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Assessment of Value Chain Actors and Market Price of Vegetable Seeds in Karnali Province

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Abstract

This study examines the vegetable seed sector in Karnali Province, Nepal, to explore its value chain actors, socio-economic dynamics of farmers, marketing channels, market price and key challenges and opportunities for vegetable seed production and marketing. A mixed-methods approach was employed, integrating both quantitative and qualitative data collected through semi-structured questionnaires administered to farmers, traders, and key informants in Surkhet and Dailekh district. In total, sixty farmers, six agro-vet traders, and six key informants were selected for the study. The findings reveal a seed sector is vital for rural livelihood with significant female participation (68.35%) but constrained by low formal education levels among farmers. Radish is the highest-produced seed by volume, while tomato fetched the highest farm gate price followed by onion and radish. The major value chain actors were seed producers, cooperatives, agrovets, private seed companies and vegetable growers. The study identifies NARC research stations as the primary source of foundation seed, with agro-vets playing a crucial role in input supply for seed production. Majority of farmers (71.67%) perceive a growing market demand, but the sector faces significant challenges, including price instability, limited technical knowledge, high labor costs. The study concludes that as the vegetable seed sector is a vital livelihood source with growth potential, its sustainability requires targeted interventions to address technical, financial, and market-related constraints to enhance farmer productivity and profitability.

Keywords: Vegetable Seeds, Value Chain actors, Market Price, SWOT Analysis

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Introduction

Seed production is a key factor in determining agricultural production potential, serving as the foundation for the effectiveness of other agricultural inputs. Nepal's agro-climatic diversity supports the production of a wide variety of vegetable seeds, offering both comparative and competitive advantages for local markets as well as international exports (Thapa & Dhungel, 2012). Commercial seed production in Nepal was initiated and established in the late 1980s with the support of various governmental and non-governmental organizations (Gauchan, 2017). The use of quality improved seeds solely can enhance productivity by 15-25% (Roy, 2014).

The value chain of vegetable seeds refers to a series of economic activities performed by value chain actors at different levels, including input supply, production, processing, storage, transportation, and marketing. Value chain mapping helps to identify key actors, their functions, linkages, and interactions within a specific industry or sector. The marketing of vegetable seeds involves various market channels with different market prices through which seeds move from producers to final consumers. Value chain actors such as input suppliers, farmers, cooperatives, seed companies, wholesalers, retailers, and consumers play a crucial role in seed distribution. The market price of vegetable seeds varies at different stages of the value chain, influenced by factors such as production costs, quality, demand, and market linkages. The vegetable sector is one of the key agricultural sub-sectors in Nepal, with the demand for vegetable seeds rising due to a substantial increase in vegetable cultivation area. Karnali has huge potential for vegetable seed production, but its current volume is still low. Despite the increasing demand for quality seeds, farmers face problems related to the quality of seeds, proper marketing channels, and access to technical and extension services. Moreover, farmers also lack of market price information on vegetable seeds. The study has the following objectives

- To explore the vegetable seed value chain actors and their functions, marketing channels, market prices and farmers' perceptions on the vegetable seed market.
- To assess the strengths, weaknesses, opportunities, and threats of vegetable seed production and marketing.
- To suggest policy recommendations for enhancing the vegetable seed value chain for production and marketing.

Literature Review

The value chain encompasses the comprehensive set of activities carried out by companies and workers to transform a product from its initial concept to its final consumption, such as design, manufacturing, marketing, distribution, and customer support (Fernandez-Stark & Gereffi, 2019). The value chain analysis is a tool used to identify development opportunities by examining each step, actors involved, value addition, and benefits gained from the created value (Oo, 2013). It applied both qualitative and quantitative methods to show the linkage and operation of the chain from input supply to processing and marketing (Hellin & Meijer, 2006).

