Report on

Mapping of Private Sector Agricultural Extension Service Providers (PESPs) in Koshi Province

Submitted to:

Small Irrigation Programme (SIP), Phase II

Submitted by:

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Acronyms and Abbreviations

ADS	- Agriculture Development Strategy (2015-2023)
AI	- Artificial Intelligent
AKC	- Agriculture Knowledge Center
CAESC	- Community Agriculture Extension Service Center
CBOs	- Community Based Organizations
DAGs	- Disadvantaged Groups
F	- F-test
FFS	- Farmer Field School
FGD	- Focus Group Discussion
FtF	- Farmer to Farmer
GoN	- Government of Nepal
ICT	- Information and Communication Technology
IoT	- Internet on Things
ISPs	- Internet Service Providers
KII	- Key Informant Interview
KPIs	- Key Performance Indicators
LARPs	- Local Agriculture Resource Persons
LGs	- Local Governments
M	- Municipality
MALDC	- Agriculture and Livestock Development Committee
MALDC	- Municipal Agriculture and Livestock Development Committee
ML	- Machine Learning
MoALD	- Ministry of Agriculture and Livestock Development
MoCIT	- Ministry of Communication and Information Technology
MSP	- Multi-Stakeholders Platform
n	- Sample
NAMDP	- Nepal Agricultural Market Development Programme
NGOs	- Non-Governmental Organizations
NPR	- Nepalese Rupees
p	- Level of significance
PESPs	- Private Sector Agricultural Extension Service Providers
PPCP	- Public-Private-Community Partnership
PPP	- Public-Private Partnership
RM	- Rural municipality
SDC	- Swiss Agency for Development and Cooperation
SDG	- Sustainable Development Goal
SIP	- Small Irrigation Programme
WUA	- Water User Association
χ^2	- Chi-square value

Acknowledgements

The study titled "**Mapping of Private Sector Agriculture Extension Service Providers in Koshi Province**" was carried out from May to June 2025 with a view to identifying and examining private stakeholders who are already engaged in, or interested in providing, agricultural extension services in Koshi Province. The study also sought to develop strategic recommendations for enhancing private sector participation in agricultural extension. This study was carried out through a combination of desk reviews, field surveys, and direct observations in private and public agriculture service providers in eleven districts across the province.

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Executive Summary

The agriculture sector in Koshi Province is undergoing a gradual shift from a predominantly government-led extension system to a more pluralistic, market-oriented model in line with Nepal's Agriculture Development Strategy (ADS) 2015-2035. This study was conducted to map the current landscape of private sector agricultural extension service providers (PESPs), assess their capacities, challenges, and outreach, and provide recommendations for strengthening their role in enhancing farmers' access to knowledge, inputs, and markets. Using mixed methods, the study surveyed 278 respondents, including 265 direct private service providers across 11 districts and 42 municipalities in the Mechi, Koshi, and Sagarmatha corridors of Koshi province. The providers included agro-vets, cooperatives, private companies, digital platforms, traders, individual experts, and NGOs/CBOs. Findings highlight that although many of these actors play vital but often unrecognized roles in service delivery, they remain constrained by policy, infrastructure, and resource gaps.

The mapping identified agro-vets (162 providers) as the most common actors, especially in hilly areas, where they are often the only point of contact for farmers. However, their services are primarily input-driven, and only 2.5% possess diagnostic equipment, limiting technical quality. Agricultural cooperatives (29) and private companies (23) provide valuable but small-scale extension support, while digital platforms (5) show high potential, offering 100% advisory services and 80% market linkages, though connectivity and digital literacy barriers restrict their reach. Traders and wholesalers (29) serve as crucial market intermediaries but struggle with price volatility and transport inefficiencies. The study also highlights systemic issues of inequity, with 38.9% of providers working only within municipal boundaries, limited coverage in remote corridors such as Sagarmatha, and inadequate outreach to women-led households (46.9%) and marginalized groups such as Dalits and Janajati.

Farmers' demand for services is increasing, particularly for soil testing, veterinary care, and reliable market access. However, PESPs face persistent challenges, including high input costs (54.3%), poor road conditions (75.9%), weak internet connectivity, and low purchasing power of farming households. Policy-related constraints emerged as the most critical barrier, with unclear and lengthy licensing processes, lack of recognition of informal providers, and weak integration of private actors into the federal extension system. Similarly, inadequate infrastructure, such as storage, cold chains, and logistics limits both service provision and market participation. Nevertheless, the study underscores significant untapped opportunities: strengthening multi-stakeholder platforms, expanding digital services, and promoting inclusive and targeted interventions could transform the extension landscape into a more effective and equitable system.

To strengthen linkages between farmers and PESPs, three levels of recommendations are proposed. **Strategically**, Nepal should promote public-private partnerships, regular dialogue platforms, market-oriented extension models, and digital transformation. **At the policy level**, simplifying licensing, offering targeted incentives, improving access to finance, and investing in rural infrastructure are critical. **At the operational level**, building skills, promoting digital literacy, connecting farmers with providers through fairs and platforms, and setting service standards will foster trust and sustainability. A phased, federalized implementation approach with federal governments leading policy reforms, provincial governments coordinating programs, and local governments facilitating ground-level linkages- will ensure that private extension services become more inclusive, market-responsive, and resilient.

1. Introduction

1.1 Background

The Small Irrigation Programme, Phase II (SIP-II), implemented by the Government of Nepal in partnership with the Government of Switzerland, builds on Phase I experience. Targeting 59 Local Governments (LGs) in Koshi Province's mid-hills, it aims to provide year-round irrigation to 21,161 hectares through 1,385 small irrigation systems, benefiting 68,445 households. Its goal is to reduce poverty among small farmers, especially from disadvantaged groups (DAGs), by increasing their agricultural income. This will be achieved through three outcomes: effective Local Government response to irrigation needs, increased productivity of small farmers, and innovative market support. The programme focuses on consolidating irrigation infrastructure gains to enable high-value crop production, commercial agriculture, and market linkages with private sector support.

Agricultural extension services are vital for enhancing the productivity, income, and resilience of smallholder farmers. Traditionally led by government agencies and projects, these services are now increasingly complemented by private sector actors such as agro-vets, cooperatives, agribusinesses, traders, and digital platforms. In Koshi Province, while SIP-II has strengthened irrigation infrastructure, the coverage, service models, and readiness of Private Sector Agricultural Extension Service Providers (PESPs) remain poorly understood and their role is not yet systematically integrated into the broader agricultural extension system.

Furthermore, the SIP external review (October 2024) highlighted this information gap and recommended a comprehensive mapping of private sector agricultural extension service providers. In response, this study identifies and categorizes private sector actors, analyzes their business models, and proposes strategies to strengthen public-private collaboration for more inclusive and market-oriented extension services.

1.2 Purpose and Objectives of the Assignment

This assignment aims to map and analyze private sector actors involved in or willing to provide agricultural extension services in Koshi Province and to develop strategies for enhancing private sector participation. Specific objectives include:

a) Identify private sector actors (Agro-vets, agriculture cooperatives, agriculture companies/ agribusiness, input and output buyers/wholesalers, individual service providers, digital service providers, NGOs/CBOs etc.) currently providing or willing to provide extension services.
b) Assess how private sector actors provide extension services, including their approach, business models, capacity, incentives and service delivery mechanisms.
c) Identify geographical areas covered, types of farmers served (smallholders, commercial farmers, marginalized groups, etc.), and the types of services provided (advisory, input supply, financial support, etc.).
d) Understand the barriers and enabling factors for private sector participation in extension services.
e) Recommend strategies for strengthening public-private collaboration in agricultural extension services for better linked with farmers of Koshi province.

1.3 Scope and Limitations

The study covered 11 districts across Mechi, Koshi, and Sagarmatha corridors in Koshi Province, identifying 265 PESPs through surveys, FGDs with WUAs, and KIIs with LGs and Agriculture Knowledge Centers (AKCs). It revealed a diverse range of actors providing advisory, input, and market linkage services. However, limitations included potential sampling bias due to snowball sampling, a short data collection window (10-25 June 2025), limited engagement with digital providers (only 5), remained no Dalit participation in FGDs with scope for improvement, and restricted access to remote regions. Despite these challenges, the study offers critical insights to inform SIP-II's strategy for integrating PESPs into Nepal's evolving extension landscape.

2. Methodology

This study used a mixed-methods approach integrating both quantitative and qualitative techniques to map and analyze Private Sector Agricultural Extension Service Providers (PESPs) across 11 districts of Koshi Province. The methodology was structured to capture diverse actors, their operational models, geographic reach, and the barriers/enablers affecting private sector participation in extension services.

2.1 Desk Review and Literature Integration

The study began with an in-depth desk review of prior studies, notably those focusing on the vegetable sector in Koshi Province. These studies identified 263 market actors and infrastructure gaps- cold storage, transport, and wholesale linkages emphasizing the need for market-oriented extension. Findings stressed embedding private sector support in Nepal's diverse extension system, guided by national policies such as:

- Agriculture Development Strategy (2015-2035)
- National Extension Strategy (2016)
- Local Government Operation Act (2017)
- Digital Nepal Framework (2019)

Despite policy recognition, operational clarity on accreditation, financing, and quality control of PESPs remains weak, limiting effective engagement.

2.2 Mapping Framework and Sampling

A snowball sampling and networking approach was applied, suitable for identifying informal and lesser-known service providers. A total of 278 respondents were surveyed, including:

- 265 respondents from various private agricultural extension providers (agro-vets, cooperatives, digital providers, private companies, input/output buyers, NGOs/CBOs, and individual)
- 5 Focus Group Discussions (FGDs) with Water User Associations (WUAs) in Mechi (2 FGDs), Koshi (2 FGDs) and Sagarmatha (1 FGD).
- 8 Key Informant Interviews (KIIs) with local municipalities and Agriculture Knowledge Centers (AKCs)

The service providers were distributed across three agro-ecological and market-based corridors as below:

SN	PESPs Type	Mechi	Koshi	Sagarmatha	Total
1	Agro-vets	54	58	50	162
2	Agri-Cooperatives	7	13	9	29
3	Private Agri-Companies	11	6	6	23
4	Digital Service Providers	4	1	0	5
5	Traders	11	11	7	29
6	NGOs/CBOs	2	1	3	6
7	Individuals	4	5	2	11
	Total	**93**	**95**	**77**	**265**

2.3 Data Collection and Tools

2.3.1 Quantitative Methods

Three trained researchers conducted field surveys using mWater/Solstice digital platform. The survey tool captured service models, clientele, and operational challenges. Daily supervision and quality assurance of collected data were conducted by the study Team Leader and SIP monitoring team.

2.3.2 Qualitative Methods

Focus Group Discussions (FGDs) were carried out with Water Users' Associations (WUAs) to capture their perspectives on access to private sector services. In parallel, Key Informant Interviews (KIIs) were conducted with local governments and Agriculture Knowledge Centers (AKCs) to explore institutional linkages and available support mechanisms. Both FGDs and KIIs were guided by semi-structured checklists to ensure consistency and depth in the information gathered.

2.4 Data Analysis and Interpretation

Collected data were cleaned, coded, and analyzed using MS Excel, SPSS (v.25) and Stata (v.14), employing:

- Descriptive statistics for service type and distribution
- Chi-square tests and ANOVA for comparative analysis
- Logit model to assess willingness to extend services

A database of all identified PESPs was developed with fields on:

- Type of service (advisory, input supply, output linkage)
- Client types and delivery modes
- Geographic and market reach
- Institutional and financial constraints
- Incentive structures

Spatial mapping helped visualize service distribution and coverage gaps.

2.5 Ethical Considerations

Ethical principles were followed throughout:

- Informed consent from all participants and respondents.
- Confidentiality and anonymity ensured.
- Voluntary participation with respect to cultural norms.
- Efforts to minimize bias and ensure fair representation, especially of marginalized and underrepresented groups.

Ethical approval was obtained from the relevant authorities, including PESPs, municipalities, AKCs, and WUAs, to ensure access to the required information. The findings were subsequently shared with stakeholders for validation.

2.6 Timeline and Implementation

The study was conducted over 45 working days, starting with survey tool finalization and team orientation. A pre-test was conducted in Biratnagar, followed by data collection from 10-25 June 2025 across the three corridors in Koshi Province. Data were reviewed and analyzed in real-time to ensure accuracy and completeness. This rigorous and inclusive methodology provided a solid empirical foundation to assess the role of PESPs and inform strategies for enhancing private sector engagement in agricultural extension services in Koshi Province.

3. Key Findings and Analysis

A comprehensive survey identified 265 PESPs across the Mechi, Koshi, and Sagarmatha corridors of Koshi Province. The findings reveal a diverse landscape of private sector actors, with agro-vets emerging as the most prominent, complemented by cooperatives, agri-companies, traders, digital providers, NGOs, and individual service providers. The analysis that follows unpacks their geographic distribution, organizational characteristics, and evolving roles in agricultural extension and service delivery, providing the basis for deeper insights in the subsequent sections.

3.1 Identification of PESPs and their Characteristics

A total of 265 PESPs were listed and surveyed across the three main corridors of Koshi Province, namely, Mechi, Koshi, and Sagarmatha. Agro-vet shops emerged as the most common service providers (162), followed by agricultural cooperatives and input/output buyers (29 each), and private agri-companies (23). As shown in Table 1, agro-vets were particularly concentrated in hill and inner Terai districts (136 of 162), while the remaining were located in major Terai market hubs such as Jhapa, Morang, and Sunsari. Their extensive presence in geographically challenging hill areas reflects farmers' heavy reliance on agro-vets for accessible input supply and advisory services, especially where public extension services are limited (refer Table 1 and Figure 1).

In addition to the traditional stakeholders, emerging players like five digital agriculture service providers, six NGOs and civil society organizations, and 11 independent or individual service providers were interviewed. These stakeholders provide a diversified ecosystem of agricultural extension services in the province. Digital service providers, though few in number, represent growing innovation in the sector, with technology-enabled services that can potentially address access gaps, especially in remote locations. Figure 1 illustrates the district-wise and corridor-wise spread of agro-vets, highlighting their widespread coverage, particularly in hilly districts where formal public extension services may be limited. The evidence refers to a vibrant and varied network of private actors playing an increasingly important role in agricultural knowledge dissemination, input supply, and value chain connections across Koshi Province. The surveyed agro-vets were distributed across 42 LGs, including 39 municipalities and rural municipalities, one metropolitan city (Biratnagar), and two sub-metropolitan cities (Dharan and Itahari).

Table 1: Identified and surveyed PESPs in Koshi Province

SN	Agriculture Extension Service Providers	Mechi Corridor (Panchthar, Ilam and Jhapa)	Koshi Corridor (Terhathum, Bhojpur, Dhankuta, Sunsari and Morang)	Sagarmatha Corridor (Khotang, Okhaldhunga and Udayapur)	Total samples (n)
1	Ago-vet Shops	54	58	50	162
2	Agriculture Cooperatives	7	13	9	29
3	Private Agriculture Companies	11	6	6	23
4	Digital Agriculture Service Providers	4	1		5
5	Input/Output Buyers (Wholesalers/Traders)	11	11	7	29
6	NGOs and CBOs	2	1	3	6
7	Independent/Individual Service Providers	4	5	2	11

SN	Agriculture Extension Service Providers	Mechi Corridor (Panchthar, Ilam and Jhapa)	Koshi Corridor (Terhathum, Bhojpur, Dhankuta, Sunsari and Morang)	Sagarmatha Corridor (Khotang, Okhaldhunga and Udayapur)	Total samples (n)
	Total	**93**	**95**	**77**	**265**

Note: Almost all agro-vets were sampled in hilly districts through snowball and networking analysis whereas representative samples of agro-vets were taken from Terai districts (like, 12 from Jhapa, 5 from Morang and 9 from Sunsari major market hubs). Total agro-vets identified and sampled from hilly districts is 136. *Source: Field survey (11-25 June, 2025)*

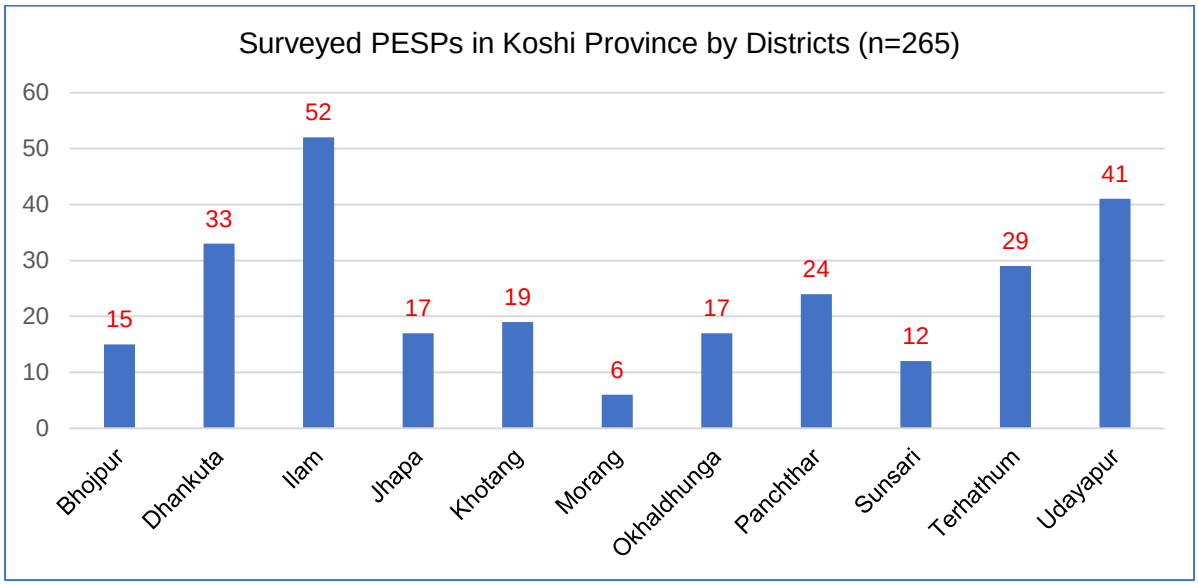


Figure 1: District wise surveyed samples of PESPs in Koshi Province

The socio-demographic analysis of 265 private sector agricultural extension service providers in Koshi Province highlights significant variations across provider types with respect to operational experience, community focus, gender composition, educational attainment, and technical expertise. Cooperatives and NGOs have been operating longer and are more community-focused, while digital service providers and companies are newer and more technically skilled. Male dominance is seen across all groups, though cooperatives and companies show better gender balance. Education levels vary, with most having secondary education, but digital providers stand out with master's degrees. Technical training is common among agro-vets and individuals but lacking in NGOs and cooperatives (Please refer below Table 2). These findings highlight the need for capacity-building, especially among less technical, community-based actors. Details characteristics of identified PESPs is presented in **Appendix 16.**

Table 2: Socio-demographic characteristics of PESPs

Variables	Agro-vets (n=126)	Cooperatives (n=29)	Companies (n=29)	Digital (n=5)	Buyers (n=29)	NGOs (n=6)	Individual (n=11)	Overall (n=265)	F-value
Age of owner (Years)	42.79	50.06	44.82	42.20	40.00	44.5	33.36	43.09	3.370***
Establishment years	11.46	16.0	8.39	7.40	8.58	18.16	11.00	11.44	3.153***
Operation years									
Gender of the owners/respondents									Chi-square
Male	78.4%	75.9%	69.6%	80.0%	62.1%	83.3%	81.8%	75.8%	4.520
Female	21.6%	24.1%	30.4%	20.0%	37.9%	16.7%	18.2%	24.2%	

Variables	Agro-vets (n=126)	Cooperatives (n=29)	Companies (n=29)	Digital (n=5)	Buyers (n=29)	NGOs (n=6)	Individual (n=11)	Overall (n=265)	F-value
Education									
Technical	67.3%	0.0%	17.4%	80.0%	3.4%	0.0%	90.9%	48.3%	98.250***
Non-technical	32.7%	100.0%	82.6%	20.0%	96.6%	100.0%	9.1%	51.7%	
Education level									
Primary	9.9%	3.4%	8.7%	0.0%	20.7%	0.0%	0.0%	9.4%	112.921***
Secondary	80.2%	62.1%	47.8%	9.0%	72.4%	50.0%	90.9%	72.8%	
Bachelor	7.4%	20.7%	34.8%	0.0%	6.9%	16.7%	0.0%	10.9%	
Master	2.5%	13.8%	8.7%	100.0%	0.0%	33.3%	9.1%	6.8%	

Notes: *** indicates significant at 1% level. #F-value for continuous and Chi-square for categorical variables.
Source: Field survey (11-25 June, 2025)

3.2 Identification and assessment of WUAs (farmers) and public service providers

The qualitative component of the study involved 8 Key Informant Interviews (KIIs) with municipalities and AKCs and 5 Focus Group Discussions (FGDs) with water user association (WUAs) conducted across three districts representing each of the Koshi Province corridors- Ilam (Mechi corridor), Dhankuta (Koshi corridor), and Udayapur (Sagarmatha corridor). A total of 16 individuals participated in the KIIs, including staff from Agriculture Knowledge Centers (AKCs) and local government agriculture sections. The gender distribution among KII participants included 10 males and 6 females, suggesting moderate female representation in institutional roles, particularly within local agricultural governance structures. These KIIs provided in-depth insights into institutional experiences, challenges, and perspectives on private sector engagement in agricultural extension services.

The KIIs and FGDs generated critical insights into institutional dynamics and community-level perspectives on private agricultural service provision in Koshi Province. The KIIs, involving AKC staff and local government officials, highlighted institutional challenges such as limited technical staff, weak coordination with the private sector, and inadequate resources to expand extension outreach. At the same time, officials recognized the enabling role of PESPs, particularly agro-vets, in bridging service gaps in remote and underserved areas. These discussions also underscored the emerging potential of digital platforms and the need for multi-stakeholder collaboration to deliver inclusive and cost-effective services.

The FGDs with WUAs revealed strong demand for pluralistic and accessible extension services, with agro-vets identified as the most trusted providers. Participants pointed to barriers such as high input costs, inconsistent quality of products, limited access to digital tools, and weak market linkages. However, enabling factors also emerged- such as active WUA mobilization, SIP-supported irrigation expansion, and farmers' willingness to co-invest in extension services through cost-sharing or service fees. These findings point to opportunities for PESPs to expand services through collective platforms, performance-based input systems, and integration with local governments and cooperatives.

Together, the qualitative evidence from KIIs and FGDs has been used in this report to explain the barriers and enabling factors affecting PESPs. These sections link farmer and institutional perspectives directly to the broader business environment assessment, providing context-specific recommendations to strengthen private sector involvement in agricultural extension services in Koshi Province. Details assessments of WUAs and public sector (Municipalities and AKCs) through FGDs and KIIs respectively presented in **Appendix 16.**

3.3 Assessment of Agricultural Extension Services Delivery through Private Sectors

3.3.1 Approaches and Business Models

In Koshi Province, private sector actors are adopting different approaches to agricultural extension services. Technology-driven and socially focused providers are increasingly using social media in their services, while traditional actors still rely mainly on offline methods. Digital service providers stand out by actively using online platforms to engage farmers through apps, videos, and mobile content, and NGOs/CBOs, individual providers, and agri-companies also demonstrate moderate uptake as part of their outreach strategies. In contrast, agro-vets, cooperatives, and input/output buyers show negligible adoption of digital tools, reflecting their reliance on physical networks, low digital capacity, or limited prioritization of online engagement. This divergence underscores a growing gap between innovative actors scaling services through technology and traditional providers maintaining face-to-face approaches, signaling the need for targeted support to bridge digital divides in agricultural extension.

3.3.1.1 Agro-vets

Nearly all identified agro-vets (98.1%) provide advisory services only when farmers buy products, rather than charging a separate fee. This means farmers usually receive advice bundled with the purchase of seeds, fertilizers, or pesticides. Only a few agro-vets (0.6%) use a fee-based model, and subsidized services (5.6%) are rare and mostly linked to temporary government or donor programs. The services also differ across areas: in Mechi, most agro-vets give simple advice; in Koshi, they offer loyalty programs; and in Sagarmatha, they provide more combined services to retain customers. While this helps agro-vets sell more products, it raises concerns about the fairness and usefulness of the advice, as it may be biased toward selling rather than solving farmers' problems. Also, the lack of digital tools or paid advisory services shows limited innovation (refer Table 3).

Table 3: Approaches and service provision business models offered by agro-vets

Service provision models by agro-vets	Corridors			Total (n=162)	Chi square
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)		
Service provision models					
Fee-for-services (paid services) [Yes]	0 (0.0%)	0 (0.0%)	1 (2.0%)	1 (0.6%)	2.254
Embedded services (Yes)	52 (96.3%)	58 (100%)	49 (98.0%)	159 (98.1%)	2.119
Subsidized services (Yes)	4 (7.4%)	3 (5.2%)	2 (4.0%)	9 (5.6%)	0.600
Types of embedded services					
Free advisory with product/inputs purchase	30 (55.6%)	22 (37.9%)	10 (20.0%)	62 (38.3%)	79.161***
Free advisory with product/inputs purchase & Loyalty programs	0 (0.0%)	32 ((55.2%)	22 (44.0%)	54 (33.3%)	
Free advisory with product/inputs purchase & Product specifications services (leveling detailing information)	18 (33.3%)	1 (1.7%)	2 (4.0%)	21 (13.0%)	
Free advisory with product/inputs purchase; Loyalty programs & Product specifications services	4 (7.4%)	3 (5.2%)	15 (30.0%)	22 (13.6%)	
Types of subsidized services					
Government-sponsored programs	3 (5.6%)	2 (3.4%)	2 (4.0%)	7 (4.3%)	4.131
Companies' initiatives program	0 (0.0%)	1 (1.7%)	0 (0.0%)	1 (0.6%)	
I/NGO funded initiatives, Government-sponsored programs, FNCCI and personal	1 (1.9%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	

Notes: ***indicates significant at 1% level. Source: Field survey (11-25 June, 2025).

In Koshi Province, very few agro-vets use digital tools (only 2.5%) use online platforms, and none offer e-commerce services. However, over 85% accept mobile payments like eSewa or Khalti, showing some use of digital finance. Agro-vets in Koshi and Sagarmatha are more likely to give farmers credit (over 78%) compared to Mechi (14.8%), meaning they help more financially dependent farmers. Insurance services are still low overall but higher in Sagarmatha (24%). This shows that while full digital services are lacking, agro-vets support farmers with credit and mobile payments (Table 4).

Table 4: Digital and financial services, services business model used by agro-vets

Variables	Corridors			Total (n=162)	Chi square
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)		
Digital and financial services					
Digital platforms used (Yes)	2 (3.7%)	0 (0.0%)	2 (4.0%)	4 (2.5%)	2.297
Mobile payment acceptance (Yes)	46 (85.2%)	50 (86.2%)	43 (86.0%)	139 (85.8%)	0.026
E-commerce (online business) capacities (Yes)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Credit facilities offered to clients (Yes)	8 (14.8%)	48 (82.8%)	39 (78.0%)	95 (58.6%)	64.402***
Insurance of agri-products/inputs/equipment at agro-vet (Yes)	2 (3.7%)	1 (1.7%)	12 (24.0%)	15 (9.3%)	18.834***

Notes: ***indicates significant at 1% level. Source: Field survey (11-25 June, 2025).

3.3.1.2 Agri-cooperatives, Companies and Buyers

Agri-cooperatives and Private agri-companies in Koshi Province exhibit distinct service delivery models shaped by their mandates and resources. Cooperatives prioritize socially-oriented, subsidized approaches providing widespread crop advisory (79.3%), group trainings (75.9%), and field visits (62.1%), focusing on inclusivity and community learning, but showing minimal use of fee-based services or digital tools. In contrast, private agri-companies adopt market-driven, innovation-oriented strategies, emphasizing fee-for-service offerings such as machinery support (43.5%), input-linked training (21.7%), call centers (26.1%), and ICT-based advisory (17.4%), while general crop advisory remains limited (21.7%). These operational differences, confirmed by significant chi-square values[1], highlight the complementary potential of integrating cooperatives' grassroots reach with companies' technological and specialized capacities to deliver more comprehensive, scalable, and sustainable agricultural extension services (Table 5).

