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Exploring Rural Youth Aspirations in Agriculture and role of information Technologies

Muhammad Iftikhar[1], Muhammad Furqan Khan[2], Ahsan Ali[3], Muhammad Saad Faiz[4], Muhammad Awais[5], Muhammad Saleem*[6]

[1,3,5,6] Institute of Agricultural Extension, Education and Rural Development, University of Agriculture Faisalabad
[2]Wasington University of Science and Technology, VA, USA
[4]School of Biochemistry and Biotechnology, University of The Punjab
*Corresponding Author: **saleemshykh@gmail.com**

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Abstract
Agriculture remains a crucial sector for rural youth; however, their engagement and information-seeking behavior significantly impact agricultural sustainability. This study was designed to explore the aspirations of rural youth in agriculture and the role of information technologies in their engagement. The research was conducted in District Khanewal, Pakistan, to assess their interest in agriculture, sources of agricultural information, satisfaction with these sources, and the challenges they face. A total of 60 young farmers were selected from four randomly chosen union councils of Tehsil Kabirwala. Data were collected through a structured interview schedule. Findings revealed that a majority (68.3%) of respondents preferred agriculture over other occupations, with 73.3% demonstrating an innovative approach by adopting modern farming techniques. Farmers primarily relied on self-experience (mean = 2.78) and YouTube channels (mean = 2.43) for agricultural knowledge, while formal sources such as agricultural officers (mean = 1.95) and websites (mean = 1.45) were used less frequently. Satisfaction levels followed a similar pattern, with self-experience (mean = 2.68) and fellow farmers (mean = 2.30) being the most trusted sources. Key challenges included financial constraints (mean = 4.10), economic problems (mean = 3.87), and policy-related issues (mean = 3.78). Limited access to irrigation (mean = 3.68) and modern technology (mean = 3.67) also hindered agricultural productivity. The study suggests strengthening digital platforms with expert-led content, enhancing the role of extension services, and integrating formal and informal information sources to improve agricultural knowledge dissemination. Addressing financial and infrastructural barriers can further encourage youth participation in agriculture, ensuring sustainable rural development

Keywords: Rural youth, agriculture, information sources, satisfaction, challenges

Introduction
Agriculture plays a vital role in Pakistan's economy, with a significant portion of the population engaged in this noble profession, either directly or indirectly. Farmers in Pakistan rely on

agriculture for multiple purposes, primarily as a source of income to sustain their livelihoods (Ullah et al., 2019). Pakistan has a significant youth population; however, their participation in agricultural activities remains minimal despite their awareness of food insecurity and low productivity challenges. Many of these young individuals come from rural areas and are directly affected by these issues. The lack of youth involvement in agriculture is a growing concern for agriculturists, researchers, and policymakers. This limited engagement is largely due to the declining state of agricultural productivity, which has diminished hopes of enhancing production levels to achieve sustainable food security for Pakistan's rapidly growing population (Hassan et al., 2016). Pakistan is predominantly a rural country, with around two-thirds of its population residing in villages. There are 50,588 villages, making up 60% of the total population. The rural sector serves as the backbone of Pakistan's economy, directly influencing the well-being of its people. However, rural poverty remains high, with poor quality of life indicators. Rural youth play a crucial role in the country's political, economic, and social development. With a population of 188 million, Pakistan is the sixth most populous country globally, and 64% of its population is below the age of 29, making youth a key driver of future progress (Govt. of Pakistan, 2013). Despite the significance of rural areas, they remain underdeveloped compared to urban regions due to low government investment in infrastructure, lack of private sector interest, and limited financial support for rural development. A small fraction of the budget is allocated to rural education, hindering the adoption and implementation of new technologies in agriculture and other sectors. Since agriculture is not the sole source of livelihood in rural areas, it is crucial to equip the 70% rural population with modern facilities and timely access to information to enhance their productivity and development (Sattar, 2007). The young generation constitutes a significant portion of Pakistan's population, with many facing unemployment due to a lack of technical knowledge. While some are educated, they often lack professional skills and do not engage in business or agriculture, focusing solely on jobs. This dependency on employment leads to low income, making it difficult for them to support their families (Ahmad et al., 2020). A positive attitude is a fundamental prerequisite for engaging rural youth in the agricultural profession. Efforts should focus on convincing and mobilizing them to take a proactive role in this field, not only for their personal benefit but also as a collective responsibility. Additionally, enhancing the appeal of the green economy is essential to sustaining their interest in farming while addressing their needs related to the agricultural business (Unay-Gailhard, & Bojnec, 2019). This study has been designed in response to the growing number of unemployed youth in Pakistan. As Pakistan is an agricultural country, a significant portion of the farming sector consists of older farmers and illiterate young individuals. This study aims to explore the reasons why young farmers show a declining interest in agriculture. Additionally, it examines the activities of those who are engaged in the sector, identifies the areas where they require training, and highlights the agricultural practices in which they have expertise.

