

Effectiveness of Government Policy for Cereal Crop Seed Marketing in Syangja District, Nepal

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ABSTRACT

The study investigates the implementation of government policies on marketing of cereal crop seed in Syangja district of Nepal. The public interventions aimed at increasing the availability of inputs for seed production are insufficient. Although they seek to improve the system, they do not adequately address the underlying structural problems in the input market. The data were descriptively analyzed by using descriptive statistics, Pearson correlation and Chi-square test using a randomized sample of 223 seed producing farmers calculated via Yamane's formula. The study highlighted an absolute institutional dependence of 100% such that respondents used only publicly funded source seeds and technical extension services. The source seed production is almost fully subsidized (99.10%), but the satisfaction with agricultural policies remains moderate, being 2.15 out of 3.0. Institutional testing services and seed support ranked the highest on satisfaction, while DESES and formal seed price mechanisms fared poorly. Major market vulnerabilities include crop damage by wild animals (index value = 0.97) and poor market prices (reported by 85.2% of farmers). These problems are made worse by the very low crop insurance enrollment rate of only 0.90%. The study recommends strengthening policy implementation by expanding support beyond production subsidies to include post-harvest processing, improving the functionality and crop-specific applicability of the Digitally Enabled Seed Subsidy Management System (DESES), and promoting accessible crop insurance schemes to enhance market resilience and reduce farmers' exposure to wildlife and climate-related risks.

Keywords: Cereal Crop, Government policy, Marketing tools, Seed Holding Capacity, DESES

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1. Introduction

Quality seeds are the basic input necessary for enhancing productivity and thus acts as a critical precursor to not only generate higher yields but also integrate food security. Empirical literature shows that use of quality certified seed can independently increase crop yields 10–15%, with advanced institutional management claiming yield increases of 15% to 20% (Madan et al., 2020). In a developing agrarian economy, seed systems are split between formal sectors (vertically integrated production and certification with government quality control) and informal sectors (farmer-saved seeds, bartering to obtain crops planted for next season, and local grain markets). In less developed countries, informal systems often provide around 90% of staple crop seeds because structural constraints limit delivery through formal markets (Almekinders & Louwaars, 2023). Cereal crops provide 26.64% share of the agricultural gross domestic product (AGDP) and hence are considered as a backbone of AGDP sector, Nepal (MoALD, 2024). Of the total arable land area in Syangja district, cereals is grown on 52,000 hectares and amounts to a total production of 154,000 metric tons (MoALD, 2024). In order to harness this production capacity, the Government of Nepal has provided macro-level frameworks with initiatives like National Seed Vision (2013–2025), Agriculture Development Strategy (ADS 2015–2035) and Seed Policy, 2022. They explicitly promote improved local seed security, public–private interactions and varietal competition. At the heart of this contemporary policy framework is the Digitally Enabled Seed Subsidy Management System (DESES), which has been developed by SQCC to collate real time tracking data for breeder, foundation and certified seeds. (SQCC, 2025).

However, for the most part, improved seeds are far from being widely adopted in practice due to policies which not yet applied. Improved maize varieties capture an insignificant 10% of the market share, while smallholders resort to informal sources. The policy-formulation-to-grass-roots-market-execution is not practical. However, the varied geography and changing cropping practices that are seen in Syangja necessitate a systematic assessment of which government policy and instruments: production subsidies, regulatory licenses and digital marketing platforms have real impacts on commercial outcomes for farmers.

2. Objectives of the Study

To resolve the analytical gaps in current policy evaluations, this study operates with a clear, specific focus on measuring the field-level execution of public seed policies. The research is guided by the following objectives:

- To analyze socio-economic characteristics of cereal seed producers and also cropping system practices in the Syangja district.

- To quantify institutional delivery of government support mechanisms, source seed subsidies, technical training, and digital marketing platforms (DESES).
- To analyze the level of farmer satisfaction regarding state-administered pricing, licensing, and seed testing services.
- To identify and rank the primary biophysical and economic constraints that hinder seed marketing.

