

**VALUE CHAIN ANALYSIS OF TURMERIC SUBSECTOR IN SURKHET DISTRICT OF NEPAL****Chhetri Ganesh Bhat<sup>1</sup>, Sharma Bani<sup>1</sup>, Devkota Durga<sup>2</sup>**

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**ABSTRACT**

*Turmeric (Curcuma longa) is a high value spice crop of high medicinal and economic concern. It has been using in Ayurveda and medicinal propose from centuries which helps to boost up digestive system, circulatory system, nervous system and immune system. 60 household respondents were selected using simple random technique without replacement from Beriganga Municipality, Barahataal Village Municipality and Chaukune village Municipality. 4 co-operatives were selected from each level randomly and 5 respondent from each co-operatives, i.e. 20 respondents from each local level. 3 spice industries and 7 traders were selected purposively. Secondary data were collected from secondary sources like PMAMP, journal articles, MOAD etc. Descriptive statistics, benefit cost analysis, value chain analysis were carried out. The study reveals that 81.67% of population were engaged in agriculture occupation as a primary source of income. The BC ratio of fresh, dry and powder turmeric was found to be 1.30, 1.09 and 1.36 (machinery), 1.16 (Dhiki Jhato) respectively. Similarly the cost of production of fresh dry and powder turmeric was found to be NRs. 18.46, NRs. 119.20 and NRs. 162.92 (machinery), NRs.189.87 (Dhiki Jhato) respectively. Market margin of fresh, dry and powder turmeric was found to be NRs. 6.03, NRs. 25.07 and NRs. 179.70 respectively. In the study area major value chain actors were providers, producers, collectors, processors, wholesalers, retailers and consumers. Insufficient technical support and improved seed rhizome, insufficient price to cover cost of production and traders dominance in pricing were the major problems faced by turmeric producing community. This study suggests the farmers for seed production, value addition, marketing and distribution in farm level.*

**Key words:** Turmeric, Economic, Dhiki Jhato, Githi

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**No. of Tables: 08****No. of References: 14**

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## INTRODUCTION

Surkhet is one of the district of province karnali. It is situated between latitude of 28°20' to 28°58' North and longitude 80°59' to 82°02' East of area 2,451 sq km. Birendranagar is the headquarter of surkhet and capital of karnali state of the new federal republic. It is further divided 9 local level units of 5 municipality and 4 village municipality. Other districts connected with Surkhet are Salyan in East, Doti and Achham in West, Achham, Dailekh and Jajarkot in North and Kailali and Bardiya at South. Highest altitude of Surkhet is Guranse at 2368 msal and Tatopani is at 198 msal altitude. (CBS, 2017). Ginger, turmeric, vegetables, sichuan peeper, mandarian, citrus, mango, litchi, banana, and cereals like rice, maize, wheat, millet and barley, legumes like lentil chickpea, gram, soyabean etc. And mustard are the major agricultural crops. In Surkhet turmeric occupy 120 ha area, production 1080 MT with productivity of 9 Mt/ha (MoAD, 2018).

Turmeric (*Curcuma longa*, Zingiberaceae) is a perennial, rhizomatous, herbaceous plant. It is one of the most important spice crop of Nepal. Among the high value crop, turmeric covers 11 % area and 15.07% in case of production (MoAD, 2018). Pseudo stem of turmeric are used as colouring and flavouring agent. Turmeric contains more than 300 naturally occurring components including beta-carotene, ascorbic acid, calcium, flavonoids, fiber, iron, niacin, potassium, zinc, and other nutrients but the chemical having high health benefit in turmeric is curcumin. Curcumin present in

turmeric prevent heart disease, acts as antioxidant, improve depression and

arthritis, anti-inflammatory and also reduce Alzheimer and cancer (Gunnar, 2018). Fresh turmeric (Kapurkot 1) has 13.8% of powder formation ability, and 92.8% of dry turmeric is converted into powder. It contains 4.89% curcumin and 6.65% aromatic oils (PMAMP, 2017).