Table 5: Approaches and service provision business models by agri-cooperatives and private agri-companies

Variables	Agri. Cooperatives (n=29)	Agri. Companies (n=23)	Total (n=52)	Chi square
Services delivery models for fee-for-services				
Soil testing	1 (3.4%)	2 (8.7%)	3 (5.8%)	0.650
Farm visits	9 (31.0%)	7 (30.4%)	16 (30.8%)	0.002
Crop advisory	23 (79.3%)	5 (21.7%)	14 (	
Pest and diseases diagnostic	1 (3.4%)	5 (21.7%)	6 (11.5%)	4.204**
Training with seed/fertilizers purchases	0 (0.0%)	5 (21.7%)	5 (9.6%)	6.975***
Technical support with machineries	0 (0.0%)	10 (43.5%)	10 (19.2%)	15.611***
Subsidized services (with external support)			17	73.91

[1] The Chi-square (χ^2) value is a statistical measure used to test the relationship between two categorical variables. It compares the observed frequencies in each category with the expected frequencies if there were no association. A higher χ^2 value indicates a stronger difference between observed and expected results, helping determine whether the relationship is statistically significant.

Farmer training program	22 (75.9%)	8 (34.8%)	30 (57.7%)	8.868***
Group demonstration	11 (37.9%)	11 (47.8%)	22 (42.3%)	0.515
ICT-based advisory	0 (0.0%)	4 (17.4%)	4 (7.7%)	5.464**
Services delivery methods				
Field-visits	18 (62.1%)	11 (47.8%)	29 (55.8%)	1.055
Group trainings	22 (75.9%)	9 (39.1%)	31 (59.6%)	7.188***
Demonstrations plots	9 (31.0%)	9 (39.1%)	18 (34.6%)	0.371
Mobile advisory	5 (17.2%)	0 (0.0%)	5 (9.6%)	4.387**
Digital platform use	1 (3.4%)	4 (17.4%)	5 (9.6%)	2.869*
Chemical fertilizers distribution	1 (3.4%)	0 (0.0%)	1 (1.9%)	0.809
Call center	0 (0.0%)	6 (26.1%)	6 (11.5%)	8.552***

Notes: ***, ** and *indicate significant at 1%, 5% and 10% levels, respectively. Source: Field survey (11-25 June, 2025).

Figure 2 shows that the majority of agriculture cooperatives in Koshi Province receive subsidies for agri-promotion primarily from government-sponsored programs, accounting for 73.91% of the total support. A smaller share, 8.70%, reported receiving subsidies from NGO-funded initiatives or financial institutions (like Small Farmers Development Bank, etc.), while 13.04% received support from both sources. This indicates that public sector support is the dominant driver enabling cooperatives to deliver subsidized services like training, field demonstrations, and input support to farmers. The limited contribution from NGOs and financial institutions suggests potential to diversify funding sources and reduce overreliance on government subsidies for more sustainable service delivery.

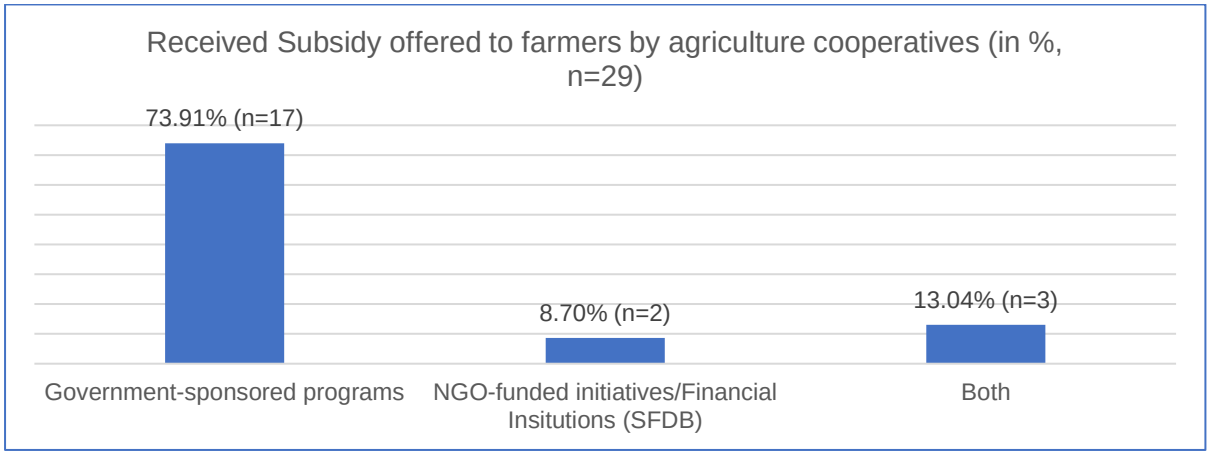


Figure 2: Received Subsidy offered to farmers by agriculture cooperatives

The Figure 3 shows that agriculture cooperatives in the study area widely adopt embedded service models, with 79.3% providing services alongside output marketing (crops and livestock) and 72.4% with input sales (seeds, fertilizers, equipment). This overlap suggests that many cooperatives integrate both input supply and output linkage as part of their service offerings, aiming to support farmers across the production cycle. Such dual embedded models enhance service accessibility and promote cooperative loyalty, though they may also limit advisory neutrality if advice is tied to specific products or markets. Strengthening independent advisory capacity alongside embedded models could improve service quality and sustainability.

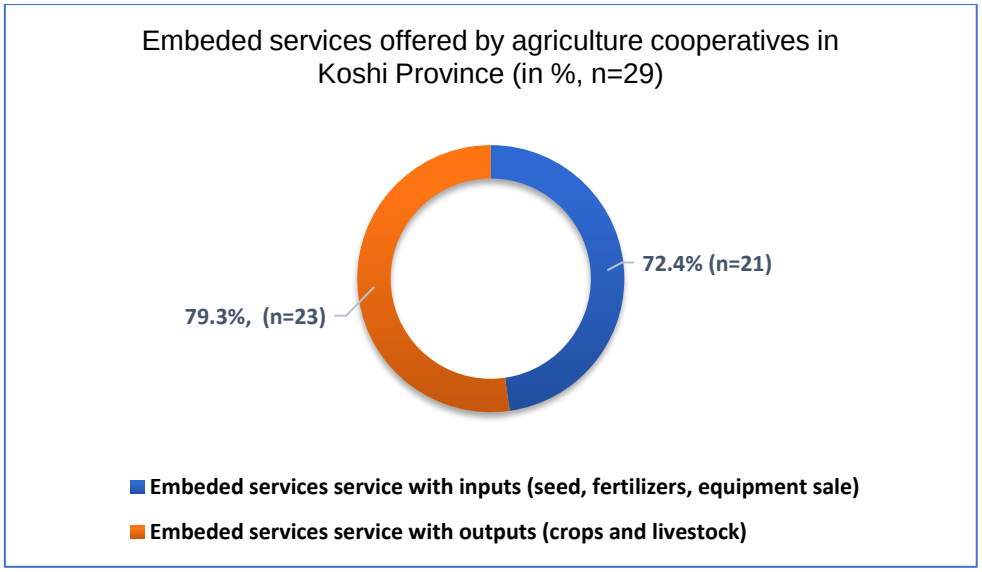


Figure 3: Embedded service offered by agriculture cooperatives

Figure 4 reveals that 52.17% of private agriculture companies in the study area embeds services with agri-inputs and irrigation equipment, while only 8.70% do so for animal feeds. This suggests a strong emphasis on crop-centric embedded services (e.g., input supply, maintenance support of supplied tools and machineries) over livestock-related offerings. The disparity highlights potential gaps in bundled service models for animal feed providers, indicating room for market expansion or diversification.

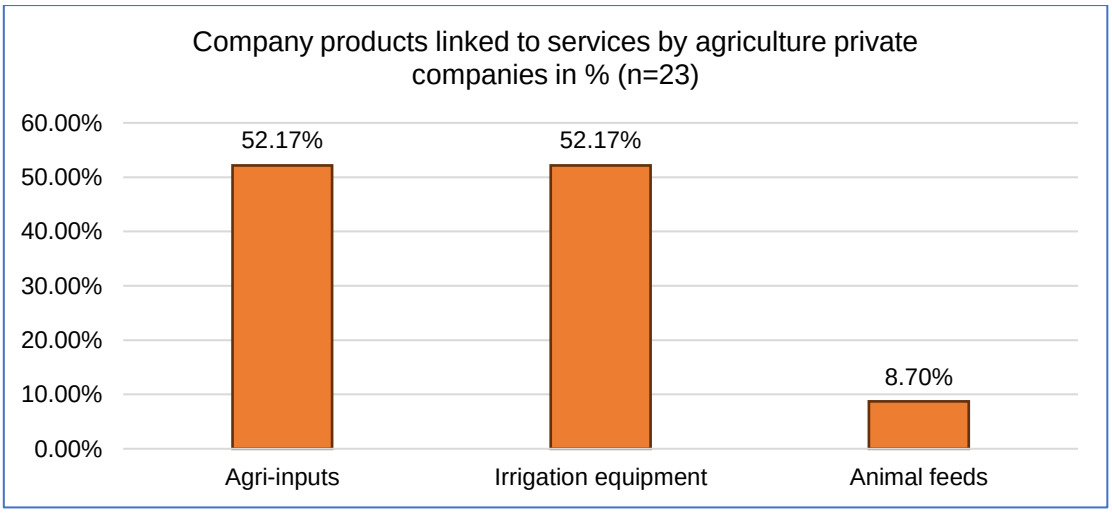


Figure 4: Embedded service offered by private agriculture companies

Figure 5 shows that digital payment is the most widely used tool among input/output buyers at 34.48% (n=10), followed by SMS alerts (17.24%, n=5) and mobile apps (10.34%, n=3). This suggests a preference for transactional digital tools over informational or app-based platforms, possibly due to ease of use or infrastructure limitations. The low adoption of mobile apps indicates potential for growth in digital agricultural services.

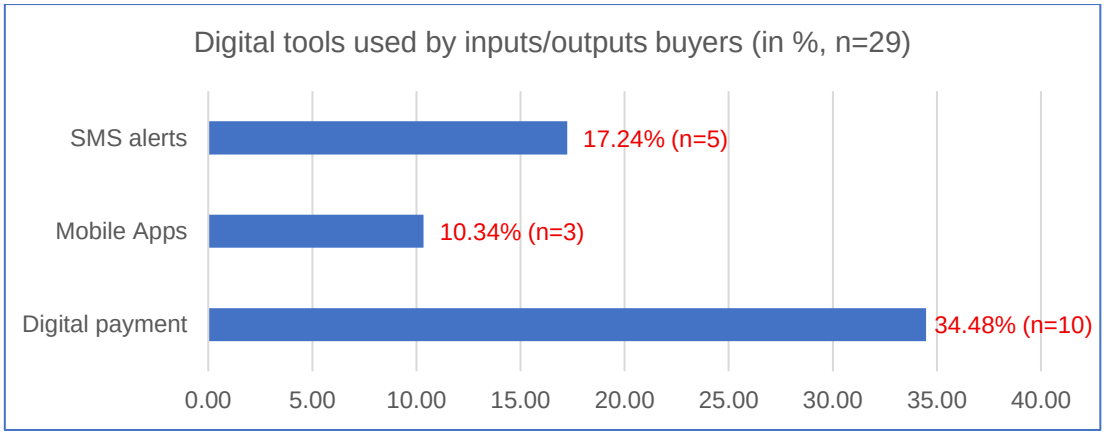


Figure 5: Digital tools used by inputs/outputs buyers

3.3.1.3 Digital service providers, NGOs/CBOs and individual

Digital service providers (n=5) dominate in financial services (100% offer digital lending and business plans) and technology adoption (100% use web platforms, 80% mobile apps, and 60% Artificial Intelligent [AI]/ Machine Learning [ML]/ Internet of Things [IoT]). However, only 40% provide agriculture input services, indicating a stronger fintech (financial technology) focus than direct agri-support. Revenue models are diversified, with commission-based (100%) and pay-per-user (80%) being most common, suggesting scalability is prioritized over subscriptions (20%).

NGOs/CBOs (n=6) primarily focus on crop production (100%) and market linkages (60%), but digital tool adoption is low (only 20% use them in spot trainings). This highlights a reliance on traditional extension methods despite climate-smart agriculture (40%) and agroforestry (40%) being emerging focus areas. Meanwhile, individual service providers (n=11) largely operate on a fee-for-service model (90.91%), with on-farm visits (90.91%) and phone consultations (81.82%) being the primary delivery methods. However, digital platform usage (e.g., WhatsApp, Viber) is only 27.27%, highlighting a reliance on direct interaction over tech-enabled solutions (Table 6).

Table 6: Approaches and service provision business models by digital, NGOs/CBOs and individual service providers

Variables	Frequency	Percentage
a. Digital service providers (n=5)		
Financial services by digital service providers		
Digital lending	5	100%
Business plan	5	100%
Insurance products	3	60%
Agriculture Input Services (Yes)	2	40%
Agribusinesses onboarded (Yes)	4	80%
Revenue model		
Subscription-based	1	20%
Premium	3	60%
Commission-base	5	100%
Government/ NGO-funded	3	60%
Pay-per-User	4	80%
Technology used		
SMS/USSD	2	40%
Mobile Apps	4	80%
Web Platforms	5	100%
Artificial Intelligent (AI)/Machine Learning (ML) Models	3	60%
Social media (Facebook, TikTok, Instagram)	1	20%

Variables	Frequency	Percentage
YouTube	1	20%
Internet on Things (IoT) Devices	3	60%
b. NGOs/CBOs (n= 6)		
Digital tools use		
In spot trainings (Yes)	1	20%
Primary focus area		
Crop production	5	100%
Market linkage	3	60%
Climate smart agriculture (CSA)	2	40%
Farming and farmer policy advisory	1	20%
Agro-forestry	2	40%
Livestock and Dairy	1	20%
Training delivery to farmers	1	20%
c. Individual service providers (n=11)		
Fee-for-services		
Yes	10	90.91%
No	1	9.09%
Service delivery methods by individual		
On-farm visits	10	90.91%
Group training	6	54.55%
Phone consultation	9	81.82%
Digital platforms (WhatsApp, Viber etc.)	3	27.27%

Source: Field survey (11-25 June, 2025).

3.3.2 Capacity

The private sector agricultural service providers have demonstrated varying types of capacities, including physical infrastructure (offices, storage, consultation spaces), technological capacity (digital tools, AI-based advisory, mobile services), human resources (technical staff, field workers), and financial capacity (turnover, investment in extension). Agro-vets excel in consultation and mobile services, cooperatives in community training, private companies in digital and mobile advisory, while digital platforms offer precision farming solutions. NGOs and individuals prioritize training and on-farm support. These capacity types shape service quality, reach, and scalability, highlighting gaps and opportunities for targeted strengthening across providers.

3.3.2.1 Physical and technological capacity of agro-vets

Agro-vet capacities in Koshi Province vary notably across corridors. In Koshi, most agro-vets (88%) provide consultation spaces, but mobile services and training are limited. Mechi excels in mobile services, input delivery (around 80%), storage facilities (92.6%), and farmer training (over 50%), yet consultation spaces are minimal (3.7%). Sagarmatha shows strong outreach through mobile services (84%) but has limited consultation spaces (10%) and diagnostic tools. Across all regions, technical capacities, including diagnostic tools, are scarce. These differences indicate the need for targeted investment to enhance infrastructure, training, and technical services tailored to local demands (Table 7).

Table 7: Physical and technical capacities of agro-vets by corridors

Variables	Corridors			Total (n=162)	Chi square (χ^2)
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)		
Physical infrastructures					
Availability of consultation space (Yes)	2 (3.7%)	51 (87.9%)	5 (10.0%)	58 (35.8%)	107.262***
Availability of storage capacity/facility (Yes)	50 (92.6%)	27 (46.6%)	32 (64.0%)	109 (67.3%)	27.283***

Variables	Corridors			Total (n=162)	Chi square (x^2)
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)		
Availability of demonstration area (Yes)	24 (44.4%)	22 (37.9%)	1 (2.0%)	47 (29.0%)	26.199***
Availability of mobile service unit (Yes)	43 (79.6%)	6 (10.3%)	42 (84.0%)	91 (56.2%)	77.274***
Types of mobile services					
Distance service (Yes)	43 (79.6%)	6 (10.3%)	42 (84.0%)	91 (56.2%)	77.274***
Product/Input deliver (Yes)	34 (63.0%)	5 (8.6%)	38 (76.0%)	77 (47.5%)	56.617***
Farm visit (Yes)	35 (64.8%)	1 (1.7%)	34 (68.0%)	70 (43.2%)	63.473***
Technical capacities					
Diagnostic tools available (Yes=1)	2 (3.7%)	1 (1.7%)	1 (2.0%)	4 (2.5%)	0.521
Types of diagnostic tools					
Soil Test (Yes)	1 (1.9%)	1 (1.7%)	0 (0.0%)	2 (1.2%)	
Moisture Test (Yes)	0 (0.0%)	0 (0.0%)	1 (2.0%)	1 (0.6%)	
Soil, Moisture Tests and Plant Clinic (Yes)	0 (0.0%)	0 (0.0%)	1 (2.0%)	1 (0.6%)	
Digital record keeping (Yes)	1 (1.9%)	1 (1.7%)	0 (0.0%)	2 (1.2%)	18.132***
Training providing facilities to the farmers (Yes)	30 (55.6%)	12 (20.7%)	12 (24.0%)	54 (33.3%)	18.132***

Notes: ***indicates significant at 1% level. Source: Field survey (11-25 June, 2025).

3.3.2.2 Physical, technology and product capacity of Agri-cooperatives, Agri-companies and Buyers

Agriculture cooperatives have strong infrastructure, with most having offices (97%) and storage (69%), but provide limited support to farmers, as few maintain demo plots (31%), processing units (28%), or training centers (20%). Private agriculture companies reach more farmers through mobile services and demo farms (52%) but lack technical support like labs or training facilities. Input/output buyers handle high volumes of produce but show low digital adoption, with only 35% accepting digital payments and fewer using mobile apps (10%) or SMS alerts (17%). Strengthening technical support, training facilities, and digital tools across these actors is essential to improve agricultural service delivery effectively (refer Table 8).

Table 8: Physical and technical capacity and current business services from agriculture cooperatives, companies and input/output buyers

Variables	Frequency	Percentage
Agriculture cooperatives (n=29)		
Availability of office space (Yes)	28	96.6%
Availability of storage facilities (Yes)	20	69.0%
Availability of demonstration area/plots (Yes)	9	31.0%
Training facilities availability (Yes)	19	19.6%
Availability of processing unit (Yes)	8	27.6%
Agriculture companies (n= 23)		
Availability of demonstration farm (Yes)	12	52.2%
Training facilities availability through training center (Yes)	4	17.3%
Availability of mobile extension units (Yes)	12	52.12%

Variables	Frequency	Percentage
Availability of laboratory facilities (Yes)	0	0.0%
Inputs/Outputs buyers (n=29)		
Digital tools used in business		
Digital payment	10	34.5%
Mobile Apps	3	10.3%
SMS alerts	5	17.2%
Business transaction and linkage	**Mean**	**Ranges**
Seed sold (quintal/year)	0.93	0-20
Fertilizers (quintal/year)	34.48	0-500
Pesticides (quintal/year)	10.34	0-200
Cereals (quintal/year)	439.14	0-12000
Vegetables (quintal/year)	25086.62	0-292000
Fruits (quintal/year)	1826.97	0-35000
Livestock (quintal/year)	1.21	0-30
Numbers of retailers/suppliers' contract	122	0-500

Source: Field survey (11-25 June, 2025).

3.3.2.3 Physical, technological capacity of digital service providers

Digital service providers are playing an increasingly important role in precision agriculture and agricultural extension through technology-driven solutions. All five surveyed platforms offer advisory services, while 80% provide market linkage support, 60% facilitate logistics, and 40% feature e-marketplaces and price alerts, highlighting their role in farmer connectivity and supply chain facilitation. Some platforms, such as DV Excellus Pvt. Ltd. (Kheti Karja), offer integrated solutions with AI-based crop advice, pest and disease alerts, weather forecasting, fertilizer calculators, and farmer record-keeping, while others provide specialized services like digital subsidy tracking. Despite varying operational maturity, these innovations show strong potential to enhance extension services, improve farmer decision-making, and bridge knowledge gaps, particularly in remote farming communities (refer Table 9 and Figure 6).

Table 9: Physical and technological capacity to digital service providers in Koshi province

Digital service providers (n=5)	Frequency	Percentage
Farm advisory services		
AI-based crop advice, Pest/ disease alerts	1	20.0%
AI-based crop advice, Pest/ disease alerts, Weather forecasts	1	20.0%
Pest/ disease alerts, Subsidy records management, One-library system	1	20.0%
AI-based crop advice, Pest/ disease alerts, Weather forecasts, Fertilizer calculator, Farmer's record keeping	1	20.0%
Not Applicable	1	20.0%
Market linkage platforms		
E-market places	2	40.0%
Market linkage services	4	80.0%
Advisory Services	5	100.0%
Price alerts	2	40.0%
Logistics support	3	60.0%
Agriculture Input Services (Yes)	2	40.00%
Agribusinesses onboarded (Yes)	4	80.00%

Source: Field survey (11-25 June, 2025).

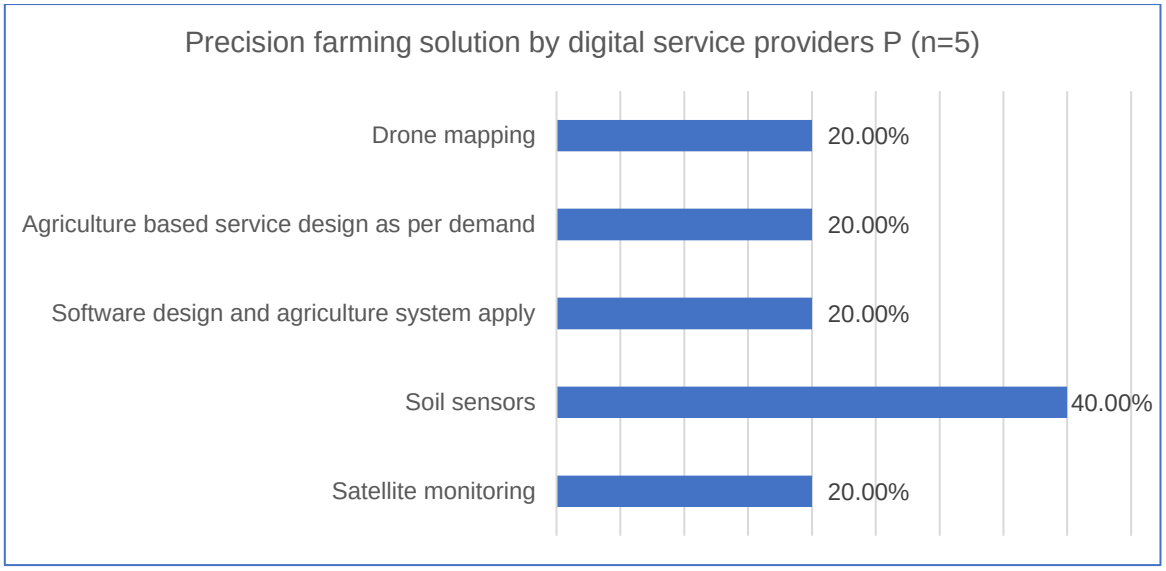


Figure 6: Precision farming solution provided by digital service providers

3.3.2.4 Physical and technical capacity of NGOs/CBOs

NGOs and community-based organizations (CBOs) contribute to agricultural extension through diverse but small-scale approaches, combining conventional and innovative methods. Key strategies include demonstration farms (60%) and mobile advisory services (40%), while a few also implement Farmer Field Schools and rainwater harvesting (RWH) for irrigation. However, digital adoption remains minimal, with only one organization using tech-based tools. Their localized impact is valuable but limited by scale, digital integration, and policy engagement highlighting the need for stronger partnerships with government and digital platforms to deliver more inclusive and climate-resilient agricultural services.

Table 10: Physical and technical capacity of NGOs/CBOs

NGOs/CBOs (n= 6)	Frequency	Percentage
Types of extension services		
Training program	5	100.0%
Demonstration farms	3	60.0%
Mobile advisory service	2	40.0%
Farmer Field School (FFS)	1	20.0%
Irrigation water management (RWH)	1	20.0%
Digital tools use		
Spot trainings	1	20.0%

Source: Field survey (11-25 June, 2025).

3.3.2.5 Physical and technical capacity of individual service providers

The 11 independents agricultural service providers show flexible and local ways of supporting farmers. All accept cash, and many also use digital payments- about 64% take bank transfers and 55% use mobile wallets like eSewa. This shows growing use of formal financial services. However, their use of digital tools is still low. Only 27% use farming apps, and less than 10% keep digital records or use online booking. This limits their ability to grow and offer better services. With better digital training and access to tools, these providers could improve their reach and support for rural farmers (refer Table 11).

Table 11: Physical and technical capacity of individual/independent service providers

Individual service providers (n=11)	Frequency	Percentage
Digital tools used		
Digital record keeping	1	9.09%
Agriculture apps	3	27.27%
Online scheduling	1	9.09%

Individual service providers (n=11)	Frequency	Percentage
Payment method accepted		
Cash	11	100.00
Mobile Payment	6	54.55
Bank Transfer	7	63.64

Source: Field survey (11-25 June, 2025).

3.3.2.6 Human resources capacity of private sectors

In Koshi Province, different private actors support agriculture, but their ability to deliver services varies. Agro-vets are common and open for long hours (almost 11 hours daily), but they have few staff (just about 2 people), including less than one vet or agriculture technician on average. Most of their work is handled by sales staff. Agriculture cooperatives serve many members (over 400), mostly women and youth, but they also have very few staff (around 2), which makes it hard to manage services well. Private agriculture companies have better staffing (about 6 people), including field and technical workers, but very few research staff, so they focus more on services than innovation. Digital service providers don't rely on traditional staff but reach many commercial and semi-commercial farmers over 42,000 in Koshi alone showing strong potential if internet and digital skills improve. Input and output traders manage over 120 business contracts, making them key players in supply chains. NGOs reach around 8,700 farmers each year through community-level work. Overall, agro-vets and cooperatives are essential but need more staff. Supporting them, while also expanding digital tools and private company services, can improve agriculture extension and farmer support across the province (Table 12).

Table 12: Human resources capacity of private sectors

Private actors	Mean
Agro-vets	
Total employees	2.06
Number of veterinarians	0.85
Number of Agriculture Technician	0.51
Number of sales staffs	1.75
Operation hours per day	10.93
Agriculture Cooperatives	
Total members	412.7
Female members	294.8
Youth member (<35 years age)	78.5
Youth Members (>35 years age)	182.1
Total staff	2.3
Private Agriculture Companies	
Total employee	6.09
Technical staff	2.00
Extension field staff	1.83
Research staff	0.17
Digital Service Providers	
Number of total active users	2,8027.6
Number of active users in Koshi Province	5,279.6
Number of farmers registered	42,681.6
Inputs/Outputs Buyers (Wholesalers/Traders)	
Number of retailers and suppliers' contract	121.7
NGOs/CBOs	
Number of farmers reach annually	8,722.3

Source: Field survey (11-25 June, 2025).

3.3.2.7 Financial capacity of the private sectors

Digital Agricultural Service Providers reported the highest annual turnover (NPR[2] 58.78 million) and profit (NPR 6.77 million), reflecting strong market demand and high-value services, although their investment in extension activities wasn't specified. Private agriculture companies also showed robust financial performance, with an average turnover of NPR 18.96 million and profit of NRP 1.84 million, but their direct investment in extension was relatively low (NPR 263,044), suggesting profit-driven operations with limited reinvestment into service delivery. In contrast, agriculture cooperatives, despite a lower turnover (NPR 1.51 million), allocated the highest investment in extension (NPR 4.94 million), indicating their commitment to grassroots capacity-building and community services (Table 13 7).

Overall, the average annual turnover across all surveyed service providers was NPR 5.99 million, with profits averaging NPR 567,910 and extension investment at NPR 747,913. However, this average is skewed by the high figures of a few digital and private actors. The F-values for turnover, profit, and investment are statistically significant, highlighting substantial financial variation among different service provider types. This suggests that while some private actors have strong financial footing, only a few (mainly cooperatives) are prioritizing reinvestment in agriculture extension, revealing gaps in sustainability and inclusivity of service delivery.

Table 13: Business turnover, profit and investment in agriculture extension by private sectors

Types of Service Providers	Annual Turnover last year (NPR)	Annual profit last year (NPR)	Total investment in agriculture extension in last year (NPR)
Agro-vet shops (n=165)	3,566,198	339,009	31,019
Agriculture Cooperatives (n-29)	1,509,272	75,464	4,939,413
Private Agriculture Companies (n-23)	18,959,565	1,836,522	263,044
Digital Agriculture Service Providers (n=5)	58,780,175	6,772,164	
Inputs Outputs Buyers (Wholesalers/Processor) (n=29)	5,883,534	419,311	
Independent/Individual Service Providers (n=11)	1,000,909	156,364	
Total Average (n=259)	5,994,290	567,910	747,913
F-value[3]	18.695***	13.964***	15.318***

Notes: ***indicates significant at 1% level. Source: Field survey (11-25 June, 2025).

