

Section 3

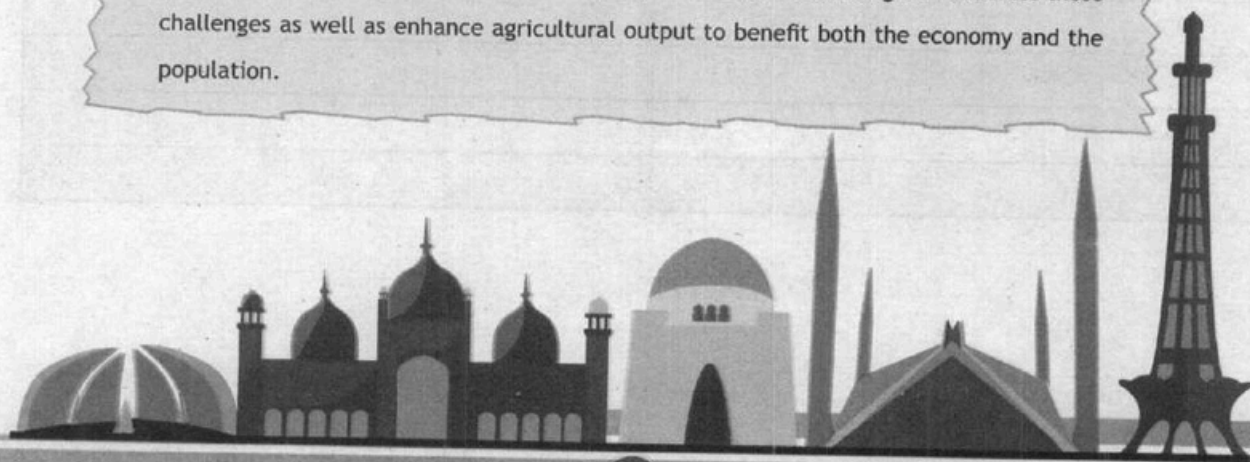
Resources and Economic Development of Pakistan

UNIT 08

AGRICULTURE, LIVESTOCK AND FISHERIES

In this unit the students will be able to:

- Demonstrate understanding of the different categories of agriculture recognizing agriculture as a complex system that involves various inputs, processes, and outputs.
- Demonstrate understanding of the major and minor food and cash crops cultivated in Pakistan, as well as their respective growing areas, and classify them based on their importance and economic significance to the country's agricultural sector.
- Evaluate agriculture's contributions to employment, processing industries, and exports in boosting the country's economy. Offer sustainable approaches to agricultural development, including organic farming.
- Identify challenges the agriculture sector is facing, including the threat of arable land being converted to housing societies and propose sustainable strategies to address these challenges as well as enhance agricultural output to benefit both the economy and the population.



Introduction

Pakistan is an agricultural country and agriculture is the main source of food production for the country's ever-increasing population. Agriculture is the cultivation of land for the production of crops and the raising of animals. It is a primary industry, meaning that it extracts raw materials from the earth. Agricultural raw materials can be processed in industry or consumed directly.

How Agriculture works As a System

Agriculture can be viewed as a system of inputs, processes, and outputs. The inputs are the resources that are used to produce agricultural products.

i. Inputs

The inputs can be divided into two main categories:

Natural (Physical): Land and other abiotic elements including soil, water and climate are essential for agriculture, as it is used to grow crops and raise livestock.

Human (Economic): Human resources include skilled and semi-skilled labour, machinery, investment, seeds, fertilizers, pesticides, machinery etc. These inputs are used to improve the productivity and efficiency of agricultural production.

ii. Processes:

The inputs regulate the type of processes required on the farm. The Processes are the activities to convert inputs into outputs. These processes can be divided into two main categories:

- **Crop production:** Crop production processes include planting, weeding, irrigating, and harvesting.
- **Livestock production:** Livestock production processes include feeding, breeding, and caring for animals.

iii. Outputs:

Outputs are the products that are produced by the agricultural system. The outputs of livestock production (livestock and dairy products) can be used as inputs to the food system or to other industries, such as the leather industry. These outputs can be divided into two main categories i.e food products and non-food products.

The diagram shows agriculture as system in Pakistan

Inputs	Processes	Outputs
Natural / Physical land, water, air, sunlight, soil, minerals	- Planting - Weeding - Irrigating - Threshing - harvesting - feeding - Breeding - caring for animals - Milking	Crops and non-food products - Cotton - Wheat - Rice - Wool - Vegetables - Fruits - flowers - biofuels
Human labor, capital, machinery, seeds, fertilizers, pesticides, water		Livestock, dairy products - Milk - Meat - Eggs
Reinvested profit back into the farm for new investment, equipment, land or livestock		

There are three main types of farming practiced in Pakistan.

A. Small-scale subsistence farming.

Pakistan is a land of subsistence farmers. Subsistence farming is based on growing crops and rearing of animals mainly for the farmer use. If there is surplus, it is sold for profit. 90% of farmers in Pakistan are small-scale subsistence farmers. This means that they own less than 12.5 acres of land. They



account for 42% of the country's workforce and contribute about 19% to the country's GDP. The subsistence farmers produce about 60% of Pakistan's agricultural output which play a vital role in Pakistan's food security. Subsistence farmers produce most of the country's basic food crops, such as wheat, rice, and maize.

Subsistence farmers in Pakistan use traditional methods of cultivation, relying on manual labor for sowing, weeding, harvesting, and threshing. Animals are used instead of machines to pull wooden ploughs and carts, and to help with threshing.

Small-scale subsistence farming in Pakistan is a labor-intensive activity therefore women and

children are also involved in the farming processes including caring for the animals. They prepare feed for animals by chopping fodder, mixing different types of feed, and delivering the feed to the animals, milking buffaloes, cows and goats, collecting eggs, raise chickens, cleaning animal and helping with harvest.

