Agriculture

Agriculture

- It is of three types :-
    - Arable (crop farming)
    - Pastoral (livestock farming)
    - Mixed (crops + livestock farming)
- It is a primary profession as raw materials are obtained directly from nature / ground / earth. Other examples are fishing, mining and forestry.

Crop farming as a system

Inputs

- Land
- Soil
- Temperature
- Rainfall
- Machines
- Fertilizers
- Labor
- Knowledge
- Irrigation

Processes

- Ploughing
- Sowing
- Irrigating
- Threshing
- Fertilizing
- Weeding
- Harvesting

Outputs

- Wheat
- Rice
- Cotton
- Sugarcane

Small scale subsistence farming features

- For family / home use
- Low output
- Poverty
- Small farms
- Need to supplement their income e.g. carpenters, blacksmiths, cobblers.
- Cheap economic inputs / tradition inputs
- For example: draft animal, natural manure as fertilizer, traditional irrigation methods like Persian wheel, desi seeds, wooden plough, inherited knowledge, family labor, etc.

Cash crop farming features

- For sale / profit
- High capital is invested
- High yield (output per unit area)
- Large farms
- High value economic inputs e.g. chemical fertilizers, HYV seeds, modern irrigation e.g. tube wells, machinery e.g. tractors, harvesters, threshers, skilled labor, etc.
- High profit

- More affordability

Barani / Rain Fed farming

Characteristics

- Depends entirely on rainfall
- Small fields
- Ploughing is done after rainfall
- Farmers are too poor to own their own tractors / lack of machines
- Traditional methods used. e.g.
    - Animal dung as fertilizer, family labor, etc
- If rainfall is insufficient then crops fail
- Mostly low yields
- Often sheep / goats reared as alternative source of food / income

Crops

- Wheat
- Millet
- Pulses
- Oilseeds
- Maize

Areas

- Potowar Plateau (Rawalpindi, Attock and Chakwal)

Irrigated farming

Characteristics

- Depends on irrigation
    - Irrigation is the artificial supply of water e.g. through perennial canals
- Large farms
- Farmers use modern machineries e.g. tractors
- Use of modern methods e.g. chemical fertilizers, HYV seeds
- More output

Crops

- Wheat
- Sugarcane
- Rice
- Cotton

Areas

- Upper Indus Plain
- Lower Indus Plain

Cropping seasons

- There are two main cropping seasons
- Rabi / winter
    - Sown in early winter and are harvested in early summer
    - Outputs are wheat (cash + grain crop), barley (grain crop), grams, etc
- Kharif / summer
    - Sown in early summer and are harvested in early winter
    - Outputs are rice (cash + grain crop), cotton (cash crop), sugarcane (cash crop), millets (grain crops), maize (cash + grain crop)

HYV Seeds examples

- Wheat - Maxi Pak
- Rice - Irri Pak
- Cotton - Nayyab – 78

Wheat

Natural requirements

- Warm temperature
- 10 – 20 degrees at sowing
- 25 – 30 degrees at harvesting
- Moderate rainfall (325 – 625 mm)
- Alluvial soil
- Well drained land
- Light rain of October – November helps its growth
- Dry harvesting season

Methods of cultivation

- Prepare fields by Ploughing, weeding and irrigating
- Seeds are sown in October – November
- This crop needs two irrigations
    - First is one month after sowing
    - Second is one month after harvesting
- Chemical fertilizers for nutrients
- Pesticides are sprayed to kill pests
- Harvested in early summer when ripe
- Thrashed (separation of grain from chaff (by – product))
- Stored or transported to the market

Main areas

- Indus plains

- Whole of Punjab
- Nawabshah (key area of Sindh)

Importance / use

- It is the staple food of Pakistan thus high demand.
    - That demand is fulfilled through the cultivation of wheat within the country which saves imports and saves foreign exchange
- In good seasons, it is exported which helps to earn foreign exchange and improves Balance of Trade
- Source of income for farmers
- Source of employment for those who work in such industries which use wheat as raw material e.g. food processing industry
- It helps to reduce rural – urban migration
- It also helps in the development of rural areas e.g. roads, electricity, etc
- Its' by – product, chaff, is used as animal fodder and in making mud houses

