

Topics Covered:

- Basic terminologies of agriculture
- Types of Agriculture
- Major crop locations of agriculture in India
- Typologies of world agriculture
- Agriculture and its features in India
- Role of the agricultural sector and its performance
- Infrastructural factors of agriculture
- Productivity of crops and conditions

AGRICULTURE BASICS

Agriculture holds paramount importance in India, being pivotal for poverty reduction, employment, and GDP contribution. Its share in the GDP has declined from 50% in 1950-51 to 18.3% in 2022-23, yet it remains vital for inclusive growth. Research by the World Bank highlights that agriculture-driven GDP growth is doubly effective in poverty alleviation compared to non-agricultural growth.



BASIC TERMINOLOGIES OF AGRICULTURE

Cropping pattern:

Cropping pattern is defined as the spatial representation of crop rotations, or as the list of crops that are being produced in an area and their sequence in time.

The cropping patterns in India include mixed cropping (wheat + mustard, cotton + soybean), crop rotation (rice/wheat + maize + sugarcane, rice + red gram), intercropping (cotton + groundnut, paddy + black gram), multiple cropping (wheat + rice, aman paddy + jute), and sole cropping (wheat, sugarcane, tobacco).

Here are some common cropping patterns in agriculture:

- **Monoculture:** Monoculture involves growing a single crop on the same piece of land in successive seasons or years. This pattern is often used for high-yield crops like wheat, rice, and maize. While it can maximize yields for a specific crop, it may increase the risk of pest and disease outbreaks and soil degradation.

- **Crop Rotation:** Crop rotation involves planting different crops in a planned sequence over time. This pattern helps improve soil health, reduce the buildup of pests and diseases specific to one crop, and optimize nutrient cycling. For example, a common rotation might include corn one year, followed by soybeans the next year, and then wheat the following year.
- **Intercropping:** Intercropping involves growing **two or more crops simultaneously** in the same field. This pattern can maximize land use efficiency and reduce the risk of crop failure if one crop fails due to adverse conditions. Common examples include planting legumes alongside cereals or combining tall crops (e.g., maize) with shorter ones (e.g., beans).
- **Sequential Cropping:** Sequential cropping refers to the practice of growing **two or more crops on the same piece of land** in a single growing season. After one crop is harvested, another is planted. This pattern is often used in regions with long growing seasons or mild winters.
- **Mixed Cropping:** In mixed cropping, **different crops are planted together** in a way that they mature at different times or have different growth habits. This pattern can help maximize land use and diversify farm income but may require careful management of crop interactions.
- **Seasonal cropping:** Seasonal cropping is based on the **availability of water** and climate conditions. In areas with distinct wet and dry seasons, farmers plant crops that are suitable for each season. For example, they may plant rice during the wet season and drought-resistant crops like millet during the dry season.
- **Cash Crop Rotation:** Some farmers alternate between cash crops (crops sold for profit) and cover crops (crops grown primarily to improve soil quality) in a rotation. Cover crops can help replenish soil nutrients, control erosion, and suppress weeds.
- **Speciality Crop Rotation:** Farmers who grow speciality crops, such as fruits, vegetables, or herbs, often plan rotations that optimize the unique needs of these crops and minimize the risk of soil-borne diseases.
- **Perennial Crop Integration:** In some cropping patterns, perennial crops like fruit trees or perennial grasses are integrated with annual crops. This can provide long-term stability and income diversification.

The choice of cropping pattern depends on various factors, including the **region's climate, soil conditions, available resources, and the farmer's objectives**. Successful cropping patterns require careful planning, crop management, and consideration of long-term sustainability and soil health. Farmers often adapt their cropping patterns based on changing conditions and new agricultural practices.

Agriculture productivity:

Agricultural productivity signifies the efficiency of utilizing resources like land, labour, capital, and technology to produce agricultural goods and services. It holds pivotal importance for food security, economic growth, and general well-being, impacting both individual farms and society. Maintaining high agricultural productivity is imperative in meeting the increasing global demand for food and related products.

Here are some key aspects and factors related to agricultural productivity:

- **Yield per Unit of Land:** One of the primary measures of agricultural productivity is the yield of crops or livestock products per unit of land or animal. Increasing

yields means producing more output from the same or less land, which is crucial for feeding a growing population.

Factors Affecting Agricultural Productivity:

- **Technology:** The adoption of advanced agricultural technologies, such as improved crop varieties, mechanization, precision farming, and biotechnology, can significantly boost productivity.
- **Management Practices:** Efficient farm management practices, including proper irrigation, soil management, pest and disease control, and crop rotation, play a crucial role in productivity.
- **Access to Inputs:** Availability and affordability of inputs like seeds, fertilizers, pesticides, and machinery can impact productivity.
- **Human Capital:** A skilled and knowledgeable workforce can make more effective use of agricultural resources.
- **Infrastructure:** Adequate infrastructure, including transportation networks and storage facilities, can reduce post-harvest losses and improve productivity.
- **Market Access:** Access to markets and fair pricing for agricultural products can incentivize farmers to increase productivity.
- **Crop Diversification:** Crop diversification involves growing a variety of crops on the same piece of land or in a region. It can improve productivity by reducing the risk of crop failure due to pests, diseases, or adverse weather conditions.
- **Genetic Improvement:** Breeding programs focus on developing crop varieties and livestock breeds with higher yields, improved resistance to pests and diseases, and better adaptability to local conditions.
- **Education and Extension Services:** Government agencies and agricultural extension services provide farmers with information, training, and advice on best practices, which can lead to increased productivity.
- **Research and Development:** Investment in agricultural research and development can lead to innovations that boost productivity, such as the development of new farming technologies and practices.
- **Government Policies:** Government policies and subsidies can either promote or hinder agricultural productivity. Supportive policies, such as price stabilization, access to credit, and infrastructure development, can encourage farmers to invest in productivity-enhancing practices.
- **Sustainable Productivity:** While increasing productivity is essential, it should be done sustainably to minimize negative impacts on the environment. Sustainable agriculture aims to maintain or enhance productivity while conserving resources, reducing environmental degradation, and promoting social equity.

Agriculture intensity:

- Agricultural intensification is a process of raising land productivity over time through increases in inputs of one form or another on a per unit area basis. Its study is essential for several reasons, many of which relate to agroforestry objectives. Here are some key aspects and factors related to agriculture intensity:
- **High-intensity agriculture:**
 - **High-intensity agriculture:** High-intensity agriculture involves the intensive cultivation of land, often characterized by the use of modern technologies, ample irrigation, high levels of fertilization, and advanced farming practices.

- **High Crop Yields:** In high-intensity agriculture, efforts are made to maximize crop yields per unit of land. This typically involves planting high-yield crop varieties and managing crops meticulously to optimize growth and productivity.
- **Livestock Intensification:** In some cases, high-intensity agriculture also applies to livestock farming, where animals are raised in controlled environments, receive specialized nutrition, and are subject to rigorous management practices.
- **Low-intensity agriculture:**
 - **Traditional or Subsistence Farming:** Low-intensity agriculture is often associated with traditional or subsistence farming practices. These may involve minimal inputs, limited mechanization, and reliance on natural conditions for crop growth.
 - **Lower Crop Yields:** In low-intensity agriculture, crop yields are typically lower compared to high-intensity systems due to limited investment in technology, fertilizers, and modern farming methods.
 - **Extensive Livestock Grazing:** In some regions, low-intensity agriculture involves extensive livestock grazing, where animals roam over larger areas in search of pasture, rather than being kept in confined spaces.

