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| RESEARCH ARTICLE

Farmers' Challenges Arising from the Promotion and Distribution of Low-Quality Improved Seeds in Takhar Province

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| ABSTRACT

This study investigates the challenges faced by farmers in Takhar Province, Afghanistan, resulting from the distribution of low-quality improved seed varieties. Takhar Province represents one of Afghanistan's primary agricultural regions, where farming constitutes the livelihood for a substantial portion of the population. Using a quantitative methodology with a descriptive-analytical approach, data was collected from 80 farmers across four districts (Darqad, Baharak, Bangi, and Taloqan) through structured questionnaires and interviews. The research identified multiple deficiencies in the improved seeds distributed by extension institutions, including inadequate physical characteristics (volume and weight), insufficient resistance to environmental and climatic conditions, limited adaptability to diverse soil types, and susceptibility to pests and plant diseases. Statistical analysis revealed that 40% of respondents expressed dissatisfaction with extension services, while 20% indicated they would discontinue using improved seeds from these institutions in the future. Furthermore, 82.5% of farmers reported that extension institutions had not conducted field surveys to evaluate seed performance. The findings suggest that without significant improvements in seed quality and institutional accountability, farmer dissatisfaction may increase substantially, potentially undermining agricultural productivity and economic stability in the region. This research highlights the critical need for enhanced quality control mechanisms, greater transparency in seed promotion, and improved compatibility testing for local environmental conditions.

| KEYWORDS

Farmers' Challenges, Agricultural Extension Services, Seed Distribution, Improved Seed Varieties, Agricultural Productivity, Takhar Province, Afghanistan

| ARTICLE INFORMATION

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1. INTRODUCTION

Agriculture has long been considered the backbone of the economy in many countries around the world, particularly in Afghanistan (World Bank, 2019). The agricultural sector in Afghanistan employs approximately 80% of the population and contributes roughly 25% to the national GDP, highlighting its critical importance to the country's economic stability and development (FAO, 2021). Historically, rural production in Afghanistan has consisted of a mixed economy of agricultural enterprises, notably including the cultivation of wheat, fruits, vegetables, and livestock farming (Wily, 2013). Despite decades of conflict and environmental challenges, agriculture continues to be viewed as a potential economic driver in rural areas, with significant opportunities for growth and development (Wily, 2013; USAID, 2018).

Problem Statement

The agricultural sector in Afghanistan faces numerous challenges that hinder productivity and sustainable development. Improved seeds, which refer to those that have been modified to possess specific traits such as resistance to diseases and pests, represent a

critical input for enhancing agricultural productivity (Byerlee & Siddiq, 2014). High-quality seeds are not only genetically and physically pure, but they also have the capacity to produce strong seedlings with robust stems and well-developed root systems, which support the healthy establishment and growth of crops in a variety of environmental conditions (Kugbei et al., 2018).

However, under certain conditions, low agricultural productivity may result from factors such as the use of low-quality improved seeds, soil moisture deficiency, low and irregular rainfall, and poor crop management (Ahmadi & Shahbazi, 2020). In the specific context of Takhar Province, farmers face significant challenges related to seed quality, which directly impacts their yields, income, and food security. Despite efforts to promote improved seed varieties, the distribution and adoption of high-quality seeds remain problematic, with many farmers receiving seeds that fail to deliver promised benefits.

Increasing agricultural output is a key element in achieving broad-based economic growth, and at present, ensuring the timely availability of high-quality seeds to farmers is considered a fundamental requirement for agricultural development (Maletta & Favre, 2017). The gap between potential and actual yields in Afghanistan remains substantial, with seed quality being a major contributing factor to this discrepancy (FAO, 2021).

Indeed, the production of high-quality seeds is seen as a crucial step toward sustainable agricultural practices across the country. This process has recently been initiated in some regions of Afghanistan, but its success, sustainability, and effective implementation of seed laws and regulations depend on adherence to international standards (USAID, 2018). The Afghanistan National Seed Policy, established in 2005 and revised in 2017, aims to create a framework for seed system development, but implementation challenges persist (Ministry of Agriculture, Irrigation and Livestock, 2017).

Given these considerations, the main obstacles currently facing smallholder farmers in Afghanistan in the agricultural production process are the lack of improved seed varieties and the limited availability of high-quality seeds (Ghafori et al., 2021). Several factors may contribute to the distribution of low-quality seeds, including inadequate quality control mechanisms, limited technical capacity for seed production, poor storage facilities, and challenges in the seed certification process. Additionally, the use of low-tech biotechnological approaches such as artificial induction, fermentation techniques, and biofertilizers without proper quality standards further compounds the problem (Popal & Javed, 2015). However, leveraging high-tech strategies and advanced genetic techniques, such as genetically modified organisms (GMOs), may offer effective solutions to this issue, although their adoption requires careful consideration of local contexts and regulatory frameworks (Nasiri et al., 2017).

The primary objective of this study is to investigate the challenges faced by farmers as a result of the promotion and distribution of low-quality improved seeds in Takhar Province.

Significance of the Study

This research is significant for several reasons. First, it addresses a critical gap in understanding the specific challenges related to seed quality in Takhar Province, which has received limited attention in previous research. Second, by identifying the factors contributing to the distribution of low-quality seeds, this study will provide valuable insights for policymakers, agricultural extension services, and seed producers to improve quality control mechanisms. Third, the findings will contribute to the broader literature on agricultural development in post-conflict settings, offering lessons that may be applicable to other regions facing similar challenges.

