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Research Article

Value Chain Development of Ginger (*Zingiber officinale* Rose.) Sub-sector in Panchthar District of Nepal

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Abstract

This research survey was conducted to analyze the value chain development in ginger subsector in Panchthar district during Sep-Dec 2017. In a household survey, 60 ginger producers along with local collectors, cooperative member and district level traders were interviewed with pre-tested semi-structured questionnaire for collection of primary data within the Prime Minister Agriculture Modernization Project (PMAMP) Ginger Block Implementation sites (Bharapa, Tharpu and Ranigaun). Data obtained from semi-structured questionnaire was subjected to descriptive analysis. The average yield in the study area was 17.32 mt/ha. Majority of the respondents had known about the trending price of ginger via local collectors and traders. On an average, the cost per kg production of fresh ginger was Rs. 16.50. The average income from ginger in the study area was Rs 40502.52. Only cleaning, sorting and packaging activities were performed by the farmers who sold their produce to local collectors who in turn supplied to district traders. Most of the respondents perceived that the disease and pest infestation and fluctuation in price were major problems. Problems of export are the quality of the product and price. Nepalese ginger lacks cleanliness that is why price remains at lower level. From the problem ranking on marketing, it was found that lack of grading and cleaning and drying practice was the most problematic on marketing. From the study it was concluded that to make ginger marketing more profitable and reliable concerned agencies should focus their programs on product standardization and diversification.

Keywords: Value Chain; Pricing; Market Margin; Export

Introduction

Ginger (*Zingiber officinale* Rose.) is one of the most importance spice crops grown in the mid hills of Nepal as High Value Crops (HVCs) which has extreme potential (HVAP, 2011). Nepal's comparative advantage in production of high value crop lies in its unique natural base and some traditional skills (ADB, 2010). The increasing trend of ginger production and export indicates that it could establish itself as an enterprise contributing significantly in national economy [1]. It has estimation that in Nepal, there are almost 66,000 families involved in ginger cultivation (GON, 2012). Among the 19 products identified with best export potential ginger is one of them [2]. With an export value of about Rs. 509 million, ginger contributed to 1.3 percent of all the exports in the fiscal year 2013 [3]. But its share to the world market is in smaller amount. Smallholder farmers mainly carry out ginger farming which has medium impact on export potential and socioeconomic sector.

Major production of Nepalese ginger goes to the Indian markets. Price varies according to global production. When there is no demand of ginger in India then no market in Nepal. Traders control the farm gate price. Producers have no effective marketing strategies. As ginger crop need high-input use, the high cost of production could result in loss if market prices run through irregularities and instabilities (Kafle, 2011). Owing to the climatic suitability and free access to the India's market, ginger has become an important export commodity in Nepal. Nepal mostly exports ginger to India in fresh form and partly in traditionally dried form sutho which is the major processed product made out of fresh ginger. Ginger candy, powder, squash, pickles are other value added products but they are not produced in large quantity. More than 75% of produced ginger in Nepal is exported to India [4].

Ginger is used as a flavoring agent, appetizer and has medicinal value too. It cuts the fat of meat and picks up flavor of blended

foods. Ginger has been traditionally used in disorders of the gastro intestinal tract as a laxative, stomachic, sialagogue, appetizer, gastric emptying enhancer, antiemetic and antidyspepsic [5]. Ginger is a product for which the trend of export has been largely positive and investment in this sector would further allow it to enhance its market growth. Nepal has mostly remained within the top ten position of world's biggest producer and exporter of ginger throughout the decade. Nepal has a world share of 12.8% and holds third position in the world in terms of ginger production quantity (tons) with 24226 ha area harvested and production of 276150 mt [6]. The total area under ginger in Nepal in the year 2015/16 was 21869 ha with the production of 271863 mt and productivity of 12.43 mt/ha [7].