Objectives

1. To find out the Demographic characteristics of the youth in the study area.
2. To find out the interest level of youth in agriculture
3. To probe out the problems being faced by rural youth in agriculture.
4. To identify the factors that creates hindrance in rural youth participation in agriculture
5. To identify sources of information used by the gender for agriculture purpose

Methodology

The study was conducted in district Khanewal, the district consists of 4 tehsils namely Khanewal Main Channu, Johannian and Kabirwala. Out of these tehsil Kabirwala was selected conveniently for the purpose of data collection. The list of the registered farmers was obtained from the agriculture officers of the area, all of the young registered farmers were the population of the study. There are 37 union council (UC) of tehsil, out of them 4 were selected randomly. From each UC

Fifteen young farmers were selected for the purpose of data collection. Thus it makes the sample size of 60 farmers. A well planned interview schedule was prepared for data collection from the respondents.

Measurement of Variables

The variables analyzed in this study included:

- **Independent Variables**: Lack of money, irrigation problems, education level, landholding size, lack of technology, age, and marketing problems.
- **Dependent Variables**: Economic problems, high input prices, low productivity, lack of training, irrigation problems, information access, adoption of new technology, and selling products.
- **Correlation Coefficient (ρ)**: The strength and direction of the relationships among these variables were determined using Pearson's correlation coefficient.

Data Analysis

The collected data was analyzed using **SPSS**. Pearson correlation analysis was applied to determine the degree and significance of relationships among variables. The significance levels were set at **$p < 0.05$ (*) and $p < 0.01$ (**)** to interpret the strength of associations. On the other hand,

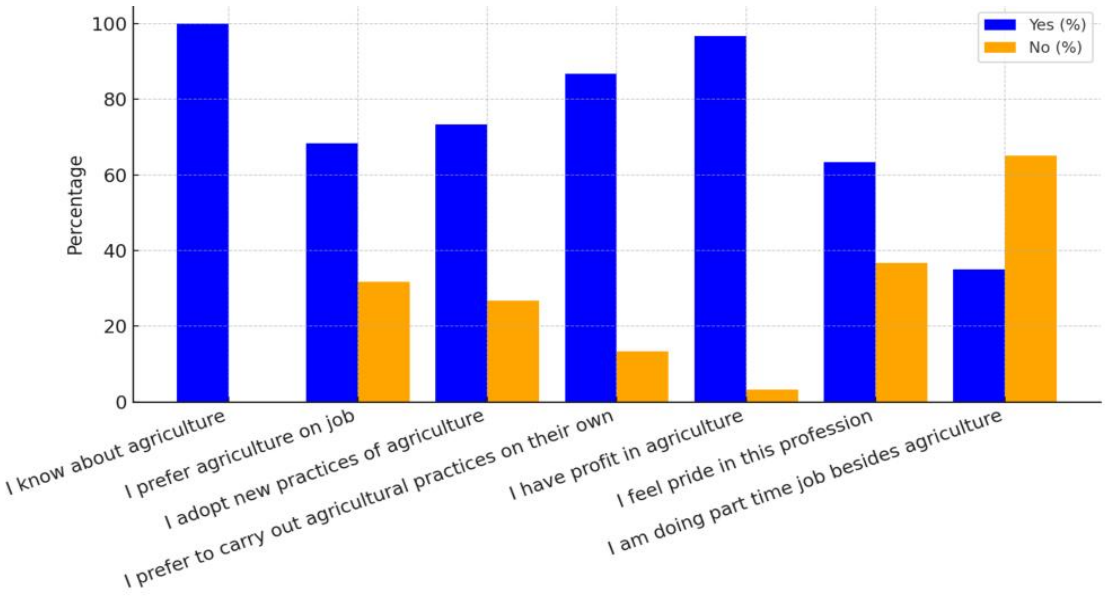
Limitations:

Main limitations of study were:

