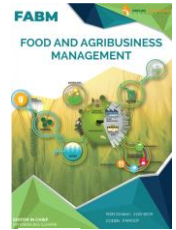


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## RESEARCH ARTICLE

# ECONOMICS OF PRODUCTION AND MARKETING OF BANANA IN KAILALI, NEPAL

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## ARTICLE DETAILS

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## ABSTRACT

A survey research was conducted to study about the economics, production and marketing of banana in Kailali district. The study was conducted in Tikapur municipality of Kailali district. 80 banana growers were selected randomly for the study. Primary data was collected from pre- tested interview schedule, direct observation. The main occupation of the HH was found to be agriculture with dominance of banana cultivation. The results of multi linear regression model revealed variables like education status, expenses on planting materials, expenses on fertilizers and micronutrient, membership of the group and cooperatives have positive significant effect on yield of banana. Major production problems of the study area were disease and pest followed by destruction due to wind. The B/C Ratio was found 1.83 which goes on increasing up to production cycle. Thus the banana production is one of the viable enterprises. If government encouraged disease resistant variety and good agriculture practices bumper production can be achieved to match the national demand.

## KEYWORDS

Banana, Yield, B/C ratio, Price spread, Producer's share.

## 1. INTRODUCTION

Agriculture is one of the important means of livelihood in developing countries like Nepal. It is the major contributing sector of the national economy accounting around 27 percent of the gross domestic product and provides employment and livelihood to 65.6 percent of economically active population (MoAD, 2017). Nepalese agriculture sector is basically based on the production of basic staple food grains. Fruits fall among the high value commodity which shares less in total cultivated area and the benefit cost ratio is much greater than staple crops. Total contribution of fruits in AGDP is 13.49%. However, major constraints in fruit cultivation are greater initial investment, long duration before harvest, weather constraint and pose greater risk factors. Basrai Dwarf, Harichal, William Hybrid are the important commercial cultivars recommended for cultivation (ADS, 2015). Banana is a relatively short duration crop and, therefore, most of the farmers can afford to grow it. It is cheaper and most nourishing fruit.

It contains nearly all the essential nutrients including minerals and vitamins and has several medicinal properties (Bose, 1990). Banana is a crop of tropical origin and cultivated throughout the tropical and warm areas subtropical region of the world. In Nepal, it is widely cultivated in terai and foothills 1500 m above sea level (Begumj and Raha, 2002). Its contribution in AGDP is 0.99%. According to ICIMOD banana is a high-value agricultural product and a major fruit in Nepal in terms of the potential growing area, production, and domestic consumption (ICIMOD, 2015). It is currently grown in 68 districts, and the total productive area of banana plantations in 2012/2013 was 11,864 ha, with a total production of about 182,005 tonnes. Although there is great potential for banana production in Nepal, there are few commercial banana plantations and current productivity is low (Bhat et al., 2011).

According to the Ministry of Agriculture, the current average productivity is tonnes per hectare, with maximum yields reaching up to 20 tonnes per hectare. Demand for bananas in Nepal currently exceeds the total national production (DADO, 2019). According to the Trade and Export Promotion Centre of the Government of Nepal in 2011/2012, Nepal imported 27,878 tonnes of bananas from India to meet the domestic demand, particularly in urban and peri-urban areas. Commercial cultivation of banana has started in some of the Terai innerterai, river basin, and foothill (Gajanana, 2002). Three sides open border with India and semi open border with china is the major challenge and opportunity for agriculture sectors in Nepal (Gangal, 2002). Banana has an important contribution to the country so that some efforts have been made by both research and extension systems for its promotion.

Different research centers under NARC has released improved varieties of banana. And the technology is disseminated among farmers with full package of information as a new innovation through Department of Agriculture (Gowda, 2002). These researches will explore the existing production and marketing situation of banana in Kailali district. Kailali district is growing in its popularity for Banana cultivation (Guledgudda et al., 2002). In Kailali district, total productive area of banana plantation in 2015/16 was 600 ha with a total production is 9000 mt and yield is 15 mt/ha and in Far Western development region, total productive area of banana cultivation is 55 ha, total production is 752 mt and yield is 13.74 (Statistical information on Nepalese agriculture, 2015/16) (Kachroo et al., 2012).

## 2. OBJECTIVES

### 2.1 Broad objective of this study

- To access the economics of production and marketing of banana.