Marketing channels define the flow of commodities from producers to consumers, involving various intermediaries such as agro-vets, cooperatives, wholesalers, and retailers (Ghimire et al., 2023). The marketing margin is the difference between the retail price and the farm gate price (Kinnucan & Zhang, 2015). The efficiency of a farm's planning and execution can be improved by applying the SWOT analysis framework to examine a farm's Strengths, Weaknesses, Opportunities, and Threats (Sabbaghi & Vaidyanathan, 2004). The value chain of developing countries is characterized as inadequate coordination, limited resources, insufficient infrastructure and an enabling environment for business (Trienekens, 2011). The smallholder farmers require access to farm mechanization to enhance

the productivity of their land and labor, thereby improving the livelihoods of farm families (Sims & Kienzle, 2016). The collective and cooperative-based marketing helps smallholder farmers access broader markets, increase bargaining power, and facilitate the better returns to farmers (Thompson, 2021). Farmers' perceptions of the seed market significantly influence their decisions regarding seed production and marketing (Manzoor, 2019). The farmers' perception of market trends and pricing mechanisms is vital to enhance their participation in value chains (Temu & Temu, 2005). The availability of technical and financial support is critical in enhancing the productivity and efficiency of the vegetable seed sector (Tata et al., 2016). Access to agricultural market price and reliable marketing information plays a crucial role in fostering competitive markets and driving the development of the agricultural sector (Magesa et al., 2014). Vegetable seed sectors hold significant potential for the economic growth and cash-generating activity of rural farmers in Nepal (Pun & Poudyal, 2018). Moreover, the diverse agro-climatic conditions, ranging from warm subtropical to cool temperate climates, offer excellent opportunities for the cultivation of a wide variety of vegetable seeds. The demand for vegetable seeds has been rising in Nepal; however, production and marketing face challenges such as inadequate grading, standard packaging, labeling, marketing, and quality control services (Timsina & Shivakoti, 2018). Over the past four decades, national vegetable seed production has consistently fallen short of demand, with a deficit of nearly 50%, causing 74.43% of Nepalese farmers to rely on local vegetable seeds, 19.89% on improved seeds, and only 4.68% on hybrid seeds for vegetable production (Baral, 2015). Farmers are the primary producers of vegetable seeds, followed by intermediaries such as seed companies and cooperatives that handle processing, grading, and marketing (Sisay et al., 2017). Vegetable seeds were predominantly imported from seven countries: India, China, Thailand, Japan, Taiwan, Korea, and Italy, with India accounting for the highest share at 88.68%. (Kafle & Joshi, 2018). The growth rate of domestic seed production needs to be accelerated to meet national demand by enhancing and strengthening the vegetable seed value chain. Identifying the challenges faced by value chain actors of the agriculture commodity is crucial for informed decision-making and the development of effective strategies for production and marketing (Rahman et al., 2021).

Methodology

Research Design

The study employed a mixed-methods approach, integrating both quantitative and qualitative research methodologies. The qualitative analysis focused on understanding the functions of major value chain actors, identifying key marketing channels, exploring farmers' perceptions of market demand, and conducting a SWOT analysis of vegetable seed production and marketing. The quantitative analysis, on the other hand, covered the socio-economic and demographic characteristics of respondents, their primary occupations, landholding size, average annual revenue generated from seed production, market prices of major vegetable seeds, and farmers' access to subsidies, credit, and training.

Data Collection Instruments

Both quantitative and qualitative primary data were collected using semi-structured questionnaires administered to vegetable seed farmers, agrovet traders, and key informants. The survey questionnaires captured the information on household socio-economic characteristics, farm characteristics, income generated from seed production, market prices, and market trends. In addition, questionnaires included the qualitative insights related to key value chain actors and their functions in the seed sector, market channels, farmer's perception on vegetable seed market and SWOT analysis of vegetable seed production and marketing. Furthermore, secondary data were reviewed from relevant

published articles, reports, and websites associated with the vegetable seed market in Karnali Province, to complement and validate the primary data findings.