- Researcher was limited to Tehsil Kabirwala.
- Due to limited resources and time, the study was restricted to Tehsil Kabirwala. Researcher had to bear all financial expenditure from his pocket.
- Time span was too short.
- Validity and reliability of this research is restricted to the extent that the respondents provided the correct data.
- The study was further limited to quantitative data provided by the respondents

Interest of Rural Youth in Agriculture

Since all of the respondents were involved in agriculture, they were asked about their perceptions of agriculture as a field of knowledge, their interest in it, and how they view it as a profession. They were also asked why they are engaged in this sector—whether they consider it a full-time profession, a part-time activity, or a profession due to a lack of other opportunities. The responses are provided below.



All of the respondents were from rural backgrounds and engaged in agriculture, so they all reported being familiar with agricultural practices. A vast majority (68.3%) of the respondents stated that they prefer agriculture over doing a job. Interestingly, 73.3% of the farmers reported being innovative, as they were adopting new agricultural machinery and equipment to achieve higher production. An overwhelming majority (86.7%) of the farmers said they perform agricultural practices themselves, such as land preparation, irrigation application, seed sowing, and harvesting. Almost all of the respondents considered agriculture a profitable profession, as they were earning a good income from it. According to the majority (63.3%) of the respondents, they feel pride in adopting agriculture as a profession. Additionally, more than one-third (35%) of the respondents were also engaged in part-time jobs while earning through agriculture

Information sources

No matter how skilled a person is, there are times when they need information about something. Similarly, a farmer, regardless of their expertise, encounters challenges and seeks information from various sources to overcome them. The following table presents the sources from which farmers obtain agricultural information.

Table 1 Sources of Information Used by Youth for Agricultural Knowledge

Information Sources	Extent of Using ICTs				
	1	2	3	Mean	SD
Self-experience	3(5)	7(11.7)	50(83.3)	2.78	.52
YouTube channels	6(10)	22(36.7)	32(53.3)	2.43	.67
Fellow farmers	8(13.3)	26 (43.3)	26(43.3)	2.30	.69
AO	12(20)	39(65.0)	9(15.0)	1.95	.59
Websites	37(61.7)	19(31.7)	4(6.7)	1.45	.62
Helpline	37(61.7)	19(31.7)	4(6.7)	1.45	.62
News papers	36(60)	22(36.7)	2(3.3)	1.43	.56

1= Low, 2= Medium, 3=High

The given table presents data on the sources of agricultural information used by farmers. The findings reveal that farmers primarily rely on their own knowledge and experience for agricultural practices, ranking this source as the most preferred due to its highest mean value among all other sources. The second major source of information is YouTube; farmers reported that whenever they face difficulties in agriculture, they watch videos of various experts on YouTube to obtain the necessary information. When farmers are unable to rely on their own knowledge, they seek assistance from fellow farmers, making this the third most frequently used source, with a mean value of 2.30. In contrast, farmers reported consulting websites, helplines, and newspapers the least, as they perceive these sources to be slow and less effective in delivering timely information. Additionally, farmers noted that agricultural articles are rarely published in newspapers, making them an unreliable source of information. Similar sources of information were also reported by Yaseen et al. (2021), according to them Most rural youth rely on local information sources, such as fellow farmers, marketing agents, and extension workers, for agricultural knowledge. However, some also seek information from cosmopolite sources, including government and private organizations. From the findings and discussion, it is suggested that for improving farmers' access to reliable agricultural information, efforts should focus on integrating formal sources with their preferred informal channels. Strengthening digital platforms like YouTube with expert-led content and interactive sessions can enhance knowledge dissemination. Additionally, expanding the role of Agriculture Officers through field visits, community meetings, and farmer-friendly helplines can bridge the gap between formal and informal information sources. Promoting farmer-to-farmer knowledge exchange through organized networks and training programs can further enhance practical learning and adoption of modern techniques.

Satisfaction about the sources of Information

As indicated in Table 1, youth utilized multiple sources to obtain agriculture-related information. They were further asked to indicate their level of satisfaction with these sources. The sources were then ranked based on their mean values.

