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ORIGINAL RESEARCH ARTICLE

Prospects and constraints of coffee production, processing and marketing in Syangja, Nepal

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ABSTRACT

Coffee is a major plantation cash crop in the mid-hills of Nepal. Syangja is one of the leading districts for coffee production and export in Nepal. This research was aimed at assessing the production potential, processing constraints, and marketing challenges of coffee in the Syangja district. The study was conducted in three rural municipalities of Syangja, namely Arjunchaupari rural municipality, Biruwa rural municipality, and Putalibazar municipality. A total of 120 samples were selected using a mixed sampling technique, combining purposive and random sampling methods. Face-to-face (FtF) interviews were conducted using a pretested semi-structured questionnaire. Data were analysed using the Relative Importance Index (RII) and forced ranking methods. The major production constraint was infestation by white stem borer (RII = 0.846), while improper cherry picking (RII = 0.9) was the most significant processing challenge. In terms of marketing, low profit margins (0.74) and price fluctuations (0.635) were identified as key constraints. Despite challenges, Syangja has strong coffee-growing potential due to its favourable climate and high economic returns. The study highlights that coffee cultivation has strong potential to enhance rural incomes in Syangja, but existing challenges in production, processing, and marketing need to be addressed. Poor government support and inadequate market linkages have resulted in dissatisfaction among farmers. Therefore, integrated interventions, including improved pest management, enhanced processing techniques, and cooperative-based marketing models, should be introduced by the Nepal government to improve the sustainability and profitability of the coffee sector in Syangja.

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INTRODUCTION

The coffee tree (genus *Coffea)*, a tropical evergreen shrub, is a flowering species in the family Rubiaceae. Although there are numerous wild coffee species, *Coffea arabica* (Arabicas) and *Coffea robusta* (Robustas) are the two most widely grown commercial species worldwide (Coffee, 2025). *Coffea arabica* is believed to be the first species of coffee to have been cultivated and is the dominant cultivar, representing about 60% of global production. Robusta coffee beans are in some ways the exact opposite of their more popular counterpart, arabica coffee beans. Robusta grows in low altitudes (sea level to 800 meters) and thrives in warm weather (24-30°C). Arabica grows in higher elevations (greater than 800 meters) and slightly chilly climates (15-24°C) and has twice the caffeine as robusta. Caffeine content of arabica averages between 1.2 and 1.5%, and robusta coffee beans boast an average of 2.2 to 2.7% caffeine, which is almost double the amount. Robusta coffee beans are not only more caffeinated than arabica beans, but they also have a stronger and more naturally bitter flavor (Elmalek, 2025). Coffee is among the most consumed beverages worldwide, which is the major cash crop grown in the mid-hills of Nepal (Coltri *et al.*, 2019). The Nepalese government has recognized coffee as one of the developing crops with the most potential

for export and foreign exchange earnings. Coffee cultivation has been found to provide significantly higher net returns compared to other crops such as maize and millet, with a 4.33 times higher net return for coffee than maize and 3.30 times higher for coffee than millet. Furthermore, coffee cultivation yields 1.87 times higher net returns compared to maize and millet combined, per unit of land, when managed with standard practices. These figures could be further increased if coffee is intercropped with ginger and banana, which serve a dual purpose of providing both fruits and shade. The primary organization in charge of promoting coffee in the nation from the point of production to the point of consumption is the National Tea and Coffee Development Board (NTCDB). The major coffee-producing districts of Nepal are Kavrepalanchok, Gulmi, Nuwakot, Gorkha, Kaski, Syangja, Ilam, Dhankuta, and Lalitpur. The coffee plantation area, production, and productivity of Nepal are 3658.65 ha, 395 mt, and 107.96 kg/ha, respectively. A major portion of coffee exported by Nepal comes from Syangja district, and the plantation area, production, and productivity of Syangja district are 354 ha, 18 mt, and 50.84 kg/ha, respectively (NTCDB, 2023). Syangja district lies at an elevation of 1260.74 meters (4136.29 feet) above sea level. Syangja has a temperate highland tropical climate with dry winters. The district's yearly temperature is 15.45°C (59.81°F) and typically receives about 242.61 millimetres (9.55 inches) of precipitation and has 189.78 rainy days (51.99% of the time) annually (Climate, 2025). The district has two types of climate zones, viz., upper tropical and subtropical, with elevation ranges of 300 to 1000 meters and 1000 to 2000 meters, respectively. This favourable climate, altitude, and soil conditions are well-suited for coffee cultivation, with moderate temperatures, ample rainfall, and mountainous terrain creating ideal conditions for growing high-quality arabica coffee varieties.

