

## Agricultural Development

**Agriculture:** is a business of primary sector, when you extract resources from nature. It's a primary industry obtaining raw material from the ground for immediate consumptions or for further processing.

Agriculture is a deliberate effort by humans to modify earth's surface either by growing crops or by rearing animals. It is the most common activity in Pakistan. Agriculture produces crops for export for foreign exchange, GDP & provides a raw material for different industries. The profit is used for rural development, utilization of land with water & fertile points.

### 3 types of farming:

Small-Scale Subsistence Farming: produces food and raw materials mainly for the people working at the farm or to be specific, when the farmer & his family consume the harvested crop. Any nominal surplus for sale is a bonus, not an expectation & not a permanent source of income. These farms are not more than 5 hectares & these farmers may have other odd/part-time jobs such as being a cobbler or a blacksmith etc. The crops grown is never of surety while surplus in favorable climatic conditions is sold to the local village vendor. Profit may use back on the farm, or other household things/necessitates and new advancement in the farm, used to pay of loans. Traditional methods are used.

Cash-Crop Farming (arable or fruit): is growing agricultural crops for sale. Farmers prefer growing those crops which can bring high yields & maximum profits. Modern techniques are used & extra labor is employed, however, not all commercial farms are mechanized. A commercial farmer selects the crop on the basis of demand, price, & favorable government policies.

Livestock Farming/Pastoral Farming:

### 3 types of crop farming:

Inundation Farming: growing crops with flood-water. E.g. Active flood-plain

Barani Farming: "Rain-fed" is when crops grow on rainfall.

Irrigation Farming: growing crops with alternate irrigation methods.

Inputs  Processes  Output

**Inputs:** requirements to carry out processes.

Natural Inputs (Physical): the factors of nature that affect the possibilities for different crops & animals. For example;

- Land

- Climate (Temperature/Rainfall)
- Water
- Soil
- Seeds

Human Inputs (Economic): the money involved. For example;

- Machinery
- Fertilizers
- Pesticides (Pest: any unwanted living organism which has a potential to cause damage (Parasitism); Insects-Insecticides, Herbs-Herbicides, Fungus-Fungicides, Rodents-Rodenticide)
- Capital
- Labor
- Irrigation
- Seeds (HYV's: High Yielding Variety/Genetically Modified Seeds/Improved Seeds)
- Knowledge & Skills
- Traditions

**Processes:** set routines or procedures lead to outputs. For Example;

- Plowing: to enter-mix soil for seed germination by the use of metal/wooden plow or machines.
- Sowing
- Irrigating
- Fertilizing
- Weeding (spraying pesticides)
- Harvesting
- Threshing
- Transplanting
- Milking
- Breeding etc. for livestock.

**Outputs:** desired product.

Food Crops: For Example;

- Wheat
- Maize
- Rice
- Corn
- Vegetable
- Flowers

- Fruits

Cash Crops: For Example;

- Egyptian Pema Cotton
- Wheat
- Rice
- Sugarcane
- Corn
- Cotton
- Tobacco
- Oil Seeds

Animal/Livestock/Pastoral Products: For Example;

- Eggs
- Meat
- Milk & other dairy (yogurt & butter etc.)

By-Products/Waste: For Example;

- Husk
- Straw
- Chaff
- Cow-dung
- Manure
- Molasses

Output is then transported in the market & sold for profit. The profit is then reinvested to buy seeds, shed, pesticide sprays & fertilizers in a commercial farm.