Factors affecting agriculture intensity:

Climate and Soil: Environmental conditions, such as rainfall patterns and soil fertility, can influence the level of agricultural intensity. Regions with abundant water and fertile soils may support more intensive agriculture.

Technology and Resources: The availability of technology, machinery, financial resources, and access to inputs like fertilizers and pesticides can determine the level of intensity in farming.

Economic Development: The level of economic development in a region can influence the adoption of modern agricultural practices and the degree of agricultural intensity.

Sustainability: High-intensity agriculture can lead to concerns about sustainability, including soil degradation, water pollution, and habitat destruction. Balancing high productivity with sustainable practices is a key challenge in modern agriculture.

Land Use Planning: Government policies and land use planning can influence the intensity of agriculture in a given area. Zoning regulations, subsidies, and conservation programs may encourage or discourage different levels of agricultural intensity.

Food Security and Nutrition: Agricultural intensity has implications for food security and nutrition. High-intensity agriculture can produce larger quantities of food, but it may not necessarily ensure equitable access to nutritious food.

Rural Communities: The level of agricultural intensity can impact rural communities. High-intensity farming may require fewer labourers per unit of land, potentially leading to rural depopulation, while low-intensity agriculture may support more traditional and labour-intensive farming practices.

It's important to note that the appropriate level of agricultural intensity varies depending on local conditions and the specific goals of agriculture in a given region. Sustainable and efficient agricultural practices should be pursued to balance the need for increased food production with environmental conservation and social well-being.

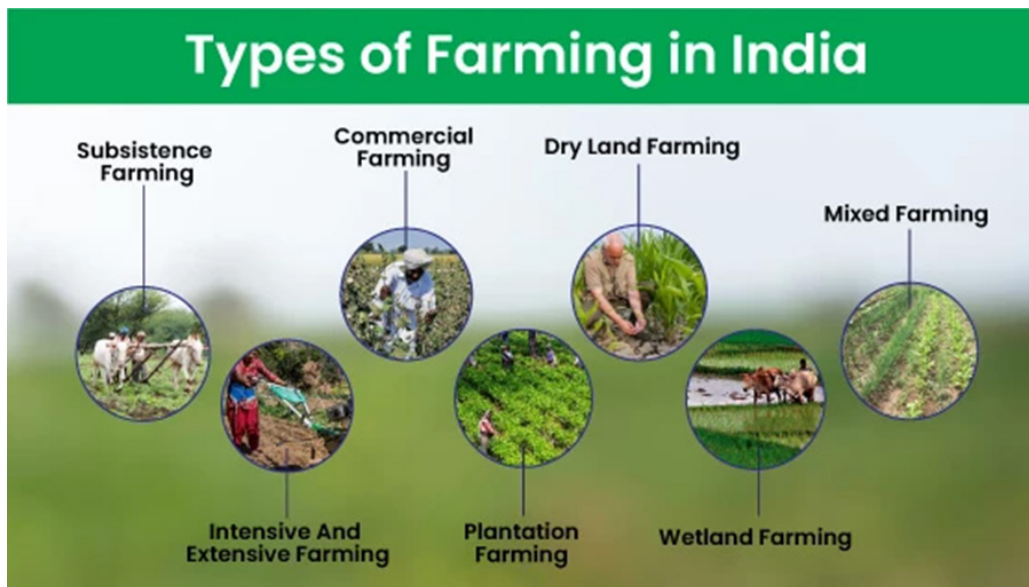
Land capability:

Land capability for agriculture refers to the suitability of a piece of land for various types of agricultural activities based on its physical and environmental characteristics. Evaluating land capability is important for sustainable land use planning and helps determine the types of crops, livestock, or agricultural practices that are most suitable for a given area. Land capability assessments consider factors such as soil quality, topography, climate, and water availability.

Some key aspects related to the land capability of agriculture:

- **Soil Quality:** Soil is a critical factor in land capability assessment. The type of soil, its texture, fertility, pH levels, and drainage capacity all influence its suitability for different crops or agricultural activities. Soil testing and analysis are often conducted to determine soil quality.
- **Topography:** The physical features of the land, including slope, elevation, and aspect (orientation to the sun), can affect its capability for agriculture. Steep slopes may be more suitable for terracing or pastureland, while flat areas may be suitable for row cropping.
- **Climate:** The local climate, including temperature, precipitation, and seasonal variations, plays a significant role in land capability. Some crops thrive in hot, arid conditions, while others require cooler, wetter climates. Climate data help determine the potential for year-round cultivation or seasonal limitations.
- **Water Availability:** Access to water resources, such as rivers, lakes, groundwater, or reliable rainfall, is crucial for agricultural productivity. Adequate water availability can support irrigated agriculture, while water scarcity may limit crop choices.
- **Drainage:** Proper drainage is essential to prevent waterlogging, which can damage crops and reduce productivity. Land capability assessments consider the natural drainage patterns of the land.
- **Land Use Planning:** Land capability assessments inform land use planning decisions, helping to designate areas for different types of agriculture, conservation, or urban development. Zoning regulations may be put in place to protect valuable agricultural land.
- **Environmental considerations:** Evaluating land capability should also consider environmental factors such as the presence of wetlands, forests, and wildlife habitats. Conservation efforts and biodiversity protection may influence land use decisions.
- **Sustainability:** Assessing land capability in a sustainable manner involves determining how agricultural activities can be conducted without depleting natural resources or causing long-term environmental harm.
- **Technology and Practices:** Advances in agricultural technology and practices can sometimes enhance land capability by improving soil fertility, water management, and pest control.
- **Local Expertise:** Local knowledge and expertise from farmers, agricultural extension services, and researchers are valuable for understanding the specific challenges and opportunities of an area.

TYPES OF AGRICULTURE



Subsistence agriculture:

Subsistence agriculture occurs when farmers grow crops to meet the needs of themselves and their families on smallholdings. Subsistence agriculture targets farm output for survival and for mostly local requirements, with little or no surplus. Planting decisions occur principally with an eye toward what the family will need during the coming year, and only secondarily toward market prices. Tony Waters, a professor of Sociology, defines “subsistence peasants” as “people who grow what they eat, build their own houses, and live without regularly making purchases in the marketplace”

Subsistence agriculture is a farming practice where farmers primarily grow crops and raise livestock to meet the basic needs of their own households or communities. In other words, the primary goal of subsistence agriculture is to produce enough food, typically without significant surplus, to feed the farmer’s family and sometimes their immediate neighbours or community.

Subsistence agriculture includes:

- **Self-sufficiency:** Subsistence farmers focus on producing enough food to sustain themselves and their families. They are less concerned with producing surplus crops for sale or trade.
- **Limited use of technology:** Subsistence farming often relies on traditional and labour-intensive methods of farming, with minimal mechanization and modern technology.
- **Diverse crops:** Subsistence farmers typically grow a variety of crops to ensure food security and reduce the risk of crop failure. This diversity may include staple crops like grains (rice, wheat, maize) and legumes, as well as fruits and vegetables.
- **Small-scale farming:** Subsistence farming is usually carried out on small plots of land, and farmers may not have access to extensive resources or capital for large-scale operations.

