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Impact of socioeconomic factors on crop diversification: A case study of district Charsadda, Pakistan

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Abstract: This study examines the impact of socioeconomic factors on crop diversification among farmers in District Charsadda, Pakistan. The main objective was to analyze how farmers' education, income level, land ownership, farming experience, and access to resources influence their decisions to diversify crops. Data was collected through a structured questionnaire from a sample of farmers selected from three union councils of Charsadda. The study also explored the shift from traditional grain crops such as wheat and maize to high-value crops including fruits, vegetables, and tobacco. The findings reveal that socioeconomic characteristics play a significant role in determining the extent of crop diversification. Educated and higher-income farmers were more likely to adopt high-value crops due to better awareness, risk management ability, and access to financial resources. Crop diversification was found to improve household income, create more employment opportunities, and enhance food security. However, constraints such as high input costs, limited access to credit, water shortages, weak market infrastructure, and inadequate government support still hinder its full potential. The study concludes that promoting crop diversification can strengthen rural livelihoods and contribute to sustainable agricultural growth in the region. It recommends targeted government interventions such as low-interest agricultural loans, improved irrigation systems, market development, and farmer training programs. These measures can encourage farmers in Charsadda and other regions of Pakistan to adopt diversified cropping systems that enhance productivity, income stability, and environmental sustainability.

Keywords: Socioeconomic factors, Crop diversification, Farmer education, Income level, Land ownership, Farming experience, Access to resources, high-value crops.

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1. Introduction

Agriculture is under increasing pressure from climate change, pest and disease outbreaks, and market volatility, all of which threaten global food security and farmer livelihoods. Monoculture practices worsen these challenges by degrading soil, increasing vulnerability to pests, and reducing resilience to environmental changes. Crop diversification—growing multiple crops using methods like intercropping and agroforestry—offers a promising solution by enhancing soil health, reducing pest pressure, and stabilizing income. It also improves food security by supporting more nutritious diets and mitigating the risks associated with market and climate shocks. This review explores the role of crop diversification in promoting sustainable agriculture and outlines its benefits, challenges, and future Potential (Tesfahan et al., 2025). There are two main ways to grow the economy: through specialization or by using economies of scale and scope. Agricultural diversification (AD) helps improve farming, protect the environment, and make better use of resources. While some countries, like those in Europe, have shifted toward specialized farming, this can harm ecosystems. Different countries show different patterns of diversification based on technology, support, and policies, leaving policymakers unsure how to balance farming growth with environmental protection (Han & Lin, 2021). Global agriculture, particularly in China, faces serious challenges due to rising food demand, shrinking farmland, and declining grain yields, prompting a shift from grain crops to high-value non-grain crops like fruits and herbs. This shift, known as non-grain use of farmland (NGUF), is driven by factors such as low profitability of grains, demographic changes, urban migration, and increased investment from private capital. While NGUF may offer higher short-term profits, it raises concerns about food security and environmental sustainability. Research across macro and micro levels highlights influences like land size, labor dynamics, policy support, and village-level governance structures. However, there remains a lack of village-scale studies, even though village collectives play a crucial role in land management and agricultural decision-making in China (Renmin et al., 2023).

The growing population is increasing food demand, and crop diversification can help farmers earn more and improve sustainability. A study in Punjab shows that growing high-value crops boosts income, but farmers face challenges like high costs and poor infrastructure. Policies like credit access, training, and better roads can support diversification and strengthen Agriculture. (Ali et al., 2024). High-value crops like Alfalfa can help farmers earn more, create jobs, and improve food security, especially when supported with proper resources like credit, infrastructure, and extension services. Many farmers in Pakistan and other developing countries are moving from traditional crops to high-value ones for better income and sustainability. However, challenges such as lack of market access, technical knowledge, and financial support can stop farmers from adopting these crops. Studies from places like Gilgit-Baltistan show that with the right support, farmers benefit greatly from switching to high-value crops. Therefore, government support and farmer awareness are key to making this transition successful and improving rural livelihood (Ali, 2024). Crop diversification, which involves practices like crop rotation, intercropping, and growing high-value crops, is crucial for sustainable farming, improved soil health, pest control, and economic stability. It helps farmers adapt to climate change, reduce risks, and improve income and food security, especially in developing countries like Pakistan. However, the shift towards monoculture, limited resources, lack of market access, and policy support for cereals have restricted the adoption of diversification. Research shows that diversification benefits both the environment and rural livelihoods, but its implementation faces challenges like inadequate infrastructure, training, and investment. This