Table 2 Satisfaction with Sources of Information Used by Youth for Agricultural Knowledge

Information Sources	Extent of Satisfaction				
	1	2	3	Mean	SD
Self-experience	6(10)	7(11.7)	47(78.3)	2.68	.65
Fellow farmers	8(13.3)	26(43.3)	26(43.3)	2.30	.69
YouTube channels	38(63.3)	22(36.7)	0(0)	1.36	.48
AO	38(63.3)	22(36.7)	0(0)	1.36	.48
Websites	40(66.7)	18(30)	2(3.3)	1.36	.55
Helpline	37(61.7)	19(31.7)	4(6.7)	1.45	.62
News papers	47(78.3)	12(20)	1(1.7)	1.23	.46

1= Low, 2= Medium, 3=High

The data on satisfaction with information sources reveals that self-experience is the most satisfying for farmers, with 78.3% reporting high satisfaction. The mean score of 2.68 suggests that most farmers are content with relying on their own experience, with a relatively low standard deviation (0.65), indicating consistent satisfaction levels. Fellow farmers are also a significant source of satisfaction, as 43.3% of respondents are moderately satisfied, and another 43.3% report high satisfaction. However, the mean score of 2.30 and standard deviation of 0.69 show more variability in satisfaction levels, suggesting that the degree of satisfaction with fellow farmers as a source may differ among respondents. On the other hand, formal information sources like YouTube channels, agriculture officers (AOs), websites, helplines, and newspapers show lower satisfaction levels. YouTube channels and AOs have a mean score of 1.36, indicating that most respondents are dissatisfied with these sources. Similarly, websites and helplines have similarly low satisfaction ratings, with means of 1.36 and 1.45, respectively. Newspapers are the least satisfactory source, with 78.3% of respondents expressing dissatisfaction. The low satisfaction scores for these sources (ranging from 1.23 to 1.45) suggest that formal channels fail to meet the farmers' expectations, while informal sources like self-experience and fellow farmers are far more fulfilling. Over time, farmers' information needs have been increasing, and fulfilling these needs largely depends on access to diverse sources of information. Farmers rely on both traditional and modern sources to stay informed and address their agricultural challenges. According to the table 1, farmers primarily depend on their own experience for agricultural information. YouTube was ranked as the second most suitable source, followed by fellow farmers in third place. This indicates that farmers rely more on human-based sources rather than technology-driven ones. Farmers also reported that no agricultural programs were broadcasted on television, which is why they preferred YouTube for timely agricultural information. These findings contradict those of Raza et al. (2020), who found that agricultural websites were considered effective by respondents (mean=3.78) due to their visual content and the ability to copy and download information. The internet was also perceived as effective, though slightly above the medium level, followed by helplines, which were rated at a medium level of effectiveness (mean=3.19). In contrast, computers and landline phones were perceived as less effective, with mean values of 2.89 and 2.70, respectively. According to Kumbhar et al. (2015), farmers in Sindh used some similar sources of information; however, their preferences varied, and they also relied on additional sources. According to their findings, radio, television, and seed and pesticide dealers were ranked among the top sources of information, while the least utilized sources were fellow farmers, private extension staff, and the internet. From the discussion, it is evident that sources of information vary across different regions due to farmers' preferences, awareness, and other factors. As reported by Ali et al. (2024), farmers' attitudes and their perceived usefulness of information and technology significantly influence their awareness and adoption of these resources.

Table 3 **Problems Faced by Youth While Engaging in Agriculture**

Statement	1	2	3	4	5	Mean	SD
Lack of money	1(1.7)	1(1.7)	10(16.7)	27(45)	21(35)	4.10	0.85
Economic problems	0(0)	2(3.3)	13(21.7)	36(60)	9(15)	3.87	0.70

Govt. policy problems	0(0)	3(5)	12(20)	40(66.7)	5(8.3)	3.78	0.66
Irrigation problem	0(0)	3(5)	21(35)	28(46.7)	8(13.3)	3.68	0.77
Lack of technology	0(0)	5(8.3)	18(30)	29(48.3)	8(13.3)	3.67	0.81
Marketing problem	0(0)	4(6.7)	20(33.3)	33(55)	3(5.)	3.58	0.69
Information about modern technology	0(0)	7(11.7)	20(33.3)	26(43.3)	7(11.7)	3.55	0.85
Selling of agriculture product	0(0)	4(6.7)	22(36.7)	32(53.3)	2(3.3)	3.53	0.67
Lack of training	3(5)	5(8.3)	17(28.3)	31(51.7)	4(6.7)	3.47	0.92
Shortage of Time	2(3.3)	3(5)	30(50)	24(40)	1(1.7)	3.32	0.74
Institutional problems	1(1.7)	12(20)	21(35)	24(40)	2(3.3)	3.23	0.87
High prices of inputs	0(0)	8(13.3)	30(50)	22(36.7)	0(0)	3.23	0.67
Education problems	1(1.7)	13(21.7)	22(36.7)	22(36.7)	2(3.3)	3.18	0.87
Unable to take risks	0(0)	24(40)	24(40)	9(15.0)	3(5)	2.85	0.86
Guidance and counseling problems	2(3.3)	22(36.7)	22(36.7)	12(20)	2(3.3)	2.83	0.90
Political problems	0(0)	14(23.3)	17(28.3)	19(31.7)	10(16.7)	2.42	1.03
Social problems	18(30)	20(33.3)	19(31.7)	3(5)	0(0)	2.12	0.90