- **Traditional knowledge:** Subsistence farming practices are often passed down through generations and are based on local knowledge and traditions regarding planting, harvesting, and animal husbandry.
- **Low surplus production:** While some surplus produce may be generated, it is typically small and often used for bartering, local trade, or occasional sales rather than for profit generation.

Primitive subsistence agriculture:

This type of farming is still practised in a few pockets of India. Primitive subsistence agriculture is practised on small patches of land with the help of primitive tools like hoe, dao digging sticks, and family community labour. This type of farming depends upon monsoon, natural fertility of the soil and suitability of other environmental conditions for the crops grown. It is a 'slash and burn' agriculture. Farmers clear a patch of land and produce cereals and other food crops to sustain their families. When the soil fertility decreases, the farmers shift and clear a fresh patch of land for cultivation. This type of shifting allows Nature to replenish the fertility of the soil through natural processes; land productivity in this type of agriculture is low as the farmer does not use fertilizers or other modern inputs. It is known by different names in different parts of the country.

Key features of primitive subsistence farming:

- **Slash-and-Burn Agriculture:** In this method, farmers clear a patch of forest or vegetation by cutting down and burning the trees and plants. The ashes from the burned vegetation provide some nutrients to the soil. Crops are then planted in the cleared area. After a few years, when the soil fertility declines, the farmers move to a new plot and repeat the process. This is also known as shifting cultivation.
- **Low Use of Technology:** Primitive subsistence farming relies on basic tools like hoes, machetes, and digging sticks. Modern machinery and advanced agricultural practices are typically absent.
- **Crop Diversity:** Farmers often grow a variety of crops, including staple food crops like rice, maize, cassava, and yam. Crop diversity helps ensure food security and resilience against crop failures.
- **Limited Surplus Production:** The primary goal of primitive subsistence farming is to produce enough food to feed the family or community. There is generally little to no surplus for sale or trade.
- **Traditional Knowledge:** Farming practices are often based on traditional knowledge passed down through generations. Farmers have an understanding of local ecosystems and adapt their practices accordingly.
- **Reliance on Rainfall:** Primitive subsistence farming typically depends on rainfall for irrigation, and there is little or no use of artificial irrigation systems.
- **Vulnerability to Environmental Factors:** This form of farming is vulnerable to climate variations, soil degradation, and deforestation, as it can lead to land exhaustion and loss of forest cover.
- **Sustainability Concerns:** The slash-and-burn method can be sustainable if practised with long fallow periods and in areas with low population density. However, unsustainable practices can lead to deforestation and environmental degradation.

Primitive subsistence farming is still practised in some remote and economically marginalized regions of the world, especially in parts of Africa, Asia, and South America. Efforts are being made to improve the sustainability of these farming practices and provide alternative livelihoods for communities engaged in primitive subsistence farming to reduce its negative environmental impact.

Intensive subsistence agriculture:

Intensive subsistence agriculture is a form of farming in which farmers expend a significant amount of labour and resources to cultivate a small parcel of land efficiently. The primary goal of intensive subsistence agriculture is to maximize crop yields in order to produce enough food to feed a family or a community, often in densely populated regions. Unlike primitive subsistence farming, which relies on basic tools and practices, intensive subsistence agriculture involves more advanced and intensified farming methods.

Features of intensive subsistence agriculture:

- **Small Landholdings:** Farmers typically have small plots of land, which they cultivate intensively to maximize productivity. The land is often limited due to population pressure.
- **High Labor Input:** Intensive subsistence farming requires significant manual labour for tasks such as planting, weeding, harvesting, and irrigation. Family members are heavily involved in the farming process.
- **Crop Diversity:** Farmers grow a variety of crops on their small plots to ensure food security and reduce the risk of crop failure. These may include staple crops like rice, wheat, maize, and soybeans, as well as vegetables and fruits.
- **Intensive Irrigation:** In areas with irregular or insufficient rainfall, intensive subsistence farmers often employ irrigation systems to ensure a consistent water supply for their crops.
- **Use of Improved Varieties:** Farmers may use improved crop varieties and hybrids to increase crop yields. These varieties are often selected for their high-yield potential and resistance to pests and diseases.
- **Fertilizer and Soil Management:** Intensive subsistence farmers frequently use fertilizers to enrich the soil and maintain its fertility. Crop rotation and other soil management practices are also common.
- **High Crop Yields:** The goal of intensive subsistence farming is to produce high crop yields per unit of land, which helps meet the food needs of the community.
- **Limited Surplus Production:** While some surplus may be generated, the primary focus is on meeting local food demands rather than producing for sale or trade.

Intensive subsistence agriculture is prevalent in densely populated regions of Asia, such as parts of India, China, and Southeast Asia, where arable land is limited, and populations are high. This form of agriculture allows these regions to meet their food requirements despite the constraints of limited land availability.

Efforts are ongoing to enhance the sustainability of intensive subsistence agriculture through the adoption of more efficient and environmentally friendly practices, as well as providing access to modern agricultural technologies and resources to improve crop yields and the livelihoods of small-scale farmers

PLANTATION AGRICULTURE:

Plantation Agriculture is a form of Agriculture in which a single person or company owns a big farm and grows a single crop (most often corn, wheat, sunflower, cotton, etc.). Plantation agriculture requires capital for modern machinery (especially for seeding and harvesting) and, of course, personnel. This type of agriculture is typically associated with tropical and subtropical regions and is known for its organization, mechanization, and focus on profit generation.

Features of plantation agriculture:

- **Monoculture:** Plantation agriculture focuses on cultivating a single crop or a limited number of crops. Common plantation crops include sugarcane, coffee, tea, rubber, palm oil, cotton, and bananas. The choice of crops depends on the climate and suitability of the region.
- **Large Land Holdings:** Plantations often cover extensive land areas, ranging from hundreds to thousands of acres. The scale of production is much larger than that of subsistence or small-scale farming.
- **Capital-Intensive:** Plantation agriculture requires significant capital investment in infrastructure, machinery, and labour. Modern machinery and technology are often used to increase efficiency.
- **Labour Force:** Historically, plantations have relied heavily on a labour force, often consisting of enslaved or indentured workers. While the nature of the labour force has evolved over time, labour-intensive tasks such as planting, harvesting, and processing are still significant in many plantation systems.
- **Export-Oriented:** The primary purpose of plantation agriculture is to produce crops for export to international markets. These crops are often cash crops, generating substantial revenue for the plantation owners and the countries where they operate.
- **High-Yield Varieties:** Plantations typically use high-yield crop varieties that are optimized for commercial production. These varieties are chosen for their productivity and market demand.
- **Agrochemical Use:** Plantations often rely on the extensive use of agrochemicals, including pesticides and fertilizers, to maximize crop yields and quality.
- **Strict Management:** Plantations are managed with precision and are subject to strict oversight. Plantation owners or corporations implement detailed cultivation, harvesting, and processing plans to maximise efficiency and profit.
- **Environmental Concerns:** Plantation agriculture can have significant environmental impacts, including deforestation, habitat destruction, and soil degradation. Sustainable plantation management practices and certifications (e.g., Fair Trade, Rainforest Alliance) aim to mitigate these negative effects.

Plantation agriculture has a complex history and has been associated with both economic development and social injustices, particularly in colonial contexts. In contemporary times, there is increasing attention on sustainable plantation management and fair labour practices to address some of the historical challenges associated with this form of agriculture.