study focuses on identifying the key factors that promote or hinder crop diversification in Punjab, Pakistan, and its potential policy outcomes (Hamaad et al., 2024).

Crop diversification involves the introduction of new crops or agricultural enterprises into existing farming systems, with or without replacing existing crops. Its primary goal is to sustain agricultural productivity by improving soil health, reducing environmental stresses, and generating employment opportunities. This strategy aims to stabilize farmers' incomes and strengthen linkages between the agricultural sector and other parts of the economy. In India, where the majority of the population lives in rural areas and depends on small-scale farming, crop diversification has become essential due to diverse agro-climatic conditions and the need for food security. The concept is applied both at the individual farm level and regionally, promoting a shift from single-crop dominance to a mix of high-value, complementary crops (Ramamoorthy, 2020).

District Charsadda is located in the northwestern part of Khyber Pakhtunkhwa, Pakistan, covering an area of 996 square kilometers. It has a population of approximately 1.83 million as per the 2023 census, with around 84% living in rural areas. The district is bordered by Peshawar, Mardan, Mohmand, and Nowshera. Charsadda is historically significant, once part of the ancient Gandhara civilization, with Pushkalavati as its historic capital. The majority language spoken is Pashto (99.66%), and the literacy rate stands at 53.94%. Agriculture is the backbone of Charsadda economy. The district has fertile land supported by irrigation from the Kabul and Swat Rivers. Major crops include sugarcane, wheat, maize, tobacco, and vegetables. Lychee is a special fruit of Charsadda, known for its quality and unique flavor. Tobacco and sugarcane contribute significantly to the local economy and industries.

Farming is largely done by smallholder farmers using traditional methods. Use of modern machinery, fertilizers, and high-yield seeds is growing but still limited. The district lacks sufficient cold storage, food processing, and packaging facilities. Agro-based industries such as sugar mills and tobacco processing units operate at a local level. Charsadda also has small-scale cottage industries like embroidery, woodworking, and handmade shoes. Economically, it is one of KP's key agricultural districts. It supplies food and cash crops to nearby urban centers like Peshawar and Mardan. Its lychee and tobacco have potential for branding and export. The district faces challenges such as poor market access, fluctuating crop prices, and limited government support. Despite this, Charsadda holds great importance for agricultural research and rural development in KP and Pakistan.

1.1. Objectives

The objectives of the research are:

- To examine the socioeconomic factors influencing crop diversification.
- To analyze the current trends in crop diversification in Charsadda, focusing on the shift from grain crops to high-value crops (fruits, vegetables and tobacco).
- To determine the effect of crop diversification on income level and employment level of farmers in the study area.
- To provide policy recommendations for sustainable agricultural practices and economic development.

1.2. Hypothesis

1. Ho**:** High yield Seeds (HYS), high profitability and market accessibility encourage crops diversification in district Charsadda.
2. H1: High yield Seeds (HYS) and market accessibility does not encourage crops diversification in district Charsadda.

2. Methodology

2.1. Research Design

This study employs a quantitative, cross-sectional research design to investigate the impact of various factors on crop diversification towards high-value crops in Charsadda. The objective is to identify the determinants, trends, and economic effects of shifting from grain crops to high-value crops such as fruits and vegetables.

