between the two systems appear to be of importance only as far as techniques of cultivation are concerned. A number of factors influence the shifting or sedentary component of subsistence agriculturists, among which the most important are probably the availability of land in relation to population pressure, the nature of the local tenurial system, the natural fertility of the soils, the problems of maintaining soil fertility, the difficulty of clearing new land and social customs. These factors are an integral part of these traditional systems which have been evolved through generations.

Tropical lands, where a combination of great heat and abundant rainfall supports a luxuriant growth of forest, give the impression of an environment in which some crops can grow so freely that farming is extremely easy. However, such an impression is far from true. The heat and rainfall encourage an indiscriminate growth of plants, which makes the maintenance of cleared fields difficult. Heavy rains wash away plant nutrients from the soils. Even the fertile soils of the low latitudes are not considered of excellent quality and, therefore, these soils are left fallow for a few years. In fact, tilled fields are likely to shift, but within an area that can be operated from a permanent village centre – thus they may be identified as areas of restricted shifting cultivation. Adjacent villages are in contact with each other and they amalgamate into bigger social and political units. Such amalgamations are numerous in Africa on the mid-slopes and at the foot of the Eastern Highlands. Land available for arable farming is limited and the man-land ratio is very low. Therefore, in regions of rudimentary sedentary tillage labour is intensively applied to land. But in operational holdings fixed capital in the form of fences and transport routes is quite limited which otherwise is essential to protect crops and to dispose of agricultural produce. Farming implements are indeed rudimentary but are comparatively more advanced than those of shifting cultivators. Now with increased contacts with the outside world, readymade steel tools are put into use. Although cash crops form an important component of the cultivator's activities and income, he gives more importance to subsistence crops so as to support his family throughout the year. This, however, shows a definite shift from a high degree of subsistence.

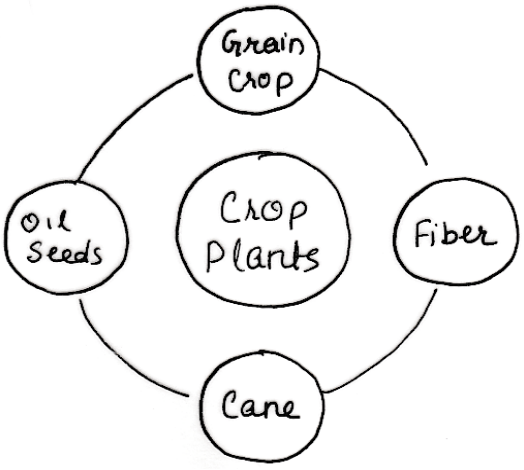
Intensive Subsistence Tillage in Monsoon Climate

Most of the subsistence farming areas are located in the monsoon (humid, sub-humid, dry sub-humid and dry) regions of South and East Asia and adjacent islands, where two types of intensive subsistence tillage are most common, chiefly with the p*resence or absence* of paddy in crop combination. But the distinctive features of both types of farming are almost identical. These features are:

- Small farms consisting of fragmented plots dominate the agricultural landscape.

- Traditional implements, such as the wooden plough and hoe, are mostly in use in major parts of the intensive farming lands of Asia experiencing the monsoon climate.
- Farming systems are of the intensive subsistence type rather than the extensive commercial type because foodgrains constitute 80 to 90 per cent of all agricultural production,the major share of agricultural produce is retained for domestic consumption and an unrepresentative proportion is traded, and most of the inputs are provided by the peasant himself, and so it is a family-based agricultural system.
- An insignificant place is occupied by beef and dairy cattle as well as sheep in farm economy; on the contrary support-livestock (draught force) dominate the livestock combinations.
- Agriculture is permanent because it is practiced on a site for many hundreds of years, as such, soil mining, soil exhaustion and soil erosion are the common features. Thus, farming systems are a form of *predatory agriculture* nature when compared with that of the New World.

These areas support more than 50 per cent of the world's population, but occupy only 12 to 15 per cent of its land area. The population is wholly or predominantly composed of peasant farmers and only a few people are engaged in grazing and manufacturing.