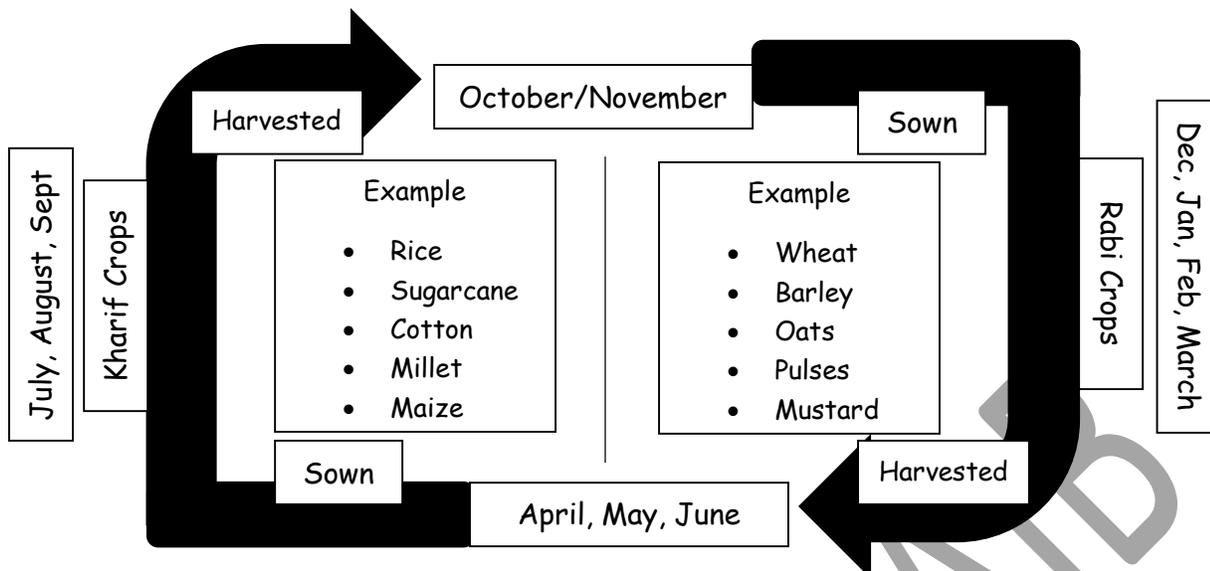
<b>Subsistence</b>	<b>Input</b>	<b>Commercial</b>
Small, fragmented, uneven land with/without ownership	Land	Vast, plain, extensive flat lands with ownership
	Temperature, 25-35°C, Warm	
	Rainfall 750-1000mm	
Bare, dry, lose, coarse grain, light in color with infertility	Soil	Fine, moist, dark grain, rich in nutrients.
Desi Variety	Seeds	HYV's (High Yielding Variety)
Little or no investment	Capital	High Capital Investment
Family	Labor	Workers with proper wages & trainings.

Inherited, traditional	Skill	Skilled workers, learned from training centers.
Experience from time	Knowledge	Faisalabad Agricultural University Peshawar Agricultural University
Hand-tools & implements	Machinery	Modern machinery equipment, tractors, threshers, combine harvesters.
Manure, cow-dung	Fertilizers	Chemical fertilizers with a combination of nitrates: phosphates: potassium
Scare-crows.	Pesticides	Chemical depending upon the pests, Ariel spray

Subsistence	Processes	Commercial
Animal power, wooden plow, slow, inefficient, manual labor	Plowing	1 person, efficient, quick, tractor, saves-time
Time-consuming, always manual, inefficient	Sowing	Machinery
Persian-wheel, karez, inundation, traditional	Irrigating	Tube-well, tractor-operated
Spread by hand or bucket	Fertilizing	Tractor back, chemical Ariel spray
Scare-crow, no surety/reliability	Pesticides	Spraying machines, Ariel spray
Manual, sickle blade wheat	Harvesting	Combine harvesters (thresher, harvester, chaff)
Manually done by either humans or animals Hit by wooden stick to remove grains & chaff, time consuming	Threshing	Combine harvesters, mechanical thresher (chaff for chipboard)
Manually germinated in soil	Transplanting	Mechanical, local, transplanting machine

Subsistence	Outputs	Commercial
Food crops in small amounts	Crops	Cash crops, industrial crop used as raw material Food crop in bulk

**Agricultural Products in Pakistan:** crops sown in winter & harvested in summer are Rabi crops, while crops sown in summer & harvested in winter are Kharif crops. Wheat is the most important & extensively-grown crop in Pakistan. The acreage depends on the type of soil, availability of water & climatic conditions.