Furthermore, this research aligns with Afghanistan's national agricultural development priorities, particularly the National Comprehensive Agriculture Development Priority Program (2016-2020), which emphasizes the importance of quality inputs, including seeds, for enhancing agricultural productivity (MAIL, 2016). By addressing seed quality issues, this study contributes to efforts aimed at improving food security, reducing poverty, and promoting sustainable agricultural practices in Afghanistan.

Literature Review

The distribution of low-quality improved seeds and the resulting challenges for farmers is a topic that has received attention in agricultural and rural development literature. This section reviews the research relevant to this subject.

Seed Quality and Its Importance in Sustainable Agriculture

Numerous studies have shown that seed quality plays a vital role in agricultural productivity. A comprehensive study by Bishaw et al. (2019) titled "Seed Quality and Food Security: The Role of Formal and Informal Seed Systems" demonstrated that access to high-quality seeds is one of the most important factors in increasing agricultural production in developing countries. These researchers found that smallholder farmers in rural areas often face limited access to quality seeds, which leads to significant reductions in crop yields.

Louwaars and de Boef (2012) in their research titled "Diverse Seed Systems for Seed and Food Security" argue that seed quality comprises four main dimensions: genetic purity, seed health, physical purity, and germination vigor. They emphasize that deficiencies in any of these dimensions can lead to dramatic reductions in crop performance.

Challenges for Farmers Using Improved Seeds in Afghanistan

A study by Wani et al. (2021) titled "Challenges and Opportunities of Seed Production System in Afghanistan" showed that despite extensive efforts to improve access to improved seeds, Afghan farmers still face numerous barriers. These barriers include the mismatch of improved seeds with local climatic conditions, high costs, and issues related to seed quality. They found that approximately 65% of farmers in their study had negative experiences with improved seeds, leading to distrust of agricultural extension institutions.

Kugbei et al. (2018) in their research titled "Development of the Seed Industry in Afghanistan: Challenges and Solutions" examined the status of the seed industry in Afghanistan. They found that lack of adequate supervision over the quality of distributed seeds, absence of proper infrastructure for seed testing, and weaknesses in seed certification systems are major factors in the distribution of low-quality seeds in the country.

Role of Agricultural Extension Institutions and Related Challenges

Chambers and Thrupp (2018) in their study titled "Farmer First: Farmer Innovation and Agricultural Research" argue that agricultural extension institutions often adopt a top-down approach in introducing new technologies, including improved seeds. This approach leads to neglecting farmers' indigenous knowledge and local conditions, ultimately resulting in non-adoption of new technologies or their failure.

The study by Sperling and McGuire (2016) titled "Understanding Farmers' Seed Systems: Concepts for Analysis and Action" showed that the lack of coordination between farmers' actual needs and seeds provided by formal institutions is one of the main reasons for the failure of seed promotion programs. They emphasize that agricultural extension institutions should have a better understanding of local seed systems and farmer preferences.

Impact of Low-Quality Seeds on Farmers' Livelihoods

Asfaw et al. (2020) in their research titled "The Impact of Access to Improved Seeds on Income and Food Security of Rural Households" found that using low-quality seeds can lead to a 30-40% reduction in farmers' income. This income reduction is particularly damaging for smallholder farmers who rely heavily on agriculture for their livelihoods.

The study by Tripp and Ragasa (2015) titled "Assessing the Effectiveness of Seed Interventions for Smallholder Farmers" showed that failure to provide seeds of appropriate quality not only leads to reduced production but also diminishes farmers' trust in governmental and non-governmental institutions. This distrust can be a serious barrier to the adoption of future innovations in the agricultural sector.

Disease and Pest Resistance in Improved Seeds

Mundt (2018) in his research titled "Disease Resistance in Agricultural Systems: Challenges and Opportunities" argues that one of the most important characteristics of improved seeds should be resistance to diseases and pests. He found that improved seeds that have not been properly tested for local conditions are often vulnerable to endemic diseases.

The study by Savary et al. (2019) titled "Damage Caused by Plant Pests and Diseases in Global Agricultural Systems" showed that using seeds with low resistance to diseases can lead to 20-40% crop damage. They emphasize that testing seeds under local conditions before their widespread distribution is essential.

Adaptation to Climatic and Environmental Conditions

Ceccarelli (2015) in his research titled "Participatory Plant Breeding: An Appropriate Approach for Sustainable Agriculture" argues that improved seeds should be adapted to local climatic and environmental conditions. He showed that many improved seeds that perform well under ideal laboratory or research station conditions perform poorly under actual field conditions and environmental stresses.

Lopes et al. (2021) in their study titled "Adaptation of Improved Wheat Seeds to Variable Climatic Conditions in Central Asia" found that many improved wheat varieties distributed in Afghanistan have not been sufficiently tested for resistance to severe temperature fluctuations and water scarcity, which are characteristic of this region's climate.

Strategies to Improve Seed Quality and Increase Farmer Satisfaction

Almekinders et al. (2019) in their research titled "Participatory Approaches in Seed Production and Distribution: Lessons from Global Experiences" argue that farmer participation in the process of selection, testing, and evaluation of improved seeds can lead to increased acceptance and success of these seeds. They emphasize that farmers' indigenous knowledge should be considered in the seed improvement and distribution process.

The study by Van Etten et al. (2019) titled "Participatory Plant Breeding in the Digital Age" showed that using innovative approaches such as "citizen breeding," in which farmers directly participate in testing and selecting new varieties, can lead to the development of seeds that are better adapted to local needs and conditions.

