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ORIGINAL RESEARCH ARTICLE

Economics of production and marketing of coffee in Bethanchowk Rural Municipality, Kavre, Nepal

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ABSTRACT

This study was conducted to assess the profitability of coffee production and marketing, find its constraints, and identify major marketing channels of coffee in Bethanchowk rural munici-pality in Kavre district, Nepal. Random and snowball techniques were used for sampling. For data analysis, MS Excel and IBM SPSS 26 were used. A total of 72 coffee farmers, 2 collectors, 6 pulpers, and 2 processors were surveyed from the study area, along with conducting FGD and KII. Coffee was grown in 0.0514 hectares (1.01 ropani; 1 hectare = 19.66 ropani) of land on average, where the farmers' overall landholding was 0.7214 hectares (14.18 ropani). The total variable cost per hectare was NPR 235783.8 (US$ 1661.22), and the total fixed cost per hectare was NPR 30038.37 (US$ 212.30). The gross margin per hectare was found to be NPR 332159.5 (US$ 2340.24). B:C ratio was calculated to be 2.14 at a 12% discount rate. The returns to scale of coffee production was 1.563, which showed increasing returns to scale in the study area. The most significant factors that affected coffee farming were the area under coffee cultivation, the number of productive plants, and labor. Farmers faced challenges due to frequent infestation from diseases and pests and having inadequate water supply access in the study area. But if the concerned authorities address those problems, coffee farming can be a great source of income, especially for rural farmers.

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INTRODUCTION

Coffee is considered as the second-largest commodity in com-mercial and industrial sectors in the world (Massoud *et al.*, 2020). Mainly, two species of coffee are produced worldwide: *Coffea arabica* and *Coffea canephora*. In 2021/22, 55.9% of the world's total coffee production came from Arabica coffee (ICO, 2023). Brazil is the most leading nation in coffee production, while Vietnam is the second and Colombia, the third (FAO, 2023; USDA, 2023; Wisniowski, 2023). On the other hand, the EU and the USA are the largest consumers and importers of coffee (FAO, 2023). Coffee was introduced to Nepal from Myan-mar (then Burma) in 1938 (NTCDB, 2023a; Tuladhar & Khanal, 2020). Arabica coffee is compatible with Nepal's geographical features, so this cultivar is grown in Nepal. The unique flavors and aromas from high-altitude cultivation make Nepali coffee a specialty coffee in the international markets (NTCDB, 2023b; Paudel & Parajuli, 2020). Until FY 2077/078 B.S., there were 31,340 farmers cultivating coffee in Nepal, and the production of green beans in FY 2077/078 B.S. was 315 MT (MoALD, 2022).

Nepal has a suitable climate and topography for the growth of organic Arabica coffee (NTCDB, 2023d). However, in the FY 2021/22 A.D., only about 69.52 tons of coffee were exported,

whereas around 279.82 tons of coffee were imported by Nepal (NTCDB, 2023c). High cost is involved in local coffee production, but the yield is comparatively lower in Nepal than in other countries. In 2018, the average productivity of Arabica coffee was 478 kg/ha in India (Iqbal, 2023), but Nepal's productivity was only 192 kg/ha in FY 2018/19 (MoALD, 2020). This shows that coffee productivity in Nepal is quite low as compared to international standards. Most of the Nepali farmers do not have huge land holding, and they employ subsistence farming techniques. There is also a lack of knowledge and proper training among Nepali coffee farmers (Dahal, 2020). Kavrepalanchowk (hereafter Kavre) is a major coffee-producing district in Nepal with 282 hectares of plantation and 36.5 MT production (NTCDB, 2023b), which is why this district was selected for the study. Even while facing spread of diseases, inadequate irrigation facilities, and drying of plants, coffee farming has been one of the growing occupations among farmers in Kavre (Karki *et al.*, 2018). Coffee farming is very important in the lives of rural farmers. It can significantly contribute to employment opportunities and rural development in an underdeveloped country like Nepal if we effectively utilize our production capacity. It is essential to explore the potential of coffee farming in Nepal. However, until now, neither the status nor the profitability analysis of coffee production in Kavre has been properly documented. This research topic was chosen because there is a growing demand for coffee in Nepal, but there are only limited numbers of studies conducted on this subject so far. This study attempts to examine the economic aspects of coffee production and marketing along with an assessment of the opportunities and challenges involved in the sector.

