

1. Details of Module and its structure

Module Detail	
Subject Name	Geography
Course Name	Geography 03 (Class XII, Semester - 1)
Module Name/Title	Human Activity-Agriculture – Part 2
Module Id	legy_10502
Pre-requisites	Basic Knowledge about Primary Economic activities Agriculture
Objectives	After going through this lesson, the learners will be able to understand the following: <ul style="list-style-type: none">• Crop distribution : a global pattern• Agriculture Region• Subsistence Agriculture• Primitive Subsistence Agriculture• Plantation Agriculture• Extensive Commercial Grain Cultivation• Mixed Farming• Dairy Farming• Mediterranean Agriculture• Co-operative Farming• Collective Farming
Keywords	Jhuming, Milpa, Subsistence Agriculture, Subsistence Agriculture, Primitive Subsistence Agriculture, Plantation Agriculture, Extensive Commercial Grain Cultivation, Mixed Farming, Dairy Farming, Mediterranean Agriculture, Co-Operative Farming, Collective Farming

2. Development Team

Role	Name	Affiliation
National MOOC Coordinator (NMC)	Prof. Amarendra P. Behera	CIET, NCERT, New Delhi
Program Coordinator	Dr. Mohd. Mamur Ali	CIET, NCERT, New Delhi
Course Coordinator (CC) / PI	Dr. Tannu Malik	DESS, NCERT, New Delhi
Course Co-Coordinator / Co-PI	Dr. Archana	CIET, NCERT, New Delhi
Subject Matter Expert (SME)	Mr. A.K.Pandey	RPVV, Raj Niwas Marg, New Delhi
Review Team	Prof. M. H. Qureshi (Retd.) Dr. P. K. Malik	JNU, New Delhi Government College Sidhrawali, Gurugram

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Among all primary activities, agriculture is the most important. Nearly half of the world's population is still dependent on it. In developing countries, the proportion of people dependent on agriculture is over 62 per cent (according to world bank). About 12,000 years ago, the first farmers selected their crops and animals for domestication from the existing flora and fauna, particular to the world's biomes, and began the cultivation of plants. Different crops and animals were domesticated in different parts of the world, some in more than one place simultaneously.

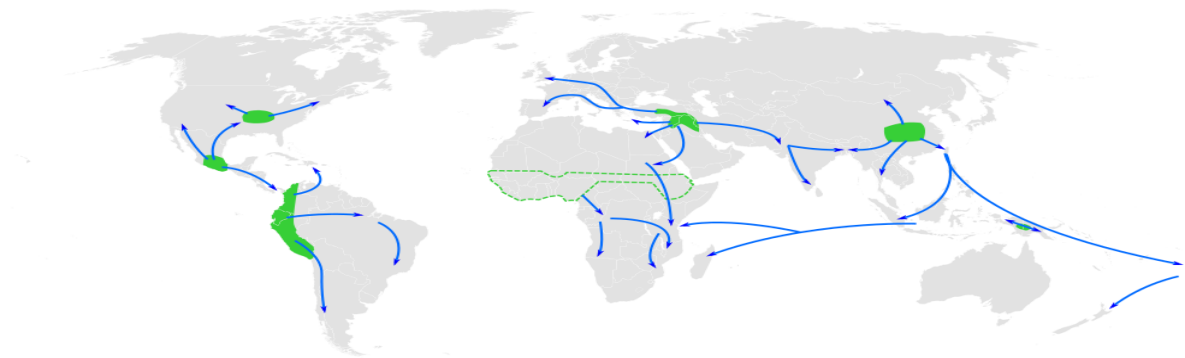


Fig. No. 01 Map of the world showing approximate centres of origin of agriculture and its spread in prehistory

Source: https://upload.wikimedia.org/wikipedia/commons/thumb/e/e9/Centres_of_origin_and_spread_of_agriculture.svg/1000px-Centres_of_origin_and_spread_of_agriculture.svg.png

Despite all the developments since then, humans are still dependent basically on the choices made by people in particular climatic regions thousands of years ago. Only about 20 crops out of several thousands species of wild plants are grown the world over as the major food sources. The distribution of biomes reflects the distribution of solar radiation, temperature and rainfall resulting in the spread of the vegetation types from equatorial forest to the tundra of the sub-Arctic and the high mountains. This broad climatic framework is still the main influence on the pattern of agriculture, though the limits of growing particular crops have now changed under human influence. With the beginning of agriculture, the nomadic herding gave way to a comparatively settled life. The most primitive form of agriculture is known as *shifting cultivation*, which still persists in some parts of the world. It is mainly practiced in the tropical forests. Trees are cut and burnt to make a clearing in the forest. Using simplest tools, fields are prepared for planting crops. After a few years of crop production, the soils get exhausted. These fields are then left fallow and new clearings are made in the forest. Subsequently, *sedentary agricultural systems* with permanent fields and villages emerged in areas of favourable climate and fertile soils. Great civilisations were built on the foundation of sedentary agriculture in the fertile river valleys - the Euphrates, the Tigris, the Nile, the Indus, the Huang He and the Chang Jiang, about 6,000 years ago. Gradually, the sedentary system of agriculture spread over most parts of the world.