2.2. Study area: Charsadda, Khyber Pakhtunkhwa

Charsadda is a fertile agricultural district in Khyber Pakhtunkhwa (KP), Pakistan. It is located near the confluence of the Swat and Kabul rivers, giving it access to rich alluvial soil and irrigation. The area supports a range of crops, but recent trends indicate a gradual shift toward high-value crops. The region has a mix of small and medium-sized farms, moderate infrastructure, and a significant population engaged in agriculture.

2.3. Target Population and Sampling

The study targets farm households engaged in crop farming in Charsadda. A stratified random sampling method will be used to ensure representation from different union councils (Hari Chand, Mandani, and Shakor) and various farm sizes (small, medium, large). A sample size of 50 farmers will be selected using Yamane's formula for reliable statistical inference.

2.4. Data Collection Methods

2.4.1. Primary Data:

Collected through structured questionnaires administered through face-to-face interviews. The questionnaire will include sections on demographics, cropping patterns, income sources, market access, use of extension services, and constraints to diversification.

2.4.2. Research instruments:

In this research study the research instrument used for collecting primary data is Questionnaire

3. Data analysis

The data analyzed in this section were collected through a field survey in September 2025. The statistical techniques used for the analysis are simple averages and percentages.

Table 3.1: Distribution of samples according to age.

Age	Frequency	Percentage
Under 25 years	22	44%
26-35 years	17	34%
36-45 years	5	10%
Above 45 years	7	14%
Total	50	100%

Table 3.1 shows the distributions of samples according to age, in which 22 respondents (44%) are under 25 years ,17 respondents (34%) are 26-35 years, 5 respondents (10%) are 36-45 years and 7 respondents (14%) are above 45 years. It is concluded that the majority of respondents are of the age under 25 years.

Table 3.2: Distribution of samples according to education.

Education	Frequency	Percentage
Illiterate	14	28%
Primary	6	12%
Secondary (matric/intermediate	13	26%
Graduate	17	34%

Table 3.2 shows the distribution of samples according to education, in the table 3.2 ,14 respondents (28%) are illiterate, 6 respondents (12%) are primary, 13 respondents (26%) are secondary and 17 respondents (34%) are graduate. It is concluded that the majority of respondents are educated.

Table 3.3: Distribution of samples according to main occupation of farmers.

Occupation	Frequency	Percentages
Farming	40	80%
Business	3	6%
Government jobs	1	2%
Other labor work	6	12%
Total	50	100%

Table 3.3 shows the distribution of sample according to main occupation, 40 respondents (80%) are farmers, 3 respondents (6%) are business, 1 respondent (2%) has government job and 6 respondents (12%) are other men. It is concluded that the majority of respondent's occupation is farming.

Table 3.4: Distribution of samples according to household monthly income.

Income	Frequency	Percentage
Less than 20000 PKR	3	6%
20001 – 40000 PKR	20	40%
40001 – 60000 PKR	12	24%
Above 60000 PKR	15	30%
Total	50	100%

Table 3.4 shows the distribution of sample according to income 3 respondents (6%) have income less than 20000 PKR, 20 respondents (40%) have income between 20001 – 40000 PKR, 12 respondents (24%) have income 40001 – 60000 PKR and 15 respondents (30%) have income above 60000 PKR. It is concluded that the majority of respondents have income 20001-40000 PKR.

Table 3.5: Distribution of samples according to farm size.

Farm size	Frequency	Percentage
Less than 1 acre	17	34%
1 – 5 acre	28	56%
6 – 10	4	8%
More than 10 acres	1	2%
Total	50	100%

Table 3.5 shows the distribution of sample according farm size, 17 respondents (34%) have farms less than 1 acre, 28 respondents (56%) farms are 1 – 5 acres, 4 respondents (8%) have farms 6 – 10 acres and 1 respondent (2%) have farms more than 10 acres. It is concluded that the majority of respondent's farm size has 1-5 acres.

