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Supply Chain Assessment of Banana Production and Marketing in Morang

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Abstract

This study aims to examine the supply chain mapping, key problems, and cost-benefit ratio analysis of banana farming in Morang district. This is a mixed-methods descriptive research design using a deductive approach. The respondents selected for this study are aged 18-65 years and are from different professions. The major occupation of these respondents is real farmers (76.6%), and 23.4% are in other services, including teachers, businessmen, and service holders. A survey was conducted with a representative sample of 300 banana growers, including both males and females. The sample was selected using the convenience sampling technique. Required information for the study was collected primarily from primary data sources. Various statistical tools were used to analyze and interpret the data, which enabled the researcher to carry out this research work. Findings indicate that farmers from each Bigha earn an average income of Rs. 347000, with an average annual cost of Rs. 108000. Quality and commercial banana farming could bring immense opportunities for the prosperity and happiness of banana growers in the study area. To enhance production, key problems faced by farmers should be addressed. Also, they need to be encouraged by providing support, grants, subsidies, and other facilities. Government, concerned ministries and departments that

serve as guardians, should promote policies, programs, and plans that benefit real and small-scale farmers.

Keywords: Banana, Farmer's satisfaction, High-value crop, Production, Supply chain

Introduction

Supply chain management is an extension and development of logistics management. Logistics management deals with the flow of goods, including purchases, inventory level control, transportation, storage, and distribution within the company. Despite this, the supply chain also links producers to supply chain actors, including traders, contractors, wholesalers, retailers, and agents, to deliver products to the market and end customers. Swinnen (2007) noted that growth in high-value agriculture implies a greater need for closer linkages among farmers, processors, traders, and retailers to coordinate supply and demand. The supply chain involves coordination and collaboration with channel partners, including suppliers, intermediaries, third-party service providers, and customers. So, the supply chain is very important in agri-products, as it plays a key role in linking farmers and trading actors, enhancing mutual coordination and cooperation to ensure the timely flow of goods from the point of origin to the point of consumption. Planning, sourcing, manufacturing, materials handling, customer service, and satisfaction are considered most pivotal to the success of the supply chain for fruits and agri-products.

Nepal is an agricultural country and has been a major economic source for the majority of families. Most of the people in our country rely on farming. Over the years, people in Nepal have engaged in various farming activities. They harvest and produce various crops, fruits, and vegetables in different seasons for their livelihood. About 66% of the population depends on agriculture, and this sector accounts for 23.95% of gross domestic product (Nepal Rastra Bank, 2022). In Nepal, bananas are considered a commercial crop because it provides significant benefits to producers. The production Upreti (2026). Supply Chain Assessment . . .

and profitability of bananas depend on costs, varieties, manure, and the farm's location (Sharma et al., 2021). Panta (2018), in his research, concluded that the quality of fertilizer supply and price affordability directly affect farmers' productivity and profitability. This is also the second most important summer crop, sharing 21% of total summer fruits production, which can contribute to enhancing the livelihood of people due to its potential expansion in production area, productivity, high demand situation, and a sustainable crop in the climate change context (Pandey et al., 2017). Various indigenous knowledge systems are still used to cultivate and store banana seeds (Adhikari et al., 2022). The Ministry of Agriculture and Livestock Development (2019) reported that the total area under banana cultivation in Chitwan is 2329 hectares.

The history of banana cultivation in Nepal is not so long. Commercial banana cultivation in Nepal has only begun in the past few decades. It is reported that Commercial cultivation of banana in Morang district has started since 2045 B.S. It was started by Mr. Surendra Bahadur Basnet (A Former Minister) on his land, and the credit for linking the area's banana production to Kathmandu is given to Mr. Amar Bahadur Maghi, a local Trader (Ministry of Agriculture Cooperatives, 2006). The land and climatic conditions in Morang are highly suitable for banana cultivation. So, interested farmers can grow different varieties, such as local and tissue-culture varieties of banana, on their land. In the early period, more farmers were engaged in commercial banana farming. Respondents reported that from the establishment phase through 10 years, banana cultivation in Morang had become extensive in certain clusters. Under Morang district, banana orchard establishment started about 30-35 years ago (Source: Field Survey, 2024). Malvoke variety of banana is mainly grown in this region. At present, farmers have begun cultivating tissue-culture varieties of Malvoke, G-9, Jahaji, local Robusta, and William in some clusters of Morang District.