MATERIALS AND METHODS

Research site

Kavre lies in Bagmati Province and is one of the 77 districts located in central Nepal. It consists of six municipalities and seven rural municipalities. Kavre has a total coffee plantation area of 292 hectares (NTCDB, 2023b), which makes it the second-highest in Nepal (Figure 1). This study was conducted in Bethanchowk rural municipality of Kavre district, which covers an area of 101 sq. km (Bethanchowk Rural Municipality, 2023). This region was chosen because it has contributed a lot to coffee production in Nepal and has a huge potential to grow further. A study found that, out of 364 hectares, 224 hectares are moderately suitable and 140 hectares are suitable for coffee production in Kavre (NTCDB, 2018).

Sample size and sampling procedure

Selection of farmers: All the coffee-growing farmers in the selected district comprise our population. The population size of coffee farmers in Kavre district is 3150 (MoALD, 2022). The minimum sample size was determined using the Raosoft online sample size calculator, by employing the formula:

$$x = Z(c/100)^2 r (100-r)$$
$$n = N x / [(N-1) E^2 + x]$$
$$E = Sqrt [((N - n) x) / (n (N-1))]$$

Where N was the population size, r was the fraction of responses that we were interested in, and Z(c/100) was the critical value for the confidence level c (Raosoft, 2023), E is the margin of error which is determined by the researcher (here, we took 10% margin of error with 90% as confidence level). By this method, 67 farmers were determined as our sample size. Initially random sampling was employed to select the district, study region and probable growers to be surveyed. Later, the snowball sampling technique was used to survey the farmers since a list comprising all the coffee growers in the study area was not available. Therefore, by taking into consideration the expected response rate, the minimum sample size was increased to 72 growers who were involved in coffee farming.

Selection of traders: The traders involved pulpers who were involved in pulping coffee, collectors of green beans of coffee and processors who were involved in secondary processing of coffee in the surveyed district. Altogether, two collectors, six pulpers and two processors were purposely selected for the study.

Focus group discussion (FGD) and key informant interview (KII)

An FGD and two KIIs (one with the chairperson of a coffee cooperative and another with an agriculture technician of the region) were conducted to identify the major challenges faced by coffee growers and for SWOT analysis of coffee in the surveyed region (Table 1).
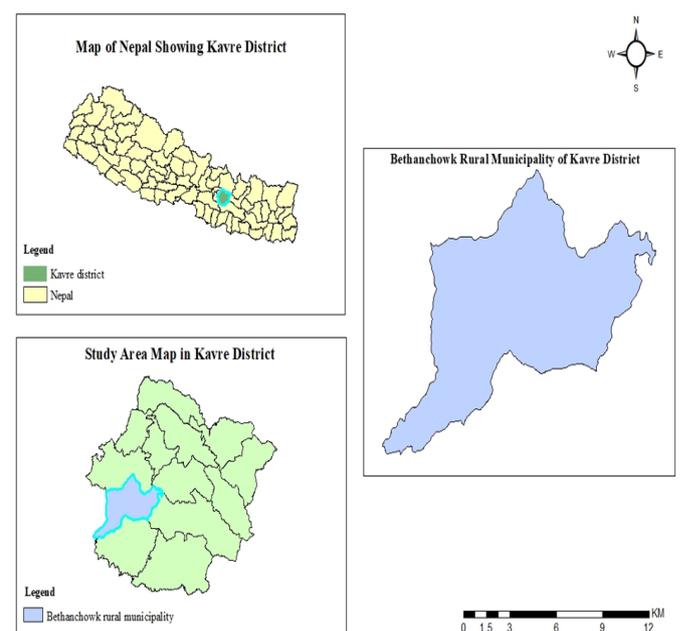

Figure 1. *Map of the study area.*

Table 1. SWOT analysis of coffee in Bethanchowk, Kavre, Nepal.

