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Value Chain Analysis and Marketing Efficiency of Onion Seed Production in Rukum West District of Nepal

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***Abstract*: Onion consumption in Nepal is increasing, but domestic onion seed production meets less than 20% of demand, resulting in heavy reliance on imports. Rukum West district has strong potential for onion seed production, yet small-scale farmers dominate and face low productivity and marketing constraints. This study analyzed the onion seed value chain and the marketing efficiency of producers using primary data from key value-chain actors and applying descriptive analysis. Results showed that onion seed production costs NPR 376,806 per hectare with a benefit–cost ratio of 1.57 and an average yield of 549.55 kg/ha, with land preparation being the major cost. Seed collectors captured the highest benefit–cost ratio, marketing margin, and net value addition, while agro-vets outside the district gained the least. Among the value chain actors, the benefit-cost ratio was highest (1.64) in seed collectors, and lowest (1.06) in agro-vet (out of Rukum west district). The majority of seed producers (40%) were received the market information (the price of seed), 38.33% of seed producers were informed after harvesting, and 21.67% of seed producers were informed at the trading time. The highest quantity of seed was hold by the seed collector (75.18%) and the low volume (5.54%) was hold by agro-vets (local level). The highest marketing margin 36.11 (NPR740.17/KG) was received by seed collectors among the middleman with the highest marketing cost of NPR 59.83/KG. In the value chain, highest net value added by collectors (NPR 727.84/Kg) and lowest (NPR 181.31/Kg) value added by agro-vet (out of Rukum west district). Among the 8 prevalent existing value chain, highest marketing efficiency was found in value chain-VIII (7.28). The lowest marketing efficiency was revealed in value chain-II which was 0.94 respectively. The study revealed that value chain-II was the lowest efficient chain but the percentage of seed moves through this chain was (64.98%) the highest of total seed.**

***Keywords*: value chain, marketing performance, marketing efficiency.**

1. Introduction

Vegetable production is one of the most important sub-sectors of Nepalese agriculture, contributing about 9.7% to the Agricultural Gross Domestic Product (AGDP) (AICC, 2016). Over the past decade, the area and production of vegetables have increased significantly, from 225,154 ha with a production of 2,754,406 MT and productivity of 12.23 MT/ha in 2008/09 to 297,195 ha with 4,271,270 MT production and 14.37 MT/ha productivity in 2018/19 (MOALD, 2019). Nepal has substantial agricultural potential, particularly in vegetable production, due to its highly diverse agro-climatic conditions ranging from 60 meters above sea level to the world's highest altitude of 8,848 meters, encompassing climates from tropical to alpine within a narrow geographic range.

The expansion of vegetable cultivation has led to a rising demand for vegetable seeds, much of which is met through imports (SCPL, 2011). In 2011, domestic vegetable seed production was only 1,272.73 MT against a total demand of 2,026 MT, indicating that approximately 78.28% of seed requirements were fulfilled by imports (VDD, 2019). Onion (Allium cepa L.) is the fourth most important vegetable crop in Nepal in terms of production volume and value (Thapa & Paudyal, 2000). Onion consumption is steadily increasing, with an annual per capita consumption of 15.46 kg, while about 65% of onion demand is met through imports (VDD, 2019). Similarly, onion seed imports account for nearly 80% of total national demand, highlighting strong potential for import substitution through domestic onion seed production.

Farmers in Rukum West district are predominantly subsistence-oriented, cultivating small landholdings with mixed farming systems that include livestock, cereals such as paddy, maize, and wheat, as well as radish and other vegetable seeds (DADO, 2015). The district possesses high potential for vegetable seed production due to its favorable climate, reliable irrigation water, and numerous small, isolated valleys along riverbanks that are well suited for vegetable and seed cultivation. Following the promulgation of the Constitution of Nepal in 2015, Rukum district was divided into Rukum East and Rukum West. In Rukum West, around 90% of the population depends on agriculture as their main occupation, while about 49% live below the poverty line (DCC, Rukum, 2013). To supplement household income, many residents engage in daily wage labor locally and seasonal migration to India (DADO, 2016). Despite these challenges, Rukum West district plays a leading role in Nepal's vegetable seed sector,

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particularly in onion and radish, contributing more than 60% of the country's domestic onion seed production (SCPL, 2011; MOALD, 2013).

A. Statement of Problem

Available data show a wide gap between the supply and demand of onion seed in Nepal, accompanied by frequent price fluctuations both annually and within a single production season. The Ministry of Agriculture and Livestock Development (MOALD) continues to face rising demand and increasing imports of onion seed, indicating substantial unmet domestic demand and strong potential to promote local production in place of imports. Despite this potential, farmers report limited access to market information and an inability to obtain reasonable farm-gate prices. Although onion seed has been produced in the district for many years, farmers' livelihoods have seen little improvement. Many households still depend on daily wage labor locally and seasonal employment in India, while a few family members work abroad or hold government jobs (DADO, 2016). As a result, although farmers continue onion seed production, they remain largely dissatisfied with the enterprise.