The industrial revolution, which took place in the eighteenth century in Europe, influenced Asia, Africa and Latin America indirectly. It boosted agricultural production in Europe and changed the cropping pattern in the Asian, African and Latin American colonies. These colonies specialised in the production of crops such as cotton, sugarcane, rice, tea, coffee and rubber, which were processed in the European factories. As demands for these crops grew in Europe, the large-scale commercial farming of some of these crops, commonly known as *plantation agriculture*, was started. Large estates of monocrop were established. They were managed scientifically with the sole objective of export or trading for earning money.

One of the effects of colonisation was worldwide diffusion and exchange of several species of plants and animals. For example, potatoes, a native of the Andes, flourished in the cool damp environment of the northern Europe and soon became a world crop. Similarly, corn (maize) spread across the world to become the third most widely grown grain after rice and wheat.

The industrial revolution in Europe provided more efficient and more specialised agricultural implements such as plough, reaper, threshing machines, harvesters, tractors and milking machines. They changed the character, scale and geography of agricultural production. In

North America, mechanisation enabled farmers to expand and specialise in the production of commodities that could be sold for the maximum profit. Thus specialised commercial agricultural systems emerged there, which gave rise to distinct crop regions—wheat belt, cotton belt, corn belt, dairy farming and truck farming (fruits and vegetables) regions. In other parts of the world also, similar technological revolutions brought power driven machines. In addition, adoption of hybrid seeds, chemical fertilisers and pesticides increased the yield of crop dramatically in many areas, though at varying rates.

Plant dispersal and industrialisation and agriculture improved agricultural production profoundly. Large numbers of people were freed to pursue other economic activities because high yields could be achieved with less number of people and using scientific and technologic innovations. The industrialised countries of the world, therefore, witnessed a perceptible shift of population from primary activities secondary and tertiary activities in a sequent manner viewed as a sign of economic development, though in developing countries employment structure has moved directly from primary to tertiary sectors.

Crop distribution: a global pattern

Physical environment, which includes climate, soil and relief, imposes certain broad limits within which particular crops may successfully cultivated or certain types of livestock profitably reared. Besides, socio-economic institutions are also important factors in crop production.

Climate

Temperature and rainfall are the two important climatic factors in limiting the areas for the growth of a particular crop.

Temperature

It is an important determinant of the distribution of crops because suitable temperature conditions are essential successful germination of seeds and growth. On the basis of the temper requirements, crops may be divided in categories : crops adapted to the temperature conditions of the tropics, those adapted to the lower temperature conditions of the sub-tropical and temperate areas.

Tropical crops, adapted to temperature conditions (31°C - 37°C) damaged, if temperature falls below 0°C and frosts occur. A few of them are so susceptible to cold that they will die at

a temperature below 10°C. However, some of the temperate crops can be grown in the tropics at higher altitudes such as apples, wheat and oats.

Crops grown in the sub-tropics and the temperate regions are adapted to lower temperature. The growing season (between the last frost in winter and the first frost in autumn) is very crucial for the growth of plants in these regions. As one moves towards the poles, this period gets smaller. As such, the number of crops that can be grown polewards, also declines. North of the Arctic Circle only rye and oats have some significance.

Similarly, many crops also have limits towards the equator. Some of them need a cold period to trigger growth and cannot withstand high rainfall. They are also susceptible to diseases found in the tropics. There are a few crops e.g. flax and olives that are grown in a very narrow zone due to such climatic limitations. Despite varying temperature requirements, most of the crops need 5°C -7°C temperature during seed germination.

Rainfall

It provides moisture to the soil that is essential for crop growth. Every plant has a root system with an enormous total surface area to draw water from the soil. Water-need of plants varies. While wheat requires about 1,500 kg of water to produce 1 kg of wheat, for the same amount of rice, 10,000 kg of water is required.

In the absence of sufficient amount of water, the plants cannot grow. It, however, does not mean that crop yields will increase proportionally with increasing amount of water supply. In contrast, if the supply of water is more than the plant's requirement, there will be decline in the crop yield. There is an optimum amount of water for every crop and this requirement varies significantly from one crop to the other. Rubber and tea, for example, need over 150 cm of annual rainfall. Wheat, on the other hand, can be grown in regions having the annual rainfall between 25 and 100 cm. Since more than 50 per cent of the land surface on the earth receives the annual rainfall between 25 cm and 100 cm, wheat is the most widely grown crop. About 10 per cent of the land has more than 178 cm of annual rainfall and only 5 per cent of the land receives over 254 cm. As such tea and rubber, have a much more restricted distribution.

