

RESEARCH ARTICLE

ECONOMIC ANALYSIS OF TEA FARMING IN JHAPA DISTRICT, NEPAL.

Suraj Dhakal

Institute of Agriculture and Animal Science, Tribhuvan University, Kathmandu, Nepal.

*Corresponding Author Email: surajeetdhakal19@gmail.com

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ABSTRACT

Tea, one of the biggest high-value exports from Nepal, which uses up 16,920 hectares of total land and accounts for 0.1% of the country's GDP. Tea as usually cultivated in the eastern regions of the nation, has significantly altered peoples' livelihoods while also boosting national income. This study was conducted on the economic analysis of tea production by farmers in Jhapa district of Nepal on parts of Bhadrapur, Haldibari and Kachankawal. Random survey of 60 samples were taken from the research area's tea farmers. The average area under tea cultivation was found to be 0.53 hectares per household. The average production per hectare was 23.05 tons, average production cost per hectare was Rs. 244,743.82 and Rs. 10.23 per kg. There were overall chances of 5% loss of the harvested tea leaves which deducted total marketable leaves. The average price of 1 kg of leaves was Rs. 19.5 and the marketing practice was done via middlemen which cost Rs. 2.5 per kg of leaves. The average gross margin per kg was Rs. 6.73 with overall benefit-cost ratio of 1.86 for every household. SWOT analysis conducted showed that favourable soil conditions had major strength with index of importance of 0.85. Likewise, difficulties in obtaining subsidies, family financial aid and market competition from private estates were major weakness, opportunity, and threat with index of 0.88, 0.85, and 0.90 respectively.

KEYWORDS

GDP, Benefit-cost ratio, Gross margin, SWOT analysis

1. INTRODUCTION

Tea is a fragrant beverage that is commonly prepared by pouring hot or boiling water over the dried leaves of the Asian evergreen shrub (bush) *Camellia sinensis*. There are several unique types of tea, such as Darjeeling and Chinese greens, which have a cooling, slightly astringent flavour. Tea plants are native to East Asia, with *Camellia sinensis* var. *sinensis* predominating at lower elevations, whereas *Camellia sinensis* var. *assamica* thrives at higher altitudes.

Camellia sinensis var. *pubilimba* is indigenous to Yunnan region in China. Tea production first began in ancient China, where basic processing procedures were used to prepare the hand-picked tea leaves. Today, tea is grown in more than 30 different countries, and the leaves are collected by machines and processed using cutting-edge technology. More than three billion people regularly drink tea, which can be flavoured with herbs, spices, and fruits and is consumed hot or iced.

In Nepal, tea is mostly grown in the country's mountainous areas. The hills of eastern part of countries are very famous for tea farming. Jhapa is the district with highest production. Ilam, Terathum, Panchthar, Dhankuta, Shankhuwasabha, Bhojpur, Khotang, etc. are the major tea producing districts through the country. These areas are ideally suited for growing tea due to their climate and soil. As Nepal is a landlocked nation in southern Asia between China's Tibet Autonomous Region and India. It has a population of around 27 million people and a land area of 147,516 km² (56,956 sq. mi). Eight of the ten tallest mountains in the world, including Mount Everest, are found in Nepal, along with fertile plains, sub-alpine wooded slopes, temperate hills and tropical plains. The Himalayas, the Hilly, and the Terai are the three topographical divisions of Nepal. 64% of

Nepal's land area is made up of the Himalayas. From the warm climate of the Terai area to the alpine environment of the Himalayas, Nepal features a wide variety of climates. The five seasons that Nepal encounters are winter, spring, summer, monsoon and autumn.

The Gross Domestic Product (GDP) of Nepal for the fiscal year 2020/21 was expected to be Rs. 1,251 billion. Preliminary projections from CBS indicate that Nepal's GDP will increase at a pace of 4.0 percent in 2020/21 as opposed to -2.1 percent in 2019-20. The agriculture industry grew by 2.6 percent during the review year as opposed to 2.23 percent growth in 2019/20. In contrast, the non-agricultural sector contracted by 4.57 percent in 2019/20, compared to a rise of 3.91 percent the previous year. Non- agriculture industry sector growth was 5.05 percent, while service sector growth was 4.43 percent. Their respective growth rates in 2019/20 were -3.69 percent and -3.97 percent. (Nepal Rastra Bank, FSR- 2020/21).