3. Research framework

For this study, the following theoretical framework has been formulated after reviewing the literature. The proposed conceptual framework presented in the figure depicts the relationship of independent variables (Seed Distribution Mechanism, Quality Control Regulations, and Training Programs, Institutional Support, Subsidy Policy) with dependent variable for seed marketing also supported by (Pereira et al, 2024)

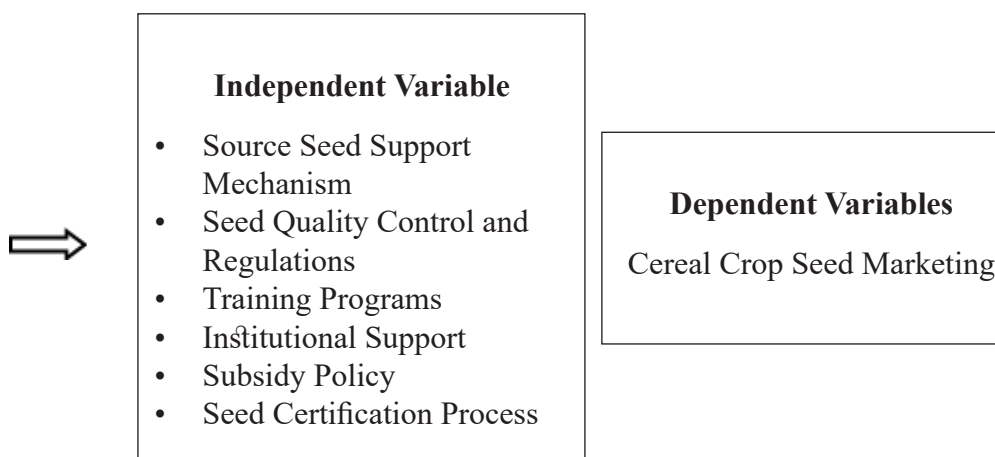


Figure 1. Research Framework of policy support on cereal crop seed marketing

4. Research Methodology

4.1 Research Design and Sampling Framework

Using a mixed-methods research design of quantitative surveys and qualitative validation tools (FGDs and KIIs), this study assesses the relationship between policy inputs and marketing success. This population constituted around N = 800 cereal seed producers registered at four different local levels, i.e., Chapakot, Galyang, Biruwa and Phedikhola of Syangja district.

To guarantee statistical representativeness, the minimum sample size (n) was calculated using Yamane's formula for finite populations $n = N / (1 + N(e)^2)$

Where N is the total population of seed producers (800) and e is the margin of error (0.05 at a 95% confidence level). Applying the parameters yielded an initial requirement of approximately 267. Due to fieldwork accessibility constraints and data verification adjustments during field compilation, a finalized sample of 223 farmers was randomly selected and surveyed across the designated local administrative blocks. Primary data were gathered through structured household questionnaires using 5-point Likert scales, complemented by Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) with government extension staff and cooperative leaders.

4.2 Operationalization of Statistical Tools

Quantitative data were processed and analyzed using Microsoft Excel and SPSS. The analytical tools were selected to match the specific properties of the data variables:

- Descriptive Statistics (Mean, Standard Deviation, Indexing): Used to summarize demographic profiles, experience levels, and institutional coverage. Priority rankings for field challenges were structured using an index calculated from weighted rankings.
- Pearson Correlation Analysis (r): Applied to continuous numerical and interval scale satisfaction variables to determine the direction and strength of linear relationships among service attributes (e.g., age, experience, licensing satisfaction, and pricing satisfaction).
- Chi-Square Test of Independence (χ^2): Used for categorical variables to evaluate whether demographic traits or crop categories significantly influence policy access, training benefits, or digital technology usage. The threshold for statistical significance was set at $\alpha = 0.05$.