Turmeric can successfully grow in warm and humid climate having semi shade area. It can be cultivated up to 1600 masl and requires temperature about 20-30 C, precipitation 1000 to 2000 mm, ph 5.5 to 6.5 but it is affected by cold and frost. In Nepal turmeric commercially can be grown in Eastern to western terai and mid hills. Kailali district has highest turmeric cultivated area and production (900 ha, 10800 Mt), while Dang has highest productivity of 30 Mt/ha (MoAD, 2018).

India is the largest producer, consumer and exporter of turmeric in the world. It account for 80% of world turmeric production. Other major producers and exporters are Myanmar, Indonesia, Netherland, United Kingdom, Peru, Germany, China, France, and United State. India exported turmeric valued 182.53 million US dollar in 2017 (Conway, 2019). In fiscal year 2073/074, 43581 kg fresh (Rs 8511000), 36565 kg powder (Rs 591000) and 1287500 kg (NRs15533700) slice or dry turmeric was imported while 139 kg (Rs 50000) fresh, 3290 Kg (NRs. 890000) powder and 25090.15 Kg slice or dry form of turmeric valued NRs. 7572000 was exported (MoAD, 2018).

Overviewing overall scenario of Surkhet district and whole nation, per

capita domestic produce is in declining ratio. This is due to the decreasing production and poor market linkage between value chain actors. Thus, this study was carried out to analyze the economics including marketing and value chain status of turmeric and to help promote its subsector growth in Surkhet district with following specific objectives:

- To study the economics of turmeric production,
- To study the market margin of value added products,
- To identify the existing status of value chain stakeholders,
- To identify the value chain performance in chain function.

## RESEARCH METHODOLOGY

In this section, research site selection, research design, sampling technique, sampling population, sampling size, sampling methods and data analysis techniques are studied.

### 1.1 Site selection

On the basis of statistical analysis and review, Surkhet district was selected purposively in 2019 due to high potential of turmeric production, marketing channel and value addition process. To collect authentic data and minimise sampling error, 3 local level of Surkhet district was selected according to their potential production accessibility of researcher, budget and time constraints and key informant interview with Mr. Padam Subedi (Agriculture officer at PMAMP zone implementation unit ginger/ turmeric)

Bheriganga municipality, Barahataal village municipality and Chaukune village municipality were selected.

### 2.2 Preliminary study

For the purpose of preliminary study, pilot survey was carried out to gather the statistical information of the target area. That information includes socioeconomic, demographic, topographic information about turmeric cultivation and marketing along with the relationship with stakeholders. This study was useful in the preparation of questionnaire.

### 2.3 Sample size, sampling techniques and sampling procedures

Farmers, village traders/middle man/ agent/ companies, and service providers were the focus of this research. 4 co-operatives were selected randomly in each local level and 5 farmers were randomly sampled through lottery system to make sample size 20 household in each local level. So the total sample size is 60 household. Similarly in 3 local level total 12 co-operatives were sampled for Key informant interview. 7 major traders were interviewed and data was taken and 2 major processing units/ companies were surveyed. Service provider Prime Minister Agriculture Modernisation Project (PMAMP zone implementation unit Surkhet ginger/ turmeric) and High Value Agriculture Project in High hills and Mountains (HVAP) were selected purposively.

The experienced personalities and expert in turmeric cultivating farmers were selected purposively. Zone officer, local

leaders and presidents of co-operatives were the major key informants. Series of questions about the present scenario of turmeric production area, yield, productivity, number of farmers involved in turmeric cultivation and economic activities were asked.

#### 2.4 Data analysis method

The primary and secondary information collected from the field survey and other methods were analyzed by using Statistical Package of Social Science (SPSS) and Micro-Soft Excel for calculating benefit cost ratio, producers share, chain performance, value addition etc. at different stages of value chains. The primary and secondary information collected from field visit, questionnaire and KII were analysed through Statistical Package for Social Science (SPSS) and Microsoft Excel for the calculation of benefit cost ratio, market margin, value chain performance, producers share etc.