Approximately 21.32 percent of Nepal's GDP and more than 60 percent of the labour force are devoted to the agricultural industry. Over the past ten years, the agriculture industry in Nepal has expanded at an average annual rate of 3.5 percent. From 42% of GDP in the early 1990s to 21.32% in last year of 2020/21, the sector's share has decreased. However, at about 60%, the sector's employment share has remained mostly steady. The outbreak of COVID-19 pandemic in 2019 and 2020 devastated the economy and caused slower growth than usual. The country's declining AGDP is also primarily caused by migration to urban areas, the exodus of young workers to other countries, and a lack of technological advancement.

Tea is one of Nepal's main high-value exports, adding 0.1% to the national gross domestic product (Tiwari *et al.*, 2018). According to figures from the National Tea and Coffee Development Board (NTCDB), over 15,000 of Nepal's tea growers are smallholders, and their work has been essential to

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the development of the country's tea sector. A total of 70,000 individuals, mostly rural women, work both directly and indirectly in this business (ITC, 2017).

The first tea plantation in Nepal was started in the year 1863 by Mr. Gajraj Singh Thapa, the 'Badahakim' (Chief Administrator) of Ilam. It is reported that the flavour of the tea and the enthralling beauty of Darjeeling's tea gardens really captivated him. He then forced the locals to work alongside the Darjeeling tea technologists on the tea estate. In the year 1865, he continued his work by growing tea in Ilam and Saktim (Rai, 2008).

History demonstrates that Nepal began commercializing tea in the latter half of the 20th century. Budhakaran Tea Estate began the first commercial tea cultivation in Jhapa, and Nepal Tea Development Corporation (NTDC) built the first tea processing factory there in 1978, according to NTCDB. The five districts of Jhapa, Ilam, Panchthar, Dhankuta, and Terathum in eastern Nepal were designated as tea zones by the Nepali government in 1982 (Baral, 2019). The National Tea and Coffee Development Board (NTCDB) was founded in 1993 with the goal of advancing the tea and coffee industries through technical assistance, the creation of policies, and their execution. To assist the growth of the tea industry, the National Tea Policy was developed in 2000. In 2002, the government agreed and enacted it.

Nepal is the home of the two types of tea: *Camellia sinensis var. assamica* and *Camellia sinensis var. sinensis*. For the purpose of producing CTC tea, many cultivars of *Camellia sinensis var. assamica* are produced in the Terai area below 500 masl. Similar to this, *Camellia sinensis var. sinensis* is grown in mountainous locations over 800 masl and is notably suited for creating orthodox tea. Crushing, ripping, and curling are used to reduce CTC tea into tiny granules. Orthodox tea is commonly consumed with milk and is prepared by removing the bud and one to three higher succulent leaves, withering, rolling, oxidation, drying, grading, and packing. Small processors in outlying locations also practice handcrafted orthodox tea (Baral, 2019). Therefore, orthodox tea is the type of tea that is most frequently produced in Nepal. It has a very strong market in Nepal and the nearby countries as well as being exported to nations like Japan, Germany, the United States, Canada, and others.

According to the data, in the fiscal year 2020/21, the number of tea estates throughout the country was 146 and the number of small farmers was estimated to 14039. The total area of production was 16920 hectares and the total tea production was 23,745.901 tons. In that of, production of CTC tea was 15,654.1 tons, orthodox tea was produced upto 7,168.255 tons and green tea of 772.455 tons was produced. About 11,920.74 tons of tea were exported in the most recent fiscal year, which is a sizable quantity (NTCDB, 2020/21). Therefore, over 50% of the overall production was exported. This demonstrates the market potential and demand for tea from Nepal.

So, tea cultivation just gradually began to increase in the decades of 1990s. With the use of more land areas, productivity has just lately begun to increase. The COVID-19 pandemic in 2020–21 disrupted the upward trend since output in 2019 exceeded to 25 thousand tons, falling short of the trend of 24 thousand tons in the last year of 2020. Both production and cultivation trends are on the rise. According to FAO, people appear to be growing tea on more land than was previously reported.