5. Results and Discussion

This section presents and interprets findings from a field survey of 223 cereal seed producers in Syangja District, Nepal, with the objective of assessing the effectiveness of government policies and programs in cereal crop seed marketing. The analysis integrates descriptive statistics, satisfaction assessments, market evaluations, and inferential statistical tests to provide a comprehensive understanding of policy performance, institutional support, and farmer outcomes.

5.1 Demographic and Socioeconomic Characteristics of Seed Producers

The gender composition in seed production is fairly balanced, with males at 56.5% and females at 43.5%, indicating significant female involvement. However, ethnic representation is skewed, dominated by Brahmin/Chhetri groups (72.6%), potentially impacting socio-economic findings. The respondents’ ages averaged 49.6 years, highlighting an experienced but aging farming population, raising concerns about generational continuity. Educationally, most farmers have secondary education (52.9%), suggesting adequate literacy for adopting new technologies, though ongoing investment in training and extension services is crucial for enhancing technical capacity.

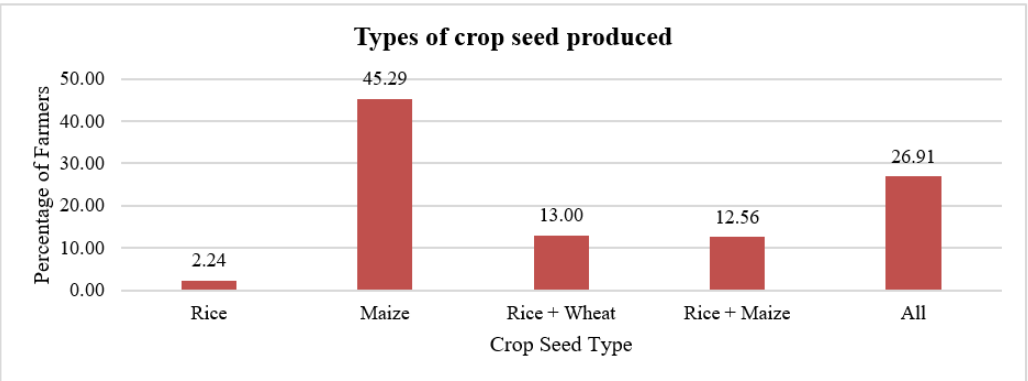
5.2. Seed Production Experience and Crop Specialization

Respondents reported an average of 10.35 years of experience in seed production, indicating a balanced mix of seasoned producers and relatively newer entrants as presented in table. This combination can foster knowledge exchange, innovation diffusion, and gradual modernization of seed production practices.

Table 1: Years of experience in seed production

Mean	Minimum	Maximum
10.35	3	20

Source: Field Survey, 2025



Source: Field Survey, 2025

Figure 2: Type of crop seed production

Crop-wise analysis indicates that maize seed production is predominant, with 45.29% of farmers engaged in its cultivation, driven by market demand, adaptability, and profitability. Meanwhile, 26.91% of farmers produce multiple cereal seeds like rice, maize, and wheat, showcasing diversification for income stability. Exclusive rice seed production remains low at 2.24%, likely due to

labor intensity, production risks, or lower returns. These findings suggest that maize remains the primary seed crop, promoting diversification could enhance resilience, reduce dependency on a single commodity, and strengthen overall seed system stability.

5.3. Government Dominance in Seed Supply and Technical Support

A striking result of the study is the complete reliance on government institutions for seed procurement and technical support. All surveyed farmers (100 percent) reported sourcing seed exclusively from government agencies, with no engagement from private companies, NGOs, or informal local sources as displayed in table below. This demonstrates strong government penetration in the seed input market but also highlights a lack of private sector participation and market competition.

Table: 2 Source of seed purchase

Source of seed purchase	Frequency	Percentage
Government	223	100

Source: Field Survey, 2025

Similarly, all respondents reported receiving technical support solely from government institutions. While this reflects the effectiveness of public extension outreach, it also signals institutional dependency and limited diversification of service providers. Strengthening partnerships with private seed companies, cooperatives, NGOs, and lead farmers could enhance service coverage, innovation, and long-term sustainability as shown in table below.