Coffee grown in Nepal's rural areas is termed "organic by default" since farmers have limited access to chemical fertilizers, insecticides, and pesticides (Tuladhar & Khanal, 2020). The marketing of Nepali coffee, especially from regions like Syangja, faces obstacles in terms of branding, distribution channels, and competitive pricing. The global coffee market is highly competitive, and Nepali coffee needs to carve out a niche that highlights its unique attributes and quality. Additionally, farmers and producers often lack direct access to lucrative markets, both within and outside Nepal, and are dependent on intermediaries who may diminish their profit margins. There are some studies on coffee production in Nepal, while detailed research focused on the specific challenges and opportunities in Syangja is lacking. Data on the economic impacts of coffee farming, region-specific constraints related to climate, soil, and topography, and the efficacy of existing coffee marketing strategies are sparse and outdated. The objective of this study is to assess the potential and challenges of coffee production, processing, and marketing in Syangja, Nepal. The study aims to evaluate the suitability of agro-climatic conditions, identify key constraints faced by farmers and processors, and analyze market opportunities. It seeks to explore strategies for enhancing productivity, quality, and profitability in the coffee sector.

MATERIALS AND METHODS

Study area

The survey was conducted in one of the major coffee-producing district, i.e., Syangja, Nepal. Syangja, with its headquarters in Putalibazar, covers an area of 1164 km². Syangja lies at about latitude 28°4'60 North and longitude 83°52'0 East. This study was carried out in three rural local levels of Syangja district, namely Arjunchaupari rural municipality, Biruwa rural municipality, and Putalibazar municipality. These municipalities are popular for coffee production, and a major portion of coffee export by Nepal comes from Syangja district.

Sample size, sampling technique, data collection and analysis

The study's target population was the coffee growers in Syangja district. The sampling frame included the top coffee-growing farmers. The DCCUL (District Coffee Cooperative Union Limited) and PMAMP, Syangja profiles were used as guides. In the main coffee-producing local levels (Arjunchaupari village municipality, Biruwa village municipality, and Putalibazar municipality) of Syangja, a household survey was performed. Moreover, a focus group discussion was conducted in a group of 5-10 people from selected sites to generate first-hand information. Altogether, 120 households were selected through a mixed sampling technique (purposively selecting the three local levels on a production basis, followed by samples from ward and municipal levels based on random sampling) for the household survey through a predesigned questionnaire. Sample size was calculated using Raosoft software at a 95% level of significance and 7.5% error, with households being selected on a proportionate basis.

Indexing of production, processing and marketing perception, prospects and constraints

The direction and extreme attitude of responses toward any proposition are provided by scaling approaches. A respondent was asked to select different categories that represented different levels of agreement and disagreement. The categories were scored, and the final score—which was the sum of the category scores—measures the attitude of the respondents. The index of importance was computed by using the following formula (Rooshdi *et al.*, 2018):

$$RII = \Sigma W/(A \times N)$$

Where,

RII= Relative Importance Index

W = Weightage given to each factor by the respondents, which ranges from 1 to 5 (as per Likert's scale). The W is calculated for each factor as W=5×n5 for factor 1, 4×n4 for factor 2, 3×n3 for factor 3, and so on. The highest weight, i.e., 5, is in this case.

A= highest weight i.e., 5 is in this case

N = Total number of respondents

Figure 1. *Flowchart of RII analysis.*

Figure 1 depicts a flowchart for RII analysis. Analysis of index of importance was calculated by the above formula separately with production, processing and marketing perception by the respondents.