The economics of orthodox tea production in Nepal were investigated, and it was discovered that the cost of production changes depending on the volume of production and location (Tiwari *et al.*, 2017). Costs associated with labour can be decreased by technology and mechanization, which also increases productivity. Though it is challenging to develop and manage a tea farm in Nepal because of a lack of government assistance and infrastructure (Poudyal, 2011).

The warm, humid climate, rainfall, acidic soil, and extended hours of sunlight make Nepal's eastern area ideal for tea production. Additionally, it guards against organic matter, fertility, vegetation, soil erosion, floods, and landslides on the mountainous slope (Poudyal, 2011). Tea plantations produce vegetation that aids in environmental preservation and maintenance and lessens soil erosion brought on by deforestation. Tea bushes have extensive roots that reach deep into the ground, preventing soil erosion and land-slide issues. It makes sense to grow tea on fallow ground or steep slopes to maintain the soil's natural properties (NEAT, 2011).

The Nepalese tea industry offers economic advantages such as self-employment, branding and commercialization, export possibilities, foreign exchange, infrastructural development, and revenue production. Good training programs, input accessibility, price, standardization, and

market accessibility support young employees and entrepreneurs, enhance people's quality of life, and address unemployment issues. Exporting tea is a lucrative approach to reduce trade imbalances and generate foreign money (Poudyal, 2011). The commercialization of tea supports environmental protection, a reduction in urban migration, the growth of ecotourism, academic research, and leisure activities. Investments made by the government in modern machinery, skilled labour, training programs, hospitals, commercial spaces, and roadways are also profitable.

On the other hand, due to its therapeutic, wellness, and fitness benefits, tea is quite popular. It is thought to be anti-influenza, anti-obesity, regulates hypertension, and lowers blood sugar. Studies have indicated that it protects against substances that cause cancer and cretinism (Rai, 2008), green tea and organic tea are in high demand. These topographic traits of Nepal's plains and steep slope can accommodate the expanding organic industry (Adhikari *et al.*, 2017).

This study looks at how socioeconomic status affects the production of tea, how it alters social and economic conditions, and how it alters regional patterns. It intends to close the knowledge gap and evaluate the benefits-cost ratio of the production analysis, market conditions, constraints, and available solutions in the Jhapa district. Farmers will be able to assess the sector's advantages, disadvantages, possibilities, and threats as well as production costs, profit margins, and their role in the tea industry.

2. LITERATURE REVIEW

That in their study discovered that since export markets need certification, orthodox tea that has been certified is more expensive across the value chain (Adhikari *et al.*, 2017). Small-scale farmers' livelihoods must be improved, and this requires revising the value chain and promoting it through recognized market channels. In order to simplify the value chain for Nepal's certified orthodox tea, government institutions may also need to supervise and evaluate third-party certification schemes.

As a reported that the market for tea in Nepal has experienced rapid growth over the past 20 years, but Nepalese tea companies are unable to compete due to barriers such as low production and productivity, inefficient resource use, low economies of scale, lack of entrepreneurship skills, subpar service providers, lack of market infrastructure, disorganized supply chain system, limited access to the global market, and insufficient government support programs (Baral, 2019). The industry is financially viable and commercially successful due to its high output and market potential, minimal risk of product displacement, and competitive advantages.

Reported that the amount of land used for tea cultivation and production is on the rise, with CTC being the most popular variety (Kalauni, 2020). The Nepalese tea export industry is doing well, and India is a major market for tea produced in Nepal. To increase output per unit of land, the government should improve domestic tea estates' status and provide extension services to help tea producers improve their methods of cultivation and management.

Has a found that local institutions and training are essential for the switch to organic cultivation. However, the majority of tea producers in Nepal lack access to financing and cannot afford the additional inputs needed for organic production methods (Karki *et al.*, 2011). To address this issue, saving and credit groups should be encouraged and supported. Raising knowledge about the growing demand for organic food and the advantages of organic agriculture are key drivers of farmers' decision to engage in organic farming.