Sampling

According to the Agriculture Development Office in Dailekh, approximately 200 farmers were involved in vegetable seed production. Similarly, records from the Directorate of Agriculture Development Office in Surkhet indicate that around 300 farmers were engaged in vegetable seed production in the region. Thus, in total, sixty farmers were selected for the study, thirty farmers from Surkhet and thirty from Dailekh, purposively to ensure diversity and representativeness. Farmers were selected based on the criteria who have a production area of at least one Ropani. Additionally, six agro-vets (three from each District) and six Key informant interviewers were chief of the Agriculture development office, president of Haatemalo Vegetable Seed Cooperative and chief of the agriculture division of Dullu municipality from Dailekh. Similarly, the Director of the Directorate of Agriculture Development, President of the Pabitra Vegetable Seed Cooperative and chief of Agriculture Division of Gurvakot municipality from Surkhet were randomly selected for the survey.

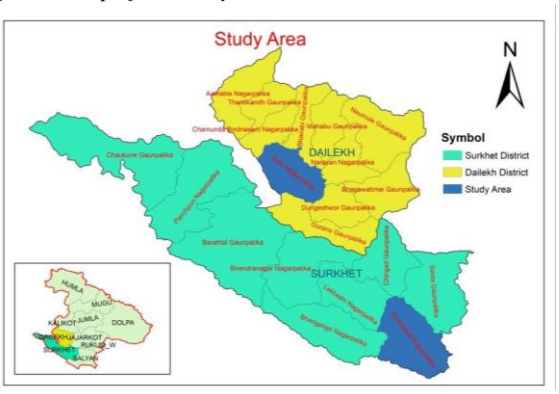
Data Analysis Process

The qualitative data were analyzed thematically, and the quantitative data were processed through descriptive statistical analysis. For the validity and reliability checks, pre-testing questionnaires were conducted before the survey to refine questions. A literature review was performed alongside cross-checking findings from the survey to enhance the reliability and validity of the data.

Site Selection

The study was conducted in the Surkhet and Dailekh districts of Karnali Province. Specifically, the vegetable seed production pocket areas of Gurbhakot Municipality-4 (Mehelkuna) in Surkhet and Dullu Municipality-4 (Tallo Dungeshwar) in Dailekh. The selection was made in consultation with the Directorate of Agriculture Development, Surkhet, and the Agriculture Development Office, Dailekh.

Figure 1: *Map of the Study sites.*



Results and Discussion

Socio-economic and Demographic Information of the Respondents

The socio-economic and demographic analysis of respondent households highlights key characteristics influencing vegetable seed production. A majority of respondents were female (68.35%), indicating significant female participation in agricultural activities. In terms of education, most respondents had only primary-level education (33.35%), while a considerable proportion were illiterate (31.65%), which may affect access to technical knowledge and market opportunities. Ethnically, Thakuri farmers formed the largest group (46.65%), followed by Dalit (25%) and Chhetri (21.65%), reflecting the diverse social composition of the farming communities. These demographic factors play a crucial role in shaping agricultural practices, access to resources, and overall productivity in vegetable seed farming.

Table 1: *Distribution of respondents by gender, education and ethnicity (n=60)*

Description		Municipality				Total	
		Dullu		**Gurbhakot**			
		Count	Percent	Count	Percent	Count	Percent
Gender of Respondent	Female	17	56.7	24	80	41	**68.35**
	Male	13	43.3	6	20	19	31.65
Education of respondent	Illiterate	12	40	7	23.3	19	31.65
	Primary	9	30	11	36.7	20	**33.35**
	Secondary	6	20	12	40	18	30
	Higher	3	10	0	0	3	5
Ethnicity of respondent	Brahmin	0	0	2	6.7	2	3.35
	Chhetri	1	3.3	12	40	13	21.65
	Janajati	0	0	2	6.7	2	3.35
	Dalit	1	3.3	14	46.7	15	25
	Thakuri	28	93.3	0	0	28	**46.65**

Primary Occupation of the Respondents

The occupations of any community reflect the micro-economic structure and well-being of the living standard of a locality. The study found that agriculture was the primary occupation (63.35%) followed by service (18.35%) and Remittance (8.35%), as shown in Table 2. The high dependence on agriculture highlights the need for better financial, technical, and market support to boost productivity and economic stability.