B. Cash crop farming.

It is commercial farming in which the farm output is sold to make a profit including crops and animals. Cash crop farming is the cultivation of crops that are grown primarily for sale and profit, rather than for consumption by the farmer or their family. Cash crops are typically grown on a large scale and are often exported to other countries. Some examples of cash crops include cotton, sugarcane, wheat, rice, corn, coffee, tobacco, cocoa, soybeans, oilseeds, fruits and vegetables.

Cash crop farms typically employ a mix of skilled and unskilled labor. Skilled labor is often needed for operating machinery, applying pesticides and herbicides, and maintaining the farm's infrastructure. Unskilled labor is often used for tasks such as planting, weeding, and harvesting.

Pakistan has two cropping seasons namely: Kharif (summer April to October) and Rabi (winter October -April). Winters in the lowlands are warm enough for temperate crops to grow, such as



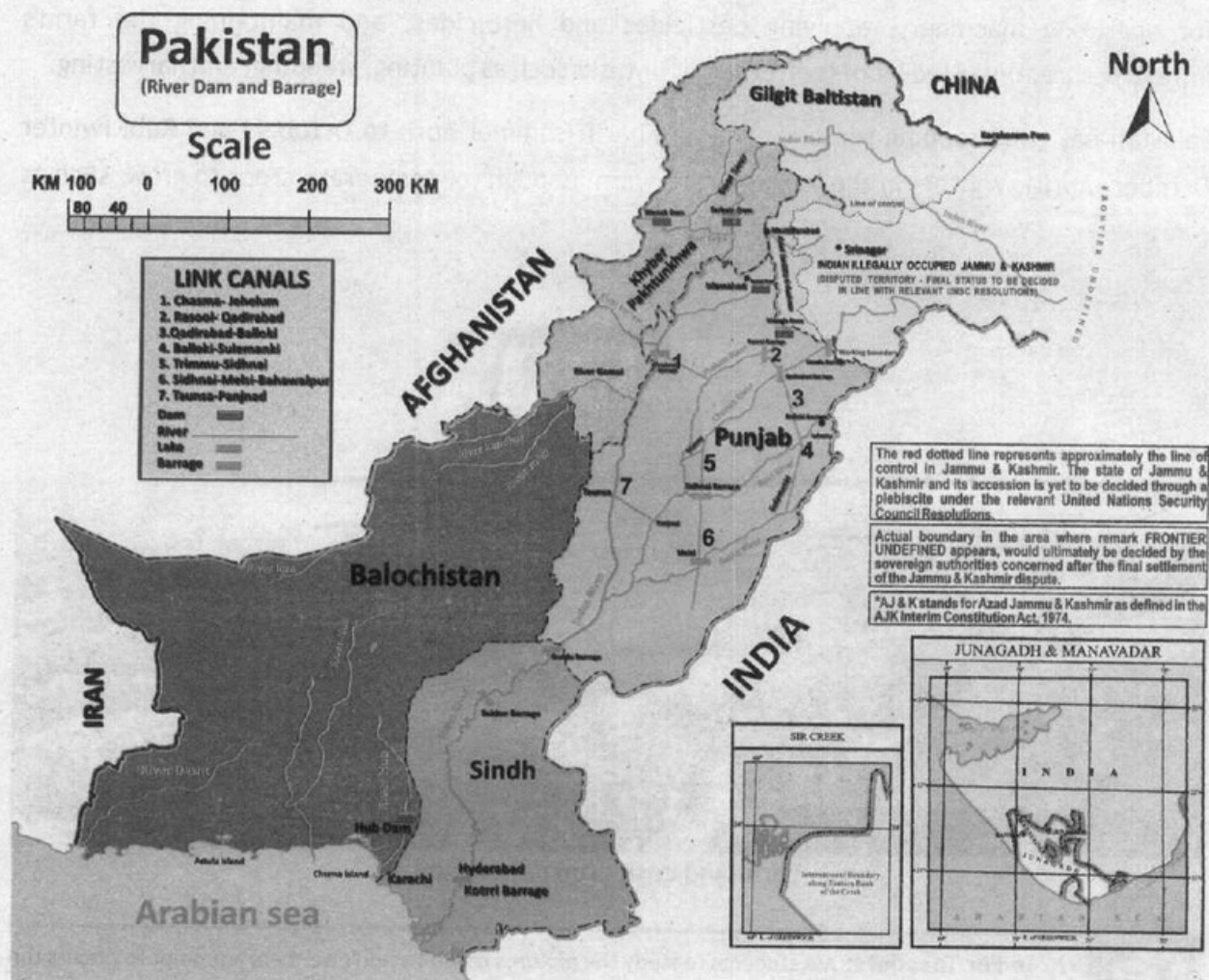
Farmland cash crop cultivation



Note For Teachers: Ask students to study the pictures carefully and give them a prompt to discuss the following: What features in the pictures suggest that this is a Large-scale subsistence farm?

wheat and rape seed, which are summer crops in the UK and other northwestern European countries. Pakistan's summer crops, such as cotton and rice, require high temperatures, like those in the tropics.

Water supply is a big problem for cash crop farming in Pakistan. Farmers can only grow crops in both seasons if they have enough irrigation water. Numerous dams (large and small) and barrages have been built to divert and store water from rivers that originate in the Himalayas. The two largest storage dams are Tarbela on the Indus and Mangla on the Jhelum. These dams supply water to large link canals, which in turn feed water into many smaller canals that crisscross Punjab and Sindh plains. Large barrages across the Indus in the south, such as Sukkur, are supplied with water from the Tarbela Dam in winter when river flow is low. Tube wells are also used to pump water from the ground for irrigation, especially in areas where canal irrigation is not available or adequate. The map shows some details about dams, barrages and link canals in Pakistan.