Also concluded that tea is a viable agricultural crop that offers locals good employment opportunities in the farming, processing, and marketing sectors (Poudel, 2010). Exporting produced tea to India and other countries now has a strong potential to create foreign cash. Tea farming provides year-round greenery for the landscape, regulates soil erosion, lowers carbon emissions, and aids in maintaining the alpine ecosystem. The tea gardens on top of the hills offer a wealth of scenic beauty, draw both domestic and international tourists, and contribute to indirect tourism revenue generation.

Reported that every villager in Nepal's eastern region owns a tea crop (Poudyal, 2011). However, farmers face issues with transportation, finances, unstable legislation, and technological issues. Over the study period, both the private sector and smallholder sectors' tea productivity increased, with the latter sector's productivity rate being higher than the former. Jhapa district is first in tea production and plantation area in the garden sector, while the smallholder sector is second in plantation area.

To explained that both Orthodox and CTC teas are grown in Nepal, with the majority of CTC production going towards domestic demand (Rimal, 2009). The expansion of the tea industry on a worldwide scale may be possible due to the uptick in output and exports. However, the Nepalese tea business is experiencing a lack of modern, adequate equipment, technical human resources, and lab facilities. Greater manufacturing of the desired grade has a significant chance of expanding the export market.

It has a concluded that green leaf orthodox tea cultivation makes a substantial contribution to rural people's household economies (Tiwari *et al.*, 2017). Large rural populations in our nation may now start their own businesses. The study suggested that traditional orthodox tea manufacturing may become a more effective way to combat poverty in Nepal's eastern mid-hills region and would help the nation gain recognition abroad by exporting orthodox tea with its name or emblem.

3. METHODOLOGY

3.1 Site Selection



Figure 1: Jhapa district in map of Nepal in 2015.

The small tea growers in Nepal's Jhapa area were surveyed for this "Economic Analysis of Tea Farming in Jhapa District, Nepal" study. In Province No. 1's Terai area, Jhapa is the country's far-east or south-east district. The district coordinates as latitude 26°38'01.68" north, longitude 87°59'25.80" east. Lowest elevation point is 58 m and highest elevation point is 500 masl. The highest recorded temperature is 42 °C in the summer and 10 °C in the winter. Loam makes up the majority of the local soil types. Other types of soil in the region include sandy loam, silty loam, and silty clay loam. Critically little phosphorus is present in the soil. The pH of soil typically varies between 4.6 and 7.89. Particularly, the research area's pH and soil moisture were determined to be somewhat acidic, at 30 centibars respectively. The survey was conducted over the farmers of Bhadrapur, Haldibari and Kachankawal area where tea farming is done by small farmers in household level.

3.2 Sample Design, Data Collection Procedures and Sources

The most important details in this text are that an interview schedule was created, pre-tested on 5 households, and a questionnaire was used to conduct a study of small farmers in the Jhapa area. A questionnaire was used to gather demographic information, annual cost of production of tea per household, economic structure of tea farmers, marketing infrastructure, institutional infrastructure, and production statistics. Secondary data was reviewed by the NTCDB, World Bank, FAO, International Trade Centre, Nepal Rastra Bank, and numerous published publications and journals. An interview with Tea Board stakeholders was also conducted to better clarify and verify the accuracy of the information acquired.

3.3 Sample Size

The survey was conducted among small farmers of Jhapa. Around 60 samples from the household of tea farmers were taken for further interpretation of the acquired data.

3.4 Data Analysis

The data from the field survey was collected, tabulated, and analysed using Microsoft Office Excel 2019. Descriptive statistics were used to analyse the respondents' socioeconomic characteristics, including percentages, frequency tables, charts, diagrams, and maps. Different analytical approaches and formulas were used to perform the economic research of the tea to calculate the final B/C ratio of tea farming households are given below:

- Total cost of production: Cost of production is the total of all expenses incurred by the business during the production process (Shephard, 2015). Total cost (TC) is the sum of all costs, both fixed and variable. Total variable costs (TVC) are expenses that change daily in accordance with the farm's capacity and production conditions. The variable costs are cost of labour, inputs, irrigation, water requirements, marketing costs etc. The costs associated with machineries and tools, land rent, asset depreciation, auditing, taxes are considered fixed costs (TFC).

$$\text{Total production cost} = \text{Total variable cost (TVC)} + \text{Total fixed cost (TFC)}$$