3.3.3 Incentives for Providing Extension Services to the Individual

The data reveals considerable variability in pricing structures among individual agricultural service providers, reflecting diverse service models and client needs. The highest mean compensation comes from seasonal contracts (NPR 9,333), suggesting farmers value long-term, comprehensive support, while hourly rates (NPR 1,863) and package deals (NPR 7,410) offer flexible mid-range options. Notably, product-based rates show the widest range (NPR 5-3,000), indicating highly contextual pricing, likely tied to input types or outcomes. The absence of standardized pricing highlights both opportunities for premium specialized services and potential accessibility barriers for smallholders. These findings underscore the need for transparent, tiered pricing models to balance provider incentives with farmer affordability in Koshi's extension ecosystem (Table 14).

Table 14: Incentives and service fee offered by individual service providers

Incentive and fee scheme offered by individual service providers	Mean	Ranges
Price structure for per hour (NPR)	1,862.50	750-3,000
Price structure per package (NPR)	7,410.00	250-15,000

[2] 1 US Dollar = NPR 137

[3] The F-value is a statistical measure used in analysis of variance (ANOVA) to compare the variation between group means with the variation within groups. A higher F-value suggests that the differences between group means are unlikely to have occurred by chance, indicating statistical significance.

Incentive and fee scheme offered by individual service providers	Mean	Ranges
Price structure per seasonal contract (NPR)	9,333.33	3,000-2,000
Price structure per product-based rate (NPR)	1,255.00	5-3,000

Source: Field survey (11-25 June, 2025).

3.3.4 Service Delivery Mechanism

In Koshi Province, almost all agro-vets (99.4%) provide services inside their shops, making this the most common way farmers get help. However, more active outreach like field visits and mobile clinics vary by region. Koshi and Sagarmatha have more field visits (about 70%) and mobile clinics, especially Sagarmatha (68%), while Mechi has fewer outreach activities. No agro-vets use digital platforms, showing a big gap in modern service methods. This uneven service delivery means farmers in some areas get less support. To fix this, more focus is needed to improve field visits, mobile clinics, and digital services, especially in Mechi, to make farming help fair and accessible across all regions (refer Table 15).

Table 15: Primary services delivery mechanism by agro-vets

Services delivery mechanism by agro-vets	Corridors			Total (n=162)	Chi square
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)		
In-shop consultation (Yes)	53 (98.1%)	58 (100%)	50 (100%)	161 (99.4%)	2.012
Field visits (Yes)	16 (29.6%)	42 (72.4%)	34 (68.0%)	92 (56.8%)	24.563***
Mobile clinic (Yes)	1 (1.9%)	6 (10.3%)	34 (68.0%)	41 (25.3%)	70.795***
Digital platforms (Yes)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	

Notes: ***indicates significant at 1% level. Source: Field survey (11-25 June, 2025).

Cooperatives focus more on community work, with 76% doing group training and 62% visiting farms. This helps farmers learn and get support directly. Private agribusiness companies, on the other hand, use more online and remote services like call centers (26%) and online platforms (17%), which save costs and can reach more people. However, cooperatives use these digital tools less, showing a gap in technology use. Companies don't offer mobile advice, so they may not connect directly with farmers. Overall, cooperatives and companies have different strengths. Combining cooperatives' community work with companies' technology could create better, fairer farming support for everyone (Table 16).

Table 16: Primary services delivery mechanism by agriculture cooperatives and companies

Services delivery mechanism	Agri-Cooperatives (n=29)	Agri-Companies (n=23)	Total (n=52)	Chi square
Field-visits	18 (62.1%)	11 (47.8%)	29 (55.8%)	1.055
Group trainings	22 (75.9%)	9 (39.1%)	31 (59.6%)	7.188***
Demonstrations plots	9 (31.0%)	9 (39.1%)	18 (34.6%)	0.371
Mobile advisory	5 (17.2%)	0 (0.0%)	5 (9.6%)	4.387**
Digital platform use	1 (3.4%)	4 (17.4%)	5 (9.6%)	2.869*
Chemical fertilizers distribution	1 (3.4%)	0 (0.0%)	1 (1.9%)	0.809
Call center	0 (0.0%)	6 (26.1%)	6 (11.5%)	8.552***

Notes: ***, ** and *indicate significant at 1%, 5% and 10% levels. Source: Field survey (11-25 June, 2025).

In Koshi Province, non-traditional private actors provide a mix of agricultural services, each with unique strengths and limitations. Digital service providers, though few, offer advanced tools like digital loans and business planning (100%), along with some AI-based crop advice and weather alerts. However, their reach is still limited. Input/output buyers focus mainly on spot purchases (100%) and rarely engage in long-term contracts, showing a short-term business approach with little digital engagement. NGOs and community-based organizations prioritize farmer training (100%) and demonstration farms (60%) but use mobile and digital tools less (40% and 20%). Individual service providers are strong in direct support, offering on-farm visits (90.9%) and phone advice (81.8%), though they too lack digital adoption (27.3%). Overall, the system is fragmented, some actors are highly specialized and

technology-driven but have limited reach, while others offer broad support with minimal technology. Better collaboration and digital training could improve services for farmers across the province (Table 17).

Table 17: Primary services delivery mechanism by digital, buyers, NGOs/CBOs and individual service providers

Private actors	Frequency	Percentage
Digital Service Providers (n=5)		
Digital lending	5	100%
Business plan	5	100%
Insurance products	3	60%
AI-based crop advice, Pest/ disease alerts	1	20%
AI-based crop advice, Pest/ disease alerts, Weather forecasts	1	20%
Pest/ disease alerts, Subsidy records management, One-library system	1	20%
AI-based crop advice, Pest/ disease alerts, Weather forecasts, Fertilizer calculator, Farmer's record keeping	1	20%
Inputs/Outputs Buyers (n=29)		
Farmer's engagement models		
Spot purchases	29	100%
Collection centers	10	34.5%
Contract farming	2	6.9%
Forward agreements	6	20.7%
NGOs/CBOs (n=5)		
Training program	5	100%
Demonstration farms	3	60%
Mobile advisory service	2	40%
Farmer Field School (FFS)	1	20%
Irrigation water management and water recycling (RWH)	1	20%
Individuals (n=11)		
On-farm visits	10	90.9%
Group training	6	54.5%
Phone consultation	9	81.8%
Digital platforms (WhatsApp, Viber etc.)	3	27.3%

Source: Field survey (11-25 June, 2025).

3.4 Mapping Reach and Impact of Private Sector Actors in Agriculture Extension Service Delivery

3.4.1 Current geographic area covered

A mapping of 265 private agricultural extension service providers in Koshi Province shows that most operate only at local levels (Table 18). About 39% work within a single municipality, and 22% cover a whole district. Agro-vets, the largest group, mostly serve local markets, while agriculture cooperatives are even more focused locally while nearly 76% operate only within their municipalities. In contrast, 43.5% of private agriculture companies work nationally, showing they have more resources and wider networks. Though only five in number, 80% of digital service providers cover the entire province, highlighting the wide reach of technology.

Input/output buyers and individual providers show mixed patterns. While some buyers serve national or even international markets, most are spread across districts and corridors. Individual service providers mostly serve small areas like wards or municipalities. They have close links with farmers but lack scale and support to expand.

Table 18: Capacity of current geographic area covered by private sector service providers types

Service Coverage	Agro-vets (n=126)	Cooperatives (n=29)	Companies (n=29)	Digital (n=5)	Buyers (n=29)	NGOs (n=6)	Individual (n=11)	Overall (n=265)	Chi square-value
Within Ward	3 (1.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (27.3%)	6 (2.3%)	162.447***
Only within Municipality	69 (42.5%)	22 (75.9%)	1 (4.3%)	0 (0.0%)	5 (6.9%)	2 (33.3%)	4 (36.4%)	103 (38.9%)	
Within District	40 (24.7%)	1 (3.4%)	3 (13.0%)	0 (0.0%)	9 (31.0%)	2 (33.3%)	2 (18.2%)	57 (21.5%)	
Within Corridor	32 (19.8%)	4 (13.8%)	5 (21.7%)	1 (20.0%)	8 (27.6%)	2 (33.3%)	0 (0.0%)	50 (18.9%)	
Within Koshi Province	12 (7.4%)	2 (6.9%)	4 (17.4%)	4 (80.0%)	3 (10.3%)	2 (33.3%)	1 (9.1%)	28 (10.6%)	
All Over the Country	6 (3.7%)	0 (0.0%)	10 (43.5%)	0 (0.0%)	2 (6.9%)	0 (0.0%)	1 (9.1%)	19 (7.2%)	
International level	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (6.9%)	0 (0.0%)	0 (0.0%)	2 (0.8%)	

Note: ***indicates significant at 1% level. Source: Field survey (11-25 June, 2025).

3.4.2 Types of farmers served

The analysis shows agro-vets support many farmers (66.7% of smallholders and 46.9% of commercial farms), making them important for both small and large farms. But their support to women-led households (46.9%), youth (43.2%), and marginalized groups (35.2%) is limited. In contrast, agriculture cooperatives and NGOs are more inclusive. Agriculture cooperatives reach 86.2% of smallholders and 65.5% of women-led homes, while NGOs support all women-led households and many youths and marginalized groups. These differences are statistically meaningful. The findings suggest that while agro-vets are common, they need to better serve vulnerable groups. More support for inclusive providers is needed for fair access to services (Table 19).

Table 19: Type of farmers served by private sector service providers types

Types of farmers reached	Ago-vets (n=165)	Agriculture Cooperatives (n=29)	NGOs/CBOs (n=6)	Overall (n=200)	Chi-square value
Smallholder farmers (Yes)	108 (66.7%)	25 (86.2%)	5 (83.3%)	138 (70.1%)	4.997*
Commercial farm (Yes)	76 (46.9%)	10 (34.5%)	2 (33.3%)	88 (44.7%)	1.860
Women-led HHs (Yes)	76 (46.9%)	19 (65.5%)	6 (100.0%)	101 (51.3%)	9.289***
Youth farmers (Yes)	70 (43.2%)	16 (55.2%)	4 (66.7%)	90 (45.7%)	2.516
Marginalized communities (Yes)	57 (35.2%)	13 (44.8%)	4 (66.7%)	74 (37.6%)	3.210

Note: *** and * indicate significant at 1% and 10% levels, respectively. Source: Field survey (11-25 June, 2025).

3.4.3 Types of current services

3.4.3.1 Agro-vets

The Mechi and Sagarmatha corridors show strong outreach efforts, with many agro-vets offering home visits, delivery services, and distance support. In contrast, Koshi corridor performs very poorly, with very few such services. This shows a big gap in service access between regions, likely due to weak infrastructure or fewer resources in Koshi. Across all corridors, technical services are very weak. Almost no agro-vets use testing tools or digital records, and only a few offers farmer training. This highlights a serious lack of tools and skills. To improve services, more investment is needed in training, digital systems, and testing tools (Table 20).

Table 20: Types of services provided from agro-vets

Types of services provided by agro-vets	Corridors			Total (n=162)	Chi square (χ^2)
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)		
Types of mobile services					
Distance service (Yes)	43 (79.6%)	6 (10.3%)	42 (84.0%)	91 (56.2%)	77.274***
Product/Input deliver (Yes)	34 (63.0%)	5 (8.6%)	38 (76.0%)	77 (47.5%)	56.617***
Farm visit (Yes)	35 (64.8%)	1 (1.7%)	34 (68.0%)	70 (43.2%)	63.473***
Technical capacities					
Diagnostic tools available (Yes=1)	2 (3.7%)	1 (1.7%)	1 (2.0%)	4 (2.5%)	0.521
Types of diagnostic tools					
Soil Test (Yes)	1 (1.9%)	1 (1.7%)	0 (0.0%)	2 (1.2%)	
Moisture Test (Yes)	0 (0.0%)	0 (0.0%)	1 (2.0%)	1 (0.6%)	
Soil, Moisture Tests and Plant Clinic (Yes)	0 (0.0%)	0 (0.0%)	1 (2.0%)	1 (0.6%)	
Digital record keeping (Yes)	1 (1.9%)	1 (1.7%)	0 (0.0%)	2 (1.2%)	18.132***
Training providing facilities to the farmers (Yes)	30 (55.6%)	12 (20.7%)	12 (24.0%)	54 (33.3%)	18.132***

Notes: ***indicates significant at 1% level. Source: Field survey (11-25 June, 2025).

3.4.3.2 Agriculture cooperatives, private companies and inputs/outputs buyers

Agriculture cooperatives and private agriculture companies mostly give crop advice (62.1% and 56.5%), but input/output buyers do not, showing clear differences in their roles. Only cooperatives offer livestock advice (17.2%). Cooperatives and companies also help connect farmers to markets, while buyers focus more on buying products and not helping producers. Buyers are best at giving market information (89.7%) and logistics help (55.2%), which the others do not offer. Companies provide more help with pest control and post-harvest services (Table 21). These patterns show that each actor has their own strengths: cooperatives focus on farmer support and market access, companies on technical help, and buyers on market and transport services. This clear role division means better teamwork and policies are needed to combine these strengths and improve farming support systems in the region.

Table 21: Types of services provided by agriculture cooperatives, companies and inputs/outputs buyers

Currents service offered	Cooperatives (n=29)	Companies (n=23)	Inputs/Output Buyers (n=29)	Total (n=81)	Chi square
Crop production advisory (Yes)	18 (62.1%)	13 (56.5%)	0 (0.0%)	31 (38.3%)	28.174***
Livestock management (Yes)	5 (17.2%)	0 (0.0%)	0 (0.0%)	5 (6.2%)	9.555***
Soil health management (Yes)	4 (13.8%)	2 (8.7%)	0 (0.0%)	6 (7.4%)	4.100
Irrigation technology (Yes)	5 (17.2%)	6 (26.1%)	0 (0.0%)	11 (13.6%)	7.954**
Post-harvest management (Yes)	9 (31.0%)	10 (43.5%)	10 (34.5%)	29 (35.8%)	0.898
Diseases and pest diagnostic (Yes)	0 (0.0%)	4 (17.4%)	0 (0.0%)	4 (4.9%)	10.611***
Quality products training (Yes)	0 (0.0%)	0 (0.0%)	3 (10.3%)	3 (3.7%)	5.586*
Inputs use guidance (Yes)	0 (0.0%)	0 (0.0%)	2 (6.9%)	2 (2.5%)	3.677
Market linkage (Yes)	16 (55.2%)	10 (43.5%)	0 (0.0%)	26 (32.1%)	22.159***
Market information (Yes)	17 (24.1%)	15 (62.2%)	26 (89.7%)	48 (59.3%)	26.253***
Logistic supports (Yes)	0 (0.0%)	0 (0.0%)	16 (55.2%)	16 (19.8%)	35.752***

Notes: ***, *** and * indicate significant at 1%, 5% and 10% levels, respectively. Source: Field survey (11-25 June, 2025).

3.4.3.3 Digital service providers

Of the five digital platforms surveyed, 100% offer advisory services, and 80% offer market linkage solutions, and this depicts a great emphasis on information dissemination as well as farmer connectivity. On the feature of market-specific functionality, two players (40%) have e-marketplaces, and similarly, the same proportion has price alerts. Additionally, 60% of them

provide logistics support, suggesting that these sites are facilitating supply chain functions beyond advisory (Table 22). Overall, although digital agriculture is just emerging in Koshi Province, the presence of advanced precision farming technology holds favorable prospects for scaling up. With targeted support and increased outreach to farmers, such online tools can significantly improve privately led extension and bridge knowledge gaps in remote farming communities.

Table 22: Types of services provided by digital service providers

Types of services by digital service providers	Frequency	Percentage
Farm advisory services		
AI-based crop advice, Pest/ disease alerts	1	20.0%
AI-based crop advice, Pest/ disease alerts, Weather forecasts	1	20.0%
Pest/ disease alerts, Subsidy records management, One-library system	1	20.0%
AI-based crop advice, Pest/ disease alerts, Weather forecasts, Fertilizer calculator, Farmer's record keeping	1	20.0%
Not Applicable	1	20.0%
Market linkage platforms		
E-market places	2	40.0%
Market linkage services	4	80.0%
Advisory Services	5	100.0%
Price alerts	2	40.0%
Logistics support	3	60.0%
Agriculture Input Services (Yes)	2	40.00%
Agribusinesses onboarded (Yes)	4	80.00%

Source: Field survey (11-25 June, 2025).

3.4.3.4 NGOs/CBOs

All six surveyed organizations help farmers with crop production and offer training, mainly acting as knowledge providers. About 60% also help connect farmers to markets, and some support climate-smart farming, agroforestry, and livestock. However, only one group works on farmer policy advice or structured training programs, meaning their wider influence is limited. For teaching methods, most use demo farms (60%) and mobile advice (40%), while a few uses Farmer Field Schools (FFS) and promote rainwater harvesting. (RWH) Only one group uses digital tools, showing a big gap in using technology (Table 23). Overall, NGOs and CBOs help farmers through training and local advice, but their reach is limited. To make a bigger impact, they need more digital tools, better policy work, and stronger partnerships with government and other actors to support climate-friendly farming.

Table 23: Types of services provided by NGOs/CBOs in Koshi province

Types of services by NGOs/CBOs	Frequency	Percentage
Primary focus area		
Crop production	5	100.0%
Market linkage	3	60.0%
Climate smart agriculture (CSA)	2	40.0%
Farming and farmer policy advisory	1	20.0%
Agro-forestry	2	40.0%
Livestock and Dairy	1	20.0%
Training delivery to farmers	1	20.0%
Types of extension services		
Training program	5	100.0%
Demonstration farms	3	60.0%
Mobile advisory service	2	40.0%
Farmer Field School (FFS)	1	20.0%
Irrigation water management (RWH)	1	20.0%
Digital tools use		

Spot trainings	1	20.0%

Source: Field survey (11-25 June, 2025).

3.4.3.5 Individual service providers

The independent service providers in Koshi Province, though small in number (11), offer many farming services. All give crop advice, and most (72.7%) help with pest and disease control. Over half (54.5%) support market linkages and value chains. However, fewer offer farm tools (36.4%) or soil testing (27.3%). This shows they meet farmer needs but lack resources. Targeted support is needed to help them grow and offer more technical services.

Table 24: Types of agriculture extension services offered/provided by individual/independent service providers

Types of services by individual service providers	Frequency	Percentage
Crop advisory	11	100%
Soil testing	3	27.3%
Pest/diseases management	8	72.7%
Farm equipment services	4	36.4%
Value chain development and market linkage	6	54.5%

Source: Field survey (11-25 June, 2025).

3.4.4 Willingness to extend services and future plan

A significant proportion (67.6%) of private sector service providers in Koshi Province are willing to extend additional agricultural services, with notable variation across provider types. Private agriculture companies (91.3%) and digital service providers (80%) show the highest willingness, reflecting their proactive approach and business-driven motivation to scale services. Agro-vets, the largest group, also show strong interest (66%), indicating growing readiness to diversify services beyond input supply. In contrast, agriculture cooperatives (58.6%) and NGOs/CBOs (50%) exhibit comparatively lower willingness, possibly due to limited technical or financial capacity (Figure 7). These findings indicate strong potential for expanding private sector roles in agricultural extension, especially if enabling environments and tailored support are provided to less active actors like cooperatives and NGOs.

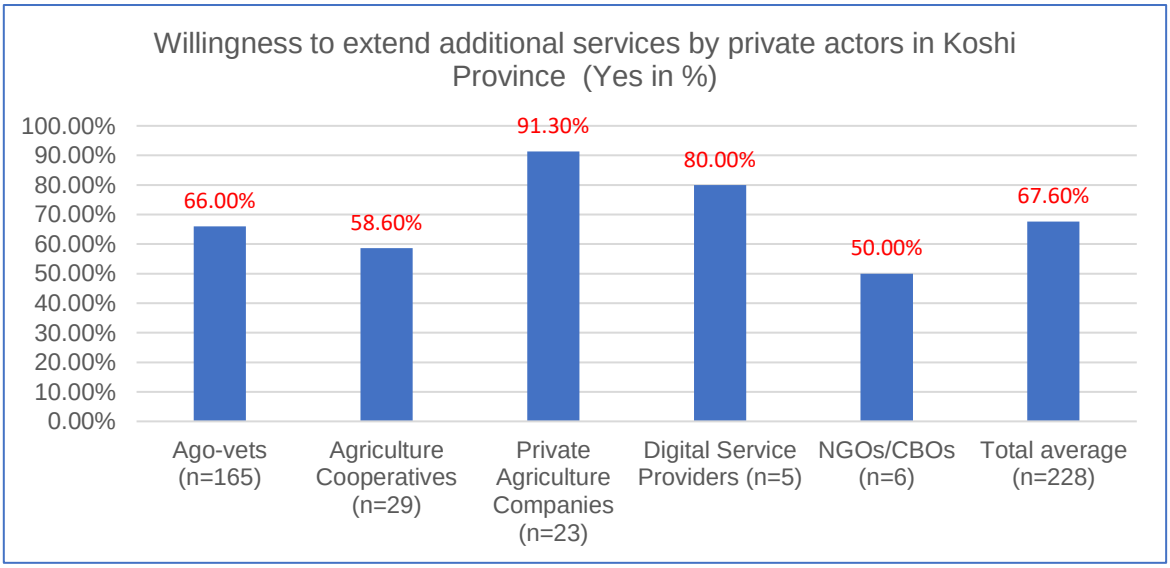


Figure 7: Willingness to extend additional services by private sector service providers

3.4.4.1 Agro-vets

Most of all agro-vets in Koshi Province are interested in offering extended farming services, but there are big differences between corridors. Overall, 66% said they want to expand, with the Koshi corridor showing the highest interest (82.8%), followed by Sagarmatha (68%) and

Mechi (46.3%). This shows agro-vets in Koshi may have better support or access to resources. Still, 34% are not ready to expand, likely due to limited skills or funds. Agro-vets in the Koshi corridor also plan to offer more new services, like mobile vet services, disease control, and farming advice. These plans are much fewer in Mechi and Sagarmatha. Services like climate-smart farming, irrigation help, and market links are still uncommon everywhere, likely due to poor demand or lack of support. Importantly, 72.8% of agro-vets can train farmers, and 85.2% are willing to work with the government or NGOs (Table 25). Mechi's agro-vets rate themselves highest in training skills, though they offer fewer services. This means focused training and support in Mechi and Sagarmatha could improve service delivery. Overall, agro-vets have good potential to grow, but need proper policy help, training, and partnerships for balanced progress across all regions.

Table 25: Willingness to extend and future plan of new services by agro-vets in surveyed corridors

Variables	Corridors			Total (n=162)	Chi square
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)		
Interest in providing additional agri. Extension services					
Yes	25 (46.3%)	48 (82.8%)	34 (68.0%)	107 (66.0%)	16.702***
No	29 (53.7%)	10 (17.2%)	16 (32.0%)	55 (34.0%)	
If yes, new services future planned (major future services plan)					
Soil testing services (Yes)	7.4%	15.5%	14.0%	12.3%	1.915
Mobile veterinary services (Yes)	0.0%	43.1%	2.0%	16.0%	48.722***
Plant diseases diagnostic (Yes)	9.3%	44.8%	36.0%	30.2%	17.709***
Vaccination camp (Livestock/poultry) [Yes]	0.0%	44.8%	0.0%	16.0%	55.065***
Inputs supply (seed, fertilizers, pesticides) [Yes]	22.2%	75.9%	18.0%	40.1%	47.592***
Demonstration of improved farming technologies (Yes)	9.3%	55.2%	20.0%	29.0%	32.479***
Climate smart agriculture (CSA) advisory (Yes)	1.9%	6.9%	4.0%	4.3%	1.723
Training and capacity building for farmers (Yes)	14.8%	29.3%	24.0%	22.8%	3.410
Irrigation support and advisory (Yes)	0.0%	10.3%	4.0%	4.9%	8.097**
Access to government services sponsored programs	22.2%	5.2%	50.0%	24.7%	27.946***
Market linkage and price information (Yes)	0.0%	5.2%	6.0%	3.7%	3.212
Post-harvest handling and storage advice (Yes)	0.0%	0.0%	14.0%	4.3%	16.727***
Farm mechanization on support (tools, machineries, rental, etc.) [Yes]	5.6%	6.9%	16.0%	9.3%	4.156
Organic farming advisory (Yes)	1.9%	5.2%	2.0%	3.1%	1.290
Capacity of Agro-vet to train farmers if there is demanded (Yes)	45 (83.3%)	36 (62.1%)	37 (74.0%)	118 (72.8%)	6.441**
Willing to partner with government/NGOs (Yes)	43 (79.6%)	47 (81.0%)	48 (96.0%)	138 (85.2%)	6.746**

Notes: ***, *** and * indicate significant at 1%, 5% and 10% levels, respectively. Source: Field survey (11-25 June, 2025).

3.4.4.2 Cooperatives, companies, digital service providers, NGOs/CBOs and individual

Various groups in Koshi Province are planning to improve farming services. Agricultural cooperatives have modest plans, with few aiming to expand market links, storage, or fertilizer sales. This suggests they need more support to grow. Private companies have stronger plans, focusing on funding, market connections, and better technical help for farmers. Digital service providers want to offer digital loans, insurance, and market services but face challenges like poor internet and trust. NGOs and community groups have the broadest plans, targeting many areas including climate-smart farming and policy work. Individual providers are eager to join government and private programs to expand their services. Overall, companies, NGOs, and digital groups lead in planning new services, while cooperatives and individuals need more help with skills and funding. Working together through public and private partnerships and improving training and finance access can help all actors better support farmers and boost agriculture across the province (Table 26).

Table 26: New service planned by cooperatives, companies, digital service providers, NGOs/CBOs and individual

Future new services plan by private sectors	Frequency	Percentage
Agriculture Cooperatives (n=29)		
Own land purchase	1	3.45%
Increase membership	3	10.3%
Processing and storage of agri-products (Pickle making, ice cream and fruits promotion, *Akabar* processing)	3	10.3%
Increase production volume of maize seed	1	3.5%
Paddy seeds production	1	3.5%
Market linkages for farmers and agri-products	5	17.2%
Training, plant disease diagnostic clinic	1	3.5%
Office construction	1	3.5%
Fertilizer distribution	2	6.9%
Establish cooperative shop	1	3.4%
Agri-loan investment	1	3.5%
Irrigation system management	1	3.5%
Private Agriculture Companies (n=23)		
Interest in new partnership and future plan		
Market linkage	18	78.3%
Fund opportunities for clients supports	22	95.6%
Technical support	14	60.9%
Digital Service Providers (n=5)		
Digital loan to farmers	1	20%
Crops and livestock insurance digitally	2	40%
Quality Agri-Input and market linkage expansion	2	40%
Agriculture based information technology	1	20%
NGOs/CBOs (n=6)		
Opportunities for Scaling Services		
Value chain development	6	100%
PPP Model	6	100%
Digital expansion	4	66.7%
Primary focus area		
Crop production	5	100%
Market linkage	3	60%
Climate smart agriculture (CSA)	2	40%
Farming and farmer policy advisory	1	20%
Agro-forestry	2	40%
Livestock and Dairy	1	20%
Training delivery to farmers	1	20%
Individual service providers (n=11)		
Interest to join for future service plan		
Service provider networks	9	81.8%

Future new services plan by private sectors	Frequency	Percentage
Government programs	11	100%
Private sector partnerships	11	100%

Source: Field survey (11-25 June, 2025).

3.4.5 Challenges and support needs

Agricultural service providers in Koshi Province face diverse challenges that constrain effective service delivery. Agro-vets struggle with low farmer purchasing power, high input costs, transportation issues, and limited technical staff, needing technical, business, and digital training. Cooperatives face finance, technical skill, governance, and market linkage gaps, requiring training, infrastructure, finance access, and digital tools. Private companies are hindered by input costs, infrastructure, licensing, and limited technical staff, seeking funding, market linkages, and technical support. Digital providers, input/output buyers, NGOs/CBOs, and individual providers share challenges of limited skills, poor infrastructure, policy constraints, and low farmer engagement, highlighting the need for capacity building, digitalization, finance, infrastructure, and partnerships to strengthen agricultural extension services province-wide. The following sections describe more in details.

