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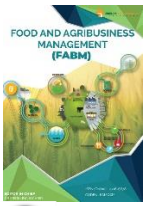

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RESEARCH ARTICLE

ECONOMIC ANALYSIS OF COFFEE PRODUCTION IN GULMI DISTRICT, NEPAL

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ABSTRACT

Coffee is an evergreen plantation cash crop grown in a hilly tract with a height of up to 5m, falls under the family Rubiaceae and genus *Coffea*. It is a popular beverage containing caffeine, a natural stimulant that can improve alertness and focus. Coffee is a foreign exchange earner. A total of 60 households were surveyed considering feasibility using a simple random sampling procedure in the five wards (1,2,3,5 and 6) of Satyawati rural municipality at Gulmi District to assess and analyze the economic analysis of production. Field visit, Household survey, Focus Group Discussion, Key Informant Interview, semi-structured interview schedule was employed to collect information as primary sources and published reports and data were used as secondary sources. The information obtained was coded, tabulated, and analyzed using Statistical Package for Social Science (SPSS) and Microsoft Excel. The research was carried out from 1st week of March to 2nd week of June 2023. Socio-demographic studies revealed that (61.7%) of the respondents were male and (38.3%) of the respondents were female. The overall average family size of the study area was found to be 5.05. The majority of respondents (46.7%) had an education up to the Primary level. Janajati and Aadibashi account for 60% of coffee producers. Subsistence and organic farming were the most common. (58.3%) of the coffee growers in the study area were involved in the farmer's group. The average area under coffee production was 0.13 hectares. The total cost of production per hectare was Rs. 2,48,186. The total returns per hectare was Rs. 6,29,192. The benefit-cost ratio, based on a period of 15 years, was calculated as 2.53. The Net Present Value was calculated at Rs. 3,81,005. The positive Net Present Value indicates the project's expected cash inflows. The Internal rate of return calculated was 22.75% indicating that the project is expected to generate a return that exceeds the cost of capital, making it an attractive investment.

KEYWORDS

Benefit-cost ratio, Coffee, Gulmi, Production.

1. INTRODUCTION

Coffee, a crop of great economic significance and environmental value, has become increasingly popular among Nepalese over the past few decades. This crop is now grown in over 41 mid-hill districts across Nepal, including Gulmi, Palpa, Syangja, Arghakhanchi, Kavre, Sindhupalchowk, Lalitpur, Kaski, Tanahun, and Lamjung (NTCDB, 2022). The unique aroma and flavor of Nepalese coffee has earned it a reputation as a specialty and organic coffee. This is attributed to factors such as altitude, geographical location, orchard management practices, and post-harvest handling, all of which play a significant role in determining the quality of the coffee. It is important to note that the quality of coffee is influenced by several stages, with 40% determined during cultivation, 40% during initial post-harvest processing, and the remaining 20% during secondary processing (Paudel and Parajuli, 2020). Coffee is a highly traded global commodity and a significant source of foreign exchange earnings for many developing countries.

Coffee cultivation is a recently introduced and highly valuable cash crop in Nepal's mid-hills region, typically grown at altitudes between 800 to 1600 meters above sea level. The cultivation of this crop offers on-farm employment opportunities and generates income for smallholder farmers in rural areas who are economically disadvantaged (Subedi, 2011). Compared to other cereal crops, coffee is economically more profitable for farmers in the present context, with profits nearly three times higher than other crops (Kattel et al., 2009). Although Nepalese coffee production currently contributes very little to the global market, specialty arabica coffee has been receiving premium prices and gaining popularity in specialty markets for over a decade due to its strong aroma and high-quality cupping.

This has gradually encouraged the expansion of coffee farming in rural areas of Nepal (Giri, 2006). Coffee can be a valuable contributor to poverty reduction in countries like Nepal, as it can be grown on marginal land. The harvesting season for coffee in Nepal, which runs from November to March, coincides with a period when farmers have relatively less work to do. Since paddy is still a major crop in Nepal, farmers would complete their harvest before November, allowing them ample time to invest in coffee cultivation until March, when they return to the paddy fields. As a result, coffee provides an opportunity for farmers to earn income during the off-season of conventional crops (Luitel, 2017).

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Coffee is a significant cash crop in the mid-hilly regions of Nepal but faces challenges like poor road connectivity, backwardness, and inadequate irrigation (Khanal, 2003). Value-addition activities and product upgrading practices are low, with farmers lacking technical knowledge and financial resources. Efforts by district-level coffee organizations and agricultural offices have not provided permanent solutions, leading to the replacement of veteran coffee cultivators with new ones (Kattel et al., 2009; Tiwari, 2010). Despite its potential to increase rural income, inadequate extension services have led to farmer dissatisfaction. Coffee productivity in Nepal is lower than in other countries due to traditional farming methods and cultivation on marginal, erosion-prone land (Bhattarai et al., 2020). Farmers in Satyawati Rural Municipality also face irrigation, landslide, and climate change issues. The NTCDB sets the minimum prices for coffee annually through negotiations, a process criticized for lacking scientific guidelines and being controversial.