- Total production: It is the total quantity of tea produced annually.

$$\text{Total quantity production} = \text{Area} \times \text{Total quantity produced per hectare}$$

- Gross revenue: The sum of the tea's total quantity and unit price is the entire income (gross revenue).

$$\text{Gross revenue} = \text{Price} \times \text{Total quantity sold}$$

- Gross margin: The difference between an enterprise's gross return and its entire production costs is known as the gross margin (Holland, 1998). The gross margin is a quick and easy way to evaluate a farm business. Greater profitability is represented by the higher gross margin.

$$\text{Gross margin} = \text{Gross returns} - (\text{Total production cost} - \text{Marketing cost})$$

- Benefit-cost analysis: Benefit-cost analysis is a ratio that is calculated by dividing the present value of the benefit stream's gross return by the present value of the cost stream's overall cost (Marglin, 2016). The total of variable and fixed expenses is the cost of production. It displays the financial return on investment. The better the investment, the greater the BC ratio.

$$\frac{B}{C} \text{ ratio} = \frac{\text{Gross returns}}{\text{Total production cost}}$$

3.5 Strengths, weaknesses, opportunities and threats (SWOT) analysis

Understanding strengths, weaknesses, opportunities, and threats is possible through a SWOT analysis. The main goal of a SWOT analysis is to assist enterprises in fully understanding all the variables that go into choosing a course of action. The SWOT analysis entails choosing an objective and identifying internal and external elements that are helpful and detrimental in achieving that target. The external analysis helps a firm to match its strategies with the business environment, while the internal analysis identifies resources that need to be upgraded (Gürel, 2017).

SWOT analysis was done by indexing technique where degree of attitude of respondents were scaled by 5 points scales i.e., very high, high, medium, low & very low with points 1, 0.8, 0.6, 0.4 & 0.2 respectively. Then the index of importance was computed by using the following formula (Jurevicius, 2022).

$$I = \frac{\sum(S_i * F_i)}{N}$$

where,

I = index of importance,

S_i = scale value

F_i = frequency of importance given by respondents

N = total no. of respondents

Then, preference ranking was done for every parameter according to the calculated index of importance.

4. RESULTS AND DISCUSSIONS

4.1 Descriptive Statistics

The total of 60 households were surveyed in the area of Haldibari Municipality, Bhadrapur Municipality and Kachankawal Rural Municipality of Jhapa district of east Nepal. The tables below illustrate the different demographic data that were included in the field survey. According to Table 1, the majority of household heads i.e., 75% who were engaged in tea cultivation were between the ages of 46 and 60. Few were older than 60 i.e., 6.67%.

Table 1: Age groups of tea farming household heads (n=60).

| Age group of household head | Percentage (%) |
|-----------------------------|----------------|
| 30-45 years | 18.33 |
| 46-60 years | 75 |
| 60 above | 6.67 |

Likewise, there were majority of male members as household head of the tea farming families around the study area. There were 78.33% male and 21.67% female as household head as shown in the Table 2 below.

Table 2: Gender of the tea farming households (n=60).

| Gender of household head | Percentage (%) |
|--------------------------|----------------|
| Male | 78.33 |
| Female | 21.67 |

There were no illiterate household head in the surveyed samples in the study area. Thus, majority of them were educated upto certificate level i.e., 55%. 40% have acquired secondary level education while 5% only have finished higher level education as in Table 3.

Table 3: Literacy of the tea farming households (n=60).

| Education of household head | Percentage (%) |
|-----------------------------|----------------|
| Primary | 55 |
| Secondary | 40 |
| Higher | 5 |

Few or 6.67% of the households in the region had land area of 0.5-0.75 hectares, although most have between 0.2 and 0.5 hectares for growing tea. As seen in Table 4, 28.89% of the household own 0.75 - 1 hectare of land for tea growing. The farmers themselves were the owners of the land used for tea growing. Over the study area, none of the farmers leased any type of land for the production of tea.