These regions are among the world's oldest agricultural areas, particularly in China, India, Pakistan, Burma and Malaysia, where 65 to 75 per cent of the people are engaged in agriculture, a true representative of agriculturalism. These areas are farmed by intensive methods, i.e. the labour input is maximum. The intensive farming methods practiced in alluvial regions support dense population in villages, a scene of ruralism.

Intensive Subsistence Tillage (With Paddy Dominance) In tropical monsoon areas the frost-free year round growing season, and the prevalence of numerous agro-climatic conditions are highly favorable to the maturing of two or three paddy crops in an agricultural year from the same *paddies*. Rice is the most distinctive and important staple food of the intensive subsistence tillage areas. The principal types of farmland are the irrigated deltas, flood plains, coastal plains, and terraced mountain slopes. These are mainly devoted to rice. The multiple cropping of rice with the most intensive methods is a common feature. In extreme cases three crops of rice can be grown successfully each year on the same field. Two crops of rice a year

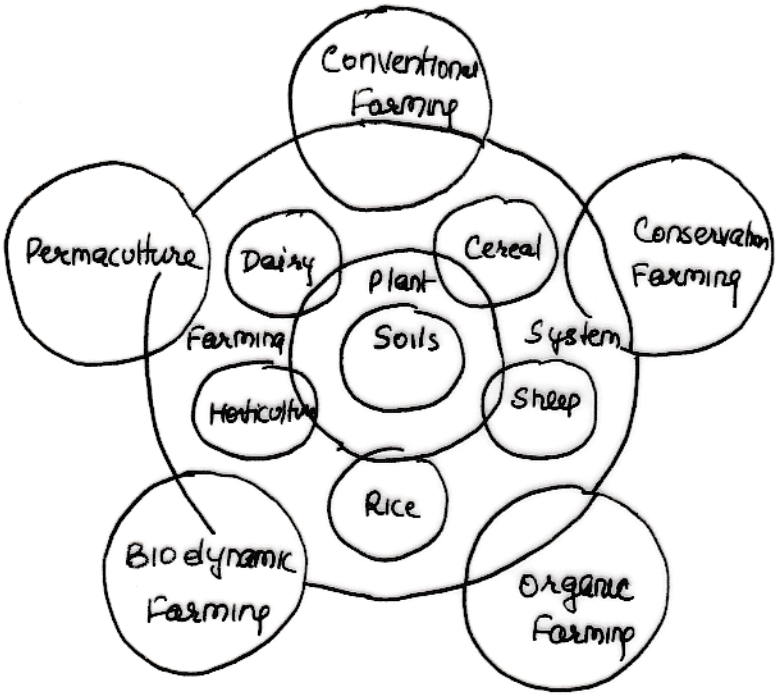
are the rule where potential agro-climatic conditions in a slightly modified form persist. One crop of irrigated rice is possible where rainfall is erratic or often fails altogether or a cool season intervenes. These conditions inhibit rice cultivation which requires a relatively higher rainfall and a high temperature. At places, where the number of frost-free days is less and where rugged relief is associated with an absence of irrigation facilities, interculture farming aimed at raising several crops side by side on alternate or mixed rows on the same piece of land is possible. Unlike some other foodgrain crops rice productivity per hectare is high and, in addition, it provides a palatable food for the local people. Due to the high paddy growing potentiality of monsoon lands, rice yields are both dependable and high.

Intensive Subsistence Tillage (Without Paddy Dominance) Areas which border the regions of paddy dominance are not devoted to intensive paddy cultivation on account of lack of moisture, a short growing season, and the prevalence of other unfavourable physical conditions for *paddies*. These handicaps have led cultivators to drastically modify the farming system. As such, the farmers are forced to produce several drought-resistant or drought-escaping cereals in place of rice. Most of these are low-value low-yielding foodgrains. Continental location has led to climatic hazards, particularly with regard to rainfall concentration, which at times is scanty and unreliable, and the short growing period for rice. Wherever fertile soils are available, wheat, barley, sorghum, bulrush millet, etc. are the staple foodgrains. Besides these, tobacco, sugar cane, vegetables, various oilseeds such as rape, mustard and linseed and certain legumes, e.g. peas, broad beans and gram or chick pea are also produced. Olericulture and horticulture are encountered in small pockets wherever favourable sites are available. Otherwise, their share in the cropped area is very small. Livestock combinations resemble those of intensive subsistence tillage with rice dominance. Animals too play a minor role in the economy because arable land is used both for the production of animal feed as well as of human food. The latter is given more importance because of the very high density of population in certain places. Draught animals, particularly cattle, are fairly common, bullocks and water buffaloes are used for heavy work, while in the high altitudes mules or asses are used for transporting agriculture produce. Certain other animals, such as swine, poultry, and goats are also domesticated with little space and food requirements.