About 83.33% of banana growers report buying suckers from fellow farmers and neighboring districts, while the remaining 16.67% buy them from distant districts and Upreti (2026). Supply Chain Assessment . . .

India. Only a few farmers (10%) report cultivating tissue-culture varieties of bananas, which are obtained from nearby districts or imported from India. Most farmers have their own irrigation systems and start-up funds, and around 30% obtain these from fellow farmers, banks, and cooperatives (Interview & Field Survey, 2024). Farmers generally grow suckers during Falgun-Chaitra and begin plucking from Ashar through Mangsir (Field Survey, 2024). They supply bananas to end markets through a trading channel. The trading channel that helps banana growers reach their products includes local traders, wholesalers, retailers, contractors, and local bicycle traders. Farmers sell about 25 % of bananas to distant markets, 55 % to main city places, and 20 % to the local hat bazaar (Field survey, 2024).

Currently, nearly 40% of bananas in the Nepali market are imported from India (The Rising Nepal, 26th Feb, 2025). As a result, domestic production is being badly affected, and Nepalese consumption heavily relies on foreign markets. Thus, home production and the home market for bananas have become an emerging issue for real-scale farmers. Despite this, farmers face several barriers when cultivating bananas. Among them, the key barriers that farmers encounter in growing bananas in Nepal are a lack of inputs, disease-free seedlings, agricultural loans, poor irrigation systems, inefficient post-harvest management, price fluctuations, and low bargaining power of farmers (Dulal & Kattel, 2020). The government, on the other hand, should assist farmers with infrastructure and human resource development.

Logistics is a part of the supply chain. Before the 1950s, the concept of logistics was understood in military terms, focusing on procurement, maintenance, and transportation (Adhikari et al., 2022). In the past, logistics was seen as the physical distribution and storage of materials. Throughout human history, wars have been won and lost by the strength and capabilities of logistics. Many countries, driven by past interests, fought against each other and won or lost wars due to logistics management. It is also argued that Britain had to lose the war with America due to a lack of logistics.

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With the passage of time and development, the importance of logistics was also felt in businesses. The key objective of the supply chain is to fill the gap created between the supplier and the end customers. This study mainly focuses on the flow of finished products and their value to end markets from producers or supply centers through upstream and downstream linkages. That means there are various actors who bridge the link between the flow of goods and the targeted market and consumers. This study strongly focuses on the organized, well-crafted path or track that is visible and indispensable in adding value to the product. It means that a visible series of organizations' efforts, in various forms, will play a key role in creating value for the products. So, an organization cannot ignore the presence and role of other organizations in the product supply process.

In addition to those activities, supply chain management also includes coordination and collaboration with its network partners, such as suppliers, intermediaries, third-party logistics providers, service providers, and customers. These are considered the trading actors and therefore play a key role in the completion of business deals across every aspect of every sector. It is very clear from the study that supply chain management is a large-scale operation that ensures the flow of the right amount of the right product to the right consumers, in the right places, at the right time. The growth of high-value agri-products, the development of agri-based industries, and coordinated vertical and structural patterns may present both opportunities and challenges for small farmers, especially in developing countries. It creates opportunities for small farmers in Nepal to raise their incomes by entering the growing markets for high-value agricultural commodities.