The onion seed sector also faces numerous constraints at both farm and market levels. Key marketing challenges include poor grading, lack of standard packaging and labeling (Timisina & Shivakoti, 2018), while production-level constraints include limited technical knowledge, low-quality seed production, inadequate storage facilities, and weak processing practices (Adhikari, 2013). Farmers encounter difficulties throughout the value chain, from input procurement to seed sales. Typically, seeds are sold to local seed collectors or district-level agro-vet centres, which then supply seed companies and agro-vet centres in Dang, Chitwan, and Kathmandu (DADO, 2015/16). In prevailing payment practices, collectors and agro-vet centres transfer financial risk to farmers by delaying payment until the seed is resold and payments are received from seed companies. Due to limited market information, many farmers sell seed without knowing prevailing prices, relying heavily on trust in collectors and agro-vet centres.

Given this context, there is a clear need to explore, investigate, and analyse the onion seed sector in Rukum West district. A comprehensive study at both farm and value chain levels is essential to identify constraints and opportunities, strengthen domestic onion seed self-sufficiency, and improve the welfare of value chain actors. Major challenges in the sector include unfair marketing practices, weak input supply systems, low productivity due to yield gaps, insufficient seed dealers, and an unorganized marketing network. Accordingly, this study aims to identify key value chain actors in the onion seed sector, examine their roles, and analyze the economic aspects of onion seed production.

B. Objectives of the Study

The general objective of my thesis was to explore the value chain of the onion seed sector in the Rukum west district of Nepal.

To explore the value chain of the onion seed sector, the researcher was focused on the following specific objectives.

- To analyze the value chain and find out the chain actors with their role in the onion seed sector.
- To explore the SWOT of onion seed at different steps of the value chain.
- To analysis the economics of onion sub-sectors in different chain actors level.

C. Limitation of the Study

These two major onion seed-producing named Musikot and Chaurjahari municipalities of Rukum west district was used to study of value chain analysis of onion seed with technical efficiency of onion seed producers. So, it might not be representative of the whole district as well as Nepal for this topic of study. The study was used the primary data of one cultivation year collected through interview, focus group discussion (FGD), etc. and the verbal response of respondent is the major foundation of this study so, there could be the chance of verbal response error. It was limited spatially as well as temporally to make the study more representative in terms of a wider range of area and time horizon.

2. Literature Review

The value chain is a series of process which focus on a good or service in a particular industry to furnish a valuable product. The concept of the value chain was firstly introduced by Michael Porter in 1985. The value chain framework rapidly helps management skill as a strong analysis tool for strategic planning. The value chain has been playing an increasingly greater role in the business. A value system incorporates the chains of the system of a firm's supplier, firm distribution channels, and the firm buyers. According to 'The Organization for Economic Co-operation and Development' (OECD) secretary-general (Gurria, 2012) the initiation of global value chains (GVCs) in the late 1990's giving a catalyst for increasing change in the landscape of global investment and trade along with major far-reaching consequences on enterprises as well as governments (Gurria, 2012).

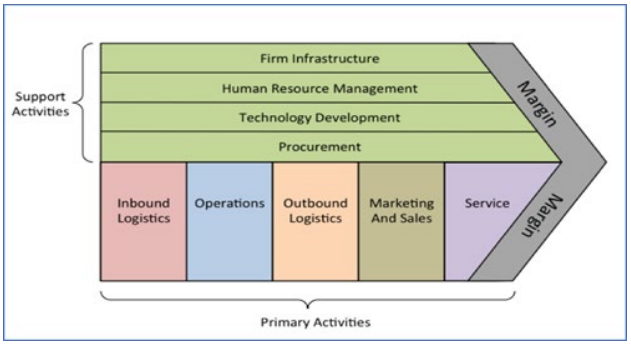

Fig. 1. Value chain activities
Source Michael Porter in 1985

Value chain mapping is an important step in the value chain project design process. It is also known as information –flow mapping (Manos and tony, 2006) is a lead management method for analyzing the present form for the flow of events that account for a service or product from the beginning of the

precise process until it arrives at the customer. Generally, value chain mapping is a visual tool that reflects a precise process and quantifies easily the time and volume taken at each stage ("What is Value Stream Mapping? Definition and Details"). Moreover, value chain mapping displays the flow of both information and materials as they move through the process (Rother et al.,1999). The objective of value chain mapping is to discover and remove waste in the value chain by uplifting the capacity of a given value chain. Inclusive value chains often focus on discovering many ways in which small–scale farmers can extract greater value from the chain by enhancing further activities along the chain (Bammann, 2007).

Value chain analysis is an approach tool used to inspect internal firm activities. Value chain analysis discovers problems and detects opportunities of specific actors for the holistic performance of the flowing chain of goods/items. The value chain analysis provides detailed insights of chain actors at every step and incorporates the additional value in all the activities (UNIDO, 2009). Moreover, value chain analysis assists different actors to create a clear sight for upgrading the chain activities (GTZ, 2006).