Winter	Early Summer	Summer	Post Monsoon/Early Winter
Dec, Jan, Feb, March	April, May, June	July, August, September	October, November
Rabi Crops grow	Rabi Crops harvest Kharif Crops sown	Kharif Crops grow	Rabi Crops sown Kharif Crops harvest
Western depressions	Convictional currents (upper Pakistan)	Summer monsoon	Transhumance begins here, seasonal migration.
Winter monsoon	Tropical Cyclones	Primary	Relief rainfall
Snowfall in northern mountains		Secondary (southern Pakistan)	Winter monsoon
		Tropical cyclones	Convictional currents

Crops	Area (000 hectares)	Production (000 tons)	Percentage share by value
Wheat	8566	23,517	39.22
Cotton	2835	13,595 1000 Bales	24.61
Rice	2571	6,160	15.37
Sugar-cane	1046	58,038	11.68
Maize			5.39
Oilseeds			1.29
Tobacco			0.42
Other			1.02

### Main Crops:

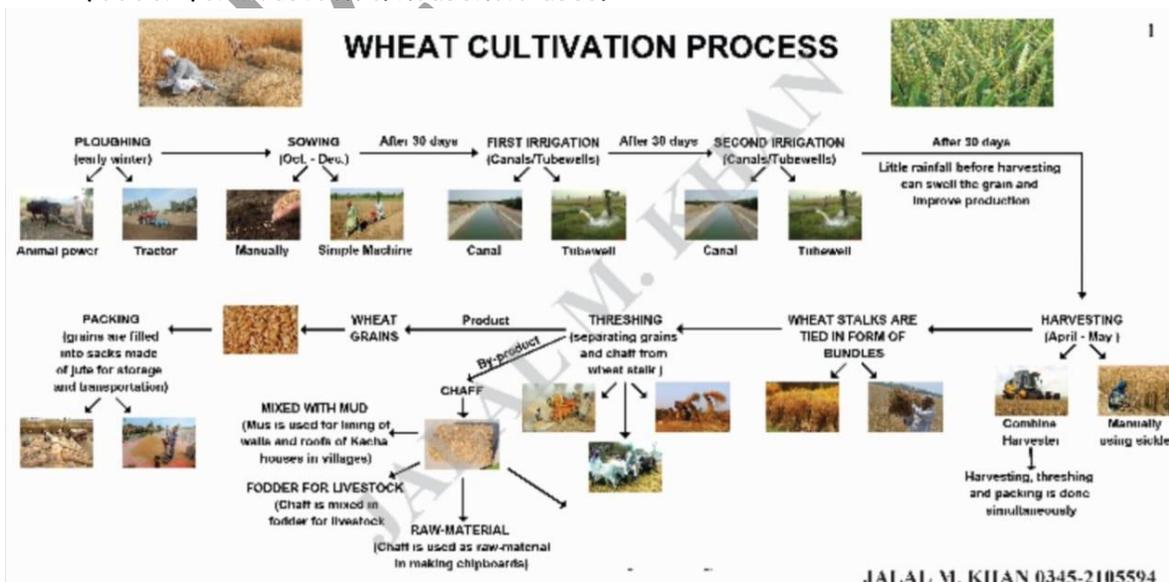
**Wheat:** is a staple/principle food crop of Pakistan. It's a Rabi crop. The canal irrigated areas of Sindh & Punjab meet most of the requirements for wheat. The soil should be rich in alluvium & the land is flat or undulating. In some parts of KPK & Potwar Plateau, wheat is grown on Barani land. Infertile soil & rugged landscape doesn't support Wheat Cultivation. Wheat's share to GDP is 3.1, to make chipboard. Golden-brown crop.

Kohson-95 & Maxi Pak-HYV's of wheat which is expensive & not readily available, more water & more fertilizers are required.

The yield of wheat has gradually increased with the introduction of new wheat varieties & improved methods such as improved water management system, chemical fertilizers are widely used & the govt. is providing loans to purchase machinery like tractors. However, Pakistan is rarely self-sufficient in wheat because of increasing population & gradual decrease in cultivable areas.