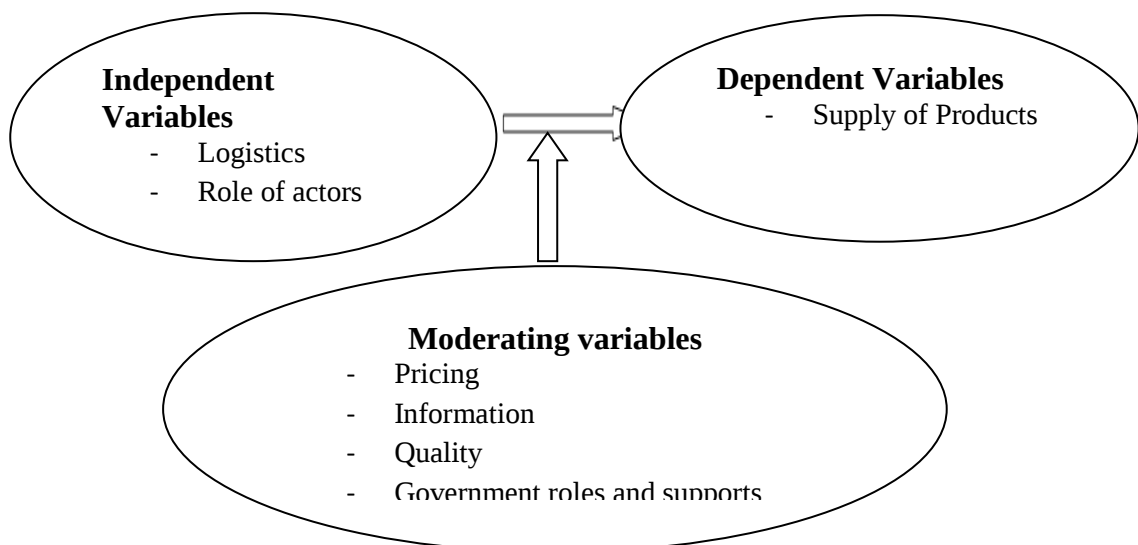
At the same time, the changes pose challenges for small farmers because high-value agricultural commodities often entail higher production costs and greater production and marketing risks (Swinnen, 2007). Understanding the agri-product value chain, including fruits, is very important for planning and executing the program, which Upreti (2026). Supply Chain Assessment . . .

significantly contributes to the nation's overall economic development. For marketing and commercial sales of products, the relationship between producers and traders is also very important. It ultimately supports good governance of the value chain by procuring and delivering necessary inputs and other natural resources. Shrestha (2021) reported that agricultural subsidies have not been properly utilized, and small and needy farmers are not benefiting from agricultural support policies and programs. Government support and subsidies are crucial for small and needy farmers to increase production and achieve profitability in the agricultural sector. However, in Nepal, government subsidies and grants are heavily exploited and influenced by political power and politically influential individuals.

The researcher in this study has applied Agile Supply Chain theory, which focuses on demand and supply management; helping farmers manage flexibility and speed; logistics management; market fluctuations; weather and seasonality; harvesting; cost-benefit efficiency; understanding government support and subsidies; recovering from disruptions; and mitigating risks.

Figure 1

Conceptual Framework of the Supply Chain of Banana



Banana farming in Morang has significant potential to contribute to rural livelihoods, food security, and the national economy. The region's agro-climatic conditions are well suited to banana cultivation, which attracts farmers. However, despite this interest, banana productivity in Morang remains relatively low compared with other districts and global averages. Farmers face several challenges, including limited access to quality seeds, inadequate knowledge of modern farming techniques, limited irrigation, post-harvest losses, and weak market linkages. Furthermore, the absence of organized supply chains, fluctuating market prices, inadequate government support and subsidies, limited market information, and poor cold storage facilities at farming sites discourage investment in banana farming. While various government and non-government initiatives have attempted to improve banana production, there is a lack of comprehensive research examining the key factors affecting productivity, farmer profitability, and market access. Therefore, this study aims to map the supply chain, identify and analyze key constraints in banana production and marketing in Morang, Nepal, and explore potential interventions to improve yields, profitability, and market efficiency.

Methods and Materials

This research was conducted in Morang District, which is among the most promising areas for banana production. This is purely exploratory research, using a deductive approach and both quantitative and qualitative methods. All farmers engaged in banana farming are considered the population of this region. A total of 300 banana-producing households in Morang District, comprising 250 males and 50 females, were selected through convenience sampling to assess supply chain mapping, key problems affecting production volume, and the cost-benefit ratio of banana farming from 2019 to 2024. Primary data sources were used to conduct the research. A field survey was conducted using structured and semi-structured questionnaires, household surveys, focus group discussions, direct observation, and key informant interviews. The Upreti (2026). Supply Chain Assessment . . .

researcher conducted conversations or posed many questions to respondents to address the research problems. The researcher conducted interviews with individuals or in groups. In the observation method, the researcher collected information by inspecting and directly observing the field. The researcher visited the field and observed the banana varieties, the area under cultivation, the plants' physical appearance, and the environment of the planting regions. In the focus group discussions, each group comprised 6 to 8 people. The researcher held discussions with informants as per the structured questionnaire to meet his research objectives. Discussions took place with real farmers, teachers, businessmen, and other service holders. The data collected were analyzed and interpreted using statistical tools such as averages, ratios, percentages, trend lines, tables, figures, and diagrams. The collected data have been recorded logically and systematically in accordance with the requirements of the research. Statistical and descriptive analyses have been used to analyze the data. For statistical and descriptive analysis, averages, ratios, percentages, tables, charts, graphs, trendlines, etc. have been used. Microsoft Excel was used to edit and properly tabulate the data. Such statistics were used to summarize the data and provide insights into banana supply chain performance.