Rice

Natural requirements

- Warm / hot
    - Temperature (20 – 30 degrees during growth)
- Warm and dry harvesting period
- Loamy / claying soil
- Flat land
- Water retentive soil
- Needs high amount of rainfall (1270 mm, however 2000 mm is ideal (not available in Pakistan so irrigation fills the gap))

Method of cultivation

- Nursery for seeds
- Repairing bunds (banks) for water
- Prepare fields by Ploughing / weeding in June
- Flooding / irrigation
- Transplanting seedlings in June / July
- Fertilizers for nutrients
- Pesticides to kill pests
- Drain water from fields before harvesting
- Harvesting in dry season / weather of September / October
- Thrashing (rice is separated from husks)

Main areas

- Larkana
- Gujranwala
- Sialkot
- Shekhupur

Importance

- Exported to other countries e.g. Basmadi to Bangladesh so helps to earn foreign exchange and increases Balance of Payment
- Fulfils local demand of rice and saves foreign exchange
- Income for farmers
- Source of employment for those who use rice as raw material e.g. food processing industry
- Reduces rural – urban migration
- Helps to develop remote areas e.g. roads / electricity
- Its' by – product, husk, is used for making animal fodder and chipboards

Q: There are four main processes of rice cultivation: Harvesting, Planting, Preparation of fields, Growth. List the processes in the correct order.

- Preparation
- Planting
- Growth
- Harvesting

Q: Explain how each of the processes named above is linked in the Lahore area from June – October.

- June rain to soften soil for preparation of field
- June – July rain for planting seeds / seedlings
- June – September sufficient rainfall / rain continues for growth
- September – October dried period of harvest.

Q: Explain how canal irrigation is used and controlled to grow rice.

- From reservoirs / dams / barrages / another canal
- Closed or opened by gates
- Field flooded in preparation before transplanting
- Kept flooded during growth
- Drained before harvest

Cotton

Natural requirements

- Hot temperature (25 – 35 degrees during growth)
- Dry harvesting period
- Alluvial soil
- Flat land
- High amount of rainfall i.e. 1000 mm (not available in Pakistan so irrigation fills the gap)
- Deep soil (very alluvial soil)

Method of cultivation

- Prepare fields by Ploughing, weeding and irrigating

- Seeds are sown in June
- After 1 month, first irrigation
- Another irrigation 2 months after the first one
- Fertilizer for nutrients
- Pesticides to kill pests e.g. leaf curl virus
- Picking in September / October usually by women
    - Because of cheap labor
    - Surplus labor
    - Structure of their fingers
- Transported to ginning mills for separating seeds from lit

Main areas

- Bahawalpur
- Bahawalnagar
- Multan
- Nawabshah
- Rahimyarkhan

Importance

- Main export of Pakistan so helps to improve Balance of Payment as it earns foreign exchange
- Fulfils local demand so restricts imports
- Income for farmers
- Employment for those who work in such industries which use cotton as raw material e.g. cotton yarn, cotton textile
- Reduces rural – urban migration
- Helps to develop remote areas e.g. roads / electricity
- Its' by – product, seeds, are used as animal fodder and for extraction of oil.

Sugarcane

Natural requirements

- Hot temperature (25 – 35 degree during growth)
- Dry harvesting time
- Alluvial soil
- Flat land
- 1520 mm rain
- This rain is not available in Pakistan so irrigation fills the gap
- Deep soil
- Well drained land

Method of cultivation

- Prepare fields by Ploughing, weeding and irrigating
- Stocks are buried underground
- Fertilizer for nutrients
- Pesticides to kill pests

- Irrigation on regular basis
- Harvesting on regular basis
- Harvesting in dry period for 2 – 3 successive years
- It is grown through rattooning
- Taken to factory quickly / without delay
- Washed / scrubbed
- Crushed
- Juice collected
- Refined
- Crystallized
- Whitened / made into white sugar
- Molasses and bagasse (by products)

