ZIBELINE INTERNATIONAL™ PUBLISHING
ISSN: 2616-1923(Online)

Malaysian Journal of Halal Research (MJHR)

DOI: http://doi.org/10.26480/mjhr.01.2024.11.18

RESEARCH ARTICLE

VALUE CHAIN ANALYSIS OF COFFEE SUB-SECTOR IN GULMI DISTRICT, NEPAL

Daxina Chand*, Santosh Paudel, Mandira Sapkota

Faculty of Agriculture, Agriculture and Forestry University, Rampur Chitwan, Nepal
Corresponding Author Email: daxinachand55@gmail.com

ARTICLE DETAILS

Article History:

Received 20 February 2024
Revised 04 March 2024
Accepted 15 April 2024
Available online 18 April 2024

ABSTRACT

World-wide popular beverage Coffee is getting popularity in Nepal as well, both in terms of consumption and production. However, several problems exist at production, processing and marketing. Hence, a study was carried out in Gulmi district, Nepal during April 2022 with an aim to analyse the value chain of coffee in Nepal, which explored the functional and economic linkage among the actors, interviewing 60 coffee producers, 3 pulper operators and 3 secondary processors. Three years of data regarding production, processing and marketing were analysed by using descriptive and analytical methods with SPSS (version 25) and MS Excel 2013. The study identified key players of coffee VC as input suppliers – supplying seedlings and other inputs; coffee producers – producing fresh cherry; pulping operators – producing dry parchment; secondary processors – producing green beans. Economic analysis of coffee producer, pulper operator and secondary processor showed that cost of production of fresh cherry, dry parchment and green bean was Rs 77.08/kg, Rs 422.3/kg and Rs 798.24/kg respectively. Benefit Cost analysis of these major players of coffee VC showed that coffee enterprise is a profitable business with BC ratio 1.11, 1.12 and 1.17 respectively. Furthermore, the study found that there's value addition of Rs 99.73/kg from fresh cherry to dry parchment, Rs 305.38/kg from dry parchment to green bean and Rs 488.72/kg from green bean to powder coffee. The study provided evidence to the argument that secondary processors were most benefited in the value chain compared to coffee producers and pulper operators.

KEYWORDS

Value-chain, B:C ratio; Coffee Production; Marketing

1. INTRODUCTION

According to National Tea and Coffee Development Board, around 600 tons of coffee is consumed in Nepal every year, of which around 500 tons is domestically produced (NTCDB, 2019). Coffee is recognised as one of the important export potential commodities of Nepal-by-Nepal Trade Integration Strategy (NTIS) 2016. Currently, coffee cultivation has spread in over 41 districts of the mid-hill regions of Nepal, 23 being the commercially producing districts. According to the statistics of fiscal year 2015/16, 434 MT of coffee was produced in 2,618 ha of area (NTCDB, 2016) while fiscal year 2020/21, 314.5 MT of coffee was produced in 3,056.7 ha of area. Produced in the highest elevation, Nepal has a unique opportunity to enter the global market of specialty coffee (Kattel, 2009).

Gulmi is a hilly district that lies in Lumbini Provience with district headquater Tamghas. It covers an area of 1,149 k. sq and had a population of 246,836 in 2021. Gulmi is widely known for introducing coffee in Nepal. Gulmi is also a major exporter of organic coffee. The major crop of Gulmi is coffee however coffee and orange cultivation are famous in the Gulmi district (CRP,2021). Due insufficient market information, quality improvement, value chain schemes and due to insufficient pre-processing facilities, scattered and remoteness of coffee plantation area in Gulmi Nepal, a few processors primarily govern the present marketing channel (Kattel, 2012). Despite of coffee being major crop of Gulmi specially Aapchaur, only few numbers of farmers are involved in coffee farming, old coffee garden is being destroyed and replaced by the cereals crops because of not getting appropriate price, production problems, processing problem, higher variable cost, marketing problems.

Coffee farmers are not getting marketing information (about price and quantity) in time. There is still a large gap between the coffee farmers, processors and traders i.e poor coordination. Many of the coffee farmers of Gulmi are facing a lower production problem which results in higher production costs. It helps in providing information related to cost, margins, prices and value addition at different stages of the coffee value chain. This study was carried out to identify actors, examine the structure of value chain and analyze cost as well as margin.

2. RESEARCH METHODOLOGY

Four Palika's (Musikot Nagarpalika, Chatrakot gaupalika, Satyawati gaupalika, Rurukshetra gaupalika) of Gulmi district were purposively selected as a research site in terms of number of coffees producing farmers, coffee production areas, production and productivity of coffee, access to road (NTCDB, 2021). Figure illustrates the study area of map of Nepal.

A total of 60 coffee producing farmers were selected randomly for the survey out of 150 registered farmers as well as 3 pulper operators and 3 secondary processors were also selected based on study area. Sample size was calculated by using Raosoft software at confidence level 95 % and margin of error 10%, sample size 60 calculated. Using simple random sampling technique 12, 18, 16, and 14 samples were selected from Musikot (30 total coffee farmers), chatrakot (45), Rurukshetra (40) and Satyawati (35) palikas respectively.