Table 3: Source of technical support in seed production

Institution	Frequency	Percentage
Government	223	100

Source: Field Survey, 2025

5.4. Training Coverage and Capacity Development

Capacity development programs show excellent nominal coverage, with 94.62% of seed producers receiving specialized training. Mechanistically, 48.88% completed integrated training covering seed production alongside pest management. However, a critical training gap exists regarding institutional and regulatory frameworks: only 1.35% of farmers received dedicated training on seed legislation, and only 1.79% received focused training on specialized pest control.

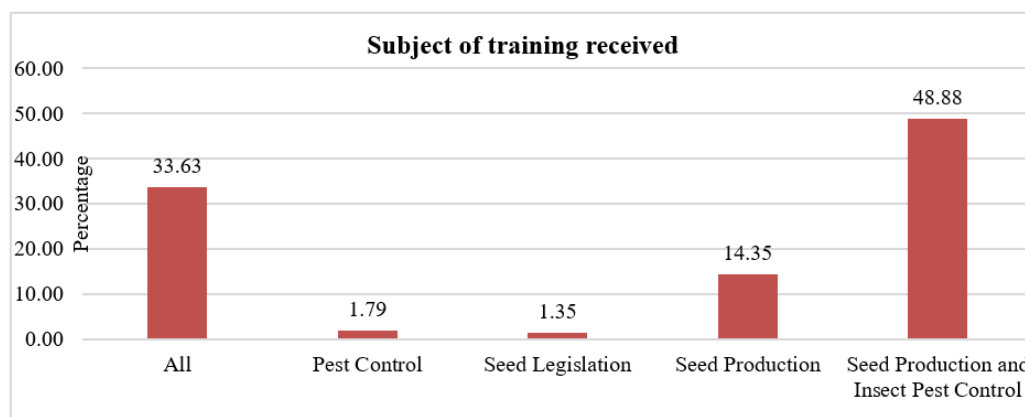
This policy delivery imbalance is also clear when examining infrastructure and

financial subsidies. While source-seed production subsidies reach 99.10% of the target group, they focus almost entirely on initial input costs. Financial support for value-addition processes – such as grading machinery, specialized cleaning tools, localized processing units, and storage infrastructure is completely absent. Consequently, 79.82% of producers must rely on low-cost, basic household storage solutions like standard seed bins or hermetic PIC bags.

Table 4: Status of training received

Particulars	Frequency	Percent
Farmers receiving training	211	94.62
Farmers not getting training	12	5.38
Total	223	100.0

Source: Field Survey, 2025



Source: Field Survey, 2025

Figure 3. Subject of training received

This integrated training approach likely contributes to improved production practices, yet the limited emphasis on seed laws and regulatory compliance may restrict farmers' ability to fully engage in formal seed markets. Expanding targeted training on legal frameworks, quality assurance, and post-harvest management could strengthen commercialization outcomes.

5.5 Subsidy Coverage and Infrastructure Support

Subsidy distribution in the study area appears extensive, with 99.10 percent of farmers reporting receipt of government subsidies for source seed production

and marketing as presented below in table. This indicates high program coverage and successful policy outreach. Most respondents received multiple forms of support, including subsidies for source seed, machinery, and combined assistance packages.

Table 5: Status of subsidy on source seed production and marketing

Particulars	Frequency	Percent
Farmers not getting subsidy	2	0.90
Farmers getting subsidy	221	99.10
Total	223	100.0

Source: Field Survey, 2025

However, subsidies related to seed processing, grading machinery, fertilizer, and pesticides were entirely absent, suggesting either limited program availability or insufficient awareness among farmers. This gap points to an opportunity for policy refinement, particularly in supporting value addition, quality enhancement, and cost-efficient production.