The Eastern Development Region has the highest share of ginger in terms of area of production and productivity of which ginger is cultivated in 30.58% area with 38.07% production [8]. Dhankuta, Illam, Panchthar and Tehrathum districts have greater potential for commercial ginger cultivation in the eastern region. Among the major exported spice crops in the district, ginger holds second position after cardamom. Panchthar is the second largest ginger producing district in eastern hills. The area under ginger production has increased by more than 200% with in the last five years. Of the 40 VDCs in the district, ginger is commercially grown in 9 VDCs (DADO Profile, Panchthar). The total area under ginger in Panchthar district in the fiscal year 2015/16 is 661 ha with production of 8839 mt and productivity 13.37 mt per ha [7].

Ginger is mostly exported in fresh form without undergoing through value addition. After the harvest of ginger only cleaning and sorting activities are performed. Fresh ginger from the eastern region is washed in facilities at Naxalbari, the nearest Indian town on the Kakarbhitta border. Majority of the ginger farmers sell to local collectors without washing/ grading/processing [9]. In terms of the total export volume, Nepal is the third largest ginger exporting country. But for total earnings from export it is 10th position [6]. It is because of lowest unit price of Nepalese ginger among major exporting countries. Therefore the study was undertaken with the aim of knowing marketing pattern, problems and marketing chain development for its sustainability.

Research Methodology

This research survey was conducted in Panchthar district during Sep-Dec 2017. In a household survey, 60 ginger producers along with local collectors, cooperative member and district level traders were interviewed with pre-tested semi-structured questionnaire for collection of primary data within the Prime Minister Agriculture Modernization Project (PMAMP) Ginger Block Implementation sites (Bharapa, Tharpu and Ranigaun). Data obtained from semi-structured questionnaire was subjected to descriptive analysis. The associated traders or local collectors from the study area were also interviewed via market chain purposive sampling. As such, 2 district traders, 2 local collectors and 1 cooperative member were interviewed. The collected data were analyzed using statistical software like Ms Excel and Statistical Package for Social Sciences (SPSS, version 16.0) [10-15].

Results and Discussion

Socio-economic characteristics of the respondents

From the study it was found that the average age of the respondents was 43.87 years whereas the average family size was 5.52. The medium and large ginger cultivating landholders had higher family size of 5.88 than the small ginger cultivating landholders of 5.04 having statistical significance at 10% level. Average economically active population was 3.75 whereas the dependency percentage was 61.77%. On an average 3.62 family members were involved in agriculture in the study area. Majority of the respondents were male and majority were involved in agriculture as their primary occupation. Majority of the respondents in the study area were Brahmin followed by Chettri, Janajati and other ethnic groups. The details are as shown in the Table 1 and 2.

Variables	Overall average (N=60)	Medium and large land holders[1] (>=2.78 ropani) n=34	Small land holders[2] (<2.78 ropani) n=26	Mean difference	t value
Age of the respondents (year)	43.87	45.44	41.81	3.63	1.155
Family size	5.52	5.88	5.04	0.84	1.947*
Economically active members in HH (age group 15 to 59 years)	3.75	3.88	3.58	0.30	0.734
Dependency percentage	61.77	69.88	51.15	18.73	1.289
Female percentage in HH	50.70	52.33	48.57	3.76	1.049
No of family members involved in agriculture	3.62	3.79	3.38	0.41	1.059

Table 1: Socio-demographic variables (continuous) of the respondents by ginger cultivating land holders category

Note: * indicate 10% level of significance.

[1]Medium and large land holders: Farmers with ginger cultivating land area more than mean 2.78 ropani

[2]Small land holders: Farmers with ginger cultivating land area less than and equal to mean 2.78 ropani