3.4.5.1 Agro-vets

Low buying capacity of farmers is listed as the most referenced issue (59.3%), followed by transportation limitations (54.9%) and costly inputs (54.3%), which have a substantial impact on business sustainability. Transportation issues are particularly pronounced in the Mechi corridor (72.2%), indicating potential remoteness or infrastructural lack. Unavailability of inputs on time (37%) is another significant issue, indicating supply chain inefficiencies. Licensing delays (14.2%) and lack of technical personnel (20.4%) also undermine ease of operations, particularly for newer and smaller agro-vets. Trust-building with farmers and inaccessibility to digital platforms (16%) also constrain outreach and expansion of services, particularly in the startup period.

As far as support needs are concerned, a vast majority of the agro-vets (77.2%) indicated need for technical skill enhancement, underlining the need for continuous training in product knowledge and advisory skills. Computer/digital tools training was also requested by a big chunk (45.7%), indicating growing interest in the application of technology in inventory, outreach, or marketing. Business management skills were also perceived by 38.9% as another area of skills capacity building. The consistent demand in corridors, especially for technical and digital training signals a clear way to government and development partners to invest in skill development, digital access, and logistics infrastructure to enhance capacity and resilience of agro-vets to enhance agricultural service delivery in Koshi Province (Table 27).

Table 27: Challenges and support needs for agro-vets

Variables	Corridors			Total (n=162)
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)	
Major operational challenges				
Limited technical staff (Yes)	14 (25.9%)	11 (19.0%)	8 (16.0%)	33 (20.4%)
High Input cost (Yes)	32 (59.3%)	33 (56.9%)	23 (46.0%)	88 (54.3%)
Transportation limitations (Yes)	39 (72.2%)	28 (48.3%)	22 (44.0%)	89 (54.9%)
Poor farmers payment capacity (Yes)	34 (63.0%)	32 (55.2%)	30 (60.0%)	96 (59.3%)
Licensing problem (Delay in licensing process)	10 (18.5%)	9 (15.5%)	4 (8.0%)	23 (14.2%)
Timely unavailability of inputs/products for sale (Yes)	22 (40.7%)	23 (39.7%)	15 (30.0%)	60 (37.0%)
Little transaction and difficult to get trust at the beginning, poor access to digital platforms	10 (18.0%)	6 (10.6%)	10 (20.0$)	26 (16.0%)
Training and resources needs for agro-vets				
Technical skill upgrading	41 (75.9%)	46 (79.3%)	38 (76.0%)	125 (77.2%)

Business management	23 (42.6%)	23 (39.7%)	17 (34.0%)	63 (38.9%)
Digital tools training	28 (51.9%)	27 (46.6%)	19 (38.0%)	74 (45.7%)

Source: Field survey (11-25 June, 2025).

3.4.5.2 Agriculture Cooperatives

Agricultural cooperatives in Koshi Province face several structural and operational challenges that limit their ability to provide effective extension services. Limited access to finance and credit prevents them from purchasing inputs in bulk or acquiring necessary machinery. Many cooperatives also struggle with low technical skills among staff and members, reducing the quality of services offered to farmers. Weak market linkages further limit their bargaining power and competitiveness, making it difficult to secure fair prices for members. Additionally, issues in cooperative management, such as low transparency, poor accountability, and minimal use of digital tools that hinder both internal operations and service delivery to farmers (Figure 8).

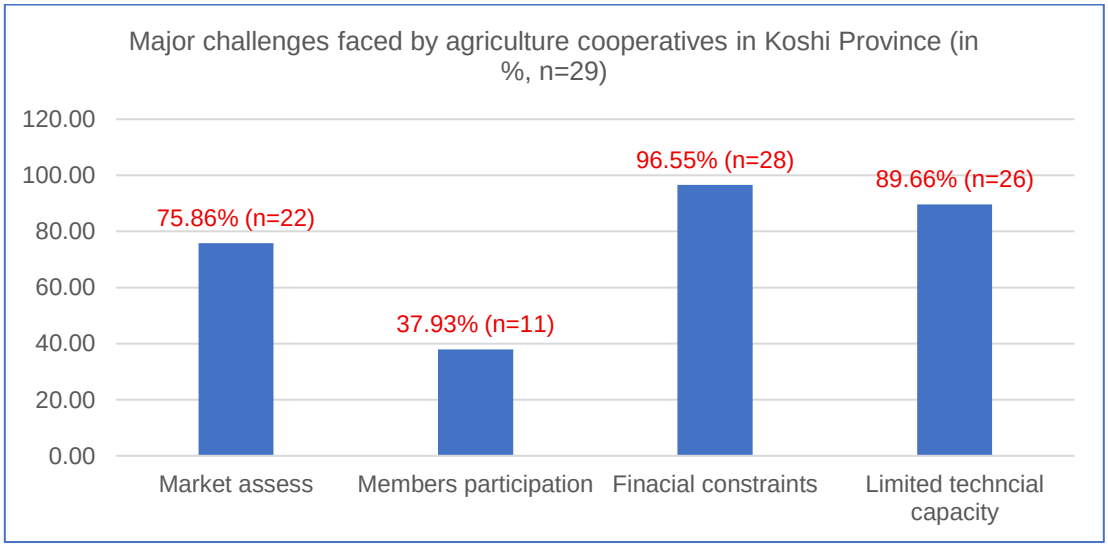


Figure 8: Major challenges faced by agriculture cooperatives

Despite these challenges, agricultural cooperatives have significant growth potential if given proper support. Key areas for support include technical training in agriculture, improving governance and business management skills, and better access to financial services such as revolving funds or soft loans. Most cooperatives also seek improved infrastructure (transport, storage, and processing facilities) to strengthen their role in the value chain. Digital tools for record-keeping, marketing, and coordination are increasingly important, especially for cooperatives in remote areas. Targeted programs and policies can help these cooperatives expand services, enhance farmer livelihoods, and contribute more effectively to inclusive agricultural development (Figure 9).

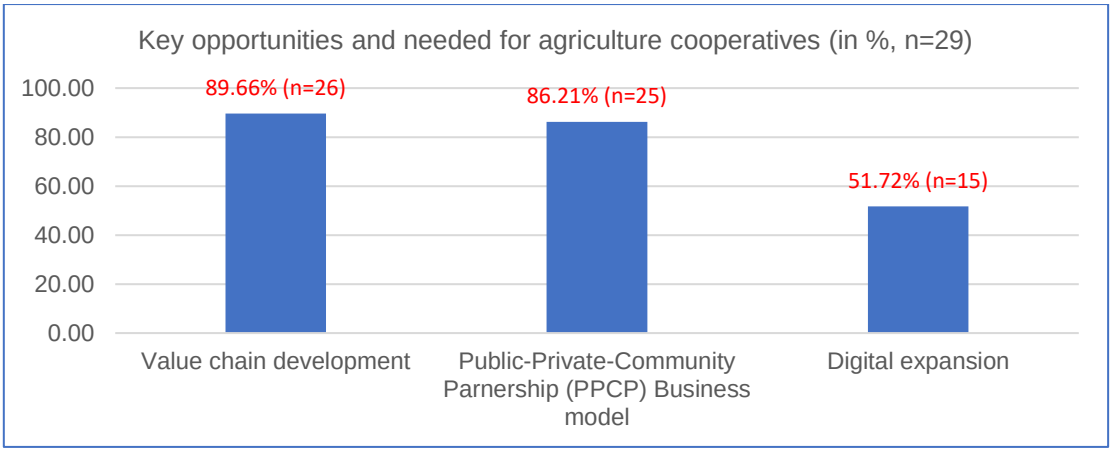


Figure 9: Key opportunities and needed for agriculture cooperatives

3.4.5.3 Private Agriculture Companies

High costs of agricultural inputs reduce profits and make products less affordable for farmers. Poor rural infrastructure and limited distribution channels make reaching remote markets difficult. Companies also struggle with delayed licenses and strict regulations, slowing their operations. A lack of skilled technical staff and limited access to finance further restrict growth and innovation. To overcome these issues, targeted support is needed, such as input subsidies, better rural infrastructure, simpler regulations, and improved access to funding. These measures can help companies work better and strengthen agriculture services in Koshi Province (Figure 10).

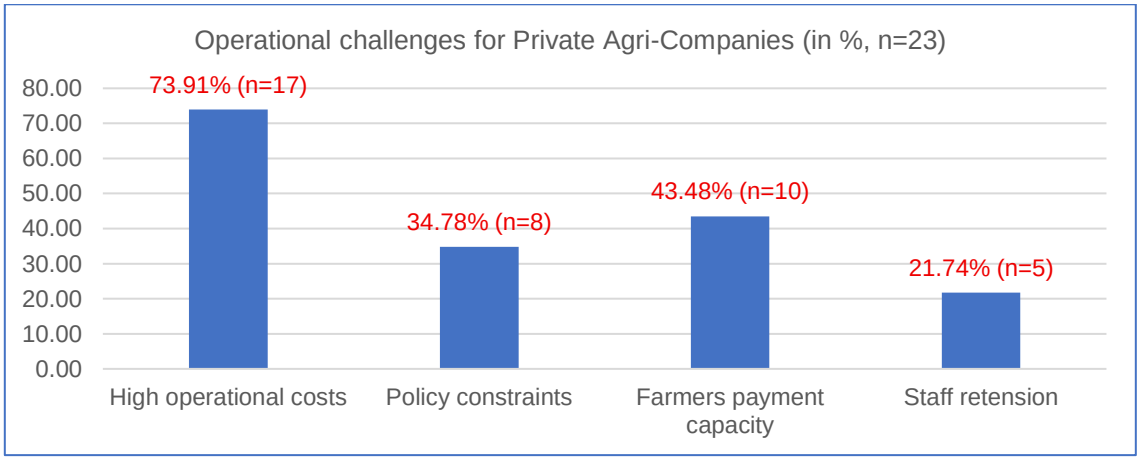


Figure 10: Operational challenges for Private Agriculture Companies

Most companies (95.65%) want funding opportunities to expand their services. About 78.26% seek market linkages to help farmers reach bigger markets and get better prices. Technical support is important too, with 60.87% focusing on improving knowledge and innovation. Overall, these companies are actively looking for collaborations that strengthen their finances, improve market access, and boost technical skills, which are essential for their growth and impact in Koshi's agricultural services.

Table 28: Interest in new partnership and future plan by private agriculture companies

Interest in new partnership by agri companies (n=23)	Frequency	Percentage
Market linkage	18	78.3%
Fund opportunities for clients supports	22	95.6%
Technical support	14	60.9%

3.4.5.4 Digital Service Providers, Inputs/Outputs Buyers, NGOs/CBOs and Individual

Digital service providers struggle with low digital skills and poor internet, plus high costs and policy limits. They need training, money, farmer connections, and better policies to grow. Input/output buyers face unstable prices, transport problems, and product quality issues. They want financial help, better storage, and market information to work well. NGOs and community groups, though active locally, lack resources, face policy problems, and have low farmer involvement. They ask for help with value chains, partnerships, and digital growth. Individual providers deal with seasonal work, farmers unwilling to pay, and limited markets. They need equipment, training, and networks to improve. Despite different problems, all actors share the need for money, infrastructure, skills, and supportive policies (Table 29). Working together through partnerships can help strengthen the agriculture support system across Koshi Province.

Table 29: Challenges and support needs for digital service providers, inputs/outputs buyers, NGOs/CBOs and individual

Challenges and support needs	Frequency	Percentage
Digital service providers (n=5)		
Major challenges		
Low digital literacy in users	5	100%
Poor Internet connectivity	5	100%
Trust issue of farmers in digital technology due to adoption of traditional practices	1	20%
High operational costs	4	80%
Policy constraints	2	40%
Support needs		
Capacity building	5	100%
Funding opportunities	5	100%
Linking farmers with digital service providers	5	100%
Policy advocacy	5	100%
Enhance local govt with digitization	2	40%
Infrastructure support	1	20%
Inputs/Outputs buyers (n=29)		
Challenges		
Transportation	22	75.9%
Price volatility	23	79.3%
Quality maintenance	18	62.1%
Transportation	22	75.9%
Support needs		
Financial services	25	86.2%
Storage infrastructure (cold storage, storage rooms, etc.)	20	69.0%
Market information	19	65.5%
NGOs/CBOs (n=6)		
Major challenges		
Limited Funding	6	100%
Policy Constraints	4	66.7%
Farmer Participation	4	66.7%
Climate Risks	3	50.0%
No Enough Physical Infrastructure	1	16.7%
Support needed		
Value chain development	6	100%
PPP Model	6	100%
Digital expansion	4	66.7%
Individuals (n=11)		
Major challenges		
Limited market access	7	63.6%
Only Seasonal demand	10	90.9%

Challenges and support needs	Frequency	Percentage
Poor Farmers willingness to pay for services	9	81.8%
Delay Payment collection	4	36.4%
Support needed		
Training opportunities	9	81.8%
Equipment access	10	90.9%
Networking platforms	8	72.7%

Source: Field survey (11-25 June, 2025).

3.5 Barriers and enabling factors for private sector participation in extension services

3.5.1 Barriers to private sectors participation in agriculture extension services

A detailed analysis of 265 private agriculture extension service providers in Koshi Province reveals multiple barriers and operational challenges, as well as support needs that vary by type of service provider. Combining quantitative assessment of barriers (Table 30) with qualitative insights on challenges and support needs (Section 3.4.5) provides a comprehensive understanding of the constraints and opportunities across the sector.

3.5.1.1 Agro-vets

Agro-vets face several significant barriers to expanding their services. The main obstacles include lack of supportive policies and regulations (3.96/5), low farmers' purchasing power (3.85), and limited profitability (3.75). Weak infrastructure such as roads and ICT (3.37) is less critical, and trust deficits with farmers (2.02) are negligible.

These barriers correspond with the operational challenges identified in section 3.3.5.1: high input costs (54.3%), transportation limitations (54.9%), and low farmer payment capacity (59.3%) significantly affect service delivery and sustainability. Licensing delays (14.2%) and limited technical staff (20.4%) further constrain operations, especially for new or smaller agro-vets.

Agro-vets expressed strong support needs in technical skill enhancement (77.2%), digital tools training (45.7%), and business management skills (38.9%). Addressing these needs, alongside policy reforms and infrastructure improvement, will strengthen agro-vets' capacity to deliver quality advisory services and expand their outreach to farmers.

3.5.1.2 Agriculture Cooperatives

For agricultural cooperatives, weak infrastructure (3.86) is the most critical barrier, followed by lack of supportive policies (3.76) and low farmers' purchasing power (3.59). Limited profitability (3.45) and trust deficits (2.45) are less severe. Section 3.4.5.2 highlights additional challenges such as poor access to finance, low technical competence among staff and members, and weak market linkages, all of which constrain the quality of services. Internal management challenges such as limited transparency, accountability, and low adoption of digital solutions further reduce operational efficiency.

Cooperatives seek support in technical training, governance and business management development, access to finance (e.g., soft loans, revolving funds), and improved infrastructure for transport, storage, and processing. Digitalization for record-keeping, marketing, and coordination, particularly in remote areas, is also a key priority. These measures can enhance cooperatives' competitiveness and their ability to serve farmers effectively.

3.5.1.3 Private Agriculture Companies

Private companies identified lack of supportive policies (4.13) as the top barrier, followed by limited profitability (3.91), weak infrastructure (3.74), and low farmers' purchasing power (3.22). Trust deficit (2.13) is minimal. As described in section 3.4.5.3, high input costs, poor rural infrastructure, limited distribution channels, and strict regulations restrict growth. A

shortage of skilled technical staff and limited access to finance further limits innovation and service expansion.

Private companies are highly motivated to form new partnerships, with 95.6% interested in funding opportunities, 78.3% in market linkages, and 60.9% in technical support. Addressing regulatory barriers, providing financial incentives, and supporting market access and technical capacity will enable these companies to expand services and improve farmers' access to agricultural inputs and knowledge.

3.5.1.4 Digital Service Providers

Digital providers are most affected by weak infrastructure (4.40), followed by policies (3.80), limited profitability (3.60), and low farmers' purchasing power (3.00). Trust deficits (2.80) are not a major concern. Section 3.4.5.4 highlights their operational challenges: poor internet connectivity, low digital literacy among farmers, high operational costs, and policy constraints. Their support needs include capacity building, funding opportunities, farmer linkages, policy advocacy, and government-led digitization initiatives. These interventions are essential for digital providers to scale their services and enhance adoption among farmers.

3.5.1.5 Input/Output Buyers

Buyers face barriers such as price volatility (3.86), transportation limitations (3.83), and lack of supportive policies (3.90), while trust deficits (2.21) are minimal. They encounter operational challenges like unstable prices, product quality issues, and transport constraints. Buyers need financial support, storage infrastructure (cold storage, warehouses), and market information systems to stabilize operations, improve service reliability, and support farmers' access to markets.

3.5.1.6 NGOs/CBOs

For NGOs/CBOs, the lack of supportive policies (4.17) is the biggest barrier, followed by weak infrastructure (3.83), low farmers' purchasing power (3.67), and limited profitability (3.50). Trust deficit (2.00) is minor. As per section 3.4.5.4, they also face limited funding, policy constraints, and low farmer participation. Support needs include value chain development, public-private partnership models, and digital expansion, enabling NGOs to leverage local networks and enhance the effectiveness of agricultural extension services.

3.5.1.7 Individual Providers

Individual providers are most constrained by low farmers' purchasing power (4.18), followed by weak infrastructure (3.73), limited profitability (3.64), and lack of supportive policies (3.45). Trust deficits (2.00) are minimal. Section 3.4.5.4 highlights seasonal demand, limited market access, and poor willingness of farmers to pay as key challenges. Individuals need training, equipment access, and networking platforms to improve outreach and service delivery. Support addressing these barriers can help individuals maintain sustainable operations despite resource constraints.

Table 30: Barriers to private sectors participation in the agriculture extension services

Barriers	Agro-vets (n=162)	Agri-Cooperatives (n=29)	Private Agri-Companies (n=23)	Digital Agri-service providers (n=5)	Input/Output buyers (Wholesalers) (n=29)	NGOs/CBOs (n=6)	Individual (n=11)	**Overall (n=265)**
Lack of supportive policies and regulation	4.02	3.76	4.13	3.80	3.90	4.17	3.45	**3.96**
Limited profitability or business incentives	3.75	3.45	3.91	3.60	3.86	3.50	3.64	**3.73**
Low farmers purchasing power	3.85	3.59	3.22	3.00	2.93	3.67	4.18	**3.66**

Barriers	Agro-vets (n=162)	Agri-Cooperatives (n=29)	Private Agri-Companies (n=23)	Digital Agri-service providers (n=5)	Input/Output buyers (Wholesalers) (n=29)	NGOs/CBOs (n=6)	Individual (n=11)	**Overall (n=265)**
Weak infrastructure (e.g., road, ICT)	3.37	3.86	3.74	4.40	3.83	3.83	3.73	**3.55**
Trust deficit between farmers and private sectors	2.02	2.45	2.13	2.80	2.21	2.00	2.00	**2.11**

Notes: 5=most important barrier, and 0=least important barriers. Source: Field survey (11-25 June, 2025).

3.5.2 Enabling factors for better business environment

Across all 236 respondents[4], government incentives (78.5%) and farmer payment systems (54.3%) were the top enabling factors, followed by policy reforms (47.9%) and partnerships/networking (38.9%). Simplified licensing (18.9%) and marketing/business plan support (0.8%) were rarely mentioned. The significant differences across actor types suggest that tailored support strategies are needed to strengthen the private extension sector, ensuring that policies, incentives, and services align with the unique needs of each provider group (refer Table 31 and Figure 11).

Agro-vets: Agro-vets (n=162) identified government incentives as the most critical factor for improving their business environment, with 87.7% of respondents highlighting this support. A strong payment system for advisory services was also essential, noted by 55.6%, while policy reforms were important to 54.3% of agro-vets. Networking and partnerships were moderately valued (34.6%), and simplified licensing was mentioned by 25.9%. Marketing support and business plan assistance were not considered significant. These findings indicate that agro-vets primarily rely on government support and farmer payment willingness to sustain and expand their services.

Agri-Cooperatives: Agri-cooperatives (n=29) showed the highest emphasis on government incentives (96.6%) and the willingness of farmers to pay for services (69.0%). Policy reforms were valued by 51.7%, while networking and partnerships were important to 62.1%. Simplified licensing (3.4%) and marketing support (0%) were largely overlooked. This suggests that cooperatives benefit from formal structures and collective action, which enhances access to incentives and creates favorable conditions for farmer payments.

Private Agri-Companies: Private agri-companies (n=23) also prioritized government incentives (87.0%) and farmer payment environments (65.2%). Policy reforms were important for 56.5%, while networking and partnerships were recognized by 60.9%. Simplified licensing (13.0%) and marketing/business plan support (8.7%) were less relevant. Overall, private companies value both financial and collaborative mechanisms to strengthen their operations.

Digital Agri-Service Providers: Digital service providers (n=5) reported full reliance on government incentives (100%) and farmer payment willingness (100%) as key enablers. Policy reforms (60%) and partnerships/networking (100%) were also seen as important, while simplified licensing (20%) and marketing support (0%) were minor considerations. The results reflect the small but specialized nature of digital providers, who depend on innovation, networking, and supportive policies to thrive.

NGOs/CBOs: NGOs and community-based organizations (n=6) rated government incentives (100%) as the most critical enabling factor, followed by policy reforms (83.3%) and farmer payment environment (66.7%). Networking/partnerships were important for 66.7%, while

[4] Out of the 265 PESPs surveyed, 29 input/output buyers (wholesalers) were excluded from the assessment of enabling factors for a better business environment, as the question was not included for buyers in the mWater survey. Therefore, the analysis was carried out with only 236 respondents

simplified licensing (0%) and marketing support (0%) were not emphasized. These organizations

Table 31: Enabling factors for better business environment perceived by private agriculture extension service provides

Enabling factors	Agro-vets (n=162)	Agri-Cooperatives (n=29)	Private Agri-Companies (n=23)	Digital Agri-service providers (n=5)	NGOs/CBOs (n=6)	Individual Agri-service providers (n=11)	Overall (n=236)	Chi-square value
Policy reform from government	88 (54.3%)	`15 (51.7%)	13 (56.5%)	3 (60.0%)	5 (83.3%)	3 (27.3%)	127 (47.9%)	35.379***
Agri-advisory service payment and purchasing environment	90 (55.6%)	20 (69.0%)	15 (65.2%)	5 (100%)	4 (66.7%)	10 (90.9%)	144 (54.3%)	48.704***
Incentive by government for agri-advisory services	142 (87.7%)	28 (96.6%)	20 (87.0%)	5 (100%)	6 (100%)	7 (63.6%)	208 (78.5%)	124.914***
Simplified licensing processes	42 (25.9%)	1 (3.4%)	3 (13.0%)	1 (20.0%)	0 (0.0%)	3 (27.3%)	50 (18.9%)	18.937***
Partnership and networking	56 (34.6%)	18 (62.1%)	14 (60.9%)	5 (100%)	4 (66.7%)	6 (54.5%)	103 (38.9%)	41.908***
Marketing support and business plan	0 (0.0%)	0 (0.0%)	2 (8.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.8%)	21.204***

Notes: ***indicates significant difference at 1% level (p=<0.01). Source: Field survey (11-25 June, 2025).

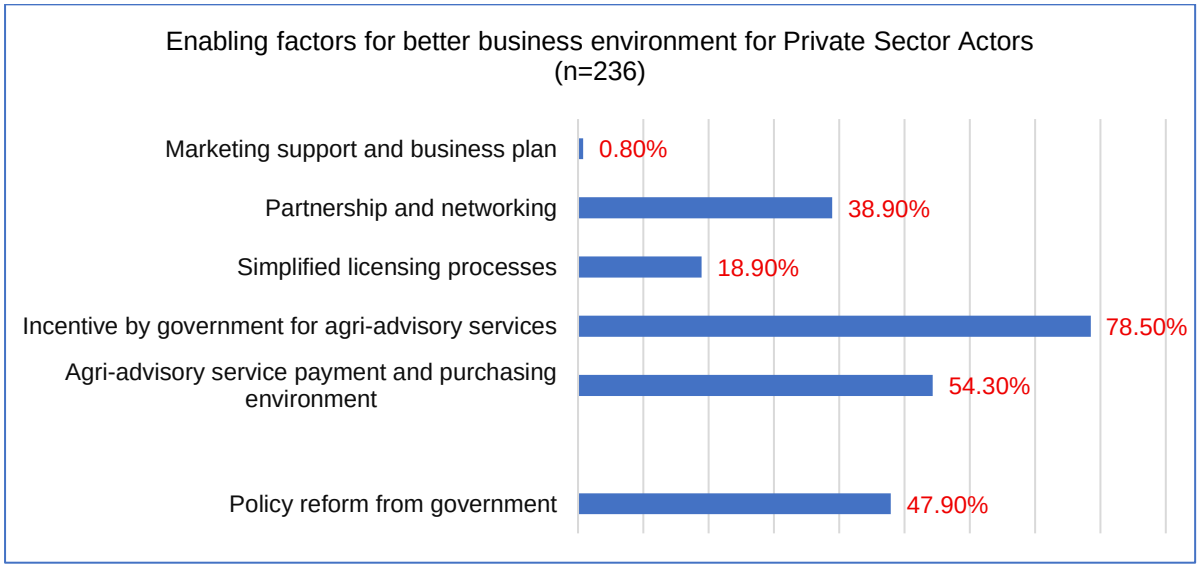


Figure 11: Enabling factors for better business environment for Private Sector Actors

3.5.3 Enabling factors based on their potential to increase private sectors involvement

The study identifies key factors that can attract and sustain private sector engagement in agriculture extension. Government incentives and subsidies are the most important enabling factors, followed by strong demand for agricultural inputs and effective public-private-community partnerships (PPCPs). Although access to ICTs and skilled human resources is weaker, they remain essential for long-term sustainability (Table 32).

Agro-vets: Agro-vets value strong demand for agricultural inputs most highly (4.59), slightly above government subsidies (4.42). Other enabling factors such as access to market data/ICT tools (3.09), PPP frameworks (3.01), and availability of skilled human resources (2.99) are less critical. This suggests that agro-vets respond primarily to immediate financial incentives and market demand, while ICT access and technical capacity are secondary considerations.

Agricultural Cooperatives: Cooperatives are highly responsive to government subsidies and incentives (4.90), with PPP frameworks (3.97) and skilled human resources (3.45) also important. Interestingly, strong demand for inputs (4.10) is slightly lower than for subsidies. Cooperatives appear motivated by formal incentives and partnership opportunities, reflecting their collective structure and dependence on coordinated support to deliver services effectively.

Private Agriculture Companies: Private companies prioritize government incentives (4.57) and skilled human resources (3.61), with strong demand for inputs (4.09) also notable. PPP frameworks (3.48) and access to ICT tools (3.91) are moderately valued. This indicates that companies are responsive to both financial and technical enabling factors and recognize the importance of capacity and coordination for sustainable operations.

Digital Agri-Service Providers: Digital providers highlight PPP frameworks (4.60) and access to ICT tools (4.20) as the most critical enabling factors, with government subsidies (4.20) and skilled human resources (3.80) also significant. Strong demand for inputs (4.40) supports their service expansion. These actors rely on technology, partnerships, and coordination to scale, but gaps in internet infrastructure and digital skills may limit adoption in rural areas.

Input/Output Buyers: Buyers emphasize government incentives (4.55) and strong demand for agricultural inputs (4.34). PPP frameworks (3.62), skilled human resources (3.14), and access to market/ICT tools (3.14) are moderately valued. This shows that financial incentives and market demand drive buyer engagement, while technology and capacity are secondary but relevant for efficiency.

NGOs/CBOs: NGOs and community-based organizations consider PPP frameworks (4.50) and government subsidies (4.00) as the top enablers. Availability of skilled human resources (3.67) and strong input demand (3.83) are also valued, while ICT access (3.00) is the weakest factor. NGOs prioritize partnerships and coordination, which aligns with their role in linking communities, private actors, and government services.

Individual Providers: Individual providers are most attracted by government incentives (4.73) and strong demand for inputs (4.27), while PPP frameworks (3.55), access to ICT tools (3.09), and skilled human resources (3.18) are moderately important. This suggests that individuals rely heavily on financial incentives and immediate market opportunities, with capacity and technology support as secondary enablers.