Regarding storage infrastructure, most farmers relied on low-cost household storage solutions such as seed bins or PIC bags (79.82 percent), while only 20.18 percent used cooperative-based RCC storage facilities.

Table 6: Seed storage structure

Particulars	Frequency	Percent
Seed bin/Pic Bag in own home	178	79.82
RCC storage of Group and Cooperative	45	20.18
Total	223	100.0

Source: Field Survey, 2025

The complete absence of private RCC storage highlights financial and infrastructural constraints, underscoring the need for investment in community-level storage facilities and post-harvest infrastructure.

5.6. Seed Availability and Challenges of seed production

Nearly all respondents (99.10 percent) reported receiving their desired quantity and variety of seed, suggesting that government-supported seed distribution systems are effective in meeting production requirements. This reflects strong

alignment between seed supply and farmer demand, a critical indicator of functional seed system performance.

Nevertheless, several production challenges persist. Wild animal attacks emerged as the most severe constraint (Index = 0.97), followed by insect and pest infestations (Index = 0.67) and low seed prices (Index = 0.64). Climatic risks, technical difficulties in machinery operation, storage capacity limitations, and source seed availability were ranked as moderate to low but remain relevant barriers.

These findings suggest that while institutional support has improved input access, external risks and market-related constraints continue to threaten seed production profitability as presented in table below.

Table 7: Ranking of the problems

Problems	Index Value	Rank
Attack of wild animals	0.97	I
Problem of insect and pest	0.67	II
Price of seed is low	0.64	III
Climatic factors like rainfall and drought	0.50	IV
Technical problem in operating seed machinery	0.46	V
Seed Holding Capacity	0.42	VI
Source Seed Availability	0.33	VII

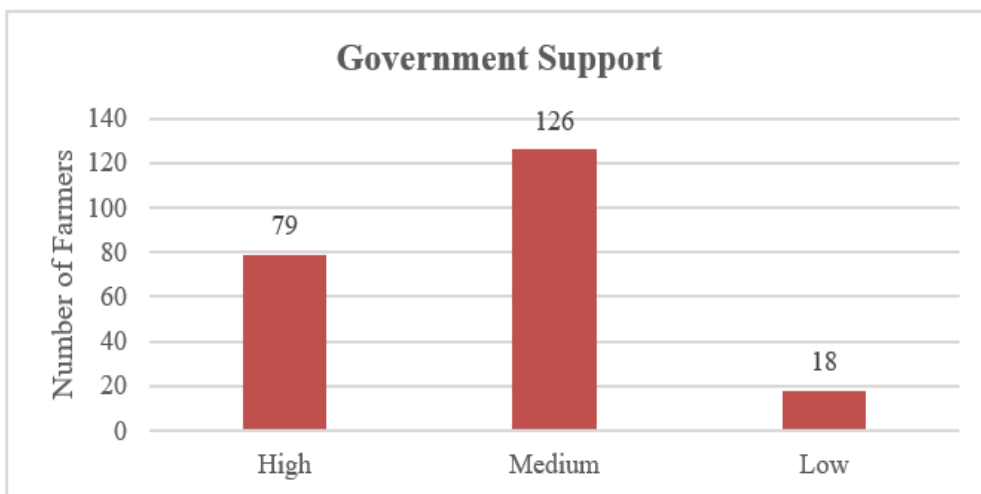
Source: Field Survey, 2025

5.7. Satisfaction with Government Services and Market Conditions

Farmers expressed moderate to high satisfaction with multiple dimensions of government services. Satisfaction with seed license approval was generally medium to high, indicating that administrative procedures are functional but could be further streamlined.