Variables	Medium and large holders (n=34)	Small holders (n=26)	Total (N=60)	Chi -square value
Gender of the respondents				
Female	6 (17.60)	4 (15.40)	10 (16.70)	0.054 (at 1 df, P= 0.816)
Male	28 (81.80)	22 (84.60)	50 (83.30)	
Primary occupation				
Agriculture	31(91.20)	22 (84.60)	53(88.30)	0.809 (at 2 df, P=0.667)
Business	2 (5.90)	2 (7.70)	4 (6.70)	
Teaching	1 (2.90)	2 (7.70)	3 (5.00)	
Religion				
Hindu	25 (73.50)	23 (88.50)	48 (80.00)	2.331 (at 2 df, P=0.312)
Buddhist	1 (2.90)	0 (0.00)	1 (1.70)	
Kirat	8 (23.50)	3 (11.50)	11 (18.30)	
Ethnic composition				
Brahmin	13 (38.20)	14 (53.80)	27 (45.00)	3.108 (at 3 df, P=0.375)
Chettri	10 (29.40)	5 (19.20)	15 (25.00)	
Janajati	8 (23.50)	3 (11.50)	11 (18.30)	
Others	3 (8.80)	4 (15.40)	7 (11.70)	
Education level				
Illiterate	3 (8.80)	0 (0.00)	3 (5.00)	10.567* (at 6 df, P= 0.103)
Literate	8 (23.50)	7 (26.90)	15 (25.00)	
Primary class up to 5	4 (11.80)	7 (26.90)	11 (18.30)	
Lower secondary up to class 8	8 (23.50)	32 (7.70)	10 (16.70)	
SLC	7 (20.60)	4 (15.40)	11 (18.30)	
+2/ Certificate	4 (11.80)	3 (11.50)	7 (11.70)	
Bachelors and Above	0 (0.00)	3 (11.50)	3 (5.00)	

Table 2: Gender, primary occupation, ethnicity and education level religion of the respondents by ginger cultivating land holders category (categorical).

Notes: Figures in parentheses indicate percentage. * indicates 10% level of significance.

From the survey it was found that, the average land holding was 1.06 ha, which was more among the medium and large ginger cultivating landholders, 1.16 ha as compared to small holders, 0.93 ha. The average household level area under ginger was 0.14 ha. The average household ginger area was 0.19 ha for medium and large ginger cultivating landholders and 0.09 ha for small ginger cultivating landholders. The details are as shown in the Table 3.

Variables	Overall average	Medium and large land holders	Small land holders	Mean difference	t value
Total land holding (ha)	1.06	1.16	0.93	0.23	1.301
Area under ginger (ha)	0.14	0.19	0.09	0.102	8.36***
Production (mt)	2.60	3.36	1.61	1.74	6.17***
Ginger yield (mt/ha)	18.49	17.95	19.20	-1.26	-1.426*

Table 3: Area, production and yield of ginger by ginger cultivating land holders category in study area.

Note: *** and * indicate 1% and 10% levels of significance, respectively.

The result shows that the average ginger yield in the study area was 17.32 mt/ha which was higher than the national average (12.43 mt/ha) and district average (13.37 mt/ha). The details are as shown in Table 4.

Variable	Bharapa (n=20)	Tharpu (n=25)	Ranigaun (n=15)	Overall mean (N=60)	F value
Yield (mt/ha)	19.36 [a]	18.62 [b]	13.98 [b]	17.32	6.438***
Price per Kg of ginger	21.98[a]	17.60[b]	17.27[b]	18.98	105.571***
HH level ginger income (Rs)	49830[a]	35484[ab]	26853.33[b]	38108.33	4.330**

Table 4: Ginger yield, price received and HH level ginger income by surveyed village.

Note: *** and ** indicate 1% and 5% levels of significance, respectively.

Institutional variables

The institutional variables such as trainings, price information and credit supply received by ginger cultivating land holders category are as given in Table 5. Among these variables, only the credit supply situation was found to be statistically significant. In case of credit supply situation, majority of the respondents 73.30% had not taken any sorts of credit for ginger cultivation, 15.0% had consulted the local groups, 8.30% had taken credit from cooperatives and only 3.30% from banks. Among the medium and large ginger cultivating land holders, 67.60% had not taken any sorts of credit for ginger, 17.80% had taken credit from local groups and 14.70% from cooperatives. Among the small ginger cultivating land holders, 80.80% had not taken any sorts of credit for ginger, 11.50% had taken credit from local groups and 7.70% from bank. The credit supply situation was found to be statistically significant at 10% level.