Research Gap in Seed Quality in Afghanistan

Despite the importance of the topic, limited studies have been conducted on the challenges farmers face due to the distribution of low-quality improved seeds in Afghanistan, particularly in Takhar province. Mansoor et al. (2022) in their study titled "Status of the Seed System in Northern Afghanistan" note that more research is needed on the impact of seed quality on farmers' livelihoods in different regions of Afghanistan.

Poole et al. (2022) in their research titled "Wheat Seed and the Future of Afghanistan" emphasize that a better understanding of farmers' challenges in using improved seeds can help design more effective policies and programs to improve food security in Afghanistan.

The literature review shows that seed quality plays a vital role in agricultural success, and low-quality seeds can create numerous challenges for farmers. Previous studies have emphasized the importance of seed adaptation to local conditions, resistance to diseases and pests, and farmer participation in the seed selection and testing process. However, there is a significant research gap regarding the specific challenges faced by farmers in Takhar province, Afghanistan, in relation to low-quality improved seeds. The present research aims to fill this gap and provide a deeper understanding of this issue.

2. METHODS & MATERIALS

This study employed a quantitative research methodology and was conducted in Takhar Province, Afghanistan during 1403 (2024/2025). The research design utilized both primary and secondary data collection methods to ensure comprehensive analysis.

Data Collection

Data collection was structured through two main approaches:

Primary Data: Collected through a structured questionnaire specifically designed for this research

Secondary Data: Obtained from library resources including academic books, peer-reviewed journal articles, and credible online sources

Research Instrument

The questionnaire was systematically designed with five distinct sections:

1. Demographic information of respondents
2. Five-point Likert scale questions to measure attitudes and perceptions
3. Multiple-choice (close-ended) questions for standardized responses
4. Mixed-choice questions combining structured and semi-structured formats
5. Descriptive questions used during in-depth interviews

Population and Sampling

The study population encompassed four geographical areas within Takhar Province:

Three districts: Darqad, Baharak, and Bangi

Outskirts of the provincial capital (Taliqan)

A multi-stage stratified random sampling technique was employed to ensure representativeness. The final sample consisted of 80 respondents distributed equally across the four areas (20 respondents per area).

Table 1: Respondent Distribution Based on District Classification

No	Names of the Districts	Responses	Percentage
1	Darqad	20	25%
2	Baharak	20	25%
3	Bangi	20	25%
4	Outskirts of the center (Taliqan)	20	25%

5	Total:	80	100%

Socioeconomic Stratification

The 80 respondents were further categorized based on their economic status:

1. Low-income group: 20 individuals (25%)
2. Middle-income group: 30 individuals (37.5%)
3. Relatively high-income group: 30 individuals (37.5%)

Research Approach and Philosophy

This study adopted an inductive research approach, proceeding from specific observations to broader generalizations. The philosophical foundation is empirical, based on collecting detailed information and establishing relationships between variables to derive general conclusions.

Data Analysis

Collected data were systematically analyzed using descriptive statistical methods including:

1. Frequency distributions
2. Percentage calculations
3. Visual representations (pie charts and bar graphs)
4. Cross-tabulation of key variables

Statistical analysis was performed using appropriate software to ensure accuracy and reliability of the findings.

3. RESULTS & DISCUSSION

The results of this study consist of two main sections: the first section is the analysis of the respondents' data, and the second section is the analysis of the questionnaire findings.

Demographic Finding Analysis

The respondents' data in this section include: name, district, age, level of education, land size in jeribs, and the respondents' farming experience, which are clearly shown in the table below and will then be analyzed and discussed.

Table (2): Statistical demographic information

S. No	Indicators:	Parts:	Statistic:		Percentage:	
		Partial		Total	Partial	Total
1	District	Darqad	20	80	25%	100%
		Baharak	20		25%	
		Bangi	20		25%	
		Outskirts of the center (Taliqan)	20		25%	
3	Age	30-40	26	80	32.5%	100%
		40-50	22		27.5%	
		Above 50	32		40 %	
3	Edu	Illiterate	52	80	65%	100%
		Twelve Passes	20		25%	
		Bachelor	8		10%	
4	Land size in terms of Jeribs	From 1 to 10 Jeribs	42	80	52.5%	100%
		From 10 to 20 Jeribs	22		27.5%	
		From 20 to 30 Jeribs	10		12.5 %	
		Above 30 Jeribs	6		7.5%	
5	Farming Experience	From 1 to 20 years	8	80	10%	100%
		From 21 to 40 years	46		57.5%	
		Above 40 years	26		32.5%	

According to the statistical data provided in the above table, it can be interpreted that the indicators consist of five different options, that analyzed as follows:

District: The respondents generally belonged to three districts and the surrounding areas of Taloqan center. According to the pre-determined statistics, each district and the center included 20 respondents, representing 25% each.

Age: The respondents are categorized into three age groups: 32.5% are between 30 and 40 years old, 27.5% are between 40 and 50 years old, and the remaining 40% are over 50 years old. Therefore, the majority of respondents are between the ages of 30 and 50.

Level of Education: The respondents' educational levels are classified into three main categories: illiterate (65%), twelve-year graduates (25%), and bachelor's degree holders (10%). This indicates that the overwhelming majority of the farmers who participated in this survey are either illiterate or have a low level of education.

Land Size (in Jeribs): The farmers who participated in this questionnaire-based survey are landowners, with 52.5% owning between 1 and 10 jeribs of land. Additionally, 27.5% own 10 to 20 jeribs, 12.5% own 20 to 30 jeribs, and the remaining 7.5% own more than 30 jeribs of arable land. Therefore, it is evident that the vast majority of the farmers cultivate between 1 and 20 jeribs of land.