Table 2: *Primary occupation of the household (n=60)*

Primary Occupation	Municipality				Total	
	Dullu		**Gurbhakot**			
	Count	Percent	Count	Percent	Count	Percent
Agriculture	17	56.7	21	70	38	**63.35**
Business	1	3.3	4	13.3	5	8.3
Service	9	30	2	6.7	11	18.35
Remittance	2	6.7	3	10	5	8.35
Wage	1	3.3	0	0	1	1.65

Land holding and Seed Cultivated Land of Farmers

Land ownership plays a vital role in the agrarian economy, serving as a key asset for farmers' livelihoods. The study found an average landholding size of 8.125 Ropani, with a range from 2 to 35 Ropani, as shown in table 3 reflecting variations in land access among farmers. Notably, the average land allocated for vegetable seed cultivation was 4.7 Ropani, as shown in table 4, suggesting that more than half of the total landholding is utilized for seed-related activities. This reflects the growing importance of vegetable seed production as a key enterprise among farmers. However, the wide range in land size also points to unequal access to productive resources, which could affect economies of scale and overall productivity within the sector. These findings highlight the need for targeted support such as improved access to credit, technical training, and input supply to enable small and medium-scale farmers to enhance their seed production capacity and profitability.

Table 3: *Size of land holding (In Ropani) in the study area (n=60)*

Municipality		Total land area	Irrigated land	Unirrigated land	Cultivated land	Lowland	Upland
Dullu	Average	8.133	6.967	1.17	7.800	1.40	6.400
	Minimum	2.0	.0	0	2.0	0	2.0
	Maximum	35.0	27.0	8	27.0	8	20.0
Gurbhakot	Average	8.117	7.083	1.20	7.617	6.52	1.155
	Minimum	4.0	3.0	0	3.0	2	.0
	Maximum	21.0	18.0	6	21.0	18	7.5
Total	Average	8.125	7.025	1.18	7.708	3.92	3.822
	Minimum	2.0	0	0	2.0	0	0
	Maximum	35.0	27.0	8	27.0	18	20.0

Table 4: *Average size of land holding for vegetable seed (In Ropani) (n=60)*

Municipality	Average	Minimum	Maximum
Dullu	5.000	1.0	10.5
Gurbhakot	4.467	1.5	15.0
Total	**4.733**	**1.0**	**15.0**

Farmers' Experience on Seed Cultivation

The study revealed that the majority (53.3%) respondents of Gurvakot municipality had more than 12 years of experience in seed cultivation, while 6.7% of respondents of Dullu had more than 12 years of experience. Farming experience plays a crucial role during the initial stages of adopting new technologies, as farmers evaluate their potential benefits, which ultimately influence their long-term use or rejection (Ainembabazi & Mugisha, 2014).

Table 5: *Farmer's experience on vegetable seed production*

Seed production Experience	Study area			
	Dullu		**Gurbhakot**	
	Count	Percent	Count	Percent
1-3 years	2	6.7	1	3.3
4-6 years	10	33.3	0	0
7-9 years	11	**36.7**	6	20
10-12 years	5	16.7	7	23.3
>12 years	2	6.7	16	**53.3**

Annual Revenue Generation from Vegetable Seeds Production

The study revealed that radish seed ranked first in vegetable seed production in terms of quantity and farm revenue. In the study area, based on production quantity, beans ranked second, followed by cowpea, onion, pea, okra and tomato. However, in terms of farm revenue, tomatoes ranked second, followed by onion, bean, cowpea, pea, and okra. The average annual revenue per household generated from vegetable seed production was Rs. 149,582.58/-, significantly contributing to the livelihood of farmers. The vegetable seed business holds immense potential and play a crucial role in

the economy, particularly in agriculture dominant countries (Dhillon et al., 2018). Srijana tomato seed had the highest farm gate price among the vegetable seed produced in the study area.