Analyzing the economics of coffee production and marketing systems provides insights into the entire process involved in the production, processing and transfer of products from producers to consumers, including associated costs, returns, and profitability so that it will be helpful to grower for allocating resources. Additionally, identifying the challenges in coffee production and marketing aids various authorities like PMAMP, MOALD, GO's, NGO's and INGO's to formulate and implement future strategies, planning to improve production.

2. RESEARCH METHODOLOGY

2.1 Site Selection

The survey was conducted in Satyawati Rural Municipality (wards 1,2,3,5 & 6), Gulmi district of Nepal which falls in Lumbini province. It is situated between the latitudes of 27°55'N to 28°27'N and longitudes of 83°10'E to 83°35'E. The district covers an area of 1,149 square kilometers, which is approximately 0.78% of Nepal's total area. The elevation of Gulmi ranges from 465 meters to 2690 meters. The study site falls under the command area of Prime Minister Agriculture Modernization Project, Coffee Super Zone, Gulmi.

2.2 Sample size and sampling procedure

Altogether 60 farmers from 5 different wards (1,2,3,5 &6) of Satyawati Rural Municipality were taken as the sample for this study. The sample were selected by simple random sampling technique for the feasibility study.

2.3 Research design

Personal interviews were used to collect data, and the respondents were asked questions based on an interview schedule and checklist to obtain the desired information. In addition, Key Informant Interviews (KII) and Focus Group Discussions (FGD) were conducted primarily to cross-check and validate the data and information gathered from the scheduled interviews, and secondarily to gather further qualitative information. Additionally, field observation was done to gather information about the current scenario of coffee cultivation at grass root level.

2.4 Data sources and types

To collect the necessary information, a variety of sources and techniques was employed. Primary and secondary data was collected and then analyzed. Coffee growers serve as the primary sources of data. Secondary information was gathered from documents from various institutions and organizations.

2.5 Data Analysis

Both primary and secondary information obtained from the field survey and other methods was coded, tabulated, and analyzed using Statistical Package of Social Science (SPSS) and Microsoft Excel. Quantitative and descriptive analysis was used to analyze different variables in the study.

2.5.1 Socio-demographic and economic variables

Variables like gender of respondents, family size, education status, source of income, etc. is analyzed by using simple descriptive statistics such as frequencies, percentage, mean, standard deviation and so on.

2.5.2 Cost of production

It is the total cost that is incurred during the overall process of production of coffee by farmer which is calculated by summing up the total fixed cost and the total variable cost.

Total cost= total fixed cost + total variable cost

2.5.3 Gross return

It refers to the total revenue generated from the sale of the crop produced from a perennial plant, such as coffee trees or vines. It can be calculated by using the following formula (Bhandari et al., 2022):

Gross return (Rs.) = Price of coffee (Rs. Per kg) × Total quantity sold (Kg)

2.5.4 Benefit-cost ratio

The benefit-cost ratio measures the economic viability of an agricultural sector by comparing the gross return to the cost of cultivation, indicating the return on every rupee invested. The benefit-cost analysis was done by using the following formula:

$$\text{Benefit} - \text{cost ratio} = \frac{\sum_{t=1}^{n} \frac{B_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{C_t}{(1+r)^t}}$$

Where,

B_t = Benefit in each year

C_t = Cost in each year

n = Number of years

r = Discount rate

Decision rule:

If B/C ratio is greater than 1, the farm business is consider to be profitable.

If B/C ratio is less than 1, the farm business is consider to be unprofitable.

If B/C ratio is equals to 1, the farm business can neither be consider profitable nor unprofitable (Luitel, 2017).

2.5.5 Net Present Value (NPV)

The net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a specific time frame. It is broadly used in capital budgeting and investment planning to decide which projects are likely to turn the greatest profit. It is simply the net present worth of the cash flow stream.

$$\text{NPV} = \sum_{t=1}^{n} \frac{B_t - C_t}{(1+r)^t}$$

B_t = Benefits from each year

C_t = Costs in each year.

t = Numbers of years

r = Discount rate

Decision rule:

NPV is positive i.e. NPV > 0, accept the project

NPV is negative i.e. NPV < 0, reject the project

NPV is zero i.e. NPV - 0, may accept the project (Bhandari et al., 2022)

2.5.6 Internal rate of return (IRR)

IRR (Internal Rate of Return) is the discount rate that makes a project's net present value zero. It assesses a project's growth potential and helps investors decide whether to invest. High IRR indicates strong growth, while low IRR suggests limited growth. A project is considered profitable and viable if its IRR exceeds the discount rate (Poudel, 2008).

For the calculation of IRR,

IRR = LDR + NPV at LDR /Sum of NPV at LDR and UDR

Where,

LDR = Lower discount rate

UDR = Upper discount rate

2.5.7 Indexing

Farmer's perception on production and marketing problem was analyzed by using indexing technique (Bastola, 2007). Similar technique was also

used to rank the reason for adopting coffee farming. The index of severity or importance can be computed by using equation as (Miah, 1993):

$I = (\sum S_i / f_i)/N$

Where,

I = Index of importance/ severity

∑ = summation

S_i = scale value at i^{th} importance / severity

f_i = frequency of importance/severity given by the respondents.