A structured and semi-structured questionnaire was utilized to collect both primary and secondary data sources, including qualitative and

Quick Response Code	Access this article online	
	Website: www.myjhalalresearch.com	DOI: 10.26480/mjhr.01.2024.11.18

Cite The Article: Daxina Chand, Santosh Paudel, Mandira Sapkota (2024). Value Chain Analysis of Coffee Sub-Sector in Gulmi District, Nepal. *Malaysian Journal of Halal Research, 7(1): 11-18.*

quantitative information. Primary data weregathered by Interview schedule, Key Informant Interview (KII), Focus Group Discussion (FGD), and Questionnaire Survey. Background data of each coffee farmer was collected from secondary sources, i.e., different published articles, journals, books, internet materials, andreports issued from the Agriculture Knowledge Centre, PMAMP, ICIMOD, Federation of Nepalese Chamber of Commerce and Industry/ AgroEnterprise Ministry of Agriculture and Livestock Development (MoALD), and paperspublished by PMAMP, PIU, Gulmi. Data collected from the survey was coded and directly entered in Statistical Package for Social Science (SPSS version 25). Detection and removal of errors and inconsistencies were done to improve the data quality. And then subsequent analysis was done by using different statistical tools like mean, frequency and so on. Moreover, various graphs and charts were made by using relevant tools of MS Excel 2013. While qualitatively data were analysed qualitatively and expressed accordingly, both descriptive and analytical methods were used to analyse the quantitative data.

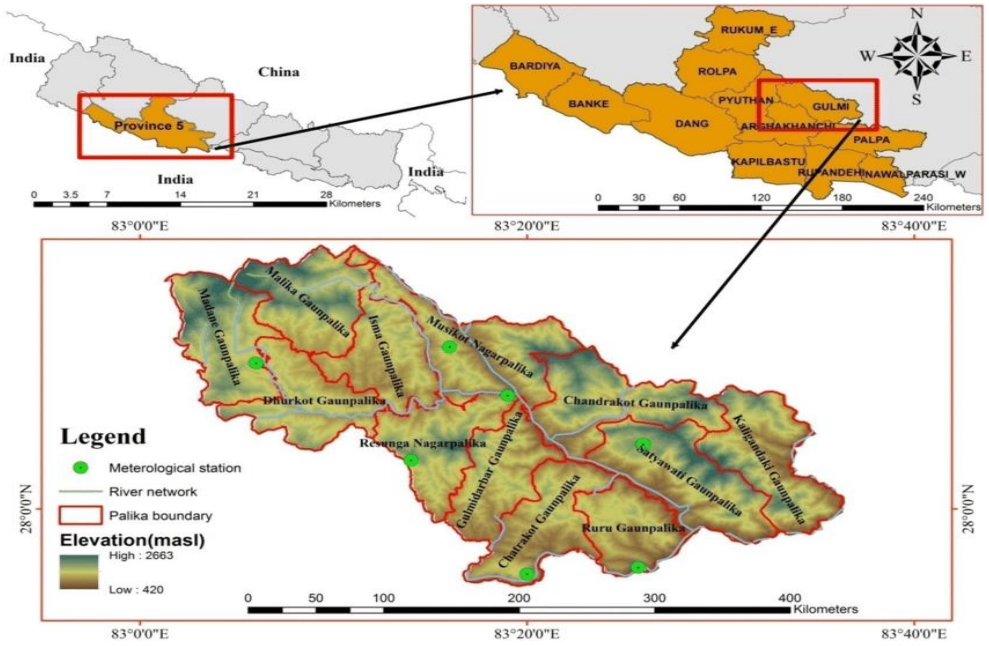

Figure 1: Map of Nepal showing study site (Source: (https://www.preprints.org/manuscript/202008.0242/v1/download, August 10,2020)

3. Results and Discussion

With respect to gender, 55.0% of the respondent were male and 45.0% of the respondent were female. The average age of the male respondent was 55.21 with maxima 78 and minima 22. similarly, the average age of female respondent was 41.59 with range 29 to 70. With respect to ethnicity, majority of the respondents were Brahmins and chhetri (80.0%). It was followed by Aadibashi/ Janajati (11.0%), and Dalit (1.0%). The education level of the respondents was found to be 6.7 % of the respondents were illiterate. 93.3 % of the respondents were literate, among them only 13.5 % of the respondents had an education level of above SLC, 65.0 % of the respondents had an education level of below SLC and 11.7 % of remaining literate respondents had an education level of SLC. Most of the household sampled were usual type of farmers (68.3 %), growing other crops besides coffee. And 30.0 % of the respondents had multiple business and only 1.7 % of the respondents were self-employed.

The majority of the coffee farmers (81.7%) in the study area were involved in farmers organization. 18.3 % of the sampled respondents had no membership. 71.7 % of the coffee farmers were a member of farmers' group and 10.0% of the coffee farmers had a membership of both farmers' group and DPCA. The average number of meetings attended in such organization is 2.63 per year. (SD= 0.782). Among the household who had membership of Farmers group, 96.1 % of the respondent opined that getting the membership of farmers' organization was helpful, since these groups provide them access over credit, tools and equipment. These organization were also the medium for the coffee farmers for the collective marketing of freshcherry they produce. In addition to collection of fresh cherry, some of these organization have processing facilities at primary level.