Similarly, most respondents reported moderate satisfaction with government support and subsidy programs, suggesting that assistance is beneficial but not fully adequate in addressing all farmer needs. Satisfaction with information access followed a similar pattern, with a majority rating it as medium, reflecting

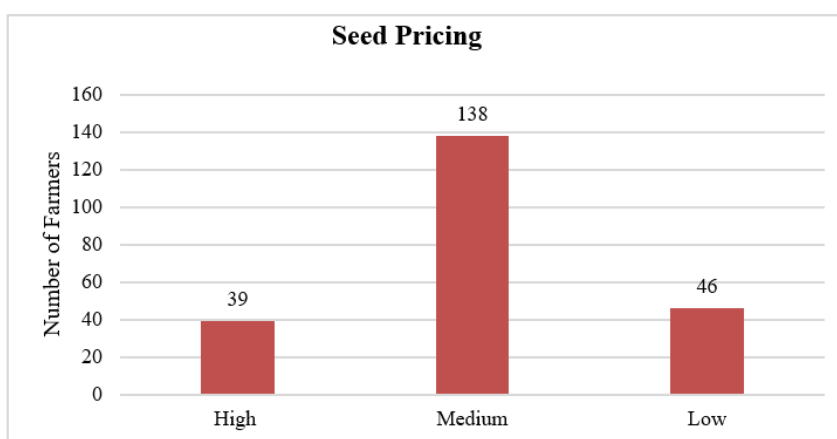
ongoing challenges related to information timeliness, accessibility, and relevance as shown below.



Source: Field Survey, 2025

Figure 4. Satisfaction on government support and subsidy in seed production and marketing

Seed pricing satisfaction emerged as a critical concern. While most farmers rated pricing satisfaction as medium, a substantial proportion expressed low satisfaction, highlighting profitability challenges and perceived inadequacy of price structures. This underscores the importance of revising pricing policies, strengthening price stabilization mechanisms, and enhancing farmers' bargaining power as reflected below.



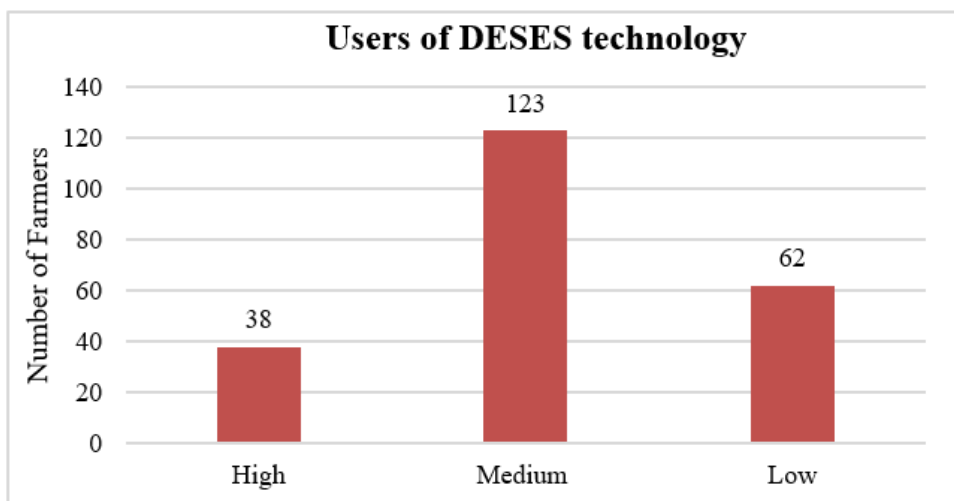
Source: Field Survey, 2025

Figure 5: Satisfaction on price of seed received

5.8. Adoption and Perception of DESES Technology

Survey results indicate moderate adoption levels. Most respondents reported medium DESES usage, while a considerable share indicated low usage due to limited awareness, technical barriers, or perceived complexity.

Finding revealed that a relatively small number of farmers i.e. 38, reported an elevated high level use of DESES; this implies that only a small number of farmers are actively utilizing DESES services to its maximum potential. On the other hand, another small number of farmers i.e. 62, reported that they use DESES services at a low level.