Subsistence Crops and Livestock Farming In this type of farming farmers produce crops and raise livestock mainly for their own subsistence and sell little or nothing in the local market. Since they earn no cash income, they cannot afford to buy modern expensive machinery and good breeding stock. They are even unable to save the best seeds from their produce to resow them for obtaining the best harvests. Their returns are evidently low and they cannot market their insignificant surplus because of competition from the

high grade output of the commercial regions of the world. Presence of peasant subsistence elements is still encountered in some areas of subsistence mixed farming. Thus, traditional methods of farming are the rule rather than the exception.

During the pre-World War II period, there were extensive areas deoted to subsistence crops and livestock farming located in East Europe, Russia, the Middle East and Mexico. However, in the post-World War II period, there is an increasing pressure on peasants to collectivize their petty holdings. This happened particularly in Russia and in most of the Socialist countries of East Europe. Farmers appear to have kept away from the traditional way of farming, and they seem to have completely switched over to mechanization and large-scale farming techniques. Besides, in many parts of South Mexico, Turkey, Iran, Iraq, etc. agriculture activities are becoming more commercial in organization and practice. At the same time, improved living standards are gradually shifting the emphasis from subsistence to commercial activities. As such, at present this activity, i.e., subsistence mixed farming, covers very limited part of the global arable land.



AGRICULTURE PRODUCTION SYSTEMS

Among cereals, barley and wheat are the most important crops. Land capability, favouring wheat production supports a cash system of farming.

Mediterranean Agriculture (Near-Subsistence in Occidental World and Commercial in the New World) Mediterranean agriculture has its classic location on the shores of the Mediterranean Sea. From a geographical point of view, it is the most popular of all types. The largest of the several regions nearly encircles the Mediterranean Sea, from which this type of farming has derived its name. The location of the

region is important, although it is an ancient system of agriculture representing a more stable collaboration between man and land. Therefore, it is the most satisfactory of all the agricultural systems.

Despite a worldwide shift from independent agricultural economics to interdependent farm economics, Mediterranean agriculture continues to maintain its distinctive character in the region of its origin. With the infiltration of Europeans into the continents of the New World, this type of agriculture emerged approximating its prototype in the Old World. The inherent characteristics of its farm economy are, however, more commercial. In the mid-latitudes, it occurs approximately between 30 and 45 latitudes. The areas within these latitudes with mild, wet winters and hot, dry summers embrace the central and southern California (North America), central Chile (South America), the southwest of Cape Province (Africa) and the southwest and southern parts of Australia.

The Mediterranean climate has mild, moist winters and hot, dry summers, caused by the presence of mountains, hills, piedmont plains, small valleys and coastal plains. Agriculture has thus been adapted to maritime climate (Csa), continental climate (Csb), summer dry conditions and differences in slope. This whole gamut of ecology and the integrated use of the contrasting micro-environments have fostered the development of four distinct, yet interrelated, agricultural systems of crop production and livestock husbandry. These are the (i) growing of cereals and vegetables with the aid of a seasonal precipitation, (ii) cultivation of planted crops of olives, figs, dates, and grapes which ripen in autumn (fall) without artificial watering, (iii) raising of widely distributed summer crops of fruits, vegetables, and forage plants by irrigation, and (iv) livestock farming mainly small animals which graze on highlands in winter and on lowlands in summer. Thus, it is an ideal example of the direct relationship between the natural environment and crop production and livestock raising. The only exception is that of southern Australia which is not mountainous and is also remote and comparatively newly cultivated. Besides, in the Los Angeles basin of southern California, due to recent development and new settlers, the features of Mediterranean agriculture, as observed in the Occidental World are not present. However in this region, commercialization and modernization of agriculture are common.