Table 6: *Major vegetable seed produced in the study (n=60)*

Study area	Major vegetable seed	Popular variety	Total quantity produced (Quintal)	Farm gate price Rs. /Kg	Total revenue generated Rs.
Dullu, Dailekh	1. Bean	Chaumase, Trisuli	30.12	220/-	662640/-
	2. Tomato	Srijana	0.39	52500/-	2092125/-
	3. Cowpea	Malepatan, Aakash	16.14	300/-	492300/-
	4. Onion	Red creole	14.54	1200/-	1744800/-
Gubhakot, Surkhet	1. Radish	Chalise Dine, Mino early	47.82	800/-	3825600/-
	2. Okra	Arka Anamika	4.19	110/-	46090/-
	3. Pea	Sikkim local	5.57	200/-	111400/-
Total farm revenue from vegetable seed in the study area Rs.					**8974955/-**
Average household revenue (among 60 Households) per year Rs.					**149582.58/-**

The Functions of Major Value Chain Actors of Vegetable Seed Sector

The survey data results obtained from the farmers, vegetable seed traders and key informants highlights several key functions of the vegetable seed value chain actors in the region. It revealed that the primary source of foundation seed of vegetables was NARC research station, indicating the key role of government research institutions in ensuring seed quality. Fertilizers and pesticides were predominantly sourced from agro-vets, with a smaller proportion coming from cooperatives, reflecting the dominant role of agro-vets in the input supply chain. The majority of the seeds produced by farmers were marketed collectively to cooperatives and SEAN Seed Company, emphasizing the importance of collective marketing in seed distribution. Farmers were responsible for initial processing steps such as cleaning, drying, and grading, before sending the seeds to larger companies for further processing. Notably, Pabitra Seed Industry in Surkhet and SEAN Seed Company in Kathmandu played critical roles in grading, laboratory testing, truth labeling, branding, and packaging of seeds, which were essential for ensuring quality control and market readiness. Seed wholesaling was handled by Pabitra Seed Industry in Surkhet and SEAN Seed Company for Dailekh, while retailing occurred through agro-vets and cooperatives. The formal agreements between farmers and seed companies, such as the contract between Haatemalo Seed Promotion Cooperative in Dailekh and SEAN Seed Company, and between Pabitra Seed Producing Cooperative in Surkhet and Pabitra Seed Industry, signify a formalized approach to seed production and marketing, ensuring both quality and supply chain stability. This integrated structure of production, processing, and marketing reflects a collaborative effort between farmers, cooperatives, and seed companies to enhance the seed industry's efficiency and sustainability.

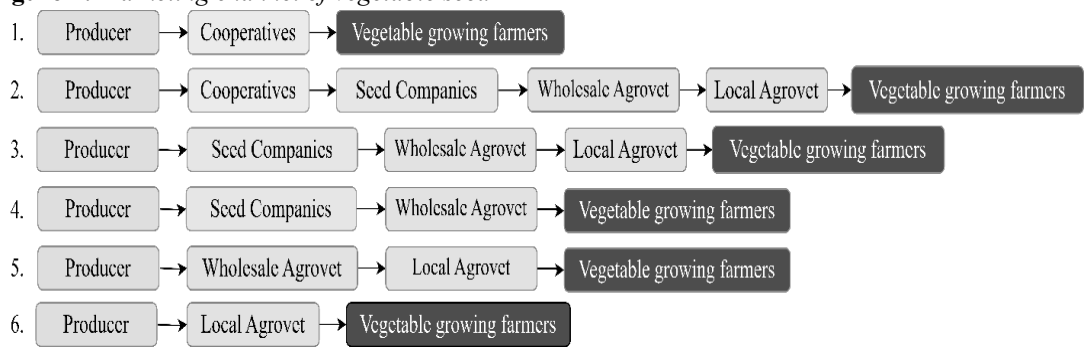
Table 7: *Major value chain actors and their functions of vegetable seeds in Karnali*