Table 32:Enabling factors based on their potential to increase private sectors involvement in agriculture extension services

Potential Enabling factors	Agro-vets (n=162)	Agri-Cooperatives (n=29)	Private Agri-Companies (n=23)	Digital Agri-service providers (n=5)	Input/Output buyers (Wholesalers) (n=29)	NGOs/CBOs (n=6)	Individual (n=11)	Overall (n=265)
Government subsidies or incentives	4.42	4.90	4.57	4.20	4.55	4.00	4.73	4.50
Strong demand for agri-inputs	4.59	4.10	4.09	4.40	4.34	3.83	4.27	4.43
Access to market data and ICT tools	3.09	3.52	3.91	4.20	3.14	3.00	3.09	3.23
PPP framework	3.01	3.97	3.48	4.60	3.62	4.50	3.55	3.31

Potential Enabling factors	Agro-vets (n=162)	Agri-Cooperatives (n=29)	Private Agri-Companies (n=23)	Digital Agri-service providers (n=5)	Input/Output buyers (Wholesalers) (n=29)	NGOs/CBOs (n=6)	Individual (n=11)	Overall (n=265)
Availability of skilled human resources	2.99	3.45	3.61	3.80	3.14	3.67	3.18	3.15

Notes: 5=high potential, 0=low potential. Source: Field survey (11-25 June, 2025).

3.6 Econometric model for factors assessment on willingness to extend services among service provider actors

3.6.1 Descriptive analysis of the variables

The dependent variable, "Willingness," shows that 68% of respondents are willing to extend services, indicating a generally positive attitude. Among the 219 observations, most respondents are male (77%), with a moderate mean age of 43.95 years and a fairly even split between those with technical (53%) and non-technical (47%) education backgrounds. Table 33 presents descriptive statistics for variables used in a Probit model analyzing the willingness of agriculture extension service providers to extend additional services in an agricultural context.

The independent variables reflect diverse characteristics: only 6% use social media, and the average enterprise age is about 12 years. The log-transformed annual turnover is 13.31, suggesting moderate income levels, while the relatively low average for investment in agricultural extension (log 3.31) indicates limited spending in that area. Regionally, respondents are distributed among Mechi (32%), Koshi (37%), and Sagarmatha (29%) corridors. Most participants are affiliated with agro-vets (73%), followed by agriculture cooperatives (13%), private agriculture companies (10%), and a very small portion with digital platforms (2%). The standard deviations show substantial variation across several variables, suggesting heterogeneity in demographics, economic scale, and affiliations among respondents.

Table 33: Descriptive statistics of variables used in Probit model

Variables	Description of variables	Observation	Mean	Std. Dev.
Dependent variable				
Willingness	Willingness to extend addition services (1=Yes, 0=No)	219	0.68	0.46
Independent variables				
Age	Age of the owner (Years)	219	43.95	12.47
Gender	Gender of the respondent (1=Male, 0=Female)	219	0.77	0.42
Education	Level of education (1=Technical, 0=non-technical)	219	0.53	0.49
Social media	Use social media (Yes=1, 0=No)	219	0.06	0.24
Establishment	Years of the establishment	219	11.65	9.01
Annual turnover	Annual turnover in last year (NPR in log)	219	13.31	4.03
Invest Extension	Investment in agriculture extension (NPR in log)	219	3.31	5.65
Mechi corridor	Mechi corridor (Yes=1, 0=No)	219	0.32	0.47
Koshi corridor	Koshi corridor (Yes=1, 0=No)	219	0.37	0.48
Sagarmatha corridor	Sagarmatha corridor (Yes=1, 0=No)	219	0.29	0.45
Agro-vet	Respondent belong to ago-vet (Yes=1, 0=No)	219	0.73	0.43
Cooperative	Respondent belong to cooperative (Yes=1, 0=No)	219	01.3	0.33
Company	Respondent belong to company (Yes=1, 0=No)	219	0.10	0.30
Digital	Respondent belong to digital (Yes=1, 0=No)	219	0.02	0.14

3.6.2 Probit model for factors dermining willingness to extend addition services by private sector

Table 34 presents the results of a Probit regression analyzing the factors influencing the willingness of private sector actors in Koshi Province to extend additional agricultural services. The model is statistically significant overall (LR chi² = 46.28, p < 0.01), with a Pseudo R² of 0.17, suggesting a moderate explanatory power. The predicted probability of willingness to extend services is 72%, consistent with the descriptive mean.

Among the independent variables, business establishment age has a statistically significant negative effect (p < 0.01), suggesting that older businesses are less likely to extend services, potentially due to risk aversion or satisfaction with current operations (Ali et al., 2021)[5]. The marginal effect indicates that each additional year in business reduces willingness by about 1.1%. Regionally, being located in the Mechi corridor significantly decreases willingness (p < 0.05), while being in the Koshi corridor increases it (p < 0.05). These regional effects could reflect differences in infrastructure, market access, or local institutional support (Thapa et al., 2020)[6].

Though not significant at the 5% level, being a agriculture company shows a positive association at the 10% level (p = 0.10), with a marginal effect of 28.2%, indicating that formal corporate structure may foster capacity or motivation for service extension (World Bank, 2020)[7]. Other variables such as age, gender, education, social media use, and financial indicators (turnover and investment) do not significantly affect willingness, suggesting that personal or basic business characteristics may be less predictive than regional or institutional factors in this context.

Table 34: Factors determine willingness to extend addition services by private sectors using Probit model in Koshi Province

Variables	Coef.	Std. Err.	z	P>|z|	dy/dx#
Age (Years)	-0.007	0.007	-0.95	0.341	-0.003
Gender (male=1)	0.163	0.239	0.68	0.497	0.056
Education (technical =1)	-0.256	0.236	-1.08	0.279	-0.086
Social media (Yes=1)	0.435	0.493	0.88	0.378	0.128
Establishment (Years)	-0.033***	0.011	-2.88	0.004	-0.011***
Annual turnover (NPR in log)	0.010	0.026	0.40	0.690	0.003
Invest Extension (NPR in log)	0.022	0.023	0.96	0.337	0.008
Mechi corridor (Yes=1)	-0.630**	0.252	-2.50	0.012	-0.222**
Koshi corridor (Yes=1)	0.528**	0.264	2.00	0.046	0.162**
Agro-vet (Yes=1)	0.294	0.719	0.41	0.683	0.102
Cooperative (Yes=1)	-0.256	0.854	-0.30	0.765	-0.090
Company (Yes=1)	1.279*	0.822	1.56	0.100	0.282***
Constant	0.765	0.921	0.83	0.406	
Observation (n)	219				
LR chi²	46.28***				
Prob> chi²	0.000				
Pseudo Re	0.17				
Log likelihood	-114.084				
Pr (willingness) (predict)	0.72				

Notes: ***, ** and * indicate significant at 1%, 5% and 10% levels, respectively. #dy/dx is marginal effect after probit.

[5] Ali, J., & Kumar, S. (2021). Determinants of Agribusiness Expansion in South Asia. *Journal of Rural Development and Administration,* 53(2), 134–149.
[6] Thapa, G., Kumar, A., & Joshi, P. K. (2020). *Dynamics of Agricultural Transformation in Nepal: Challenges and Prospects*. IFPRI Discussion Paper.
[7] World Bank. (2020). *Enabling the Business of Agriculture 2019*. Washington, DC: World Bank Group.

4. Conclusion

4.1 Summary of Findings

A total of 265 Private Sector Agricultural Extension Service Providers (PESPs) were identified and surveyed across Koshi Province's three main corridors of Mechi, Koshi, and Sagarmatha. Agro-vet shops dominate the sector, representing 61% (162) of providers, followed by agricultural cooperatives and input/output buyers or traders (29 each), private agri-companies (23), and emerging actors including digital service providers (5), NGOs/CBOs (6), and independent individual providers (11).

Socio-Demographics: PESPs vary significantly in terms of experience, education, and community focus. Cooperatives and NGOs are older, community-oriented, and demonstrate better gender balance. Private companies and digital providers are newer, highly educated (often Master's level), and possess strong technical expertise. Agro-vets and individual providers usually have technical training but lower formal education levels.

Business Models and Approaches: Agro-vets primarily offer embedded services, providing advice alongside product sales, with fee-based models rarely used. Cooperatives adopt subsidized, community-centered approaches, including training and field visits. Private companies implement fee-for-service and technology-driven models, including machinery support, call centers, and ICT advisory. Digital providers employ advanced technologies such as AI, IoT, digital lending, and insurance services.

Capacity Assessment: Physical and technical capacity differs across providers. Agro-vets maintain basic infrastructure but lack diagnostic tools, while digital providers have advanced capabilities but limited reach. Cooperatives and NGOs possess community infrastructure but limited technical resources. Human resources are generally low: agro-vets average two staff, cooperatives serve many members with few staff, and private companies employ around six. Financially, digital providers and private companies report higher turnover and profits, whereas cooperatives reinvest the most into extension services despite lower revenue.

Service Delivery: Traditional methods dominate, including in-shop consultations, field visits, and phone-based advice. Digital delivery is minimal and mostly restricted to specialized digital providers and some private companies. Corridor-wise, Mechi lags in outreach services.

Geographical Coverage and Farmers Served: Most PESPs, especially agro-vets and cooperatives, operate locally at ward or municipal levels. Private companies and digital providers have broader, sometimes national reach. Agro-vets serve a large proportion of smallholder (66.7%) and commercial (46.9%) farmers but have limited reach to women-led households, youth, and marginalized groups. Cooperatives and NGOs are more inclusive, focusing on these underserved populations. Service provision ranges from basic input sales and advisory (agro-vets) to crop advisory, group training, and market linkages (cooperatives); technical and ICT support (companies); AI-based advisory and digital financial services (digital providers); and training, demonstration farms, and climate-smart agriculture (NGOs).

Barriers and Enabling Factors: Key barriers include restrictive policies, low farmer purchasing power, weak infrastructure, limited profitability, and operational challenges such as high input costs and insufficient technical staff. Enabling factors include government incentives, strong demand for agri-inputs, and partnership opportunities through Public-Private-Community Partnership (PPCP) and Public-Private Partnership (PPP) models. Providers also require support in technical skills, business management, digital tools, finance access, and infrastructure.

Key Findings and Analysis: Agro-vets are the backbone of private extension but often offer product-biased advice with limited technical depth. A digital divide exists, with a few advanced providers alongside a majority of traditional actors. Motivation varies: cooperatives and NGOs are mission-driven, companies and digital providers are market-driven, and agro-vets prioritize input sales. Willingness to expand services is strong (66% overall), highest among private

companies (91.3%) and digital providers (80%), with corridor and business type influencing this willingness. A Probit analysis showed that location (Koshi corridor) and being a private company positively influenced willingness to expand services, while older businesses and the Mechi corridor showed less interest. Factors like age, gender, or business size had no major effect. The system remains fragmented, highlighting the need for collaborative models that integrate cooperatives' grassroots reach with companies' technological capacity to create a holistic and inclusive extension ecosystem.

4.2 Implications for Stakeholders

The mapping of private sector agricultural extension service providers in Koshi Province highlights critical implications for stakeholders involved in the Small Irrigation Programme (SIP-II) and agricultural development.

- *Local Governments (LGs)*: Should partner with private providers to expand advisory services, simplify licensing, and establish agriculture extension service unit/cell using a public-private-community approach (PPCP).
- *Water User Associations (WUAs)*: Can work with PESPs to access training, inputs, and markets, but need support in digital tools and contract negotiation.
- *Private Providers*: Must improve affordability and access, and explore innovations like mobile veterinary services and bundled input-advisory services.
- *Development Partners (e.g., SDC/SIP-II):* Should fund infrastructure (like cold storage and digital tools), promote multi-stakeholder coordination, and support inclusive finance for farmers.
- *Farmers:* Especially disadvantaged groups, will benefit from improved advisory access. Awareness programs and subsidized fees are needed to ensure equity.

5. Recommendations for Strengthening Linkages

Enhancing agricultural service delivery, market access, and productivity in Nepal's federalized context requires stronger linkages between farmers and Private Sector Agricultural Extension Service Providers (PESPs). Drawing on the identified challenges, barriers, and enabling factors, the following recommendations are presented at three levels: Strategic, Policy, and Programmatic/Operational.

5.1 Strategic Recommendations

- *Promote Public-Private Partnerships*: Develop clear national and provincial policies/Act/Regulation/guidelines so that government, cooperatives, and private actors can work together effectively in agricultural extension.
- *Create Regular Dialogue Platforms*: Hold provincial and local forums where farmers, private providers, and government share experiences, coordinate, and plan together.
- *Adopt Market-Oriented Models*: Test value chain-based extension and contract farming to directly link farmers with markets and private service providers.
- *Encourage Digital Agriculture*: Expand the use of ICT tools, mobile apps, and digital advisory platforms to reach more farmers, especially in remote areas.

5.2 Policy Recommednations

- *Make Licensing Easier*: Simplify and speed up the licensing process so that private providers can join agricultural extension services more quickly.
- *Give Financial Incentives*: Offer tax rebates, subsidies, or small grants to encourage private companies to invest in extension services.
- *Improve Access to Credit*: Provide soft loans, revolving funds, and credit facilities so private service providers can expand their work.
- *Invest in Infrastructure*: Include roads, storage, and digital/ICT facilities in local, provincial, and national development plans to support better extension delivery.

5.3 Programmatic/Operation Level Recommendations

- *Build Skills of Service Providers*: Provide regular training and mentoring on technical, business, and digital skills to strengthen PESPs.
- *Promote Digital Literacy*: Run village-level training so both farmers and service providers can easily use mobile apps and ICT tools.
- *Connect Farmers and Providers*: Organize digital platforms and local fairs to link farmers with PESPs for advice, inputs, and market access.
- *Ensure Quality and Trust*: Set and share simple service standards and codes of conduct so farmers can trust the advice and services they receive.

5.4 Recommended Actions with Timeline, Responsibility, and Barriers Addressed

Level	Action	Timeline	Responsible Entity	Barriers Addressed
Strategic Level	Develop national/provincial PPP framework for extension services	Medium-term (1-2 years)	Federal government (MoALD, DoA) with provincial support	Lack of supportive policies, weak collaboration, limited incentives

Level	Action	Timeline	Responsible Entity	Barriers Addressed
	Establish farmer–PESP- government dialogue platforms	Short-term (<1 year, ongoing)	Provincial and local governments; private sector associations	Trust deficit, weak farmer–PESP linkage, poor networking
	Pilot market linkage schemes (e.g., contract farming)	Medium-term (1-3 years)	Provincial governments, private companies, cooperatives	Poor purchasing capacity, price volatility
Policy Level	Simplify licensing for PESPs	Short-term (6-12 months)	Federal government (MoALD, regulatory agencies)	Delayed licenses, strict regulations
	Provide targeted subsidies/incentives	Medium-term (1-2 years)	Federal government (budget); provincial governments (implementation)	Low profitability, low farmer purchasing power, high input cost
	Establish revolving funds or soft loan schemes	Medium-term (1-3 years)	Provincial governments, banks, cooperatives	Poor access to finance, high operational costs
	Integrate rural infrastructure into development plans	Long-term (3-5 years)	Provincial and local governments with federal co-funding	Weak transport, storage, ICT infrastructure
Programmatic/ Operational Level	Conduct capacity building for PESPs and farmers	Short-term (within 12 months; ongoing)	Provincial agriculture offices, NGOs, private associations	Low technical competence, weak governance in cooperatives
	Launch digital literacy programs and improve connectivity	Medium-term (1-3 years)	Local governments; federal ICT support; telecoms	Low digital literacy, poor connectivity, resistance to digital adoption
	Develop digital matchmaking and networking platforms	Short-term (6-12 months)	Local governments, private digital providers, cooperatives	Limited market access, trust deficit
	Establish quality standards for private extension	Medium-term (1-2 years)	Federal government with provincial enforcement	Low trust, inconsistent service quality, reluctance to pay

Note: The problems, support needs, barriers and enabling factors of PESPs and recommendations are presented in Appendix 17 (p. 80).

5.5 Implementation Approach in the Federal Context

- *Federal Government*: Lead policy formulation, regulatory reforms, financing mechanisms, and establish national-level standards for private extension services.
- *Provincial Governments*: Coordinate programs, mobilize resources, invest in infrastructure, and implement targeted initiatives.
- *Local Governments*: Facilitate on-ground activities, mobilize communities, raise farmer awareness, and maintain direct linkages with PESPs.
- *Private Sector and Cooperatives*: Deliver services, innovate with digital tools, expand platforms, and establish partnerships with farmers.
- *NGOs/Development Partners*: Provide capacity building, pilot innovative service models, and support inclusive and gender-responsive approaches.

Appendices:

Appendix 1: Field Plan of Team Leader and Researchers

SN	Activities	Date	Days	Remarks
1	Finalization of questionnaires in mWater for survey and Checklist for FGDs and KII	10-11 June 2025	2 days	Team Leader with SIP team finalize in Biratnagar
2	Orientation to the Researchers and finalization the field schedule in SIP Office, Biratnagar, Pre-testing the questionnaire in Biratnagar market hub (in mWater)	11-12 June, 2025	1 day	In the leadership of Team Leader and SIP team in Biratnagar
3	Main field survey in the eight Districts-Qualitative survey (Mechi, Koshi and Sagarmatha corridor)	13-25 June, 2025	13 days	**All three researchers are mobilized** (**Koshi:** Dhankuta, Tehrathum, Bhojpur, Sunsari and Morang; **Mechi:** Ilam, Phanchthar; Jhapa and Morang **Sagarmatha:** Udhayapur, Khotang and Okhaldunga) Supervision by: Team Leader and SIP team
4	KII with AKC, Local government, FGD with WUG	13-19 June, 2025	7 days	Ilam, Dhankuta, Udayapur Lead by Team Leader in collaboration with SIP team

Note: Team Leader: Prof. Dr. Rishi Ram Kattel; Researchers- Mrs. Sunita Phago (Mechi Corridor), Mr. Yadu Kumar Uprety (Koshi Corridor) and Mr. Keshar Bahadur Rai (Sagarmatha Corridor).

Appendix 2: List of KII Participants from AKC and Palikas in Koshi Province (n=16)

SN	Name	Position	Contact	Types	District	Municipality
1	Kul Bahadur Rai	Acting Chief	9852681668	AKC	Ilam	Ilam Municipality
2	Jiban Tada Magar	Information Officer	9842119568			
3	Narandra Bahadur Rana	Acting Chief	9852050424	AKC	Dhankuta	Dhankuta Municipality
4	Indra Parja	Plant Protection Officer	9852070294			
5	Yogendra Prasad Yadav	Chief	9852835067	AKC	Udayapur	Triyuga Municipality
6	Rubi Shrestha	Administrative Officer	9762377067			
7	Durga Kumar Baral	Deputy Mayor	9852642002	LG	Ilam	Suryodaya Municipality
8	Devendra Sharma	Economic Development Coordinator and Ward-9 Chairperson	9842659201			
9	Pragya Pokhrel	Agriculture Officer/Agri-Section Chief	9862668246			
10	Upendra Nepal	Agriculture Officer/Agri-Section Chief	9842738171	LG	Ilam	Ilam Municipality
11	Bhaktaman Rai	Agriculture Officer/Agri-Section Chief	9442116254	LG	Dhankuta	Dhankuta Municipality
12	Aasha Muktan	Agriculture Officer	9849304109			
13	Bina Devi Rai	Agriculture Officer	9852061888			
14	Indra Maya Tamang	Agriculture Officer/Agri-Section Chief	9800907343	LG	Dhankuta	Pakribas Municipality
15	Parmila Danuwar	Agriculture Officer	9842869265	LG	Udayapur	Triyuga Municipality
16	Som Bahadur Rana	Agriculture Technician	9842876224			

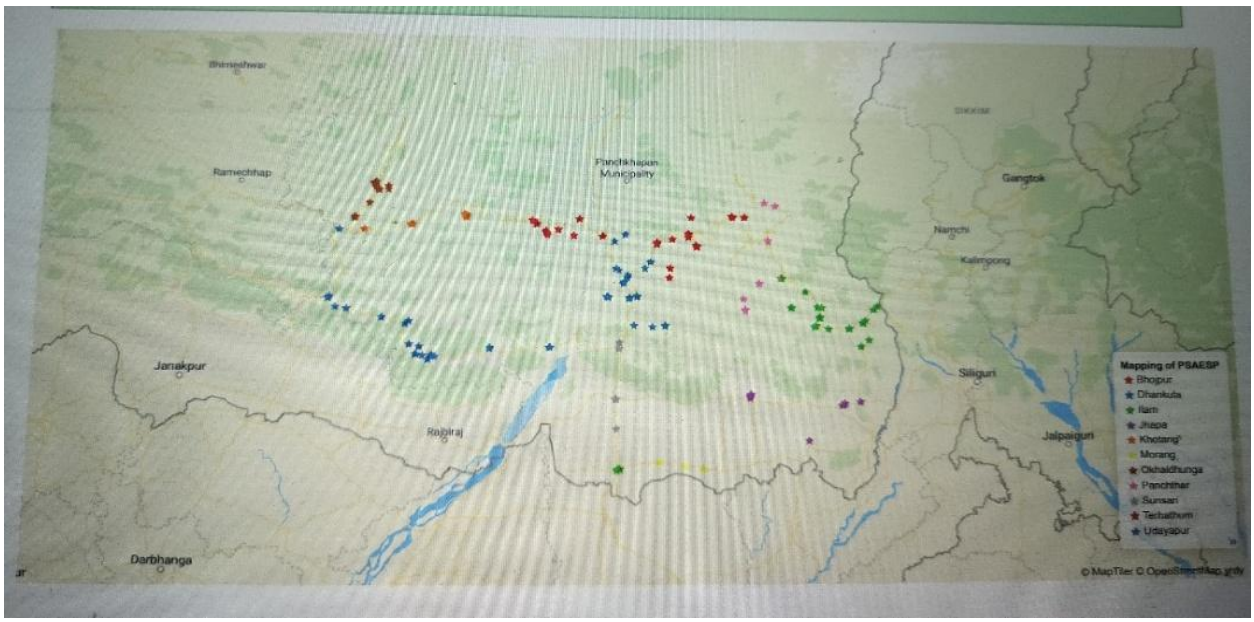
Note: AKC= Agriculture Knowledge Center; LG= Local Government (Municipalities/Rural Municipalities)

Appendix 3: List of FGDs participants from WUAs in Koshi Province, SIP-II Commands Areas (n=84)

SN	Name	Gender	Ethnicity	Municipality	District	Phone
FGD participants from Ramekhola WUA, Suryodaya Municipality-6, Sangam Tol, Ilam district (14 June, 2025)						
1	Dal Bahadur Rai	Male	Janajati	Suryodaya	Ilam	9842726532
2	Kul Bahadur Rai	Male	Janajati	Suryodaya	Ilam	9863620857
3	Dhiraj Rai	Male	Janajati	Suryodaya	Ilam	9843834290
4	Sachin Rai	Male	Janajati	Suryodaya	Ilam	9744338557
5	Sham Rai	Male	Janajati	Suryodaya	Ilam	9863620922
6	Arun Rai	Male	Janajati	Suryodaya	Ilam	9810088344
7	Dew Kumar Sunuwar Rai	Male	Janajati	Suryodaya	Ilam	9765260808
8	Dhiren Kattel	Male	Brahmin/Chhetri	Suryodaya	Ilam	9842670580
9	Chita Bahadur Rai	Male	Janajati	Suryodaya	Ilam	9842662590
10	Bibek Rai	Male	Janajati	Suryodaya	Ilam	9815011772
11	Shailesh Rai	Male	Janajati	Suryodaya	Ilam	9844224367
12	Sanjip Rai	Male	Janajati	Suryodaya	Ilam	9869575776
FGD participants from WUAs, Ilam Municipality-1, 5, 10, Ilam Bazar Santitol, Ilam district (15 June, 2025)						
13	Jit Bahadur Shrestha	Male	Janajati	Ilam	Ilam	9842720055
14	Dhanendra Kumar Shrestha	Male	Janajati	Ilam	Ilam	9842774013
15	Pubaram Limbu	Male	Janajati	Ilam	Ilam	9842636622
16	Kumar Bhujel	Male	Janajati	Ilam	Ilam	9824081211
17	Narendra Limbu	Male	Janajati	Ilam	Ilam	9828079074
18	Sandip Rai	Male	Janajati	Ilam	Ilam	9817991390
19	Bipin Rai	Male	Janajati	Ilam	Ilam	9817991390
20	Harka Bahadur Rai	Male	Janajati	Ilam	Ilam	9816958537
21	Dhana Maya Khati	Female	Janajati	Ilam	Ilam	9825944025
22	Muna Thapa	Male	Brahmin/Chhetri	Ilam	Ilam	9816086763
23	Khem Raj Gurung	Male	Janajati	Ilam	Ilam	9824052113
24	Bhim Bahadur Rai	Male	Janajati	Ilam	Ilam	9816094812
25	Devi Maya Khati	Male	Janajati	Ilam	Ilam	9817072771
26	Yamuna Ghimire	Female	Brahmin/Chhetri	Ilam	Ilam	9807993552
27	Dal Bahadur Lektam	Male	Janajati	Ilam	Ilam	9826929185
28	Pahalman Basnet	Male	Brahmin/Chhetri	Ilam	Ilam	9816071391
29	Ratna Bahadur Laptha	Male	Janajati	Ilam	Ilam	9867645524
30	Ram Magar	Male	Janajati	Ilam	Ilam	9844629140
31	Parmila Khadka	Female	Brahmin/Chhetri	Ilam	Ilam	
32	Man Kumari Ghimire	Female	Brahmin/Chhetri	Ilam	Ilam	9817092550
33	Sirjana Gurung	Female	Janajati	Ilam	Ilam	9817026942
FGD participants of Bhageri WUA, Udayapurgadhi Rural Municipality-7, Adheri, Udhayapur district Tol (17 June, 2025)						
34	Mahendra Bahadur Rai	Male	Janajati	Dhankuta	Dhankuta	9842061952
35	Nakar Rai	Male	Janajati	Dhankuta	Dhankuta	9704255780
36	Arjun Rai	Male	Janajati	Dhankuta	Dhankuta	9811065627
37	Govinda Rai	Male	Janajati	Dhankuta	Dhankuta	
38	Ojel Rai	Male	Janajati	Dhankuta	Dhankuta	
39	Sangyang Rai	Male	Janajati	Dhankuta	Dhankuta	9807371252
40	Kush Rai	Male	Janajati	Dhankuta	Dhankuta	
41	Roshni Rai	Female	Janajati	Dhankuta	Dhankuta	9862173395
42	Durga Rai	Female	Janajati	Dhankuta	Dhankuta	9826368997
43	Sumira Rai	Female	Janajati	Dhankuta	Dhankuta	9817357626
44	Yage Bahadur Rai	Male	Janajati	Dhankuta	Dhankuta	9814081950
45	Puja Rai	Female	Janajati	Dhankuta	Dhankuta	9817355662
46	Budhu Maya Rai	Female	Janajati	Dhankuta	Dhankuta	
47	Indra Kumari Rai	Female	Janajati	Dhankuta	Dhankuta	9812324011
48	Chandra Kumari Rai	Female	Janajati	Dhankuta	Dhankuta	
49	Torna Bahadur Basnet	Male	Brahmin/Chhetri	Dhankuta	Dhankuta	
50	Saroj Basnet	Male	Brahmin/Chhetri	Dhankuta	Dhankuta	
51	Sita Basnet	Female	Brahmin/Chhetri	Dhankuta	Dhankuta	
52	Kamala Aryal	Female	Brahmin/Chhetri	Dhankuta	Dhankuta	
53	Bhakta Bahadur Rai	Male	Janajati	Dhankuta	Dhankuta	
54	Kul Bahadur Karki	Male	Brahmin/Chhetri	Dhankuta	Dhankuta	9818028539
FGD participants from Kholitar WUA, Pakhribas Municipality-3, Kholitar, Dhankuta district Tol (17 June, 2025)						
55	Rana Bahadur Magar	Male	Janajati	Pakribas	Dhankuta	9801699358
56	Sita Dahal	Female	Brahmin/Chhetri	Pakribas	Dhankuta	9805361057
57	Netra Bahadur Ale	Male	Janajati	Pakribas	Dhankuta	9817392232
58	Nara Maya Ale	Female	Janajati	Pakribas	Dhankuta	980403922
59	Gyaitra Katuwal	Female	Brahmin/Chhetri	Pakribas	Dhankuta	9807085661
60	Khina Maya Rana	Female	Janajati	Pakribas	Dhankuta	9812357134