Forced ranking/scale of importance was used to rank the problems faced by farmer's processors and traders.

$$I_{imp} = \Sigma S_i F_i / N$$

Where,

I_{imp} = index of importance

S_i = I^{th} scale value

F_i = frequency of i^{th} importance given by the respondents

N = total number of respondents

RESULTS AND DISCUSSION

Characteristics of coffee growers

Out of 120 coffee farming respondents, 62 were male and 58 were female. Table 1 shows that males slightly outnumbered females, with 51.67% of respondents being male and 48.33% being female. This near parity in gender representation highlighted the significant involvement of both men and women in the coffee sector. Khanal *et al.* (2019) found that the gender of the household head has no significant impact on the productivity of coffee. In contrast, Paudel & Parajuli (2020) reported that the gender of the household head had a significant impact on the selection of coffee processing methods. The minimum and maximum members in a family were found to be 3 and 16, respectively. The mean family size of the respondents was 6.68, with a standard deviation of 2.805, which indicated that the typical household in the Syangja district was relatively large. On average, each household had 4.37 economically active members, with a standard deviation of 2.176, which showed a significant portion of family members were involved in economic activities, which likely contributed to the family's livelihood. The average number of dependent members (e.g., children, elderly) per family was 2.08. This reflects that the economically active members must support these economically non-active members. The average dependency ratio was 0.64, with a standard deviation of 0.63. The minimum and maximum ages of respondents involved in coffee production were found to be 21 years and 94 years, respectively, with an average age of 56.5 and a standard deviation of 13.9. Table 1 illustrates that the majority of the respondents (60%) fall within the 51-75 age group, indicating that coffee-related activities were largely carried out by middle-aged to elderly individuals, while only 2.5% were under 25 years, demonstrating a relatively low engagement from the youngest demographic. The largest group of respondents (28.33%) had an education level up to grade 5, while 21.67% were illiterate and only 7.5% had completed a bachelor's degree or higher. The smallest group (3.33%) consisted of respondents with higher secondary (Plus 2) education. Among 120 respondents, 87.5% were involved in cooperatives, and the rest of the 12.5% were not involved in cooperatives. Those farmers who were in different cooperatives were also involved in different trainings and campaigns. Paudel & Parajuli (2020) reported that the level of education significantly influenced the selection of coffee processing methods.

Table 1. Characteristics of coffee growers in Syangja district, Nepal (Survey, 2024).

Respondents	Average number of members	Percentage
Male respondents	62	51.66
Female respondents	58	58.33
Economically active population	4.37	
Economically dependent population	2.08	
Family size	6.68	
Age group		
1-25	3	2.5
25-50	39	32.5
50-75	72	60
75-100	6	5
Level of Education		
Illiterate	26	21.66
literate	15	12.50
Up to 5	34	28.33
Up to 8	9	7.50
SLC	23	19.16
Plus 2	4	3.33
Bachelors & above	9	7.50
Involved in cooperative	105	87.5
Not involved in cooperative	15	12.5

Prospects of coffee production

Table 2 represents the respondents perceptions of commercial coffee farming in Syangja district. The majority of respondents (88 out of 120) rated the climatic conditions for coffee farming as "very good," suggesting that the climate in Syangja district is highly suitable for commercial coffee farming. Only 8 respondents rated it as "not good." The government status received more negative feedback compared to the others. While 64 respondents rated the government's support or policies as "good," 23 rated it "satisfactory," and 18 as "not good." Only a small number (15) rated it as "very good." This suggested that the government's role in supporting commercial coffee farming was perceived as the least favorable aspect. The majority of respondents (61.7%) had a positive outlook on the potential for commercial coffee farming in Syangja district, with most rating it as either "very good" or "good," as shown in Figure 2. The small number of respondents with a "satisfactory" rating suggested that there may be isolated concerns but overall confidence in the growth of commercial coffee farming, supported by factors like climatic suitability and market. The results are consistent with the findings of Paudel *et al.* (2021), who reported coffee grown at this altitude under shade management exhibits superior quality.