Variable	Small holders	Medium and large holders	Total (N=60)	Chi -square value
Training related to ginger				
Yes	3 (11.50)	9 (26.50)	12 (20.00)	2.053
No	23 (88.50)	25 (73.50)	48 (80.00)	(at 1 df, P=0.152)
Knowledge regarding the price of ginger				
External source	1 (3.80)	4 (11.80)	5 (8.30)	1.209
Local collectors/Traders	25 (96.20)	30 (80.20)	55 (91.70)	(at 1 df, P=0.271)
Credit supply				
Banks	2 (7.70)	0 (0.00)	2 (3.30)	7.151*
Cooperatives	0 (0.00)	5 (14.70)	5 (8.30)	(at 3 df, P=0.067)
Local groups	3 (11.50)	6 (17.60)	9 (15.00)	
Not yet	21 (80.80)	23 (67.60)	44 (73.30)	

Table 5: Trainings, knowledge about price, credit supply and supports from organizations received by ginger cultivating land holders category.

Note: Figures in parentheses indicate percentage. * indicates 10% level of significance

Value chain analysis

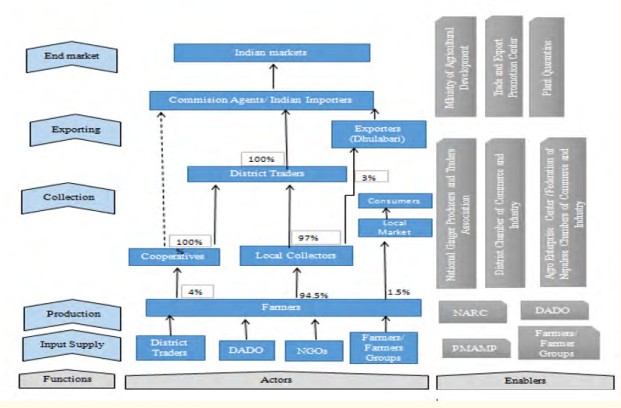


Figure 1: Value chain map of ginger sub-sector in Panchthar district.

Actors and functions

Value chain actors are the individuals at each link along the chain to transfer a product from its conception to its end consumption. The VC actors involved in ginger sub-sector are input suppliers, farmers, local collectors, district traders, exporters, Indian importers/commission agents, wholesalers and retailers.

Input suppliers

Input suppliers are those who provide inputs for production and marketing of ginger. Seed, FYM and labors are the major inputs required for ginger production and are usually managed by farmers themselves. Every farmer stored seeds for production next year. FYM for ginger cultivation was managed by the farmers from their own livestock holding. Chemical fertilizers and pesticides were rarely used by the farmers. Sacks for packaging of ginger were provided by the district traders. Government and non-governmental agencies provided technical knowledge and inputs; however, most of the farmers were unaware about that technical assistance.

Farmers

There were about 2550 ginger producers in the study area. Inputs were procured by farmers from locally available materials. Most of the farmers in the study area were producing ginger for selling purpose. Freshly harvested ginger was cleaned and sorted. Preliminary cleaning was done by removing soil and roots from rhizome and sorting was done to separate the good rhizomes from the damaged ones. The study area dealt only with the production of fresh ginger rhizome. There was no further processing of ginger into other processed products. Furthermore, the ginger was harvested only when appropriate prices were offered by the local collectors or district traders.

Local collectors

Local collectors are the intermediary agents responsible for collection of ginger at farm level and transporting them to the district headquarter i.e. Phidim. Their prime tasks were to inform the farmers regarding the trending prices of ginger and also to fix the collection date so that farmers could harvest their produce on time, inspect the ginger harvest of producers and weighing good ones. The local collectors received Rs 1 per kilogram of the fresh rhizomes weighed. Most of the local collectors were the contact person of district traders.

District traders

District traders are the bridging agents responsible for transport of ginger from the district to the final market at Naxalbari, India. The district traders employed a couple of local collectors at the production hubs to move the produce to district headquarter. Further, ginger cooperative also supplied the collected ginger to the district traders. District traders had the provision of a store to collect the ginger until exportable volumes were met.

Exporters

Exporters may be district traders or national traders who export ginger to Indian market.