Farming Experience: The table indicates that respondents have substantial experience in agriculture. Only 10% have between 1 and 20 years of farming experience, while 57.5% have between 21 and 40 years of experience, and the remaining 32.5% have over 40 years of farming experience.

Statistical Findings Analysis

The questionnaire utilized a five-point Likert scale to assess farmers' perceptions and experiences related to the promotion and distribution of improved seed varieties in Takhar Province. The data presented below reflect responses from 80 farmers and have been analyzed across eight key items. The analysis is structured to offer a clear interpretation of trends and attitudes within the target population.

Table (3) **Distribution of Responses to Perception-Based Questions on Improved Seed Quality and Extension Services**

No	Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total Respondents
1.	You are satisfied with the annual income generated from your agricultural land.	2	4	22	40	12	80
2.	You mostly use improved seeds distributed by extension institutions on your land	4	4	10	44	18	80
3.	What extension institutions claim about improved seeds does not correspond to reality.	6	8	20	38	8	80
4.	You prefer to use local and non-improved seeds rather than the low-quality improved seeds distributed by extension institutions.	0	8	12	44	16	80
5.	You have experienced that the outcome of using low-quality improved seeds from extension institutions is not satisfactory.	0	6	4	32	38	80
6.	You have decided not to use improved seeds distributed by extension institutions anymore.	0	48	4	16	12	80
7.	So far, the local government has not taken the necessary measures to improve the quality of distributed seeds	0	0	4	30	46	80
8.	You are still willing to use improved seeds from extension institutions in the future.	0	16	20	28	16	80

Item 1) Satisfaction with Annual Agricultural Income: Only 7.5% of respondents expressed satisfaction (strongly agree or agree) with their annual income from farming, while 65% reported dissatisfaction. A moderate portion (27.5%) remained neutral.

Interpretation: A significant share of farmers are dissatisfied with their farming income, indicating economic vulnerability and suggesting that low returns may affect their adoption of agricultural innovations.

Item 2) Use of Improved Seeds Distributed by Extension Institutions: A minority (10%) of farmers reported using improved seeds promoted by extension institutions, while 77.5% disagreed or strongly disagreed with their usage.

Interpretation: Despite the availability of improved seeds, actual adoption rates remain low—suggesting skepticism or barriers in accessibility and trust in seed quality.

Item 3) Credibility of Extension Institutions' Claims Regarding Seed Quality: Only 17.5% agreed with the claims made by extension institutions concerning seed quality, whereas 60% expressed doubt or disagreement.

Interpretation: A clear trust deficit exists between farmers and extension agents, with most farmers believing that the advertised benefits of improved seeds are exaggerated or inaccurate.

Item 4) Preference for Local vs. Improved Seeds: A strong 72.5% of respondents preferred using traditional, local seed varieties over the improved seeds supplied by extension services. Only 10% expressed a preference for the improved seeds.

Interpretation: Local seed varieties continue to dominate agricultural practice, reflecting both cultural familiarity and dissatisfaction with the performance of the introduced improved seeds.

Item 5) Experience with the Outcome of Low-Quality Improved Seeds: An overwhelming 87.5% of respondents reported unsatisfactory outcomes from the use of improved seeds provided by extension institutions.

Interpretation: This widespread dissatisfaction highlights serious shortcomings in seed quality and its failure to meet farmers' expectations in terms of yield, resistance, and reliability.

Item 6) Decision to Discontinue the Use of Improved Seeds: Approximately 35% of farmers stated that they would no longer use improved seeds from extension institutions, while 60% remained open to continued use, contingent on improvements in quality.

Interpretation: While frustration is evident, many farmers still demonstrate cautious optimism and a willingness to re-engage if credible improvements are made.

Item 7) Perceived Government Inaction Regarding Seed Quality: An overwhelming 95% of respondents indicated that the government had not taken sufficient steps to improve seed quality.

Interpretation: The perceived absence of government oversight and intervention is a critical barrier to trust-building and sustainable seed system development.

Item 8) Willingness to Use Improved Seeds in the Future: Only 20% of farmers expressed a willingness to continue using improved seeds, while 65% either disagreed or remained neutral.

Interpretation: Farmers' future engagement with improved seeds remains uncertain and hinges upon significant reform in quality assurance, testing, and institutional credibility.

