

"Agricultural decline in Pakistan and how to counter it"

Outline.

1. Introduction

- (i). Hook
- (ii). Background
- (iii). Thesis Statement

This decline is majorly driven by climate change, water shortage, orthodox farming practices, unavailability of cheap fertilizer, bad pest control, migration of people from rural to urban areas and reduction in fertile cultivable land. This can be controlled if timely measures are taken by the government and the farmers such as adaptation to climate change, mitigation of greenhouse gas emission, use of advance technology and machinery, ready availability of pesticide and fertilizer. These are discussed in detail.

2. Causes

2.1 Climate Change

- 2.1.1. Type of climate in Pakistan - semiarid.
- 2.1.2. Global warming causing desertification and droughts.
- 2.1.3. Excessive monsoon rain causing floods

and wiping crops and hitting GDP
every almost other year i.e 2025, 2024, 2022.

2.1.4. Farmers not well equipped well to
changing climate.

2.2. Water supply variability

2.2.1. Indus river irrigating Pakistan but
IWT suspended by India.

2.2.2. Overdrafting of ground water due
to inefficient use of water.

2.2.3. Heavy rains in monsoon not being
handled effectively.

2.3 Orthodox farming techniques

2.3.1. Unaffordability of mechanized farming
machinery for farmers.

2.3.2. Farmers not trained enough for
new techniques

2.3.3. Using organic manure instead of
fertilizer.

2.3.4. Stubble burning for quick wiping
but it is ~~ca~~ undermining soil fertility

2.4 Bad pest control

2.4.1. Small farmers can't - not afford pesticide.

2.4.2. Latest pesticide not communicated
to farmers by government.

2.5 Fertilizer production

2.5.1. Only two fertilizers: Urea and DAP, manufactured
in Pakistan. Rest imported.

2.5.2. Lack of availability causing usage of irrelevant available fertilizer.

2.5.3. Fertilizer manufactured from natural gas. Lack of availability of continuous gas supply sabotaging fertilizer production.

2.6 Migration of people from rural to urban

2.6.1 Farmers shifting to urban cities and changing profession for better life.

2.7 Reduction in fertile areas.

2.7.1 Encroachment by urban areas of rural areas.

2.7.2 Fertility of soil lost due to overuse leaving them barren.

3. Counter Measures.

3.1 Adaptation to climate change

3.1.1 New Dam construction.

3.1.2 Old dams capacity increment.

3.2 Mitigation of Climate change.

3.2.1. Greenhouse gases emission from industries to be regulated.

3.2.1 E-mobility vehicles promotion.

3.2.3 Genetically engineered seeds utilized that survive in adverse condition.

3.3 Water war resolved multilaterally

3.3.1. Government negotiations putting political tensions aside for general public.

3.3.1. Involvement of international organization to resolve the dispute.

3.4. Irrigation modernization.

3.4.1. Efficient use of ground water with sprinklers. Government subsidies to promote adaptation of sprinklers.

3.4.2. Awareness about overdrafting long term impacts to the farmers.

3.4.3. Fortification of channel embankments for conservation of water evaporation/seepage.

3.4.4. Storing of flood water for later usage.

3.5. Mechanized farming.

3.5.1. Large modern farmers development with investment of big companies. e.g.

JK farms and adoption of their model.

3.5.2. Loan for small farmers for buying of machinery and tractors.

3.5.3. Awareness campaign for farmers of good practices.

3.5.4. Establishment of more laboratories.

3.6. Pesticide availability.

3.6.1. Awareness of upcoming pest to farmers.

3.6.2. Readily available pesticide should be ensured.

3.7. Fertilizer manufacturing.

3.7.1. Supply of natural gas to industries throughout year by exploring both local and international avenues.

4. Conclusion.

"The Essay"

"Pakistan is an agricultural country." This is a ubiquitous statement widely used in Pakistan; Since it employs 37-40% of the population of the country and the largest export industry of Pakistan has also been fed by agriculture i.e. Textile industry. However, according to Pakistan economic survey report 2024-2025—annual growth rate has declined by 13.8% in fiscal year 2025. This decline is majorly driven by climate change, water shortage, orthodox farming practices, unavailability of cheap fertilizer, bad pest control, migration of people from rural to urban areas and reduction in fertile, cultivable land. This decline can only be controlled if timely ~~efforts~~ measures are ~~done~~ ^{taken} by ~~the~~ government and ~~the~~ farmers, such ~~the~~ as adaptation to climate change, mitigation of greenhouse gas emission, use of advance technology and machinery, i.e. mechanized farming, ready availability of pesticide and fertilizer. These are discussed in detail as follows.

Climate change is a global issue. However it becomes a bigger challenge for an agricultural country like Pakistan. Pakistan lies

in a sub-tropical region with semi-arid climate with varying rainfall pattern throughout the country—mainly due to diverse topography, with north receiving more rainfall than southern areas of the country. Hence northern flat areas becomes more suitable for agriculture than southern desert areas like Thar and Cholistan, where soil and climate is suitable for agriculture hence reducing areas land for agriculture. On top of this global warming is causing desertification of more areas in the country—like Sindh.