Indian importers/commission agents

Most of the ginger exported to India initially goes to Indian commission agents (CA) who were based in major market hubs of India and border cities of Nepal.

End market

Naxalbari is the major market hub for Nepalese ginger. Ginger from Panchthar district is washed and packaged in Naxalbari. Kolkata is the major market for ginger from Naxalbari.

Enablers

Enablers are the chain specific actors that create an enabling environment for the smooth operation of the chain. At the producer's level, DADO, PMAMP, farmers/farmers group were the enablers. Similarly, at the trader's level, NGPTA, DCCI, DFTQC, AEC/FNCCI etc. were the enablers. At higher level, MoAD, TEPC, plant quarantine etc. were the enablers.

Ginger marketing

Marketing functions

Farmers harvested their ginger only when appropriate prices were offered. All the farmers performed cleaning, sorting and packaging of ginger after its harvest. After harvesting of ginger, preliminary cleaning was done by removal of roots and soil. Sorting was also done to separate the good rhizomes from the damaged ones.

None of the farmers performed grading in their field. Packaging was done in the netted sacks having capacity of 50-60 kg provided by the district traders. Farmers had to bring their produce to the nearby road from their field.

Activities	Bharapa (n=20)	Tharpu (n=25)	Ranigaun (n=15)	Total
Cleaning	20 (100)	25 (100)	15 (100)	60 (100)
Sorting	20 (100)	25 (100)	15 (100)	60 (100)
Grading	0	0	0	0
Packaging	20 (100)	25 (100)	15 (100)	60 (100)

Table 6: Activities conducted by farmers after harvest of ginger at field level in the surveyed village.

Note: Figures in parentheses indicate percentage.

Fresh ginger was the only dealt product. There was no further processing of it into value added products. The reason for this was mainly due to lack of technical knowledge and skills on processing. The packaged ginger from within the accessible roads near farm was collected by local collectors and transported via tractors having the capacity of carrying 35-40 quintal to the traders situated at district headquarter, Phidim. Ginger was stored in the store house until the exportable volumes were met and then transported via trucks to Naxalbari. The entire cost of transportation was borne by district traders. The cost for washing and re-packaging ginger at the washing centers in Naxalbari was also borne by the district traders.

Marketed volume

On an average, 72.41% of the total harvest was exported whereas remaining 27.58% was stored for seed purpose next year and also for household consumption. The percentage stored for household consumption was very minimal as compared to the total production. On an average, the cost per kg production of fresh ginger was Rs. 16.50. Only preliminary cleaning and sorting were carried out after ginger harvest. Farmers only harvested ginger when appropriate price were offered. The percentage of marketed volume and ginger stored for seed purpose and household consumption in the study area is as shown in Table 7.

Description	Minimum	Maximum	Mean
Marketed volume	37.50	92.00	72.41
Ginger stored for seed and household consumption	8	62.50	27.58

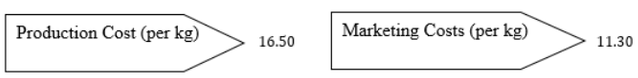
Table 7: Marketed volume and ginger stored for seed and household consumption (percentage) in the study area.

Pricing system

From the study it was found that, the majority of the respondents i.e. 96.70% of the respondents considered district traders as the major players in determining price in the study area. Only 3.3 % of the respondents considered Indian markets as the major players in determining price in the study area. However, the farmer's prices were influenced by the district traders and their prices were in turn influenced by the buying prices at market hub of Naxalbari, India. District traders consulted with the importers at Naxalbari for determining the price of ginger in the district. Farmers in turn contacted the local collectors or the district traders about the trending price of ginger. The average price of ginger in the study area was Rs. 16.50 per kg of ginger. The price of ginger varied among the surveyed villages which were Rs. 21.98 at Bharapa, Rs. 17.60 at Tharpu and Rs. 17.27 at Ranigaun. Owing to the distance from the district headquarter and the transportation cost incurred, prices varied. As such the tractor charged Rs. 2 from Bharapa, Rs. 3 from Tharpu and Rs. 3.5 per kg ginger from Ranigaun respectively.