Main areas

- Peshawar
- Mardan
- Faisalabad
- Nawabshah

Importance

- Sugar cane is raw material for sugar mills
- Exported in good seasons so helps to earn foreign exchange thus improves Balance of Trade
- By – products used like Molasses in chemical industry
- Bagasse in chipboard making
- Fulfils local demand of sugar
- Restricts imports so saves foreign exchange
- Income for farmers
- Employment for those who work in sugar mills which uses sugar cane as raw material
- Reduces rural – urban migration
- Helps to develop remote areas
- Molasses is used in making Ethalyn
- Bagasse used as animal fodder
- Bagasse used to produce electricity
- Bagasse used for making packing material

Tobacco

- Irrigation
- Mardan, Peshawar
- Exported
- Chemical fertilizers
- Alluvial soil

Q: Explain why is it important to increase production of sugar and other agricultural products in Pakistan.

- Income for farmers
- Reduces rural – urban migration
- Increasing population
- Nutritious / need for better food production
- Increases exports / earns foreign exchange / increases GDP / increases Pakistan's income
- Reduces imports / improves Balance of Payment
- Provides employment in named industries e.g. sugar mill
- By – products e.g. Bagasse for fuel production

Q: Waste products from food crops such as straw from cereals and bagasse from sugarcane have some uses. Explain the importance of waste products such as these.

- Bagasse for paper / cardboard
- Bagasse for chipboard
- Molasses for chemical industry
- Straw for roofing
- Animal fodder
- Mixed in soil to make Kacha houses
- Bagasse for power stations / fuel
- Bagasse for making packing material
- Can save fossil fuels / coal / gas / oil
- Cheaper than fossil fuels, electricity, etc

Fruit farming

- Apples, apricots, almonds
    - They are found in northern Balochistan (Quetta and Mastun valley)
    - Found in Northern Swat, Hunza and Baltistan
    - Because of sunshine / warmth for photosynthesis
        - Soil for nutrients
        - Flat area of valley floors for easy cultivation
        - Rain for better growth
- Dates
    - Grown in Kharan, Thar and Turbat
    - Because sunshine is available for photosynthesis
        - Soil for nutrients
        - Flat land for easy cultivation
        - Irrigation through Karez for better growth
    - Importance
        - Used as food
        - Shelter to crops from strong wind
        - Shades from intense heat of desert
- Bananas, Mangoes and Citrus fruits
    - Grown in Northern Sindh and Southern Punjab

        - Because irrigation from River Indus
        - Flat land of Lower Indus Plain for easy irrigation
        - Temperature above 15 degree even in winter
        - Alluvial soil for nutrients
        - Monsoon / summer rainfall for better growth

Q: Why are fruit crops mainly grown for local use?

- Perishable
- Heavy / difficult to transport
- Small amounts so hardly for local areas
- Not of export quality

Maizes, Pulses, Millet, Oilseeds, Tobacco

Q: Name two crops on the list that are mainly used for animal fodder.

Maize, Millet, Oil seeds

Q: Name one crop on the list that is not a food crop

Tobacco

Q: Name one crop that is rich in protein

Pulses

Q: Name one type of soil seed

Mustard, groundnut, sesame, sunflower, soya beans

Livestock farming

- It is the rearing of animals
- It is of three types
    - Nomadic
        - Frequent / Seasonal movement from one place to another in search of food and water
        - Sheep, goats & camels reared
        - Practiced in Thar and Kharan desert
    - Transhumance (semi – nomadic)
        - Seasonal
        - Animals are kept high up in the mountains in summer and brought down to lower pasture in winters
        - Goats, sheep and cattle are reared
        - Practiced in Northern and Western mountains
    - Settled
        - Permanent

- Goat, sheep, cattle, hens and buffaloes are reared
- Practiced in villages of Punjab and Sindh

Livestock farming as a system

Inputs

- Natural grazing fields
- Water from ponds / lakes
- Open land
- Family labor
- Animal shed
- Fodder rooms
- Processed fodder
- Specialized labor
- Veterinary facilities
- Machines for milking, etc