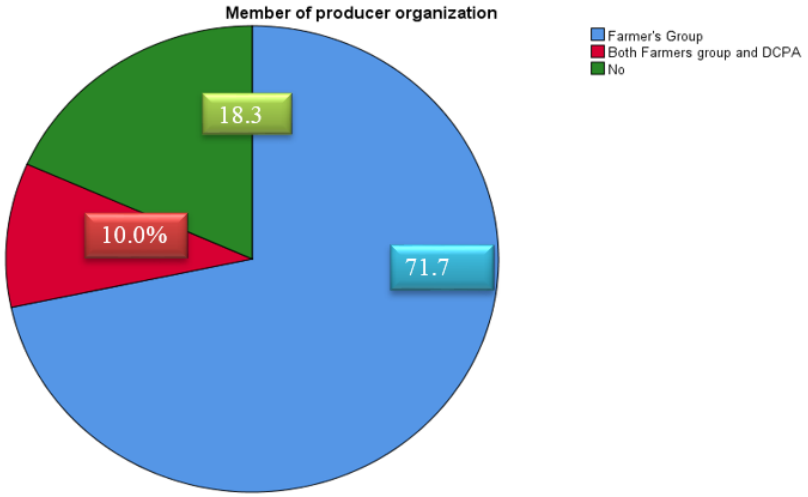

Figure 2: Membership of framers' organization and opinion on its usefulness

The average land holding of coffee farmers is 10.153 *ropani* of upland, 6.848 *ropani* of lowland and 7.571 *ropani* of private khoriya land, as illustrated in figure 3. In Nepal, coffee is generally planted in upland, private forest and khoriya type of land. Since the average area of coffee plantation per HH in the study area is found to be 5.367 ropani (n=60, sd= 9.9148), there is still some area for extension of coffee.

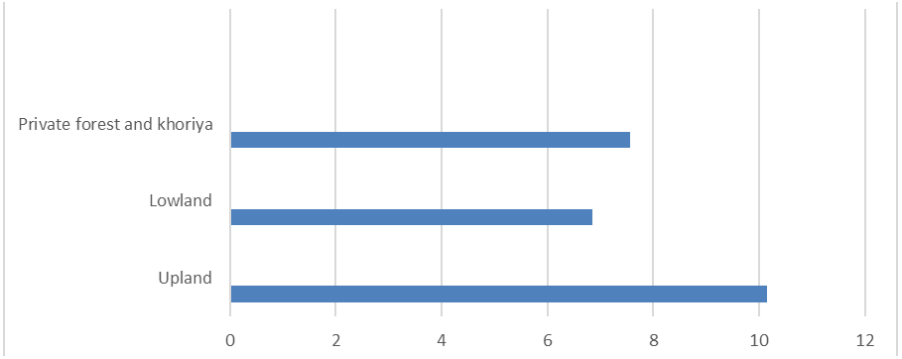

Figure 3: Average land holding of coffee farmers

The average number of years of coffee plantation in sampled HH was 19.08 years. In Musikot Nagarpalika, the average area of coffee plantation per HH has increased from 2.46 to 7.46 ropani with average number of initial plants 235 and current number of productive coffee bushes per HH 148.67. Scenario is somewhat similar in Chatrakot Gaunpalika as well. In Chatrakot Gaunpalika, the average area of coffee plantation per HH has increased from 1.46 to 3.43 ropani with average number of initial plants 157.8 and current number of productive coffee bushes per HH 114.68. While in Satyawati Gaunpalika, the average area of coffee plantation per HH has decreased from 4.9 to 4.63 ropani with average number of initial plants 501.33 and current number of productive coffee bushes per HH 185.33. In RurukShetra Gaunaplika, the average area of coffee plantation per HH has increased from 2.47 with average number of initial plants 268 to 5.93 ropani with that of 406.67 productive plant bushes.

Table 1: Initial and current coffee plantation status in study area

Characteristics	Musikot	Chatrakot	Satyawati	Rurukshetra
No. of years of coffee plantation	22.2	27.54	7.2	19.73
Initial area of coffee plantation per HH (ropani)	2.46	1.46	4.9	2.47
Coffee plantation per HH (ropani)	7.46	3.43	4.63	5.93
Initial no. of plants per HH	235	157.8	501.33	268
Productive coffee bushes per HH	148.67	114.48	181.33	406.67

The reasons for adopting coffee farming are ranked in table 10 below. Primary reasons for adopting coffee farming are more income compared to cereals with index 0.82. It was followed by "high price and demand" and "GOs and NGOs support", similarly, easy to sell was ranked fourth which is followed by only alternative in the land owned.

Table 2: Reasons for adopting coffee farming

Reasons	Priority given by respondents					Index value	Rank
	1	2	3	4	5		
More income	33	12	5	9	1	0.82	I
GOs and NGOs support	19	6	9	26	0	0.66	III
High price and demand	7	22	27	4	0	0.71	II
Easy to sell	1	19	19	21	0	0.60	IV
Only alternative in the land owned	0	1	0	0	59	0.21	V

Source: Field Survey (2022)

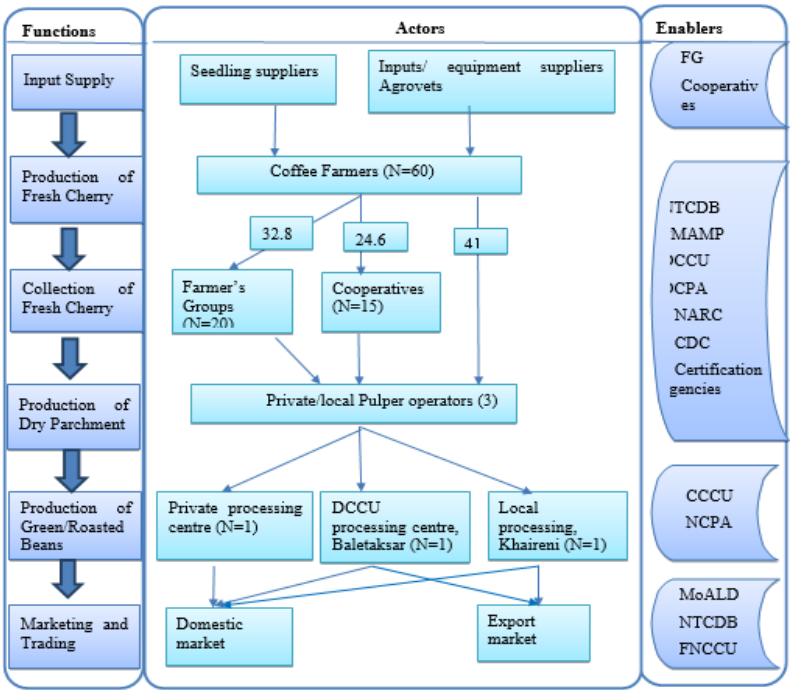

Figure 4: Value chain map of coffee in study area (Source: Field survey (2022)