Value addition is the activities/process of changing the product's value by altering its current time, place, and form characteristics highly preferred in the market. It is the process of transformation or changes the primary product into more value from simple procedures to complex ones. Successful value addition concentrates highly technical and geographical vast markets where competition is sparse. The willingness of the final consumer shaped the value addition of the delivered products (Kaplinsky and Morris, 2000).

The agriculture value chain defines the wide scale of activities and set of factors that bring an agricultural product from production in the field to final consumption with adding of the value of the product in each stage. Agricultural value chain analysis starts very early by people involving agricultural development in developing countries. It is guided by the main four approaches: effective demand, production, value chain governance, and upgrading (Kaplinsky and Morris, 2000).

3. Methodology

The conceptual framework studies from the input to output market and the factors affecting across the whole chain. The enablers, actors and their function has been studied throughout the whole chain.

The west Rukum district was selected for the study because it accounts for the highest-ranking for the production of onion seed in Nepal (MOALD, 2013). As per the potentiality and number of onion seed growers availability, the two municipalities named Musikot (being district headquarter) and Chaurjahari (Far from district headquarter) were selected. The local level seed collector, local agro-vet center (retailer), and district level agro-vet center (wholesaler) was selected by "Chain-referral sampling" techniques (Bagheri, &Saadati, 2015). The Key information interview was conducted with the chairman of the district federation of seed producer's cooperative and two seed companies of Dang, and Chitwan.

A. Primary Information

The primary data was collected with 120 seed producer, 2 cooperatives, 7 Agro-vet (local level), 8 seed collector (Biu-Byapari) 10 Agro-vet (out of Rukum west district), 2 seed company, and 34 seed user (onion producer) through pre-tested questioner, KII and, and group meeting. The discussion was done with the Vegetable Seed Production Center (SVSPC), District Agriculture Development Office, National Agriculture Modernization Project (NAMP), Vegetable and Vegetable Seed Zone Office, and national level seed companies.

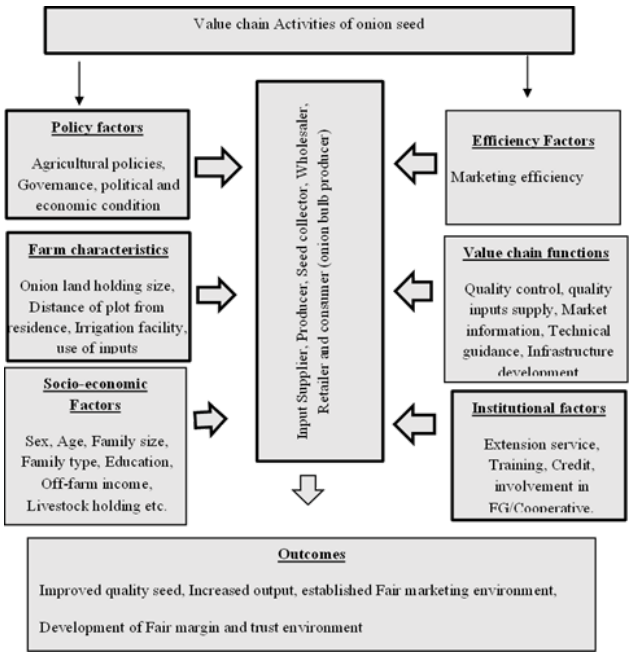

Fig. 2. A Conceptual framework of value chain analysis of onion seed

B. Secondary Information

The published articles, annual book of DADO, SVSPC, MOALD, SQCC, VDD, and DOA were used for necessary secondary information and data. For secondary data/information was used from the government database system and non-government organization/agency's published literature and books.

C. Economic Analysis

The economic analysis of the onion seed value chain was calculated as per the following equations.

1) Benefit-Cost Ratio (BCR)

$$Benifit\ cost\ ratio\ (BCR) = \frac{Gross\ return}{Total\ cost}$$

- Per unit production cost

$$Per\ unit\ production\ cost\ (NRs) = \frac{Total\ variable\ cost}{Total\ quantity\ production\ seed}$$

2) Contribution of Onion in the Household Economy

$$Contribution\ of\ onion\ seed\ in\ house\ hold\ income(\%) = \frac{Total\ income\ from\ onion\ seed}{Total\ household\ income}$$

3) Marketing Performance

The equation was used as given below.