Cereals and vegetables are grown mainly with the held of winter rain, and this is a significant feature of the Mediterranean farming system. There are numerous minor field crops, such as lupines, broad beans, kidney beans, chick-peas, potatoes, onions, etc. These crops, plated in autumn, utilize the winter rain and mature before summer.

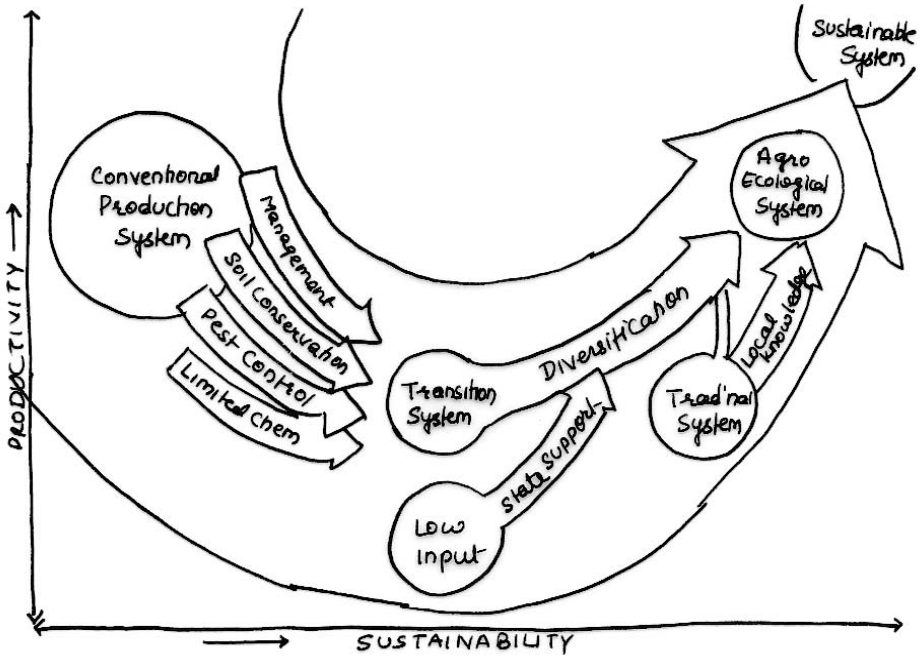
Commercial Systems

Livestock Ranching In the utilization of grasslands, according to Jones and Darkenwald (1966), two types of activities are predominant, i.e. livestock ranching (extensive, commercial grazing) and nomadic herding. In some respects they have many points in common: for example, both represent extensive use of land because several hectares are required to feed one animal; both are carried on in regions sustaining sparse population, and in both the tending of livestock significantly outranks the production of crops. Herds and flocks in both cases graze chiefly on the available natural vegetation. In many other ways, however, livestock ranching and nomadic herding differ markedly. Livestock ranching is common to the grasslands of the Americas, South Africa, Australia and New Zealand and nomadic herding is mainly restricted to the vast expanse of the Old World where it has been dominant from ancient times. The former is characterized by fixed, fenced holdings and permanent ranch houses, while in the latter the nomads can freely migrate with the change of seasons. The livestock rancher specializes in raising one type of animal, whereas the nomadic herder attempts to tend several different kinds of animals. The livestock ranching products, such as meat, wool, hides, skins, etc. are chiefly exported to the outside world but the products of nomadic herding are almost entirely kept for local consumption. In commercial grazing animals are transported to other places for fattening and slaughtering. On the other hand, in nomadic herding regions, the slaughtering of animals and the preparation of many other products usually take place within the region.

The livestock ranching system (the extensive commercial grazing system) has also a number of characteristics in common with the plantation agricultural system. These include the extent of land occupation, association with external investments, and notable division of managerial and labour resources. However, there is some difference, i.e. it differs from the plantation system by its dependence upon the sale of livestock rather than plant products.