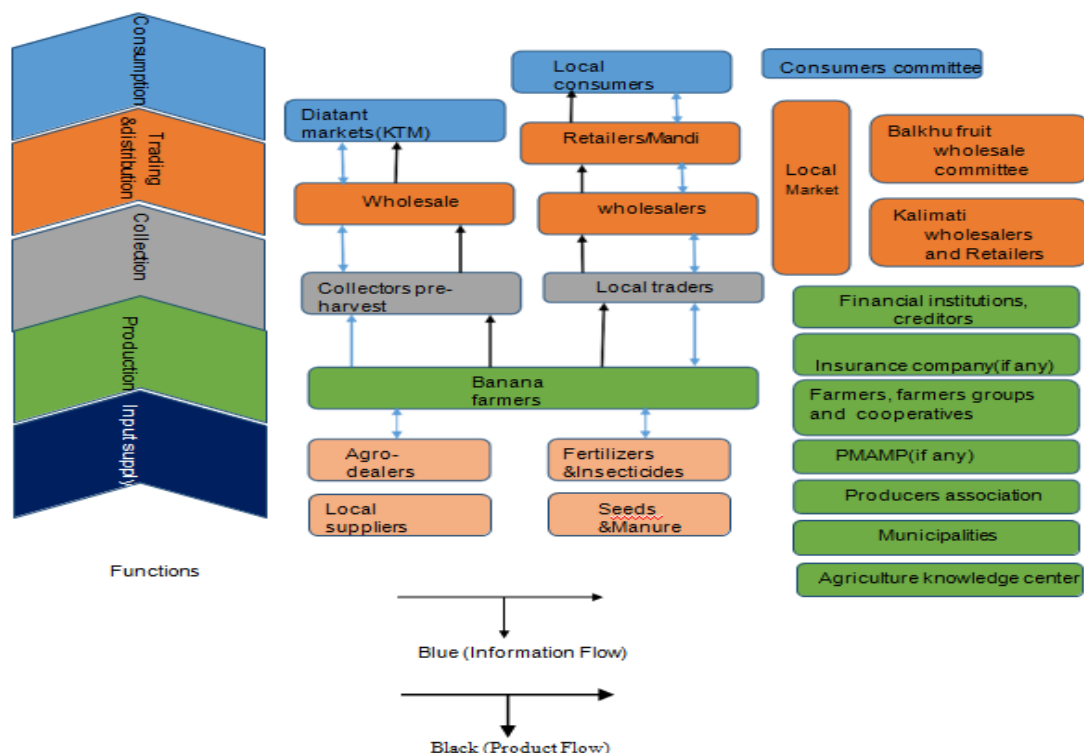
The mean (average) was calculated for various factors, such as the average cost of production per bigha per year, average sales per bigha per year, and average selling price per finger & per ghari, for the study areas of Jhapa, Morang, & Sunsari Districts, respectively. It provides some insights into the production & sales of bananas in the study area. Ratios were calculated for each year and district for the cost-benefit ratio, the average cost-benefit ratio for 2013-2023, and the combined average cost-benefit ratio of the three districts. It provides the researcher with clear and concise information on the cost-benefit ratio of banana farming. Tables & figures were developed to analyze the literature review, supply chain structure, supply chain conduct, respondent sample size, land area covered, & varieties of banana produced in the study area. They were Upreti (2026). Supply Chain Assessment . . .

developed to analyze production & sales volumes, sales area & year, cost-benefit ratios, & farmers' knowledge. Figures were used to show the conceptual & structural framework, represent supply chain mapping, supply chain structure & conduct, and assess other constructs, providing useful insight to the researcher to sum up his research study.

Results and Discussion

Results

The given chart shows the banana value chain, starting from input suppliers such as agro-dealers, local suppliers, and fertilizer, seed, and manure providers, who support banana farmers in production. Farmers then supply their produce to collectors, local traders, and wholesalers, who in turn distribute bananas to local and distant markets, such as Kathmandu. Retailers and Mandy sellers finally deliver bananas to local consumers. Alongside, various institutions, such as financial organizations, insurance companies, farmers' groups, cooperatives, municipalities, and agricultural knowledge centers, provide necessary financial, technical, and organizational support. The map highlights both the product flow (black arrows) from farmers to consumers and the information flow (blue arrows) among farmers, traders, consumers, and supporting institutions.