## RESULT AND DISCUSSION

### 3.1 Economic analysis

Economic analysis of turmeric cultivation includes, cost of production, benefit cost

ratio analysis of fresh, dried and powder form, value chain function and market margin.

### 3.2 Cost of production

Cost of production in turmeric cultivation includes, fixed cost and variable cost. Land rent, depreciation cost of machinery and repair maintenance cost are fixed cost whereas input cost, labour cost and other miscellaneous costs are included in variable cost.

Cost of production of fresh turmeric was found to be NRs. 8200.30 per ropani. Among all cost, land rent occupy 6.09%, input cost occupy 54.51% and labour cost occupy 39.39%. Out of total cost, seed rhizome covers 31.37% and manure and FYM covers 16.36%. While packaging, communication, land preparation, FYM placement and planning, mulch collection, weeding/irrigation, harvesting/grading/cleaning/sorting, marketing and miscellaneous covers 0.3%, 0.16%, 6.63%, 10.22%, 10.36%, 0.96%, 9.95%, 1.24% and 6.24% of total cost of production. Production of fresh turmeric was found to be 461.43 kg and average loss was found to be 17.14 Kg (3.71%) in one ropani of land. Production of 1 Kg fresh turmeric, Rs.18.46 is incurred.

Table 1: Calculation of cost of production of fresh and dried turmeric

S.N.	Description	Quantity	Unit	Rate	Total
<b>Cost of production of fresh turmeric</b>					
<b>A</b>	<b>Land rent</b>	1	Ropani	500	500
<b>B</b>	<b>Cost of input</b>				
1	Seed	106.42	Kg	24.17	2572.17
2	Manure/ FYM	25.4	Doko	52.83	1341.88
3	Packaging	1	Sack Lump sum		30.00
4	Communication	1	Lump sum		13.94
5	Miscellaneous	1	Lump sum		512.29
<b>C</b>	<b>Cost of labor</b>				
1	Land preparation	0.48	Bullock day	1133.33	544.00
2	FYM placement and planting	1.48	Man day	566.67	838.67
3	Mulch collection	1.5	Man day	566.67	850.01
4	Weeding/spraying/irrigation	0.14	Man day	566.67	79.33
5	Harvesting/cleaning/sorting/grading/packing	1.44	Man day	566.67	816.00
6	Marketing/transportation	0.18	Lump sum	566.67	102.00
	Total production of fresh turmeric per ropani	461.43			
	Grand total cost for fresh turmeric per ropani				8200.30
	Loss in kg	17.14	3.71%		
	Production after loss (Kg)	444.29			
	Cost per kg of fresh turmeric (NRs.)				18.46

Source: Field survey, 2019

Turmeric has various form of value addition. *Githi* and powder are the major value added form after cleaning, sorting and grading. To produce 1 Kg of *githi*, 5.18 Kg fresh turmeric is used. During *githi* production process, 2% handling and drying loss occurs. Rs.119.20 was incurred to produce a Kg of *githi*.

Table No 2: Estimation of additional cost of dry formation

<b>Additional cost of production of dry turmeric</b>					
1	Boiling/ drying (444.29 Kg)	2.50	Man day	566.67	1416.67
2	Firewood and other equipment cost	1	Lump sum	400	400
	Total cost for drying				10016.97
	Total production of dry turmeric(Kg)	85.74			
	Loss in kg	1.71	(2%)		
	Net production after loss(Kg)	84.03			
	Cost per kg production of turmeric(NRs.)				119.20

Source: Field survey, 2019

Powder is the final value added form of turmeric in the consumption unit in Surkhet district. 90% of *githi* was converted into powder. By means of machinery, 1% loss of turmeric occurs during handling and packaging process. Rs.162.92 was incurred to produce 1 Kg of turmeric powder by using machinery. 51.67% of total household

were using machinery and 41.67% household were using traditional *Dhiki Jhato* technique in powder production process while remaining 6.66% household were not performing machinery and *Dhiki Jhato*.