Extensive commercial grain cultivation:

Extensive commercial grain cultivation refers to the large-scale farming of grain crops for commercial purposes, often on vast areas of land with the primary goal of producing grains for sale in domestic and international markets. This type of agriculture typically involves modern farming techniques, mechanization, and the use of technology to maximize grain yields.

Features of extensive commercial grain cultivation:

- **Large Land Holdings:** Extensive commercial grain cultivation involves large tracts of land dedicated to the production of grain crops like wheat, corn (maize), rice, barley, oats, sorghum, and others.
- **Mechanization:** Modern machinery and technology are used extensively in extensive commercial grain cultivation. This includes tractors, combine harvesters, irrigation systems, and precision farming techniques to optimize crop production.
- **High-Yield Varieties:** Farmers often select high-yield crop varieties that are genetically improved or hybridized to enhance productivity and disease resistance.
- **Use of Agrochemicals:** Pesticides, herbicides, and fertilizers are commonly used to control pests, and weeds, and enhance soil fertility, respectively.
- **Market-Oriented:** The primary purpose of extensive commercial grain cultivation is to produce grains for sale in local and international markets. These grains may be used for human consumption, animal feed, industrial processes, or as raw materials in various food products.
- **Global Trade:** Many countries engage in extensive commercial grain cultivation as part of their agriculture sector to meet the global demand for grains. Grain exports are a significant source of income for these countries.
- **Crop Rotation:** Some commercial grain farmers implement crop rotation practices to maintain soil health and reduce the risk of soil depletion and disease buildup.
- **Technological Advances:** Advances in biotechnology, genetic engineering, and precision agriculture are often applied to improve crop yields, reduce environmental impact, and increase profitability.
- **Environmental Considerations:** The large-scale nature of extensive commercial grain cultivation can have environmental impacts, including soil erosion, nutrient runoff, and habitat disruption. Sustainable farming practices, such as no-till agriculture and responsible pesticide use, are encouraged to mitigate these effects.

Mixed farming:

Mixed farming is a type of farming that involves both the growing of crops and the raising of livestock. Such agriculture occurs across Asia and in countries such as India, Malaysia, Indonesia, Afghanistan, South Africa, China, Central Europe, Canada, and Russia. Though at first it mainly served domestic consumption, countries such as the United States and Japan now use it for commercial purposes.

The cultivation of crops alongside the rearing of animals for meat or eggs or milk defines mixed farming. For example, a mixed farm may grow cereal crops, such as wheat or

rye, and also keep cattle, sheep, pigs or poultry. Often the dung from the cattle serves to fertilize the crops. Also, some of the crops might be used as fodder for the livestock. Before horses were commonly used for haulage, many young male cattle on such farms were often not butchered as surplus for meat but castrated and used as bullocks to haul the cart and the plough.

Features of mixed farming:

- **Crop and Livestock Integration:** In mixed farming, farmers grow crops (such as grains, vegetables, fruits, or forage crops) alongside raising livestock (such as cattle, sheep, goats, poultry, or pigs) on the same farm.
- **Synergy:** The integration of crops and livestock allows for a symbiotic relationship between the two components. For example, livestock can provide manure, which serves as a natural fertilizer for crops, while crop residues can be used as feed for the animals.
- **Diversification:** Mixed farming diversifies the farm's sources of income and food production. This diversity helps reduce the risks associated with reliance on a single agricultural activity.
- **Nutrient Cycling:** The combination of crops and livestock on the same farm can improve nutrient cycling. Manure from animals can replenish soil nutrients, reducing the need for synthetic fertilizers in crop production.
- **Reduced Pest and Disease Pressure:** The presence of livestock can sometimes help control pests and weeds in crop fields through grazing or by disrupting pest life cycles.
- **Resilience:** Mixed farms are often more resilient to adverse environmental conditions or market fluctuations because they have multiple sources of income and production.
- **Crop-Livestock Rotations:** Some mixed farming systems incorporate crop-livestock rotations, where different areas of the farm are used for either crops or livestock rotationally. This can help optimize land use and improve soil health.
- **Local Sustainability:** Mixed farming can promote local sustainability by reducing the need for long-distance transportation of both food and animal feed, thus lowering the carbon footprint of food production.
- **Farmers' Expertise:** Successful mixed farming often requires diverse skills and knowledge, as farmers need to manage both crop and livestock enterprises effectively.

Dairy farming:

Dairy farming has been an important part of the agricultural scenario for thousands of years. India being a predominantly agrarian economy has about 70 per cent of its population living in villages, where livestock plays a crucial role in the socio-economic life. Livestock provide high-quality foods such as milk, cheese, butter, ghee, etc. India is not only one of the top producers of milk in the world but also the largest consumer of milk and milk products in the world. Due to the shortfall in supply, we have to import significant amounts of milk products to meet internal demand.

Importance of dairy farming:

Diversity of Dairy Animals: India has a diverse population of dairy animals, with indigenous breeds like the Gir, Sahiwal, Red Sindhi, and Murrah buffalo, among others.

These breeds are well adapted to the country's varied climatic conditions.

- **Small-Scale and Traditional Farming:** A significant portion of dairy farming in India is carried out by small-scale and traditional farmers. They often have a few dairy animals, and the milk produced is mainly for household consumption or sold locally.
- **Cooperative Dairy Sector:** The cooperative dairy sector is a critical player in India's dairy industry. The National Dairy Development Board (NDDB) and the cooperative dairy brand Amul are prominent examples. These cooperatives have helped organize small-scale farmers and provide them with access to markets, veterinary services, and modern dairy technologies.
- **Milk Production and Processing:** Milk is produced throughout the country, from the northern plains to the southern peninsular region. It is collected and processed in various dairy plants and cooperative societies. India produces a wide range of dairy products, including milk, yoghurt, ghee (clarified butter), paneer (cottage cheese), and various sweets and desserts.
- **Government Initiatives:** The Indian government has initiated various programs and policies to promote dairy farming, such as the National Dairy Plan (NDP) and the Rashtriya Gokul Mission. These programs aim to improve the quality of dairy animals, increase milk production, and enhance the livelihoods of dairy farmers.
- **Challenges:** Despite its success, the Indian dairy industry faces several challenges, including low milk productivity per animal, inadequate infrastructure, and issues related to animal health and nutrition. There is also a need for better marketing and value addition to dairy products.
- **Export Potential:** India has been exploring opportunities to export dairy products to international markets. However, meeting international quality standards and ensuring the safety and hygiene of dairy products remain areas of concern.
- **Sustainability and Environmental Concerns:** As dairy farming expands, there are growing concerns about its environmental impact, including deforestation for fodder cultivation, water usage, and greenhouse gas emissions. Sustainable practices and efficient resource management are becoming increasingly important.

Mediterranean Agriculture:

It is a form of agriculture found in the Mediterranean climate. The four main aspects are orchard farming, viticulture, cereal, and vegetable cultivation. Products grown include olives, pomegranates, oranges, figs, pears, grapes, etc.

It is that type of agriculture found in the areas surrounding the Mediterranean Sea which have mild, wet winters and hot, dry summers, and also in those areas with similar climate- central and southern California, central Chile, the southwest of Cape Province, the southwest of Western Australia. This region is an important supplier of citrus fruits.

Best quality wines in the world with distinctive flavours are produced from high quality grapes. The inferior grapes are dried into raisins and currants. The advantage of Mediterranean agriculture is that more valuable crops such as fruits and vegetables are grown in winter when there is great demand in European and North American markets.