The deficiency in the rainfall can be overcome with the help of irrigation either from groundwater or from rivers and tanks. The amount of water available in the soil for the crop also depends on the rate of evaporation, which increases with temperature. Hence, crops in the tropics need higher rainfall than in the temperate zone.

Soil

Soil is the essential material upon which all agriculture is based. Soil characteristics are largely the product of the climate. In addition to temperature and rainfall, plants need nutrients, which are mostly obtained from the soil. We have already read about the soil formation process in earlier classes. As we know, interaction and mixing of weathered rock with organic (plant and animal) matter along with groundwater produce the soil in which the plants grow. They contain minerals, which are essential for plant growth. The soil forming process makes the original elements of the rock more mobile so that plants could use them as nutrients.

There are six major nutrient elements. They are: nitrogen, phosphorus, potassium, calcium, magnesium and sulphur. Besides, iron and small quantities of trace elements such as boron and iodine are also required by plants. The capacity to provide nutrients varies greatly among different soils depending on the composition of the original rocks and the climatic factors — temperature and rainfall of the region. In tropical regions, the nutrients are easily leached out because of high rainfall. In temperate regions, the soils have more nutrients. Desert soils have



Fig No.2 soil

Source: <https://goo.gl/Fr5QEt>

high concentration of nutrients but the lack of water makes them immobile and unavailable. The nutrients are replaced in the soil naturally through decomposition of plant and animal organisms. It is a slow process. Hence, for faster nutrient replacement, chemical fertilisers, mainly nitrogen, phosphorus and potassium are added to the soil.

Loamy soils are generally, considered ideal for agriculture because of their richness in plant nutrients, good drainage and ease in working. Heavier clay soils with adequate drainage are

more suitable to certain crops. Sandy soils are usually infertile, although they may be used for cultivation after heavy application of fertiliser.

Relief

Three elements of relief - altitude, orientation of slope to sunlight and gradient, influence the pattern of agricultural activities. In middle latitudes, high altitudes restrict the number and types of crops that may be grown. In the tropics, on the other hand, increased altitude provide some relief from the excessively high temperature and humidity of the lowland plains.

On a local scale, orientation of the slope is an important element of relief. In the northern hemisphere, south-facing slopes receive more intensive sunshine for a longer period than their north-facing counterparts. The gradient of slopes affects the type of agriculture as well as methods of cultivation. Steep gradient restricts the use of heavy machineries. Besides, the risk of soil erosion is also greater here.

Socio-Economic Institutions

While factors of physical environment impose basic limits upon agricultural production, they alone will not adequately explain patterns of agricultural land use. The scale, intensity and extent of production within physical limits is determined by social and economic conditions such as farm size, type of tenure (freehold ownership, various forms of tenancy and state ownership), consumer demand, transport and marketing facilities, the availability of capital, and government subsidies and support policies. The physical limits of production are relatively stable and can be extended only within narrow limits. But the economic margin of production fluctuates according to demand. Hence, within any particular environment many choices and options are normally open to the farmer. The actual farming pattern is determined by the farmer's evaluation of the possibilities offered by the physical environment as well as various social and economic factors.

Agricultural Regions

One of the earliest but one of the most satisfactory classifications was proposed by D.Whittlesey in 1936. He employed five criteria to classify agricultural regions of the world: crop and livestock combination; intensity of land use; processing and marketing of farm produce; degree of mechanisation; and types and associations of buildings and other

structures associated with agriculture. In this scheme, 13 main types of agricultural regions were identified as follows:

Nomadic herding:

1. Livestock ranching;
2. Shifting cultivation;
3. Rudimental sedentary tillage;
4. Intensive subsistence, rice dominant;
5. Intensive subsistence, without rice
6. Commercial plantation;
7. Mediterranean agriculture;
8. Commercial grain farming;
9. Commercial livestock and crop farming;
10. Subsistence crop and livestock farming;
11. Commercial dairy farming; and
12. Specialised horticulture.

The above mentioned regions have been simplified. Assessment of the factors selected for the above classification seems to be subjective rather than quantitative. In spite of this, Whittlesey's classification provides the foundation for latter attempts in this direction. On the basis of the main characteristics of the farming practices and the products characteristics, agricultural systems of the world can be broadly grouped into **subsistence agriculture** and **commercial agriculture** though the distinction between the two, times is quite blurred.