Table No 3: Estimation of additional cost of powder formation by machinery

**Additional cost of production of powder turmeric Machinery (84.03 Kg)**

1	Machinery cost (51.67%)	84.03	Kg	20	1680.60
2	Packaging cost	1	Lump sum	500	500
	Grand total cost				12197.57

Figures inside parentheses indicates percentage of household involved

Total production of powder turmeric 75.62  
 Loss in Kg 0.75 (1%)  
 Net production Kg 74.87  
 Cost per kg of turmeric production (NRs.) 162.92

Source; Field survey, 2019

*Dhiki Jhato* is the traditional and conventional method used in the powder formation process. This method is labour inefficient. 1.5% handling and packaging loss was found from this technique. During the production of 1 Kg, Rs.189.87 was incurred.

Table No 4: Estimation of additional cost of powder formation by *Dhiki Jhato*

**Additional cost of production of powder turmeric *Dhiki Jhato* (84.03 Kg)**

1	<i>Dhiki Jhato</i> (41.67%)	6.4	Man day	566.67	3626.68
2	Packaging cost	1	Lump sum	500	500
	Grand total cost				14143.65

Figures inside parentheses indicates percentage of household involved

Total production of powder turmeric kg 75.62  
 Loss in Kg 1.13 (1.5%)  
 Net production Kg 74.49  
 Cost per kg of turmeric production (NRs.) 189.87

Source: Field survey, 2019

3.3 Benefit cost ratio

Turmeric has different value added form i.e. *githi*, powder etc. In one ropani area, B/C ratio was found to be 1.30 of fresh turmeric, 1.09 of *githi*, 1.36 of powder formed by machinery and 1.16 of powder formed by *Dhiki Jhato*.

Table No 5: Estimation of BC ratio

S.N.	Particulars	Total cost/ropani	Gross revenue/ropani	B/C ratio
1	Fresh	8200.30	10649.63	1.30
2	<i>Githi</i>	10016.97	10934.40	1.09
3	Powder			
a	Machinery	12197.57	16596.43	1.36
b	<i>Dhiki Jhato</i>	14143.65	16512.20	1.16

\*Average price of fresh, dry and powder turmeric was Rs.23.97, Rs.130.12 and was Rs.221.67  
 Source: Field survey, 2019

3.4 Distribution of cost and margin

Table no 6 illustrates the marketing margin of different value added forms of turmeric and linkage with value chain actors. Field study reveals that, cost of production of

per kg fresh turmeric was NRs. 18.46 including 3.71% post-harvest loss. Farm gate price of fresh turmeric was NRs.23.97/kg with profit margin NRs.5.41/kg. To produce 1kg dry turmeric NRs.119.20 is incurred including 2% loss in farmer's field. They sold dry turmeric at price NRs.129.93/kg at farm gate. By using machinery farmer produce turmeric

Table No 6: Distribution of cost and margin

powder at NRs.162.92/kg however per kg cost reaches NRS.189.87 including 1% and 1.5% handling losses and sold to consumer at price NRs.220.30/kg respectively. From the social survey the market margin of fresh, dry and powder turmeric was found to be NRs.6.03/kg, NRs.25.07/kg and NRs.179.70/kg respectively.