1= Very Low Extent, 2: low extent, 3: Medium Extent, 4: High Extent, 5: Very high

The data highlights key challenges faced by farmers, with financial constraints being the most significant issue (mean = 4.10, SD = 0.858), as 80% of respondents reported it as a major barrier. Economic issues (mean = 3.87) and government policy constraints (mean = 3.78) also pose significant hurdles, reflecting the need for better financial support and policy reforms. Other critical challenges include irrigation issues (mean = 3.68), lack of technology (mean = 3.67), and marketing difficulties (mean = 3.58), emphasizing the need for improved infrastructure and market access. Farmers also face obstacles in accessing modern agricultural information (mean = 3.55),

highlighting gaps in extension services. On the other hand, social problems (mean = 2.12) and political issues (mean = 2.42) are perceived as less pressing concerns. Challenges such as risk aversion (mean = 2.85), time shortages (mean = 3.32), and high input costs (mean = 3.23) further underscore the operational difficulties in farming. Overall, addressing financial, technological, and policy-related barriers can significantly enhance agricultural productivity and farmer well-being. Ali et al. (2021) also reported similar challenges, highlighting key obstacles faced by youth in engaging in agriculture. According to the study, the major issues included small landholdings, high production costs, flawed marketing systems, land ownership complications, youth's reluctance towards farming, low agricultural returns, limited access to agricultural information, infertile land, labor-intensive practices, and a lack of sufficient agricultural knowledge. According to Aftab et al. (2021) Many respondents felt that pursuing agriculture as a profession would not bring them recognition. The primary reason for this lack of acknowledgment was the low financial returns in the agricultural sector. Agriculture has become increasingly complex, facing growing challenges such as shrinking landholdings, water scarcity, a rising population, and limited resources. Similar barriers were also reported by Mahmood et al. (2023) according to them limited access to resources, traditional mindsets, restricted market opportunities, and low profitability can act as barriers preventing rural youth from participating in sustainable agricultural practices. Keeping in view the findings and discussion it is recommended that Enhancing financial support through subsidies and low-interest loans can ease farmers' economic constraints. Improving market access and infrastructure will boost profitability and attract youth to agriculture. Strengthening extension services and training programs will equip farmers with modern knowledge and technologies for sustainable farming.

Engagement in Agriculture activities

Respondents were asked about the agricultural activities they are engaged in, and their level of engagement was measured using categories such as Very Low Extent, Low Extent, Medium Extent, High Extent, and Very High Extent. The mean value was computed, and their engagement was ranked accordingly.

Table 4: Youth Participation in Agricultural Activities

Statement	1	2	3	4	5	Mean	SD
Chemical control	0(0)	2(3.3)	23(38.3)	32(53.3)	3(5.0)	3.60	.64
Irrigation	0(0)	12(20.0)	12(20.0)	30(50.0)	6(10.0)	3.50	.92
Harvesting	0(0)	7(11.7)	23(38.3)	25(41.7)	5(8.3)	3.46	.81
Sowing operations	0(0)	4(6.7)	28(46.7)	25(41.7)	3(5.0)	3.45	.69
Selection of seed	0(0)	10(16.7)	26(43.3)	19(31.7)	5(8.3)	3.31	.85
Proper marketing	3(5.0)	15(25.0)	20(33.3)	22(36.7)	0(0)	3.01	.91
Storage of seeds	1(1.7)	20(33.3)	30(50.0)	7(11.7)	2(3.3)	2.81	.79
Post-harvest	1(1.7)	21(35.0)	32(53.3)	5(8.3)	1(1.7)	2.73	.70
Cleaning of grains	4(6.7)	22(36.7)	26(43.3)	7(11.7)	1(1.7)	2.63	.88
Packaging	6(10.0)	21(35.0)	22(36.7)	11(18.3)	0(0)	2.60	.97
Biological Control	17(28.3)	19(31.7)	15(25.0)	9(15.0)	0(0)	2.26	1.03