Table 4: Area (in hectares) of the tea farm (n=60).

| Area (ha) of tea farming | Percentage (%) |
|--------------------------|----------------|
| 0.25 - 0.5 ha | 64.44 |
| 0.5 - 0.75 ha | 6.67 |
| 0.75 - 1 ha | 28.89 |
| More than 1 ha | 18.18 |

Discussing on the experience on tea farming, many of them i.e., 68.33% of the surveyed households had experience of tea farming of more than 60 years.

Table 5: Experience of the tea farming households (n=60).

| Experience in tea farming | Percentage (%) |
|---------------------------|----------------|
| Less than 15 years | 31.67 |
| More than 15 years | 68.33 |

The study area had all household heads engaged in farming and tea production, with none of them working in other professions. There were not many farmers who received training from local agriculture cooperatives, leading to traditional farming and harvesting methods.

4.2 Production Practices

15-18 times a year, labour was used to collect the leaves. The area's peak harvesting period lasted eight months and included the spring, summer, and monsoon seasons i.e., April to November. During the remaining months of the year i.e., December to March, intercultural tasks including weeding, pruning, watering, fertilization, and pesticidal & fungicidal applications were completed.

Particularly, almost 70% of small farmers are found in the areas where Orthodox tea is produced. As a result, the hiring of wage labour or "pluckers" in the tea industry differs from other CTC tea-producing big garden-dominated farming systems (Poudel, 2010). The farm was given in contract to the middlemen or contractor for conducting every intercultural activity like: pruning, harvesting, irrigating, fertilizing, etc. which requires hired labours to function. Then, the harvested leaves are

marketed via tea trucks.

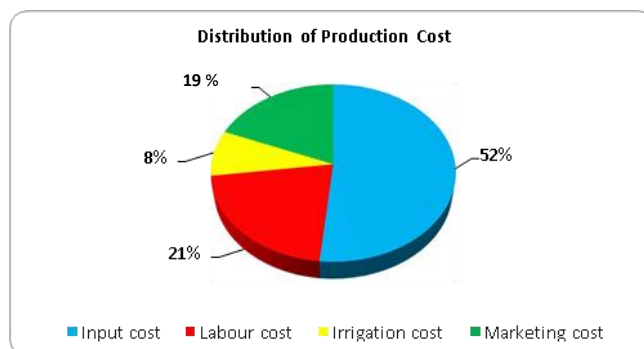
The cultivated variety was 'Tinali' over the study area and the inputs were used in the frequency of 1-3 times for fertilizers and 4-5 times for pesticides, fungicides, vitamins, etc during the non-harvesting period and were as below:

- Fertilizers: Urea, DAP, MOP
- Pesticides: Minchu+ (Bt.), Oberon (Spiromesifen 240 SC), Alanto (Thiacloprid 21.7%), Hotstar (Imidacloprid 70% WG) for mites, whiteflies, aphids, etc.
- Weedicides: Glyphosate 41% SL
- Fungicides: Nisarga (*Trichoderma viridae* 1.5% WP), a bio-fungicide for root rot, collar rot, damping-off, wilt, blight, etc.
- Vitamins: Multiplex Kranti as supplement for N, P, K, Ca, Mg, etc.; AX-Zinc as zinc supplement.

In 2008, after a month-long labour strike in the tea industry was resolved as a result of the daily rate being established at NRs. 95 (about US\$1.27) for all sorts of garden laborers, the government finally changed the wage rates for the tea sector. The pay rate for male and female employees in the same garden was now equal. Although it is often higher than in gardens, the pay rate in the small-holder farming sector is not set (Poudel, 2010). In the study area, labours were used for pruning, weeding & tillage operations during non-harvesting time and for harvesting time for plucking leaves. Each labour cost Rs. 200 - 400 a day of working.

Electricity used for pumping water for irrigation cost Rs. 250 per kattha i.e., Rs. 7500 per hectare done annually for 5-7 times. Processing usually done by processing factories i.e., not at farmers level, at Bhadrapur upto where tea leaves were to be carried imposing marketing cost to contractors of Rs. 2-3 per kg according to distance from farm by the contractors or marketers. The average distance of the nearby market for the tea farmers was 17-20 km.