The major input supplies used in coffee farm were manure, seed/ seedlings, organic pesticides and tools and equipment. The source of these inputs is illustrated in figure below. For manure, majority (43 out of 60) of the coffee farmers used FYM from their own yard. Tools for pruning like pruning knife, saw and secateurs (20 out of 60) was provided by multiple sources either by cooperatives or GOs/NGOs or locally available, among them 18 out of 60 coffee farmers used locally available tools and equipment for pruning purpose. Pesticides for plant protection (33 out of 60) was provided from agro vets and coffee farmers 16 out of 60 had multiple sources of pesticides for coffee cultivation like cooperatives/ groups, GOs/ NGOs/ INGOs and agro vets. Likewise, the source of seed and seedlings for coffee farmers (26 out of 60) was cooperatives/ groups whereas GOs/NGOs/INGOs like Coffee Development Center and Coffee Research programs had provided seed and seedlings to 20 out of 60 coffees.

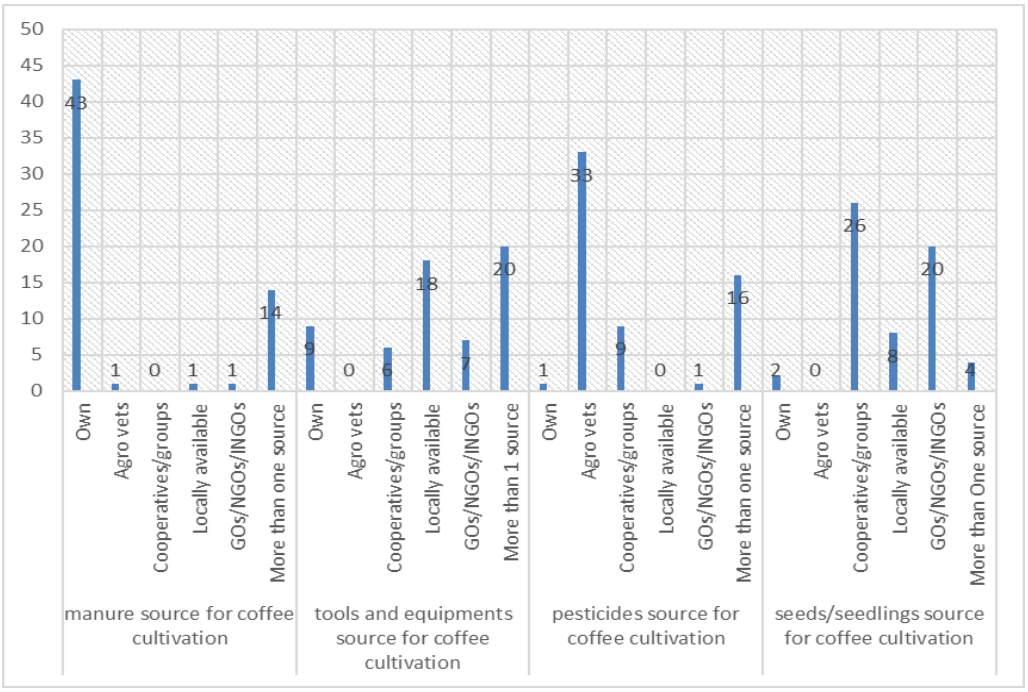

Figure 5: Source of input supplies in coffee farm

Among total sampled coffee producers, 41% coffee producers sold their coffee direct to local pulper operators, 32.8% sold their coffee to Farmer's Groups and only 24.6% sold their coffee to Cooperatives. From the value chain map, there were three main collectors i.e. i) Farmer's Groups, ii) Cooperatives, iii) Private/local pulper operators and for the production of Dry parchment there were total three pulper operators in study area. Basically, pulper operators had three options to sell their dry parchment i.e. i) Private processing centre, Aapchaur, ii) DCCU processing centre, Baletaksar, and iii) Cooperative processing centre, Khaireni.

From the value chain map, there were three secondary processing units i.e. i) Private processing centre, Aapchaur, ii) DCCU processing centre, Baletaksar, and iii) Cooperative processing centre, Khaireni. Among three secondary processing units, private processing centre sold their beans and powder coffee only in domestic market while other two secondary processing units sold their beans and powder coffee both in domestic as well as in export market.

From the above value chain map, it is clear that the main enabling environment providers of value chain mapping were Farmer's Groups, Cooperatives, NTCDB (National Tea and Coffee Development Board), PMAMP (Prime Minister Agriculture Modernization Project), DCCU (District Coffee Cooperatives Union), DCPA (District Coffee Producer's Association), NARC (Nepal Agriculture Research Council), CDC (Coffee Development Centre), Certification agencies, CCCU (Central Coffee Cooperative Union), NCPA (Nepal Coffee Producers Association), MoALD (Ministry of Agriculture and Livestock Development), FNCCI (Federation of Nepalese Chambers of Commerce and Industry).