Marketing costs and margins

The average cost of production per kg of fresh ginger was Rs. 16.50 per kg which included both the fixed costs (land, spades, and rake) and variable costs (seed, manure and labor costs). The average farm gate price received by the farmers was Rs. 17.89. The gross margin per kg of fresh ginger was Rs. 1.39. The traders were offered Rs. 35 per kg of the ginger. The overall cost borne by the district traders from collection to sale of ginger per kg was Rs. 30.30 and the gross margin was Rs. 4.70. The marketing margin kept by the Indian importers was around Rs. 7-10 IC and this amount accounted for the losses, load and unload, taxes and transportation costs while supplying the product to end market, the margin being Rs. 3-5.



Item	Cost (Rs.)	Item	Cost (Rs.)
Average cost of production	17.61	Input (sack, thread)	0.372
(per kg)		Weighing	1
		Transportation (Naxalbari)	5.73
		Truck load	0.1875
		DDC tax	1
		Municipality taxes	0.215
		Custom clearance	0.8
		Truck unload	0.112
		Losses (6%)	1.77
		Washing and packaging	0.12
		Purchasing price	19
Farm level cost	16.50	Total district traders cost	30.30
Gross margin	1.39	Gross margin	4.70
Sales price	17.89	Sales Price	35

Table 8: Marketing costs and marketing margin.

Problems in ginger value chain

Production problems were disease (rhizome rot and yellowing of leaves) and insects (grubs) infestation, lack of knowledge regarding the disease pest management, lack of manpower at times of need and high wage rate and transportation problem. Lack of proper market, price fluctuation and low farm gate price were the major problems encountered by farmers while marketing ginger. Also, there were no processing and post harvest centers at the local level hindering any sorts of value addition. Difficult road conditions hindered the intact transportation of ginger to the destination resulting into some sorts of physical injury. Higher transportation costs, multiple taxation and unofficial payments on the way incurred higher marketing price on the part of traders. Unstable market with the volatile market price had compelled the traders to adjust schedule of exporting ginger.

SWOT analysis of ginger sub-sector

Strengths	**Weaknesses**
• High value cash crop having higher export potential • Suitability of mid-hills for ginger farming owing to climate and geography • Possibility of intercropping with maize, bean and vegetables • Organic produce using locally available materials	• Perishable nature of product • No effective solutions against rhizome rot disease • Traditional cultivation and seed storage practices
Opportunities	**Threats**
• Increased scope to expand area and productivity • Opportunity of mother rhizome harvesting during off season that fetches higher price • Improved post harvest practices like cleaning, sorting, grading and packaging practices • Diversification into various products such as *sutho*, candy, pickle, juice etc. • Listing of ginger as having high potential export commodity by Nepal Trade Integration Strategy • Employment generation through post harvest services • Market exploration other than India	• Volatile market price • Time and again listing of Nepalese ginger as restricted item by India • High dependence of Nepalese ginger upon Indian market • Lack of post harvest services like collection centers, washing centers and cold storage • Multiple taxes and unofficial payments during transportation • Access to limited market centers

Table 9: SWOT analysis of ginger in study area

Conclusion

The research survey was conducted with the major aim of analyzing the value chain and marketing of ginger sub-sector in Panchthar district. Ginger is one of the important cash crops in the district owing to having both comparative and competitive advantage in terms of both climatic suitability and export potential. Ginger holds 2nd position next to cardamom among the major spices exported from the district. Fresh ginger was the only dealt product of ginger in the study area and was harvested only during the main season. There was no provision of mother rhizome harvesting due to no demand by the traders and also due to bad road conditions during monsoon. The district traders sold their produce to Indian importers at Naxalbari, a major market hub of Nepalese ginger. Problems of export are the quality of the product and price. Lack of grading, cleaning and drying practice was the most problematic on marketing. From the study it was concluded that to make ginger marketing more profitable and reliable concerned stakeholders should focus their programs on product standardization and diversification of ginger production that can improve the socio-economic status of the commercial ginger producing farmers.

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