Items	Cost of production NRs./kg	Items	Cost of value addition	Items	Cost of value addition	Items	Cost of production	Consumer price
Fresh	17.77	Purchase price NRs.124.16 (5.18 kg for 1 kg githi)	NRs.21.13 /kg dry formation					Trader sold fresh turmeric at price NRs. 30/kg
Loss 3.71%	0.69							
Total	18.46		145.23					
Dry	116.82	Farmer sold dry turmeric NRs.129.93		Purchase price NRs. 155/kg For 1.11kg= 172.22				Trader sold Githi at Av. Price NRs. 155/ kg
Loss 2%	2.38		2.9					
Total	119.20		148.13					



Powder	Farmer sold powder NRs. 20.30						Consumer price NRs. 400 / Kg powder turmeric
Machinery	161.30				NRs. 25.95 /kg dry formation	Price paid by trader NRs. 320	Marketing and transportation cost NRs. 3.5 / Kg of powder
Loss 1%	1.62				1.9		
Total	162.92				200.07		
<i>Dhiki Jhato</i>	187.03				NRs. 54.66 /kg		
Loss 1.5%	2.83				3.4		
Total	189.87				230.28		
Profit per kg fresh turmeric	5.51	Profit per kg <i>Githi</i>	10.73	Profit per kg Powder(machinery)	69	Profit per kg Powder( <i>dhiki jhto</i> )	40.43
Market margin of fresh	6.03	Market margin of dry	25.07	Market margin of powder	179.70		

Source: Field survey, 2019

### 3.5 Problem Ranking

In Surkhet, there were several problems related to turmeric production and marketing. Indexing/scaling technique was employed to prioritise the problems. This method was implemented and explained below;

### 3.6 Production problem

Problems during production process were collected during pilot survey and major problems were prioritise according to farmers point of view and perception which are ranked and presented in table no 7 which shows that major problem in their locality was lack of technical knowledge and support from service providers. Poor communication system between farmers and service provider due to distant location of farmer field and

Table No 7: Scaling of production problems

agriculture office has created limited information flow and extension service. Similarly lack of sufficient and quality seed was another major problem in farmer field condition. Lack of appropriate training about turmeric production and sufficient irrigation were ranked as major problem. Incidence of disease pest and unavailable input were minor problems in recent condition.

Production Problems	Index	Rank
Insufficient technical support	0.883217	1
Insufficient seed rhizome	0.87845	2
Poor quality seed	0.723533	3
Lack of appropriate training	0.551933	4
Poor irrigation facility	0.5138	5
Incidence of disease/pest	0.304067	6
Unavailable input	0.142	7

### 3.7 Marketing problem

Major marketing problems of turmeric faced by farmers are presented in table no 8. The result shows that the insufficient price to cover the cost of production was leading problem the second major problem was lack in marketing infrastructure. Lack of roads to rural farmers for transportation and marketing this problem was ranked as major problem. Similarly traders were dominating the market of turmeric distribution. Their sole role in pricing was another major problem. Lack of market information system and poor linkage between stakeholders were also major problems of marketing prospective in study area.

Table No 8: Scaling of marketing problems

Marketing Problems	Index	Rank
Insufficient price to cover cost of production	0.953333	1
poor marketing infrastructure	0.913333	2
Traders dominance in pricing	0.813333	3
Inappropriate market information system	0.746667	4
No formal agreement with traders	0.206667	5

## CONCLUSION

Turmeric cultivation was found to be good source of income of household economy. Higher net profit and benefit cost ratio showed that turmeric cultivation was profitable. Therefore, the investment in turmeric production and processing was found to be financially sound in study area. Further, more profit can be achieved by adopting new technology for land preparation, application of appropriate amount of well decayed manure, improved seed rhizome, irrigation facility, identification of better mulching materials, quality control and value addition which reduce the labour cost and increase the total production ultimately increase gross revenue and BC ratio. Poor market information was the major constraints in the marketing system. Communication gap between processor and farmers creating the dominance of traders leading high market margin. Insufficient price to cover the cost of production, farmers were discouraged in further expansion of area and scale of production. Traders, co-operatives and processors were playing

key role in value addition and product distribution function. Turmeric was underestimated spice crop and was cultivated in marginal lands. Lack of proper co-ordinations between service providers and actual farmers, opportunist turmeric cultivators were getting more services from GOs and NGOs. Insufficient irrigation and mulching materials in study area, actual farmers were in harsh condition.

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