N = total number of respondents (∑fi)

2.6 SWOT analysis

The strength, weakness, opportunities and threats related to coffee production was analyzed from the group discussion, interview and key informants. SWOT analysis was done at production and marketing level of coffee. Information thus obtained from different actors of coffee production used in SWOT analysis.

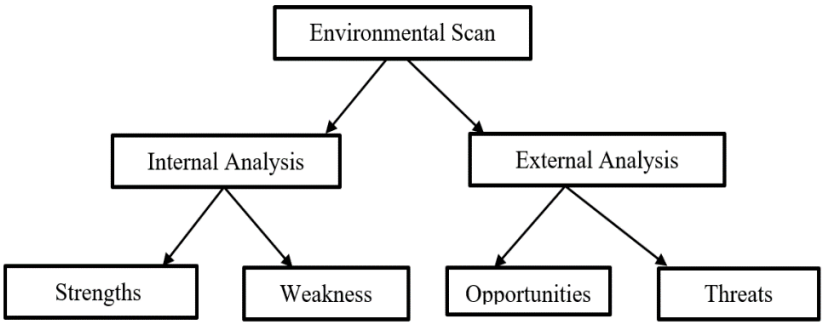

Figure 1: SWOT analysis framework

3. RESULT AND DISCUSSION

3.1 Age and gender of the respondent

With respect to gender, 61.7% of the respondents were male and 38.3% of the respondents were female. The age distribution of the respondents by gender is presented in Table 1. The average age of the male respondent was 45 with maxima 67 and minima 21. Similarly, the average age of female respondent was 36 with range 23 to 67.

Table 1: Age distribution of respondents by gender

Characteristics	Mean	Minimum	Maximum
Male (n=37, 61.7%)	45	21	67
Female(n=23, 38.3%)	36	23	50
Total (N=60)	41.55	21	67

(Source: Field Survey, 2023)

3.2 Ethnicity of the respondent

With respect to ethnicity, majority of the respondents were Aadibashi/ Janajati (60.0%). It was followed by Brahmin/ Chhetri (38.3%), and Dalit (1.7%). The ethnic composition of the sampled HH is presented in Table 2.

Table 2: Ethnic composition of the sampled HH

Ethnicity	Frequency	Percent
Brahmin/ Chhetri	23	38.3
Janajati/ Aadibashi	36	60.0
Dalit	1	1.7
Total	60	100

(Source: Field Survey, 2023)

3.3 Family size

The size of the family and economically active population provides information regarding the availability of labor for farming. Average family size was found to be 5.05 which is higher than national family size average (4.6).

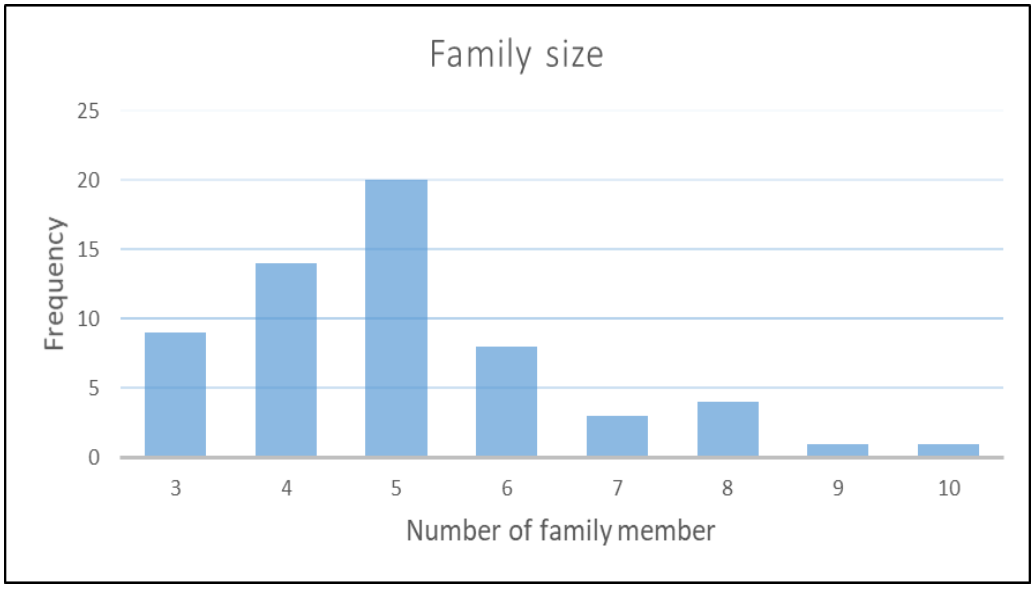

Figure 2: Family size of sampled household (Source: Field Survey, 2023)

3.4 Economically active member

Mean population of economically active male (1.87) was higher than economically active female (1.83) in the study area. The government of Nepal classifies individuals aged 15-59, who have the potential to work, as part of the economically active population (Adhikari et al., 2024). Average economically active population was found to be 3.70.