Commercial Grain Farming in Semi-arid Lands Commercial grain farming is the creation of great economic and technological changes brought about by the Industrial Revolution of the nineteenth century. It is of recent origin and is both extensive and mechanized in respect of production technology. It has no prototype from which it can be said to have emerged; rather, its origin is recent in the semi-arid lands, particularly of the United States, Canada, Argentina, Australia and Russia. These areas are mostly far from marine influence and are surrounded by the warm, humid and cold arid climates. Their location is continental, and as a result summers are short and winters too cold for wheat cultivation. This is the reason why wheat is sown in early spring and harvested in summer; as such it is designated as the *spring wheat belt* in the

northern hemisphere in the United States and Canada. The farmers face many hazards but with a careful fallowing system and the use of chemical fertilizers and modern machinery, this type of farming yields huge quantities of grain. The utilization of these vast expanses of land for farming virtually began with the development of the tractor-driven steel plough and harvesting machinery, and the extension of railroad transport and shipment facilities. Therefore, this system depends on the inventions of the mid-nineteenth century. Under the pressure of labour shortage, which is always a problem in semi-arid grain lands, farming has developed almost entirely on a machine basis. The regions now liberally devoted to commercial grain farming were once extensively occupied by nomadic herders and livestock ranchers.



Farming systems without livestock are somewhat rare and the growing of crops is usually complemented by keeping of livestock for draught force and meat or milk. On the whole, however, commercial grain farming is to be looked upon exclusively as one meant for grain production for export. The crop and livestock combinations do exist but in simple and standardized forms because livestock products are essentially of secondary importance in the farm economy for local use. Therefore, the slogan of the region under study may be *export wheat, eat meat*.

Progressive methods of cultivation commonly imply a high degree of mechanization in all regions; however, agricultural activities are more or less extensive. In fact, mechanization reduces labour requirement and requires a large size of farming unit. With the employment of a little labour and sophisticated machinery on low value land, the output suffices to maintain the population. On the whole, output per unit of land is

always low as compared to region where intensive cultivation is the common practice; however, since the per capita production is high, the farming is commercial.

Commercial Livestock and crop Farming Mixed farming may have stemmed from the medieval agriculture of the northwest Europe, which was essentially subsistence in character. It now features both commercial crops and livestock in different combinations and in varying ratios. This system, at present, is not only confined to Europe, but also to the humid middle latitude lands of the United States and of other continents except Asia. Regions of mixed farming are characterized by the phenomenon of the inter-dependence of crop and livestock, which rightly provides optimum utilization of the available land resources. The characteristics of any such system, as of any other agricultural system, are the result of a combination of numerous factors, such as physical, economic, political and social. The combination of physical factors and human circumstances varies considerably and as a result there are large varieties of farm enterprises in the commercial livestock and crop farming regions of the world.

In tracts where the climate is relatively warm, wheat, maize, and oats are the major food grain crops. Wheat is usually consumed by the locals, oats by the livestock and maize by both. But in places where summers are cool or wet or where soils are relatively infertile, wheat and maize are substituted by rye and barley. Hay is grown in the form of legumes and fodder. Root crops are grown everywhere but they are largely cultivated in the rye-barley region. Among root crops potatoes, turnips and sugar beet are the most important. The surplus of any crop is generally sold, but the main cash income comes from cattle, pigs (swine), and poultry and sheep products. Cattle, hogs (castrated male pigs reared for meat) and poultry, birds figure predominantly with horses, mules or oxen used as draught animals. These diverse plant and animal combinations suit varied environments, which include a wide range of climate, soils and markets. Markets are dominated by the nearby trading and manufacturing centres, with their multifarious demands. Vegetables and other minor crops add to the variegated appearance of the farmed landscape. In Europe, market gardening is quite popular in areas bordering large urban centres, whereas in the United States, it is dairy farming which is popular. These areas are too small to be shown on small-scale maps.

Commercial Dairy Farming In many ways, dairying is the most advanced and efficient type of farming. It is practiced near industrial and urban centres. Although the capital establishment costs for housing, machinery and fodder storage are high, the returns are higher. The differences between dairy areas and the neighbouring mixed farming regions are statistically established by the

(i) high ratio of hay to grain production,

(ii) high percentage of dairy cows to livestock of other types,

(iii) high human population density of the dairy belts,

(iv) heavy capital input, i.e. high capitalization, and

(v) considerable market orientation of livestock products in dairy areas. In short, the crop and livestock combinations in a dairy farming regions are just about the same as in a mixed farming region; however, the emphasis in the dairy region is on the raising of milch stock and the production of forage crops and feeds for them. The percentage of land under crops is about the same in both; the livestock density per unit area is also almost identical but local variations are considerable on account of physical environment variations.