SN	Functions	Key actors
1	**Input supply**	
1.1	Foundation seed supply	NARC stations (HRD, Khumaltar; HRS, Dailekh; HRS, Malepatan; and ARS, Jumla), Vegetable Seed Production Center Rukum Paschim, SEAN company
1.2	Supply of fertilizers, pesticides, drip & sprinkler irrigation systems, and sprayers	Agro-vets, cooperative, fertilizer company, and farmers themselves
2	**Seed production**	
2.1	Vegetable seed production	Farmers associated with Pabitra seed-producing cooperatives in Surkhet and Haatemalo seed promotion cooperatives in Dailekh.
3.	**Seed Processing**	
3.1	Seed processing, packaging, labeling and seed quality testing.	Seed companies (Pabitra Seed Industry, Surkhet, SEAN Seed Company in Kathmandu)
4	**Seed marketing**	
4.1	Seed Wholesale traders	Seed companies: 95.5% (Pabitra seed industry, Surkhet, SEAN seed company in Kathmandu) Local agro vet traders :4.5%
4.2	Retailers	Agro-vets, cooperatives
5	**End users**	Vegetable production farmers
6	**Enablers**	
6.1	Financial subsidy and technical inputs/services	Directorate of Agriculture Development (DOAD), Agriculture Development Office (ADO), Integrated Agriculture Laboratory, Municipalities and Rural Municipalities, Prime Minister Agriculture Modernization Project (PMAMP), INGOs/NGOs, SEAN company
6.2	Financial credits and loan interest subsidy	Cooperatives, microfinances, Banks, MOLMAC
6.3	Seed seller license	Directorate of Agriculture Development (DOAD), Agriculture Development Office (ADO)
6.4	Regulation and seed quality control	Seed Quality Control Center (SQCC), National Seed Company Limited (NSCL), Integrated agriculture lab
6.5	Acts, Rules and Policies	Nepal Seed Vision (2013-2025), National Seed Policy (2000), Seed regulation (1997), Seed Act (1988)
6.6	Advocacy, capacity development	Directorate of Agriculture Development (DOAD) Agriculture Development Office (ADO) District federation of cooperatives and Agriculture Cooperatives District Chamber of Commerce and Industry

Marketing Channel of Vegetable Seeds

The result from semi-structured questionnaire administered to farmers, traders, and key informants revealed that the vegetable seed market channel comprises multiple interconnected. The main actors include vegetable seed producers, cooperatives, seed companies, wholesale agrovets, local agrovets and vegetable grower. The major marketing channels of vegetable seed in both study sites s are shown in Figure 2.

Figure 2: *Marketing channel of vegetable seed*



Market Price and Marketing Margin of Major Vegetable Seeds

Seven types of vegetable seeds were grown in the study area, Especially Bean, cowpea, tomato and onion in Dailekh and Pea, Radish and Okra were grown in the Surkhet district as shown in Table 8 and Table 9. The farm gate price, retail price and wholesale price were also different for separate places. The Farm gate price and Agrovet retail price of Radish seed was Rs. 800/- and Rs. 2,500/- per kilogram. Similarly, the Farm gate price and Agrovet retail price of tomato seed were Rs. 52,500/- and Rs.70,000/- per kilogram. It indicates that the marketing margin of the Srijana tomato seed produced in Dailkeh district was highest (Rs.17500/- per kg), followed by Radish seed (Rs.1700/- per kg). The highest retail price was recorded for Srijana seeds Rs. 175,000 per kilogram in Nepal (Magar & Gauchan, 2016). The following table depicts the marketing margin and different types of Prices of major vegetable seeds in the study area.