Figure 2*Supply Chain Mapping of Banana under Morang District***Table1***Supply Chain Structure of Banana in Morang District.*

Categories District	Indicators	Morang
Factor condition: application	Fertilizer availability	Crisis at the
	Insecticides/pesticides	Frequent basis
	Sucker replacement rate	5 to 7 years
	Irrigation facility (pump-set)	No dam/No
canal facility		
Demand and supply	Supply situation	April to July- 50
Behaviors:		August to
October- 35 %		

March-15 %		November to
Supply Chain Governance:	Demand	Lowest demand
at winter		(November to
March)	Governor	Collection
traders		(Local and bulk
scale traders)		
Entry barriers:	Power relation	Buyer driven
	Training, knowledge& technology	Lowest
	Land availability & accessibility	Yes
loan)	Capital	Yes (Own &
Institutional framework:	Price risk	Yes
pump-	Subsidies	Lower (Especially for
set,		
agricultural tools		Small
equipments)		&
	Research & Development	Poor

The banana supply chain in Morang District presents several challenges and features. Farmers face a fertilizer crisis during application and frequently use insecticides, while sucker replacement occurs only every 5 to 7 years. There is no dam or canal for irrigation, limiting water access. Banana supply is highest from April to July (50%), moderate from August to October (35%), and lowest from November to March (15%), which also marks the period of lowest demand. The supply chain is mainly governed by local and bulk-scale collection traders, making it buyer-driven. Entry barriers include very low access to training, knowledge, and technology, though land and capital (own and loan) are available, with price risk remaining a concern.

Institutional support is weak, with low subsidies (mostly for pump-sets and small tools) and poor research and development facilities. Overall, the banana supply chain in Morang struggles with input shortages, seasonal demand fluctuations, and weak institutional backing.

Table 2

Supply Conduct of Banana under Morang District

Categories	Indicators	Morang
District		
Product and market system:	Selling unit	Fingers
contract	Seller-buyer relationship	Informal
producers		between
bicycle, Safari,	Transportation means	Cycle,
tractor,		Pick-up van,
Price-setting strategy:	Wholesale commission	8-10 %
	Demand-supply equilibrium	50 %
	Responding	
	Price setting by negotiation	50 %
Technological adoption:	Adoption of selected technology	Low adopters
(6/60*100)	Initiation of tissue culture sapling	10%
(12/60*100)	Disease-resistant varieties	20%
(45/60*100)	Suckers treatment	75%
Replacement & buying of	Processing & Grading	No (0%)
(50/60*100)	At 5-7 years, from fellow farmers	83.33%
Suckers		
Risk supporting services:	Insurance service	Not Insured
Vertical linkage:	Linkage type	No long-term
business		Relationship

Supply Linkage: Farmers	Resources	I Suppliers &
	Traders	Play a key
role		

The banana supply chain in Morang District shows that bananas are mainly sold as fingers, with informal contracts between producers and buyers. Transportation is done using cycles, bicycles, safari vehicles, pick-up vans, and tractors, while wholesalers charge an 8–10% commission. Price-setting is equally divided between demand-supply equilibrium (50%) and negotiation (50%). Technological adoption is generally low: only 10% adopt tissue culture saplings, 20% use disease-resistant varieties, and 75% practice sucker treatment, while processing and grading are absent. Most farmers replace suckers every 5–7 years, and 83.33% source them from fellow farmers. Risk support is minimal because farmers are not insured, and vertical linkages remain weak, with no long-term business relationships. In terms of supply linkage, suppliers and farmers provide inputs, while traders play a key role in the overall supply chain. Overall, the banana supply chain in Morang is characterized by informal practices, limited use of technology, and weak institutional and risk-support services.

Key Factors Affecting the Supply Chain of Banana

The banana supply chain in Morang district faces several challenges that reduce farmers’ profits and product quality. Limited cold storage facilities, poor road connectivity, and lack of modern sorting, grading, handling, and packaging methods cause significant post-harvest losses. Farmers rely on unskilled labor, have weak market linkages, and are often exploited by traders. Government policies and subsidies rarely reach the real farmers due to political influence, while increased imports of hybrid bananas from India make local production less competitive. Additionally, pests,

diseases, high input costs, and low productivity further worsen the situation, forcing many farmers to struggle to sustain their livelihoods.