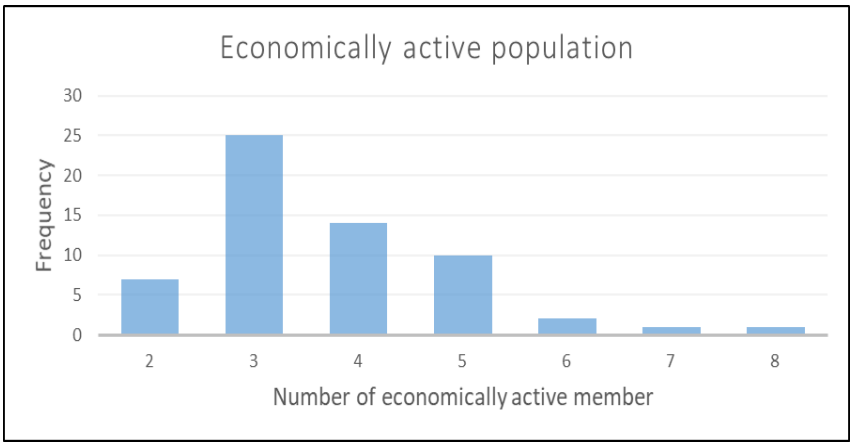

Figure 3: Economically active population of sampled household (Source: Field Survey, 2023)

3.5 Education level

The education level of the respondents is illustrated in the Figure 3. Among them only 16.7 % of the respondents had an education of higher level, 35.0% of the respondents had an education level of secondary Level ,46.7% of respondent had an education level up to primary and remaining 1.7% of respondent had no any formal education status.

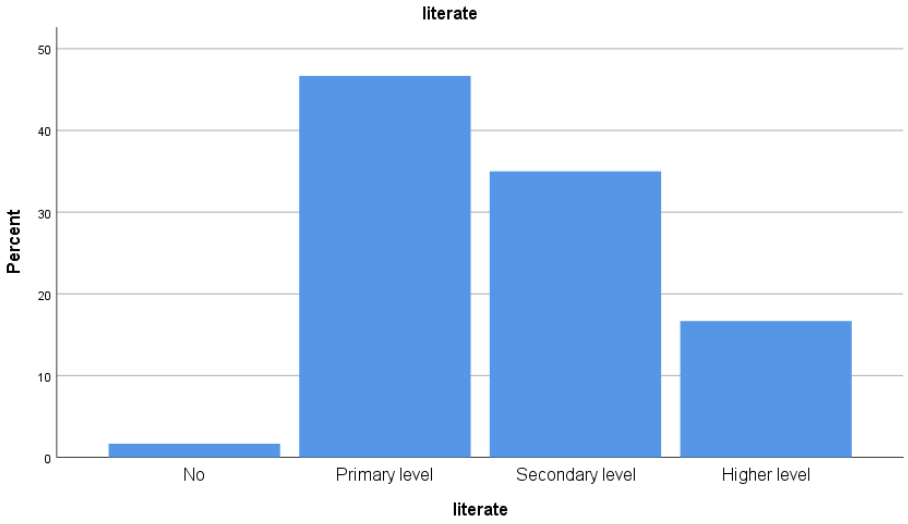

Figure 3: Education level of respondent (Source: Field Survey, 2023)

3.6 Primary occupation of respondents

Occupation of local community people reflect the nature of micro economy of any locality and various commercial, business as well employment opportunity in the area and also determines the well-being of living standard. The Figure 7 reveals that the primary occupation of majority of the farmers in the study area was services and it is followed by agriculture (36.7%).

Figure 4: Primary occupation of respondent (Source: Field Survey, 2023)

3.7 Land holding status of sampled household

In the study area, it was found that on average, respondents owned 13.51 ropani of land. Out of this, on average, 4.98 ropani and 7.52 ropani land was private forest+khoriya and cultivable land respectively. Similarily, 3.07 ropani of land was irrigated, remaining 10.44 ropani of land was rainfed and lastly 2.59 ropani of land was occupied by coffee.

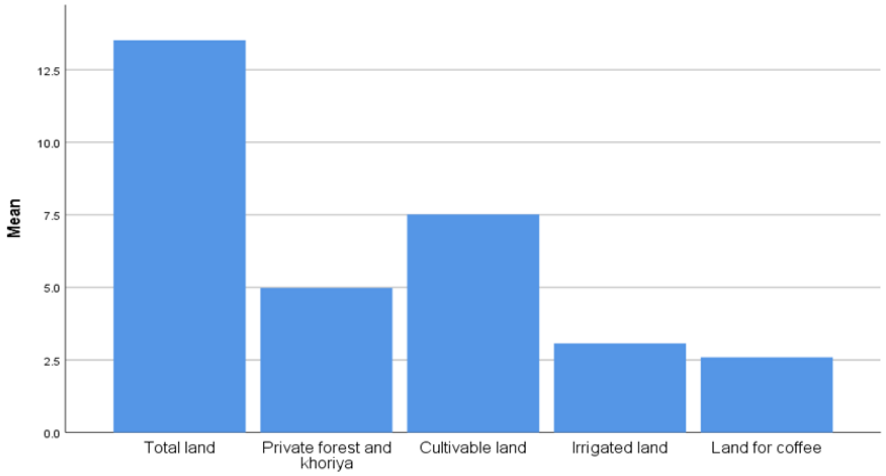

Figure 5: Land holding status of coffee farmer (Source: Field Survey, 2023)

3.8 Type of farming

From table 6, the surveyed participants were involved in different types of farming. Subsistence farming was the most prevalent, with 48 respondents, constituting 60% of the total, indicating their engagement in this form of agriculture. Commercial farming was less common, with 12 respondents (20%).