For calculating cost of fresh cherry production, only variable cost was considered. Share of each variable costs in cost of fresh cherry production are illustrated in figure below and details of each cost is presented in table below. Because of asynchronised ripening nature of coffee, harvesting is quite troublesome and requires repetitive plucking which contributed 32% of the total cost of production. It was followed by Cultural practices labour cost (25%) like weeding pruning etc and manuring cost (17%)

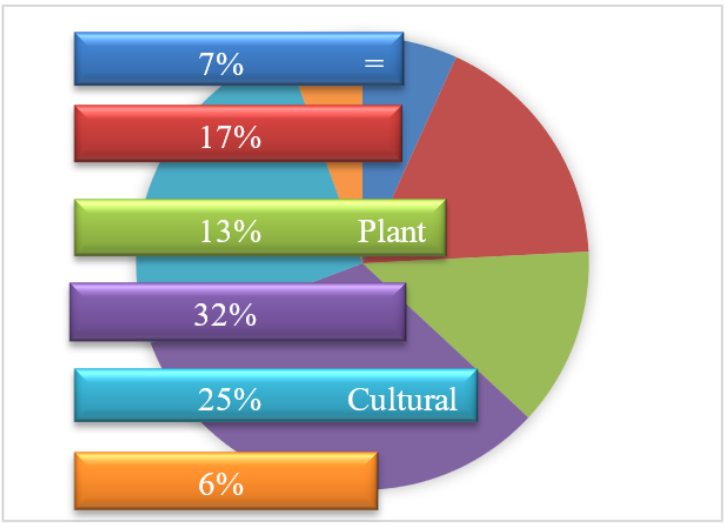

Figure 6: Contribution of different variable costs in cost of fresh cherry production

Below table shows that the cost of fresh cherry production was Rs 113026.15 per ha. Technically, while 2000 plants could be planted in hectare of land, the average density of plantation in the study area was 2063 plants per ha. Hence, cost of production per bush was also analysed. The cost of production per bush was estimated as Rs 154.88. Similarly, cost of producing 1 kg of fresh cherry was Rs 77.08.

Table 3: Details of cost of fresh cherry production per ha

Particulars	Mean ± se (n=60)	Sd
Seedling cost and other cost per ha (Rs)	1422.86 ± 215.12	1666.32
Manure cost per ha (Rs)	13016.55 ± 795.85	6164.64
Plant protection cost per ha (Rs)	8010.17 ± 540.12	4183.55
Harvesting labour cost per ha (Rs)	47795.92 ± 2666.74	20656.45
Cultural practices labour cost per ha (Rs)	36257.79 ± 3542.16	26675.36
Irrigation cost per ha (Rs)	6477.87 ± 721.35	5587.57
Cost of production per ha (Rs)	113026.15 ± 8616.25	66741.21
Cost of production per bush (Rs)	154.88 ± 10.52	41.50
Cost of production per kg of FC	77.08 ± 2.89	13.37

For the estimation of cost of dry parchment production both fixed and variable cost was considered. Below table shows that the details of production cost of dry parchment. The total variable cost and total fixed cost of producing a kg of dry parchment at pulping centre was Rs 387.11 and Rs 32.25 respectively. Hence, studying 3 pulping centers of the study area, the total cost of dry parchment was estimated as Rs 422.36 per kg.

Table 3: Details of dry parchment per Kg

Particulars (Rs/Kg)	Mean ± se (n=3)	Sd
Input cost of fresh cherry	359.60 ± 13.5	23.39
Electricity cost	2.25 ± 0.43	0.74
Washing cost	4.16 ± 0.17	0.29
Packaging cost	4.79 ± 0.42	0.73
Labour cost	16.31 ± 1.85	3.20
Total Variable cost of production	387.11 ± 12.61	21.85
Total Fixed cost of production	32.25 ± 7.75	13.43
Total Cost of production per kg of DP	422.36 ± 8.20	14.20

Studying 3 secondary processing units of the study area, cost of producing green bean was also calculated. At this level as well, both fixed and variable cost were analysed.

Table 4: Details of cost of green bean production

Particulars (Rs/Kg)	Mean ± se	Sd
Input cost of dry parchment	516.84 ± 27.99	48.49
Electricity cost	4.73 ± 3.78	6.55
Labour cost	71.11 ± 17.79	30.82
Packaging cost	2.53 ± 0.27	0.48
Other cost	2.36 ± 2.36	4.11
Fuel cost	4.64 ± 1.15	2.00
Total Variable cost of production	602.24 ± 29.28	50.72
Total Fixed cost of production	195.99 ± 4.89	8.47
Total cost of production per kg of GB	798.24 ± 34.17	59.19

It showed that the total variable and fixed costs incurred in producing a 1 kg of green bean was Rs 602.24 and Rs 195.99 respectively. Hence the total cost of producing green bean was Rs 798.24 per Kg.

Below table reveals the profitability analysis of producing fresh cherry per Kg. As discussed in previous section, the cost of fresh cherry production was Rs 113026.15 per ha. The cost of fresh cherry production was Rs 77.08 per Kg. The gross return from cherry was Rs 95.24 per Kg. Hence, the gross margin was Rs 18.15 per Kg. After deducting the marketing cost, the net profit from a kg of coffee was estimated as Rs 9.72, which can be expressed into percentage as 10.24 %. Similarly, Benefit cost ratio was calculated as 1.11, which indicated that the coffee farming was a profitable business.