Source: Field Survey, 2025

Figure 6. Satisfaction on use of DESES technology

The limited use of DESES as a marketing platform suggests the need for improved training, system expansion beyond rice and wheat, and integration with market linkages to enhance adoption.

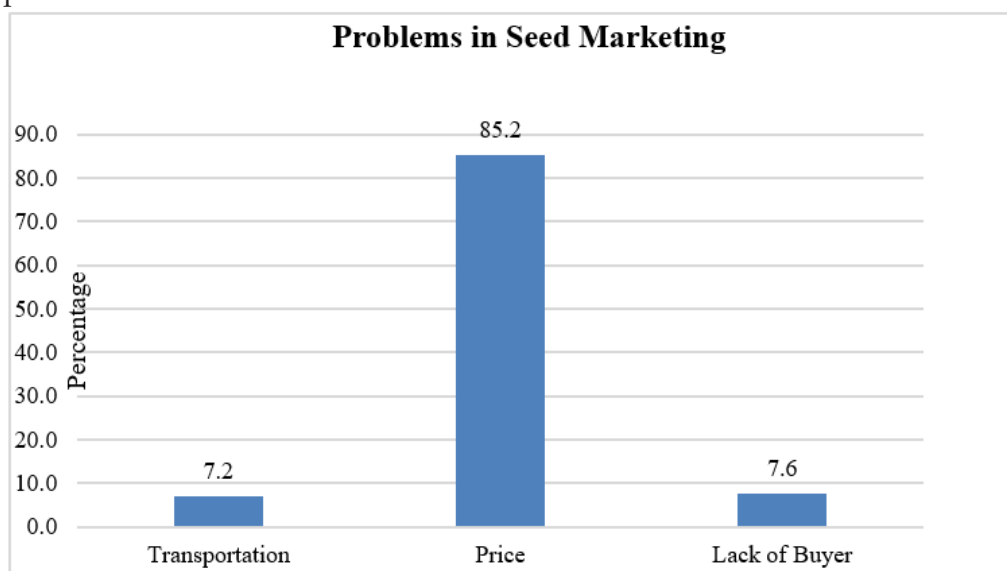
5.9. Market Channels and Seed Marketing Constraints

Government institutions serve as the dominant market outlet, with 96 percent of farmers selling their seed through government channels. Engagement with cooperatives, agro-vets, and seed companies remains minimal, highlighting limited private sector integration and market diversification.

Outside the DESES system, farmers primarily marketed seed through agro-vets (49.3 percent) and government institutions (48.8 percent), while direct engagement with seed companies remained negligible (1.9 percent). This pattern

indicates restricted competition, limited price negotiation opportunities, and dependence on institutional buyers.

Price-related challenges emerged as the most significant marketing constraint, affecting 85.2 percent of respondents. Transportation and buyer availability were relatively minor issues. These findings reinforce the central role of pricing mechanisms in determining farmer profitability and market sustainability as presented below.



Source: Field Survey, 2025

Figure 7. Major problems in seed marketing

5.10. Crop Insurance and Risk Management

Participation in crop insurance programs was exceptionally low, with 99.10 percent of farmers reporting no insurance coverage. This suggests substantial barriers related to awareness, affordability, trust, or institutional accessibility. Given the high risks associated with climate variability, pests, and wildlife damage, expanding crop insurance outreach could significantly improve risk resilience among seed producers.

5.11. Inferential Analysis: Correlation and Chi-Square Findings

Correlation analysis reveals strong interrelationships among satisfaction variables, indicating that farmers' perceptions of service quality are interconnected. Satisfaction with government support exhibited the strongest correlation with testing services and information access, suggesting that overall satisfaction is driven by service experience rather than financial incentives alone.