- Price spread = Price paid by the consumer – price received by the producer
- Producer share (%) = (Price received by the producer/Price paid by the consumer) × 100
- Marketing efficiency = Price received by the producer/(Total marketing cost + Total net marketing margin)

4) Value Adding by Traders

$$Value\ added\ by\ trader = Gross\ margin - Marketing\ cost$$

$$Whereas, Gross\ margin = Sale\ price - Purchase\ price)$$

5) Market Margin

$$Margin = Si - (Ppi + Mci)$$

$$Pmi\ (\%) = \left(\frac{Margin}{Si}\right) * 100$$

Ppi =Purchase price of i^{th} middleman, Mci = Marketing cost of i^{th} middleman, Pmi = Percentage margin of i^{th} middleman

4. Result and Discussion

A. Value Chain Analysis

1) Age and Gender Distribution of Respondents

The study revealed that the average age of respondents was 48.56 years with a maximum of 69 years and a minimum of 25 years. Concerning gender, 21.67 % of the respondents were female and only 78.33 % of respondents were male. The average age of female respondents was 50.58 years and the mean age of male respondents was 48.01 years.

2) Value Chain Map

The onion seed flows through different actors and channel as below.

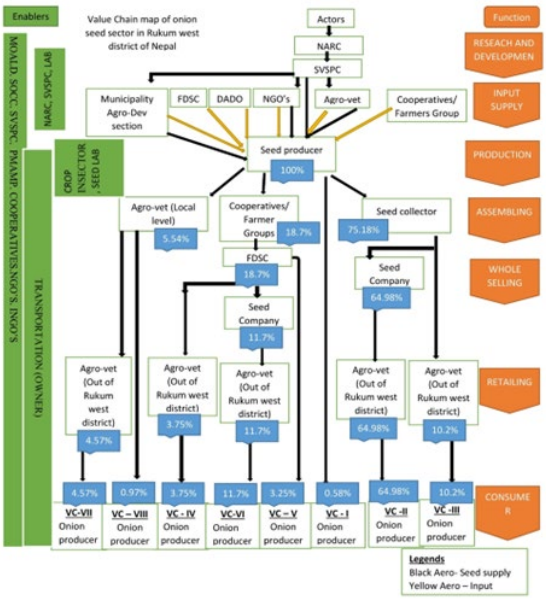

Fig. 3. Value chain map of onion seed sector of Rukum west district, Nepal

The map shows that there area at least channel where onion seed is being dispatched to end consumers. The functions along all these value chains are being repeatedly done by each of the actors. Almost 64% of the onion seed goes outside the Rukum district via channel II.

Table 1
Age and Gender distribution of seed producers

Respondents	Number of producers	Percent (%)	Mean Age	Minimum Age	Maximum Age
Female	26	21.67	50.58±9.419864	26	66
Male	94	78.33	48.01±8.717175	25	69
Total	**120**	**100**	**48.56±8.89692**	**25**	**69**

Source: Field survey (2020)

Table 2
Input supply situation in onion seed sectors

Actors	Role	Supporting Actors	Supporting actors' Role
DADO SVSPC Municipalities Agro-vets	Supply of foundation seed, technical inputs, agro-inputs (fertilizer, pesticide, storage bin, and seed packing sac).	SQCC DAADO	Provide agro-inputs, financial funds, and technical inputs.
Cooperative Seed collector Farmer		Different international aid NGO's/INGO's	Prepares the support programs and inter- linkages.

Source: Field survey (2020)

Table 3
Onion seed production activities, supportive actors and their roles

Actors	Role	Supporting Actors	Supporting actors' Role
Farmers Producer Groups/ Cooperatives	Production of improved onion seed and experience exchange between local level	DADO, Municipalities, Different international aid NGO's/INGO's, community- based organization CBO's	Subsidy program Training &visit, information delivery. Monitoring and supervision of farm fields Group formation and promotion of farmers through capacity building programs.

Source: Field survey (2020)

3) Input Suppliers

The major inputs and the suppliers are being shown in table below. Its shows that agro-vets are the major input suppliers in the onion seed value chain. The enablers are mostly the government and non-government organizations like NARC, SVSPC, DADO, MAS, NGOs, agro-vets, cooperatives, and seed producers themselves to the onion seed producers. In the study area, 24 agro-vets (12 in Musikot municipality, 8 in Chaurjahari municipality) and 7 seed cooperatives/farmers groups were involved in the seed value chain.

4) Seed Producers

The majority of onion seed producers were involved in cooperatives/farmers group. There were 645 onion seed producers in Rukum west district.

5) Local Traders

The local traders are the agent those are acting as a bridge between seed producers and wholesalers to supply the seed from Rukum west district. In the Rukum west district, 18 seed collectors, 8 agro-vets, and DFSC were procured seed from producers. They bargain with Seed Company and large scale agro-vets of other districts based on total production volume on that season. Based on the bargain they fix the price of seed then they start to make payment of seed to the producer. So, the majority of seed producer has received the payment after local traders received from seed companies. Among the local traders, seed collector holds the maximum volume of seed 75.18%, that volume was the sale to seed companies 64.98% and agro-vets (out of Rukum west district) 10.2%. The DFSC procures 18.7% of seed from producers and sells to seed companies, agro-vets, and seed users. The agro-vets (local level) hold 5.54% of total volume seed and sale to agro-vets (out of Rukum west district). The seed producer was doing as a seed collector too, so the majority of seed collectors were the seed producer.