Subsistence Agriculture



Fig. No.3: Subsistence Agriculture

Source: https://upload.wikimedia.org/wikipedia/commons/6/65/Agriculture_au_tchad.jpg

Subsistence agriculture is one in which the farming areas consume all, or nearly so, of the products locally grown. It can be grouped in two categories — **Primitive Subsistence Agriculture and Intensive Subsistence Agriculture.**

Primitive Subsistence Agriculture

Primitive subsistence agriculture or shifting cultivation is widely practised by many tribes in the tropics, especially in Africa, south and Central America and south East Asia. The vegetation is usually cleared by fire, and the ashes add to the fertility of the soil. Shifting cultivation is thus, also called slash and burn agriculture. The cultivated patches are very small and cultivation is done with very primitive tools such as sticks and hoes. After sometime (3 to 5 years) the soil loses its fertility and the farmer shifts to another parts and clears other patch of the forest for cultivation. The farmer may return to the earlier patch after sometime. One of the major problems of shifting cultivation is that the cycle of jhum becomes less and less due to loss of fertility in different parcels. It is prevalent in tropical region in different names, e.g. Jhuming in North eastern states of India, Milpa in central America and Mexico and Ladang in Indonesia and Malaysia, *Chengin* in Philippines, *Roka* in Brazil and *Masole* in Democratic Republic of the Congo. Though, shifting cultivation is also migratory in nature, it allowed people to stay in a place for a longer duration.



Fig. No.:4 Cameroonian man cultivates at the subsistence level.

<https://goo.gl/FH9rme>



Fig. No.:5 A typical modern Central American Milpa.

https://en.wikipedia.org/wiki/Milpa#/media/File:Milpa_2011.jpg

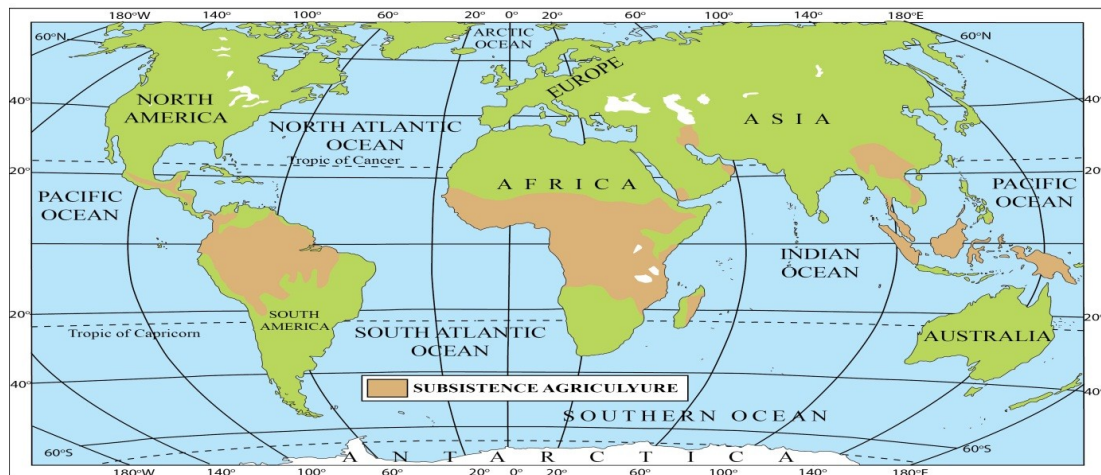


Fig. No: 6 Areas of Primitive Subsistence Farming

Intensive Subsistence Agriculture

This type of agriculture is largely found in densely populated regions of monsoon Asia. Basically, there are two types of intensive subsistence agriculture.

(i) **Intensive subsistence agriculture dominated by wet paddy cultivation:** This type of agriculture is characterised by dominance of the rice crop. Land holdings are very small due to the high density of population. Farmers work with the help of family labour leading to intensive use of land. Use of machinery is limited and most of the agricultural operations are done by manual labour. Farm yard manure is used to maintain the fertility of the soil. In this type of agriculture, the yield per unit area is high but per labour productivity is low.



Fig. No. 7 Rice Plantation

https://upload.wikimedia.org/wikipedia/commons/3/33/Rice_plantation_in_Java.jpg

(ii) **Intensive subsistence agriculture dominated by crops other than paddy:** Due to the difference in relief, climate, soil and some of the other geographical factors, it is not practical to grow paddy in many parts of monsoon Asia. Wheat, soyabean, barley and

sorghum are grown in northern China, Manchuria, North Korea and North Japan. In India wheat is grown in western parts of the Indo-Gangetic plains and millets are grown in dry parts of western and southern India. Most of the characteristics of this type of agriculture are similar to those dominated by wet paddy except that irrigation is often used.

The Europeans colonised many parts in the world and they introduced some other forms of agriculture such as plantations which were mainly profit-oriented large scale production systems.