Additionally, the country receives annual ~~monsoon~~ rainfall during monsoon season. However, with changing climate the country is experiencing excessive rainfall and hence causing floods every other year. Recent such incidence were in 2023, 2024, and 2022; destroying crops throughout the country. Although such pattern is seen, farmers are not well equipped to counter such disasters. With changing climate the ploughing and harvesting season is also shifting for Rabi and Kharif crops but our farmers are sticking to same old harvesting season; ~~Reducing~~ the yield. Not only climate change is also bringing other issues like water scarcity.

Natural disasters are being exacerbated by geopolitical tensions between India and Pakistan. Vast areas of Pakistan are irrigated by Indus river. But ~~the~~ ^{with the} suspension of Indus water Treaty by India, land irrigation is affected the most, hence affecting food security in Pakistan. With emerging tensions with Afghanistan North western region is also in stress for water from Kabul river. Not only global issues, in-efficient water usage by farmers is also a threat to sustainable future of agriculture.

Pakistan relies on ground water table for irrigation, however overdrafting of water with tubewells is lowering the water table. This is due to the reason that farmers rely on open ~~and~~ canals for maneuvering of water to the fields which is seeped and lost during causing water loss. Also water logging of field rather than efficient sprinkling of water is used by farmers.

Heavy rains during the monsoon season ~~are~~ is also not utilized to store water for future purposes. This part is of the government ~~Excess~~ water is not being store. There is not enough infrastructure to store this water whereas the flood water is drained into the ~~the~~ sea.

Moreover, the farming techniques used by our farmers are also orthodox. Since they can't afford tractors, ploughing machines, sprayers and harvester; reducing large scale efficient farming opportunities. Additionally, farmers are also not educated enough to integrate ~~or~~ to new practices into their farming. For example, every soil has a different composition of nutrients and requirement. Without getting the soil tested from laboratories, farmers ~~using~~ use irrelevant fertilizers for their farms, reducing soil fertility and yield. On top of this, poor farmers use organic manure instead of fertilizers since they can't afford it. Another practice widely done in Pakistan is ~~that~~ to clear farms ~~fastly~~ quickly after harvesting for next ~~crop~~ the farmers burn the stubble, which not only pollute the air but also undermine soil fertility.

~~Crops ~~are~~ always ~~in~~ ~~check~~ face pest problems. But~~

In addition to bad practices, the pest control is also a challenge for poor farmers. ~~which Right type of pesticide application is also a challenge.~~ Selecting the right pesticide and then having sufficient funds

to afford them is a problem majority of the farmers face in Pakistan. Moreover, lack of awareness regarding new emerging pest and their controlling techniques are also not communicated to the farmers by the government.

~~Relevant~~ Fertilizer availability is also a problem in Pakistan. Fertilizer is ~~produced from~~ ~~natural gas~~. Only two fertilizers are manufactured in Pakistan i.e. Urea and DAP. All other fertilizers are imported from other countries which drives their cost high and also the less diversity in their availability. This means firstly farmers will not be getting what they want and secondly if they get it, it is not feasible for them to buy it.

Out of the two fertilizers produced in Pakistan Urea, the most produced fertilizer, is manufactured from natural gas. However the depleting natural gas resources in Pakistan is causing less availability of it for industrial purposes and more for household purposes. Causing fertilizer companies to be working only partially throughout the year. ~~for~~ Some small companies, which rely on government for natural gas ~~works~~ like Agrotech, only are only

manufacturing it for 3-4 months per year. whereas large companies, ~~having~~ ~~their own gas well,~~ have to stop ~~the production~~ ~~companies~~ during winter season. This is causing lesser availability of fertilizer for farmers. Hence creating a demand supply gap and driving the cost high for small farmers.

Facing with ~~rapid urban~~ all these challenges people ^{are} ~~from~~ migrating from ~~rur~~

In addition to farming challenges, the quality of life in rural areas is also driving people in rural areas to ^{migrate to} urban cities in search of better quality of life. This is resulting in lesser and lesser availability of ~~for~~ labor for agriculture. This has also been set into effect due to fluctuating crop prices set by government each year. Farmers whose ~~when the government~~ import agriculture products ~~the demand~~ supply of it increases and hence demand ~~is~~ is lower, which reduces the profit margins for farmers. In this uncertainty it ~~is~~ is not feasible for farmers to stay in the profession. For example in 2020 the ~~gov~~ there was huge demand of wheat in the country, but the

produce was not enough to meet the demand and hence in 2023 the prices of wheat set by government was high. But ~~then~~ in 2024 farmers in anticipation of same good profit cultivated ~~extens~~ wheat extensively however at the same time government in view of 2023 experience also imported huge amount of wheat. So there was abundance of wheat both locally and imported, ~~so +~~ which drives the wheat prices to very minimal in 2024. Hence to the fact that farmers were not able to cover their expense with the price they got for their product hence making huge losses. This uncertainty of business is causing of major investor to shift to other avenues, reducing the capital as well as labor in agriculture.