The average production cost distribution of the comprises majorly by input cost with 52%. Then, labour cost, marketing cost and irrigation cost covers 21%, 19% and 8% respectively

**Figure 2: Production cost distribution of tea farming in the study area.**

4.3 Economic Analysis

The average area of cultivation was 0.53 hectares over the district with average productivity of 23.05 tons/ha. Over the district, the average production was observed to rise as farm sizes went from small to big. The average production over the area was 11.83 tons and the 5% average annual loss of leaves were deducted from the total production making it to 11.24 tons.

Every year, there are more tea plantations. In 2009/2010, the total plantation area was 16,718 hectares. The primary districts in Nepal for tea plantations are Jhapa, Ilam, Panchathar, Dhankuta, and Terathum. Every year, more tea is produced. In 2009/2010, it was 16,208.13 tons. In 2009/2010, Jhapa district produced 14,118.65 tons. This was a substantial amount among producing districts (Poudyal, 2011).

Table 6: Average household area, productivity and production.

| Area (ha) | Productivity (kg/ha) | Production (kg) | Sales after 5% loss (kg) |
|-----------|----------------------|-----------------|--------------------------|
| 0.53 | 23051.69 | 11834.68 | 11245.33 |

The average cost per hectare was Rs. 244,743.82 or, Rs. 10.23 per kg. The

price of marketing per kg of leaves averaged Rs. 2.5 and depended on how distant the growers were from the processors. This led to an average production cost of Rs. 124,904.35 and an average marketing cost of Rs. 26,296.47 in the study area, as shown in Table 7. The financial study also

shows the average yearly production of processing enterprises was 38,981 kg. For leaves with initial stages of 2-3 leaves, the average manufacturing cost for industrial scale was shown to be \$5.58 per kg of ready to use tea (Baral, 2019).

Table 7: Average annual variable cost of production.

| Cost (Rs./ha) | Cost (Rs./kg) | Marketing cost (Rs./kg) | Production cost (Rs.) | Marketing cost (Rs.) |
|---------------|---------------|-------------------------|-----------------------|----------------------|
| 244743.82 | 10.23 | 2.5 | 124904.35 | 26296.47 |

The annual gross revenue was Rs. 232,174.07 per household in the study area of Jhapa. The average gross revenue per kg was Rs. 19.46 while revenue was Rs. 455,008.63 per hectare. Likewise, the profit margin was Rs. 6.73 per kg of leaves. Thus, the average annual margin of every household was Rs. 80,973.25 as shown in the Table 8. In 2015, the typical cost was Rs. 31.78 in Fikkal and Rs. 30.01 in Kanyam. Due to farmers' low-quality production using insufficient inputs and intercultural interactions that impede the production, the price of tea in Jhapa was relatively low (Tiwari *et al.*, 2017).

Table 8: Average annual gross revenue and margin.

| Average | (Rs./kg) | (Rs./ha) | Annual (Rs.) |
|---------------|----------|-----------|--------------|
| Gross revenue | 19.46 | 455008.63 | 232174.07 |
| Margin | 6.73 | - | 80973.25 |

Finally, the B/C ratio was estimated as 1.86 for each household, indicating that even though the farmers in the Jhapa area used traditional and unrefined farming methods, they were still making a profit.

Table 9: B/C ratio analysis.

| Av. gross returns (Rs.) | Average cost (Rs.) | B/C ratio |
|-------------------------|--------------------|-----------|
| 232174.07 | 124904.35 | 1.86 |

It is important to take into account additional elements when assessing a crop's profitability, such as the selling price and cost of inputs. Additionally, environmental elements such as climate, pests, and diseases can affect the success of the crop. Therefore, it is important to analyse all variables that can impact a crop's profitability before making any decisions.

4.4 SWOT Analysis

• Strength

The favourable soil conditions for tea growing in the area, which have an importance index of 0.85, are the area's main competitive advantage. The possibility of earning international certifications by producing high-quality, organic tea was one of the additional benefits of tea planting in the region. Similar to this, the Jhapa district's suitability for tea planting was somewhat strengthened by its favourable climate and flat topography. In Table 10, it illustrates how practices of tea drinking, scent, and flavour were given less importance to enhance the current tea business.