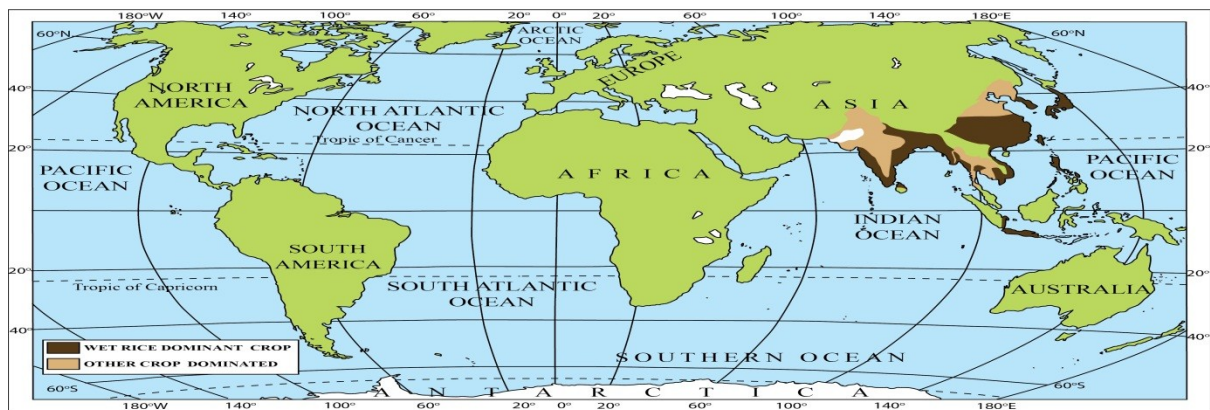


Fig. No: 8 Areas of Intensive Subsistence Farming



Fig. No.:9 Intensive agriculture –corn field

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Plantation Agriculture



Fig. No. 10 Plantation agriculture

<https://goo.gl/v3U5g>

Plantation agriculture as mentioned above was introduced by the Europeans in colonies situated in the tropics. Some of the important plantation crops are tea, coffee, cocoa, rubber, cotton, oil palm, sugarcane, bananas and pineapples.

The characteristic features of this type of farming are large estates or plantations, large capital investment, managerial and technical support, scientific methods of cultivation, single crop specialisation, cheap labour, and a good system of transportation which links the estates to the factories and markets for the export of the products.

The French established cocoa and coffee plantations in west Africa. The British set up large tea gardens in India and Sri Lanka, rubber plantations in Malaysia and sugarcane and banana plantations in West Indies. Spanish and Americans invested heavily in coconut and sugarcane plantations in the Philippines. The Dutch once had monopoly over sugarcane plantation in Indonesia. Some coffee fazendas (large plantations) in Brazil are still managed by Europeans.

Today, ownership of the majority of plantations has passed into the hands of the government or the nationals of the countries concerned.

The slopes of hills are used for tea plantations because of favourable geographical conditions.

Extensive Commercial Grain Cultivation

Commercial grain cultivation is practised in the interior parts of semi-arid lands of the mid-latitudes. Wheat is the principal crop, though other crops like corn, barley, oats and rye are also grown. The size of the farm is very large, therefore entire operations of cultivation from ploughing to harvesting are mechanised. There is low yield per acre but high yield per person.

This type of agriculture is best developed in Eurasian steppes, the Canadian and American Prairies, the Pampas of Argentina, the Velds of South Africa, the Australian Downs and the Canterbury Plains of New Zealand