Market gardening and Horticulture:

A market garden is a relatively small-scale production of fruits, vegetables and flowers as cash crops, frequently sold directly to consumers and restaurants. Commercial gardening or horticulture is growing flowers and non-edible plants on a large scale.

1. Market gardening and horticulture specialise in the cultivation of high-value crops such as vegetables, fruits and flowers, for urban markets.
2. Farms are small and are located where there are good transportation links with the urban centre where high-income groups of consumers are located.
3. It is both labour and capital-intensive and emphasizes the use of irrigation, HYV seeds, fertilizers, insecticides, greenhouses and artificial heating in colder regions.
4. This type of agriculture is well developed in densely populated industrial districts of northwest Europe, the northeastern United States of America and the Mediterranean regions.
5. The Netherlands specializes in growing flowers and horticultural crops especially tulips, which are flown to all major cities of Europe.

Truck farming:

In the regions where farmers specialize 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.

The major truck farming areas are in California, Texas, Florida, along the Atlantic Coastal Plain, and in the Great Lakes area. Among the most important truck crops are tomatoes, lettuce, melons, beets, broccoli, radish, onions, cabbage and strawberries. This type of farming requires comparatively high capitalization as well as a large amount of labour.

Factory farming

Intensive animal farming or industrial livestock production is known as factory farming. It is a type of intensive agriculture, especially an approach to animal husbandry designed to maximize production while minimizing cost.

A modern development in the industrial regions of Western Europe and North America is factory farming. Livestock, particularly poultry and cattle rearing are fed on manufactured feedstuff and carefully supervised against diseases.

1. This requires heavy capital investment in terms of building machinery for various operations, veterinary services and heating and lighting.
2. Breed selection and scientific breeding.

Co-operative Farming

An agricultural cooperative, also known as a farmer's cooperative where farmers pool their resources voluntarily for more efficient and profitable farming.

A farm that is run in cooperation with others in the purchasing and using of machinery, stock, etc. and in the marketing of produce through its own institutions (farmers 'cooperative) a farm that is owned by a cooperative society.

Cooperative farming can help farmers by lowering their costs of inputs or hiring services for example storage and transport. It sells the products at the most favourable terms and

helps in processing quality products at cheaper rates. Co-operative farming has been successful in many Western European countries like Denmark, Netherlands, Belgium, Sweden, Italy etc.

Collective Farming

Collective farming is when a group of farmers pool their land, domestic animals, and agricultural implements, retaining as private property enough only for the member's own requirements. The profits of the farm are divided among its members.

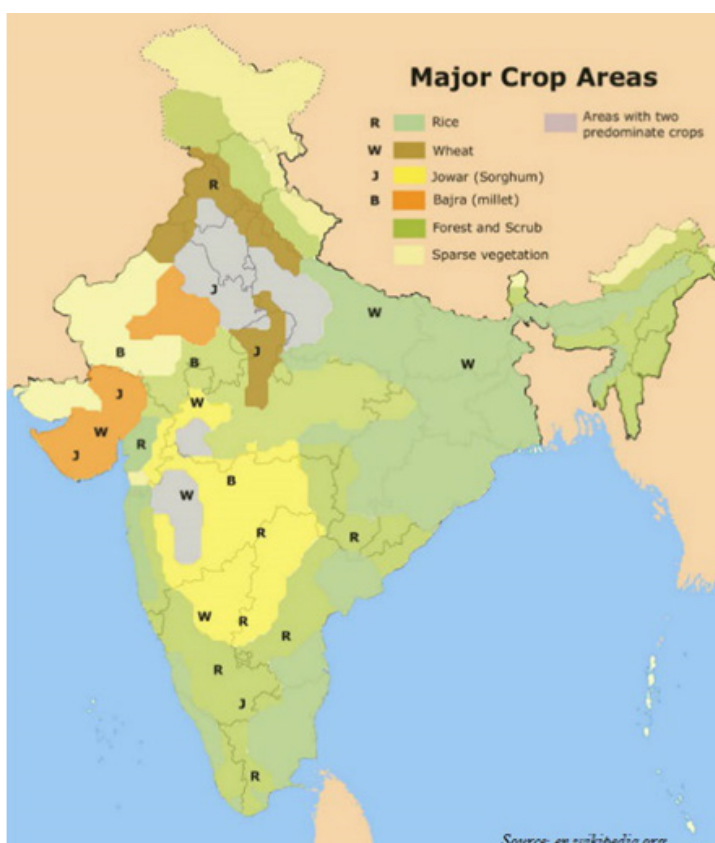
1. Social ownership of the means of production and collective labour
2. Collective farming or KOLKHOZ was introduced in the former Soviet Union to improve upon the inefficiency of the previous methods of agriculture and to boost agricultural production for self-sufficiency
3. Yearly targets were set by the government and the produce was also sold to the state at fixed prices
4. Produce more than the fixed amount was distributed among the members or sold in the market
5. The farmers had to pay taxes on the farm products, hire machinery, etc
6. 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.

Viticulture:

Viticulture refers to studying and growing grapes, either for wine production or for raw consumption (table grapes). Viticulture includes all the agricultural studies, efforts, and actions of growing grapes until the day of harvest.

Grape cultivation dates back to 6,000-8,000 BC in the Near East. Greek mythology attributes grapevine introduction to Dionysus. Ancient Greece saw systematic grapevine production by 4,000 BC, becoming vital by 2,000 BC. It spread from Crete to Sicily and Europe in the 13th century. Top grape producers are Italy, France, the US, Spain, and China. Some sources suggest China is the largest producer. Grape products include table grapes, raisins, wine, grape juice, must, distillates, leaves, and vinegar, each from different grape varieties.

MAJOR CROP LOCATIONS OF INDIA



WORLD AGRICULTURAL TYPOLOGIES

Agriculture typologies refer to categorizations or classifications of agricultural systems and practices based on various criteria, including climate, cropping patterns, land use, and socioeconomic factors. These typologies help researchers, policymakers, and farmers understand and address the diverse challenges and opportunities in agriculture around the world.

A few classifications of agriculture typologies:

- **Subsistence vs. Commercial Agriculture:** This typology distinguishes between agricultural systems primarily oriented toward feeding the farmer's family (subsistence) and those geared toward producing surplus for sale in markets (commercial).
- **Crop Types:** Agriculture can be classified based on the types of crops grown, such as cereal farming (wheat, rice, maize), horticulture (fruits and vegetables), cash cropping (cotton, sugarcane, coffee), or agroforestry (tree-based farming).
- **Cropping Systems:** Crop rotation, monoculture, intercropping, and mixed cropping are examples of cropping systems that classify agriculture based on how crops are grown in a particular area.
- **Climate Zones:** Agriculture can be categorized by the climate in which it operates, such as tropical, temperate, arid, or Mediterranean. Different climate zones require varying agricultural practices and crop choices.
- **Land Use:** Land use can be classified as arable land (for crop cultivation), pasture and rangeland (for livestock grazing), and fallow land (resting to restore fertility).