Table 8: Correlation analysis among the variables

Variable	Age	Education	Experience	Training	Subsidy	Sat_License	Sat_Testing	Sat_Support	Sat_Info	Sat_DESES	Sat_Price
Age											
Education	-0.30**										
Experience	0	-0.27*									
Training	0.20*	-0.09	0.01								
Subsidy	0	0	0.05	-0.01							
Sat_License	-0.1	-0.12	0.03	0.16*	0.04						
Sat_Testing	-0.1	-0.30**	0.32**	0.08	-0.1	0.40**					
Sat_Support	-0.20**	-0.19*	0.19*	0.07	0.04	0.60**	0.63**				
Sat_Info	-0.20**	-0.19*	0.07	-0.08	0.04	0.44**	0.52**	0.63**			
Sat_DESES	-0.1	-0.35**	0.38**	-0.05	-0.02	0.18*	0.48**	0.30**	0.41**		
Sat_Price	-0.20**	-0.23*	0.05	-0.01	0	0.33**	0.40**	0.53**	0.44**	0.42**	

** . Correlation is significant at the 0.01 level.

* . Correlation is significant at the 0.05 level.

Farmer experience is positively correlated with seed testing satisfaction ($r = 0.32$) and DESES platform satisfaction ($r = 0.38$). Conversely, education level displays a negative correlation with DESES satisfaction ($r = -0.35$), indicating that more educated farmers have higher expectations for digital tools and are more critical of the platform's limitations. The strongest positive correlation is between overall government support satisfaction and official testing services ($r = 0.63$), as well as access to information ($r = 0.63$). This shows that farmer satisfaction is driven by high-quality, reliable services rather than financial handouts and financial subsidies show near-zero correlation with all satisfaction variables, proving that simply giving out inputs does not solve core market problems like poor farm-gate prices.

Table 9: Chi square test of different variables

Variable 1	Variable 2	χ^2 Statistic	p-value	df	Result ($\alpha=0.05$)
Gender	Subsidy Receipt	0.8149	0.3667	1	Not Significant
Ethnicity	Training Status	4.3569	0.8236	8	Not Significant
Extension Contact	Subsidy Receipt	0.0000	1.0000	0	Not Significant
Training Status	Satisfaction Support	8.9076	0.3501	8	Not Significant
Crop Type	DESES Satisfaction	136.7045	0.0000	8	Significant

Source: Field Survey, 2025

Chi-square analysis further demonstrated that most demographic variables (gender, ethnicity, extension contact) did not significantly influence access to subsidies or training, indicating relatively equitable program coverage. However, crop type showed a strong and statistically significant association with DESES satisfaction, suggesting that digital service effectiveness varies by crop and may require crop-specific customization.

6. Conclusion

This study demonstrates that government seed policies in the Syangja district have successfully established a baseline of high input reach and extensive training coverage, they suffer from deep structural weaknesses. The complete state monopoly over seed supply and extension services creates institutional

bottlenecks and blocks private sector innovation. Furthermore, current policy mechanisms are poorly aligned with field realities: financial subsidies ignore post-harvest processing needs, the DESES digital platform lacks proper functionality for the district's dominant maize crops, and a near-total absence of crop insurance leaves smallholders highly vulnerable to severe wildlife and climate risks.

7. Policy Recommendations

- **De-monopolize Extensions and Seed Channels:** Create public-private-cooperative partnerships to break the state monopoly. Transition agrovets and local agricultural cooperatives from simple traders into registered, certified source-seed distributors.
- **Upgrade Post-Harvest and Storage Subsidies:** Shift funding focus away from simple input subsidies and toward value-addition infrastructure like community-managed RCC storage facilities and modern seed-cleaning tools.
- **Adapt and Simplify the DESES System:** Modify the DESES platform to include comprehensive tracking and marketing tools tailored specifically for maize varieties.
- **Enforce Mandatory Insurance and Wildlife Mitigation:** Address the district's top operational hazard by linking government input subsidies directly to mandatory crop insurance enrollment and introducing subsidized community fencing.
- **Expand Regulatory and Legal Training:** Shift extension training priorities toward seed legislation, quality control compliance, and modern marketing strategies to help smallholders transition smoothly into formal commercial markets.

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