6) Wholesalers

The wholesaling was done by seed companies and big seed farms. They covered 76.68% of the seed volume of the study area. They were procured the seed from seed collectors, agro-vets (local level), and DFSC. After procurement, they test the seed for quality and give the appropriate packaging for selling. They were trading the other crop's seed too and the majority of onion seed was imported from foreign countries. They sale the seed to the agro-vets, cooperatives, and farmer groups of different districts.

7) Retailers

In the seed retailing function, agro-vets (outside of district), agro-vets (local level), cooperatives, and farmer groups were involved. In general, agro-vets of Rukum west were doing multifunction like they supply the inputs (seed, fertilizer, and pesticides), collect seed from the producer, and wholesale to agro-vets outside of the district. The agro-vets outside of districts mostly procured the seed from seed companies, agro-vets of seed production areas, and seed farms. They covered the big volume (95.2%) seed of the study area.

8) Processing

The seed processing function was accomplished through seed companies, DFSC, seed farms, and entrepreneurs. They perform the following activities.

Table 4
Actors involved and their role in onion seed processing

Actors	Role	Supporting Actors	Supporting actors' Role
DOC Seed Companies Seed farm entrepreneurs	Storing/Grading/Separation, quality testing, truthful labeling, and pricing	Municipalities, Different NGO's/INGO's SQCC, Seed lab	Market monitoring and linkage development between agencies, Quality standard declaration, Seed testing

Source: Field survey (2020)

Table 5
Actors involved and their role in market logistics

Actors	Role	Supporting Actors	Supporting actors' Role
Wholesaler, Distributors, Agro-vets, Retailers	Distribution, Retail	SQCC, VDD NGO's	Market monitoring and linkage development between agencies, Quality standard declaration, upscaling of farmers group and cooperatives

Source: Field survey (2020)

Table 6
Cost of production of onion seed production in the study area (NPR/ha)

Particular	Average	Minimum	Maximum	Unit	Percent
Variable Cost					
Nursery cost	8291.573±4537.716	1651.44	26075.37	NPR/ha	2.20
land preparation cost	87305.29±38086.89	32111.33	259512	NPR/ha	23.17
FYM/compost cost	27802.92±15692.11	5898	128336.1	NPR/ha	7.38
Fertilizer cost	20412.19±11566.65	4100.514	69203.2	NPR/ha	5.42
Irrigation, weeding, fertilization, and pesticide application cost	43136.86±17813.96	17694	123858	NPR/ha	11.45
Harvesting cost	33996.84±15249.26	12638.57	82572	NPR/ha	10.83
Pesticide cost	15857.45±9737.875	0	51116	NPR/ha	4.21
Post-harvest cost	48114.35±18054.72	13270.5	129362.8	NPR/ha	12.77
Resource seed cost	14233.27±8117.188	3686.25	36862.5	NPR/ha	3.92
Miscellaneous cost	14762.74±7725.342	1966	45218	NPR/ha	3.78
Total A	313913.5±105673.4	136075.3	683578.2	NPR/ha	83.31
B) Fixed cost (cost of land used)	62892.34±19888.76	7864	98300	NPR/ha	16.69
Total (A+B)	376805.8±110217.2	194388.3	753371	NPR/ha	100.00

Source: Field survey (2020)

9) Market Logistics

The market logistics of onion seed was primarily done by wholesaler/ distributors, agro-vets and retailers in the Rukum west district of Nepal. The activities and supporting activities were given table 5.

B. Economic Analysis

1) Cost of Onion Seed Production

The total cost of production was NPR.376,805.8/ hectare. The preparation cost and land used cost were the major cost of production. The land preparation cost covered the highest part (23.17%), followed by the cost of land use covered 16.69% of the total cost of production. Similarly, the post-harvest cost was 12.77%, cultural operation cost (irrigation, weeding, fertilization, and pesticide application) contributed 11.45%, followed by harvesting cost 10.83%, FYM compost used 7.38%, fertilizer used 5.42%, similarly, 2.20% low-cost contribution was in nursery preparation and management activity and miscellaneous cost contributed 3.78% to the total cost of production.

The yield, per kilogram price, gross return, and cost per kilogram, net return, and benefit-cost ratio of onion seed is as below.

Table 7
Cost, Return and Profit of Onion Seed Production

Particular	
Yield (Kg/ha)	563.3659
Price (NPR/ha)	1050
Gross return (NPR/Kg)	591534.195
Total variable cost (NPR/ha)	313913.483
Total cost (NPR/ha)	376805.823
Gross margin (NPR/ha)	277620.712
Net return (NPR/ha)	214728.372
Benefit-cost-ratio	1.57
Profit margin ratio	0.363002467
Cost of onion seed Per Kg (NPR/Kg)	668.85

Source: Field survey (2020)

2) Benefit-Cost Ratio Analysis

In the study of value chain analysis of the study area following given chain-actors were analyzed. Among the following actors seed collectors have a high benefit-cost ratio of 1.64 followed by seed producers has 1.53 and the lowest benefit-cost ratio has agro-vet (out of districts) 1.06. In this study seed user (onion producer) was also studied for BCR and they have 1.57 revealed.