Strengths	Weaknesses
Substantial knowledge about coffee farming	Frequent infestations of pests and diseases, with limited effective control measures
Appropriate soil conditions	
Production of superior-quality coffee	Low resilience to climate and environmental hazards
	Insufficient water resources, leading to poor productivity of coffee
	Very low coffee production compared to its demand
Opportunities	**Threats**
Strong support from local government and various organizations	Vulnerable to frost
Relatively cheaper land and labor costs	Low control of farmers on the price of coffee
Inputs available at the village	Inadequate infrastructure in coffee production areas
Rising demand for Nepali coffee	
Structured traders and well-established markets available	
Employment opportunities available for women and the underprivileged	

Sources of data

Primary sources: The primary data were collected from farmers and traders through field surveys using pre-tested questionnaires, and through the FGD and KIIs. Information regarding existing production systems and various problems associated with coffee production and marketing at the study site were collected through these sources.

Secondary sources: Secondary sources of data such as the publications of FAO, USDA, NTCDB, NARC, and MoALD, various online open access journals, articles, previous theses, published books and websites were used to obtain information regarding coffee production.

Data analysis and interpretation

The data collected during the survey were categorized into several variables. Then, these variables were entered into MS Excel and IBM SPSS 26 for further analysis. The various methodologies used for data analysis are:

Descriptive analysis: The descriptive statistics were used to describe the socio-demographic profile of the coffee farmers and the production status of coffee.

Determination of cost of production

Fixed and variable costs are two fundamental components of production economics. Fixed costs do not change regardless of the level of production or output. On the other hand, variable costs change directly with production or output. Variable costs (VC) incurred in coffee farming that are included in this study are:

Cost of sapling ($C_{sapling}$)

Costs of manure/ FYM (C_{fym})

Costs of plant protection materials (C_{pp})

Labor costs (C_{labor})

i) Transplanting costs

ii) Manuring costs

iii) Costs on inter-cultural operations like weeding, training and pruning

iv) Harvesting costs

Other costs including irrigation, repair and maintenance and post-harvest costs (C_{other})

Similarly, the fixed costs (FC) of coffee production included in this study are:

Land tax (C_{tax}) (since people didn't rent land for coffee production in the study area, rent is not included)

Depreciation of equipment's used for coffee production ($C_{depreciation}$)

Therefore, the following equation can be used to describe the cost of coffee production based on this research.

Total costs (TC) = Total fixed costs (TFC) + Total variable costs (TVC)

Where, Total fixed cost (TFC) = C_{tax} + $C_{depreciation}$

Variable costs (VC) = $C_{sapling}$ + C_{fym} + C_{pp} + C_{labor} + C_{other}

And TVC = VC + Interest on variable costs (12 % of VC)

In this study, some variable costs were determined based on the costs prevailing in the locality while calculating production costs. This is because farmers often did not need to make direct monetary payments for these items. For example, many farmers employed a system called "perma" for labor, which did not involve direct payments; instead, they exchanged labor on each other's lands. Similarly, FYM/ manure production also happened mostly on the farm itself, which reduced the need for external monetary purchases of these items.

Gross margin analysis

Gross margin helps coffee farmers in assessing the profitability of their production activities by measuring the difference between the revenue generated from coffee sales and the direct costs associated with producing and selling coffee.

Gross margin (GM) = Gross return (GR) – Total variable costs (TVC)

Where, Gross return = Price of fresh cherries (NPR/kg) × Total quantity sold (kg)

Benefit cost ratio (BCR)

The benefit-cost ratio (BCR) is a financial metric that helps farmers in evaluating whether the benefits of coffee farming outweigh its costs. They can also decide if this farming is worth pursuing based on BCR. The formula that is used to calculate the benefit-cost ratio in this study is:

BCR = Gross return / Total Costs

Production function model

The Cobb-Douglas production function model was employed in this study because it is used extensively in agricultural research activities and it is also suitable for comparing the partial elasticity coefficient (Prajneshu, 2008). The Cobb-Douglas production model is used in this study to evaluate the impacts of various factors on production outcomes and to approximate the effectiveness of variable production factors in coffee cultivation.

Where,

Y = Gross or total income from fresh cherries (NPR/hectare)

X_1 = Sapling cost (NPR/hectare)

X_2 = FYM/ manure costs (NPR/hectare)

X_3 = Labor costs incurred during coffee production (NPR/hectare)

X_4 = Number of productive plants

X_5 = Area under coffee cultivation (hectares)

u = Random disturbance term

$b_1 ... b_5$ are the coefficients to be estimated

The Cobb-Douglas production function was transformed into a logarithmic function to make it more practical and usable.