Cost-Benefit Analysis of Banana Farming

The table and figure below show the cost-benefit ratio of banana farming in Morang District from 2019 to 2024.

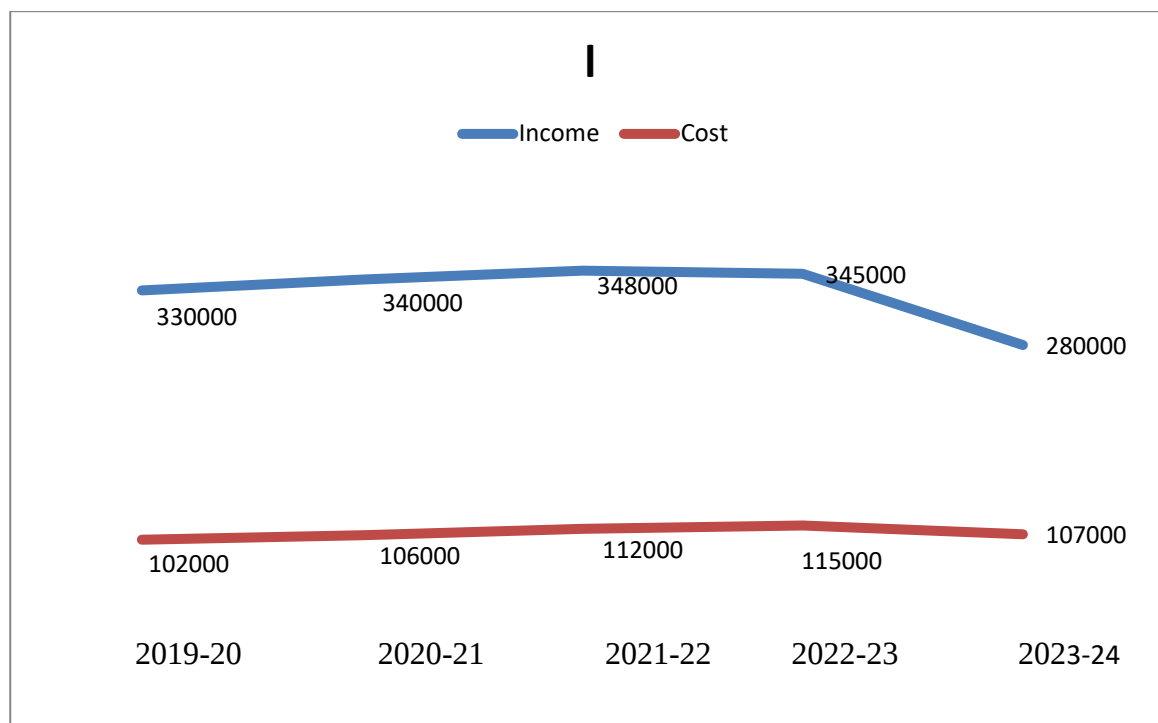
Table 3

Analysis of Cost-Benefit Ratio during the Years 2019 to 2024

Year	Income (Rs.) / Bigha	Cost (Rs.) / Bigha	BC Ratio
2019-2020	330000	102000	3.23:1
2020-2021	340000	106000	3.21:1
2021-2022	348000	112000	3.11:1
2022-22023	345000	115000	3.00:1
2023-2024	280000	107000	2.62:1

Figure 3

Trend Line showing Cost-Benefit Ratio during the Years 2019 to 2024



The table and figure above show the income, cost, and benefit-cost (BC Ratio) of banana fruit for the respective years. Table 3 shows that Rs. 348000 is the highest income and Rs. 280000 is the lowest income observed during the years 2018-19 and 2020-21. The benefit-cost ratio is highest at 3.23:1 in 2017-18 compared with subsequent years. Figure 1 shows the trend lines for income and cost of fruit produced across different years. The trend line, with benefit and cost factors fluctuating, indicates that income generated across different time periods is inconsistent.