### Cultivation of wheat:

- Land is ploughed to make soil softer in early winter (October/November)
- Sow in early winter (October/November). 90-120 days is total growth time.
- 30 days after sowing, 1<sup>st</sup> irrigation through tube-wells & canals, give fertilizers.
- 30 days after 1<sup>st</sup> irrigation, give the 2<sup>nd</sup> irrigation & fertilizers.
- 30 days after 2<sup>nd</sup> irrigation, little rainfall before harvesting swells up grains & improve produce, making bumper crop/surplus production.
- Harvesting in early summer (April/May/June)
  - Combine harvesters: harvest, thresh (separate grains from chaff), & pack
  - Manually: using sickle
  - Simple harvester: local machine
- Wheat stalks tied in forms of bundles manually (if not done by combine harvester)
- Threshing (if not done by combine harvester) using sticks, thresher machines or animals power (cows stepping on it). It is the process of separating grains & chaff from wheat stack. It gives product of grains which is transported for imports & domestic use.
- The byproduct chaff is used to make chipboard, mixed with mud to make houses, fodder for livestock & household uses.



### **Geographical Requirements of Wheat:**

- Mild temperature, at the time of growing & warm temperature for ripening.
- Moderate Rainfall is important to make bumper crop.
- Mostly depends on irrigation.
- Stiff loamy or clayey soil but doesn't thrive if there is stagnant water.
- Flat or undulating ground to facilitate machinery.
- Well-drained land.

Wheat production areas in Punjab-Faisalabad & Sialkot

Wheat production areas in Sindh-Nawab Shah

### **Cultivation on Barani Farms:**

- Depends upon the seasonal rainfall & temperature.
- Sowing begins in dry months of Oct-Nov at temp 15°C.
- 13-32mm of rainfall provides moisture to seeds help germinating.
- Wheat growing from western depression, timely, frequently & in light showers.
- Harvesting, wheat stalks are tied in the form of bundles.
- Harvesting period from April-May 25-31°C temperature for crop ripening.
- Wheat is taken for threshing done manually or with animal power.
- Grains are then stored for family use or sent to the market for sale.

**Rice:** is the 2<sup>nd</sup> largest food crop grown in Pakistan. It is now a major export item accounting for nearly 6.5% of total export earnings & contributes about 1.7% to GDP as it's a staple food in Bangladesh. It ensures food security for Pakistan & increasing population. It can be easily grown in water-logged areas. It's a Kharif crop. Irri-Pak HYV's are used.

The yield of rice has gradually increased with the introduction of improved rice varieties such as basmati-super, increased research efforts on rice cultivation methods, better availability of HYV's, pesticides & fertilizers, availability of agricultural loans & credit facilities as well as irrigation water. However, Pakistan is rarely self-sufficient in rice because of increasing population & gradual decrease in cultivable areas. It requires cheap & abundant labor.

### **Cultivation of Rice:**

- Rice is a transplanted crop which means the plant is sown into smaller nurseries & then transplanted to large rice field/Paddy. Takes 4 months to grow.
- Field is ploughed with already flooded water.
- Rice seeds are sown into beds/nurseries in early summer (April/May/June)
- When rice reaches about 9-10 inches, it is transplanted into the Paddys with mud-bunds/embankments around the farm, so 30-37 centimeters of water is retained.

- The soil should be loamy, clayey & full of nutrients.
- Around 1500-2000mm of rain is needed & irrigation can be done by tube-wells & perennial canals to fulfill the gap b/w natural rainfall & water requirements.
  - Transplanted manually & rice cultivation is the most labor intensive job.
  - Rice transplanters are used for mechanized rice cultivation.
- Weeding & spraying pesticides is done manually.
- Fertilizers are used.
- Once rice is full grown, water is drained manually.
- Harvesting done manually, but sometimes by combine harvesters.
- Threshing is carried out by animal power or mechanical threshers.
- Rice grains are sent to rice mills/shellers.
- Labor rubs the rice in their oily hands to remove shells.
- Rice is polished & packed. It gives product of grains which is transported for imports & domestic use.
  - Gives good quality rice: Basmati Super.
  - Low Quality rice: Irri-Pak (international rice research institute)
- The byproduct husk is used as a raw material in making cardboard, fodder for livestock, mixed with mud for lining the roofs & walls of slum mud houses.

#### **Geographical Requirements of Rice:**

- Mean temperature 20-30°C with no cold season
- Heavy Rainfall is important.
- Sunny harvesting time.
- Loamy or clayey soil.