Synthesis of Findings

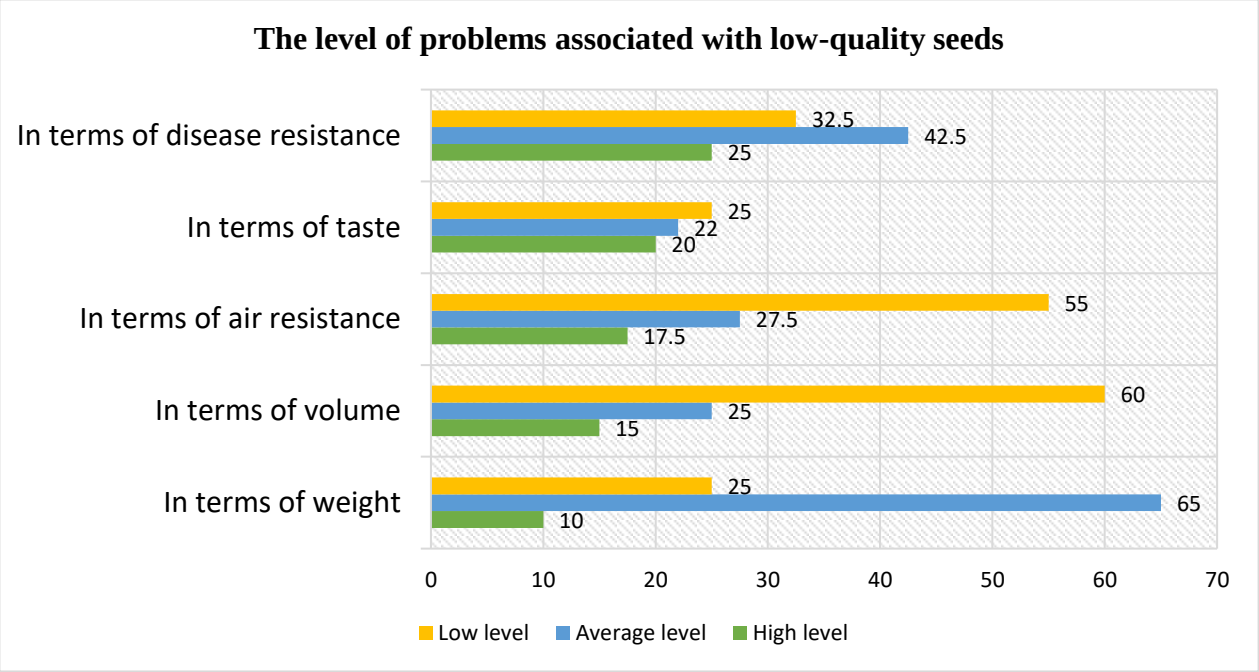
The analysis reveals a persistent gap between institutional claims and farmers' lived experiences with improved seeds. Issues of low seed quality, lack of adaptation to local agro-ecological conditions, poor disease resistance, and insufficient field verification have eroded farmers' trust in both the seeds and the institutions promoting them. Nonetheless, a fraction of respondents retains hope for improvement, indicating a potential opportunity for re-establishing trust through meaningful policy reforms and participatory agricultural extension practices.

Table (4) Evaluation of the levels of problems associated with low-quality seeds

NO	Problem Area	High Level		Medium Level		Low Level		Total Respondents
		(Count)	(%)	(Count)	(%)	(Count)	(%)	
1.	Poor quality in terms of weight	8	10%	52	65%	20	25%	80

2.	Poor quality in terms of volume	12	15%	20	25%	48	60%	80
3.	Poor quality in terms of climatic resistance	14	17.50%	22	27.50%	44	55%	80
4.	Poor quality in terms of taste	16	20%	44	55%	20	25%	80
5.	Poor quality in terms of disease resistance	20	25%	34	42.50%	26	32.50%	80

Figure (1)



Evaluation of the levels of low-quality seeds

According to the data in the table and the above graph, the percentage of problems with low-quality seeds in terms of their type and level, as identified by the respondents, are analyzed and explained as follows:

In terms of weight: The responses received in this area indicate that 10% of the respondents reported high-level issues, 65% reported medium-level issues, and 25% reported low-level issues. This means that the low-quality seeds, particularly in terms of weight, are mostly at the medium level.

In terms of volume: In regard to the low quality of their seeds in terms of volume, 15% of respondents selected high-level, 25% selected medium-level, and 60% selected low-level. Therefore, it was found that most of the quality issues related to seeds in terms of volume are at the low and medium levels.

In terms of resistance to air (temperature fluctuations): Respondents in regard to the low quality of their seeds, particularly concerning their resistance to cold and hot weather, selected 17.5% for high-level, 27.5% for medium-level, and 55% for low-level. Therefore, it was again found that most respondents reported low-quality seeds in terms of resistance to temperature fluctuations at the low and medium levels.

In terms of taste: Respondents regarding the low quality of their seeds in terms of taste selected 20% for high-level, 55% for medium-level, and 25% for low-level. It was concluded that most of the complaints of farmers regarding low-quality seeds are related to taste, with issues predominantly at the high and medium levels.

In terms of resistance to diseases: Respondents regarding the low quality of their seeds in terms of resistance to diseases selected 25% for high-level, 42.5% for medium-level, and 32.5% for low-level. Once again, it was found that the majority of the low-quality seeds obtained by farmers from extension institutions have issues with disease resistance at the low and medium levels.

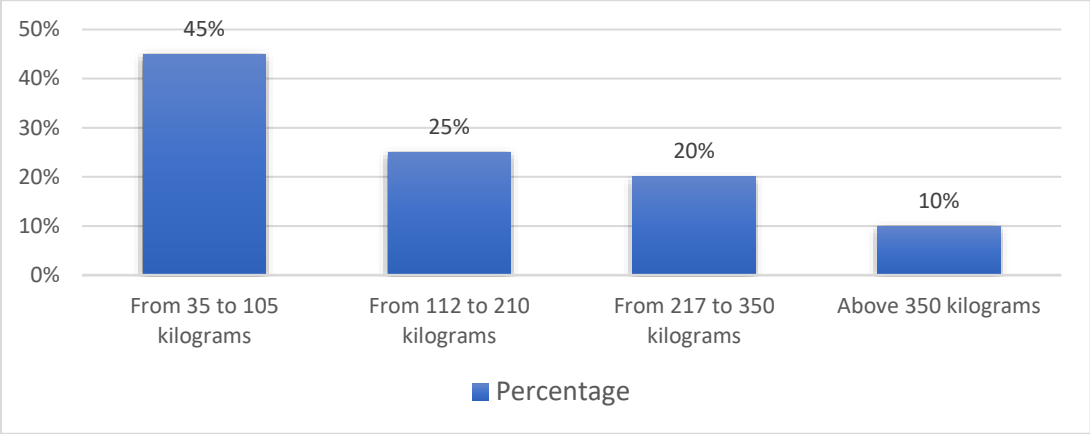


Figure (2) Amount of improved seeds obtained from extension institutions in one year