SN	Name	Gender	Ethnicity	Municipality	District	Phone
61	Yash Bahadur Rana	Male	Janajati	Pakribas	Dhankuta	9825356889
62	Tek Bahadur Poudel	Male	Brahmin/Chhetri	Pakribas	Dhankuta	
63	Kumar Rana	Male	Janajati	Pakribas	Dhankuta	9803258764
64	Chandra Bahadur Ale	Male	Janajati	Pakribas	Dhankuta	9807031897
65	Harka Bahadur Karki	Male	Brahmin/Chhetri	Pakribas	Dhankuta	9807079851
66	Lekh Bahadur Rana	Male	Janajati	Pakribas	Dhankuta	
67	Tirtha Bahadur Ale	Male	Janajati	Pakribas	Dhankuta	9822794993
FGD participants from Bhageri WUA, Udayapurgadhi Rural Municipality-7, Adheri, Udhayapur district Tol (17 June, 2025)						
68	Ram Bahadur Ghale	Male	Janajati	Udayapurdadhi	Udhayapur	9811720604
69	Prem Bahadur Adhikari	Male	Brahmin/Chhetri	Udayapurdadhi	Udhayapur	9816756353
70	Chitra Ghale	Male	Janajati	Udayapurdadhi	Udhayapur	9823766183
71	Tik Bahadur Khapangi	Male	Janajati	Udayapurdadhi	Udhayapur	
72	Ghogendra Chapagai	Male	Brahmin/Chhetri	Udayapurdadhi	Udhayapur	9804736238
73	Rudra Bahadur Karki	Male	Brahmin/Chhetri	Udayapurdadhi	Udhayapur	9827774774
74	Parmila Ghale Magar	Female	Janajati	Udayapurdadhi	Udhayapur	
75	Shar Bahadur Pulami	Male	Janajati	Udayapurdadhi	Udhayapur	9804722570
76	Teju Rai	Male	Janajati	Udayapurdadhi	Udhayapur	9823171135
77	Kalpana Khatri	Female	Brahmin/Chhetri	Udayapurdadhi	Udhayapur	9801456112
78	Sumitra Karki	Female	Brahmin/Chhetri	Udayapurdadhi	Udhayapur	9819754636
79	Devi Pulami	Female	Janajati	Udayapurdadhi	Udhayapur	9763734480
80	Tika Maya Magar	Male	Janajati	Udayapurdadhi	Udhayapur	
81	Shyam Bahadur Ghale	Male	Janajati	Udayapurdadhi	Udhayapur	9819929513
82	Min Bahadur Basnet	Male	Brahmin/Chhetri	Udayapurdadhi	Udhayapur	9811731734
83	Ganesh Bahadur Khadka	Male	Brahmin/Chhetri	Udayapurdadhi	Udhayapur	9818765509
84	Ojaraj Adhikari	Male	Brahmin/Chhetri	Udayapurdadhi	Udhayapur	9829714107

Appendix 4: Map showing study sides in Koshi Province, Nepal (n=265)



Appendix 5: Identified and sample agro-vets by corridor, districts and municipality in Koshi Province (n=162)

SN	Corridor	District Name	Municipality Name	Samples (n)
1	Mechi	Ilam	Deumai municipality	3
2			Ilam municipality	12
3			Suryodaya municipality	14
4		Panchthar	Falgunanda rural municipality (RM)	2
5			Miklajung RM	3
6			Phidim municipality	8

SN	Corridor	District Name	Municipality Name	Samples (n)
7		Jhapa	Birtamod municipality	3
8			Damak municipality	5
9			Jhapa RM	1
10			Mechinagar municipality	3
11	Koshi	Dhankuta	Chaubise RM	2
12			Chhathar Jorpati RM	4
13			Dhankuta municipality	7
14			Mahalaxmi municipality	1
15			Pkharibas municipality	3
16			Sahidbhumi RM	1
17			Sangurigadhi RM	2
18		Terhathum	Aatharai RM	2
19			Chhathar RM	1
20			Laligurans municipality	4
21			Menchhayayem RM	1
22			Myanglung municipality	6
23		Bhojapur	Bhojpur municipality	5
24			Arun RM	2
25			Pauwa Dunma RM	3
26		Sunsari	Dharan Sub-Metropolitan City	3
27			Duhabi municipality	1
28			Itahari Sub-Metropolitan City	5
29		Morang	BiratnagarMetropolitan City	2
30			Dhanapalthan RM	1
31			Rengeli municipality	1
32			Sunwarshi municipality	1
33	Sagarmatha	Udhayapur	Belaka municipality	3
34			Chaudandigadhi municipality	3
35			Katari municipality	6
36			Rautamai RM	3
37			Triyuga municipality	13
38			Udhayapurgadhi RM	3
39		Okhaldhunga	Menchhayayem RM	3
40			Siddhicharan municipality	7
41		Khotang	Diktel Rupakot Majhuwagadhi municipality	5
42			Halesi Tuwachung municipality	4
Total samples agro-vets (n)				**162**

Source: Field survey (11-25 June, 2025)

Appendix 6: List of Agro-Vets Surveyed in Koshi Province (n=162)

SN	Name Of Service Provider	Name of Respondent	Contact	Position	Education	Municipality	Ward No.	Establishment Years	Permission letter for seed sells from AKC	License for pesticides sell	Annual Turnover of last FY (NPR)	Investment in additional agri-extension Services of last FY (NPR)
	Mechi Corridor- Ilam District (n=29)											
1	Ganesh Agrovet Center	Bashu Prasad Ghimire (Sharma)	9842627390	Owner	Technical	Ilam Municipality	5	8	Yes	Yes	700,000	0
2	New Krishi Beej	Pashupati Bhattarai	9852680044	Owner	Technical	Ilam Municipality	7	12	Yes	Yes	4,613,253,400	200,000
3	Krishi Beej Bhandar	Anjana Parajuli	9842647322	Manager	Literate	Ilam Municipality	7	30	Yes	Yes	2,994,560	400,000
4	Mangalbare Krishi Bhandar	Subash Ghimire	9844610166	Owner	Technical	Deumai Municipality	4	18	Yes	Yes	3,000,000	50,000
5	Gramin Krishi Beej Bhandar	Narayan Prasad Poudel	9842735904	Owner	Technical	Ilam Municipality	5	11	Yes	Yes	1,600,000	0
6	Yahowa Krishi Tatha Pashu Sewa Vetnary Center	Balkrishna Adhikari	9816921093	Staff	Non-Technical	Deumai Municipality	4	4	No	Yes	1,500,000	0
7	Om Shidda Kali Agrovet	Kalpana Karki	9842008138	Manager	Non-Technical	Deumai Municipality	4	10	Yes	Yes	2,900,000	0
8	Manjil Krishi Tatha Vetenary Sewa	Babita Adhikari Thapa	9814090552	Manager	Non-Technical	Ilam Municipality	4	5	No	No	200,000	0
9	Subhalabha Krishi Bhandar	Chet Kumar Magar	9852682373	Owner	Technical	Ilam Municipality	7	6	Yes	Yes	500,000	0
10	Ma Durga Agricuture And Supply	Dinesh Chandra Mahat	9842745900	Manager	Non-Technical	Ilam Municipality	7	4	Yes	Yes	1,000,000	0
11	Pachakanya Agrovet	Pramod Kumar Shah	9864254833	Owner	Technical	Suryodaya Municipality	12	2	No	Yes	200,000	0
12	Bantawa Agrovet	Indip Rai	9863612635	Manager	Non-Technical	Suryodaya Municipality	11	6	No	No	200,000	0
13	Jai Ma Durga Agrovet And Feed Supplier	Kumar Bahadur Karki	9863612888	Manager	Technical	Suryodaya Municipality	10	2	No	No	900,000	0
14	Pashupati Krishi Bhandar	Manohar Thami	9844691902	Owner	Technical	Suryodaya Municipality	10	10	Yes	Yes	2,990,000	0
15	Yamuna Agrovet	Niraj Shah	9807329690	Manager	Technical	Suryodaya Municipality	10	21	Yes	Yes	2,900,000	0
16	Shah Agro Vet	Shivasankhar Shah	9842627981	Owner	Technical	Suryodaya Municipality	10	23	Yes	Yes	10,000,000	250,000
17	Pathibhara Krishi Bhandar	Bhim Prasad Subedi	9842627803	Manager	Non-Technical	Suryodaya Municipality	10	2	No	No	500,000	0
18	Ghimire Agro Center	Ganesh Ghimire	9842743408	Owner	Technical	Suryodaya Municipality	10	10	Yes	Yes	150,000	0
19	Kanyam Agro Vets	Gopal Khadka	9842662605	Owner	Technical	Suryodaya Municipality	6	12	Yes	Yes	1,000,000	0

SN	Name Of Service Provider	Name of Respondent	Contact	Position	Education	Municipality	Ward No.	Establishment Years	Permission letter for seed sells from AKC	License for pesticides sell	Annual Turnover of last FY (NPR)	Investment in additional agri-extension Services of last FY (NPR)
20	Shah Krishi Bhandar	Umesh Kumar Shah	9860850051	Owner	Technical	Suryodaya Municipality	10	8	Yes	Yes	2,950,000	20,000
21	Baral Agro Vet	Ranjana Baral	9862655433	Manager	Technical	Suryodaya Municipality	8	20	Yes	Yes	300,000	0
22	Durga Agrovet Center	Durga Maya Acharya	9826902525	Manager	Non-Technical	Ilam Municipality	10	3	Yes	Yes	500,000	100,000
23	Mata Pathivara Agrovet	Bhupendra Gartaula	9842717055	Owner	Technical	Suryodaya Municipality	12	22	No	No	800,000	100,000
24	Karki Agrovet	Hom Bahadur Karki	9861371267	Onwer	Technical	Suryodaya Municipality	9	15	Yes	Yes	500,000	20,000
25	Ashu Krishi Beej Bhandar	Nirmala Dhamala	9814053392	Owner	Non-Technical	Ilam Municipality	8	4	Yes	Yes	400,000	0
26	Kafle Agrovet Center	Dhanmaya Kafle	9849908477	Onwer	Non-Technical	Ilam Municipality	7	6	Yes	Yes	100,000	0
27	Pathivara Machinery Parts Bikri	Nar Bahadur Basnet	9816916968	Owner	Non-Technical	Ilam Municipality	8	5	No	No	8,500,000	0
28	Sangita Agrovet	Bimala Yadav	9817355500	Owner	Technical	Suryodaya Municipality	2	3	No	Yes	295,000	0
29	Maskot Agrovet Center	Roshan Poudel	9847241007	Owner	Technical	Ilam Municipality	1	3	No	No	300,000	0
	Mechi Corridor- Panchthar District (n=13)											
30	Pokhrel Agrovet	Muna Devi Khanal	9816997525	Manager	Non-Technical	Falgunanda Rural Municipality	7	19	Yes	Yes	200,000	0
31	Shrestha Agrovet	Rajendra Kumar Shrestha	9816935045	Owner	Technical	Falgunanda Rural Municipality	5	6	No	No	100,000	0
32	Rabi Vetenary And Sajha Agrovet	Dinesh Khanal	9852675151	Owner	Technical	Miklajung Rural Municipality	4	19	Yes	No	800,000	0
33	Lila Vetnary And Sajha Agrovet	Saran Kumari Lawati	9815041641	Owner	Non-Technical	Miklajung Rural Municipality	4	6	Yes	Yes	80,000	0
34	Pandey Agrovets	Arjun Pandey	9818087349	Onwer	Technical	Miklajung Rural Municipality	2	4	No	Yes	50,000	0
35	Apil Agro	Rajendra Dhakal	9852684672	Manager	Technical	Phidim Municipality	1	18	Yes	Yes	3,500,000	0
36	Om Sai Pathivara Suppliers	Rajendra Dhakal	9852684672	Owner	Technical	Phidim Municipality	1	12	No	No	50,000,000	0
37	Budhha Agrovet	Bhanu Tamang	9815003003	Owner	Technical	Phidim Municipality	1	13	Yes	Yes	250,000	0

SN	Name Of Service Provider	Name of Respondent	Contact	Position	Education	Municipality	Ward No.	Establishment Years	Permission letter for seed sells from AKC	License for pesticides sell	Annual Turnover of last FY (NPR)	Investment in additional agri-extension Services of last FY (NPR)
38	Miklajung Supplier	Sushila Rai	9815000866	Owner	Non-Technical	Phidim Municipality	1	4	No	No	5,000,000	0
39	Mishra Sajha Krishi Pasal	Tirtha Raj Mishra	9842681350	Owner	Technical	Phidim Municipality	1	24	Yes	Yes	1,000,000	0
40	New Bibek Krishi Bhandar	Devi Maya Baral	9842672540	Manager	Non-Technical	Phidim Municipality	6	8	Yes	Yes	4,500,000	800,000
41	Kisan Sewa Agrovet	Lila Nath Dhakal	9842013284	Owner	Technical	Phidim Municipality	1	26	Yes	Yes	500,000	0
42	Kubhakarna Vetenary	Manju Koirala	9840598785	Manger	Non-Technical	Phidim Municipality	1	5	Yes	No	400,000	0
	Mechi Corridor- Jhapa District (n=12)											
43	Suwani Krishi Bhandar	Kedar Baral	9852677724	Owner	Technical	Birtamod Municipality	5	26	Yes	Yes	400,000	0
44	Pathivara Agro Center	Puja Bhattrai	9816072154	Owner	Non-Technical	Jhapa Rural Municipality	13	1	Yes	Yes	-	0
45	Mechi Agro Veterinary	Kamal Baral	9852673418	Owner	Technical	Birtamod Municipality	5	28	Yes	Yes	80,000,000	0
46	Parijat Krishi Bhandar	Nawaraj Uprety	9844638130	Owner	Technical	Birtamod Municipality	5	8	Yes	Yes	20,000,000	0
47	Dhiren Agro Supplier	Dhiren Shrestha	9804786246	Owner	Technical	Mechinagar Municipality	13	6	Yes	Yes	4,000,000	20,000
48	Smriti Agro Vets	Netra Prasad Sapkota	9842702624	Manager	Technical	Mechinagar Municipality	13	1	Yes	Yes	400,000	0
49	Mitra Krishi Bhandar	Krishna Poudel	9842704890	Owner	Technical	Mechinagar Municipality	13	30	Yes	Yes	400,000	0
50	Hamro Agro Traders	Ganga Prasad Khatiwada	9852670809	Owner	Technical	Damak Municipality	1	26	Yes	Yes	30,000,000	0
51	Bhawana Agro Vet Center	Narendra Khadka	9829325263	Manager	Technical	Damak Municipality	5	10	Yes	Yes	500,000	0
52	Srekhara Krishi Bhandar	Robin Budhathoki	9844603499	Manager	Technical	Damak Municipality	6	30	Yes	Yes	40,000,000	0
53	Hamro Agro Traders	Ganga Prasad Khatiwada	9852670809	Owner	Technical	Damak Municipality	1	23	Yes	Yes	30,000,000	0
54	Gajurmukhi Agro Vet	Indra Kumar Budathoki	9816072624	Manger	Non-Technical	Damak Municipality	1	14	Yes	Yes	2,000,000	0
	Koshi Corridor- Dhankuta District (n=20)											
55	Koshi Pahadi Agrovet	Gopal Budathoki	9842061998	Owner	Non-Technical	Dhankuta Municipality	7	25	Yes	Yes	7,500,000	0
56	Xintang Veterinari	Saroja Baral	9842171860	Owner	Technical	Dhankuta Municipality	1	12	Yes	Yes	1,500,000	0
57	Nisan Vetnery Ausadi And Agri Pasal	Uttam Shrestha	9842053210	Owner	Technical	Dhankuta Municipality	7	19	Yes	Yes	2,000,000	50,000

SN	Name Of Service Provider	Name of Respondent	Contact	Position	Education	Municipality	Ward No.	Establishment Years	Permission letter for seed sells from AKC	License for pesticides sell	Annual Turnover of last FY (NPR)	Investment in additional agri-extension Services of last FY (NPR)
58	Kafle Kisan Pasal	Nagendra Kafle	9842301320	Owner	Literate	Dhankuta Municipality	1	24	Yes	Yes	2,000,000	0
59	Hile Agrovet Center	Sakuntala Surya Aale	9852132076	Owner	Technical	Dhankuta Municipality	1	11	Yes	Yes	3,500,000	0
60	Rona Agrovet	Som Bahadur Ranamagar	9862018941	Owner	Technical	Dhankuta Municipality	1	23	Yes	Yes	4,500,000	0
61	Pashupati Agrovet	Hikmat Shrestha	9804058543	Owner	Technical	Pakhribas Municipality	4	2	Yes	Yes	600,000	0
62	Agro Tek And Treders	Padmawati Rai	9842345032	Owner	Non-Technical	Pakhribas Municipality	4	5	No	Yes	1,000,000	0
63	Poultry Suppliers [Gautam Agrovet)	Dilip Gautam	9852061233	Owner	Technical	Mahalaxmi Municipality	5	13	No	Yes	2,000,000	0
64	Jorpati Agrovet	Tanka Kumari Rana	9842256122	Owner	Technical	Chhathar Jorpati Rural Municipality	2	8	Yes	Yes	1,100,000	0
65	Bisal Kisan Pasal	Radhika Dahal	9840362111	Owner	Non-Technical	Chhathar Jorpati Rural Municipality	6	8	Yes	Yes	3,000,000	0
66	Mid Hils Agro Suppliers and Concerns	Tara Poudel	9842387336	Owner	Non-Technical	Chhathar Jorpati Rural Municipality	6	6	Yes	Yes	4,500,000	0
67	Pahadi Agrovet	Menuka Thapa	9842341854	Owner	Technical	Chhathar Jorpati Rural Municipality	4	20	Yes	Yes	3,500,000	0
68	Aaditya Veterinary Mix Shopping Center	Asfitua Rai	9769710460	Owner	Non-Technical	Sahidbhumi Rural Municipality	6	5	Yes	Yes	500,000	50,000
69	Uttarpani Agrovet	Dilima Rai	9815320014	Owner	Non-Technical	Pakhribas Municipality	9	4	Yes	Yes	1,500,000	100,000
70	Roila Agrovet	Durga Roila	9852111251	Owner	Non-Technical	Dhankuta Municipality	9	7	Yes	Yes	150,000	2,000,000
71	New Pathivara Agro Center	Lila Rai	9814395292	Owner	Non-Technical	Sangurigadhi Rural Municipality	6	10	Yes	Yes	500,000	25,000
72	Krishak Agro Vet	Gita Debi Yadab	9807725103	Owner	Non-Technical	Sangurigadhi Rural Municipality	5	20	Yes	Yes	2,500,000	150,000
73	Rajarani Krishi Agro	Bikram Chemjong	9842151580	Owner	Non-Technical	Chaubise Rural Municipality	6	9	Yes	Yes	2,500,000	250,000
74	Chubise Agrovet	Puja Khadka	9827025989	Owner	Technical	Chaubise Rural Municipality	6	1	No	No	1,500,000	200,000

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	Koshi Corridor- Terhathum District (n=14)											
75	Bharati Pashu Panxi Upachar Tatha Paramarsa Sewa	Bharati	9842455980	Owner	Technical	Myanglung Municipality	6	2	Yes	No	1,000,000	0
76	Dajuvai Agro Tatha Suppliers	Nabin Bhattarai	9862430373	Owner	Non-Technical	Laligurans Municipality	5	2	Yes	Yes	1,500,000	0
77	Kiran Agrovet	Hari Kirat	9842070724	Owner's Father	Non-Technical	Laligurans Municipality	2	5	No	Yes	1,500,000	0
78	Xathar Agrovet	Janak Karki	9842379287	Owner	Non-Technical	Chhathar Rural Municipality	5	17	Yes	Yes	500,000	0
79	Adhikari Agrovet Center	Raju Adhikari	9862112660	Owner	Technical	Myanglung Municipality	2	25	Yes	Yes	3,000,000	0
80	Dhungana Pashu Ausadhalaya	Loknath Dhungana	9842059900	Owner	Technical	Myanglung Municipality	2	15	Yes	Yes	300,000	0
81	Durga Vawani Veterinari Medicine Center	Prem Prasad Dhungana	9852060264	Owner	Non-Technical	Myanglung Municipality	2	20	Yes	No	500,000	0
82	Baral Agro Veterenari Center	Yam Mani Baral	9842473058	Owner	Technical	Aatharai Rural Municipality	1	25	Yes	Yes	1,000,000	0
83	Sankhet Yegro Bheterinari	Jyoti Kumar Bohora	9843202029	Owner	Non-Technical	Aatharai Rural Municipality	1	3	No	Yes	500,000	0
84	Indramaya Veterenari	Sita Budhathoki	9862811852	Owner	Non-Technical	Myanglung Municipality	6	5	Yes	Yes	300,000	0
85	Rubi Kirana Pasal	Torn Bahadur Karki	9842426692	Owner	Non-Technical	Myanglung Municipality	7	10	No	No	25,000	0
86	Mancheyayem Agrovet	Tanka Bahadur Tamang	9762038816	Pwner	Non-Technical	Menchhayayem Rural Municipality	5	8	No	Yes	400,000	0
87	Laliguras	Samjhana Thapa	9852060044	Owner	Non-Technical	Laligurans Municipality	7	12	Yes	Yes	2,500,000	0
88	Tinjure Agrovets	Rishipuj Rai	9825317941	Owner	Technical	Laligurans Municipality	2	12	Yes	Yes	1,000,000	0
	Koshi Corridor- Bhojpur District (n=10)											
89	Manakamana Agrovet	Gajendra Bahadur Karki	9842095697	Owner	Technical	Bhojpur Municipality	7	2	No	No	2,500,000	0
90	Siddakali Pashu Swasthya Upachar Kendra Tatha Agro Suppliers	Laxmi Ghimire	9814991559	Owner	Technical	Bhojpur Municipality	7	12	Yes	Yes	800,000	0
91	Bhojpur Agrovet Farma	Kumar Prasad Tamang	9842086498	Owner	Literate	Bhojpur Municipality	7	25	Yes	Yes	700,000	0

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92	Karan Agrovet	Ser Bahadur Khadka	9866326461	Owner	Technical	Arun Rural Municipality	3	9	No	No	400,000	0
93	Kaamana Agrovet	Chandra Bahadur Khatri	9814371077	Owner	Technical	Pauwa Dunma Rural Municipality	3	6	No	Yes	500,000	0
94	Archana Agrovet	Krishna Bahadur Khatri	9828064158	Owner	Non-Technical	Pauwa Dunma Rural Municipality	3	18	Yes	No	250,000	0
95	Bhojpur Agrovet	Binam Shrestha	9852086469	Owner	Technical	Bhojpur Municipality	7	4	Yes	Yes	1,000,000	0
96	Dawa Pashu Upachar Kendra Tatha Agro Supplier	Rajan Pradhan	9819337213	Owner	Technical	Bhojpur Municipality	3	8	Yes	Yes	300,000	0
97	Tiwari Agrovet	Krishna Prasad Tiwari	9815062904	Owner	Technical	Pauwa Dunma Rural Municipality	2	5	Yes	No	2,000,000	0
98	Prativa Agrovet And Suppliers	Ganesh Ku.Ar Shrestha	9842347787	Owner	Non-Technical	Arun Rural Municipality	6	15	Yes	Yes	300,000	0
	Koshi Corridor- Sunsari District (n=9)											
99	New Makalu Agro Vet	Kasusal Bista	9762722211	Manager	Non-Technical	Itahari Sub-Metropolitian City	9	11	Yes	Yes	-	0
100	Mendoza Agro Store	Kusum Tamang	9829349732	Owner	Technical	Dharan Sub-Metropolitian City	3	10	Yes	Yes	2,500,000	200,000
101	Anugraha Agrovet	Ok	9800906539	Staff	Technical	Dharan Sub-Metropolitian City	3	1	Yes	Yes	2,800,000	250,000
102	Krishi Batiks	Upendra Prasad Saha	9862205323	Owner	Technical	Dharan Sub-Metropolitian City	3	32	Yes	Yes	500,000	0
103	Safal Agro Traders	Kesab Lamichane	9851028570	Owner	Technical	Itahari Sub-Metropolitian City	6	6	Yes	No	10,000,000	0
104	RR Trade And Suppliers	Duka Devi Dahal	9843475445	Owner	Technical	Itahari Sub-Metropolitian City	6	3	Yes	Yes	2,500,000	0
105	Rijal Agro Tredars	Sujan Niraula	9814021014	Staff	Technical	Itahari Sub-Metropolitian City	7	1	No	Yes	-	0
106	Priyanka Agrovets	Rosan Raj Mahato	9852054883	Owner	Non-Technical	Itahari Sub-Metropolitian City	6	19	Yes	Yes	10,000,000	100,000

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107	Chaudhary Agrovets	Satya Narayan Majhi	9810101571	Owner	Non-Technical	Duhabi Municipality	4	13	Yes	Yes	2,500,000	0
	Koshi Corridor- Morang District (n=5)											
108	Purwanchal Agro Vet	Omraj Thapa	9852021563	Owner	Technical	Biratnagar Metropolitian City	6	34	Yes	Yes	40,000,000	0
109	Bachan Agricu	Bipul Bachan	9824312451	Manger	Non-Technical	Biratnagar Metropolitian City	6	40	Yes	Yes	5,000,000	0
110	Manoj Agrovet	Santosh Thakur	9703740556	Owner	Technical	Dhanapalthan Rural Municipality	4	35	Yes	Yes	5,000,000	0
111	Pashupati Khad Bij Bhandar	Sib Narayan Rajbabsu	9811090150	Owner	Non-Technical	Rangeli Municipality	7	26	Yes	Yes	2,000,000	0
112	Kamal Agrovet	Sampat Lal Saha	9816341620	Owner	Non-Technical	Sunwarshi Municipality	9	12	Yes	Yes	5,000,000	0
	Sagarmatha Corridor- Udayapur District (n=31)											
113	Rampur Agrovet Center	Naindra Karki	9819773232	Owner	Technical	Belaka Municipality	9	8	Yes	No	4,600,000	0
114	Shrestha Agrovet	Gauri Shrestha	9807768466	Owner	Technical	Belaka Municipality	9	8	Yes	Yes	2,500,000	0
115	Aaulobijaya Agro	Yaman Rai Done	9842916600	Staff	Non-Technical	Triyuga Municipality	11	5	Yes	Yes	2,200,000	0
116	Health Vet Pharma	Aruna Chaudhary	9817753475	Manager	Technical	Belaka Municipality	9	12	Yes	Yes	2,800,000	0
117	Sita Vet Center	Hari Bahadur Khadka	9842927547	Owner	Technical	Chaudandigadhi Municipality	6	21	Yes	Yes	3,900,000	0
118	Hamro Agrovet	Akash Ghimire	9816723297	Owner	Technical	Chaudandigadhi Municipality	7	3	Yes	Yes	5,000,000	0
119	Katuwal Pashupanchhi Ausadhi Pasal	Pankaj Katuwal	9852844022	Manager	Technical	Chaudandigadhi Municipality	6	24	Yes	Yes	5,000,000	0
120	Avishek Agrovrt	Durgananda Chaudhary	9842837416	Owner	Technical	Triyuga Municipality	11	18	Yes	Yes	12,000,000	0
121	Sirjana Agrovet	Satyanarayan Chaudhary	9819715824	Owner	Technical	Triyuga Municipality	11	21	Yes	Yes	10,000,000	0
122	Triyuga Agrovet Center	Nirmala Budathoki Karki	9842826648	Owner	Technical	Triyuga Municipality	11	18	Yes	Yes	6,000,000	0
123	Raut Agrovet	Santosh Raut	9846667127	Owner	Technical	Triyuga Municipality	11	2	No	No	900,000	0
124	Nisha Agrovet	Rabi Pajiyar	9840636950	Manager	Technical	Triyuga Municipality	11	7	No	Yes	2,500,000	0