Important Crops

I. Cotton

Cotton is a vital crop for both the agricultural and textile sectors of the economy. It accounts for around 0.6 percent of GDP and 3.1 percent of the value added in agriculture. Cotton is an export-oriented raw material for the textile industry, and it plays a significant role in Pakistan's foreign exchange earnings.

Geographical Requirement:

Rainfall: Cotton requires moderate rainfall. However, cotton can be grown in areas with less rainfall if irrigation is available.

Temperature: Cotton is a warm-season crop and requires temperatures between 25°C and 35°C for optimal growth. Temperatures below 20°C can stunt plant growth, and temperatures above 40°C can reduce yields.

Irrigation: Cotton is a drought-tolerant crop, but irrigation is often necessary to achieve high yields. Irrigation is especially important in areas with low rainfall or during droughts.

Soil Type: Soil type for cotton is a well-drained, loamy soil with a pH between 6.0 and 7.5.

Cotton Picking

Problems of Cotton Crop

Pakistan, a major cotton producer, is experiencing a significant decline in production due to multiple challenges, including:

- i. **Economic:** Cotton is no longer as profitable as other crops such as maize, paddy, and sugarcane.
- ii. **Biotic stresses:** White fly and pink bollworm infestations are damaging crops. Leave curl virus also attacks the crop with irreversible effects.
- iii. **Abiotic stresses:** Climate change, heat stress, and extreme rainfalls are also impacting the production.
- iv. **Poor agricultural practices:** Unsustainable farming practices such as poor soil management and excessive pesticide use are also contributing to the decline.
- v. **High input costs:** Fertilizers, pesticides, and seeds are expensive, making it difficult for farmers to turn a profit.
- vi. **Limited research and development:** There is a shortage of early generation seeds, and research on new varieties that can withstand pests, diseases, and climatic stresses is inadequate.

Revival of Cotton Production

To revive cotton production in Pakistan, the following measures are essential:

- i. Set a minimum indicative or intervention price for cotton. This will ensure that farmers receive a fair price for their crops, even when market prices are low.
- ii. Issue subsidies to farmers in a timely manner. This will help to reduce the cost of inputs such as seeds, fertilizers, and pesticides.
- iii. Improve extension services to educate farmers about best practices i.e use of HYVs, awareness about irrigation needs and soil management. This will help farmers to improve their yields and reduce their costs.
- iv. Develop and distribute genetically modified (GM) cotton seeds that are resistant to pests and diseases. This will help to reduce crop losses and improve yields.
- v. Issue subsidies for pesticides, seeds, and fertilizers through Kissan cards. This will make it easier for farmers to access the inputs they need at an affordable price. Loan may be granted on easy terms and conditions.

Wheat

Wheat is Pakistan's main staple crop and, therefore, essential for the food security of the country. It accounts for 9.2 % of the value added in agriculture and 1.8 % of the GDP. Self-sufficiency in wheat has been a core objective of every government. Wheat crop recorded historic high production of 27.293 million tonnes showing an increase of 8.1 percent over 25.248 million tonnes production of 2020. This was primarily due to the increase in cultivated area. Significant high yielding wheat varieties include Maxi Pak, MH-21 etc. By using high-yielding wheat varieties, farmers can increase their yields and profits.

Geographical Requirements

Wheat is a relatively adaptable crop and can be grown in a variety of geographical conditions.

Soil type: Wheat prefers well-drained, loamy soils with a pH between 6.0 and 7.5.

Rainfall: Wheat requires moderate rainfall. However, wheat can be grown in areas with less rainfall if irrigation is available.

Temperature: Wheat is a cool-season crop and requires temperatures between 10 and 20 degrees Celsius for optimal growth. Temperatures above 30 degrees Celsius can stress the crop and reduce yields.

Irrigation: Wheat can be grown in rainfed conditions, but irrigation is often necessary to achieve high yields. Irrigation is especially important in areas with low rainfall or during droughts.



Wheat

Wheat Production areas

During 2020-21, area under cultivation increased by 4.2 percent to 9,178 thousand hectares over last year's sown area of 8,805 thousand hectares. Wheat is Pakistan's main staple crop, and it is essential for the country's food security. Punjab is the largest wheat producing province in Pakistan, accounting for over 70% of the country's total wheat production. Other major wheat producing provinces include Sindh, Khyber Pakhtunkhwa, and Baluchistan. Major Wheat growing areas include:

- Punjab: Faisalabad, Toba Tek Singh, Jhang, and Chakwal
- Sindh: Jacobabad, Larkana, and Shikarpur
- Khyber Pakhtunkhwa: Mardan, Nowshera, and Swabi
- Balochistan: Quetta, Pishin, and Zhob

Sugar Cane

Sugarcane is a valuable cash crop in Pakistan, accounting for 3.4% of agriculture's value addition and 0.7% of GDP. In 2020-21, the area under sugarcane cultivation increased by 12% to 1,165 thousand hectares, and production increased by 22% to 81.009 million tonnes. This was due to favorable weather conditions, better management, timely availability of inputs, and higher economic returns.

Geographical Requirements

Temperature: Sugarcane requires a temperature range of 20°C to 30°C for optimal growth. Temperatures below 20°C can stunt plant growth, and temperatures above 40°C can reduce yields.

Rainfall: Sugarcane requires moderate rainfall, ranging from 100 to 1520 mm. However, sugarcane can be grown in areas with less rainfall if irrigation is available.

Soil type: Sugarcane prefers well-drained, loamy soils with a pH of 6.5 to 7.5. Clay soils can be too heavy and poorly draining for sugarcane, while sandy soils may not retain enough moisture.