According to the above figure, it has been determined that 45% of respondents obtain 35 to 105 kilograms of improved seeds from extension institutions. In addition, 25% of them receive 112 to 210 kilograms, 20% receive 217 to 350 kilograms, and finally, the remaining 10% obtain more than 350 kilograms of improved seeds from extension institutions for planting over the course of one year.

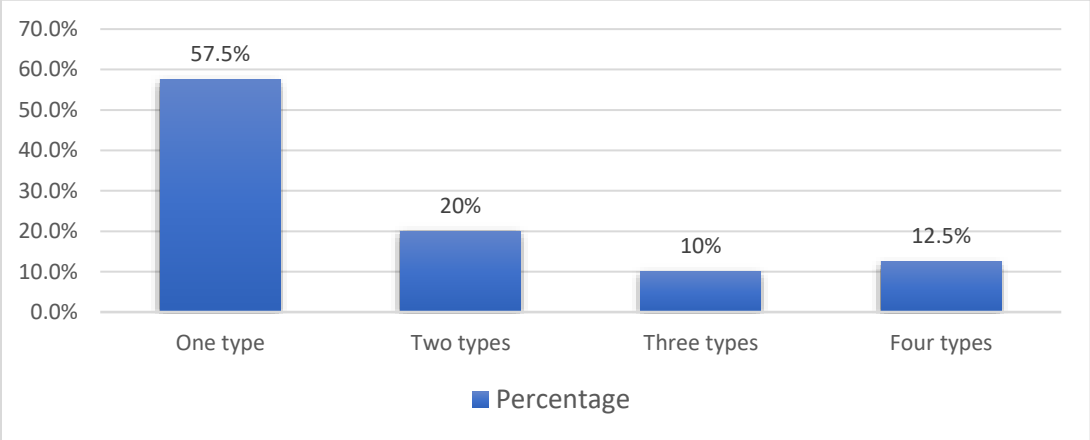


Figure (3) Types of acquisition of improved seeds from extension institutions in one year

According to the above figure, it has been determined that 57.5% of the respondents receive one type of improved seed from extension institutions. Accordingly, 20% of them receive two types, 10% receive three types, and the remaining 12.5% receive four types of improved seeds from extension institutions for cultivation on their farms.

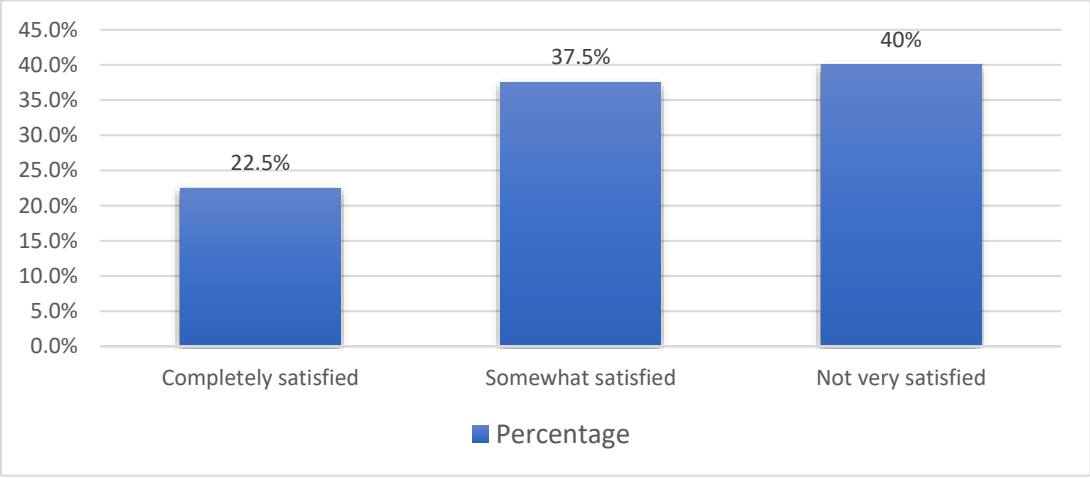


Figure (4) Farmers' level of satisfaction with improved seeds provided by extension institutions

According to the above graph, it was found that 22.5% of respondents are completely satisfied with the seeds they received, 37.5% are somewhat satisfied, and the remaining 40% are not very satisfied with the improved seeds provided by extension institutions.

Table (5): Farmers' Expression of Dissatisfaction with the Poor Quality of Improved Seeds Provided by Extension Institutions

Options	Yes	No	Total
Percentage	25%	75%	100%

The statistics in the table above show that, so far, only 25% of the farmers have expressed their dissatisfaction with the poor quality of the improved seeds to the extension institutions, while the remaining 75% have not taken any action in this regard.

Table (6): Conducting a field survey by extension institutions

Options	Yes	No	Total
Percentage	17.5%	82.5%	100%

Statistical findings have shown that, so far, extension institutions have not taken the necessary actions for conducting field surveys and evaluating the quality of their improved seed seeds, as only 17.5% of farmers have confirmed that the institutions have conducted field surveys, while the remaining 82.5% have responded negatively.