Table 4

Variable Cost of Production per Bigha during the Years 2019-2024 under the Study Area

Variables	Average cost/Bigha (Rs.)
Fertilizer cost/Bigha	15000
Operation cost/Bigha	15000
Irrigation and pruning cost/Bigha	8000
Plant protection cost/Bigha	12800
Seeds purchasing cost/Bigha	16200
Labor cost/Bigha	15600
Land lease cost/Bigha	45000
Land preparation cost/Bigha	16800

The table above shows the varying costs of essential inputs (seeds, fertilizers, irrigation systems, insecticides, and pesticides) and labor wages. For one bigha of farmland, Farmers need to bear various costs, such as manure, operating, training and pruning, plant treatment and protection, seed purchase, labor, land lease, and land preparation. This results in an average annual cost of Rs. 108000 per bigha. Farmers most often manage these costs with their own funds and loans from financial institutions and other creditors.

Discussion

While the mapping highlights the presence of diverse actors, it also underscores the fragmented and underdeveloped nature of the banana supply chain. The study identifies several critical problems that directly affect farmers' productivity and profitability. One of the most pressing issues is the lack of cold storage and post-harvest management facilities. Very few cold storages exist in Morang, and those that do are often located far from farming sites. As a result, bananas are transported to urban

centers without preservation, leading to spoilage, quality deterioration, and wastage. Farmers and traders rarely practice proper sorting, grading, or packaging, which further reduces product value and consumer appeal. Poor connectivity and infrastructure compound this issue, as rural roads are often muddy, rough, and unreliable, especially during rainy seasons. These road conditions increase transportation time and costs, while also damaging bananas during transit. Weak infrastructure not only raises costs but also discourages traders from reaching farms directly, forcing farmers to depend on local middlemen (Field Visit & Interview with Smallholders, 2024).

Another major problem is the shortage of inputs such as fertilizers, insecticides, pesticides, and high-quality disease-free seedlings. Fertilizers are often not available when needed, while tissue culture varieties remain underutilized due to high costs and limited supply. This dependence on traditional inputs reduces productivity and increases vulnerability to pests and diseases. The problem is further intensified by the shortage of skilled labor. Banana farming requires intensive labor for land preparation, irrigation, pruning, harvesting, and post-harvest handling, yet most workers are untrained and unskilled, making their efforts less productive. Farmers themselves bear much of the workload, which not only limits output but also increases production costs (Field Visit & Interview with Smallholders, 2024)

Market linkages are another weak point in the supply chain. Farmers are highly dependent on middlemen for market access, and these intermediaries often exploit them through non-transparent pricing systems. Prices fluctuate with seasons, rising in summer when demand is high and falling sharply in winter, leaving farmers with inconsistent returns. Producers are price takers, not price makers, and negotiation power rests almost entirely with traders. This imbalance discourages farmers from making long-term investments in improving production. The role of government in addressing these issues also appears ineffective. Although the government allocates billions in subsidies to the agricultural sector, the study shows that genuine farmers rarely benefit.

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Agricultural subsidies have not been utilized properly in practice and small and needy farmers are not benefited from the agricultural support, policies and programs.

Government subsidies are heavily influenced by political power and political influential persons (Mahesh Kumar Shrestha, 2021, P.N.16-22). Instead, subsidies are captured by politically influential individuals. Farmers in Morang report receiving minimal grants, mostly for small tools or pump-sets, while larger structural needs such as irrigation canals, cold storage, and research programs remain unaddressed. This failure of policy implementation leaves farmers without the institutional support needed to expand their production and reduce risks.

The problem of increased imports further undermines domestic banana farming. Almost forty percent of bananas consumed in Nepal come from India, and these imported bananas are often larger, hybrid varieties that dominate urban markets. This makes local production less competitive, forcing Nepalese farmers to sell at lower prices. Indian subsidies make their products cheaper, causing them to flood the Nepali market. This has led to increase imports of agricultural products in the total commodity trade” (Timilsina, 2019).

Such competition not only reduces their income but also contributes to Nepal’s trade deficit in agricultural commodities. Combined with this is the issue of declining productivity, which arises from pest attacks, diseases, high input costs, and poor-quality seeds. Farmers also face rising land lease costs and labor expenses, making banana farming less profitable than in the past.