Rice production areas in Punjab-Gujranwala & Sialkot

Rice production areas in Sindh-Nawab Shah & Larkana

Rice production areas in Balochistan-Jaffarabad & Naseerabad

**Cotton:** is an eminent cash crop & a main source of foreign exchange earnings for the country. In addition to providing raw material to the local textile industry (industrial raw material), the raw cotton & cotton products also gives 60% & above of the major export, contributing to 3% in GDP. It's a Kharif crop. Desi varieties, & important cotton varieties are Nayab-78 & Neelam 121.

The yield of cotton has gradually increased with the introduction of improved fertilizers, machinery, pesticides & HYV's are used. Increased availability of irrigation to make up for the deficiency of rainfall. Increased capital. However, risk of rain, strong winds, sandstorms, frost, shortage of chemical fertilizers & investments may lead to problem regarding cotton cultivation. Too much heat, summer floods, overflowing river water, bad

HYV's also decrease the produce. Moreover, due to extensive summer rainfall the river channel overflows, waterlogging the land, submerging the roots causing less production of cotton as a result less textile production, less GDP, increased costs of production, lower employment, burden on the country's economy etc. Leaf curl due to virus attacks the leaves from ground soil, causing unripen bolls to fall without growth & locust attack. A single frosty night, moisture freezes & when it thaws crops are ruined.

### **Cultivation of Cotton:**

- Seeds are sown 30-35 cm apart, cotton grows like a bush & needs space. Extensive labor force in Pakistan.
- 30 days after sowing, 1<sup>st</sup> irrigation through tube-wells & canals, give fertilizers.
- 60 days after 1<sup>st</sup> irrigation, give the 2<sup>nd</sup> irrigation, fertilizers & herbicides.
- 1500-2000mm rainfall.
- Cotton bolls ripen during the dry months of October & November (35°C) because crop is sensitive to frost.
- When plant reaches 130-150cm, picking (harvesting) is always done manually.
- Fibers shouldn't even get some rain or fiber is destroyed.
  - Mostly women workers (force) is used for cotton picking, because women work force is cheaper than men, many rural men migrate to the cities for money. Women are abundant in supply, women have delicate, tender & soft hands resulting/ causing lesser damage to the fiber. Women are patient workers & work carefully pick ripen cotton only. Cotton boll do not ripen simultaneously as some grow early. Multiple women are used. The total cotton picked per day which is weighed & wages are given accordingly.
- Cotton bolls are packed/filled into bags & transported by roads in trucks to ginning mills to get packed.

### **Geographical Requirements of Cotton:**

- Mean temperature 25-35°C with no cold season
- Ample Rainfall is important.
- Medium Loam soil, natural manure.
- Leveled land.

Cotton production areas in Punjab-Multan & Faisalabad

Cotton production areas in Sindh-Sukkur & Hyderabad

Cotton production areas in Balochistan-Lasbella

**Sugarcane:** is an eminent industrial raw material for the production of sugar & gur (jaggery) a food item. It's an eminent cash crop of Pakistan which also holds a share in export, contributing to 1.5% in GDP. It's a Kharif crop. Desi varieties are Pak Upland &

important sugarcane varieties are Thatta-10 & Larkana 2001. Sugarcane has the highest acreage/yield.

The yield of sugarcane has gradually increased with the introduction of improved fertilizers, machinery, pesticides & HYV's are used. Increased availability of irrigation to make up for the deficiency of rainfall. Increased capital. However, shortage of chemical fertilizers & investments may lead to problem regarding sugarcane cultivation. Bad HYV's also decrease the produce.

### **Cultivation of Sugarcane:**

- Stalks of sugarcane of 30 cm height are planted in April & May 30 cm apart.
- 1500-2000mm rainfall.
- Sugarcane ripen at a temperature of 30°C.
- The quantity & quality of the yield depends on:
  - Frequency of irrigation.
  - Application of chemical fertilizers; Nitrates: Phosphates: Potassium Potassium & Nitrogenous fertilizers are primarily needed
- Ratoon crops leave a 30 cm stem behind. Sugarcane can be ratooned 2-3 times.
- Harvesting is done manually by extensive labor using a sickle in (early winter) when the crop is 6-7ft.
- Sugarcane stalks are tied in bundles.
- Bundles are made & to be transported by tractors, trolleys, trucks, lorries, animal cart etc. immediately to the sugar-mills nearby to avoid delays, loss of moisture & sugar content.
  - They need to be transported immediately or the sugarcane starts to lose moisture content as evaporation continues. Immediate transportation is important as when the sugarcane loses moisture, it loses weight & the profit of the farmer begins to decrease.
  - The sugarcane starts rotting & loses sugar content.
  - Sugarcane is heavy, bulky material & is costly to transport.
- Industry:
  - Cleaning with water to remove dirt.
  - Scrubbing with limestone to remove smell.
  - Crushing sugarcane with large crusher to extract syrup & juice.
  - Evaporation with heat by either electricity, gas or bagasse burning to evaporate moisture to attain solid of sugar.
    - ➔ Steam is produced which is used to power turbines which are connected to generators which produce electricity which is then used to power themselves & the natural grid system (for selling).
    - ➔ Color.