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125	Tamang Agrovet	Dhanbir Tamang	9842537790	Owner	Technical	Udayapurgadhi Rural Municipality	6	7	No	Yes	3,000,000	0
126	Gita Agrovet	Lilaraj Shrestha	9842538585	Owner	Technical	Udayapurgadhi Rural Municipality	6	3	No	Yes	2,900,000	0
127	Kishan Agrovet	Subina Katuwal	9863979555	Manager	Technical	Katari Municipality	4	7	Yes	Yes	15,000,000	0
128	Dipendra Agrovet	Dipendra Thapa Magar	9843272664	Owner	Technical	Katari Municipality	4	3	Yes	No	1,200,000	0
129	Smart Rautamai Pasu Tatha Krisi Sewa Kendra	Kailash Karki	9861731450	Owner	Technical	Rautamai Rural Municipality	7	3	Yes	No	1,200,000	0
130	Rautarani Agrovet	Ekraj Karki	9742289718	Owner	Technical	Rautamai Rural Municipality	7	5	No	No	700,000	0
131	Chandika Agro	Binod Kumar Dahal	9802215921	Owner	Technical	Rautamai Rural Municipality	7	12	No	Yes	800,000	0
132	Anil Agrovet	Anil Ghimire	9842813015	Owner	Technical	Triyuga Municipality	7	11	No	Yes	2,900,000	0
133	Karki Agrovet	Dhaka Kumari Thapa	9862541757	Owner	Technical	Triyuga Municipality	7	5	Yes	Yes	4,000,000	0
134	Kharpali Agrovet	Manju Khanal	9861547812	Owner	Technical	Triyuga Municipality	9	4	No	Yes	1,200,000	0
135	Shrestha Agro	Tanka Bahadur Shrestha	9852835214	Owner	Technical	Udayapurgadhi Rural Municipality	8	7	Yes	Yes	3,000,000	0
136	Kankai Agrovet	Sunil Shaha	9852832392	Manager	Technical	Katari Municipality	3	21	Yes	Yes	8,000,000	0
137	Gita Vet Concern	Ramakanta Chaudhary	9842881937	Owner	Technical	Katari Municipality	3	26	Yes	Yes	40,000,000	0
138	Sunkoshi Agrovet Center	Tulasha Magar	9842944446	Staff	Technical	Katari Municipality	14	7	Yes	Yes	2,200,000	0
139	Pokharel Agrovet Center	Chhabiraman Pokharel	9843245729	Owner	Technical	Katari Municipality	6	2	No	Yes	300,000	0
140	Krishana Agrovet	Krishana Chaudhary	9801501612	Owner	Technical	Triyuga Municipality	3	9	Yes	Yes	1,600,000	0
141	Rajesh Agrovet	Rajesh Chaudhary	9805997510	Owner	Technical	Triyuga Municipality	4	5	Yes	Yes	2,100,000	0
142	Shiv Binayak Agro	Nirjala Khadka	9842869499	Staff	Technical	Triyuga Municipality	5	12	No	Yes	5,000,000	0

SN	Name Of Service Provider	Name of Respondent	Contact	Position	Education	Municipality	Ward No.	Establishment Years	Permission letter for seed sells from AKC	License for pesticides sell	Annual Turnover of last FY (NPR)	Investment in additional agri-extension Services of last FY (NPR)
143	Ram Janaki Agrovet	Ishwor Bahadur Shrestha	9842975865	Owner	Technical	Triyuga Municipality	3	7	No	Yes	1,800,000	0
	Sagarmatha Corridor- Okhaldhunga District (n=10)											
144	Krisha Agrovet Pasal	Isha Basnet	9842980353	Staff	Non-Technical	Manebhanjyang Rural Municipality	5	11	Yes	Yes	1,800,000	0
145	Sharada Agrovet	Sharada Niraula	9852845165	Owner	Technical	Siddhicharan Municipality	11	10	Yes	Yes	3,100,000	0
146	Rumjatar Agrovet	Ahamad Mansuri	9842206085	Staff	Technical	Siddhicharan Municipality	4	12	Yes	Yes	60,000	0
147	Sagarmatha Agro Center	Raj Kumar Rai	9842981848	Owner	Technical	Manebhanjyang Rural Municipality	4	7	Yes	Yes	800,000	0
148	Gurung Agrovet	Rohit Gurung	9842857759	Staff	Non-Technical	Siddhicharan Municipality	4	10	Yes	Yes	400,000	0
149	Rns Agro	Ramila Niraula	9843552240	Owner	Technical	Siddhicharan Municipality	11	4	Yes	Yes	6,000,000	0
150	Koyal Agrovet	Koyal Rai	9842970283	Owner	Technical	Manebhanjyang Rural Municipality	5	2	Yes	No	1,800,000	0
151	Bastola Vet Pharma	Yubaraj Bastola	9863745617	Owner	Technical	Siddhicharan Municipality	4	5	No	No	1,500,000	0
152	Sarthak Agro Center	Kumari Baniya Ghimire	9862807603	Owner	Technical	Siddhicharan Municipality	12	9	Yes	Yes	1,800,000	0
153	Karki Agrovet	Parbati Karki	9842929463	Staff	Non-Technical	Siddhicharan Municipality	12	18	Yes	Yes	5,000,000	0
	Sagarmatha Corridor- Khotang District (n=9)											
154	Halesi Agro Seed Center	Anjana Rai	9862744814	Owner	Technical	Diktel Rupakot Majhuwagadhi Municipality	1	7	No	Yes	1,200,000	0
155	RN Agrovet Center	Nabin Acharya	9862741771	Staff	Technical	Diktel Rupakot Majhuwagadhi Municipality	1	1	No	Yes	-	0
156	Bajimaya Agro And Seed Center	Raju Bajimaya	9842877079	Owner	Non-Technical	Diktel Rupakot Majhuwagadhi Municipality	1	17	Yes	Yes	10,000,000	0
157	Purnima Agrovet	Sachin Bastola	9862742886	Owner	Technical	Diktel Rupakot Majhuwagadhi Municipality	1	3	No	Yes	4,000,000	0
158	Pramila Agro Center	Pramila Rai	9848010903	Staff	Non-Technical	Diktel Rupakot Majhuwagadhi Municipality	1	10	Yes	Yes	1,800,000	0

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159	Subham Agrovet Center	Sudip Rai	9863837001	Staff	Technical	Halesi Tuwachung Municipality	7	6	Yes	Yes	1,200,000	300,000
160	Kalika Halesi Agrovet	Daksha Kumar Rai	9869568093	Owner	Technical	Halesi Tuwachung Municipality	7	7	Yes	Yes	3,600,000	800,000
161	Halesi Agrovet Center	Dijen Rai	9863878174	Owner	Technical	Halesi Tuwachung Municipality	7	2	No	Yes	600,000	0
162	Dudhkoshi Agrovet Center	Anjan Bhattarai	9860198946	Owner	Technical	Halesi Tuwachung Municipality	1	1	Yes	No	-	0

Appendix 7: List of Agriculture Cooperatives Sampled in Koshi Province (n=29)

SN	Name of Service Provider (Agri-Coop)	Name of Respondent	Contact Number	Position	Level of Education	District	Municipality	Ward No.	Annual agri loan investment (NRs.)
1	Deumai Multipurpose Co-Operatives Society Ltd	Deukumar Managr	9842724089	Manager	Masters	Ilam	Deumai Municipality	4	1,731,307
2	Shree Namuna Krishi Tatha Pashupalan Sastha Ltd	Padam Prasad Acharya	9863611665	Manager	Secondary	Ilam	Deumai Municipality	4	10,000,000
2	Shree Janamaitri Krishi Sahakari	Sakila Rai	9864278347	Staff	Bachelors	Ilam	Suryodaya Municipality	11	4,827,300
4	Shree Mahila Pashupati Krishi Bahudeshya Sahakari	Kalpana Tamang	9869731444	Manager	Bachelors	Ilam	Suryodaya Municipality	2	6,000,000
5	Rabi Kiran Krishi Bahudeshya Sanstha	Urmila Rai	9815000977	Manager	Secondary	Panchthar	Miklajung Rural Municipality	4	5,100,000
6	Hatemalo Krishi Sahakari Sastha	Devi Prasad Adhikari	9852681606	Chairman	Bachelors	Panchthar	Phidim Municipality	1	45,495,270
7	Shree Gauri Shankhar Krishi Sahakari Sastha	Milan Pokhrel	9842681759	Manager	Bachelors	Panchthar	Phidim Municipality	1	10,000,000
8	Koshi Hill Enterprenent Producer Cooperative Limited Nepal (KOSEPAN)	Jagadish Raya	9842366790	Manager	Masters	Dhankuta	Dhankuta Municipality	7	-
9	Guthi Krishi Sahakari	Dananjay Chapagai	9842080368	Manager	Secondary	Dhankuta	Dhankuta Municipality	9	-
10	Chanuwa Namfu Krishi Bahuudeshyia Sahakari Sanstha Limited	Rajesh Budathoki	9763527933	Chairperson	Secondary	Dhankuta	Mahalaxmi Municipality	4	-
11	Siduwa Bahuudesyiya Sahakari Sanstha	Hem Prasad Bhattarai	9842342526	Manager	Secondary	Dhankuta	Chhathar Jorpati Rural Municipality	6	-

SN	Name of Service Provider (Agri-Coop)	Name of Respondent	Contact Number	Position	Level of Education	District	Municipality	Ward No.	Annual agri loan investment (NRs.)
12	Kiyachu Krishi Sahakari Sanstha	Tanka Maya Limbu	9842191975	Chairperson	Masters	Terhathum	Myanglung Municipality	1	200,000
13	Yakumbagadi Krishi Sahakari Sanstha Li	Daya Sagar Gautam	9852684246	Chairperson	Secondary	Terhathum	Aatharai Rural Municipality	1	120,000
14	Jan Jagaran Krishi Tatha Upvokta Sahakari Lomited	Narendra Karki	9842329520	Chairperson	Secondary	Terhathum	Chhathar Rural Municipality	2	1,100,000
15	Siminakshi Krishi Sahakari Sanstha	Tej Prakas Shrestha	9849035432	Member	Primary	Terhathum	Myanglung Municipality	6	1,600,000
16	Amphuwa Jiri Bahuudesyiy Sahakari Sanstha Li	Radhika Bhattarai	9852749689	Manager	Bachelors	Terhathum	Myanglung Municipality	6	-
17	Lungvitta Krishi Sahakari Sanstha	Subas Kandanwa	9842180334	Secretry	Secondary	Terhathum	Aatharai Rural Municipality	6	500,000
18	Krishi Prabardan Sahakari	Rajkumar Shrestha	9862297477	Executive Member	Secondary	Bhojpur	Bhojpur Municipality	12	1,000,000
19	Bij Briddi Krishi Sahakari Sanstha	Kamal Shrestha	9845879000	Secretary	Secondary	Bhojpur	Bhojpur Municipality	4	400,000
20	Mayung Krishi	Sundar Shrestha	9819333972	Secretary	Secondary	Bhojpur	Bhojpur Municipality	3	200,000
21	Sana Kishan Krishi Sahakari Sangstha Ltd	Yubaraj Koirala	9842845068	Manager	Secondary	Udayapur	Triyuga Municipality	5	47,274,000
22	Sajha Sahakari Sangstha Ltd	Nabin Kumar Danuwar	9922305736	Staff	Secondary	Udayapur	Katari Municipality	3	-
23	Anna Bali Krishi Sahakari Sangstha Ltd	Dharmaraj Bhattarai	9804747662	Manager	Secondary	Udayapur	Katari Municipality	5	1,962,000
24	Shrada Mahila Bahuudesiya Sahakari Sangstha Ltd	Gita Kumari Thapa Magar	9805952200	Chairman	Secondary	Udayapur	Triyuga Municipality	3	3,925,000
25	Rampur Krishi Sahakari Sangstha Ltd	Dambar Prasad Bastola	9842950638	Manager	Masters	Khotang	Diktel Rupakot Majhuwagadhi Municipality	6	250,000
26	Halesi Mahila Krishi Sahakari Sangstha Ltd	Lakshmita Thakuri	9869194766	Manager	Secondary	Khotang	Halesi Tuwachung Municipality	7	450,000
27	Nawayug Pragatishil Bahuudesiya Sahakari	Yubaraj Rai	9851230997	Chairperson	Secondary	Okhaldhunga	Manebhanjyang Rural Municipality	2	760,000
28	Sarswoti Mahila Krishi Sahakari	Laxmi Katuwal	9842993611	Manager	Secondary	Okhaldhunga	Siddhicharan Municipality	2	141,300
29	Taluwa Mahila Bahuudesiya Sahakari	Sirjana Thapa Magar	9817731199	Manager	Bachelors	Okhaldhunga	Siddhicharan Municipality	1	206,800

Appendix 8: List of Private Agriculture Companies Sampled in Koshi Province (n=29)

SN	Name of Service Provider (Agri-Companies)	Name of Respondent	Contact Number	Position	Level of Education	District	Municipality	Ward No.	Annual turnover (NRs.)
1	Aryal Chowk Krishi Khadya Prosodhan and Packaging Udhyog	Shiva Kumar Aryal	9842681838	Manager	Secondary	Ilam	Rong Rural Municipality	3	100,000
2	Ghimire Rice Mills	Shyam Kumar Ghimire	9842728686	Owner	Primary	Ilam	Suryodaya Municipality	8	2,000,000
3	Sakti Food Products	Kamal Niraula	9817031240	Owner	Secondary	Ilam	Suryodaya Municipality	9	1,200,000
4	Namuna Achar Collection Udyog	Niyati Rijal	9807948359	Manager	Secondary	Ilam	Ilam Municipality	7	5,000,000
5	Pabitra Seed Company Pvt Ltd	Chandra Ojha	9851201161	Manager	Bachelors	Ilam	Suryodaya Municipality	5	50,000,000
6	Kisan Care Pvt Ltd	Rajeev Raman Neupane	9857016237	Director	Masters	Ilam	Suryodaya Municipality	10	15,000,000
7	Dr Agro Tech	Raju Bista	9841804576	Owner	Bachelors	Panchthar	Phidim Municipality	1	9,000,000
8	Bhattarai Rai	Tara Prasad Bhattarai	9761078916	Owner	Primary	Panchthar	Phidim Municipality	1	400,000
9	Tamor Nepal Agro Pra. Li	Sandip Khatiwada	9852634675	Owner	Bachelors	Jhapa	Birtamod Municipality	5	14,000,000
10	Machinery Nepal Private Limited	Ronash Bhazgain	9842755788	Manager	Masters	Jhapa	Birtamod Municipality	5	100,000,000
11	Asian Seeds Pvt Ltd	Mohan Kattel	9815085889	Manager	Bachelors	Jhapa	Birtamod Municipality	5	80,000,000
12	Kuber and Sons Pvt. Ltd	Jaya Prakas Ghimire	9804060344	Owner	Bachelors	Sunsari	Itahari Sub-Metropolitian City	9	19,500,000
13	Patlekhola Tarkari Sankalan Kendra	Lekhnath Subedi	9842050795	Member	Secondary	Dhankuta	Dhankuta Municipality	6	20,000,000
14	Shree Krishna Krishi Aujaar Suppliers	Saurav Dahal	9862042193	Owner	Bachelors	Dhankuta	Dhankuta Municipality	1	48,000,000
15	Sindhuwa Krishi Bhandar	Meghendra Gurung	9842366624	Owner	Secondary	Dhankuta	Chhathar Jorpati Rural Municipality	6	300,000,000
16	Igavocado	Rajesh Kumar	9707784882	CEO	Bachelors	Dhankuta	Pakhribas Municipality	4	-
17	Terhathum Yegro Tredars	Nagendra	9842114792	Owner	Secondary	Terhathum	Myanglung Municipality	1	2,500,000
18	Prakriti Gharelu Achar Udhog	Sashi Lama Karki	9862945961	Owner	Secondary	Udayapur	Triyuga Municipality	11	80,000
19	New Variety Masala Udhog	Rabin Gurung	9852835836	Owner	Secondary	Udayapur	Triyuga Municipality	4	6,000,000
20	Namuna Krishi Janya Samagri Prasodhan Kendra	Durga Jayanti Rai	9851185152	Owner	Bachelors	Khotang	Diktel Rupakot Majhuwagadhi Municipality	1	1,600,000
21	Khotang Uddami Kosheli Ghar	Bimala Rai	9852849060	Owner	Secondary	Khotang	Diktel Rupakot Majhuwagadhi Municipality	1	2,500,000

SN	Name of Service Provider (Agri-Companies)	Name of Respondent	Contact Number	Position	Level of Education	District	Municipality	Ward No.	Annual turnover (NRs.)
22	Manila Organic Krisi Prasodhan Kendra	Mansubha Tamang	9842935613	Staff	Secondary	Okhaldhunga	Siddhicharan Municipality	11	290,000
23	Roshan Suppliers	Roshan Katuwal	9852840756	Owner	Secondary	Okhaldhunga	Siddhicharan Municipality	11	10,000,000

Appendix 9: List of Digital Agriculture Service Providers Sampled in Koshi Province (n=5)

SN	Name of Service Provider (Agri-Coop)	Name of Respondent	Contact Number	Position	Level of Education	District	Municipality	Ward No.	Annual turnover (NRs.)	Social Media Link
1	Pathway Technologies and Services Private Limited	Bobin Thapa	9769761946	Agriculture Programme Coordinator	Masters	Ilam	Rong Rural Municipality	6	62,486,611	https://www.facebook.com/geokrishi
2	Dream Works Solution	Kiran Bamanu	9855025158	Coordinator	Masters	Jhapa	Jhapa Rural Municipality	6	22,651,452	https://www.facebook.com/share/1AcHSu2xMg/
2	Dynamic Solution	Manshi Jaiswal	9855036603	Coordinator	Masters	Jhapa	Jhapa Rural Municipality	6	1,662,812	
4	Bhabi Engineering Solution	Buddinath Timsina	9843019295	Directors	Masters	Morang	Sundarharaicha Municipality	1	7,100,000	
5	Dv Excellus Pvt Ltd -Kheti Karja	Mr. Neuraj Karki	9802393240	Operation Director	Masters	Ilam	Suryodaya Municipality	10	200,000,000	https://www.facebook.com/dvexcellus

Appendix 10: List of Input/Outputs Buyers (Wholesalers/Processors) Surveyed in Koshi Province (n=29)

SN	Name of Service Provider (Inputs/outputs buyers)	Name of Respondent	Contact Number	Position	Level of Education	District	Municipality	Ward No.	Annual Turnover (NRs.)
1	Selling Varieties	Mangal Bahadur Limbu	9815918392	Manager	Primary	Ilam	Ilam Municipality	5	400,000
2	Myra Vegetable Shop	Mohan Rai	9815092674	Manager	Secondary	Ilam	Ilam Municipality	7	100,000
3	Dipsana Sabji Pasal	Dipesh Karki	9840994365	Owner	Secondary	Ilam	Ilam Municipality	7	400,000
4	Nirmala Local Varieties	Khagenra Prasad Sanjel	9862763720	Manager	Secondary	Ilam	Ilam Municipality	7	2,000,000
5	Sandakpur Sabji Pasal	Bimkala Sunuwar	9844649609	Manager	Primary	Ilam	Ilam Municipality	7	700,000
6	Janta Kirana Pasal	Puspa Khatiwada	9763504450	Owner	Secondary	Ilam	Deumai Municipality	4	400,000
7	Mausami Store	Sudarshan Mandal	9817961096	Owner	Secondary	Ilam	Deumai Municipality	4	700,000

SN	Name of Service Provider (Inputs/outputs buyers)	Name of Respondent	Contact Number	Position	Level of Education	District	Municipality	Ward No.	Annual Turnover (NRs.)
8	Ishan Kirana Pasal	Ishwor Shrestha	9852226162	Owner	Secondary	Bhojpur	Bhojpur Municipality	7	5,000,000
9	Bandana And Ridam Sabji Tatha Kirana Pasal	Om Kumar Yonjan	9842592269	Owner	Primary	Terhathum	Myanglung Municipality	1	4,000,000
10	Rupa Store	Rupa Baniya	9849972069	Owner	Secondary	Terhathum	Laligurans Municipality	2	7,500,000
11	Sabnam Fenci Tatha Maxa Masu Pasal	M D Samsad Ali	9852060786	Owner	Primary	Terhathum	Myanglung Municipality	3	10,000,000
12	Patenagi Sabjitatha Falful Pasal	Bijaya Mukhiya	9808306037	Manager	Primary	Ilam	Ilam Municipality	7	400,000
13	Namabudda Koseli Ghar	Nima Sherpa	9815940965	Owner	Secondary	Panchthar	Falgunanda Rural Municipality	3	100,000
14	J Yunis Store	Bhanubhakta Sanjel	9852681983	Owner	Secondary	Panchthar	Falgunanda Rural Municipality	3	3,000,000
15	Laxmi Kirana Tatha Tarkari Pasal	Dasarath Prasad Saha	9842828987	Owner	Secondary	Udayapur	Triyuga Municipality	13	5,100,000
16	Jeebin Jisam Sabji Bhandar	Jeebin Rai	9849515261	Owner	Secondary	Udayapur	Triyuga Municipality	13	6,022,500
17	Ram Laxman Sabji Bhandar	Radheshyam Saha	9842876028	Onwer	Secondary	Udayapur	Triyuga Municipality	13	10,000,000
18	Not Register Yet	Khagendra Prasad Poudel	9860267594	Owner	Secondary	Terhathum	Aatharai Rural Municipality	5	20,000,000
19	Subash Namuna Krishi Farm	Subash Dhamala	9816005173	Onwer	Secondary	Panchthar	Falgunanda Rural Municipality	3	10,000,000
20	Prerana Suppliers	Daibaram Rai	9842535508	Owner	Secondary	Khotang	Diktel Rupakot Majhuwagadhi Municipality	1	3,600,000
21	Bhagwati Suppliers	Anish Karki	9860791677	Owner	Bachelors	Khotang	Diktel Rupakot Majhuwagadhi Municipality	1	9,000,000
22	Merchant Tarkari Sankalan Kendra	Til Bahadur Shrestha	9852379124	Chairperson (Ex)	Secondary	Terhathum	Myanglung Municipality	6	17,500,000
23	Poudel Suppliers	Naina Poudel	9765384404	Owner	Secondary	Terhathum	Laligurans Municipality	2	5,000,000
24	Aasan Krishi Tatha Pasu Panxi Firm	Him Thapa	9763723600	Owner	Bachelors	Terhathum	Laligurans Municipality	7	3,000,000
25	Nawadurga Sabji Pasal	Tanka Roila	9852050983	Owner	Secondary	Dhankuta	Dhankuta Municipality	1	30,000,000
26	Jata Baba Gorakhnath Sabji Bhandar	Syam Sundar Gupta	9842275309	Owner	Primary	Sunsari	Dharan Sub-Metropolitan City	13	7,500,000
27	Jaya Ma Dantakali Sabji Bhandar	Birendra Chaudhary	9824392537	Owner	Secondary	Sunsari	Dharan Sub-Metropolitan City	13	6,000,000
28	Iswora Suppliers	Iswora Khatri	9842993800	Owner	Secondary	Okhaldhunga	Siddhicharan Municipality	11	2,600,000
29	Krish Karan Prasodhan Kendra	Sanju Basnet	9862618187	Owner	Secondary	Khotang	Diktel Rupakot Majhuwagadhi Municipality	1	600,000

Appendix 11: List of NGOs/CBOs Surveyed in Koshi Province (n=6)

SN	Name of Service Provider (NGOs/CBOs)	Name of Respondent	Contact Number	Position	Level of Education	District	Municipality	Ward No.	Types
1	Sahayatra Nepal	Hem Kumari Siwa	9842627640	President	Secondary	Ilam	Ilam Municipality	7	Local
2	Defan, Udayapur	Chandramani Guragai	9852832351	Chairman	Masters	Udayapur	Triyuga Municipality	11	National
3	National Farmer Group Federation, Phidim	Ganesh Pokhrel	9852681069	Manager (District In-Charge)	Secondary	Panchthar	Phidim Municipality	1	National
4	Janakalyan Samaj Nepal	Birendra Magar	9852849240	Chairman	Masters	Khotang	Diktel Rupakot Majhuwagadhi Municipality	1	District
5	Human Rights Social Awareness and Development Center (HUSADEC), Nepal	Diwas Dahal	9842450143	Project Officer	Bachelors	Dhankuta	Dhankuta Municipality	7	National
6	Lids Nepal	Hari Karki	9869733372	Chairman	Secondary	Okhaldhunga	Likhu Rural Municipality	4	Local

Appendix 12: List of Independent/Individual Agriculture Service Providers Surveyed in Koshi Province (n=11)

SN	Name of Service Provider (regi.) /Individual	Name of Respondent	Contact Number	Position	Education	Level of Education	District	Municipality	Ward No.	Year of experience
1	Kalpana Niraula	Kalpana Niraula	9812337573	Agronomist, non-entrepreneur	Technical	Secondary	Bhojpur	Pauwa Dunma Rural Municipality	3	2
2	No Name	Praveg Shresths	9825379434	Independent	Technical	Secondary	Dhankuta	Dhankuta Municipality	10	11
3	No Registration	Bima Rai	9862138849	Individual	Technical	Secondary	Dhankuta	Sahidbhumi Rural Municipality	6	32
4	No Registered	Likman Rai	9852109379	Independent	Non-Technical	Secondary	Dhankuta	Sahidbhumi Rural Municipality	6	15
5	Santosh Kandangwa	Santosh Kandangws	9842477637	Individual	Technical	Secondary	Terhathum	Aatharai Rural Municipality	7	18
6	Diwas Gartaula	Diwas Gartaula	9862667830	Junior Agriculture Technician	Technical	Secondary	Ilam	Suryodaya Municipality	10	10
7	Yogendra Man Shrestha	Yogendra Man Shrestha	9842635893	Independent Service Provider	Technical	Masters	Ilam	Ilam Municipality	7	5
8	Birendra Kafle	Birendra Kafle	9852681640	Agriculture Technician	Technical	Secondary	Panchthar	Phidim Municipality	6	10
9	Sarita Baral	Sarita Baral	9842434614	Agriculture Technician	Technical	Secondary	Panchthar	Phidim Municipality	1	8
10	Ghimire Krishi Farm	Raman Ghimire	9825794513	Independent	Technical	Secondary	Khotang	Diktel Rupakot Majhuwagadhi Municipality	4	4
11	DB Krishi Farm	Prakash Rokka	9862002701	Independent	Technical	Secondary	Khotang	Diktel Rupakot Majhuwagadhi Municipality	6	6

Appendix 13: Questionnaire for quantitative survey for private service providers using Solstice/mWater

(Link: https://solstice.world/#/forms/8adfeff5650845cebbbe99ce5af9f066)

Appendix 14: Policy Matrix: Private Sector Agriculture Extension in Nepal

Policy/Document	Key Provisions on Private Sector Extension	Relevance to PESPs	References
National Agricultural Policy (2004, amended 2061 BS)	Encourages PPPs in extension; promotes private roles in input supply, agro-processing, and marketing.	Recognizes private sector but lacks PESP-specific guidelines.	MoALD (2004)
Agriculture Development Strategy (ADS 2015-2035)	Advocates pluralistic extension with private participation; emphasizes demand-driven services.	Directly supports PESP integration into national systems.	GoN/ADS (2015)
Local Government Operation Act (2017)	Delegates extension to LGs; allows collaboration with private actors.	Enables LG contracts with PESPs for service delivery.	GoN (2017)
National Extension Strategy (2016)	Promotes diversified providers (private companies, NGOs, cooperatives).	Framework for PESP accreditation and coordination.	MoALD (2016)
Seed Act (1988) and Fertilizer Act (2001)	Regulates private input supply (seeds, fertilizers), indirectly shaping linked extension services.	Agro-vets act as de facto PESPs.	GoN (1988, 2001)
Digital Nepal Framework (2019)	Encourages digital agriculture platforms (e.g., Smart Krishi) for advisory services.	Supports tech-based PESPs (mobile apps, call centers).	MoCIT (2019)
Koshi Province Agriculture Policy (2023)	Prioritizes PPPs for extension; allocates LG budgets to engage private providers.	Incentivizes PESP partnerships in SIP-II districts.	Koshi Province (2023)

Key Takeaways

- Pro-Private Policies: Most policies endorse private sector roles but lack actionable guidelines (e.g., accreditation, funding).
- Local Governance: LGs can legally engage PESPs (Local Government Operation Act), but capacity constraints hinder implementation.
- Digital Potential: Digital Nepal Framework opens avenues for tech-driven PESPs (e.g., mobile advisory services).
- Gaps: No unified system for PESP accreditation, quality assurance, or performance monitoring.

Appendix 15: Community-based agricultural extension service centers (CAESC) concept and model

According to ADS (2015), the decentralized extension system will include three main measures: (i) establishment of Community Agricultural Extension Service Centers (CAESC) in each Village Development Committee (it becomes Ward in newly re-structured Palika at local government level); (ii) strengthening capacity of existing and planned Agriculture and Livestock Service Centers that will provide backstopping services to the community-based and management agricultural extension centers or CAESCs; and (iii) promoting a voucher system to empower farmers to access the best available agricultural input and extension service providers.

The presence of Community (Palika-based) Agricultural Extension Service Centers (CAESC) will ensure that the local conditions and agro-ecological conditions are taken into account. The development and dissemination of productivity enhancing technologies and systems appropriate to subsistence agriculture will be a task for the research and extension system (ADS, 2015, p. 70).