Table 3.6: Distribution of samples according to farming experience:

Experience	Frequency	Percentage
Less than 5 years	14	28%
5 – 10 years	15	30%
11 – 20 years	11	22%
More than 20 years	10	20%
Total	50	100%

Table 3.6 shows the distribution of samples according to farming experience, 14 respondents (28%) have experience less than 5 years, 15 respondents (30%) have experience 5 – 10 years, 11 respondents (22%) have experience 11 – 20 years and 10 respondents (20%) have experience more than 20 years. It is concluded that the majority of the respondents have farming experience is 5-10 years.

Table 3.7: Distribution of samples according to land ownership status.

Land ownership status	Frequency	Percentage
Owner	8	16%
Tenant	28	56%
Owner + tenant	2	4%
Half	17	34%
Total	50	100%

Table 3.7 shows the distribution of sample according to land ownership, 8 respondents (16%) are owner, 28 respondents (56%) are tenants, 2 respondents (4%) are owner cum tenants and 17 respondents (34%) are on half. It is concluded that the majority of the respondent's land ownership is tenant.

Table 3.8: Distribution of samples according to main source of irrigation.

Source of irrigation	Frequency	Percentage
Canal	48	96%
Electric Tube well	0	0
Rain – fed (barani)	1	2%
Solar tube well	1	2%
Total	50	100%

Table 3.8 shows the distribution of samples according to source of irrigation, 48 respondents (96%) use canal irrigation, 0 respondent use electric tube well for irrigation, 1 respondent (2%) use rains for irrigation and 1 respondent (2%) use solar tube well for irrigation. It is concluded that the majority of the respondents use canal for irrigation.

Table 3.9: Distribution of samples according to family members directly involved in farming.

Family members	Frequency	Percentage
1-2	19	38%
3-4	28	56%
5-6	2	4%
More than 6	0	0
Total	50	100%

Table 3.9 shows the distribution of sample according to family members involved in farming, 19 respondents (38%) told that 1-2 members are involved in farming, 28 respondents (56%) told that 3-4 members are involved in farming, 2 respondents (4%) told that 5 – 6 members are involved in farming and 0 respondent are more than 6 members. It is concluded that the majority of the respondents have 3-4 members are involved in farming.

Table 3.10: Which crops do you currently grow?

Current crops	Frequency	Percentage
Tobacco	2	4%
Vegetables and fruits	44	88%
Wheat	3	6%
Sugarcane	1	2%
Total	50	100%

Table 3.10 shows the frequency of samples according to current crops,2 respondents (4%) are growing tobacco currently, 44 respondents (88%) are currently growing vegetables and fruits, 3 respondents (6%) growing wheats currently and 1 respondent (2%) currently growing sugarcane. It is concluded that the majority of the respondents growing fruits and vegetables.

Table 3.11: Distribution of samples according to have you shifted from grain crops (like wheat/maize) to high value crops (like fruits and vegetables)?

Shift from grain crops or not	Frequency	Percentage
No	4	8%
Yes	46	92%
Total	50	100%

Table 3.11 shows the distribution of samples according to grows grain crops or vegetables, 4 respondents (8%) are not shifted from grain crops and 46 respondents (92%) are shifted from grain crops to vegetables. It is concluded that the majority of the respondents are shifted from grain crops.

Table 3.11.1: Distribution of samples according to if yes, what motivated you to shift?

Motivated you to sift	Frequency	Percentage
Higher income	37	80%
Market demand	6	13%
Soil/climate condition	2	4.3%
Other	1	2.1%
Total	46	100%

Table 3.11.1 shows the distribution of samples according to what motivate you to shift from grain crops to fruits and vegetables, 37 respondents (80%) told that main cause of motivation is higher income, 6 respondents (13%) told that the cause of shifting is market demand, 2 respondents (4.3%) told that cause of shifting is soil/climate condition and 1 respondent are due to other reasons. It is concluded that the majority of the respondents has motivated due to higher income.