Over 80 per cent of the world's milk, nearly nine-tenths of the world's butter, over four-fifths of the world's cheese and virtually the entire production of condensed and dried milk are produced in Europe, Russia, North America and Australia. Further, much of dairy production in Africa and South America is produced in the European settlements such as South Africa and Argentina.

Commercial dairy farming is the third agricultural system of the temperate latitudes, which developed from the medieval system of agriculture of North Europe. Until the 1950s dairying was confined to farms, where fresh milk was consumed by the farmers, villages and people of nearby towns. In some large towns dairymen kept cows in sheds where stock was fed on hay and grains. However, with the development of rail transport facilities in the second half of the nineteenth century large cities were connected with distant regions for the transportation of fresh milk. Gradually with the use of power in churning milk and the invention of cream separators, the making of cheese and butter shifted to factories. Similarly, the manufacturing of condensed, evaporated and dried milk was done in factories.

In many parts of the world, commercial dairy farming is an activity of the temperate latitudes based on the utilization of permanent pastures. For instance, in the northwestern Europe dairy farms occupy coastal and low-lying meadowlands of abundant precipitation, warm summers, and cool and cold winters (50° to 60° north latitudes); other regions of dairy farming are the eastern states of the United States around urban centres (40° to 50° north latitudes), the southeastern part of Australia and the North Island of New Zealand (30° to 40° north latitudes). Besides, there are numerous minor dairy regions in the western United States, eastern Argentina, Middle Chile, the Republic of South Africa, eastern Japan and western Russia. It is being introduced in those areas where summers are too cool and moist for either corn or wheat, and where hay is the most reliable crop for supplementary feeding. Besides, the availability of silage feeds during winter is an additional advantage. Leguminous forage, root crops, oats, and barley supplement the hay feed of cows, and rye and potatoes are grown for human consumption. City dairy regions produce dairy products generally at higher costs because animals are fed on imported feed.

Livestock husbandry is broadly divided into two groups: those in which cows are largely stall fed on imported feed, and those in which cows are grazed on pastures with or without supplementary feeding. Productivity is, therefore, highly variable and depends upon the quality of the stock and the feed.

Specialized Horticulture and Olericulture The production of fruits and vegetables in orchards and kitchen gardens is a common feature of the agriculture of humid temperate regions of the world. Among the Occidental agricultural systems of the middle latitudes, horticulture is practiced only in the Mediterranean regions. Elsewhere, large scale fruit and vegetable growing is confined to exceptionally favourable spots. Most of the areas where this type of farming is practiced are too small to be shown on the world map. However, an attempt has made here to map the large areas. The most ancient and important areas of specialized horticulture and olericulture are restricted to the vineyards of Western Europe not experiencing the Mediterranean climate. This system of agriculture developed with the creation of markets by urbanites who were directly engaged in manufacturing, mining and commerce, and who were willing to pay a good price for large quantities of perishable fresh fruits and vegetables.

Like dairying, this system of farming became distinctive only in the recent past, i.e. since refrigeration and rapid rail transport became available. The notable crops are vegetables and bush fruits. Agriculturists in these regions specialize either in particular fruits or vegetables; in certain places combinations of both are predominant. The methods employed to grow these types of crops are virtually traditional. The scale of farming is small, and intensive attention is paid to individual plants. More explicitly, where soil is good, favouring early harvest; intensive labour and consummate human skill are devoted to the growing of a large number of crops on a minimum hectareage. Warm soils are particularly favourable for raising successive crops, hence the relatively high farmk produce from them. To obtain high returns, development of irrigation facilities, application of fertilizers and use of glass or hot houses for vegetable and fruit raising are necessary. Location is an important factor which frequently determines the methods employed. Locations close to big markets often need to be adapted for particular technology. In contrast, in areas away from markets various natural advantages encourage the application of less extensive techniques; zones of truck farms extend and still farther from the city markets into belts of warm climates. Although lacking the advantage of proximity to markets, truck farms are compensated by exceptionally favourable soil and climatic conditions which accelerate the process of growth of desired crops which mature earlier than in their competing suburban gardens.