Interview findings

Interview findings Analysis

The findings from the interview questions indicate that the vast majority of respondents consider factors such as poor quality in relation to regional climate, low yields, weakness against plant diseases, and poor taste of the produce as issues they have observed during the planting and harvesting process. Furthermore, they do not see much difference between improved seeds and non-improved seeds; in other words, the respondents claim that there is not much difference between improved and non-improved seeds. Based on what has been stated, the results of the interview responses regarding the final question suggest that extension institutions should be honest in promoting their improved seeds, and before promoting them, they should test the seeds to ensure they are resistant to pests, diseases, temperature fluctuations, and other environmental factors.

4. CONCLUSION

As evident, the statistical population of this study includes three districts Darqad, Baharak, and Bangi as well as the surrounding areas of the center of Takhar province. Among these, 40 individuals formed the sample of the research.

The findings of this study indicate that low-quality improved seed varieties have been promoted to a significant extent in Takhar province. As shown by the results, most respondents complained about the poor taste quality of these seeds, with 80% of them confirming this issue.

The research also revealed that these low-quality improved seeds are characterized by factors such as low quality in terms of size and weight, lack of resistance to environmental and weather conditions, incompatibility with different soil types, and low resistance to pests and plant diseases. These issues have led approximately 40% of farmers to express dissatisfaction with the services provided by extension institutions, and 20% of them stated that they would not use improved seeds provided by these institutions in the future. The lack of attention by extension institutions to address these problems, if continued, may significantly increase farmers' dissatisfaction in the future.

Statistical findings of the study also showed that, so far, extension institutions have not taken any serious steps to address the problems caused by the poor quality of improved seeds. According to 82.5% of the responses, no action has been taken by the institutions in this regard.

The interview findings of this research showed that respondents perceive little difference between the improved seeds promoted by extension institutions and the local non-improved seeds. As a result, the necessity of honesty in the promotion of improved seeds by the institutions, as well as the importance of testing these seeds in different soil types and under varying weather conditions, has been emphasized as a key solution to the existing challenges.

5. DISCUSSION

The findings of Sadawarti and Kambalkar (2023) indicate that the preservation of seed quality and improvement in seed characteristics not only lead to greater resistance against diseases and climatic changes, but also result in significantly enhanced crop quality and quantity. In line with this, the present study also reveals that low-quality improved seeds are characterized by poor physical attributes in terms of size and weight, lack of resistance to environmental and climatic conditions, incompatibility with various soil types, and vulnerability to pests and plant diseases. Hence, focusing on seed preservation and improving their quality could lead to a substantial increase in agricultural yields.

Similarly, the findings of Croft (2001) and Elmer et al. (2023) suggest that enhancing seed quality depends on multiple parameters. Among these are genetic improvement, selection of high-quality seed varieties, attention to their compatibility with local water and soil conditions, detailed studies of the climatic patterns of target cultivation areas, and proper preparedness to combat natural threats to seeds—all of which can yield favorable results. These conclusions align with the findings of the present study, which show that farmers in Takhar province face various challenges during the planting and harvesting process. A major cause of these challenges is the lack of attention to seed quality, incompatibility with local environmental conditions, and the absence of commitment and transparency from extension institutions. Addressing these critical aspects could lead to more desirable outcomes in the future.

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REFERENCES

[1] Ahmadi, K., & Shahbazi, H. (2020). Challenges and opportunities for sustainable agriculture in Afghanistan. Journal of Agricultural Research, 58(2), 121-135.
[2] Almekinders, C. J., Beumer, K., Hauser, M., Misiko, M., Gatto, M., Nkurumwa, A. O., & Erenstein, O. (2019). Understanding the relations between farmers' seed demand and research methods: The challenge to do better. Outlook on Agriculture, 48(1), 16-21.
[3] Asfaw, S., Pallante, G., & Palma, A. (2020). Diversification strategies and adaptation deficit: Evidence from rural communities in Niger. World Development, 127, 104751.
[4] Bishaw, Z., Struik, P. C., & Van Gastel, A. J. G. (2019). Wheat and barley seed systems in Ethiopia and Syria. In M. Solh & M. Saxena (Eds.), Food Security and Climate Change (pp. 341-365). Springer.
[5] Bolton, L. (2019). Agriculture in Afghanistan – Economic sustainability and infrastructural resilience. Institute of Development Studies, Brighton, UK.
[6] Byerlee, D., & Siddiq, A. (2014). Agricultural research and extension systems in Afghanistan: Rebuilding in a challenging environment. Agricultural Systems, 129, 11-20.
[7] Ceccarelli, S. (2015). Efficiency of plant breeding. Crop Science, 55(1), 87-97.
[8] Chambers, R., & Thrupp, L. A. (2018). Farmer first: Farmer innovation and agricultural research. Routledge.
[9] Croft, D. (2001). The effects of genetically modified crops and seeds on farmers. Agricultural Law Resource and Reference Center, Dickinson School of Law, Pennsylvania State University.
[10] Food and Agriculture Organization (FAO). (2021). Afghanistan: Agricultural livelihoods and food security in the context of COVID-19. Rome: FAO.
[11] Gebretsadik, Kiros, & Kiflu, Ashenafi. (2018). Challenges and Opportunities of Genetically Modified Crops Production; Future Perspectives in Ethiopia, Review. The Open Agriculture Journal, Volume 12, (27).
[12] Ghafori, A., Rahmani, H., & Stanikzai, M. (2021). Factors affecting adoption of improved wheat varieties among smallholder farmers in northern Afghanistan. International Journal of Agricultural Extension, 9(1), 45-59.
[13] Jelani, A. (2013). Wheat and maize projects in Afghanistan. Research for Developing Countries and Australia (ACIAR), No. 85.
[14] Kugbei, S., Shahab, S., & Bishaw, Z. (2018). Quality seed production, processing and storage. In S. Kugbei, M. Turner, & P. Witthaut (Eds.), Quality declared seed system: Technical guidelines on standards and procedures (pp. 15-32). Rome: FAO.
[15] Kugbei, S., Shahab, S., Bishaw, Z., & Niane, A. A. (2018). Status of the seed sector development in Afghanistan. Journal of Crop Improvement, 32(5), 689-704.
[16] Lopes, M. S., El-Basyoni, I., Baenziger, P. S., Singh, S., Royo, C., Ozbek, K., & Ban, T. (2021). Exploiting genetic diversity from landraces in wheat breeding for adaptation to climate change. Journal of Experimental Botany, 72(14), 5125-5139.
[17] Louwaars, N. P., & de Boef, W. S. (2012). Integrated seed sector development in Africa: A conceptual framework for creating coherence between practices, programs, and policies. Journal of Crop Improvement, 26(1), 39-59.
[18] Maletta, H., & Favre, R. (2017). Agriculture and food production in post-war Afghanistan. In A. Pain & J. Sutton (Eds.), Reconstructing agriculture in Afghanistan (pp. 25-40). FAO and Practical Action Publishing.
[19] Mansoor, M., Naveed, S., & Hamid, A. (2022). Status of seed systems in northern Afghanistan: Challenges and opportunities. Journal of Agriculture and Rural Development, 15(2), 78-93.
[20] Ministry of Agriculture, Irrigation and Livestock (MAIL). (2016). National Comprehensive Agriculture Development Priority Program 2016-2020. Kabul: MAIL.