Table 10: Strength of tea farming in Jhapa district.

| Strength | Index | Preference Ranking |
|------------------------------|-------|--------------------|
| Favourable soil condition | 0.85 | I |
| International certifications | 0.83 | II |
| Favourable climates | 0.70 | III |
| Favourable topography | 0.55 | IV |
| Practices of tea consumption | 0.48 | V |
| Taste & aroma of tea | 0.38 | VI |
| Medicinal value | 0.35 | VII |

• Weakness

The main weakness of the district's tea farming was the farmers' inability to obtain subsidies, with an index of 0.88, farmers were deprived of gaining subsidies and its difficult procedures for them to obtain it, which was followed by poor use of technologies, traditional and cultural farming methods, standardization and quality issues, problems receiving fertilizers like urea, a lack of marketing expertise, and unskilled personnel in charge of the tea farming. As shown in Table 11, the area's performance in producing tea was not most negatively impacted by the farmers' poor financial situation, the low production trend of tea, and the ineffectiveness

of the marketing channels.

Table 11: Weakness of tea farming in Jhapa district.

| Weakness | Index | Preference Ranking |
|-----------------------------------|-------|--------------------|
| Problems in gaining subsidies | 0.88 | I |
| Poor technologies | 0.813 | II |
| Traditional cultivation practices | 0.80 | III |
| Quality & standard problems | 0.79 | IV |
| Difficulty in receiving inputs | 0.78 | V |
| Inadequate market information | 0.63 | VI |
| Lack of skilled personnel | 0.60 | VII |
| Poor financial state of farmers | 0.58 | VIII |
| Low productions | 0.55 | IX |
| Poor marketing practices channels | 0.50 | X |

• Opportunities

Financial aid and support to the family economically was the main opportunity to the farmers with the index of 0.85 followed by chances of sustainable agro-forestry practices, employment, use of land and exporting opportunities. The opportunities for eco-tourism, branding and organic tea farming were least preferred as per the index by the farmers as shown in Table 12.

Table 12: Opportunities of tea farming in Jhapa district.

| Opportunities | Index | Preference Ranking |
|-------------------------------|-------|--------------------|
| Financial aid | 0.85 | I |
| Agro-forestry practices | 0.83 | II |
| Employment chances | 0.80 | III |
| Expansion of tea business | 0.78 | IV |
| Good revenue generation | 0.75 | V |
| Use of steep & barren land | 0.70 | VI |
| Export opportunities | 0.69 | VII |
| Eco-tourism | 0.65 | VIII |
| Recognition of Nepalese brand | 0.63 | IX |
| Organic tea farming | 0.60 | X |

• Threats

Table 13: Threats of tea farming in Jhapa district.

| Threats | Index | Preference Ranking |
|---|-------|--------------------|
| Competition by private estate | 0.90 | I |
| Heavy reliance on Indian market | 0.80 | II |
| Limited capital of farmers | 0.73 | III |
| Loss market due to poor quality & standards | 0.70 | IV |
| Pest & diseases attacks | 0.69 | V |
| Inconsistent Indian import policy | 0.68 | VI |
| Lack of co-ordination between producers & marketers | 0.65 | VII |
| Shortage of labours | 0.48 | VIII |
| Landslides & floods | 0.33 | IX |

Private tea estates with an index of 0.90 posed the biggest danger to the tea industry since they had their own estate, processing plant, production

plant, marketing plans, benchmark, and brand. The dependence of tea producers on the Indian market, quality issues, insect and disease attacks on the field, and ineffective communication between farmers and marketers were the other main risks. With scores of 0.48 and 0.33, respectively, the availability of labour, landslides, and flood were to be listed last since they did not pose a significant threat to farmers as shown in Table 13.

5. CONCLUSIONS

The B/C ratio was 1.86 for the tea farmers in study area showing their profitable production with the average of Rs. 10.23 per kg and marketing cost of Rs. 2.5 per kg. The average gross revenue was Rs.19.46 per kg that gives the gross margin of Rs. 6.73 per kg for the productivity of 23.05 tons per hectare.

Similarly, favourable soil conditions had a key strength with an index of importance of 0.85, according to the SWOT analysis. Additionally, with index of 0.88, 0.85, and 0.90, respectively, challenges in getting subsidies, family financial support, and market rivalry from private estates were significant weaknesses, opportunities, and threats.

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