Processes

- Feeding
- Milking
- Cleaning
- Selling
- Refrigerating
- Shearing
- Exercising

Outputs

- Milk
- Meat
- Wool
- Eggs
- Hides

Importance of livestock farming

- Contributes to GDP so to national income
- Some of their products are exported
    - So foreign exchange is earned which improves Balance of Payment / Trade
- Raw materials for domestic industry
    - Milk in food processing industry
    - Wool in woolen textile industry
    - Skins / hides in tanning industry

- Fulfils domestic need of nutritious food like meat and milk ; so reduces imports
- Draft power
    - To pull the plough
    - For threshing
    - To lift water from wells
    - To pull carts for transport to town / market
- Source of income for farmers

Problems of livestock farming

- Few hospitals / veterinary facilities so difficult to treat animals
- Lack of grazing grounds so weak animals due to lack of food
- High prices of processed fodder so difficult for poor farmers to afford
- Inefficient marketing system of milk so usually sell milk to the middle man on low price
- Inadequate storage facilities like refrigerating due to lack of electricity and due to poverty and the result is that they are to sell their products for low prices
- Primitive breeding methods so low quality animals
- Unhygienic condition of farms
    - More diseases in animals
    - Buyers are reluctant to purchase due to low quality
- Illiterate farmers so cannot modernize their farms by modern techniques like milking machines
- Poverty so cannot purchase modern techniques like milking machines

Development strategy / Solution

- Loans to purchase modern inputs
- Selective breeding methods for better quality animals
- Better fodder for stronger and bigger animals
- More grazing land by irrigation, fertilizers, etc
- Vaccination to improve health
- More medicines / more vets to treat animals
- Mechanization e.g. milking machines for hygiene and speed

Livestock resources

Buffalo

- Milk (70% of Pakistan's milk)
- Meat
- Draft animal
- Hides
- Dung as manure

However,

- Not sure footed so cannot be kept in mountainous areas

- They need a lot of water so cannot be kept in Balochistan

Main areas are

- Bahawalpur
- Multan
- Jhang
- Sahiwala

Cattle

- Cows
  - Milk
- Bullocks
  - For prestige
- Meat
- Draft animal (4 points)
- Hides
- Dung for biogas

Main areas are

- Bahawalpur
- Multan
- Jhang

Sheep and goats

- Wool
- Meat (preferred meat so high demand)
  - Demand is increasing due to high population
  - Demand is increasing due to better standard of living
- Hides for tanning industry
- Dung as fertilizer
- Wool to woolen industry
- Sure footed so can be kept in mountainous areas

However

- Overgrazing so causes soil erosion … (3 pts)

Main areas

- Bahawalpur
- Multan
- Jhang
- Zhob

Poultry

- Eggs
- Meat
  - Preferred meat
  - More demand
  - Demand increases due to growing population
  - Demand increases due to better standard of living

- Main areas are the outskirts of all the main cities of Pakistan like Islamabad, Rawalpindi, Mureee, etc.

Poultry farming

- It is the keeping of hens for commercial purposes

Methods

- Hens lay eggs
- Eggs are hatched
- Small hens / chickens are transferred to sheds where they are fed and vaccinated on regular bases
- When they attain some weight and age, they are transported to the market where they are sold for profit

Q: Why are buffaloes more important than cattle?

- More milk
- More meat

Q: Why do most farmers want to own a pair of bullocks?

- To pull the plough
- For threshing
- To lift water from wells
- To pull carts for transport to own town / market
- Most farmers are poor..
    - .. so cannot afford machinery / bullocks / cheaper than machinery
- Most fields are too small for tractors
- Bullocks are a sign of prestige

Q: Why is a large supply of water necessary for a buffalo farm?

- For drinking
- For keeping the buffalo cool / spraying on buffalo
- For washing / dipping buffalo / bathing
- For cleaning
- For adding to their milk

Q: No fodder crops are grown on the farms near Karachi. How are these farms supplied with food for the buffalo?

- By road / tractor / cart
    - In bulk / large amounts
- From crop farms outside Karachi / on southern Lower Indus plain
    - Near Hyderabad / Thatta / Badin

Q: Explain the importance of the buffalo farms to Karachi.