3) Market Margin of Middle Man

The marketing margin of the different value chain actors across the onion seed value chain is as shown in table 9.

Table 9
Marketing margin of middleman in onion seed production

Particular	Sale price (NPR/Kg)	Purchase price (NPR/ Kg)	Marketing cost (NPR/ Kg)	the margin of the middle man (NPR/Kg)	Percentage margin of the middle man (%)
Collector	2050	1250	59.83	740.17	36.11
Agro-vet (Local level)	2028	1679	45	304	14.99
Cooperative/Farmers group	1965	1725	24.54	215.46	10.96
DSCF	2350	2000	55	295	12.55
Seed company	2900	2525	45.06	329.94	11.38
Agro-vet (Outside of district)	3100	2900	15.75	184.25	5.94

Source: Field survey (2020)

4) Value Adding by Different Actors Involved in the Value Chain

Value-adding is also focused on change in utility and utility may change by time, place, and form. The product has added value when the product transfers different stage and pass from one to another (Alam, 2012). The data results show that collector, agro-vet (local level), cooperatives/farmers group, DSCF, Seed Company, and agro-vet (out of district) were NPR 740.17, NPR 304, NPR 215.46, NPR 295, NPR 329.94, and NPR 184.25. Among the actors, the collector added more value than other actors involved in the value chain and followed by the seed company, agro-vet (local level), DSCF,

Table 8
Benefit-cost ratio of onion seed actors involved in onion seed value chain

Particular	Total cost	Total revenue (NPR/Kg)	Benefit (NPR/Kg)	Profit margin (%)	Benefit-cost ratio
Seed producer (NPR/Kg)	668.85	1050	381.15	0.363002	1.57
Seed collector (NPR/Kg)	1250.00	2050	800.00	0.390244	1.64
Agro-vet (Local level) (NPR/Kg)	1723.635	2028	304.37	0.150081	1.18
Cooperatives/Farmer groups (NPR/Kg)	1749.548	1965	215.45	0.109645	1.12
Seed company (NPR/Kg)	2559.94	2900	340.06	0.117262	1.13
Agro-vet (Out of districts) (NPR/Kg)	2915.75	3100	184.25	0.059435	1.06
Seed user (Onion producer) (NPR/Kg)	23.02	36.18	13.17	0.363871	1.57

Source: Field survey (2020)

Table 10
value-adding by different actors involved in the onion value chain

Particular	Sale price (NPR/Kg)	Purchase price (NPR/Kg)	Gross margin/Net return (NPR/Kg)	Marketing cost (NPR/Kg)	Value-adding (NPR/Kg)
Producer	1050	0	0		0
Collector	2050	1250	800	59.83	740.17
Agro-vet (Local level)	2028	1679	349	45	304
Cooperative/Farmers group	1965	1725	240	24.54	215.46
DSCF	2350	2000	350	55	295
Seed company	2900	2525	375	45.06	329.94
Agro-vet (Outside of district)	3100	2900	200	15.75	184.25

Source: Survey (2020)

Table 11
Net value-adding by different actors involved in the value chain

Particular	Sale price (NPR/Kg)	Purchase price (NPR/Kg)	Gross margin/Net return (NPR/Kg)	Marketing cost (NPR/Kg)	Value-adding (NPR/Kg)	Post-harvest loss (NPR/Kg)	Net value-adding (NPR/Kg)
Producer	1050	0	364.34	31.9	332.44	50.25	282.19
Collector	2050	1250	800	59.83	740.17	12.33	727.84
Agro-vet (Local level)	2028	1679	349	45	304	175.99	128.01
Cooperative/Farmers group	1965	1725	240	24.54	215.46	7.18	208.28
DSCF	2350	2000	350	55	295	5.50	289.50
Seed company	2900	2525	375	45.06	329.94	16.21	313.73
Agro-vet (Outside of district)	3100	2900	200	15.75	184.25	2.95	181.31

Source: Field survey (2020)

Table 12
Price spread and producer share

Particular	Consumer price (NPR/Kg)	Producer price (NPR/Kg)	Price spread (NPR/Kg	Producer share (%)
Value chain-I	1478	1260.04	217.96	85.25304
Value chain-II	3100	1260.04	1839.96	40.64645
Value chain-III	3025	1260.04	1764.96	41.65421
Value chain-Iv	2965	1260.04	1704.96	42.49713
Value chain-V	2350	1260.04	1089.96	53.61872
Value chain-VI	3000	1260.04	1739.96	42.00133
Value chain-VII	2995	1260.04	1734.96	42.07145
Value chain-VIII	2028	1260.04	767.96	62.13215

Source: Field survey (2020)

cooperatives/farmers group, and agro-vet (out of district).