- ➔ Molasses is a by-product which is edible.
  - ★ Livestock feed.
  - ★ Alcohol for wine & ethanol  $C_2H_5OH$  for other stuff (pharmaceutical & cosmetic etc.)
  - ★ Imported crude oil containers brought crude oil & took molasses as used for wine in foreign countries.
  - ★ Citric acid.
- Brown sugar is chemically treated to attain crystals of white sugar.
- The byproduct bagasse is attained after the entire process & extraction of syrup is done. It is used to make chipboard & livestock feed. Many industries burn bagasse to use heat to boil the sugar syrup for evaporation so it is also used as fuel energy.

### **Geographical Requirements of Sugarcane:**

- Requires temperature 25-35°C.
- Ample Rainfall is important 1520mm.
- Loam soil, natural manure & fertilizers, nutrients consuming exhausting the soil.

Sugarcane production areas in Punjab-Sargoda & Faisalabad

Sugarcane production areas in Sindh-Thatta & Hyderabad

Sugarcane production areas in KPK (on terraced fields)-Peshawar & Mardan

### **Minor Crops:**

**Maize/Corn:** is the highest yielding cereal crop. It's the 3<sup>rd</sup> most important cereal crop after wheat & rice. It's a Kharif crop.

### **Uses:**

1. Corn oil
2. Corn syrup
3. Corn starch
4. Cornflakes
5. Corn flour
6. Fodder

### **Geographical Requirements of Maize:**

- Requires temperature up to 35°C.
- Rainfall between 50-500mm.
- Porous soil.

Maize production areas in Punjab-Multan & Faisalabad

Maize production areas in KPK (97%)-Peshawar, Swat & Mardan

**Tobacco:** an eminent cash crop. Grown small-scale, but gives good value & high-yield. Good quality tobacco is known as Virginia Tobacco and HYV. It's a Rabi crop.

**Uses:**

1. Cigarettes
2. Chewing item
3. Medicines

**Geographical Requirements of Tobacco:**

- Requires irrigation.
- Fertile soil.

Tobacco production areas in Punjab-Multan & Faisalabad

Tobacco production areas in KPK-Peshawar & Mardan

**Millets:** Jawar & Bajra. It's a low grade grain crop used mainly as food by the rural population. Drought resistant, low production & less profitable. It's a Kharif crop.

**Uses:**

1. Bird feed
2. Livestock feed
3. Human food-roti

**Geographical Requirements of Millets:**

- Dry, arid soil.

Millets production areas in Punjab-Rawalpindi

Millets production areas in Sindh-Tharparkar

**Pulses/Daal:** Deficient in production, demands are mostly met by import. It's a Rabi crop.

**Uses:**

1. Source of protein (Mung, Mash, Masoor)
2. Poor man's food

**Geographical Requirements of Pulses:**

- Barani areas are suitable.
- Enrich soil as they can naturally fix nitrogen in soil

Pulses production areas in Punjab-Mianwali district

Pulses production areas in Sindh-Sukkur & Shikarpur

**Oilseeds:** Oil is extracted from various oilseeds. Deficient in production, demands are mostly met by import from Malaysia & Spain. In Pakistan, Cotton seeds, Rape seeds, mustard seeds, ground nuts & castor seeds are grown. It's a Kharif crop.