Where,

Ln = Natural logarithm

a = Constant

u = Error term

Returns to scale

Returns to scale is a concept that evaluates how increasing or decreasing the proportion of inputs (such as labor, capital, and resources) affects the quantity of output produced. Returns to scale is determined by adding the elasticities of individual production inputs (Acharya *et al.*, 2019; Sharma *et al.*, 2016).

Indexing

The analysis of production and marketing problems from the perspectives of the farmers in the study area were conducted by using an indexing technique. Respondents were instructed to rank certain problems they faced during coffee production on a scale of 1 to 7, with 1 being the most severe and 7, the least severe; for marketing problems, it was on a scale of 1 to 5, with 1 being the most severe and 5, the least severe. Their responses were coded and then forced ranking method was used to analyze them. The formula used in this approach is given below.

$$I_{imp} = \sum \frac{S_i F_i}{N}$$

I_{imp} = Index of severity

∑ = Summation

S_i = I^{th} scale value

F_i = Frequency of ith severity given by the respondents to the survey

N = the total number of respondents to the survey

Marketing margin and producers' share

Marketing margin is the difference between the price at which a product is sold to the end consumer and the price at which it was purchased from the producer. It is calculated as follows:

Marketing margin (MM) = Retailer's price – Farm gate price

The producer's share refers to the portion of the final retail price that goes to the producer of the product. It is calculated as below:

$$P_s = (P_f / P_r) \times 100$$

Where, P_s = Producer's share,

P_f = Producer's price (Farm gate price) and

P_r = Retailer's price

RESULTS AND DISCUSSION

Economics of coffee production

In the study area, the cost of planting material/ sapling per hectare was NPR 27872.15, the cost of FYM/ manure per hectare was NPR 26188.73, the cost of plant protection materials was NPR 2057.552 per hectare, and the labor cost was NPR 152646.3 per hectare. The total variable cost per hectare was NPR 235783.8. And the total fixed cost per hectare was calculated to be NPR 30038.37. The total cost of production per hectare was found to be NPR 265822.2. Labor cost was the highest expense of all in the study area (Table 2). The extant findings showed similar results (Mohammed *et al.*, 2013; Pandit, 2008). In the surveyed area, farmers directly sell their products to collectors or pulpers within the village. The revenue generated from coffee primarily arises from the trade of fresh cherries. The average income from coffee production in the study area was found to be NPR 567943.4 per hectare.

Productivity of coffee

Coffee productivity is influenced by factors such as the number of productive trees, the size of the coffee plantation, and the yield of each plant. The number of productive plants per hectare was found to be 1320.677 in the studied region, which is higher than the findings in Palpa, where it was 56 coffee trees/ ropani (i.e., 1100.4 plants/ha) (Acharya & Dhakal, 2014), but lower than that of Gulmi where it was 89.01 coffee plants/ ropani (i.e., 1749.04 plants/ha) (Bhattarai *et al.*, 2020). The productive area under coffee/household was 0.05138 ha. The fresh cherry production was 4648.79 kg/ha. The productivity of fresh cherry per plant was 3.52 kg. This productivity could have been low due to the attack by white stem borers on most of the coffee farms, and farmers not finding any proper organic means to control it. This could also be attributed to the fact that per hectare coffee plantation in the studied region was lower than what is

Table 2. Detail information of cost of production of coffee per hectare per year in Bethanchowk, Kavre, Nepal.

Particulars	Units	Mean (NPR)
Sapling cost	NPR	27872.15
FYM/ manure cost	NPR	26188.73
Plant protection materials cost	NPR	2057.552
Labor cost	NPR	152646.3
Other costs	NPR	1756.514
Variable costs	NPR	210521.3
Interest in variable costs, (12% of VC)	NPR	25262.55
Total variable costs	NPR	235783.8 (~$ 1659.98)
Depreciation of equipment	NPR	29843.44
Land tax	NPR	194.928
Total fixed costs	NPR	30038.37 (~$ 211.48)
Total cost of production per hectare	NPR	265822.2 (~$ 1871.46)

[**Note:** 1 USD = ~142.04 NPR, as of 11/03/2025].