Industrial Crops Certain aspects of industrial crops are similar to those of plantation farming of the tropics. A negligible proportion of the crop is used on the farm for produces it; it is mainly sold for foreign export or to local manufacturers. Of the industrial crops, cotton is the most significant in many parts of the world. Although developed in ancient India and China and introduced into the America at an early date, cotton farming expanded only after the invention of the cotton ginning machines in 1973.The present world output of cotton is two and a half times what it was just prior to World War I. Although cotton is grown in about seventy countries, only in the United States. Egypt and India, it is recognized. Cotton is grown in the United States chiefly in the region of which has long been known as the *Cotton Belt*.

Cash-Cropping System

Commercial Plantation Farmer in the Tropics Commercial plantation farming is perhaps the most rational system which is totally different from peasant agriculture. The former represents the system introduced by Europeans into the tropical and sub-tropical lands, and it refers to large scale, capitalized and often highly centralized cultivation in the plantations of cash crops for export. As such, it offers the best example of an export. As such, it offers the best example of an export-oriented system.

In the tropics it is, today, one of the most distinctive types of farming though it is the oldest of the modern types of large-scale, specialized, and alien systems of agriculture. Europeans have superimposed commercial plantation in a few areas in the form of scattered patches. These are surrounded by vast stretches of intensive subsistence tillage dominated by rice from time immemorial, and in many other places by shifting cultivation or rudimentary sedentary tillage, both holding a pivotal position in tropical latitudes. In brief, commercial plantation began with the colonization of the hot, humid portions of the Americas and Southeast Asia, where its development has taken place largely during the past hundred years. It made a more remarkable breakthrough than livestock ranching, despite the fact that the former is so much dependent upon the outside world that nearly every bit of the cash crop is sold outside the region of production. It involves the growing and processing of cash crops and most of the products move to the temperate lands, chiefly those of the northern hemisphere. The most potent factor for the rapid extension and expansion of plantations is that a large number of crops of the tropics, except sugar cane and tea, have to face little competition from the crops of the middle temperate latitudes. Sugar cane and tea are not exclusively tropical and are also grown in areas with cold winters.

The plantation is a device or a system to procure commodities of standard quality, and in desired quantities, which cannot be produced in the temperate latitudes and which the low latitude inhabitants (*locals*) either

do not grow, such as heavea rubber, or produce in insufficient quantities, such as sugar cane or of unreliable quality, such as tea.

Commercial plantation – a superimposed system – was started after the discovery of the low latitudes. The products were formerly considered novelties which subsequently ceased to be so when they became regular items of consumption in the middle latitudes. Plantations were rapidly extended and new crops were added because the growing cities created new markets. Transportation and refrigeration facilities improved processing machinery and the value of the products for an industrial society enhanced production and also added new crops, such as banana.

The plantation system is commonly linked with the production of various tropical and subtropical crops. The classic plantation crops are rubber, coconut, oil palm, cacao, coffee, copra, indigo, cotton, arrow root, pineapple, sugar cane, etc. To this group of crops banana and ttea may also be added. Banana is a herbaceous crop of the humid tropics because it is not a woody, perennial or annual plant. After having harvested banana fruit the plant is cut off from above the ground level. The root systems resprout and replanting is not required. Similarly, tea yields almost continuous production of leaves over a number of years. But cotton, jute, tobacco, groundnut, etc. are all annuals and require considerable labour at specific times of the year and thuse pose problems. In the case of both tea and rubber, labour requirements spread over a year. Sugar cane, like banana is a herbaceous perennial. At the time of its harvest, the crop is cut at ground level. The crop resprouts the following year as a ratoon crop. All these crops may be considered as providing characteristics of true plantation agriculture but they cannot strictly be called plantation crops because they are partly grown by peasants for their sustenance.

Commercial plantation agriculture has traditionally been financed by Europeans or at least by the people residing in the temperate regions of the western world. The managerial and technical staff, farm implements, industrial machinery, plant fertilizers, railway facilities, machines that reduce ravages of tropical diseases and pests, and even clothing, and part of the food for both the administrative staff and labourers come from outside areas especially temperate regions. Most of the unskilled labour is recruited from the *locals* or those living in nearby areas or on contract basis.