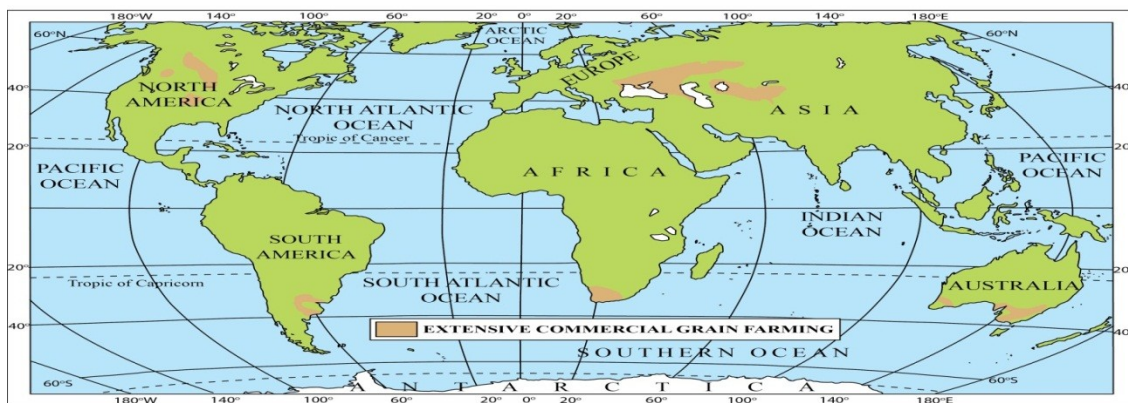


Fig.No : 11 Areas Of extensive commercial grain cultivation

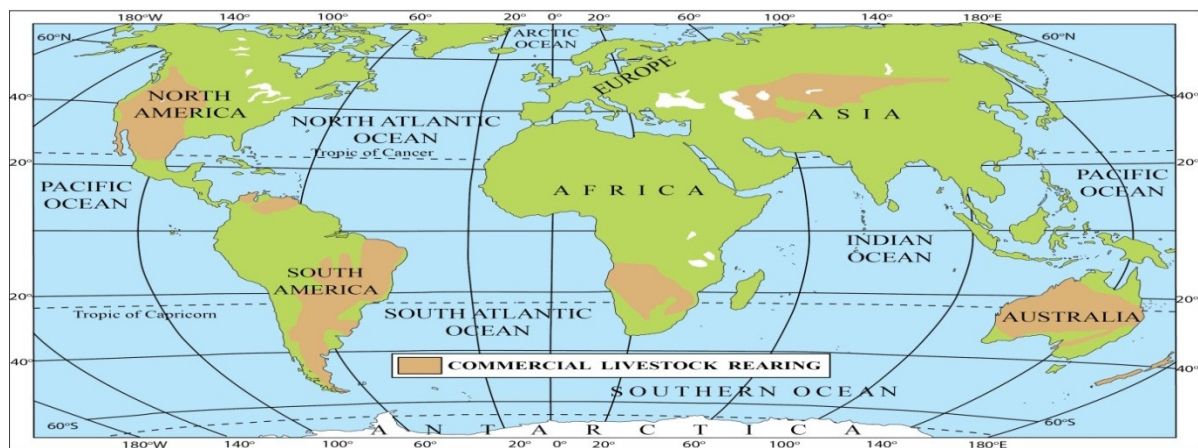


Fig.No.: 12 Areas of commercial Livestock Rearing

Mixed Farming

This form of agriculture is found in the highly developed parts of the world, e.g. North-western Europe, Eastern North America, parts of Eurasia and the temperate latitudes of Southern continents.

Mixed farms are moderate in size and usually the crops associated with it are wheat, barley, oats, rye, maize, fodder and root crops. Fodder crops are an important component of mixed farming. Crop rotation and intercropping play an important role in maintaining soil fertility. Equal emphasis is laid on crop cultivation and animal husbandry. Animals like cattle, sheep, pigs and poultry provide the main income along with crops. Mixed farming is characterised by high capital expenditure on farm machinery and building, extensive use of chemical fertilisers and green manures and also by the skill and expertise of the farmers.



Fig No.:13 Mixed farming at Lychpole Farm

http://s0.geograph.org.uk/geophotos/01/32/77/1327790_b5429531.jpg

Dairy Farming

Dairy is the most advanced and efficient type of rearing of milch animals. It is highly capital intensive. Animal sheds, storage facilities for fodder, feeding and milching machines add to the cost of dairy farming. Special emphasis is laid on cattle breeding, health care and veterinary services. It is highly labour intensive as it involves rigorous care in feeding and milching. There is no off season during the year as in the case of crop raising. It is practised mainly near urban and industrial centres which provide neighbourhood market for fresh milk and dairy products. The development of transportation, refrigeration, pasteurisation and other preservation processes have increased the duration of storage of various dairy products. There are three main regions of commercial dairy farming. The largest is North Western Europe the second is Canada and the third belt includes South Eastern Australia, New Zealand and Tasmania.