- Milk
- Butter / ghee / other named dairy product
- Karachi has a huge population / increasing population
- Milk is expensive to transport
- Milk can be fresh
- Milk can be supplied regularly
- Supplies hides / skins
    - Karachi is important for the production of leather goods
- Dung sold for fuel in markets
    - Used domestically / home
    - Used commercially / hotels / shops
- Meat

Q: What are the advantages and disadvantages of these types of livestock farming in either mountain or desert areas?

Advantages

- Access to good pasture
- Low cost / free
- In areas of poor soil / land
- Source of income like good to sell
- Source of food
- Dung for fertile soil
- Camels adapt to desert
- Sheep and goats eat poor quality grass.

Disadvantages

- Need to move about (no permanent home)
- Poor quality animals so difficult to be commercial
- Cannot keep buffalo in mountains / desert because
    - Lack of water in desert
    - Lack of vets in both areas
    - Relies on uncertain desert climate
    - Overgrazing
    - Surefooted so can slip in mountain areas

Q: Explain why the animals are reared in a nomadic way in arid areas.

- Search for / lack of food / pasture
- Search of / lack of water
- Quickly finished so have to move
- Move with the weather
- No infrastructure for settlement

Q: What are the disadvantages of keeping animals in a nomadic way?

- Overgrazing / soil erosion / desertification
- Low income
- Animals may die / starve
- Poor quality animals
- Lack of veterinary care / diseases spread easily
- Difficult to improve / develop

Factors effecting agricultural production

Natural

- Topography (Land)
    - Flat / undulated
        - Irrigation can be easily practiced
        - High yield
        - Easy to plough
    - Steep land
        - Difficult to use machinery
        - Difficult to irrigate therefore
        - Less output
- Soil
    - Alluvial silt is deposited by rivers through floods on farm land which carries nutrients
        - Provides nutrients
        - Moisture retentive
        - Fertile
        - Not prone to water logging
    - Thin soil
        - Infertile due to less nutrients
- Pest / diseases
    - Destroy crops
    - Preventive and curative methods are applied e.g.
        - Seeds are poisoned before sowing (preventive)
        - Spraying of pesticides (preventive + curative)
- Rain
    - At the correct time of the year e.g. at start of monsoon for kharif crops like rice
    - Gentle shower during growth
    - None during harvest
    - Very important for Barani crop as they are fully dependent on raindall
- Sunshine / Temperature
    - For warmth for photosynthesis
    - Ripening

Human factors

- Irrigation
    - Enough water
    - At correct time

    - Fills the gap of rainfall
    - Removes salinity through tube wells
    - Reduces water logging by lowering water table through tube wells. But
    - Water logging and salinity due to
        - Poor farming practices (overuse of water of perennial canals)
        - Unlined canals, water seeps into the ground
    - Tube wells are expensive to install and
        - Maintain as they use fuel or electricity
    - Lack of technology for pumps / wells
    - Lack of electricity / load shedding.
- Fertilizers (chemical)
    - Better than dung
    - Provides nutrients / minerals
    - Minerals need replacing after cultivation
    - Reduces crop failure
    - Pakistan's soil deficient in minerals so fertilizers
        - Makes up for deficiency
        - E.g. of Nitrogen, potash (potassium), phosphate
    - Higher yield. However
    - Expensive
    - Illiterate farmers
    - Causes water pollution (eutrophication)
- Mechanization
    - Faster work
    - More efficient so less wastage
    - Better preparation of fields
    - Can thrash and harvest
    - Does not need to rest
    - Needs less labor. However
    - Causes unemployment
    - Increases rural – urban migration
    - May break down
    - Not suitable for small farms / needs large farms
    - Expensive to purchase and maintain
    - Needs special skills (farmers illiterate)
- Transport
    - Faster speed e.g. sugar cane to the mill prevents losses
    - Dry ports for imports
        - E.g. Fertilizers
    - Loans. However
    - We are a developing country so government cannot afford to make these as low budget
    - Funds to buy inputs e.g. fertilizers
    - Funds to buy machines
    - Funds to buy HYV seeds
    - Bigger fields can be maintained