**Uses:**

1. Consumption
2. Medicine

**Geographical Requirements of Oilseeds:**

- Barani areas are suitable.
- Enrich soil as they can naturally fix nitrogen in soil

Oilseeds production areas in Punjab-Rawalpindi & Mianwali

Oilseeds production areas in Sindh-Sanghar

Oilseeds production areas in KPK-Kohat

**Green Revolution:** was a program started by Ayub Khan from 1959-1960. It was to increase quantity and quality of agricultural outputs. Increased exports, food security.

1. Mechanization
2. HYV's, fertilizers & pesticides
3. Agricultural information & research
4. Loans ADBP on easy installments
5. Increased water supply on Indus Water Treaty (1960); 2 Dams, 5 barrages & 7 link canals
6. Salinity control & Reclamation project SCARP in 1960 for fertile land

This however also led to un-employment.

**Eutrophication:** balanced ecosystem is ruined & all living organism in the water body die. Algae grows Algal bloom; thick green layer on top of water & oxygen & sunlight doesn't reach water organisms in water so they die. No photosynthesis in water plants takes place.

DDT sprays & pesticides cause pollution and are a known carcinogen.

**Fruit Farming:** planting or growing fruits for commercial or subsistence purposes.

1. For sale, profits, foreign exchange.
2. Nutritious diets & natural habitat to birds.
3. Protection of main crops against strong winds & shade to farmers.

Problems faced can be poor storage facilities, bad transport system, poor marketing strategies & lack of investment etc.

Dates: Khairpur District.

Bananas: South & East Hyderabad.

Oranges: Central & eastern Punjab.

Almonds & Grapes: Balochistan

Apples & Apricots: Swat & Hunza (Northern Mountains)

**Livestock Farming/Poultry Farming:** refers to keeping/rearing/breeding of animals in order to produce food for population. Raw materials for industries & animals are also used for draft power primarily for agriculture. Problems faced are diseases spread such as bird-flu, TB in cattle by badgers, air pollution etc.

1. Gives protein: meat & milk. Nutritious food in Pakistan.
2. Contributes to 10% GDP (major contributor to export earnings)
  - We export livestock products such as milk etc. to UAE.
  - Processed products such as leather to Europe.
3. Bridging the gap between the supply & demand of proteins. Reduces pressure.
4. Source of employment for a large % rural population.
5. Source of raw material for many industries:
  - Leather: skin/hide
  - Meat processing & food processing
  - Milk for dairy industry
  - Horns & hooves to make glue
  - Animal hairs for carpet weaving
  - Animal blood to make poultry feed and animal feed
  - Bones to make gelatin
  - Manure rich source of Nitrogen in the soil
6. Apart from providing products and by products livestock used for animal draft power such as Persian wheel, chace, chaduf carb for transportation, plowing, threshing.
7. Indirectly many people are engaged in agro-based industries such a leather industry, woolen textile and milk processing industry.

**Input:**

Natural Inputs:

- Animals
- Fodder

- Land
- Water

Human Inputs:

- Capital
- Labor
- Knowledge & skills
- Processed fodder along with shed, barns and cages
- Medical facilities
- Processing and system facilities
- Storage facilities

**Processes:**

- Feeding
- Breeding
- Milking
- Shearing wool
- slaughtering

**Outputs:**

- Meat
- Milk
- Wool
- Skull
- Eggs

By-Products/Waste:

- Cow dung
- Milk processed products: Cheese, Butter, Ghee, & Yoghurt

• <b>Subsistence</b>	<b>Input</b>	<b>Commercial</b>
Low quality weak animals.	Animals	Good quality, strong animals, bred for meat & milk.
Open pastures; Shamilats	Grazing	Stall-fed animals.
Transhumance to protect animals from extreme.	Temperature	Temp. controlled sheds are made to protect animals from extreme.
Ponds, lakes, river or canals nearby.	Water	Water own source, artificial ponds for buffaloes, cleaning, washing, drinking & to mix in water for increasing quantity.