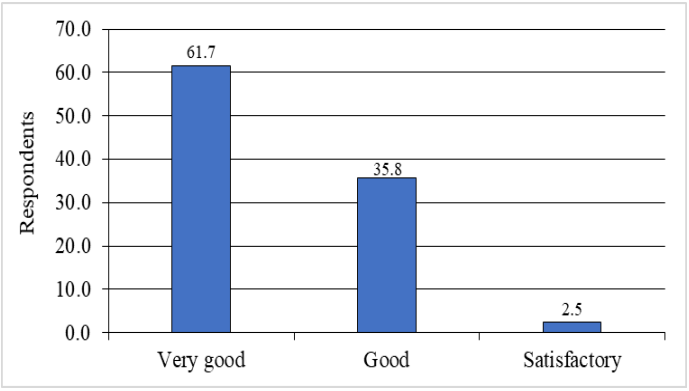

Figure 2. *Potential of commercial coffee farming in Syangja, Nepal.*

Constraints in coffee production

Out of several problems faced by coffee farmers in the study area, five major problems were identified and ranked as shown in Table 3. Infestation by the white stem borer emerged as the most significant problem, with the highest index score (0.846), which indicated that the insect pest had caused severe damage to coffee plants and was a major threat to coffee production. The issue of high initial investment ranked the lowest (0.361) among the identified problems, suggesting that it was not the most pressing concern for farmers in the district. Similar results were reported by Tadesse *et al.* (2020), concluding that pest infestation is the major problem in the production of coffee.

Constraints in coffee processing

In the overall processing of the coffee cherry, major problems were identified, such as improper picking (unripe cherry or over-ripe cherry), unpredictable weather leading to problems in the open drying of pulped coffee (parchment to be), scarcity of water, water storage problems, and delay in cherry transport from farmers' fields to collection centres to the pulping unit, leading to untimely fermentation of harvested cherries, which deteriorated the aroma and flavor of the coffee being processed. Also, climate change had brought changes in flowering time, harvesting time, and processing of coffee. Five major problems were identified by Focus Group Discussion and were ranked by using the Forced Ranking Method, as represented in Table 4. Improper picking of coffee cherries ranked as the most significant issue, with an index score of 0.9, and the least severe issue was human resource scarcity. These results align with the findings of Paudel & Parajuli (2020), who also reported that harvesting cherries at an improper stage is the major constraint in the processing of coffee.

Table 2. Perception regarding commercial coffee farming (Survey, 2024).

Statement	Very good	Good	Satisfactory	Not good	Total	Index	Rank
Climatic suitability	88	19	5	8	120	0.360	I (Very good)
Potential economic status	69	46	2	3	120	0.372	III (Satisfactory)
Government status	15	64	23	18	120	0.591	IV (Not good)
Market demand	70	46	4	0	120	0.362	II (Good)

Table 3. Production constraints of coffee in Syangja district, Nepal (Survey, 2024).

S. No.	Problem	Index score	Rank
1	High initial investment	0.361	V*
2	Damage due to infestation of white stem borer	0.846	I**
3	Poor irrigation facility	0.765	II
4	Limited technical knowledge	0.705	III
5	Unavailability of man power	0.523	IV

Table 4. Processing constraints of coffee in Syangja district, Nepal (Survey, 2024).

Problems	Index score	Rank
Improper Picking	0.90	I**
Weather change	0.70	II
Water storage problem	0.65	III
Cherry transportation	0.55	IV
Human resource scarcity	0.45	V*

Steps to ensure the quality of coffee

The 4 processors ensured the following steps to maintain the quality of coffee.

- Training to coffee farmers about harvesting technique.
- Proper altitude recommendation.
- Disease and pest control awareness.
- Harvested cherry reached to processing unit within 12-24 hrs.
- Grading of ripe cherry.
- Water floatation.