Method of Cultivation

To cultivate sugarcane, the soil is prepared by tilling it to a depth of at least 30 cm. Organic matter should then be added to the soil to improve drainage and fertility. Sugarcane stalk is cut to 30-45 cm long and the cuttings are planted in furrows that are 10-15 cm deep and 75-100 cm apart. Sugarcane requires regular irrigation and requires regular fertilization especially potash. It is important to keep the sugarcane field free of weeds, as they compete with the sugarcane for water and nutrients.



Sugarcane growing regions

Punjab is the largest sugarcane producing province in Pakistan, accounting for over 60% of the country's total sugarcane production. The major sugarcane growing districts in Punjab include Faisalabad, Toba Tek Singh, Jhang. Sindh is the second largest sugarcane producing province in Pakistan, accounting for around 25% of the country's total sugarcane production. The major sugarcane growing districts in Sindh include Jacobabad, Larkana, and Shikarpur. Khyber Pakhtunkhwa is the third largest sugarcane producing province in Pakistan, accounting for around 10% of the country's total sugarcane production. The major sugarcane growing districts in Khyber Pakhtunkhwa include Mardan, Nowshera, and Swabi.

Rice

Rice is a major food and cash crop in Pakistan. It is the second most important staple food crop after wheat and the second most export commodity after cotton. Rice contributes 3.5% of value added in agriculture and 0.7% of GDP. Rice production is divided into two categories:

- **Basmati (fine)**
- **Coarse**

The production of coarse types has been increasing in recent years. In 2020-21, rice was cultivated on 3,335 thousand hectares, 9.9% more than the previous year.



Geographical Requirements

Temperature: Rice requires a temperature range of 20°C to 35°C for optimal growth. Temperatures below 20 °C can stunt plant growth, and temperatures above 40 °C can reduce yields.

Rainfall: Rice requires moderate to high rainfall, ranging from 1270mm - 2000mm. However, rice can be grown in areas with less rainfall if irrigation is available.

Soil type: Rice prefers well-drained, loamy soils with a pH of 6.5 to 7.5. Clay soils can be too heavy and poorly draining for rice, while sandy soils may not retain enough moisture.

Method of Cultivation

The soil is tilled and levelled to prepare the seedbed. Rice seeds are sown in the seedbed. Seedlings are transplanted to the main field when they are 3-4 weeks old. Rice requires regular irrigation, especially during the first few months after transplanting. A balanced fertilizer should be applied every 4-6 weeks. It is also important to keep the rice field free of weeds. Weeds compete with the rice for water and nutrients, and they can also harbour pests and diseases. Rice is typically harvested 3-4 months after transplanting. The crop is harvested by hand or by machine. The harvested rice is then threshed to remove the grains from the stalks.

Areas of Cultivation

Punjab is the largest rice producing province in Pakistan, accounting for over 70% of the country's total rice production. The major rice growing districts in Punjab include Faisalabad, Sheikhupura, Gujranwala, Hafizabad, Sialkot, and Narowal. Sindh is the second largest rice producing province in Pakistan, accounting for around 20% of the country's total rice production. The major rice growing districts in Sindh include Jacobabad, Larkana, and Shikarpur. Khyber Pakhtunkhwa is the third largest rice producing province in Pakistan, accounting for around 10% of the country's total rice production. The major rice growing districts in Khyber Pakhtunkhwa include Mardan, Nowshera, and Swabi. In Balochistan very small amount of rice is cultivated.

Problems of Rice Crop

- Rice is susceptible to a number of pests and diseases, such as rice stem borers, brown plant hoppers, and blast disease.
- Rice is also susceptible to abiotic stresses, such as drought, salinity, and flooding.
- Weeds compete with rice for water and nutrients, and they can also harbor pests and diseases.
- Rice is a heavy feeder and requires regular fertilization. Nutrient deficiencies can lead to reduced yields and poor grain quality.

Management Strategies:

Pests and diseases control: Pests and diseases can be managed through a combination of cultural practices, biological control, and chemical pesticides. Cultural practices, such as crop rotation can help to maintain soil fertility. Biological control involves the use of various biological organisms to control pests. Chemical pesticides should only be used as a last resort.

Laser leveling: Laser leveling is a land preparation technique that uses lasers to create a level surface. This can help to improve water distribution and reduce water waste.

Alternate wetting and drying (AWD): AWD is a water management practice in which rice fields are alternately flooded and drained. This can help to reduce water consumption without sacrificing yield.

Nutrient deficiencies: Nutrient deficiencies can be managed through regular fertilization. A balanced fertilizer should be applied every 4-6 weeks

Maize

Maize is the third important cereal crop of Pakistan after wheat and rice. It contributes 3.4 percent to the value added in agriculture and 0.6 percent to GDP. Maize is cultivated as a multipurpose crop for food particularly in manufacturing of corn flour, and custard powder, feed and fodder for animals and poultry. While human consumption is declining, its utilization in feed and wet milling industry is growing at a fast pace. During 2020-21, maize was



Maize crop

cultivated on an area of 1,418 thousand hectares reflecting an increase of 1.0 percent over last year's 1,404 thousand hectares. The production increase was largely due to increase in area, availability of improved variety of seed, and better economic returns. Geographical requirement includes 35°C temperature with rainfall between 50-500 mm. It can be grown effectively on porous soil.

Tobacco

Tobacco is grown in Pakistan on around 0.25 percent of irrigated land. The major tobacco growing areas are in the Khyber Pakhtunkhwa province, specifically in the districts of Swabi, Mardan, Nowshera, and Charsadda. These districts produce over 90% of the country's Flue Cured Virginia (FCV) tobacco.