Table 8: *Market prices and Marketing margin at different layers of seed value chain*

Vegetable seed	Price Rs. /Kg – Gurbhakot, Surkhet					Major Varieties
	Farm gate	Cooperative	Agrovet wholesale	Agrovet retail	Marketing margin	
Radish	800	1000	1500	2500	1700	Mino Early, Chalis Dine
Pea	200	250	290	330	120	Sikkim Local
Okra	110	140	600	700	610	Arka Anamika
Bean	0	0	320	350	-	Chaumase, Trisuli
Cowpea	0	0	330	380	-	Malepatan, Prakash
Onion	0	0	1500	2000	-	Red Creole
Tomato	0	0	65000	80000	-	Srijana

Table 9: *Market prices and Marketing margin at different layers of seed value chain*

Vegetable seed	Price Rs. /KG- Dullu, Dailekh					Major Varieties
	Farm gate	Cooperative	Agrovet wholesale	Agrovet retail	Marketing margin	
Radish	0	0	1250	2000	-	Mino Early, Chalis Dine
Pea	0	0	220	250	-	Sikkim Local
Okra	0	0	400	600	-	Arka Anamika
Bean	220	240	270	350	135	Chaumase, Trisuli
Cowpea	300	320	350	380	80	Malepatan, Prakash
Onion	1200	1150	1250	1500	500	Red Creole
Tomato	52500	55000	60000	70000	17500	Srijana

Farmer's Perception of Market Demand for Vegetable Seed

The study revealed that a significant majority of respondents (71.67%) reported an increase in the market demand for vegetable seeds, as shown in Table 10. This trend is largely attributed to the growing consumer demand for fresh vegetables, as well as the expanding needs of vegetable seed production and seed-processing industries. The rise in commercial vegetable farming is a key driver of this increased demand, highlighting the commercial vegetable cultivation.

Table 10: *Farmers' perception of market demand for vegetable seed*

Market demand	Study area				Total	
	Dullu		**Gurbhakot**			
	Count	Percent	Count	Percent	Count	Percent
Increase	20	66.70%	23	76.70%	43	**71.67%**
Decrease	2	6.70%	4	13.30%	6	**10.00%**
Same	8	26.70%	3	10.00%	11	**18.33%**

Farmer's Access to Subsidies, Credit and Training for Seed Production

Table 11 compares financial and technical support for farmers in Dullu and Gurbhakot. It shows that financial and technical support for farmers in Dullu and Gurbhakot municipality indicates a noticeable disparity between the two areas. In Gurbhakot, a higher proportion of farmers received subsidies (60%), credit (46%), and training (73%) compared to Dullu, where these figures were 40%, 30%, and 60%, respectively. Overall, farmers in Gurbhakot had greater access to essential financial and technical resources, which contribute to more favorable farming.

Table 11: *Farmer's access to financial and technical access*

Financial and Technical access	**Study Area**				**Total**	
	Dullu		**Gurbhakot**			
	Count	Percent	Count	Percent	Count	Percent
Subsidy received	12	40.00%	16	60.00%	28	**46.66%**
Credit received	9	30.00%	14	46.00%	23	**38.33%**
Training received	18	60.00%	25	73.00%	43	**71.66%**

SWOT Analysis of Vegetable Seed Production, Processing, and Marketing

The results from the household survey, key informant survey, and agrovet survey revealed that seed price instability and limited seed production were key challenges in vegetable seed production. Moreover, the increasing demand of hybrid vegetable seed by vegetable growing farmers

in another key threat as the seed farmers in Karnali province mostly produce improved seeds, but market demand is higher for hybrid seed, all the respondents in the study area said that the vital cost of vegetable seed production was labor cost. Farmers also face the problem of frequent diseases and pests such as blight, aphids, rust, and borers. Sometimes, farmers were faced with the problem of natural calamities such as hailstones, storms and heavy rainfall. In the study area, sixty percent of farmers faced the technical problem of vegetable seed production. Such technical service was provided by the cooperative, seed company, the agriculture development office and NARC. Farmers faced the difficulty with market dynamics due to limited knowledge of how it operates and why prices fluctuate. Farmers had a lack of bargaining power and were totally dependent on the market price fixed by cooperatives and the Seed Company as shown in Table 12.