5) Net Value-Adding by Traders

Net value-adding is different from value-adding. In net value adding was measured by deducting the marketing cost and post-harvest loss from gross margin. In the study area, it was revealed that farm level (seed producer) NPR 282.19/Kg, collector NPR 727.84/Kg, agro-vet (local level) NPR 128.01/Kg, cooperatives/farmers group NPR 208.28/Kg, DSCF NPR 289.5/Kg, Seed Company NPR 313.73/Kg, and agro-vet (out of district) NPR 181.31/Kg value was added. Among the value chain actors, the collector was added more value as compared to other value chain actors and the lowest value was added agro-vet (out of district).

6) Marketing Performance

In the study area, eight types of marketing channels were dominant in the onion seed value chain. The marketing performance of those channels was evaluated by price spread, producer share, and marketing efficiency tools.

- *Price Spread and Producer's Share*

The results show that more price spread in value chain-II NPR 1839.96/Kg and followed by value chain- III NPR 1764.96/Kg, value chain-VI NPR 1739.96/Kg, value chain-VII NPR 1734.96/Kg, value chain-VIII NPR 767.96/Kg, and lowest NPR 217.96/Kg in the value chain I. In the producer share results, 85.25% highest producer in value chain I and low producer share 40.64% in value chain-II. So, it revealed that value chain-I is a more suitable channel than other existing channel but in the scenario of percentage seed moves, through value chin- I is lowest 0.58% seed moves, and the maximum seed moves through value chain II but it has highest price spread and lowest percentage of producer share.

- *Marketing Efficiency*

Marketing efficiency is an efficient way to evaluate marketing performance. In the study area, the following prevalent value chain was considered. The high marketing efficiency has in value chain-VIII 7.28 and followed by value chain-VII 3.40, value chain I 3.34, value chain 2.18, value chain-IV 1.63, value chain-VIII 1.28, value chain-VI 1.1, and low in value chain-II. So, it revealed that maximum seed moved value chain-II was not giving good marketing performance among the other value chain.

Table 13
Marketing efficiency

Particular	The price paid by seed user (NPR/Kg)	Price received by seed producer (NPR/Kg)	Total marketing cost (NPR/Kg)	Total net marketing margin (NPR/Kg)	Marketing efficiency
Value chain-I	1478	1050	31.9	282.19	3.34
Value chain-II	3100	1260.04	120.64	1222.88	0.94
Value chain-III	3000	1260.04	75.58	909.14	1.28
Value chain-Iv	2965	1260.04	95.29	679.08	1.63
Value chain-V	2300	1260.04	79.54	497.78	2.18
Value chain-VI	3000	1260.04	140.35	992.82	1.11
Value chain-VII	2995	1260.04	60.75	309.31	3.40
Value chain-VIII	2028	1260.04	45	128.01	7.28

Source: Field survey (2020)

5. Conclusion

The production cost of onion seed production was per hectare NPR 376,805.8 with NPR 668.85 per kilogram cost and the 1.57 benefit-cost-ratio was lower than onion seed produced in SVSPC farm Rukum (SVSPC, 2016). In onion seed production, the land preparation part incurred the highest 23.17 % of total cost followed by post-harvest 12.77%, inter-cultural 11.45%, and harvesting cost 10.83%. It showed that human labor needed part took more cost, it might be due to mechanization wasn't adopted by seed producer of the study area. The benefit-cost ratio was analyzed in the value chain actor's stage of onion seed in which the benefit-cost ratio (BCR) of seed collectors was 1.64 that was highest among the chain actors and agro-vet out of Rukum west district (retailer) were have a less benefit-cost ratio (BCR) 1.06. However, seed collectors were holding the highest quantity of seed volume 75.18 % of total traded seed in the study area.

In the onion seed value chain, the marketing margin of the middleman was analyzed at the middleman stage based on their involvement. Where, Seed Collectors was received 36.11% (NPR 740.17/KG) and it is highest among the middleman whereas the lowest marketing was 5.94% (NPR 184.25/KG) received by the retailer (agro-vet out of Rukum west district). The marketing cost of onion seed was also found highest NPR 59.83/KG at Seed Collector stage and lowest was NPR 15.75/Kg found at retailer stage (agro-vet out of Rukum west district).

In the onion seed value chain, there were eight types of the value chain was revealed. Among those value chain maximum quantity 64.89% of the total traded seed of study area has been moved through value chain-II whereas lowest 0.58% of total seed was moved through value chain-I.

In the value chain analysis, net value-adding at different chain actor levels is one of the major concerns of this study. The maximum net value NPR 727.84/Kg was added by Seed Collector and lowest value NPR 181.31/KG was added by retailer (agro-vet out of Rukum west district) level.