Method of cultivation:

Transplanting: Seedlings are grown in seedbeds and then transplanted to the main field.

Direct sowing: Seeds are sown directly in the main field.

Tobacco is a labour-intensive crop, and it requires regular attention and care. Farmers weed the fields, water the plants, and apply fertilizer. They harvest the tobacco leaves at the right time and cure them properly.

Do You Know?

Tobacco is a ratoon crop. Ratoon crop is a second crop that is grown from the roots of the previous crop.



Tobacco field

Other Crops

Gram, Bajra, and Jowar production decreased in 2020-21 due to smaller areas under cultivation and unfavorable weather conditions. Barley, Rapeseed & Mustard, and Tobacco production remained the same as the previous year. The production of Barley, Rapeseed & Mustard and Tobacco remained at low production level.

In 2020-21, production of pulses including Moong, Mash, and Potato increased significantly, while production of Chillies and Onion decreased slightly. Masoor production remained the same. Pakistan imported 2.917 million tonnes of edible oil in 2021, while local production was 0.374 million tonnes.

Fruit farming

Fruit farming is a significant part of Pakistan's economy by providing employment and generating foreign exchange earnings. Pakistan is the fifth largest producer of fruits in the world, Pakistan produces a wide variety of fruits, including apples, mangoes, citrus fruits, bananas, grapes, guavas, dates, and peaches.



Fruit Farming in Pakistan

Fruit farming is practiced in all four provinces of Pakistan, but the major fruit growing regions are in Punjab, Sindh, and Khyber Pakhtunkhwa. Punjab is the largest fruit producing province in Pakistan as it accounts for over 60% of the country's total fruit production. The major fruit growing districts in Punjab include Multan, Faisalabad, Toba Tek Singh, and Sargodha. Sindh is the second largest fruit producing province in Pakistan that accounts for around 25% of the country's total fruit production. The major fruit growing districts in Sindh include Jacobabad, Larkana, and Shikarpur. Khyber Pakhtunkhwa is the third largest fruit producing province in Pakistan, accounting for around 10% of the country's total fruit production. The major fruit growing districts in Khyber Pakhtunkhwa include Mardan, Nowshera, and Swabi. Hunza and Swat are known for apples and apricots. In Balochistan, varieties of apples, dates, apricots and grapes are produced. Pakistan is also a major producer of dry fruits, such as almonds, walnuts and raisins.

Government Support Schemes for Fruit Farmers

The government is providing subsidies to farmers for purchasing fruit plants and fertilizers. The government is also providing training to farmers on modern fruit farming practices. National Program for the Development of Horticulture (NPDH): The NPDH provides subsidies to farmers for the purchase of fruit plants and other agricultural inputs. It also provides training to farmers on modern fruit farming practices such as, cold storage for fruits protection and preventing harvest loss, pest and disease management, irrigation, fertilization, and harvesting.

Contribution of Agriculture to employment sector

Agriculture is essential to Pakistan's economy, food security, and employment. It contributes 19.2% to GDP and employs 38.5% of the labor force. Over 65% of the population relies on agriculture for livelihood. However, agricultural growth has been slow due to shrinking arable land, climate change, water shortages, and rural-to-urban migration. Increasing agricultural productivity requires new approaches. Agriculture can play a vital role in spurring economic growth, but it faces challenges such as climate change, water shortage, and rising input prices.

C. Livestock farming

Livestock farming is the raising and management of domesticated animals for the production of meat, milk, eggs, and other animal products. It is one of the oldest and most important forms of agriculture, and it is a significant contributor to the country's economy, accounting for around 11% of GDP. The sector also plays an important role in food security, providing a source of high-quality protein. Livestock farming can be divided into three main types: nomadic, settled, and transhumance. The details of each type will be discussed next.

Nomadic

Nomadic livestock farming is a traditional form of livestock farming in which herders move their animals from place to place in search of pasture and water. Nomadic livestock farming is typically practiced in arid and semi-arid regions, where there is limited availability of resources. Nomadic livestock farming is practiced by the Baloch and Pashtun tribes in the Balochistan and Khyber Pakhtunkhwa provinces of Pakistan. The main types of livestock raised by nomadic farmers are sheep and goats.

Settled

Settled livestock farming is a type of livestock farming in which animals are kept in permanent enclosures. Settled livestock farming is typically practiced in areas with more abundant resources, such as arable land and water. Settled livestock farming is practiced throughout Pakistan, but it is particularly concentrated in the Punjab and Sindh provinces. The main types of livestock raised by settled farmers are cattle, buffaloes, goats, and poultry.

Type of Livestock	Areas	Cities
Cattle, Buffaloes	Punjab, Sindh	Lahore, Karachi, Faisalabad
Sheep	Balochistan, Khyber Pakhtunkhwa, Kashmir	Quetta, Peshawar, Muzaffarabad
Goats	Balochistan, Khyber Pakhtunkhwa, Kashmir, Punjab, Sindh	Quetta, Peshawar, Muzaffarabad, Lahore, Karachi
Poultry	Punjab, Sindh	Lahore, Karachi, Faisalabad



Nomadic Livestock

Transhumance

Transhumance livestock farming is a type of livestock farming in which herders move their animals between different pastures seasonally. Transhumance livestock farming is typically practiced in mountainous regions, where there is a seasonal variation in the availability of pasture. Transhumance livestock farming is practiced by the



Gujjar and Bakarwal tribes in the Kashmir region of Pakistan. The main types of livestock raised by transhumance farmers are sheep and goats.

Do You Know?

What are the sustainable approaches to agricultural development?