[21] Ministry of Agriculture, Irrigation and Livestock (MAIL). (2017). Afghanistan National Seed Policy. Kabul: MAIL.
[22] Ministry of Agriculture, Irrigation and Livestock. (2017). General guidelines for seed standards; Public producer partnership to strengthen seed standards in Afghanistan. International Center for Agricultural Research in the Dry Areas – Afghanistan.
[23] Ministry of Finance of Afghanistan. (2016). Afghanistan National Peace and Development Framework 2017–2021. Kabul: Ministry of Finance.
[24] Mundt, C. C. (2018). Durable resistance to wheat rust and beyond: Breeding for disease resistance. Euphytica, 214(7), 1-12.
[25] Nasiri, M., Ahmadi, S., & Mousavi, S. (2017). Potential applications of biotechnology in agriculture development in Afghanistan. Central Asian Journal of Agricultural Research, 6(3), 78-92.
[26] Poole, N, & Colleagues. (2022). Wheat seed and the future of Afghanistan. Australian Centre for International Agricultural Research & USAID Development Base.
[27] Poole, N., Donovan, J., & Erenstein, O. (2022). Wheat seed and the future of Afghanistan. Australian Centre for International Agricultural Research & USAID Development Base.
[28] Popal, A., & Javed, K. (2015). Traditional and modern biotechnological approaches in Afghan agriculture: Challenges and opportunities. Journal of Agricultural Biotechnology and Sustainable Development, 7(2), 15-24.
[29] Prabhu, T., & Colleagues. (2023). The impact of seed enhancement on crop growth and yield parameters in rice fields. International Journal of Modern Microbiology and Applied Sciences, 12.
[30] Sadawarti, M. J., & Kambalkar, P. A. (2015). Seed Protection and Quality Enhancement by Modern Techniques - A Tool for Sustainable Agriculture. Integrated Soil and Water Resource Management for Livelihood and Environmental Security, ICAR Research Complex for NEH Region, Meghalaya, India.
[31] Savary, S., Willocquet, L., Pethybridge, S. J., Esker, P., McRoberts, N., & Nelson, A. (2019). The global burden of pathogens and pests on major food crops. Nature Ecology & Evolution, 3(3), 430-439.
[32] Sperling, L., & McGuire, S. (2016). Understanding and strengthening informal seed markets. Experimental Agriculture, 52(3), 365-384.
[33] Tripp, R., & Ragasa, C. (2015). Hybrid maize seed supply in Ghana. Food Security, 7(3), 609-620.
[34] USAID. (2018). Afghanistan Value Chains: High-Value Crops. Washington, DC: USAID.
[35] Van Etten, J., Beza, E., Calderer, L., Van Duijvendijk, K., Fadda, C., Fantahun, B., & Zimmerer, K. S. (2019). First experiences with a novel farmer citizen science approach: Crowdsourcing participatory variety selection through on-farm triadic comparisons of technologies (tricot). Experimental Agriculture, 55(S1), 275-296.
[36] Wani, S. A., Hussain, A., Ganie, S. A., & Munshi, Z. H. (2021). Challenges and opportunities of seed production system in Afghanistan. International Journal of Agricultural Sciences, 17(3), 145-158.
[37] Weissmann, Elmer, A. (2023). Seed Quality Enhancement. Journal of Agricultural Development, 3(21).
[38] Wily, L. A. (2013). Land, people, and the state in Afghanistan: 2002-2012. Afghanistan Research and Evaluation Unit.
[39] World Bank. (2019). Afghanistan Development Update: Building confidence amid uncertainty. Washington, DC: World Bank.