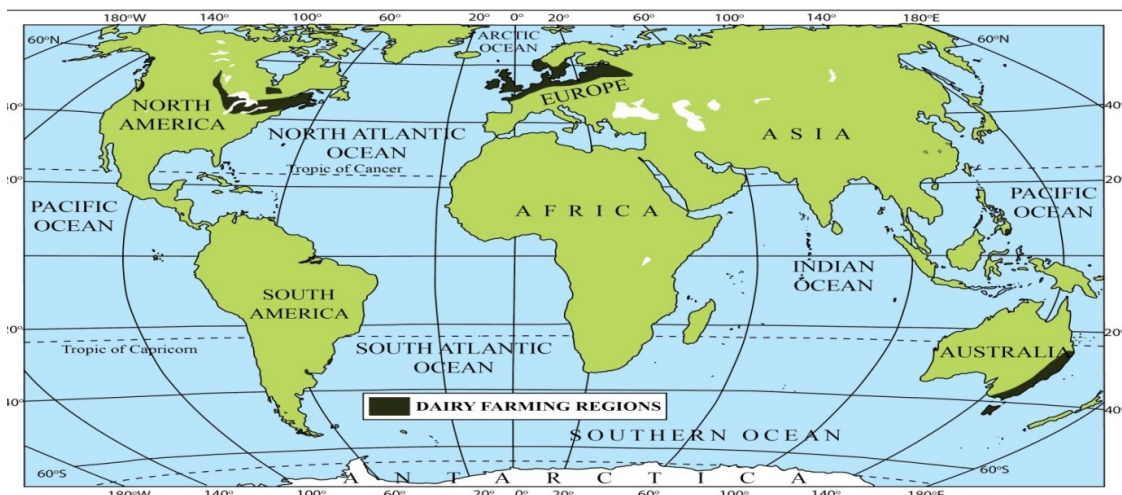


Fig. No.14: Dairy Farming

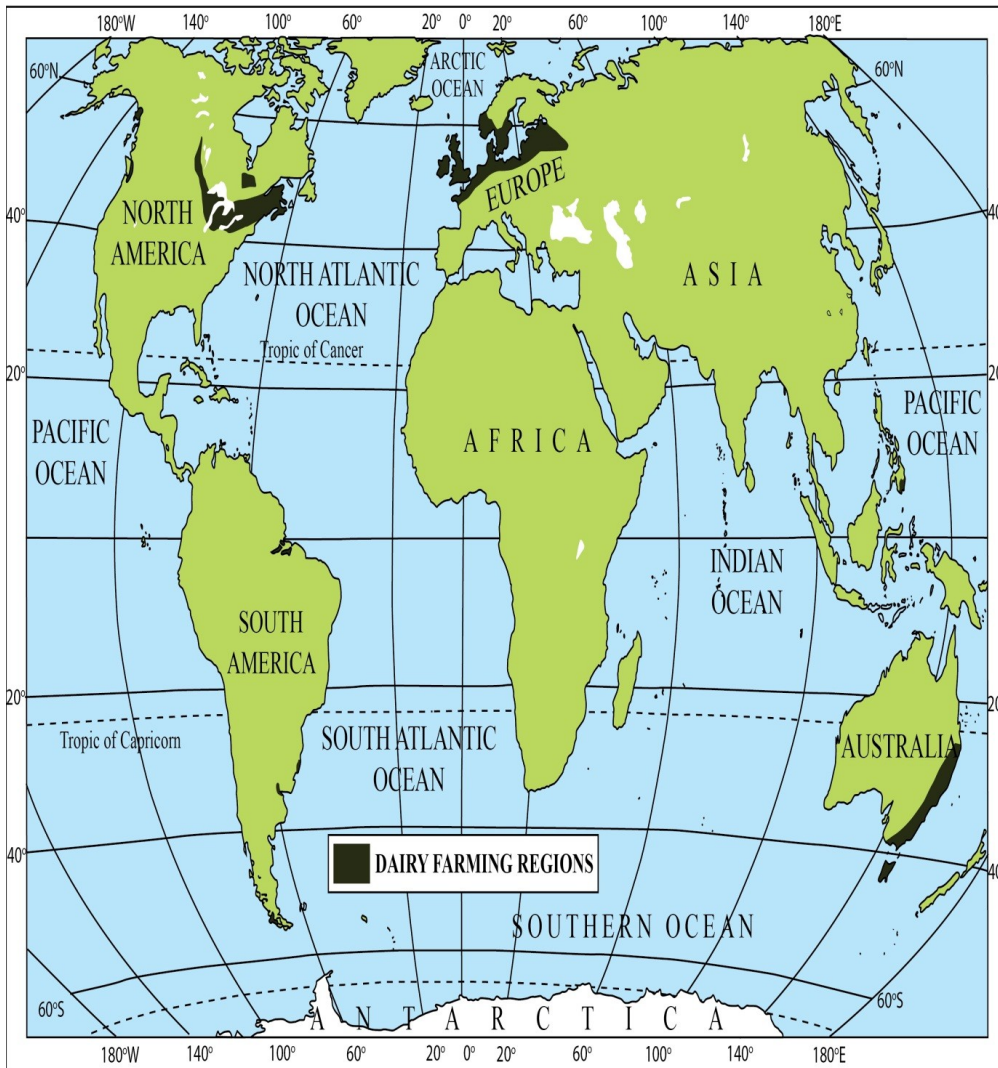


Fig.No.15 Areas of Dairy Farming

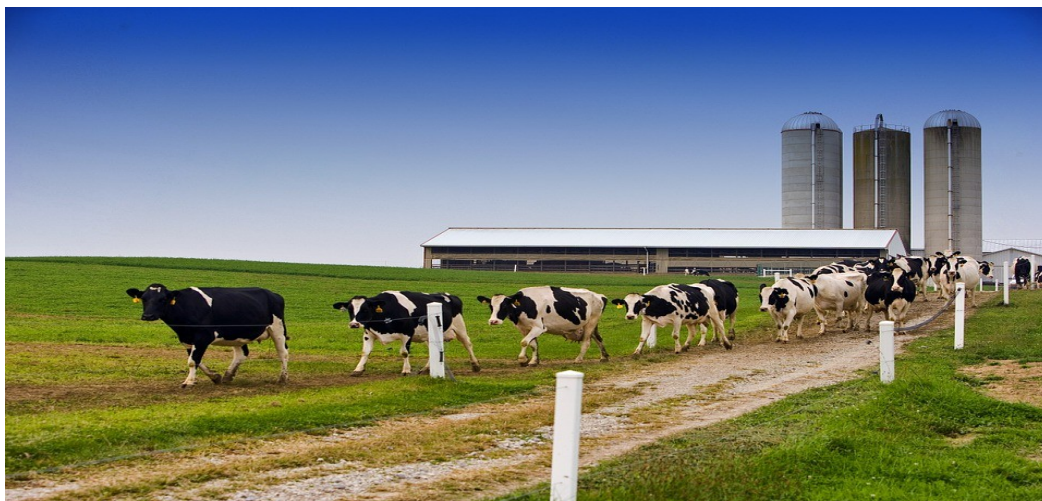


Fig.No.16 Dairy Farming

Mediterranean Agriculture

Mediterranean agriculture is highly specialised commercial agriculture. It is practised in the countries on either side of the Mediterranean sea in Europe and in north Africa from Tunisia to Atlantic coast, southern California, central Chile, south western parts of South Africa and south and south western parts of Australia. This region is an important supplier of citrus fruits.

Viticulture or grape cultivation is a speciality of the Mediterranean region. Best quality wines in the world with distinctive flavours are produced from high quality grapes in various countries of this region. The inferior grapes are dried into raisins and currants. This region also produces olives and figs. The advantage of Mediterranean agriculture is that more valuable crops such as fruits and vegetables are grown in winters when there is great demand in European and North American markets.



Fig No.17 Viticulture

Market Gardening and Horticulture

Market gardening and horticulture specialise in the cultivation of high value crops such as vegetables, fruits and flowers, solely for the urban markets. Farms are small and are located where there are good transportation links with the urban centre where high income group of consumers is located. It is both labour and capital intensive and lays emphasis on the use of irrigation, HYV seeds, fertilisers, insecticides, greenhouses and artificial heating in colder regions.

This type of agriculture is well developed in densely populated industrial districts of north west Europe, north eastern United States of America and the Mediterranean regions. The Netherlands specialises in growing flowers and horticultural crops especially tulips, which are flown to all major cities of Europe.



Fig No: 18 Horticulture

https://upload.wikimedia.org/wikipedia/commons/4/4a/Image_of_fresh_produce_on_display.jpg

The regions where farmers specialise in vegetables only, the farming is known as truck farming. The distance of truck farms from the market is governed by the distance that a truck can cover overnight, hence the name truck farming.