Table 3.12: Distribution of samples according to percentage of land used for high value crops like fruits and vegetables and tobacco.

%age of land used for HVC	Frequency	Percentage
Less than 25%	2	4%
25 – 50%	9	18%
50 – 75%	4	8%
More than 75%	35	70%
Total	50	100%

Table 3.12 shows the distribution of sample according what percentage of land are used for HVC, 2 respondents (4%) told that they use less than 25% of their land for HVC, 9 respondents (18%) told that they use 25-50% land for HVC, 4 respondents (8%) told that they use50-75%of land for HVC, and 35 respondents (70%) told that more than75% of their land are used for HVC. It is concluded that the majority of the respondents use greater part of their land for vegetables.

Table 3.13: Distribution of samples according to which crops do you prefer as high value crops.

Prefer as HVC	Frequency	Percentage
Vegetables	47	94%
Fruits	2	4%
Sugarcane	1	2%
Wheat	0	0
Total	50	100%

Table 3.13 shows the distribution of samples according to which crops is prepared as HVC, 47 respondents (94%) prefer vegetables as HVC, 2 respondents (4%) prefer fruits as HVC, 1 respondent (2%) prefer sugarcane as HVC and 0 respondents prefer wheat as HVC. It is concluded that the majority of the respondents prefer vegetables as high value crops.

Table 3.14: Distribution of samples according to do you use high yield seeds?

Use high yield seeds or not	Frequency	Percentage
Yes	50	100%
No	0	0
Total	50	100%

Table 3.15 shows the distribution of samples according to high yield seeds, 50 respondents (100%) farmers use high yield seeds and 0 respondents does not use high yield seeds. It is concluded that the majority of respondents use high-yield seeds.

Table 3.15.1: If yes, how effective have they been?

How much effective HYS	Frequency	Percentage
Very effective	44	88%
Less effective	2	4%
Not effective	2	4%
Other	2	4%
Total	50	100%

Table 3.15.1 shows the distribution of samples according to HYS effectiveness, 44 respondents (88%) response that HYS very effective, 2 respondents (4%) response is that HYS are less effective, 2 respondents (4%) response that TYS are not effective and 2 respondents (4%) are others.

Table 3.16: Distribution of samples according to do you have access to credit/loans for farming?

Access to loans	Frequency	Percentage
Yes	6	12%
No	44	88%
Total	50	100%

Table 3.16 shows the distribution of samples according to loans access for farming, 6 respondents (12%) have access to loan and 44 respondents have not access to loans. It is concluded that the majority of the respondents have no access to credit.

Table 3.17: Distribution of samples according to how easy is it for you to access market?

Market access	Frequency	Percentage
Very easy	40	80%
Somewhat easy	4	8%
Difficult	3	6%
Very difficult	3	6%

Table 3.17 shows the distribution of samples according to market accessibility, 40 respondents (80%) have very easy access to market, 4 respondents (8%) have somewhat easy access to market, 3 respondents (6%) have difficult to access market and 3 respondents (6%) have difficult accessibility to the market. It is concluded that the majority of respondents have access to market is very easy.

Table 3.18: Distribution of samples according to receive training / advice from agricultural extension services?

Receive training	Frequency	Percentage
Frequently	1	2%
Sometime	10	20%
Rarely	6	12%
Never	33	66%
Total	50	100%

Table 3.18 shows the distribution of sample according to the receiving of training, 1 respondent (2%) receive training frequently, 10 respondents (20%) receive training sometime, 6 respondents (12%) receive training rarely and 33 respondents (66%) receive training never. It is concluded that the majority of the respondents have never receive training.

Table 3.19: Distribution of samples according to what is your main source of information for making crops decisions?