Table 3. Factors affecting coffee production in the study area.

Variables	Coefficient (B)	Standard error	t-value	p-value
(Constant)	1.570	1.048	1.498	0.139
Sapling cost	0.249	0.215	1.157	0.251
Manure cost	0.168	0.097	1.738	0.087
Labor cost	0.283**	0.094	3.026	0.004
Number of productive plants	0.708**	0.227	3.116	0.003
Area under coffee cultivation	0.155***	0.030	5.096	0.000
R^2	0.763			
Adjusted R^2	0.745			
F-value	42.565			
Returns to scale (Σb_i)	1.563			

[Note: ** $p \leq 0.01$ and *** $p \leq 0.001$, where p denotes the level of significance].

recommended on a nationwide scale. Altogether, 2161.5 per hectare (i.e., 110 coffee plants per ropani) are recommended for plantation (AITC, 2023). The low productivity could also be because, in some farms, many plants were unproductive, and many were just starting to provide returns; similar results were obtained in Kavre (Dahal, 2020). [Note: 1 hectare = 19.66 ropani; Ropani is the unit of land measurement commonly used in Nepal and some parts of India].

Profitability analysis of coffee production

The total variable cost was found to be NPR 235783.8/ha, and the total fixed cost was found to be NPR 30038.37/ha. The total cost was determined to be NPR 265822.2/ha. Gross return from coffee was found to be NPR 567943.4 per hectare. Gross margin was then calculated to be NPR 332159.5 per hectare. [Note: 1 USD = ~142.04 NPR, as of 11/03/2025].

Benefit cost ratio (BCR)

The BCR at 12% discount rate was calculated to be 2.14, which shows that coffee farming is profitable in the surveyed region. This can be due to high market demand for that region's coffee and favorable pricing, efficient farming practices leading to reduced production costs, effective resource management, and availability of subsidies from the local authorities in the study area. In a similar study conducted by (Bhattarai *et al.*, 2020), the BCR of coffee was found to be 2.52 in Gulmi and 1.52 in

Arghakhanchi, whereas (Luitel, 2017) had found the BCR to be 1.24 in Kavre and Sindhupalchowk.

Production function analysis

Table 3 shows that the area under coffee cultivation was the most significant factor affecting coffee production, and the number of productive plants and labor costs were other significant factors affecting it. The model's coefficient of determination (R^2) was 0.763. This implies that 76% of the variation in the dependent variable was explained by the independent variables in the model. The returns to scale was determined to be 1.563, which implies that a one percent increase in all inputs leads to a 1.563 percent increase in output. This signifies increasing returns to scale. The returns to scale of coffee production in Parbat was found to be 1.26 (Sharma *et al.*, 2016), depicting an increasing returns to scale. The returns to scale of coffee production in Kavre, Sindhupalchowk and Syangja were found to be 0.975, 0.986 and 1.054 respectively (Pandit *et al.*, 2015), which showed decreasing returns to scale in all districts except Syangja.

Description of major socio-economic continuous variables of the respondents

Table 4 shows the description of the major socio-economic variables of respondents in the study area. The mean number of family members actively contributing to their household's economy was

3.57. The average landholding per household was 0.7214 hectares, and the typical area allocated to coffee cultivation was 0.0514 hectares. This result is similar to the findings in Gulmi, where the average area under coffee cultivation per household was 0.95 ropani (i.e., 0.0483 hectares) (Bhattarai *et al.*, 2020). However, many farmers in the studied region have been expanding their coffee cultivation areas in recent times due to various reasons such as perceived benefits of coffee over cereal crops, lower care requirements for coffee, and active support from local authorities and organizations.

Problems with coffee production

It was found that the most severe problem faced by coffee growers was the infestation of pests and diseases. This could be because the region had generally warm climate and frost occurrence. Together this creates favorable conditions for the proliferation of coffee pests and diseases (Koh *et al.*, 2020). Coffee growers in this area had limited access to effective pest management methods, and their knowledge was also limited. This likely contributed to the severity of pest infestations. The major pest was found to be coffee white stem borer (*Xylotrechus quadripes*), and the major disease was seen to be coffee leaf rust (*Hemileia vastatrix*). The high index value of 0.976 suggests this issue is critical. The lack of sufficient water supply was the second most significant problem faced by coffee growers, which could be linked to inadequate investments in water infrastructure in that specific region. In a similar study conducted by (Acharya & Dhakal, 2014), high insect pest attack by Coffee borer was ranked as the major problem faced by coffee farmers, whereas in the study by (Sharma *et al.*, 2016), lack of irrigation and lack of knowledge were ranked first and second respectively.