In the value chain, the marketing performance of the involved chain was analyzed in this study and that was evaluated by two indicators producer's share and marketing efficiency. The study revealed the highest producer's share was found 85.25% at value chain-I it means the lowest price was spread in this value chain level and marketing efficiency was highest in value chain-VIII. Whereas the lowest producer's share and marketing efficiency both were found 40.65% and 0.94 at value chain-II respectively. However, through value chain-II moves the highest quantity of onion seed despite It was less efficient and low producer's share.

References

[1] P. Adhikari and D. Adhikari, *Study of Socio-Economic Impacts of Vegetable Seeds in Khalanga Village Development Committee*. Rukum, Nepal: Sub-Tropical Vegetable Seed Production Centre, 2013.

[2] Agriculture Information and Communication Centre (AICC), *Onion Seed Production Technology*. Kathmandu, Nepal: AICC, 2015/16. [Online]. Available: https://www.aicc.gov.np

[3] M. F. Alam, M. S. Palash, M. A. Mian, and M. M. Dey, "Marketing of major fish species in Bangladesh: A value chain analysis," Food and Agriculture Organization, pp. 10–23, 2012.

[4] A. Bagheri and M. Saadati, "Exploring the effectiveness of chain referral method in sampling hidden populations," *Indian J. Sci. Technol.*, vol. 8, no. 30, pp. 1–8, 2015.

[5] H. Bammann, "Participatory value chain analysis for improved farmer income, employment opportunity and food security," *Pac. Econ. Bull.*, vol. 22, no. 3, pp. 113–125, 2007.

[6] District Agriculture Development Office (DADO), *Annual Progress Report 2013/14*. Rukum, Nepal: DADO, 2014.

[7] District Agriculture Development Office (DADO), *Annual Progress Report 2015/16*. Rukum West, Nepal: DADO, 2016.

[8] District Coordination Committee (DCC), *District Profile: Rukum*. Rukum, Nepal: DCC, 2013.

[9] Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), *Value Chain Analysis and Making the Market Work for the Poor (M4P): Poverty Reduction through Value Chain Promotion*. Eschborn, Germany: GTZ, 2006.

[10] A. Gurría, "The emergence of global value chains: What do they mean for business?," in *Proc. G20 Trade and Investment Promotion Summit*, Mexico City, Mexico, 2012.

[11] High Value Agriculture Project (HVAP), *Value Chain Analysis of Vegetable Seed in Nepal*. Birendranagar, Surkhet, Nepal: HVAP Project Management Unit, 2011.

[12] R. Kaplinsky and M. Morris, *A Handbook for Value Chain Research*. Ottawa, ON, Canada: IDRC, 2000.

[13] T. Manos, "Value stream mapping: An introduction," *Qual. Prog.*, vol. 39, no. 6, pp. 64–69, 2006.

[14] Ministry of Agriculture and Livestock Development (MOALD), *National Seed Vision 2013–2025*. Kathmandu, Nepal: MOALD, 2013.

[15] Ministry of Agriculture and Livestock Development (MOALD), *Statistical Information on Nepalese Agriculture 2013/14*. Kathmandu, Nepal: MOALD, 2014.

[16] Ministry of Agriculture and Livestock Development (MOALD), *Statistical Information on Nepalese Agriculture 2018/19*. Kathmandu, Nepal: MOALD, 2019. [Online]. Available: https://www.moald.gov.np

[17] M. Rother and J. Shook, *Learning to See: Value Stream Mapping to Add Value and Eliminate Muda*, 1st ed. Brookline, MA, USA: Lean Enterprise Institute, 1999.

[18] G. B. Thapa and D. Paudyal, "Dynamics of vegetable production, distribution, and consumption in Asia," in *Dynamics of Vegetable Production, Distribution, and Consumption in Asia*, M. Ali, Ed. Shanhua, Taiwan: AVRDC–The World Vegetable Center, 2000, pp. 231–270.

[19] K. P. Timsina and G. P. Shivakoti, "Vegetables production and marketing: Practice and perception of vegetable seed producers and fresh growers in Nepal," *Agric. Food Secur.*, vol. 7, no. 11, pp. 1–9, 2018.

[20] United Nations Industrial Development Organization (UNIDO), *Agro-Value Chain Analysis and Development: The UNIDO Approach*. Vienna, Austria: UNIDO, 2009. [Online]. Available: https://www.fao.org/sustainable-food-value-chains/library/details/en/c/266279/

[21] Vegetable Development Directorate (VDD), *Annual Progress Report 2019*. Kirtipur, Nepal: National Centre for Potato, Vegetable and Spice Crop Development, VDD, 2019. [Online]. Available: https://www.vdd.gov.np

[22] Sub-Tropical Vegetable Seed Production Centre (SVSPC), *Study of Socio-Economic Impacts of Vegetable Seeds in Khalanga VDC, Rukum*. Rukum, Nepal: SVSPC, 2013.