Crops decision	Frequency	Percentage
Agriculture officers	5	10%
Fellow farmers	13	26%
Mobile / internet	0	0%
Own experience	32	64%
Total	50	100%

Table 3.19 shows the distribution samples according making crops decision, 5 respondents (10%) take crop information from agricultural officers, 13 respondents (26%) take information from fellow farmers, 0 respondents (0%) take information from mobile/internet and 32 respondents (64%) make crops decision from its own experience. It is concluded that the majority of the respondents make crops decision from its own experience.

Table 3.20: Distribution of samples according to what are the biggest challenges you face in diversifying crops?

Challenges in crops diversification	Frequency	Percentages
High input cost	34	68%
Lake of market access	4	8%
Water shortage	2	4%
Risk of crops failure	10	20%
Total	50	100%

Table 3.20 shows the distribution of samples according to challenges face by farmers in crops diversification, 34 respondents (68%) face high input costs, 4respondents (8%) face lake of market access, 2 respondents (4%) face water shortage and 10 respondents (20%) face risk of crops failure. It is concluded that the majority of the respondents face challenge for diversifications is high input cost.

Table 3.21: Distribution of samples according to has your income change after diversification?

Income level changes	Frequency	Percentage
Significantly increase	40	80%
Slightly increase	9	18%
No change	0	0%
Decrease	1	2%
Total	50	100%

Table 3.21 shows the distribution of samples according to changes in income level due to crops diversification, 40 respondents (80%) income level significantly increase, 9 respondents (18%) income level slightly increase, 0 respondents (0%) income level not change and 1 respondent (2%) income level decrease. It is concluded that the majority of the respondent's income level increase significantly after diversification.

Table 3.22: Has employment/labor use on your farm changed? Due to crops diversification.

Employment change	Frequency	Percentage
Increased	42	84%
Decreased	3	6%
Same	5	10%
Total	50	100%

Table 3.22 shows the distribution of samples according to changes in employment, 42 respondents (84%) responded that due to crops diversification the level of employment is increased, 3 respondents (6%) farmers face decrease in employment, 5 respondents (10%) farmers have no change in employment and 0 respondents (0%) are other. It is concluded that the majority of the respondents face an increase in employment.

Table 3.23: Distribution of samples according to do you feel more food secure after diversification?

Food secure after diversification	Frequency	Percentage
Yes	47	94%
No	3	6%
Total	50	100%

Table 3.23 shows the distribution of samples according to food security,47 respondents (94%) farmers have feel more food secure after diversification, 3 respondents (6%) shows no food security after diversification. It is concluded that the majority of the respondents feel more food secure after diversification.

Table 3.24: Distribution of samples according to which benefits have you experienced?

Benefits of diversification	Frequency	Percentage
Higher income	38	76%
Better soil quality	9	18%
Lower pest attack	1	2%
Improved food security	2	4%
Total	50	100%

Table 3.24 shows the distribution of samples according to benefits of diversification, 38 respondents (76%) experience higher income, 9 respondents experience better soil quality, 1 respondent (2%) experience lower pest attack, 2 respondents (4%) experience improved food security. It is concluded that the majority of the respondent's experience benefits of crops diversification in the form of higher income.

Table 3.25: Distribution of samples according to what type of support would help you diversifying more successfully?

Help for diversification	Frequency	Percentage
Low interest loans	23	46%
Technical training	14	28%
Access to cold storage	2	4%
Guaranteed crops prices	11	22%
Total	50	100%

Table 3.25 shows the distribution of samples according to support for diversification, 23 respondents (46%) farmer needs low interest loans, 14 respondents (28%) farmers needs technical training, 2 respondents (4%) farmers needs access to cold storage and 11 respondents (22%) farmers need guaranteed crops prices.

Table 3.26: Do you think government policies support crops diversification?

Government policies support diversification	Frequency	Percentage
Yes	17	34%
No	8	16%
Do not know	24	48%
Other	1	2%
Total	50	100%

Table 3.26 shows the distribution of samples according to government policies, 17 respondents (34%) farmers are of view of that yes government support diversification, 8 respondents (16%) farmers view that government do not support diversification, 24 respondents (48%) do know about government policies and 1 respondent (2%) are other view about diversification.