There are a number of different organic farming methods that can be used as sustainable approaches to agriculture in Pakistan. Some of the most common methods include:

- 1) **Crop rotation:** Planting different crops in the same field in sequence. This helps to improve soil fertility and reduce the risk of pests and diseases. One patch of land is left to rest called fallow land.
- 2) **Intercropping:** Planting two or more different crops in the same field at the same time to improve soil fertility and reduce weed competition.
- 3) **Cover cropping:** Planting crops that cover the soil surface. This prevents soil erosion.
- 4) **Composting:** Composting is making of compost from a variety of materials, such as plant residues, manure, and food scraps.
- 5) **Biological pest control:** It is the use of natural predators and parasites to control pests. For example, ladybugs can be used to control aphids, and lacewings can be used to control whiteflies.
- 6) **Farmland must not be converted into housing schemes.** More water schemes may be helpful in sustaining agricultural activities.

Organic farming can be practiced on a variety of scales, from small backyard gardens to large commercial farms. In Pakistan, organic farming is most commonly practiced by small-scale farmers.

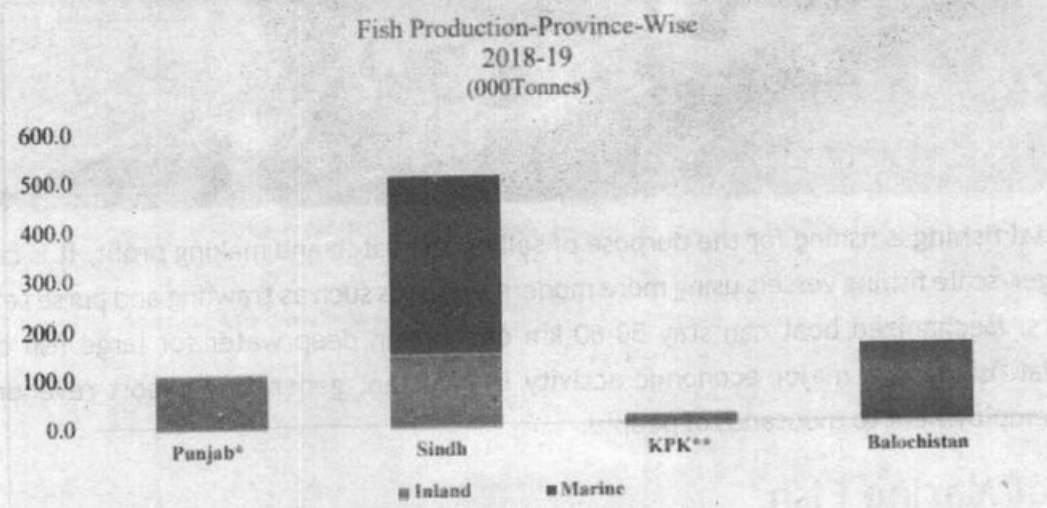
Fisheries in Pakistan

The fisheries, a subsector of agriculture in Pakistan, is concerned with the harvesting and processing of aquatic resources, such as fish, shellfish, and crustaceans. It is a major contributor to the country's economy, providing food security, employment, and export revenue. Fisheries account for 1.6% of total exports in 2020. The major importing countries for Pakistani fisheries are Thailand, China, Vietnam, the UAE, South Korea, Malaysia, Kuwait, Japan, Saudi Arabia, and Indonesia. During the Covid pandemic, the import of fish declined significantly from 22 million in 2017 to 6 million in 2020.

Fish Production in Pakistan

Fisheries are divided into three main types: inland fisheries, marine fisheries, and aquaculture.

The graphic representation of fish production province-wise shows the total fish production in thousand tonnes for the year 2018-19. Punjab and Khyber Pakhtunkhwa (KPK) only have inland fisheries, while Balochistan has marine fisheries and Sindh has both inland and marine fisheries. The fish production data for Punjab includes fish production from Mangla Dam, and the fish production data for KPK includes fish production from Gilgit-Baltistan.



Source: Ministry of Food and Security

Marine Fishing

Pakistan's 1,050-kilometer coastline along the Arabian Sea is home to two major fishing centers: Sindh and Makran. These coasts have rich marine fishing grounds that contribute about 64% of the country's total fish production, compared to 36% from inland fisheries. Karachi and Korangi are the main fishing ports of Sindh, while Makran has smaller ports such as Sonmiani, Jiwani, and Ormara. Gwadar port is also being developed as a modern fishing center with a state-of-the-art fish curing yard, ice factory, and refrigeration plant.

Types of Marine Fishing

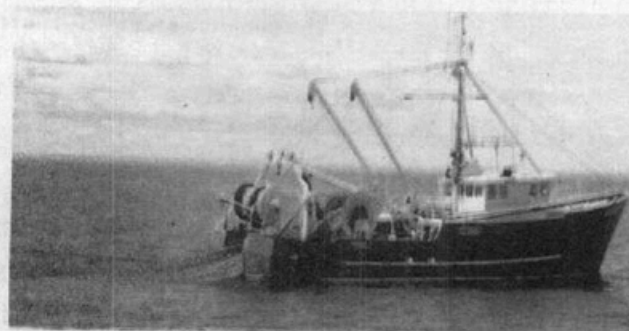
Subsistence fishing: is fishing for the purpose of consumption of the farmer and his family as fish is the main component of their diet. It is carried out by small-scale fishermen using traditional methods such as handlines, nets, and traps. Traditional boats can stay only up to 5km away from the coast. Subsistence fishing catch is less in amount therefore alternative sources of income are generated by the subsistence fishermen such as making fish feed, fish net and boat repairs etc.



Commercial fishing is fishing for the purpose of selling the catch and making profit. It is carried out by larger-scale fishing vessels using more modern methods such as trawling and purse seining, gill netters. Mechanized boat can stay 50-60 km offshore in deep water for large fish catch. Commercial fishing is a major economic activity in Pakistan, generating export revenue and providing employment to thousands of people.