The data indicates that chemical control of insect pests is the most prevalent practice among farmers, with 35 out of 60 respondents reporting high or very high engagement. This practice ranked first, with the highest mean value (3.60). Farmers emphasized the need to educate illiterate peers on appropriate chemical applications, highlighting their established credibility within farming communities. The second most common activity was irrigation application, with approximately 60% of respondents reporting high to very high involvement. Many farmers personally irrigate their fields, while others closely supervise the process. Harvesting ranked third, with 50% of respondents actively engaged, often due to labor shortages or personal interest in agriculture. Sowing followed as the fourth most practiced activity, with only 5% of farmers highly involved, while 42% were moderately engaged. Minimal participation was observed in seed cleaning, grain packing, and biological pest control. Farmers expressed the need for training in innovative agricultural methods, emphasizing the responsibility of the Agriculture Department in facilitating such capacity-building initiatives as reported by Yaseen et al (2012), rural youth strongly agree on the need for agricultural training, with crop protection ranked as the top priority Vocational agricultural training and capacity building therefore they recommended that Agricultural societies and associations should be established to encourage rural youth participation in farming activities. Additionally, need-based training—especially in crop protection, vocational agriculture, and capacity building—should be provided to equip them with advanced skills and modern techniques for improving agricultural practices. Similarly, Mahmood et al. (2023) emphasizes the need for targeted training programs to equip rural youth with the knowledge, skills, and support necessary for adopting sustainable agriculture. Addressing their challenges and attitudes can enhance engagement in farming and contribute to rural development. A key policy recommendation is for the government and stakeholders to implement specialized training and capacity-building initiatives that bridge knowledge gaps, provide practical skills, and promote awareness of sustainable agriculture's benefits.

Table 4 Correlation among variable

Independent Variables	**Dependent Variables**	(ρ)
Lack of money	Economic problems	0.78**
Lack of money	High input prices	0.65**
Irrigation problems	Low productivity	0.61**
Education level	Lack of training	-0.52**
Land holding size	Irrigation problems	-0.47**
Lack of technology	Information access	0.43*
Age	Adoption of new tech	-0.39*
Marketing problems	Selling products	0.72**

The correlations reveal key relationships between financial, infrastructural, and educational factors affecting agricultural and economic outcomes. A strong link between "lack of money" and "economic problems" ($\rho = 0.78^{**}$) highlights financial constraints as a major challenge, while its moderate correlation with "high input prices" ($\rho = 0.65^{**}$) suggests affordability issues. "Irrigation problems" significantly impact "low productivity" ($\rho = 0.61^{**}$), whereas larger land holdings face fewer irrigation challenges ($\rho = -0.47^{**}$). Education mitigates "lack of training" ($\rho = -0.52^{**}$), underscoring its role in skill development. Age negatively affects technology adoption ($\rho = -0.39^{*}$), and marketing issues strongly hinder product sales ($\rho = 0.72^{**}$). These findings suggest policy interventions in irrigation, financial support, education, and market access to improve agricultural productivity and economic stability. Further research should examine causal links,

especially between technology and information access. Policymakers should provide financial support through subsidies or low-interest credit to ease farmers' economic burdens. Strengthening agricultural extension services can enhance skills, technology adoption, and productivity. Investing in irrigation infrastructure and market access will help address water issues and improve farmers' sales.

Conclusion

In conclusion, rural youth exhibit strong aspirations for agriculture, with a majority considering it a profitable and honorable profession. Most farmers prefer practical experience and peer interactions over formal information sources, relying heavily on self-experience, YouTube, and fellow farmers for agricultural knowledge. However, low engagement with formal channels like agricultural officers, websites, and newspapers indicates a gap in extension services. Financial constraints, economic issues, and policy limitations remain key challenges, highlighting the need for better financial support, infrastructure, and market access. Additionally, chemical pest control, irrigation, and harvesting are the most practiced activities, emphasizing the need for training in innovative techniques. Strengthening agricultural extension services and improving access to reliable information can enhance productivity and support the aspirations of rural youth in agriculture.

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