Table 5: Profitability analysis of fresh cherry production per Kg

Particulars (Rs/ha)	Mean ± se (n=60)	Sd
Total cost of production (CoP)	77.08 ± 2.89	13.37
Gross return (GR)	95.24 ± 0.22	1.67
Gross margin (GM)= (GR-CoP)	18.15 ± 2.94	13.78
Marketing cost	8.44 ± 1.21	4.39
Total Variable Cost (TVC)	85.52 ± 7.81	19.49
Net profit (NP= GR-TVC)	9.72 ± 4.59	18.41
Net profit %	10.24 ± 2.22	8.64
BC ratio	1.11 ± 0.02	0.02

Details of cost of dry parchment production are presented in Table below. As discussed in section 5.4.1.2, total fixed cost and variable cost of producing 1 kg dry parchment and pulping centre was Rs 32.25 and Rs 387.11 respectively. With Rs 422.36/kg as cost of production and Rs 491.11/kg as gross return, the gross margin per kg of dry parchment production was estimated as Rs 104.00 only. Subtracting the marketing cost (i.e. transportation plus communication) of Rs 15.96 per kg, the net profit was calculated as Rs 52.79 per kg which is expressed in percentage as 11%. Similarly, BC ratio was calculated as 1.12 which indicates that the pulping business is just profitable business.

Table 6: Profitability analysis of dry parchment production per Kg

Particulars (Rs/kg)	Mean ± se (n=60)	Sd
Total Fixed Cost	32.25 ± 7.75	13.43
Total Variable Cost of Production	387.11 ± 12.61	21.85
Total cost of Production	422.36 ± 8.20	14.20
Gross return (GR)	491.11 ± 4.44	7.69
Gross margin (GM)	104.00 ± 11.14	19.30
Marketing cost	15.96 ± 1.08	1.86
Net profit	52.79 ± 10.43	18.07
Net profit %	11 ± 2	4
BC ratio	1.12 ± 0.48	0.48

Below table reveals the profitability analysis of green bean production. As discussed in section 5.4.1.3, the fixed and variable cost of producing a kg of green bean was Rs 28.82 and Rs 449.58 respectively. Hence the production cost was Rs 478.40 per kg. With gross return Rs 610.25 per kg green beans, the gross margin was calculated as Rs 160.67. Subtracting the marketing cost (i.e. transportation plus communication), net 62 profit was estimated as 120.86 which can be expressed into percentage as 24.13. Likewise, BC ratio was estimated as 1.24 which indicates that the secondary processing is also a profitable business.

Table 7: Profitability analysis of green bean production per Kg

Particulars (Rs/Kg)	Mean ± se (n=3)	Sd
Fixed Cost	195.99 ± 4.89	8.47
Variable Cost of Production	602.24 ± 29.28	50.72
Total Cost of Production	798.24 ± 34.17	59.19
Gross Return	966.77 ± 15.13	26.20
Gross Margin	364.53 ± 15.79	26.20
Marketing Cost	22.02 ± 5.99	10.38
Net Profit	146.50 ± 26.24	45.45
Net Profit %	15 ± 3	5
BC ratio	1.17 ± 0.41	0.07

For estimating value addition in different levels of coffee value chain, the average market price of fresh cherry, dry parchment, green beans and powder coffee is presented in Table below. The average price of coffee products at each level was converted into Green Bean Equivalent by using the conversion factors as presented in Table 7. It was found that there was value addition of Rs 99.73 from fresh cherry to dry parchment. While for the green bean of domestic market there was value addition of Rs 305.38 from dry parchment, the value addition was Rs 488.72 for the green beans of export market. Similarly, from green beans in domestic market to powder coffee in domestic market there was a value addition of Rs 569.99.

Table 8: Value addition in different levels of coffee value chain

Level	Particulars	Price (Rs/kg)	GBE conversion factor	GBE price (Rs/kg)	Value addition (Rs/kg)
Producer	Fresh Cherry	77.08	0.18	428.22	-
Primary processor	Dry Parchment	422.36	0.8	527.95	99.73
Secondary processor	Green beans (domestic market)	833.33	1.00	833.33	305.38
	Green beans (export market)	1016.67	1.00	1016.67	488.72

Source: Field survey (2022)

It was found that infestation of insects and disease, inadequate government support, High cost of inputs were the major problems in production with ranking I, II and III respectively with index value 3.57, 3.12 and 2.63. It was followed by other production problems like lack of credit facilities (IV), lack of technical knowledge (V), and lack of irrigation facilities (VI). In addition to that, high labour wage, untimely supply of inputs, lack of quality inputs, unavailable farm labour seems to least bother the coffee farmers with rank VII, VIII, IX and X respectively.

Table 9: Ranking of production problems

Particulars	Severe	Moderate	Slight	Low	Index	Rank
Lower irrigation facilities	19	4	2	35	2.12	VI
Inadequate government support	11	46	3	0	3.12	II
Infestation of insects & diseases	39	16	5	0	3.57	I
Unavailable farm labour	0	11	6	43	1.47	X
Poor technical knowledge	2	29	15	14	2.32	V
High labour wage	0	14	36	10	2.07	VII
High cost of inputs	1	38	19	2	2.63	III
Lack of credit facilities	2	39	13	6	2.62	IV
Low quality inputs	1	2	31	26	1.63	IX
Untimely supply of inputs	1	5	28	26	1.68	VIII

It was found that low farm gate price, insufficient storage facilities and insufficient marketing information were the major problems in marketing with ranking I, II and III with index value 3.5, 2.67 and 2.43. It was followed by other marketing problems like transportation problem and inaccessible market (IV), insufficient processing facilities (V), presence of middleman (VI), price fluctuation (VII), untimely payment (VIII) and rejection of crop (IX).