- **Scale of Farming:** Agriculture can be categorized by the scale of operations, ranging from smallholder or family farming to large-scale commercial farming and agribusiness.
- **Agro-Ecological Zones:** This typology classifies agriculture based on ecological regions, considering factors like soil type, topography, and vegetation, which influence farming practices.
- **Traditional vs. Modern Farming:** Traditional farming methods often rely on age-old practices and limited mechanization, while modern farming utilizes advanced technologies, including machinery, biotechnology, and precision agriculture.
- **Socioeconomic Categories:** Agriculture can be classified based on socioeconomic factors such as the income level of farmers, access to resources, and market integration. Categories may include subsistence farming, smallholder farming, and commercial farming.
- **Organic vs. Conventional Farming:** Agriculture can be categorized based on the use of synthetic inputs (conventional farming) or adherence to organic farming principles, which prioritize natural and sustainable practices.
- **Specialized vs. Diversified Farming:** Some farms specialize in producing a single crop or livestock species, while others practice diversified farming, cultivating multiple crops and raising various livestock species.
- **Urban vs. Rural Agriculture:** This typology distinguishes agriculture in rural areas, often traditional and subsistence-based, and agriculture in urban or peri-urban areas, which may focus on high-value crops or aquaculture.
- **Land Tenure Systems:** Agriculture can also be classified based on land tenure systems, such as communal land, smallholder ownership, large-scale plantations, or land leased from the government.

These typologies help researchers and policymakers tailor agricultural interventions, development programs, and policies to the specific needs and characteristics of different agricultural systems. They also aid in understanding the diversity of global agriculture and its potential for sustainable development and food security.

AGRICULTURE IN INDIA

- **Salient features of agriculture in India:**

Some of the outstanding features of Indian agriculture are mentioned as follows.

1. Subsistence agriculture:

Most parts of India have subsistence agriculture. The farmer owns a small piece of land, grows crops with the help of his family members and consumes almost the entire farm produce with little surplus to sell in the market. This type of agriculture has been practised in India for the last several hundred years and still prevails despite the large-scale changes in agricultural practices after Independence.

2. Pressure of population on agriculture:

The population in India is increasing at a rapid pace and exerts heavy pressure on agriculture. Agriculture has to employ a large section of the workforce and has to feed the teeming millions. While looking into the present need for food grains, we require an additional 12-15 million hectares of land to cope with the increasing demands by 2010 A.D. Moreover, there is a rising trend in urbanization.

Over one-fourth of the Indian population lived in urban areas in 2001 and it is estimated that over one-third of the total population of India would be living in urban areas by 2010 A.D. This requires more land for urban settlements which will ultimately encroach upon agricultural land. It is now estimated that about 4 lakh hectares of farmland are now being diverted to non-agricultural uses each year.

3. Importance of animals:

Animal force has always played a significant role in agricultural operations such as ploughing, irrigation, threshing and transporting agricultural products. Complete mechanization of Indian agriculture is still a distant goal and animals will continue to dominate the agricultural scene in India for several years to come.

4. Dependent upon Monsoon:

Indian agriculture is mainly dependent upon monsoon which is uncertain, unreliable and irregular. Despite the large-scale expansion of irrigation facilities since Independence, only one-third of the cropped area is provided by perennial irrigation and the remaining two-thirds of the cropped area has to bear the brunt of the vagaries of the monsoons.

5. Variety of crops:

India is a vast country with varied types of relief, climate and soil conditions. Therefore, there is a large variety of crops grown in India. Both tropical and temperate crops are successfully grown in India. Very few countries have a variety of crops comparable to that produced in India.

6. Predominance of food crops:

Since Indian agriculture has to feed a large population, production of food crops is the first priority of the farmers almost everywhere in the country. More than two-thirds of the total cropped area is devoted to the cultivation of food crops. However, with the change in cropping pattern, the relative share of food crops came down from 76.7 per cent in 1950-51 to 58.8 per cent in 2002-03.

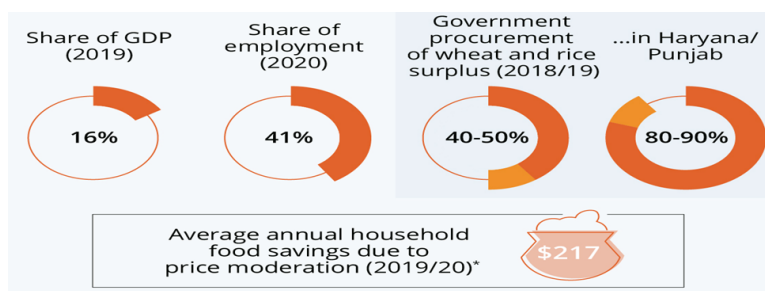
7. Insignificant place to give fodder crops:

Although India has the largest population of livestock in the world, fodder crops are given a very insignificant place in our cropping pattern. Only four per cent of the reporting area is devoted to permanent pastures and other grazing lands. This is due to the pressing demand for land for food crops. The result is that domestic animals are not properly fed and their productivity is very low compared to international standards.

8. Seasonal pattern:

India has three major crop seasons:

- (i) Kharif season starts with the onset of monsoons and continues till the beginning of winter. Major crops of this season are rice, maize, jowar, bajra, cotton, sesamum, groundnut and pulses such as moong, urad, etc.
- (ii) Rabi season starts at the beginning of winter and continues till the end of winter or the beginning of summer. Major crops of this season are wheat, barley, jowar, gram and oil seeds such as linseed, rape and mustard.
- (iii) Zaid is the summer cropping season in which crops like rice, maize, groundnut, vegetables and fruits are grown. Now some varieties of pulses have been evolved which can be successfully grown in summer.



ROLE OF THE AGRICULTURE SECTOR AND ITS PERFORMANCE

Agriculture sector in India and its performance:

The agriculture sector remains resilient with 4.6% annual growth during the last six years. 2021-22 agricultural exports reach an all-time high of USD 50.2 billion, increasing MSP, growing agricultural credit, income support schemes and agriculture insurance among key factors promoting the sector.

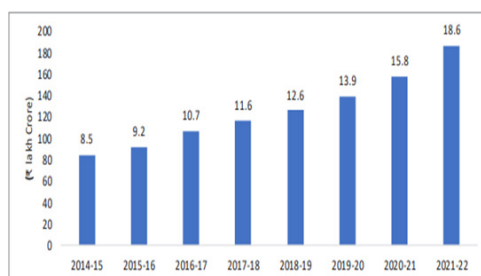
The Economic Survey 2022-23, presented by Finance Minister Nirmala Sitharaman, highlights the significant contribution of the agriculture sector to India's overall growth, development, and food security. The country has become a net exporter of agricultural products, reaching a record US \$50.2 billion in exports in 2021-22. This growth is attributed to government measures that have boosted crop and livestock productivity, provided price support through Minimum Support Prices (MSPs), encouraged crop diversification, and focused on enhancing credit availability, mechanization, horticulture, and organic farming. These efforts align with the recommendations of the Committee on Doubling Farmers' Income.

Minimum Support Price (MSP) to Ensure Returns Over Cost of Production:

The Government has been increasing the MSP for all 22 Kharif, Rabi and other commercial crops with a margin of at least 50 per cent over the all-India weighted average cost of production since the agricultural year 2018-19, says the Survey. Relatively higher MSP was given to pulses and oilseeds to keep pace with the changing dietary patterns and achieve the goal of self-sufficiency.

Enhanced Access to Agricultural Credit:

The Government has set a target of ₹18.5 lakh crores in agricultural credit flow in 2022-23. The Government has consistently increased this target every year and it has also been able to continuously surpass the target set every year over the past several years. In 2021-22, it was about 13 per cent more than the target of ₹16.5 lakh crores.