Types of Marine Fish

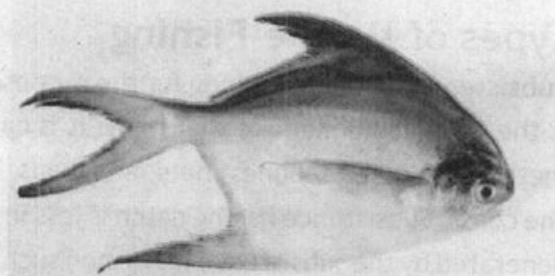
Sharks	Drums	Mackerel
croakers	Demersal	Catfish



Sustainable Development of Marine Fisheries

Set catch limits: The government can set catch limits for different fish species based on scientific assessments of sustainable yields. This will help to prevent overfishing and ensure that fish populations have a chance to recover.

Close fishing grounds during spawning seasons: Spawning seasons are critical for fish reproduction. By closing fishing grounds during spawning seasons, the government can help to protect fish stocks and ensure that future generations of fish can thrive.



White Pomfret (marine specie)

Ban the use of destructive fishing equipment: Destructive fishing equipment such as dynamite and bottom trawls can damage fish habitats and kill the fish indiscriminately. The government can ban the use of destructive fishing gear to protect fish stocks and the marine ecosystem.

Inland fisheries:

Inland fisheries in Pakistan employ a variety of fishing methods, including cast netting, gill netting, trawling, hook and line fishing, and spearfishing, to harvest fish and shellfish from freshwater lakes, rivers, reservoirs, and abandoned channels of canals and rivers. The most common fish species caught in inland fisheries are carp, catfish, and perch, Palla, Thalla, Rahu and Trout.

According to the Food and Agriculture Organization of the United Nations (FAO), inland fisheries in Pakistan employed over 211,609 people in 2014, representing a significant portion of the total employment in the Pakistani fisheries sector. Inland fishing is an important source of employment in rural areas of Pakistan, providing a livelihood for many people who may not have other job opportunities. It also plays a role in reducing poverty and improving food security.

Sustainable Development of Inland Fisheries

The Pakistani government is working to promote the sustainable development of inland fisheries through measures such as stocking fish populations, regulating fishing practices, and protecting fish habitat.

Aquaculture/ Fish farm:

Aquaculture is the farming of fish and shellfish in controlled environments. Aquaculture fisheries are becoming increasingly important as the demand for seafood grows. Fish farms need a reliable supply of clean water. This water is used to fill the ponds and to maintain the water quality in the ponds. Fish feed is purchased from commercial suppliers or

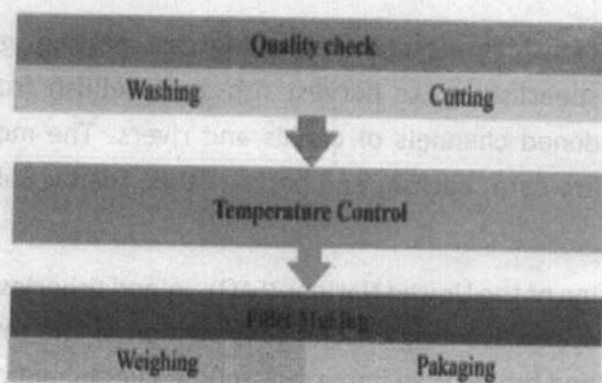


Trout Fish Farm

produced on-farm. Fish farms typically use a variety of equipment, such as pumps, aerators, and feeders. This equipment is used to maintain the water quality in the ponds, feed the fish, and monitor their growth and health. Trees are planted to maintain the air quality and oxygen level. The main fishing centres are Haleji in Thatta, Manchar lake in Dadu district, the river Indus at Kotri, Sukker, reservoirs of Tarbela and Mangla dam.

Types of farm Fish.

Almost all the inland types of fish are reared at the farm including Palla, Thalla, Rahu, Murrel, Grass carp, silver carp and Trout.



Do You Know?

Machineries used for Fish Processing

Machineries Fish Meat Separator
Individual Quick-Freezing Machine (IQF)
Icing Machine
Metal Detector Machine
Contact Plate
Freezer Machine for Chilling

To make value-added seafood products, a specific process is followed, depending on the type of fish. The diagram shows the detailed processing of surimi and cuttlefish only.

Problems of the fishing Industry

There are 4 of the major problems of the fish industry in Pakistan:

Overfishing: Overfishing is the biggest threat to the sustainable development of the fish industry. It is caused by high demand for fish, inadequate fishing regulations, and illegal fishing.

Pollution: Water pollution from industrial and agricultural waste contaminate fish stocks and make them unsafe for human consumption.

Climate change: Climate change is causing sea levels to rise and water temperatures to increase. This is disrupting fish habitats and making it more difficult for fish to reproduce.

Lack of infrastructure and technology: The fish industry lacks modern infrastructure and technology. This makes it difficult for fishermen to catch and process fish efficiently.

Government efforts to develop fisheries

- **Curtailing overfishing:** The government is working to reduce overfishing through a number of measures, including setting catch limits, closing fishing grounds during spawning seasons, and banning the use of destructive fishing gear.
- **Fighting pollution:** The government is working to combat water pollution through a number of measures, including investing in wastewater treatment plants, regulating industrial and

agricultural runoff, and raising awareness of the importance of clean water.

- **Adapting to climate change:** The government is working to adapt to climate change by investing in coastal infrastructure, developing new fishing methods, and helping fishermen to diversify their livelihoods.
- **Improving infrastructure and technology:** The government is working to improve infrastructure and technology in the fish industry by investing in fishing harbors, processing facilities, and cold storage facilities. The government is also providing training and support to fishermen on the use of modern fishing methods and technologies.