Table 10: Ranking of marketing problems

Particulars	Severe	Moderate	Slight	Low	Index	Rank
Low farm gate price	39	12	9	0	3.5	I
Transportation problem and inaccessible market	0	31	23	6	2.42	IV
Presence of middleman	1	14	16	29	1.78	VI
Insufficient market information	5	24	23	8	2.43	III
Insufficient processing facilities	23	4	7	26	2.40	V
Insufficient storage facilities	23	7	17	13	2.67	II
Untimely payment	0	1	17	42	1.32	VIII
Price fluctuation	0	3	37	20	1.72	VII
Rejection of crop	0	0	1	59	1.02	IX

Table 11: SWOT analysis at coffee producers' level

Strength	Weakness
Suitable agroclimate for producing Coffee.	Limited availability of improved planting materials.
Farmers have reasonable access on training and technical services	Scattered and small scale of production
Higher return than cereals and inter- Cropping possibilities	Land fragmentation causing limited scope for commercialization.
Strong network of the farmers via FG and cooperatives for production.	Gestation period of 3-4 years restrain farmers to adopt coffee production.
Lower level of productivity Less chances of rejection of crop.	Perishable nature of fresh cherry Giving less than 24 hours for processing.
Opportunities	**Threat**
Utilize Fallow, marginal and under Utilized land.	Infestation of pest (Coffee white stem borer) and disease (Coffee leaf rust).
Large number of farmers still to be the Member of cooperatives/FG.	Inconsistent quality and volume of production.
Several GOs and NGOs are working For the capacity building of coffee producers	High cost of production.

Table 13: SWOT analysis at coffee primary processors' level	
Strength	**Weakness**
Primary processing can be done at farm level.	Scarcity of water in pulping centers of some area.
Access in training related to quality Processing.	Inferior quality of pulping machines producing broken parchments.
Development of infrastructure in Pulping centre.	Unavailability of repairing facilities.
Increasing awareness on wet proc-inconsistent quality of coffee.	Scattered pulper operators producing
Easing methods for producing high quality dry parchment.	Increasing supports provided by Government as well as non-governmental agencies.
Opportunity	**Threat**
Government and non-government Organizations supports in establishing	Unscheduled delivery of fresh cherry by farmers to pulping centres.
Pulping centres in remote areas.	Lack of research in processing technology.
Organized collection of fresh cherry Via farmers' group and cooperatives.	Less profit margin for pulper for processing.
Growing use of wet processing methods operators.	

Table 14: SWOT analysis at secondary processors' level	
Strength	**Weakness**
Well-developed channel for collection of dry parchment.	Inferior quality of processing machines producing broken beans.
Cooperatives doing both processing and marketing minimizing number of actors in the value chain.	Unavailability of repairing facilties.
	No sufficient product diversification
Opportunity	**Threat**
Growing demand of Nepalese organic Coffee in both domestic and export markets.	Rising price of raw coffee.
Potential for increasing income by diversification and alternative	Uncertified coffee being sold as Organic.
uses of coffee by-product from husk, leaf, branches.	Fluctuating world coffee price Product and exchange rate.

4. Conclusion

Economic analysis was carried out at three major actors of the value chain: namely, coffee producer, pulper operator and secondary processor. Cost of production per unit of fresh cherry, dry parchment and green bean was estimated as Rs 77.08/kg, Rs 422.36/kg and Rs 798.24/kg respectively. Similarly, the net profit of coffee producers was found to be 10.24% compared to that of 11% and 15% respectively for pulper operators and secondary processors. Benefit Cost analysis of these major players showed that coffee enterprise is a profitable business with BC ratio 1.11, 1.12 and 1.17 respectively at the levels of coffee producer, pulper operator and secondary processor.

Furthermore, the study exposed that there's value addition of Rs 99.73/kg from fresh cherry to dry parchment, Rs 305.38/kg from dry parchment to green bean in domestic market while Rs 488.72/kg from dry parchment to green bean in export market and Rs 569.99/kg from green bean to powder coffee. Coffee is a promising and potential exportable commodity of Nepal. Because of the growing coffee culture among the youths, especially in the cities, demand of coffee is increasing every year. However, its production isn't increasing in the same trend. Value chain analysis of the coffee sub-sector shows that secondary processors are benefitted the most in the chain. Farmers are not getting modest benefit because of high cost of production and declining production which stems from the lack of irrigation and infestation of pest and diseases.

Acknowledgments

The authors wholeheartedly owe their sincere and deep gratitude to the Coffee farmers of the Gulmi district for their continuous support throughout the research. They are my supporting hands who always guided to show right path.

Author Contribution Statement

Authors: Daxina Chand, Santosh Paudel and Mandira Sapkota were involved in entire conception, design interpretation and analysis of data, drafting the paper, revising critically and final approval of version to be published. They agree to be accountable for all the aspects of the work.

References

Ali, M., Kindit, R., Matin, M.A., Ranjitkar, S., and Zomer, R.J., 2016. Suitability Analysis and projected climate change impact on Banana and Coffee production zone in Nepal. PLoS ONE. DOI:10.1371/journal.Pone.0163916

Aoki, K., 2012. Coffee as a livelihood support for small farmers: A case study of Hamsapur Village in Nepal. International Agriculture and Extension Education 19 (1).

BeaCoN., 2018. Market analysis of Nepalese coffee. Sanepa, Lalitpur: Transcend vision pvt. ltd. CDC (Coffee Development Centre).2020/2021 Different Coffee Varieties Cultivated in Aapchaur, Gulmi.

Chauhan, R., 1998. Economic analysis of vegetable production and marketing in Azamagarh district of Uttar pradesh. Indian Journal of Agriculture Economics, Pp. 533-680.