    - Purchase more land
    - Better irrigation like tube wells
    - However, farmers illiterate so do not know how to get loans
    - Difficult for subsistence farmers to get loans as they have small farms. They cannot give guarantee to the banks to return loans.
    - Less output due to poor weather conditions so cannot give back loans.
- Training / Knowledge
    - Better management / efficiency e.g. knowledge of weather, understanding of soil, etc
    - Better method of cultivation
    - Knowledge of diseases
    - Better use of HYV seeds
    - Proper use of fertilizers and pesticides
    - Better use of machinery / technology
    - Better money management / can get loans
    - Better marketing. However
    - Poverty so cannot afford modern methods
    - High rate of illiteracy
        - Expensive for the government to provide training and education to everyong
- Seed varieties (HYV)
    - Higher yield
    - Resistence to pests and diseases
    - Double yield
    - Multi cropping possible
    - Drought resistance therefore less water demand
    - Grow faster. However
    - Exhaust the nutrients of soil
    - Poverty
    - Illiteracy
- Telecommunication
    - Access to information
    - Improves education / skills
    - Easy to contact markets. However
    - Expensive to purchase telecommunication gadgets
    - Illiterate so do not know how to use them
    - Lack of electricity in villages
- Pesticides
    - Kill pests
    - Targets at pests only
    - But must be used at correct time. However
    - Expensive
    - Illiterate farmers cannot read instructions
    - Air and water pollution
- Size of farms
    - Large farms

        - Efficient
        - Easy to use machinery
        - Easy to irrigate
        - Easy to get loans
        - Easy to research
        - Large output
    - Mostly small farms in Pakistan
        - Inefficient
        - Machinery cannot be used
        - Loans cannot be taken
        - Irrigation is hard
        - Research is difficult
        - Less output

Q: How does the government encourage the use of chemical fertilizers?

- Use of media / pamphlets, etc
- Laons be provided
- Reduction in prices
- By sending experts to villages
- Model farms to exhibit the benefits of chemical fertilizers
- More fertilizer industries e.g. Pak – Arab fertilizer factory, Multan

Q: Why are so many farms small in size?

- Islamic law of inheritance
    - Land divided amongst all children
- Majority of farmers are poor
- Little mechanization so large area cannot be worked
    - Only able to work small area by hand
- Many farmers are only subsistence farmers
- Landlords have divided their land into small tenant farms.
- Land consolidation policy has not been very successful

Land reforms of 1959, 72, 77

Why?

- To break the hold of landlords
- Fair distribution of land
- Protection of the rights of tenants
- Consolidation of land holdings

Land reforms of 1959

- Maximum 200 hectares of irrigated or 400 hectares of non – irrigated land could be provided

- Extra land could be taken from the government
- Compensation to landlords in installments
- Tenants to get ownership of the land resumed on payment of the price of the land in installment
- Landlords could not fire the tenants
- Consolidation of land holdings

Land reforms of 1972

- 60 hectares of irrigated or 120 hectare of non-irrigated land could be provided
- No compensation for the land acquired from landlords
- Resumed land will be distributed to tenants without making any payment
- No landlord could fire the tenants at his own will
- The tenatns were given the first right of purchase if the landlord sold the land
- Consolidation of land holding

Land reforms of 1977

- 40 hectares of irrigated or 80 hectares of non-irrigated land could be provided
- Compensation to landlords
- Land will be distributed amongst the tenats free of cost
- Consolidation of land holdings
- Tenants could not be ousted

Why were these reforms not successful?

- On paper / half – hearted attempt / lack of political will
- Strong landlords
- Low social / economic status of tenants
- Corruption in land revenue department
- Lack of documentation of land

Why land consolidation?

- Economic units
- Easy use of machinery / modern methods
- Easier to supervise
- Better irrigation
- Easier to get loans
- Bring more land into cultivation

Q: To what extent can land reforms be successful increasing agricultural production?

- Land reforms are positive as due to them there is / are
    - More efficient use of land
    - Bigger fields for mechanization due to consolidation
        - So less time wasted / faster work

    - More independence of tenants / free from control of landlords. However.
    - Poverty of farmers
    - Power of landlords
    - Government not interested.