In addition to market gardening, a modern development in the industrial regions of Western Europe and North America is factory farming. Livestock, particularly poultry and cattle rearing, is done in stalls and pens, fed on manufactured feedstuff and carefully supervised against diseases. This requires heavy capital investment in terms of building, machinery for various operations, veterinary services and heating and lighting. One of the important features of poultry farming and cattle rearing is breed selection and scientific breeding.

Types of farming can also be categorised according to the farming organisation. Farming organisation is affected by the way in which farmers own their farms and various policies of the government which help to run these farms.

Co-operative Farming

A group of farmers form a co-operative society by pooling in their resources voluntarily for more efficient and profitable farming. Individual farms remain intact and farming is a matter of cooperative initiative.

Co-operative societies help farmers, to procure all important inputs of farming, sell the products at the most favourable terms and help in processing of quality products at cheaper rates.

Co-operative movement originated over a century ago and has been successful in many western European countries like Denmark, Netherlands, Belgium, Sweden, Italy etc. In

Denmark, the movement has been so successful that practically every farmer is a member of a co-operative.



Fig No: 19 Co-operative Farming

<https://goo.gl/7nfpLq>

Collective Farming

The basic principle behind this types of farming is based on social ownership of the means of production and collective labour. Collective farming or the model of Kolkhoz was introduced in erstwhile Soviet Union to improve upon the inefficiency of the previous methods of agriculture and to boost agricultural production for self-sufficiency.

The farmers used to pool in all their resources like land, livestock and labour. However, they were allowed to retain very small plots to grow crops in order to meet their daily requirements.

Yearly targets were set by the government and the produce was also sold to the state at fixed prices. Produce in excess of the fixed amount was distributed among the members or sold in the market. The farmers had to pay taxes on the farm produces, hired machinery etc. Members were paid according to the nature of the work allotted to them by the farm management. Exceptional work was rewarded in cash or kind. This type of farming was introduced in former Soviet Union under the socialist regime which was adopted by the socialist countries. After its collapse, these have already been modified.



Fig No: 20 Collective Farming

https://upload.wikimedia.org/wikipedia/commons/a/ae/North_Korea-Sariwon_Migok_Farm-01.jpg