CoPP (Coffee Promotion Program). 2010. A study on domestic market of coffee in Nepal. CoPP/ Helvetas Swiss Intercoopetation, Nepal.

CoPP (Coffee Promotion Program). 2010. Annual Report 2010. CoPP/Helvetas Swiss. Intercoo- peration, Nepal.

CoPP (Coffee Promotion Program). 2014. Assessment of sub-sector: Coffee. CoPP/Helvetas Swiss Intercooperation, Nepal.

Crawford. 1852. History of Coffe. Journal of the Statistical Society of London, Pp. 50-58. http://doi.org/10.2307/2338310.

CRP (Coffee Research Program).2020/2021 Different Coffee Varieties in CRP, Baletaksar, Gulmi.

Dhakal, S.C., Dutta, J.P., Khanal, A.P., and Khanal, S., 2019. Value chain analysis of coffee: A Story on journey of cherry from production site to consumer cup. International Journal of Agriculture, Forestry and Life Science, Pp. 225-232. www.ijalfs.org

Feller, A., 2006. Value chain versus supply chain. BP. Trends, Pp. 1-7.

Ferreira, T., Farah, A., Guinaraes, R., and Shuler, J., 2019. Introduction to coffee plant and Genetics. Royal Society of Chemistry, Pp. 1-25. DOI:10.1039/9781782622437-00001.

Gilbert, C.L., 2006. Value chain analysis and market power in the commodity processing with application to the cocoa and coffee sectors. Paper presented at workshop organised by FAO held at Rome, Italy, 4-5 April 2006. http://web.unitn.it/files/5_06_gilbert.pdf.

Giri, Y., 2006. Status and Potential of Coffee Cultivation in Neoal. New Baneshwor, Kathmandu, Nepal: National Tea and Coffee Development Board.

Gotame, T.K., and Budhathoki, K., 2005. Research needs on coffee enterprise development in Nepal. In: Tea-A-Tea. NTCBD, New baneshwor, Kathmandu.

Humphery, J., 2001. The value chains: spreading the gains from globalisation. Library road, Brighton BN1 9RE, UK.: Institute of Development Studies.

ICO (International Coffee Organization). 2021. Botanical Aspects .ICO,London,UK.https://wdb.archive.org/web/20211003123956

ITC (International Trade Centre). 2022. The Coffee Exporter Guide 6th Ed. International Trade Centre, 54-56, rue de Montbrillant, 1202 Geneva, Switzerland.

Kadel. 2009. A study on production cost and margins of coffee in Sindhupalchowk district. Helvetas Swiss Intercooperation Nepal: Coffee Promotion Program.

Kattel, R., 2009. The impact of coffee production on Nepali smallholder in the value chain. Hannover, Germany: Leibniz University.

Luitel, G. 2017. Value chain analysis of coffee production in Central Nepal. M.Sc. Thesis Institition of Agriculture and Animal Science, Tribhuvan University, Post graduate college Kritipur, kathmandu, Nepal.

NACS (National Association of Convenience Store). 2013. Facts sheets: Coffee sales. Association of Convience Store.1600 Duke Street Alexandria, Va 22314, USA.

NTCDB (National Tea and Coffee Development Board). 2016. National Tea and Coffee Development Board, New baneshwor, kathmandu, Nepal. https://teacoffee.gov.np.

PACT (Project for Agriculture Commercialisation and Trade). 2012. Value chain Development

Paudel, B.P. (Fiscal Year 2074/75). Annual Progress Report . Aapchaur, Gulmi: Coffee Development Centre.

Paudel, K., Johnson,T.G., and Yamoto, N., 2012. Compairing technical effeciency organic and convential coffee farms in Nepal using data envelopment analysis (DEA) approach. International association of Agricultural Economists(IAAE). https://www.researchgate.net /publication/254385495

Paul, K., 2017. A History in Nepalese Coffee. Thanks Giving Coffee.

Ponte, S., 2002. The ' Latte revolution'? Regulation, Markets and Consumption in the Global Coffee Chain. World Development. Doi:10,1016/SD305-750X(02)00032-3

Santos, T.F., 2019. Introduction to Coffee Plant and Genetics. In T. F. Santos, Coffee: Production, Quality and Chemistry (pp. 1-25). Royal Society of Chemistry.

Sapkota, K.R., 2018. Enhancing the Value chain of Gulmi coffee by empowering coffee cooperatives of Gulmi. Daayitwa Public Service Fellow, Pp. 1-20.

Smit, R.F., 1985. A History of Coffee. Springer, Baston, MA, 1-12. http://doi.org/10.1007/978-1-4615-6657-1-1.

Subedi, R.N., 2011. Comparative Analysis of Dry and Wet process of coffee with Respect to quality and cost in Kavre District, Nepal: A case of Panchkhal Village. Internal Research Journal of applied and basic science, Pp. 181-193. https://www.irjabs.com@2011.

TEPC (Trade and Export Promotion Centre). 2015. A glipse of Nepal's foreign trade 2013/2014.Trade and Export Promotion Centre. Pulchowk, Lalitpur, Nepal.

UNIDO (United Nations Industrial Development Organizations). 2009. Agro-value chain analysis and development, The UNIDO approach. Agri-Business Development Branch of

UNIDO, Vienne, Austria.1-4. http://www.unido.org/fileadmin/ user_medis/Publication/ Pub_free/ Afro_value_chain_analysis_and _development.pdf.

USAID Nepal (United State Agency for International Development Nepal). 2011. Value chain/market analysis of the ginger sub-sectior in Nepal. United State Agency for Internationaldevelpoment. General Development Office, Kathmandu, Nepal.