Problems in coffee marketing

The findings revealed that the most critical issue in coffee marketing was the limited scale of production, resulting in high demand and low supply. Due to its unique flavors and qualities, Nepali coffee has been in increasing demand as consumer preferences have shifted towards specialty and high-quality coffee. Market demand has increased faster than what local production capacity could accommodate. Many farmers started coffee cultivation practices more than a decade ago but did not expand their farms as much until recently. Some of them had recently re-started and/or re-expanded coffee cultivation after heavy pest and disease infestations destroyed their coffee farms several years ago. Besides, the absence of quality control measures at the production level and inadequate governmental support were ranked second and third, with index scores of 0.767 and 0.642, respectively (Table 5). In a previous study conducted by (Luitel, 2017), low farm gate price was ranked first, whereas low scale of production was ranked second as the major problems faced by coffee growers in Central Nepal.

Marketing channel

Figure 2 illustrates the coffee marketing channels within the study region. The primary marketing channels are represented by the more prominent routes. However, there was also minor coffee flow observed on the less prominent routes, although the amount was small. Figure 2 indicates that producers in the studied region primarily sold their coffee products to collectors or pulpers. The freshly harvested cherries went through a process of de-pulping, fermentation, washing, and drying at the pulping centers to become dry parchment. Once primary processing was complete, the dry parchment was sent to secondary processors and traders. They carry out tasks like hulling, grading, hand sorting, roasting, and packaging. Unroasted green beans are exported to international markets. On the domestic market, both roasted coffee beans and ground coffee are made available for sale. Key international markets for Nepali coffee are Japan, the U.S.A., and the Netherlands. Major domestic markets for Nepali coffee includes department stores, hotels and restaurants.

Table 4. Statistical description of the major continuous variables in Bethanchowk, Kavre, Nepal.

Variables	Minimum	Maximum	Mean
Age of the respondents	21	83	46.58
Economically active family members	1	9	3.57
Total owned land (hectare)	0.1526	2.14	0.7214
Productive coffee land (hectare)	0.0168	0.61	0.0514

[Note: 1 hectare = 19.66 ropani]

Table 5. Problems faced during the production and marketing stages by coffee growers in Bethanchowk, Kavre, Nepal.

| Problems during the coffee production stage	Index	Ranks
Lack of quality seedlings	0.601	III
Infestation of insects, pests and diseases	0.976	I
Lack of technical knowledge and extension	0.506	IV
Low labor supply	0.452	V
Low market price	0.379	VI
Shade maintenance	0.296	VII
Lack of proper water supply	0.789	II
Problems in coffee marketing stage	Index	Ranks
Lack of quality control measures at production level	0.767	II
Inadequate support from government	0.642	III
Small scale of production	0.861	I
Inadequate processing facilities	0.411	IV
Lack of awareness of Nepalese coffee in the domestic market	0.319	V
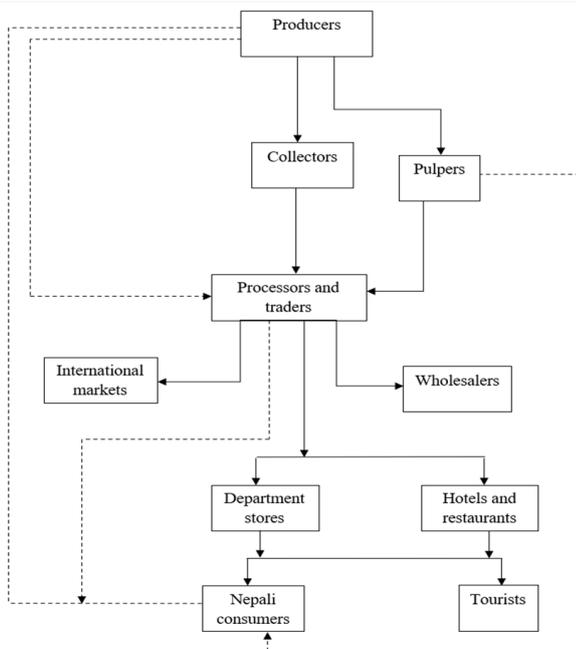
Figure 2. *Marketing channels of coffee in Bethanchowk, Kavre, Nepal.*