The cost-benefit analysis carried out in the study paints a mixed picture. On one hand, banana farming in Morang is still profitable, generating three times higher returns than the cost of production. On average, farmers earn Rs. 347,000 per bigha annually, while the average cost is Rs. 108,000. This makes banana cultivation one of the most lucrative agricultural activities in the region. On the other hand, the trend analysis from 2019 to 2024 reveals that profitability is gradually declining. The benefit-cost ratio fell Upreti (2026). Supply Chain Assessment . . .

from 3.23 in 2019–20 to 2.62 in 2023–24, showing that profit margins are shrinking. The highest income of Rs. 348,000 was recorded in 2021–22, while the lowest, Rs. 280,000, was reported in 2023–24. The decline in profitability reflects rising costs of production, inconsistent productivity, and unstable market conditions. A breakdown of costs shows that land leasing and labor are the largest expenses, followed by seeds, fertilizers, irrigation, pesticides, and land preparation. Most of these expenses are covered by farmers themselves, either through personal savings or loans, which increases their financial burden. Without access to crop insurance or reliable subsidies, farmers remain vulnerable to losses caused by pests, diseases, natural disasters, and market fluctuations.

Taken together, the results highlight both the opportunities and the constraints of banana farming in Morang. The region has favorable climatic conditions, established farming clusters, and high demand for bananas at the local and national levels. Banana farming is still profitable compared to many other crops, making it an attractive option for rural households. However, the system is plagued by structural inefficiencies, weak infrastructure, poor institutional support, and unfair market practices. Farmers are trapped in a cycle of high production costs, declining productivity, and limited bargaining power. Unless addressed, these issues threaten the long-term sustainability of banana farming in the district.

The discussion makes it clear that the future of banana farming in Morang depends on comprehensive interventions. Improving road connectivity and expanding cold storage facilities would reduce post-harvest losses and increase farmers' returns. Promoting tissue culture varieties, ensuring the timely availability of fertilizers, and providing training in modern farming techniques would enhance productivity. Transparent price-setting mechanisms and stronger farmer cooperatives could reduce exploitation by middlemen. Effective distribution of government subsidies, combined with crop insurance and trade policies to protect domestic farmers from unfair

competition, would further strengthen the sector (Field Visit & Interview with Smallholders, 2024). Without such interventions, banana farmers in Morang may face declining incentives to continue or expand cultivation, despite the high potential of the crop. The study therefore emphasizes that sustainable development of the banana supply chain requires not only technological and infrastructural improvements but also political commitment to ensuring that policies and programs truly benefit real farmers.

Conclusion

The study on the banana farming supply chain in Morang district concludes that banana cultivation remains a profitable agricultural enterprise and a vital source of rural income, yet its sustainability is under increasing pressure due to structural, economic, and institutional challenges. Farmers in the district currently earn nearly three times their production costs, demonstrating that banana farming continues to hold significant economic potential. However, the benefit-cost ratio has been gradually declining, primarily due to rising input costs, decreasing productivity, inadequate infrastructure, and the exploitative practices of middlemen. These factors collectively threaten the long-term competitiveness of the sector.

Key constraints include the absence of adequate cold storage facilities, poor road connectivity, limited access to high-quality seeds and fertilizers, and ineffective subsidy mechanisms. Heavy dependence on banana imports from India further undermines the local supply chain, reducing incentives for domestic producers. Pest and disease outbreaks, limited access to modern tools and technology, and a lack of technical awareness among farmers also contribute to production-related difficulties. These issues have discouraged some farmers and reduced their enthusiasm for expanding banana cultivation.

Given these challenges, there is a clear need for timely and coordinated interventions. Governments at all levels should take proactive measures to strengthen infrastructure, provide grants and subsidies, ensure timely supply of inputs, and protect farmers from Upreti (2026). Supply Chain Assessment . . .

unfair market practices through effective regulations. Establishing storage facilities, improving road networks, and supporting farmer cooperatives could enhance the efficiency and profitability of the banana supply chain. Likewise, the involvement of institutions in research, development, and farmer training is essential. Support through access to credit, insurance schemes, and capacity-building initiatives will further encourage farmers to continue producing.

At the marketing level, farmers must be trained and encouraged to adopt practices such as sorting, grading, packaging, processing, and value addition to achieve better prices and expand market opportunities. The integration of local and global supply chain knowledge into higher education curricula can also play a crucial role. Field visits, research collaborations, and internships can expose students to real-world challenges and solutions, enabling them to develop innovative recommendations that directly benefit farmers.

In conclusion, banana farming in Morang district reflects both opportunity and vulnerability. With targeted interventions in infrastructure, technology adoption, policy reforms, and market regulation, banana cultivation can remain profitable, competitive, and sustainable. Strengthening the supply chain not only improves farmers' livelihoods but also contributes to food security, rural development, and the region's overall economic growth.

Conflict of interest

The author declares no conflict of interest.

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