Source: Based on data from DAFW and Agricultural Statistics at a Glance 2021.

The Economic Survey highlights the government’s efforts to facilitate easy credit access for farmers through initiatives like the Kisan Credit Card (KCC) Scheme and the Modified Interest Subvention Scheme, offering competitive interest rates on short-term agricultural loans up to ₹3 lakhs. As of December 2022, 3.89 crore KCCs have been issued to eligible farmers with a total limit of ₹4,51,672 crore. Additionally, the KCC facility was extended to fisheries and animal husbandry farmers in 2018-19, resulting in over 1.0 lakh KCCs for fisheries and 9.5 lakh for animal husbandry as of October and November 2022, respectively.

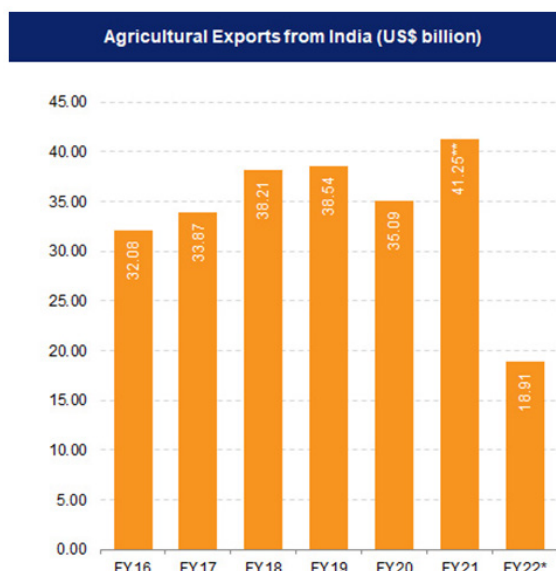
Income and risk support:

The Economic Survey highlights the success of the PM-KISAN scheme, which provided income support to 11.3 crore farmers in the April-July 2022-23 cycle, totalling over ₹2 lakh crores in assistance over the past three years. An empirical study by ICAR and IFPRI found that the scheme helped farmers with liquidity constraints for buying agricultural inputs and meeting daily consumption, education, health, and other expenses.

The Pradhan Mantri Fasal Bima Yojna is the world’s largest crop insurance scheme by farmer enrolment, with an average of 5.5 crore applications annually. Over the last six years, farmers paid ₹25,186 crore in premiums and received ₹1.2 lakh crore in claims (as of 31 October 2022). The scheme’s acceptability among farmers has increased significantly, with a 282% rise in participation by non-loanee, marginalized, and small farmers since its inception in 2016.

Farm Mechanisation – Key to Unlock the Productivity:

With the average size of household ownership farm holdings seeing a downward trend, the Economic Survey suggests that machines that are viable and efficient for small farm holdings are the key to increasing productivity. Under the Sub Mission on Agricultural Mechanisation (SMAM), 21,628 Custom Hiring Centers, 467 Hi-Tech hubs and 18306 farm machinery banks have been established as of December 2022, besides assisting state governments with training and demonstration of agricultural machinery use. Farm mechanization additionally also reduces the cost of cultivation and the drudgery associated with farm operations notes the Survey.



Picture showing the trend of agriculture productivity and exports from India

Organic and Natural Farming:

India has the highest number of organic farmers in the world at 44.3 lakhs, and 59.1 lakh ha area has been brought under organic farming by 2021-22, says the Survey. Organic and natural farming provides chemical and pesticide-free food grains and crops, improves soil health and reduces environmental pollution.

The Government has been promoting organic farming through two dedicated schemes viz., Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) through cluster and Farmer Producer Organisations formation. Under PKVY, 32,384 clusters totalling 6.4 lakh ha area and 16.1 lakh farmers have been covered as of November 2022. Likewise, under MOVCDNER, 177 FPOs/FPCs have been created, covering 1.5 lakh farmers and 1.7 lakh hectares to promote organic farming of niche crops in the Northeast region.

Under Bhartiya Prakratik Krishi Paddhati (BPKP), a scheme to help farmers adopt all forms of traditional/ecological farming practices including Zero-Budget Natural Farming (ZBNF), 4.09 lakh hectares of land have been brought under natural farming in eight states.

INFRASTRUCTURAL FACTORS OF AGRICULTURE IN INDIA

Infrastructure is crucial for agriculture, from input supply to post-harvest management. Planned investments in this sector can boost productivity, reduce losses, and increase income. India faces higher post-harvest losses due to gaps in basic infrastructure like storage and supply chains. The Indian government initiated the 'Agriculture Infrastructure Fund' as a Central Sector Scheme to finance pre- and post-harvest infrastructure. Launched in August 2020, this fund offers medium/long-term debt financing with 3% interest subvention and credit guarantees. It focuses on creating post-harvest and community farming assets to enhance agriculture. This initiative addresses the need for better infrastructure in Indian agriculture, including storage, irrigation, and seed distribution systems.

Irrigation:

Indian irrigation infrastructure includes canals, groundwater wells, tanks, and rainwater harvesting projects. Groundwater systems cover 39 million hectares, while canals cover an additional 22 million hectares.

- In 2010, only 35% of Indian agricultural land was reliably irrigated, with 2/3rd dependent on monsoons. Improvements in irrigation have boosted food security, reduced monsoon dependence, increased agricultural productivity, and generated rural jobs.
- Dams used for irrigation also provide drinking water, flood control, and drought prevention. However, free electricity and attractive prices for water-intensive crops like sugarcane and rice have led to groundwater depletion and poor water quality. Over 60% of water for farming is used by rice and sugar, which occupy 24% of cultivable land.

Indian seed sector:

Seed is the basic and most critical input for sustainable agriculture. The response of all other inputs depends on the quality of seeds to a large extent. It is estimated that the direct contribution of quality seed alone to the total production is about 15

– 20% depending upon the crop and it can be further raised up to 45% with efficient management of other inputs. The developments in the seed industry in India, particularly in the last 30 years, are very significant.

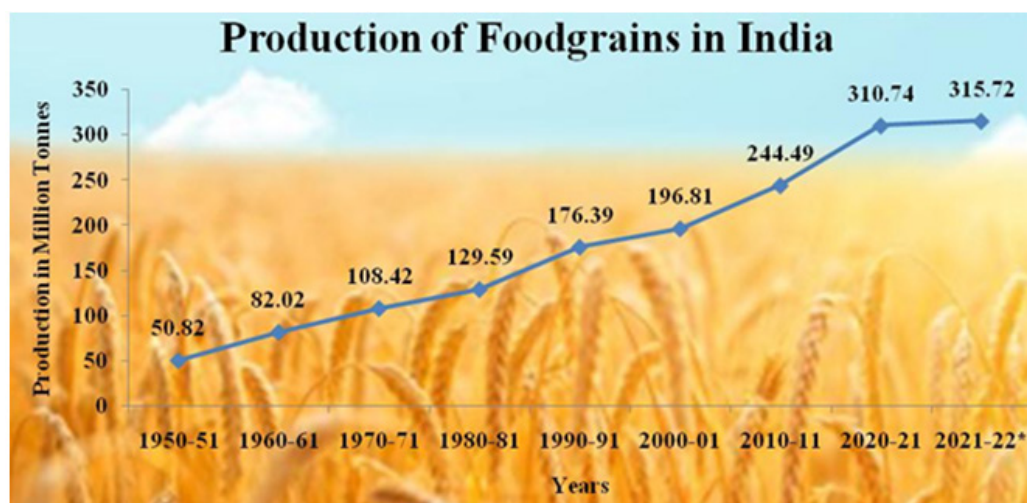
Major seed-producing states in India:



This map does not indicate the Geographical boundary of India.