No walls, slums, under-developed, covered with hay & chaff, weak, dark, low-heighted with 1 central food supply.	Sheds	Cemented, bricks, heat insulation, clean, open, spacious, well-lit & allotted compartments for animals.
Open fodder grazing.	Fodder	Coriander spice, special nutrients rich diet for increased milking capacity & fats.
Family workers.	Labor	Skilled workers with proper wages & knowledge.
Inherited, traditional.	Skill	Skilled workers, learned from training centers. Skilled developed councils is an organization which gives skills.
Experience from time.	Knowledge	Proper research based on modern times.
Little or no investment.	Capital	Large capital for animal services.
Vaccines sometimes given themselves against TB, cattle-flow, and bird-flu. Own herbal medicines such as coriander are used.	Veterinary facilities	Own veterinary part in farms 24/7 with wages. Proper antibiotics & medicines.
Milks cans to store milk. Weak animals are slaughtered. Quantity.	Storage facilities	Temperature controlled tanks for storage are used. Mechanical slaughtering plants for big animals. Quality.

Subsistence	Outputs	Commercial
Desi eggs & milk for personal usage. Surplus given to local shops/street hawkers. Ghee, yoghurt etc. Healthy meat.	Eggs, meat & milk. (Poultry)	White eggs, bulky & abundant milk. Unhealthy meat. Cheese ghee, yoghurt etc.
Wool for yarn.	Wool	Wool for clothes & fabric.
Weak, skinny, clumsy animal	Animal	Strong, fat animal sold on Eid.

**Fodder Requirements:** are fulfilled by bringing fodder from nearby districts such as Hyderabad & Thatta districts which is expensive for transport. Milk & meat being a perishable item has high demand in Karachi so animals are kept in Karachi.

### Types of Livestock:

#### 1. Goats and Sheep:

Area: Most widespread, survived anywhere; Balochistan Plateau, and Potwar Plateau

Reasons: Sure footed to climb mountains, temperature and topography, easy care.

Benefits: Meat, Milk, Skin, Wool, Low Cholesterol diet,

Problems: Grazing openly can result in soil exposure leading to soil erosion

Solutions: Stall-fed animals are encouraged.

Common Types: Beetal, Burberry, Pak Angora.

## 2. Cattle:

Area: Balochistan Plateau, and Potwar Plateau

Reasons: Survived rocky terrain, variety of topographical conditions and high temperature.

Benefits: Meat, Milk, Leather, Draft Power.

Problems: Poor quality animals, weak and prone to disease/requires extra care.

Solutions: Vaccinations, Cross-breeding and nutritious diet is encouraged.

Common Types: Red Sindhi.

## 3. Bullocks and Buffaloes:

Area: Usually found on the Canal colonies of the Indus Plane to prevent from severe heat.

Reasons: Being a heavy, bulky animals with short legs as a result it cannot move on the mountainous terrain. Temperatures are variable as buffalos are extremely sensitive to temperature. A single frosty night or heat stroke can kill them.

Benefits: Largest contributed to Milk & Meat, Draft Power.

Problems: They love water which is sometime unavailable, costly.

Solutions: ample canal water, pools, vaccinations, sheds.

Common Types: Kundi Ravi.

<b>Problems of livestock farming</b>	<b>Solutions of livestock farming</b>
Overgrazing causing soil erosion.	Stall-fed animals.
Veterinary facilities are not commonly available. (resources, traditional treatment)	Vaccines & disease control programs.
High price of animal feed & fodder.	Increased area under cultivation for fodder.
Milk being a perishable item spoils. (costly refrigerators)	Improved husbandry.
Inadequate meat storage.	Improved storage facilities. (refrigerators)
Insufficient for quantity breeding & primitive methods.	Selective breeding.
Unhygienic animal husbandry conditions.	Improved transport networks.
Illiterate & unskilled farm workers.	Establishment of training centers.

## Effect of Agriculture & Environment:

1. Deforestation.
2. Soil exposure leading to soil erosion.
3. Leeching & infertility.
4. Water pollution
  - Eutrophication: when nitrates go into water.
  - General water pollution by pesticides which are not generally biodegradable,
5. Most of these when enter the human body are carcinogens.
6. Rice paddy (fermentation releases methane).
7. About 12% of Cattle & sheep's etc. food is changed into methane in farts (curry spice coriander can help as a natural anti-biotic).
8. Overall methane emissions from livestock waste.

#### **Impact of Environment on Agriculture:**

1. Floods & storms effect it.
2. Ripening rate increases when more global warming happens. (Good)
  - However, needs care so harvest is done on the right time and soil doesn't get ruined.
3. More evaporation & evapo-transpiration means more rainfall.