~~Due to bad~~ Overuse of soil nutrients is also rendering the soil infertile. hence reducing the available fertile area for cultivation. Also the encroachment of cities on farming land is also reducing farming area. ~~which in to~~ Pakistan population is increasing at a rapid pace with current population standing at 241 million. This large population has to be accommodated. ~~is~~ Hence more and more conversion of land to ~~ag.~~ from agriculture to residential areas.

A recent world bank study claims that Pakistan true urban population is 88% which tells about the lesser availability of land as well as labor for agriculture. From this it can be inferred that agriculture is declining in Pakistan.

This decline will bring massive drawbacks for Pakistan in terms of food security. For a country whose 40.5% population is below poverty line according to world bank. This ~~dec~~ decline in quantity of food mean, the prices of food will rise rising food prices. That means around 40% might not be able to afford food hence bringing large scale socio-economic crisis in Pakistan.

This crisis can only be averted if timely actions are taken to counter it.

Firstly, the government has to develop infrastructure to adapt to the effects of climate change. In order to ensure proper handling of water during monsoon floods ~~hydel power~~ Dams need to be constructed. These dams will store the water from northern areas and ~~the~~ in monsoon and then release them during summers.

It is a ~~high~~ capital ^{intensive} project so international assistance ~~provid~~ provided by UN, i.e.

\$100 billion per annum fixed for global climate change challenges, can be used for this purpose. Alongwith new dam, holding capacity of existed dams can also be considered to be increased. Projects need to be carried out the ~~accume~~ remove the accumulated silt over time on the dam basin. This silt deposit over the years have decreased the water holding capacity of Tarbela and Mangla dam.

At the same time ^{climate change} mitigation strategies should also be pursued. Industries throughout the country needs to be regulated for their greenhouse gas emissions. Carbon tax should be imposed on such industries. Incineration of waste should be monitored and pollutant capturing chimney needs to be installed in industries with high greenhouse gas emission. Alongwith industries, motor vehicles are the second highest contributors of greenhouse gas emitter. ~~These~~ Pakistan need to move to green energy mobility. Movement to electric vehicle is a commendable effort done by Pakistan already but the price of such imported vehicles are higher than combustion vehicles. ~~Some~~ 50 government need to promote local production of electric vehicles in Pakistan.

Additionally, seeds of crops which are climate resistant i.e. requiring lesser water for production, need to be introduced to farmers in Pakistan. Genetically engineered crop seeds will help in increasing the farm yield as well as mitigating the climate change effects.

Water shortage for irrigation can be due to unilateral treaty suspension of Indus water needs to be taken up with UN. The governments need to sit on a table to discuss the issues, keeping aside their internal politics for the betterment of general population. If bilateral talks are not possible an external watch dog needs to get involved who has good relations with both the sides such as Saudi Arabia or the World bank. A framework has to be decided to separate tensions between the countries from the social issues.

Additionally, farmers themselves have to go for efficient use of ground water. The use of sprinklers for ^{specific} designated areas of a farm has to be done. Subsidies needs to be given to farmers by the government for purchase of sprinklers, as poor farmers might not want to spend money for something they are not benefitting

from due to their myopic thinking. So education of farmers needs to be done to tell them about the compromise they are doing with their sustainable future by overdrafting water now. Also the channels they use to maneuver water, that causes water losses needs to be cemented/lined. Trees needs to be grown on banks of such channels to mitigate evaporation of water.

Water capturing and storing during floods season by directing the water efficiently to nearby water bodies like ponds needs to be established by the farmers, which then effectively used by them in dry seasons. Such channels has to be properly designed and such ponds ^{has} to be properly maintained.

In addition to farmer water, farming techniques has to be improved. Large scale farms with mechanized farming has to be established. Investors from other sectors needs to be attracted towards agriculture. JK farms is ~~are~~ such a good model to be replicated. Where large ploughing machines, sprayers and harvesters are used. Monitoring of farms is done with drones.

Alongwith with spraying of fertilizers and pesticides. This model has to be replicated by more people.

Small farmers should also be encouraged and ~~pro~~ provided resources for modern mechanized farming. ~~loan~~ interest free loans by government needs to be given ^{to them} to buy machinery and tractors. ^{More} laboratories needs to be established close ^{agriculture} to ~~poor~~ Education of the farmers also needs to be done to teach them about ~~the~~ modern global practices ~~and~~ They should be told about effective utilization of fertilizers: which fertilizer is used for which type of soil or crop.

Awareness regarding stubble burning also should be provided. They should be told about the harmful effect it brings to their health and also at the same time decrease of soil fertility.

Pesticides availability should be ensured at affordable prices to the farmers. Effective use of such pesticides should also be communicated to the farmers. Pre-emptive measure regarding incoming pest should be communicated to the farmers.

Fertilizer manufacturing throughout the year has to be ensured by the ~~farmers~~ government by ensuring continuous supply of

natural gas to fertilize plants. New avenues of gas has to be explored in Pakistan and also abroad such as Iran and central asian republics.

The time we are in right now, we have to treat our farmers like a child ensuring ~~that~~ they are listened and their needs are met appropriately only then we can ensure a sustainable future for Pakistan for its food security.