To upgrade the quality of farmer-saved seed, which is about 80-85% of the total seed used for crop production programmes, financial assistance is provided for the distribution of foundation/certified seeds at 50% cost of the seed of crops for the production of certified/quality seeds only and for training on seed production.

PRODUCTIVITY AND CONDITIONS OF CROP GROWTH



RICE:

Rice is mainly grown in rain-fed areas that receive heavy annual rainfall. That is why it is fundamentally a kharif crop in India. It demands a temperature of around 25 degrees Celsius and above and rainfall of more than 100 cm (39 in). Rice is also grown through irrigation in those areas that receive less rainfall.[citation needed] Rice is the staple food of eastern and southern parts of India.

Conditions of Growth:

Rice is grown under varying conditions in India from 8° to 25° N latitude and from sea level to about 2,500 meters altitude. It is a tropical plant and requires high heat and high humidity for its successful growth. The temperature should be fairly high at a mean monthly of 24°C. It should be 20°- 22°C at the time of sowing, 23°-25°C during growth and 25°-30°C at the harvesting time. The average annual rainfall required by rice is 150 cm.

WHEAT:

It is rich in proteins, vitamins and carbohydrates and provides balanced food. India is the fourth largest producer of wheat in the world after Russia, the USA and China and accounts for 8.7 per cent of the world's total production of wheat.

Conditions of Growth:

Conditions of growth for wheat are more flexible than those of rice. In contrast to rice, wheat is a rabi crop that is sown at the beginning of winter and is harvested at the beginning of summer. The time of sowing and harvesting differs in different regions due to climatic variations.

BARLEY:

Barley is an important cereal crop in India, primarily grown in the northern and northwestern regions of the country. It is known for its adaptability to diverse environmental conditions and is used for various purposes, including human consumption, animal feed, and malting for the brewing industry.

Conditions:

Barley is a cool-season crop and can be grown in a wide range of climatic conditions. In India, it is mainly cultivated during the Rabi season (winter season) because it requires cooler temperatures for proper growth.

The primary barley-growing states in India include Punjab, Haryana, Rajasthan, Uttar Pradesh, Madhya Pradesh, and Jammu and Kashmir. These regions have suitable climatic conditions for barley cultivation. Barley prefers well-drained loamy or sandy loam soils with good moisture-holding capacity. It can tolerate a slightly alkaline pH level but thrives in slightly acidic to neutral soils.

Beverages:

Tea and coffee are two of the most popular beverages in India, and they are grown in different regions of the country under specific conditions.

Conditions:

- Tea is primarily grown in the northeastern and southern regions of India. The northeastern states of Assam, West Bengal, and Tripura, as well as the southern states of Tamil Nadu and Kerala, are the major tea-producing areas. Tea plants require well-drained, acidic soils (pH 4.5 to 5.5) that are rich in organic matter. Soil testing and appropriate soil amendments are essential for maintaining soil health and optimizing tea productivity.
- Coffee (Coffea spp.) is primarily grown in the southern states of Karnataka, Kerala, and Tamil Nadu. Some coffee is also produced in parts of Andhra Pradesh and Odisha. Coffee plants thrive in regions with a distinct wet season and dry season. They require a tropical climate with temperatures between 15°C to 30°C. Coffee is often grown under shade trees, which provide protection from direct sunlight and help maintain soil moisture. Coffee plants prefer well-drained, loamy soils rich in organic matter.

FIBRE CROPS:

Natural fibres are the backbone of the Indian textile industry. It constitutes more than 60% of the total fibre industry. After the agricultural industry, the Indian textile industry gives direct employment to millions of people. Several small and medium industries use by-products of natural fibres. More than 75 million households worldwide are directly involved in the production of natural fibres. In India, 30 million farmers are involved in the production of natural fibres.

Cotton:

Cotton is one of the most significant fibre crops in India, contributing significantly to the textile industry.

Conditions: Cotton is primarily grown in regions with a tropical and subtropical climate. It requires warm temperatures, well-distributed rainfall, and a frost-free growing season.

Soil: Cotton thrives in well-drained soils with good moisture-holding capacity. Sandy loam and loam soils are often preferred.

Productivity: Cotton yields can vary depending on factors like the cotton variety, farming practices, and pest management. On average, cotton yields in India range from 500 to 800 kilograms per hectare.

- Cotton is primarily grown in states like Gujarat, Maharashtra, Andhra Pradesh, Telangana, Punjab, Haryana, Rajasthan, and Madhya Pradesh. Gujarat, particularly the Saurashtra region, is known for high-quality cotton production.

Jute:

Jute is another important fibre crop in India, used in making burlap, sacks, and other textiles.

Conditions: Jute is primarily grown in the Ganges Delta region of India, which includes West Bengal, Bihar, and Assam. It requires a hot and humid tropical climate with regular rainfall.

Soil: Jute is well-suited to flood-prone, low-lying areas with alluvial soils. It can also tolerate saline conditions.

Productivity: Jute yields can vary but typically range from 1,000 to 1,500 kilograms per hectare.

- West Bengal is the largest jute-producing state in India, with districts like Hooghly and North 24 Parganas being prominent jute-growing areas.

Silk (Mulberry and Non-Mulberry):

India is a major producer of silk, both from mulberry (*Bombyx mori*) and non-mulberry silkworms.

Conditions: Mulberry silk is primarily grown in regions with moderate temperatures and well-distributed rainfall. Non-mulberry silk production is more widespread and can adapt to various climatic conditions.

Soil: For mulberry cultivation, well-drained loamy soils are preferred.

Productivity: Mulberry silk production is measured in terms of cocoon yield per tree or per hectare. Yields can vary based on silkworm varieties and management practices.

- Mulberry silk is produced mainly in states like Karnataka, Andhra Pradesh, Tamil Nadu, and Jammu and Kashmir. Non-mulberry silk, including Tasar, Muga, and Eri silk, is produced in various states, including Jharkhand, Chhattisgarh, Assam, and Meghalaya.

Ramie:

Ramie is a lesser-known but valuable fibre crop in India.

Conditions: Ramie requires a warm and humid climate with adequate rainfall.

Soil: Well-drained loamy soils are suitable for ramie cultivation.

Productivity: Ramie yields can vary but can be quite high under favourable conditions.

Productivity for these fibre crops can be influenced by various factors, including climate, soil quality, crop variety, and agricultural practices. To optimize productivity, farmers often adopt best practices such as proper land preparation, irrigation, pest and disease management, and the use of improved crop varieties

- Ramie cultivation is found in states like Assam, Bihar, West Bengal, and Karnataka.

Flax (Linseed):

Flax is grown for its fibres and seeds in India.

Conditions: Flax is typically grown in cooler regions with temperate climates, and it prefers well-drained soils.

Soil: Well-drained loamy soils are suitable for flax cultivation.

Productivity: Flax fibre yields can vary depending on growing conditions and cultivars. In India, fibre flax is often grown alongside linseed for oil extraction.

- Flax is grown in states with temperate climates such as Madhya Pradesh, Uttar Pradesh, Bihar, and Jharkhand