According to the hypothesis, high yield Seeds (HYS), high profitability and market accessibility encourage crops diversification in district Charsadda. According to the table 3.18 majority of the respondents (80%) responded that market accessibility plays an important role in crops diversification in study area samples in table 3.12 shows that majority of respondents (82%) claims that higher profits are the main cause of crops diversification. In light of the above data analysis the hypothesis of the results stands valid and the hypothesis is accepted.

4. Conclusion

This research concludes that socioeconomic factors such as education, income level, farming experience, land ownership, and access to resources play a vital role in influencing crop diversification among farmers in District Charsadda. The findings reveal that most farmers have shifted from traditional grain crops such as wheat and maize to high-value crops like fruits, vegetables, and tobacco. The main motivation behind this shift is the potential for higher

income and strong market demand. The study also found that crop diversification has significantly increased farmers' earnings, created more employment opportunities, and improved food security at the household level.

However, several constraints still limit diversification, including high input costs, limited access to credit facilities, lack of technical training, and weak marketing infrastructure. Farmers also face challenges related to water availability and inadequate government support. Therefore, it is essential for policymakers to provide targeted interventions such as low-interest agricultural loans, capacity-building programs, modern irrigation systems, and better road and market infrastructure. Strengthening agricultural extension services can further guide farmers in adopting modern and sustainable practices. Promoting crop diversification in Charsadda can enhance income stability, reduce poverty, and make agriculture more resilient to climate and market risks. With proper policy support and farmer participation, crop diversification can become a key driver of sustainable agricultural growth and rural economic development in Pakistan.

4.1. Recommendation:

- Farmer Education Programs**:**
  The government and NGOs should organize awareness sessions and training workshops to educate farmers about the benefits and methods of crop diversification.

- Literacy and Skill Development:
  Increasing literacy levels and providing technical farming skills can help farmers make better production and marketing decisions.

- Encouraging Young Farmers:
  Young and educated farmers should be motivated to adopt modern and diversified farming systems through incentives and success stories.

- Access to Low-Interest Loans:
  Banks (like ZTBL, HBL) should provide easily accessible and low-interest agricultural loans to enable farmers to invest in high-value crops.

- Crop Insurance Schemes:
  Introduce crop insurance programs to protect farmers against losses from droughts, floods, and price fluctuations, encouraging them to diversify safely.

- Subsidies for High-Value Crops:
  The government should provide subsidies on seeds, fertilizers, and equipment for high-value crops such as vegetables, fruits, and tobacco.

- Improve Irrigation Systems:
  Build and maintain canals, tube wells, and water storage systems to ensure year-round irrigation for diversified crops.

- Development of Cold Storage and Processing Units:
  Establish cold storage facilities and small processing plants in Charsadda to reduce post-harvest losses and increase farmers' profit margins.

- Better Road and Transport Facilities:
  Improve rural roads and transport networks to reduce transportation costs and help farmers access markets more efficiently.

- Strengthening Market Access:
  Create organized agricultural markets where farmers can sell fruits and vegetables at fair prices without depending on middlemen.

- Guaranteed Prices and Contracts:
  The government should offer minimum support prices or contract farming systems to reduce farmers' risk and encourage diversification.

- Farmer Cooperatives and Unions:
  Promote cooperative farming systems where small farmers can combine resources to share inputs, machinery, and marketing benefits.

- Use of Modern Technology:
  Encourage the adoption of modern machinery, drip irrigation, and mobile-based advisory services to increase productivity and efficiency.

- Promote Environment-Friendly Practices**:**
  Farmers should practice intercropping, crop rotation, and organic fertilizers to improve soil fertility and environmental sustainability.

- Strengthen Agricultural Extension Services:
  The government should increase the number of trained extension workers to provide on-field guidance, new crop techniques, and pest control measures to farmers.

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