Table 3: Type of farming adopted by the farmer

	Frequency	Percent
Subsistence	48	80%
Commercial	12	20%
Total	60	100%

(Source: Field Survey, 2023)

3.9 Involvement in farmers' organization

Getting a membership of farmers' organizations influences the production process and marketing of coffee growers. The situation of involvement and the opinion on its usefulness is illustrated in Figure 6. The study revealed that majority of the coffee farmers (58.3%) were involved in farmer's organizations and 36.7 % of the sampled respondents had no membership. Likewise, 5% of the coffee farmers had a membership of both the farmers' group and DCCU. Among the households who had a membership of the Farmer's group, 58.3 % of the respondents opinioned that getting the membership of farmers' organization was helpful since these groups provide them access to credit, tools, and equipment. This organization was also the medium for the coffee farmers for the collective marketing of fresh cherries they produce. In addition to the collection of fresh cherry, some of these organizations have processing facilities at the primary level.

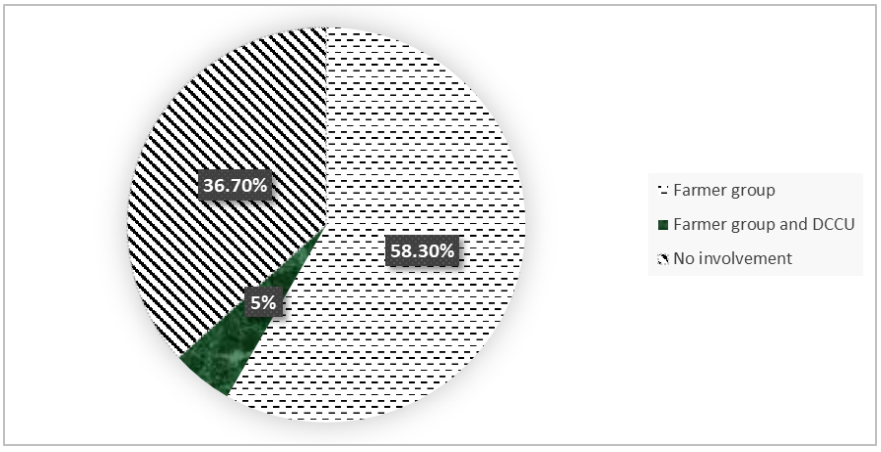

Figure 6: Involvement in Farmer organization (Source: Field Survey, 2023)

3.10 Women's participation in decision making

The status of women's participation in decision-making is illustrated in Table 4. Majority of the household i.e. 55% of male made decision regarding coffee cultivation and 26% of the households, only female made the decision. Similarly, from sampled data, 18% of households, both genders made the decision.

Table 4: Women's participation in decision-making

	Frequency	Percent
Male	33	55.0
Female	16	26.7
Both	11	18.3
Total	60	100.0

(Source: Field Survey, 2023)

3.11 Technical aspects of coffee farmers

3.11.1 Coffee plantation status

Ward number 3 had the highest mean total coffee plants (354), the largest land area for coffee (4.1 ropani), and the highest number of productive coffee plants (115) followed by ward 6 which had 149 coffee plants, 2.0 ropani of land, and a productive bush of 107. This comparison highlights significant variations in coffee plantation characteristics among different wards, with Ward 3 being the most prominent in terms of coffee production.

Table 5: Coffee plantation status in the study area			
Ward number	**Mean coffee plants**	**Mean land in ropani**	**Mean productive plant**
1	104	1.7	98
2	99	1.4	48
3	354	4.1	115
5	113	1.7	91
6	149	2.0	107

(Source: Field Survey, 2023)

3.11.2 Access to training and technical service

The access to training on coffee production and technical service is illustrated in Figure 7. It was clear that 100% of the respondents said that they had received training in coffee production but only 68.3 % of them said that the training is sufficient and remaining of respondents said the training is insufficient.