Effects of agriculture on environment

- Chemical fertilizers reach rivers which cause algea so less oxygen and sunlight for aquatic life
- Pesticides / insecticides pollute air and cause diseases as farmers inhale them because they do not use precautions like masks
- Deforestation of land for agriculture can lead to soil erosion if left exposed
- Irrigation due to poor farming practices causes water logging and salinity
- Over-grazing by sheep which causes soil erosion
- HYV seeds exhaust nutrients of soil

Problems of agriculture (crop farming)

- Small size of farms due to growing population
- Lack of money / poverty
- Difficult for small farmers to get loans
- Lack of education / knowledge so cannot use modern methods
- Many farmers dislike new ideas / hold traditional attitude
- Fear the use of machinery would increase unemployment
- Most machinery has to be imported / is very expensive
- Machinery is difficult to use on fragmented farms
- Shortage / expensive of fuel / power supplies
- Fuel is expensive
- Lack of technical experts of machinery
- Lack of spare parts for machinery
- Animals provide other needs of farmers as well as draft uses so preferred to machinery
- Using HYV seeds needs specialized knowledge
- Insufficient chemical fertilizers produced in Pakistan
    - Are to be imported
- Oppressive landlords do not allow change
- Tenants are insecure or are unsure of their position and so do not take risk change
- Storms and flooding / pest attacks e.g. leaf curl virus destroy crops
- Rural – urban migration so able – bodied men leave
- Water logging and salinity reduces cultivable area / yield

Solutions / Improvements

- Green revolution (use of modern inputs like HYV seeds for high yield)
- Increase in farmland due to irrigation
    - E.g. development of dams / link canals / perennial canals / tube wells
- Government support / policies

    - Land reforms giving tenants greater security
- Loans to farmers to purchase machinery
- Imported / subsidized fertilizers / inputs
- Guaranteed prices / support prices of output
- Agricultural universities / colleges like Agriculture University Faisalabad therefore more research and experts in agriculture
- Education / training of farmers through media
- High yield / better seeds
- More use of HYV seeds e.g. irri pak for rice, maxi pak for wheat, nayyab – 78 for cotton
- Increased use of fertilizers
- Increased use of pesticides / insecticides
- Mechanization e.g. tractors for Ploughing
- Financial help from relatives abroad / foreign investment.

Q: To what extent could government action increase agricultural production in Pakistan?

Possibilities (res 2)

- Improve education like model farms traveling advisors, training centers, colleges, etc
- Loans e.g. for machinery, HYV, fertilizers
- Subsidized (low prices) e.g. for imported machinery, lower fertilizer prices
- More fertilizer / pesticides factories or imports
- More machinery factories or imports
- Land reforms e.g. consolidation for easy use of machinery
- Improve water availability e.g. reservoirs, canals
- Cure of water logging and salinity e.g. SCARP
- Weather forcasts
- Media like radio, tv

Problems (res 2)

- Lack of money
- Illiteracy
- Other calls on government investment / attention
- Fears of unemployment due to mechanization
- Land reforms may fail due to corruption / power of land lords

Q: Explain other causes of low farming incomes

- Soil erosion means poor root growth and small crop output
- Overgrazing means lack of food for animals and soil erosion
- Desertification causes climatic change and a lack of water due to less rainfall
- Low crop productivity means low income leading to less money for better seeds, fertilizers, etc
- Poor quality livestock produces less milk, nmeat, etc

- Traditional farming metohods give low yields
- Small farms so little mechanization
- Oppressive landlords (Zamindars) so high rents, no change of improvement
- Storms and flooding / pest attacks (e.g. locusts, weevils destroy crops)
- Illiteracy / lack of education so no improvement
- Rural – urban migration so able bodies men leave
- Water logging and salinity reduces cultivable area / yield
- Lack of government support / investments

Q: Name a type of machine that can be used for rice cultivation instead of humans

Labor, tractors, harvesters, mechanical irrigators (not thresher for cultivation)

Q: Name three important grain crops grown in Pakistan and for each state whether it is a kharif or rabi crop

- Millet – kharif
- Maize – kharif
- Rice – kharif
- Wheat – rabi