Table 12: *SWOT analysis of vegetable seed production and marketing*

Internal factors		**External Factors**	
Strengths	**Weaknesses**	**Opportunities**	**Threats**
1. Production	**1. Production**	**1. Production**	**1. Production**
Suitable climate and geography.	Limited technical knowledge in seed production.	Employment generation	Fluctuations in Market demand and price.
Facilities of road, irrigation, and electricity.	Lack of skilled manpower, mechanization, and technology.	Increased income and savings.	Low farm-gate price and competitiveness.
Diversity in vegetable seed variety.	Limited seed inspectors.	Grab the growing market demand.	Dominance of foreign seed markets.
High-value agro product	Limited research on the seed sector in Nepal.	Government, INGO, and NGO subsidies,	Disease and insect issues.
Increasing vegetable seed market.	Limited technical service & crop insurance	Low tax on agri-farms.	Climate change and Natural calamities.
Presence of seed companies and agro-vets.	Land fragmentation and outmigration	Agriculture loan and interest subsidy,	Heavy dependence on monsoon
2. Processing	**2. Processing**	**2. Processing**	**2. Processing**
Indigenous knowledge in cleaning, drying, and curing.	Lack of skilled manpower and high technical knowledge	Subsidies available for seed processing.	Traders bypass the producers for unprocessed seeds.
Availability of labor.	Limitation of seed testing lab	Improved packaging, labeling and value addition.	Maintenance of seed quality.
3. Marketing	**3. Marketing**	**3. Marketing**	**3. Marketing**
Increasing market for vegetable seeds.	Lack of information on market demand and price.	Export potential and import substitution.	Uncertainty in supply, demand, and pricing.

Availability of local traders and agro-vets.	Low bargaining power for producers.	Employment and Income generation.	Influence of external markets, especially Indian.
Road, electricity, and communication linkages.	Unsold stock seeds of agro-vets are not returned to companies. small scale farmers	Timely seed availability for farmers.	Annual policy and budget constraints. Growing demand for hybrid seeds.

Conclusion and Policy Implications

The study reveals that vegetable seed production in Karnali Province plays a significant role in farmer's livelihoods, with agriculture being the primary occupation and women actively participating in production. The sector is characterized by small to medium scale landholdings, varied cultivation experience, and a diverse range of crops including radish, bean, tomato, cowpea, onion, pea, and okra, generating substantial household income. The key value chain actors such as farmers, cooperatives, seed companies, agro-vets, and government institutions collectively ensure the supply, processing, and marketing of seeds. However, the sector faces multiple challenges, including limited technical knowledge, high labor costs, pest and disease incidences, price instability, limited access to credit and subsidies, low bargaining power, and an increasing demand for hybrid seeds that local producers are unable to meet. SWOT analysis highlights opportunities in growing market demand, government support, and the potential for income diversification, while weaknesses and threats include fragmented land, inadequate technical services, vulnerability to climate and external market pressures. Based on these findings, policy measures should focus on enhancing farmer's technical capacity through training and extension services, improving access to financial resources, promoting hybrid and high-value seed production, and strengthening linkages between farmers, cooperatives, and seed companies to ensure efficient and equitable market access. Additionally, research and development should be supported to address pest and disease management, improve seed quality, and diversify crop varieties to enhance the productivity, competitiveness, and sustainability of the vegetable seed sector in Karnali Province. Due to limitations of the study, further research should focus on large-scale survey to better understand on seed production and marketing efficiency, cost-benefit analysis, post harvest losses, price stabilization, and access to financial services to support farmers and traders.

Disclosure Statement

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