What I have Learned

- ✓ Agriculture sector is facing the problems of water scarcity, climate change, and land degradation.
- ✓ Agriculture provides food for a growing population and helps to lift people out of poverty.
- ✓ Kharif crops are grown during the monsoon season i.e., June to September in Pakistan.
- ✓ Rabi crops are sown in October and November and harvested in February and March. They provide food during winters.
- ✓ Agriculture as a system is a complex web of inputs, processes and outputs that work together to produce food and other agricultural products.
- ✓ Pakistan has a long coastline and a number of inland water bodies, which provide abundant fishing resources. The fishing sector employs over 2 million people in Pakistan, and contributes about 1% to the country's GDP.

Exercise

Answer the following questions by choosing the best answer A, B, C or D.

1. Fisheries export in Pakistan in 2020 account for:
A. 5% B. 2.3% C. 1.6% D. 0.6%
2. What is one of the biggest challenges facing the fishing sector in Pakistan?
A. Overfishing B. Illegal fishing C. Pollution D. All of the above
3. What is the most cultivated cash crop in Pakistan?
A. Wheat B. Rice C. Cotton D. Sugarcane

4. What are three of the benefits of cash farming in Pakistan?
- A. It provides income for farmers
 - B. It helps to meet the country's food needs
 - C. It creates jobs in the agricultural sector
 - D. It is for famer and his family use
5. Which of the following is a method of cultivation of rice?
- A. Broadcasting
 - B. Transplanting
 - C. Both A and B
 - D. None of the above
6. Which of the following is a method of cultivation of sugarcane?
- A. stalk cutting
 - B. Transplanting
 - C. Trench planting
 - D. None of the above
7. Which of the following is a key difference between nomadic and transhumance herding?
- A. Nomadic herders move in search of water and pasture, while transhumant herders follow a regular seasonal migration pattern.
 - B. Nomadic herders typically have permanent homes, while transhumant herders do not.
 - C. Nomadic herders raise a variety of livestock, while transhumant herders typically specialize in one or two types of livestock.
 - D. Nomadic herding is practiced in all parts of the world, while transhumance is only practiced in certain regions.
8. What is one of the benefits of nomadic and transhumance herding?
- A. It allows herders to access a wider range of grazing resources.
 - B. It helps to reduce the risk of overgrazing in any one area.
 - C. It allows herders to avoid conflict with other herders or farmers.
 - D. All of the above
9. Which of the following is a difference between inland fish farming and aquaculture farming?
- A. Inland fish farming is practiced in freshwater bodies, while aquaculture farming can be practiced in both freshwater and saltwater bodies.
 - B. Inland fish farming typically involves smaller-scale operations, while aquaculture farming can involve both small-scale and large-scale operations.
 - C. Inland fish farming is typically practiced in developing countries, while aquaculture

farming is typically practiced in developed countries.

D. Inland fish farming is a newer practice, while aquaculture farming has been practiced for centuries.

10. Which of the following is a similarity between inland fish farming and aquaculture farming?

A. Both practices involve the farming of aquatic organisms.

B. Both practices can be used to produce food for human consumption.

C. Both practices can provide income and employment opportunities for people.

D. All of the above.

Answer the following questions briefly

1. How do the inputs, processes and outputs on a cash crop farm are different from a small-scale subsistence farm?
2. Identify fishing ports of Sindh and Makran coast.
3. Describe the appearance of rice and wheat crop.
4. How are the temperature, rainfall and soil conditions of sugar cane differ from cotton crop.
5. Explain three major problems common to all cash crops which hinder the growth.
6. Suggest approaches to sustainable agriculture in Pakistan.
7. Compare the contribution to employment sector of the following:
 - i. Cotton and Rice
 - ii. Fisheries
 - iii. Livestock

Answer the following questions in detail in your own words

1. What are the important strategies for the sustainable growth of cash crops in Pakistan? Explain with reference to rice, cotton, sugar cane and wheat.
2. Explain the importance of Maize, Tobacco and other crops for the economy of Pakistan.
3. To what extent livestock farming is important for the economic development of Pakistan?
4. Differentiate between the method of rice, tobacco and wheat cultivation.
5. Describe the fishing methods used by marine and Inland fishing in Pakistan.
6. Suggest measures to protect and develop the fishing industry in Pakistan.

Forming Opinions (Debate)

If we develop more fish farms in Indus plain by using abandon channel of rivers or canal water, it will reduce the burden on crops and livestock. Do you agree. Give reasons and specific examples.

Project

Investigate the use of technology in agriculture, including precision farming, drones, and robotics.

Glossary

Fisheries: The industry or activity of catching or raising fish.

Subsistence agriculture: A type of agriculture in which the farmer produces enough food to feed their family and their livestock, but not enough to sell.

Commercial agriculture: A type of agriculture in which the farmer produces food to sell for profit.

Cash crop: A crop that is grown to be sold for money, rather than for consumption by the farmer.

Food crop: A crop that is grown to be eaten.

Livestock: Animals that are raised for their meat, milk, eggs, or wool.

Crop rotation: The practice of growing different crops in the same field in a series of years. This helps to improve soil fertility and reduce the risk of pests and diseases.

Irrigation: The artificial watering of land or crops.

Fertilizer: A substance that is added to soil to improve its fertility and increase crop yields.

Pesticide: A substance that is used to kill pests, such as insects, weeds, or fungi.

Aquaculture: The farming of aquatic organisms, such as fish, shellfish, and seaweed.

Fishery management: The process of managing fish populations and their habitats to ensure sustainable fishing.

Overfishing: The catching of fish at a rate that is faster than the fish population can reproduce.

List more words and write their meaning that you find difficult in this chapter.