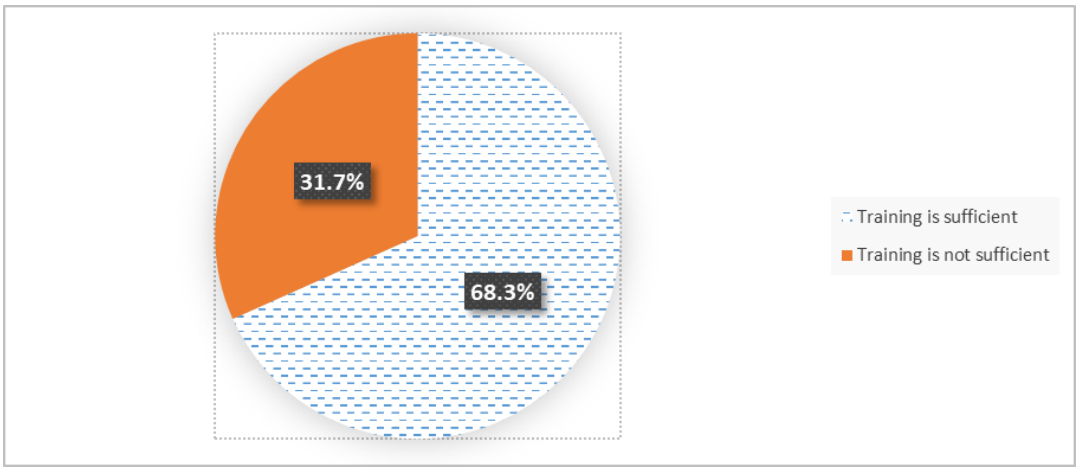

Figure 7: Access to training and technical service (Source: Field Survey, 2023)

3.11.3 Reasons for adopting coffee farming

The reasons for adopting coffee farming are ranked in Table 6. It is clear that the primary reasons for adopting coffee farming is more income compared to cereals with index of 0.843. It was followed by "Neighbours have done this so" and "High demand and high price". Similarly, coffee is the only alternative in the land was ranked fourth which is followed by GO and NGO support.

Table 6: Reasons for adopting coffee farming		
Reasons	**Index**	**Rank**
Only alternative in the land	0.503	IV
GO and NGO support	0.497	V
High demand and high price	0.557	III
More income	0.843	I
Neighbour have done this so	0.600	II

(Source: Field Survey, 2023)

3.11.4 Learned Coffee cultivation

It was found that most people (66.7%) learned farming practices from their family and neighbors. About 28.3% got their knowledge from extension services, while only 5% learned from government and non-government organizations. This showed that informal networks, like family and neighbors, play a big role in teaching farming methods to the surveyed group.

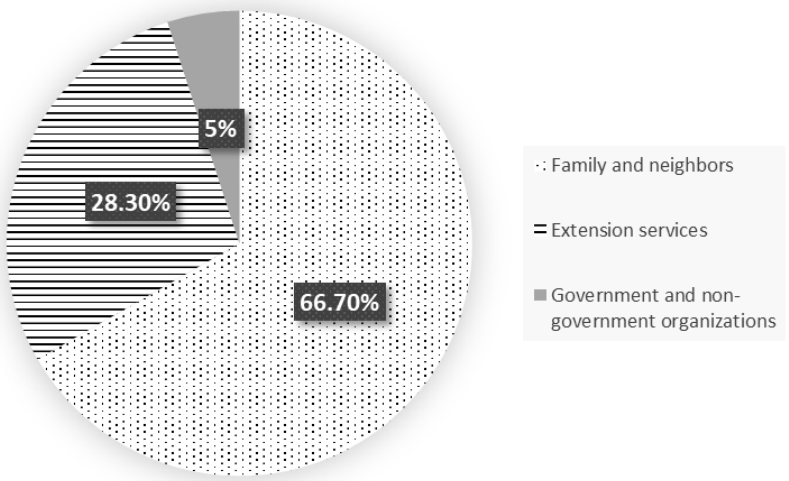

Figure 8: Learned Coffee cultivation (Source: Field Survey, 2023)

3.11.5 Status of mixed cropping with coffee

Majority of respondent farmers i.e. 83.3% practiced mix cropping with Coffee in the study area while remaining i.e. 16.7 % not.

Table 7: Status of mixed cropping with Coffee

Mixed Cropping with Coffee	Frequency	Percent
Yes	50	83.3
No	10	16.7
Total	60	100.0

(Source: Field Survey, 2023)

3.12 Economic analysis of coffee production

3.12.1 Cost of Production

3.12.1.1 Initial Investment

In the case of initial investment, the first-year total cost per hectare amounted to Rs. 74, 621, comprising Rs. 62,270 in fixed costs and Rs. 12,351 in variable costs. In the second year, there was a substantial reduction in costs, with a total of Rs. 27,872 per hectare, breaking down into Rs. 18,977 as fixed costs and Rs. 8,895 as variable costs. Finally, in the third year, the total cost per hectare decreased further to Rs. 24,827 with Rs. 13,813 attributed to fixed costs and Rs. 11, 014 to variable costs. This data provides a clear picture of the project's financial performance, illustrating a trend of decreasing costs over the three years.

Table 8: Initial investment cost for first 3 years

Particulars	1st Year	2nd Year	3rd Year
Variable Cost	Amount (Rs)	Amount (Rs)	Amount (Rs)
Fertilizers and Mustard cake cost	4,806	2,100	2,230
Bordeaux Mixture Cost	1,749	2,295	4,176
Transportation Cost	3,341	2,200	2,486
Miscellaneous Cost	2,455	2,300	2,122
Total Variable Cost	**12,351**	**8,895**	**11,014**
Fixed cost	Amount (Rs)	Amount (Rs)	Amount (Rs)
Layout and land preparation cost	22,088	4,240	3,403
Shade management cost	2,520	2,500	2,300
Seedling cost	33,425	8,000	4,100
Land tax cost	1,237	1,237	1,235
Irrigation canal cost	3,000	3,000	2,775
Total fixed cost	**62,270**	**18,977**	**13,813**
Total cost	**74,621**	**27,872**	**24,827**

(Source: Field Survey, 2023 and author's calculation)

3.12.1.2 Operating Cost

Operating cost per hectare involved in Coffee production from the 4th year to the 15th year is presented in Table 14. Over the 15 years, the total cost shows a varying pattern. The costs start at Rs. 12,535 in the 4th year and gradually escalate, reaching Rs. 49,661 in the 15th year. This trend reflects a steady growth in expenditures over time. After the third year, increased maintenance, nutrient management, disease control, and larger harvests contributed to significantly higher variable costs compared to fixed costs in coffee crop cultivation.