Though the constitution has provisioned that agriculture extension as exclusive function of the local level, the local governments still to establish full institutional set up for agricultural services. The local government has envisioned that ward as a service delivery unit. These wards cover relatively larger geographical coverage, diversity and larger population as compared to past political set up. However, the assessment also found that almost in every ward one or more types of service providers such as cooperatives, farmer groups, producer associations, Local Agriculture Resource Persons (LARP) and private sector actors such as agro-vets, farms, nurseries are available.

In this scenario, the programme proposes an institutional model which integrates some of the good practices in agriculture extension services such as farmer-to-farmer extension, cooperatives and some of the experiences from private sector embedded services. This proposed framework integrates a range of public, community and private sector partnership based upon the local context for piloting agriculture extension services at cluster (one or more wards) or ward level under 'business model'. CAESC is envisioned as service provider at cluster/ward level owned by community such as cooperatives, LARPs or agro-vets. The CAESC may receive support from various source to establish viable business, diversify clientele-based services based and receives incentives from one or more than one areas of the services as illustrated in Figure 13.

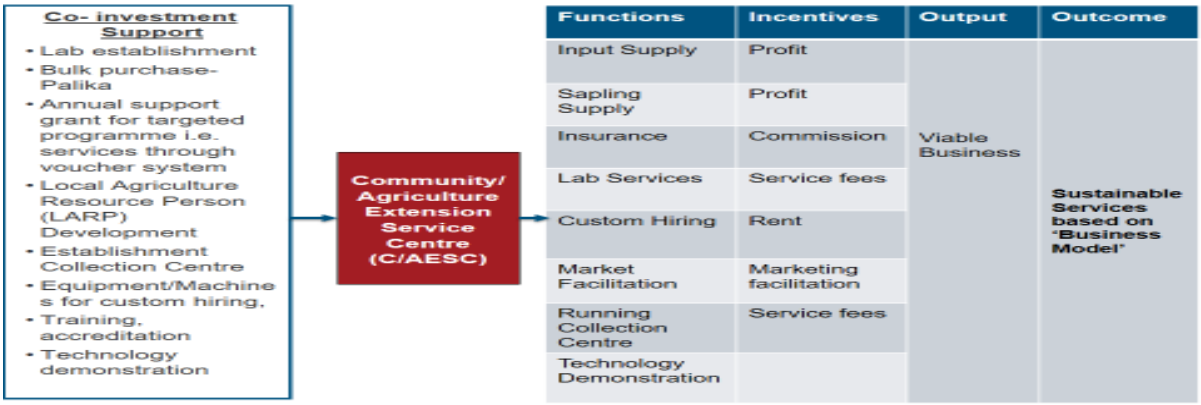


Figure 12: Business model of C/AESC for viable business and sustained agricultural services at local government' cluster/ward level

Integrated Agriculture Services from C/AESC based on the business model

As mentioned in Figure 13, the C/AESC will establish a viable business in an integrated model such as establish and operate agro-vet services, establish nurseries or farms, custom hiring

services, laboratory services, establishment and operation of collection centers, crop and livestock insurance services, technology demonstration etc. Based on the business plan, the CAESC may also receive support or funds from various sectors such as municipality, private sectors, projects and programmes, training institutions for initial establishment and expansion of the business, enhance technical capacity, advisory services and accreditation. The Municipality also can award service contracts to the CAESC for bulk purchasing of agro inputs such as seed, saplings, equipment and for targeted services such as vaccination, campaign, soil testing, promotional programmes. The targeted services can be operated through voucher system. The CAESC governing committee will act in planning, supervising and monitoring of these activities and perform a linking function with MALDC, municipal agriculture and livestock units, and municipal economic development committee.

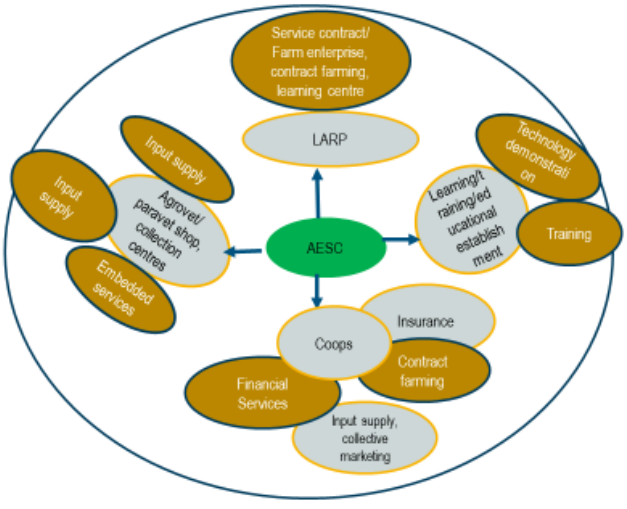
The CAESC receives incentives from one or more areas (as illustrated in the figure 2) such as incentives from selling agro-inputs, rental fees from farm equipment, fees/commissions from insurance, incentives from targeted services and fees from the service recipient in specific services. These incentives will support the CAESC to establish a viable business and which ultimately support to establish sustainable agricultural services in the long run. This model will contribute to overcome the constraints in agricultural services arising from the limited human resources and capacity of the public domain and increase access to the farmers for agricultural services near to their locality.

The Municipality will provide technical assistance through its Agriculture and livestock unit in areas such as quality assurance, capacity building, accreditation, service contracts for targeted services and input supplies. Further the Municipality will support through enabling policies and the MALDC or ward committee will facilitate to establish linkages, oversight for accountable services and feedbacks mechanisms.

Major actors of the Agriculture Extension Services

i) Private Sector: In a pluralistic extension system, the role of the private sector as a service provider is of growing importance. Thereby the private sector provides services in three forms: a) ***Embedded services***: Agro-vet / Para-vets and input suppliers advise farmers together with the sale of an input (e.g., seeds, pesticides, fertilisers, machinery, vaccines, and veterinary drugs); b) ***Contract farming***: Processing and trading businesses advise farmers in connection with the purchase of agricultural products; and c) ***Private Consulting Companies***: Private consulting company's advice farmers against the full payment of the services, e.g. in commercial farming.

ii) Local Agriculture Resource Persons (LARPs): LARPs includes a wide range of local service providers such as village agriculture worker, village animal health workers, leader farmers with agriculture enterprising. These service providers are provided specific training courses, gained experiences within their farming business and often accredited from government training institutions such as CTEVT. The services from these LARPs are well integrated in Farmer to Farmer (FtF) extension methods which is also incorporated in Agriculture extension policies. Farmer to Farmer Extension methods is well recognised as cost effective and efficient extension methods to reach larger number of farmers in Nepal since past decades. The CAESC governing committee could identify such local human resources and utilize their services in local trainings and demonstrations. This human resource may create their own agriculture related business which ultimately develop



the agricultural sector of the locality. The municipality should encourage these actors in the form of some incentives like soft loan or seed money.

iii) Cooperatives: Cooperatives provides multiple services to the farmers (as their members/ shareholders) such as collective marketing, input supply (seeds, fertilizers, custom hiring), provide financial services through saving credit schemes and collective farming. The governments at all level have also strong focus to strengthen cooperatives for social mobilization and economic activities at local level. The municipality could designate one such capable cooperative in CAESC to provide agriculture related services and distribute inputs. The municipality should have signed agreement with conditions on services and cooperative business.

iv) Training/learning Centers/educational establishment: these institutions or centers also provide various services such as technology demonstration, piloting, on the job training, trainings and advisory services. Such type of institutions particularly in the agriculture sector is growing nowadays.

The programme interventions for CAESC establishments include support to local government in developing guidelines, mapping of service providers and assess their capacities, support in capacity building of local service providers such as Agro-vets, Coops, LARPs and support the selected CAESC for developing and establishing viable business through co-investment support for viable business and to enhance their technical capacities for agriculture extension services. The municipality can facilitate the services and businesses of these actors with some incentives in the form of soft loan or seed money.

Linkages of C/AESC with Municipality

The Municipal Agriculture and Livestock section provides technical backstopping, regulation, quality assurance, service contracts. The Municipal Agriculture and Livestock Development Committee (MALDC) or ward committee will undertake a facilitating and oversight role to accountable, transparent services from C/AESC (Figure 14).

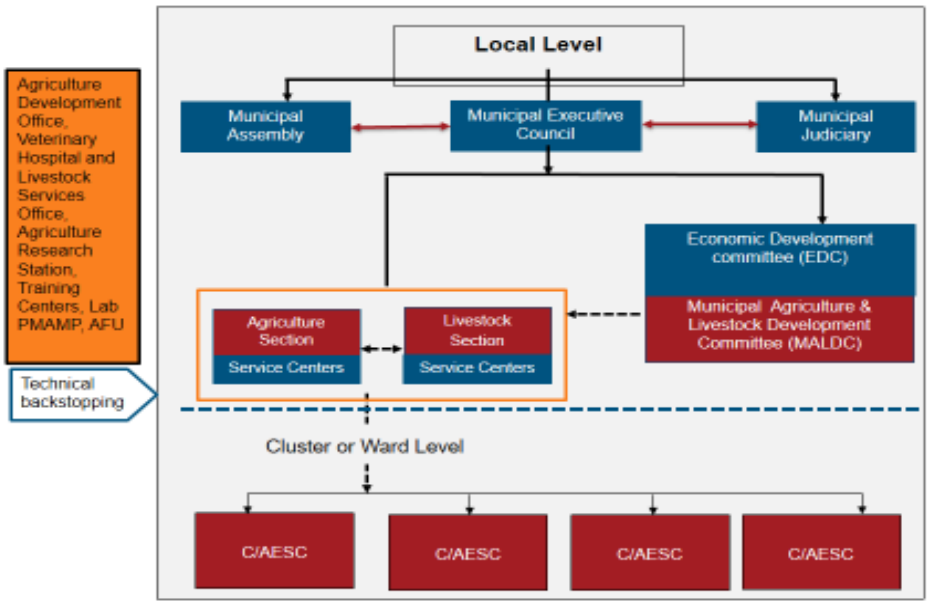


Figure 13: Proposed linkages of C/AESC with Municipal agriculture unit and Municipal Agriculture and Livestock Development Committee (MALDC)

Note: Each C/AESC should have a governing committee formed under the leadership of elected ward chief or member and members from local agriculture related stakeholders. This

committee, in overall, will perform the planning, supervising and monitoring functions of the C/AESC.

Appendix 16: Characteristics of PESPs, WUAs, Municipalities and AKCs in Koshi Province

Socio-demographic and institutional features of agro-vets by surveyed corridors

Table 35 presents the profile of 162 agro-vet service providers across Mechi, Koshi, and Sagarmatha corridors in Koshi Province. While owners' ages are similar, Mechi and Koshi agro-vets have longer business experience (over 12 years) than those in Sagarmatha (around 9 years). Sagarmatha agro-vets work the longest hours (12.4 hours/day) and have more veterinarians, while Mechi employs more staff overall. Most owners are male (78.4%), though Sagarmatha has more female ownership (26%) and the highest share of technically qualified owners (88%). Regarding licensing, 75% of agro-vets have permission to sell seeds, highest in Koshi (81%) and lowest in Sagarmatha (68%). Over 82% are licensed to sell pesticides. These differences suggest a need for region-specific support, especially in improving regulatory compliance and institutional linkages in emerging markets like Sagarmatha.

Table 35: Socio-demographic, operation, employment, business types and licensing of agro-vets in surveyed districts

Variables	Corridors			Total (n=162)	F/Chi square value[#]
	Mechi (n=54)	Koshi (n=58)	Sagarmatha (n=50)		F-value
Age of owner (Years)	44.92	41.87	41.56	42.79	1.191
Establishment years	12.16	12.87	9.06	11.46	2.934*
Operation years	12.10	12.46	9.06	11.45	2.603*
Operation hours per day	11.03	9.58	12.40	10.93	56.928***
Total employees	2.53	1.63	2.04	2.06	10.926***
Number of veterinarians	0.75	0.67	1.16	0.85	7.466***
Number of Agriculture Technician	0.72	0.36	0.46	0.51	4.854***
Number of sales staffs	1.96	1.32	2.04	1.75	20.273***
					Chi square
Gender of the owners					
Male	44 (81.5%)	36 (79.3%)	37 (74.0%)	127 (78.4%)	0.903
Female	10 (18.5%)	12 (20.7%)	13 (26.0%)	35 (21.6%)	
Education					
Technical	36 (66.7%)	29 (50.0%)	44 (88.0%)	109 (67.3%)	17.628***
Non-technical	18 (33.3%)	29 (50.0%)	6 (12.0%)	53 (32.7%)	
Business types					
Sole proprietorship	54 (100%)	58 (100%)	47 (94.0%)	159 (98.1%)	6.847**
Partnership	0 (0.0%)	0 (0.0%)	3 (6.0%)	3 (1.9%)	
Permission letter received for seed sale from AKC					
Yes	40 (74.1%)	47 (81.0%)	34 (68.0%)	121 (74.7%)	2.430
No	14 (25.9%)	11 (19.0%)	16 (32.0%)	41 (25.3%)	
License of pesticides sale					
Yes	42 (77.8%)	49 (84.5%)	42 (84.0%)	133 (82.1%)	1.033
No	12 (22.2%)	9 (15.5%)	8 (16.0%)	29 (17.9%)	

Notes: ***, *** and * indicate significant at 1%, 5% and 10% levels, respectively. [#]F-value for continuous and Chi-square for categorical variables. Source: Field survey (11-25 June, 2025)

Socio-demographic features of respondents from FGDs and KIIs

The FGDs involved 84 participants, all members of Water User Associations (WUAs), with a demographic composition of 62 males and 22 females. Ethnically, the participants included 23 Brahmin/Chhetri and 61 Janajati individuals, reflecting the region's diverse social structure (Table 36).

Table 36: Features and characteristics of KII and FGDs participants in Koshi Province for qualitative survey

Qualitative survey	Number	To whom	Local Government (Palika)	Total participants
KIIs	8	3-AKCs in Ilam, Dhnakuta and Udhayapur (Total 3 KIIs with AKCs)	2 KIIs in Suryodaya, Ilam Municipalities in Mechi corridor 2 LGs in Dhankuta Municipality and Pakhribas Municipaly in Koshi corridor, 1 LG in Triyuga Municipality in Sagarmatha Corridor Total 5 KIIs with LG	16 participants in 8 KIIs. 10 Male and 6 Female participated in KIIs
FGDs	5	5 FGDs with Water User Associations (WUAs)	Each in Suryodaya, Ilam, Dhankuta, Pakhribas Municipalities and Udaypurgadhi Rural Municipality	84 participants in 5 FGDs. 62 Male and 22 Female including 23 Brahmin /Chhetri and 61 Janajati

Source: Field survey (13-19 June, 2025)

In terms of ethnicity, the FGDs revealed that 61 participants (72.6%) were from Janajati communities (including Rai, Gurang, Ghale, Ale, etc.), while 23 participants (27.4%) belonged to Brahmin/Chhetri groups. Notably, no Dalit individuals participated in any of the FGDs, highlighting a critical gap in representation. This exclusion likely stems from the nature of the irrigation schemes and the low landholding capacity and irrigation demand within Dalit communities. Janajati dominance was most prominent in Suryodaya Municipality (91.7%) and remained high in Ilam and Dhankuta municipalities, each with over 76% Janajati participation. The most balanced ethnic composition was seen in Udayapurgadhi Rural Municipality, with 52.9% Janajati and 47.1% Brahmin/Chhetri representation. These findings emphasize both the underrepresentation of women and the absence of Dalit voices in WUA-level decision-making. While private sector-led agricultural extension services are emerging in these areas, the data clearly indicate the need for more inclusive and equitable outreach strategies that address gender and caste-based disparities in agricultural planning and resource access.

Table 37: Gender of FGDs participants from WUA in three corridors of Koshi Province

Corridor	District	Municipalities	Female	Male	Total
Mechi	Ilam	Suryodaya	0 (0%)	12 (100.0%)	12 (100.0%
		Ilam	5 (23.8%)	16 (76.2%)	21 (100.0%)
Koshi	Dhankuta	Dhankuta	9 (42.9%)	12(57.1%)	21 (100.0%)
		Pakribas	4 (30.8)	9 (69.2%)	13 (100.0%)
Sagarmatha	Udayapur	Udayapurgadhi RM	4 (23.5%)	13 (76.5%)	17 (100.0%)
Total (n=84)			**22 (26.2%)**	**62 (73.8%)**	**84 (100.0%)**

Table 38: Ethnicity composition of FGDs participants from WUA in three corridors of Koshi Province

Corridor	District	Municipalities	Brahmin/ Chhetri	Janajati	Total
Mechi	Ilam	Suryodaya	1 (8.3%)	11 (91.7%)	12 (100.0%)
		Ilam	5 (23.8%)	16 (76.2%)	21 (100.0%)
Koshi	Dhankuta	Dhankuta	5 (23.8%)	16 (76.2%)	21 (100.0%)
		Pakribas	4 (30.8%)	9 (69.2%)	13 (100.0%)
Sagarmatha	Udayapur	Udayapurgadhi RM	8 (47.1%)	9 (52.9%)	17 (100.0%)
Total (n=84)			**23 (27.4%)**	**61 (72.6%)**	**84 (100.0%)**

Demand of agriculture services from WUAs

In FGDs discussions, with support from the Small Irrigation Programme (SIP) and local governments, communities in Koshi Province have shifted from two to up to four cropping cycles, boosting cereal and vegetable yields by 30-60%. SIP's subsidies and capacity building, along with active Water User Associations (WUAs), have enabled high-value crop cultivation (e.g., cardamom, ginger, vegetables) across 200-500 ropani farmed by 30-40 households per WUA. Agro-vets remain the most preferred private service providers, though concerns over quality, pricing, and input availability persist. Awareness of digital tools like GeoKrishi is low, and WUAs demand better market linkages, cold storage, and performance-based input systems. Group training is the most favored extension method (80%), while individual visits and digital tools are emerging options.

Table 39: Service providers preferences by WUAs during FGDs

Types	Ilam		Dhankuta		Udayapur	Overall (n=5)
	Suryodaya M	Ilam M	Dhankuta M	Pakhribas	Udayapurgadhi RM	
Agro-vets	Yes	Yes	Yes	Yes	Yes	5 (100%)
Agriculture Cooperatives			Yes	Yes	Yes	3 (60%)
NGOs/CBOs	Yes	Yes				2 (40%)
Local Government and AKC	Yes	Yes		Yes	Yes	4 (80%)

Source: Field survey with WUAs (13-19 June, 2025)

Table 40: Preferred method of extension delivery by WUAs during FGDs

Methods	Ilam		Dhankuta		Udayapur	Overall (n=5)
	Suryodaya M	Ilam M	Dhankuta M	Pakhribas M	Udayapurgadhi RM	
Group training		Yes	Yes	Yes	Yes	4 (80%)
Individual visit	Yes	Yes				2 (40%)
Digital platform		Yes		Yes		2 (40%)
Demo farm				Yes		1 (20%)

Source: Field survey with WUAs (13-19 June, 2025)

The data from Table 41 reveals a strong willingness among Water User Associations (WUAs) in Koshi Province to expand and pay for a wide range of agriculture extension and support services. All participants from five FGDs expressed 100% interest in receiving services such as mobile veterinary support, plant disease diagnostics, vaccination camps, input supplies, irrigation advisory, training, and climate-smart agriculture (CSA) guidance. Most of these services were preferred through a subsidized model, either fully subsidized or with partial cost-sharing, especially for technical services like soil testing, disease diagnostics, and improved farming demonstrations. The preference for a subsidized-plus-payment approach indicates that while farmers value these services, affordability remains a critical concern. For services like mobile veterinary care and vaccination, direct payment (fee-for-service) is acceptable, suggesting higher perceived value and urgency among livestock-owning households.

Additionally, 60% of the WUAs showed willingness to pay for market linkage and post-harvest advisory services, especially when such services are designed around collective marketing mechanisms, such as a service charge of NPR 2-3 per kg of product sold. This signals a readiness among farmers to invest in services that directly improve their income and reduce market inefficiencies. Farm mechanization services also garnered 80% interest, with expectations of at least 50% subsidy to make rental tools and machinery more affordable.

However, no demand was expressed for organic farming advisory, highlighting either a lack of awareness or low perceived benefit or self-knowledge of organic practices at present.

Table 41: Willingness to expand and pay for specific service by WUAs during FGDs

Services	Frequency (n=5)		(Fee for service/embedded or subsidize)	Payment scheme
Soil Testing Services	Yes	%	Subsidized + Pay	
Mobile Veterinary Services	5	100	Pay	
Plant Disease Diagnosis	5	100	Subsidized + Pay	
Vaccination Camps (Livestock/Poultry)	5	100	Pay	
Input Supply (Seeds, Fertilizers, Pesticides)	5	100	Subsidized + Pay	
Demonstration of Improved Farming Techniques	5	100	Subsidized	
Climate-Smart Agriculture Advisory	5	100	Subsidized	
Training and Capacity Building for Farmers	5	100	Subsidized	
Irrigation Support and Advisory	5	100	Subsidized	
Access to Government Subsidy Programs	5	100	Subsidized	
Market Linkage and Price Information	3	60	Collective	NPR 2-3/kg product
Post-Harvest Handling and Storage Advice	3	60	Subsidized	
Farm Mechanization Support (tools, machinery, rental, etc.)	4	80	Pay + 50% subsidy	
Organic Farming Advisory	0	0		

Features of agriculture extension service delivery mechanism from local government and AKC

Agricultural extension service delivery in Koshi Province, particularly through local governments (Palikas) and district-based Agriculture Knowledge Centers (AKCs), is limited in scope and capacity[8]. The system is lacking of technical human resources at the local and provincial levels, which drastically reduces the coverage and effectiveness of extension services. In the majority of the municipalities of Koshi Province, such as Ilam, Dhankuta, and Triyuga- the local governments tend to rely on a few available agriculture technicians, who are themselves overburdened and are not able to provide timely and specific advisory services to farmers working in different agro-ecological zones[9].

Local Governments' Agriculture Service Mechanism

Provincial governments of Koshi Province have focused primarily on input subsidy distribution, including seeds and agricultural machinery, at a subsidy rate of as much as 75% of the cost (AKCs from Ilam, Dhankuta and Udyayapur, 2025 during KII). The municipalities also conduct capacity-building activities for farmers, primarily in the form of training and exposure visits. These, however, are ad hoc and not informed by systematic needs assessment and long-term extension planning.

Palikas' own financial investment in the agriculture sector remains minimal. The analysis of surveyed municipalities of Ilam, Dhankuta, Pakribas and Triyuga revealed that the budget of the agriculture sector is below 1% of the total municipal budget. The agriculture departments of these municipalities are also depending largely on federally set "samapurak" (complementary) budgets, which typically range from NPR 3 to 5 million per Palika per year. These allocations are supply-driven, often without any relation to farmers' priorities or local

[8] MoALD (2023). *Annual Agriculture Development Report*. Ministry of Agriculture and Livestock Development, Nepal.
[9] Province Government of Koshi (2024). *Koshi Province Agricultural Policy and Budget Analysis Report*.

needs, against the demand-driven and participatory spirit of federalism in agricultural service planning.

Agriculture Knowledge Centers (AKCs) Function

Earlier, AKCs were leaders in farmer capacity development, technology transfer, and provision of inputs, especially of good seeds, fertilizers, and mechanization services. Recently, their function has transformed. Today, AKCs are increasingly involved in facilitating access to subsidized farm credit, acting as intermediaries between farmers and banks.

Now, AKCs in the Koshi Province support the release of interest-subsidized agricultural loan schemes, which offer farmers a 5-7% interest subsidy. To implement this, nearly 42 financial institutions (cooperatives, microfinance institutions, and commercial banks) have been chosen and registered as qualifying partners for releasing loans in the Koshi Province (AKC from Ilam, 2025 during KII).

In spite of this promising template, uptake of subsidized credit is low, primarily due to intricate application procedures, protracted documentation, and weak institutional linkages between the bank and farmer. Smallholder farmers, particularly women and the poor, are excluded from formal credit, suggesting a requirement for greater inclusive financial education and simplified procedures.

Systemic Weaknesses

- Weak coordination between local authorities and AKCs leads to disjointed extension services and redundant activities.
- Low levels of digital extension tool adoption, despite growing mobile penetration among rural users.
- Inadequate mechanisms for routine monitoring, evaluation, and feedback weaken accountability and learning cycle in delivery of services[10].

Koshi Province's agricultural extension program is crippled by poor budgets, vacancies, and a shift towards subsidy-based and technical models. While Palikas specialize in input subsidies, AKCs are moving towards financial linkages, leaving a void for ground-level advisory services. Strengthening support to farmers requires better coordination, more local funding, and simplification of loan procedures.

[10] ADS Review Committee (2022). *Implementation Review of Agricultural Development Strategy 2015-2025*.

Appendix 17: Problems, support needs, barriers and enabling factors of PESPs and recommendations

PESP Type	Challenges / Problems	Support Needs	Barriers	Enabling Factors	Recommendations (Strategic, Policy, Programmatic/Operational)
Agro-vets (n=162)	Limited technical staff, high input cost, transport constraints, low farmers' payment capacity, licensing delays, product unavailability, lack of trust, poor digital access	Technical skill upgrading, business management, digital tools training	Weak policies/regulations, low profitability, weak infrastructure (road/ICT), low farmer purchasing power, trust deficit	Policy reform, simplified licensing, advisory service incentives, partnerships/networking, business planning support, government subsidies, growing input demand, access to ICT/market data	Simplify licensing, introduce subsidy/incentive schemes, strengthen agrovet–farmer trust, promote ICT-based input distribution, develop agrovet cooperatives for scale efficiency
Agri-Cooperatives (n=29)	Poor access to finance, low technical competence, weak management and transparency, limited digital adoption	Technical/agronomic training, governance/business capacity building, access to finance/soft loans, storage/transport facilities, digitalization support	Weak governance, limited capital/risk financing, political interference, poor ICT infrastructure	Cooperative legislation and government support, revolving funds, networking/federations, cooperative-based extension, farmer trust, donor partnerships, aggregation potential	Strengthen governance, facilitate low-interest credit, build ICT-based MIS systems, promote value chain integration, continuous staff training
Private Agri-Companies (n=23)	High input costs, poor rural infrastructure, delayed licenses, regulatory hurdles, lack of skilled staff, limited finance	Input subsidies, simplified regulations, rural infrastructure investment, funding for service expansion, partnerships for market/technical capacity	High compliance costs, weak investor confidence, poor enabling policy, limited R&D, low farmer purchasing power	Government-private partnerships, incentives, market development initiatives, access to export markets, investor interest, agri-tech expansion	Create investment-friendly policies, facilitate PPPs, provide tax breaks/subsidies, improve logistics/storage, support skill development programs
Digital Service Providers (n=5)	Low farmer digital literacy, poor internet, trust deficit, high operational costs, policy constraints	Capacity building for farmers, funding, policy advocacy, ICT infrastructure,	Rural connectivity gaps, high ICT adoption cost, regulatory gaps, farmer reluctance	Expansion of ICT infrastructure, government e-agriculture policies, digital startup support, integration with financial	Develop rural internet infrastructure, promote digital literacy, create enabling e-agriculture policies, provide seed

PESP Type	Challenges / Problems	Support Needs	Barriers	Enabling Factors	Recommendations (Strategic, Policy, Programmatic/Operational)
		partnerships with local governments		services, smartphone penetration, youth interest in agri-tech	funding, integrate advisory, financial, and marketing services
Input/Output Buyers (n=29)	Transport challenges, price volatility, quality assurance issues, seasonal supply fluctuations	Access to finance, cold storage/warehousing, reliable market information, logistics support	Poor rural roads, limited storage, price risks, weak quality enforcement	Rural logistics/cold chain investment, government support for contract farming, access to market info, organized retail/agribusiness, export opportunities	Develop cold chain/storage systems, encourage contract farming and market linkages, stabilize markets via policies, support aggregation centers for smallholders
NGOs/CBOs (n=6)	Limited funding, policy restrictions, low farmer participation, climate vulnerability, inadequate infrastructure	Value chain development, PPP engagement, digital expansion, community capacity building	Short-term donor funding, policy inconsistency, limited local ownership, climate shocks	Donor partnerships, community trust, government collaboration, grassroots reach, social mobilization experience	Strengthen PPP models, ensure long-term financing, promote climate-smart agriculture, invest in rural infrastructure, mainstream NGO/CBO role in policy
Individuals (n=11)	Limited market access, seasonal demand, low willingness to pay, payment delays	Training/capacity building, equipment support, networking opportunities, finance access	Lack of scale economies, limited formal market access, trust deficit, low financial literacy	Personal initiative, on-farm advisory, niche/seasonal service potential	Provide training, facilitate market linkages, support networking platforms, improve access to finance/equipment