Price spread and producers' share on consumer price

It took approximately 4 kg of fresh cherries to yield 1 kg of dry parchment. During the hulling process, 25% was reduced, resulting in 0.75 kg remaining. Subsequently, during grading, hand sorting, and roasting, there was another 25% reduction, leaving around 0.5625 kg, which was then used to produce ground coffee. By calculation, it's determined that approximately 7.11 kg of fresh cherries were required to produce 1 kg of ground coffee. The average expense for processing fresh cherries into ground coffee was NPR 98.36 per kg, packaging cost was NPR 16.67 per kg, and costs for marketing and overheads were NPR 26.89 per kg. As a result, the total cost for both processing and marketing was NPR 141.92 per kg of ground coffee. The average cost of ground coffee on the domestic market was NPR 1780 per kg. This is the price paid by customers in supermarkets and online stores. The cost of purchasing 7.11 kg of fresh cherries was NPR 868.63. This means, the farm gate price for 1 kg of fresh cherry was NPR 122.17. The processing cost for each kg of fresh cherry amounted to NPR 19.96. This resulted in a final retail price of NPR 250.35 per kg of fresh cherries before considering processing and marketing expenditures. After subtracting processing and marketing costs, it became NPR 230.39 per kg of fresh cherries. The marketing margin for each kg of fresh cherries was NPR 108.22. Producers' share became 53.02% after deducting processing and marketing expenses, and it was 48.79% when not accounting for processing and packaging costs. These results are higher than the results of the study conducted in Kavre and Sindhupalchowk during 2007, where the producers' share was 47.10% after subtracting processing and marketing costs and 40.43% without (Bastola, 2007). This could be because of the increased prices received by producers at present in the studied area. Processing and marketing operations in the coffee industry may also have improved over time. The producers may have negotiated better terms with processors and marketers

due to a better understanding of market dynamics. Between the two studies, the producer's share may also have changed due to changes in policies, subsidies, and support programs.

Conclusion

This study explored the economic aspects related to coffee production and marketing in Bethanchowk rural municipality in Kavre, Nepal. The BCR was calculated to be 2.14 at a 12% discount rate, which suggests that the study area has favorable economic viability for coffee farming enterprises. The area under coffee cultivation was found to be the most significant factor affecting coffee production in the surveyed region. In the study, the returns to scale was determined to be 1.563. This indicates that a one percent increase in all inputs collectively corresponds to a 1.563 percent increase in the overall output of coffee farming. This suggests that coffee farming exhibits economies of scale, which means that as the size of the operation grows, productivity and output also grow and at an even faster rate. Increased coffee production will benefit various stakeholders. Coffee producers will experience higher yields and profits. Business activity would increase, and the intermediaries involved in processing and marketing would gain from it. This study also acknowledges that there is a huge supply-demand gap in the Nepali coffee industry, which indicates a potential market opportunity. By increasing coffee production, it becomes possible to bring supply and demand into closer alignment. This in turn can lead to increased price stability and the fulfillment of consumer needs. The study found that the most critical challenges faced by coffee growers in the studied area were the attack of pests and diseases that caused infestations, along with inadequate access to suitable water sources. Training can be provided to farmers regarding disease and pest management in coffee cultivation by organic means. A reliable source of water should be ensured in coffee farming areas. Investing in irrigation systems and reservoirs can mitigate water shortages during dry periods and this can also help in improving coffee productivity. Since the highest-cost input is labor, other alternative approaches and machinery can be considered to replace some of the labor-intensive tasks.

DECLARATIONS

Author contribution statement: Conceptualization: S.K.; Methodology: T.R.C.; Software and validation: T.R.C.; Formal analysis

and investigation, Resources: D.D.; Data curation: S.K.; Writing—original draft preparation: R.K., R.B., S.R.; Writing—review and editing: R.K., R.B., S.R.; Visualization: R.C.; Supervision: T.R.C. All authors have read and agreed to the published version of the manuscript.

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