Table 9: Operating cost for the years of fourth to fifteenth

Years	Fixed cost (Rs.)	Variable cost (Rs.)	Total cost (Rs.)
4th	1,966	10,569	12,535
5th	2,123	9,758	11,882
6th	2,304	11,039	13,344
7th	2,900	12,974	15,874
8th	3,132	17,174	20,307
9th	4,007	18,695	22,702
10th	4,367	21,486	25,854
11th	5,417	24,978	30,396
12th	5,905	30,515	36,420
13th	6,896	32,182	39,079
14th	8,179	35,241	43,421
15th	9,637	40,024	49,661

(Source: Field Survey, 2023 and author's calculation)

3.12.2 Total returns

The study revealed coffee started fruiting from the third year; however, the economic returns were witnessed only from the 4th year of orchard establishment. According to the findings, the returns from the coffee went increasing with increasing years and were highest in the 13, 14 and 15 years. It was reported that 15th year onwards the production was decreased. Table 10 showed the returns from the coffee in each year up to the 15 year. Over the course of 15 years, the total returns exhibit substantial growth. Beginning at Rs. 10,225 in the 4th year, the returns consistently increase year by year. By the 15th year, the total returns reach a significant sum of Rs. 2,96,912. This demonstrates a consistent upward trajectory in returns, reflecting a positive trend in the project's financial performance over the years.

Table 10: Total returns from coffee	
Years	**Total returns per ha (Rs.)**
4th	10,225
5th	19,580
6th	37,769
7th	50,780
8th	61,895
9th	70,560
10th	82,556
11th	1,09,727
12th	1,36,001
13th	2,12,819
14th	2,59,728
15th	2,96,912

(Source: Field Survey, 2023)

3.12.3 B:C ratio

The benefit cost ratio obtained was 2.53 that indicates the investment is expected to be highly profitable, with benefits significantly exceeding costs. Although coffee enterprise creates an attractive opportunity, but it requires careful risk assessment and proper management activities to secure enduring success in the long term.

Table 11: Present worth of cost and benefit (to find B:C ratio)				
Years	**Total returns (Rs)**	**Present worth of gross return (Rs.)**	**Total cost (Rs.)**	**Present worth of Cost (Rs.)**
1st	0	0	74,622	74,622
2nd	0	0	27,873	25,339
3rd	0	0	24,828	20,519
4th	10,225	7,919	12,535	9,418
5th	19,580	16,074	11,882	8,115
6th	37,769	28,703	13,344	8,285
7th	50,780	47,447	15,874	8,960
8th	61,895	37,837	20,307	10,420
9th	70,560	39,212	22,702	10,590
10th	82,556	41,708	25,854	10,964
11th	1,09,727	53,667	30,396	11,719
12th	1,36,001	62,470	36,420	12,765
13th	2,12,819	87,324	39,079	12,451
14th	2,59,728	1,02,025	43,421	12,577
15th	2,96,912	1,04,801	49,661	11,434
Total	13,48,557	6,29,192	4,48,804	2,48,186

(Source: Field Survey, 2023 and author's calculation)

3.12.4 Net present value

From the calculation, the NPV was calculated to be Rs. 3,81,005. This positive NPV indicates that the project's expected cash inflows, when discounted to the present, exceed the initial investment or cost of the project, making it a financially favorable undertaking.

3.12.5 Internal rate of return

Table 12 represented a financial analysis of a investment over a 15-year period, with corresponding cash flows for each year. The initial year (Year 1) involves a significant cash outflow of Rs74,622, which was followed by cash outflows in subsequent years, gradually decreasing in magnitude until Year 4. From Year 5 onwards, the cash flows turn positive and continue to increase steadily. The internal rate of return (IRR) calculated was 22.75%.

This analysis suggested that the project initially incurs substantial costs, resulting in negative cash flows. However, the project becomes increasingly profitable starting from Year 5, with positive cash flows exceeding the initial investment. The IRR of 22.75% indicates that the project is expected to generate a return that exceeds the cost of capital, making it an attractive investment. This information is valuable for decision-making and to assess the financial viability of the project over the 15-year period.