Marketing constraints of coffee

In terms of marketing constraints for coffee in Syangja district, low profit emerged as the most significant issue, with a score of 0.74 as displayed in Table 5, indicating that stakeholders struggled to make substantial returns on their coffee production. Price fluctuations (0.635) further added to the financial instability, making it difficult for farmers to predict and plan for income. Unavailability of human resources (0.56) also ranked high, affecting the timely harvesting and processing of coffee for market. Other constraints include inadequate coffee supply (0.53), which limited the quantity available for sale, and lack of storage facilities (0.455), which increased post-harvest losses. Transportation problems (0.385) and low demand (0.35) were less severe issues but still affected the overall efficiency and profitability of coffee marketing in the region. Addressing these constraints could significantly improve the commercial viability of coffee farming. Bhandari *et al.* (2022) also reported that, low market prices have been identified as a major marketing problem, affecting farmers' income and discouraging investment in coffee production.

Potential market places and marketing channel for Syangja's coffee

Syangja's coffee has various potential marketplaces both domestically and internationally. Roasted beans are primarily sold within Nepal, while green beans are exported. Key domestic markets for Syangja's coffee include Pokhara, Butwal, Kathmandu, and Nepalgunj, where there is a growing demand for high-quality coffee. Additionally, the export of green beans to Japan presents a significant opportunity for expanding the market and increasing the global reach of Syangja's coffee. The marketing channels for coffee in Syangja district demonstrate varying levels of complexity, with three distinct pathways (Figure 3). Results of this study are in accordance with Paudel *et al.* (2021), who also reported the marketing channel of coffee in Nepal.

Table 5. Marketing constraints of coffee in Syangja district, Nepal (Survey, 2024).

Problems	Score value	Rank
Low profit	0.740	I**
Price fluctuation	0.635	II
Unavailability of human resources	0.560	III
Inadequate Coffee supply	0.530	IV
Lack of storage facility	0.455	V
Transportation problem	0.385	VI
Low demand	0.350	VII*

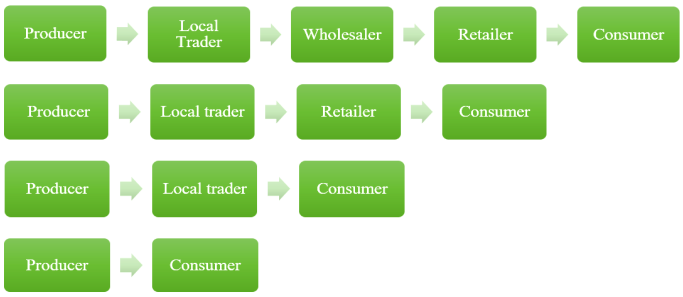

Figure 3. *The marketing channels for coffee in Syangja district demonstrate varying levels of complexity, with three distinct pathways.*

Conclusion

The study highlights the key characteristics, opportunities, and challenges associated with coffee production in the Syangja district. Coffee farming in the region involves both men and women, with a relatively large household size contributing to economic activities. The favourable climatic conditions make Syangja a suitable region for commercial coffee cultivation, and the majority of farmers hold a positive outlook on its potential. However, several constraints hinder coffee production and processing, with pest infestation, improper cherry picking, unpredictable weather, and limited water availability emerging as major concerns. Additionally, marketing constraints such as low profit margins, price fluctuations, and inadequate human resources further impact the sector's growth. Despite these challenges, Syangja's coffee holds strong market potential, both domestically in cities like Pokhara, Butwal, Kathmandu, and Nepalgunj, and internationally, particularly in Japan. Addressing production, processing, and marketing constraints through government support, farmer training, infrastructure development, and pest management strategies will be crucial in enhancing the sustainability and profitability of coffee farming in the region. Future research should focus on integrated pest management strategies, climate resilience in coffee farming, post-harvest handling and quality enhancement, market expansion and value addition, government policy and support mechanisms, and labour availability and mechanization. Investigating these areas will help develop effective solutions to existing challenges, ensuring the long-term growth and competitiveness of Syangja's coffee industry.

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DECLARATIONS

Authors contribution statement

Conceptualization: B.S. and B.M.; Methodology: B.S.; Software and validation: B.S. and B.M.; Formal analysis and investigation: B.S. and B.M.; Resources: B.S. and B.M.; Data curation: B.S.; Writing—original draft preparation: B.S.; Writing—review and editing: B.S. and B.M.; Visualization: B.S.; Supervision: B.S.; Project administration: B.S.; Funding acquisition: B.S. All authors have read and agreed to the published version of the manuscript.

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