Table 12: Cash flows (to find IRR)	
Year	**Cash flows**
1st	-74,622
2nd	-27,873
3rd	-24,828
4th	-2,310
5th	7,697
6th	24,425
7th	34,905
8th	41,588
9th	47,858
10th	56,702
11th	79,331
12th	99,580
13th	1,73,740
14th	2,16,306
15th	2,47,251

(Source: Field Survey, 2023 and author's calculation)

3.12.6 Major production problems

In the context of coffee production, insect pest damage (Rank I, Index 0.92) emerged as the most critical challenge, signifying severe damage to crops. It was closely followed by the importance of irrigation facilities (Rank II, Index 0.79) and technical farming knowledge (Rank III, Index 0.74), which played crucial role in maintaining crop health and productivity. Climate change (Rank IV, Index 0.73) was also a significant concern, affecting coffee cultivation. Challenges related to the quality of inputs (Rank V, Index 0.73, the availability of credit facilities (Rank VII, Index 0.62), and quality seedlings (Rank VIII, Index 0.60) were notable but slightly less severe. Meanwhile, the problems of disease (Rank IX, Index 0.49) and a lack of labor (Rank X, Index 0.47) were comparatively less critical but still noteworthy factors impacting coffee production. These rankings provided valuable insights into the key challenges faced by the industry, highlighting the urgent need to address pest damage and invest in irrigation and technical knowledge.

Table 13: Major production problems		
Production problems	**Index**	**Rank**
Quality seedling unavailability	0.60	VIII
Insect pest damage	0.92	I
problem of disease	0.49	IX
Lack of labor	0.47	X
High wage of labor	0.67	VI
lack of credit facility	0.62	VII
lack of quality input	0.73	V
Irrigation facility	0.79	II
Technical knowledge	0.74	III
Climate change	0.73	IV

(Source: Field Survey, 2023)

3.13 Major marketing problems

The major marketing problem was the low farm gate price (ranked first with an index of 0.83), followed by insufficient processing facilities (ranked second at 0.79), transportation and market inaccessibility

(ranked third at 0.73), delayed payments (ranked fourth at 0.67), and price fluctuation (ranked fifth at 0.653). These findings underscore the key marketing challenges. Meanwhile, it was followed by marketing problem like postharvest loss (VI), insufficient market information (VII), Rejection of crop by trader reasoning low quality (VIII), insufficient storage facility (IX) and presence of middleman (X).

Table 14: Major marketing problem faced by farmers

Marketing problems	Index	Rank
Low farm gate price	0.83	I
Price fluctuation	0.65	V
No timely payment	0.67	IV
Technical knowledge about minimization loss	0.51	VI
Insufficient processing facility	0.79	II
Insufficient storage facility	0.56	IX
Transportation and inaccessable market	0.73	III
Insufficient market information	0.59	VII
Presence of middleman	0.49	X
Rejection of crop by Trader	0.58	VII

(Source: Field Survey, 2023)

3.14 SWOT analysis

Strength	Weakness
• Agro-climatic conditions suitability • Higher returns compared to cereals • Possibility of intercropping with maize and ginger in field • Involvement of cooperatives in marketing • High demand in the international market • Less chance of rejection of crop.	• Poorly developed irrigation facility • Scattered land and small scale production • Lack of timely availability of inputs • Inadequate technical knowledge • Lack of quality seedling • Gestation period of 3-4 years restrain farmers to adopt coffee production. • Perishable nature of fresh cherry giving less than 24 hours for processing.
Opportunity	**Threats**
• Employment opportunities • Suitable market • Utilize fallow, marginal and under-utilized land. • Increasing processing industry within the country • Good price available to the farmers • Government and private sector provide training and service to the farmers	• Seasonal fluctuation of the price • Infestation of new disease and pests • High cost of production. • Climate change

4. Conclusion

Coffee is potential enterprise of Gulmi, having BC ratio greater than one i.e. (2.53), NPV is Rs 3,81,005 and IRR calculated was 22.75%. The rising coffee culture, particularly among urban youth, has led to increasing demand each year. Nevertheless, coffee production isn't keeping pace with this growing demand. Farmers are struggling to achieve modest profits due to the high production costs and declining yields, primarily caused by inadequate irrigation and pest and disease infestations at Satyawati Rural Municipality of Gulmi district.

Suggestions

The research findings have led to the following recommendations:

- Encourage farmers to utilize recommended inputs such as manures, bordeaux mixture, and irrigation for improved coffee cultivation.
- Proper shade management of coffee.
- Provide comprehensive training in harvesting, fermenting, drying, packing, and storage techniques to ensure and uphold coffee quality.
- Facilitate the establishment of robust market extensions that connect farmers with markets and enhance their marketing skills.
- Motivate processors to adopt sound grading and packaging practices to maintain coffee quality.
- Embrace advanced technologies for value addition in coffee processing.
- Conduct thorough market studies to rectify market distortions, disorganization, and ensure fair treatment of producers.
- Expand international trade relationships and streamline marketing channels for smoother coffee exports.
- Introduce measures to enhance pricing transparency within the coffee sector.
- Promote effective collaboration among government agencies and various NGOs and INGOs to ensure the availability of technical support for farmers.
- Take action to certify Nepalese Organic Coffee.
- Focus on building a distinct brand image for Nepalese coffee.
- In the existing areas, density of plantation should be increased in order to increase the productivity along with strategic plans for plant protection against white stem borer and coffee leaf rust.

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