### Quick Response Code



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## 2.2 Specific objective

- To estimate benefits and cost ratio
- To identify the marketing channels in banana marketing.
- To analyze the price spread in the marketing of banana.
- To examine the production and marketing constraints of banana production.

## 3. MATERIALS AND METHOD

### 3.1 Study area

Kailali district was purposively selected for this study because it is one of the main bananas producing districts in the country. Kailali has been identified as pocket area for banana production, high number of commercial banana growers, and numbers of NGO/INGOs working in this area in banana technology promotion (Karpagam, 2000). This district has most favorable climate, soil and temperature condition for the banana cultivation. Southern part of the district is emerging as a banana hub in the region (Khunt et al., 2001). Province government has given major priority to banana cultivation in the very region. Banana based industries have already been established in the southern belt of the district (Mali et al., 2003).

### 3.2 Source of data Primary data

Primary data was collected through Face to face interview conducted between the farmers. Besides, preliminary field visit, data verification, validation, focus group discussion (between members of Banana Producers Association) and key information (Agricultural Development Officer, staffs of Ministry of Land Management and Agriculture and Cooperatives) were also conducted (Pawar et al., 2010; Rao, 2000). For some data collection data tools were used in the study. Climatic data was also collected for analysis, effect on banana production in this area. Total 80 samples were selected for collection of primary data.

### 3.3 Secondary data collection

Ministry of Agriculture and Development, District Agriculture Development Office, Kailali, Central Bureau of Statistics, NGOS/INGOS and different farmer's group were the source of secondary information. Different information about past researches and related materials were also collected from different journals, books and articles using internet.

### 3.4 Data collection and Processing

All data were tabulated such as age, education, family size, family income, land holding, training received etc. and analyzed by using Microsoft Excel and Statistical Package for Social Sciences (SPSS), STATA and R-Studio.

### 3.5 Socio economic indicator variables calculated

#### 3.5.1 Benefit cost ratio

Benefit cost analysis is calculated by using total cost of production of banana and total gross return from produce. The B/C ratio was calculated using the following formula:

$$B/C \text{ ratio} = \text{Gross Return} / \text{Total Cost}$$

#### 3.5.2 Marketing margin and producer's share

Marketing margin is the difference between farm gate price received by the farmers and the price paid by the consumer (Shivanand, 2002). It was calculated by subtracting the farm gate price from the retailer's price.

$$\text{Marketing Margin} = \text{Retailer Price} - \text{Farm Gate Price}$$

Similarly, producer's share is the price received by the farmer expressed as a percentage of the retail price, which is the price paid by the consumers. It was calculated using following formula:

$$\text{Producer's Share (Ps)} = \text{Farm gate price} / \text{retailer price} \times 100$$

#### 3.5.3 Price spread

Price spread is defined as the difference between the price paid by consumers and the net price received by the producer for an equivalent quantity of farm produces. It is expressed as percentage of consumer price.

$$\text{Price spread} = (\text{Consumers price} - \text{net price of producers}) / \text{consumers price} * 100$$

### 3.6 Factors affecting banana production

In order to estimate the factors affecting banana production multivariate

regression model was applied. Production (in bunch) was accounted as the dependent variable while cost incurred on the planting material, fertilizer, manure, micro nutrient, pesticide, labor, animal/machine, and area under banana cultivation (in bigha) were considered as the explanatory variables. Linear relationship was assumed to exist between these variables. The regression model was expressed as:

Quantity banana produced by farmer = f (Labor, Expense on planting material, animal/machine, fertilizer, manure, micro nutrient, pesticide, area under banana cultivation) the mathematical specification is:

$$Y = \alpha_0 + \beta_1 P_m + \beta_2 F + \beta_3 M + \beta_4 M_i + \beta_5 P + \beta_6 S_i + \beta_7 E_d + \beta_8 F_s + \beta_9 G + \beta_{10} T + \beta_{11} M_b$$

Where,

Y = Banana yield (bunch)

P<sub>m</sub> = Expense on Planting material F = Expense on fertilizer (NRs.)

M<sub>i</sub> = Expense on micronutrient (NRs) P = Expense on pesticide (NRs.)

S<sub>i</sub> = Source of income E<sub>d</sub> = Education status F<sub>s</sub> = family size

G = Gender

T = Training received M<sub>b</sub> = Membership

α<sub>0</sub>, β<sub>1</sub>.....β<sub>11</sub> = Coefficient to be estimated.

### 3.7 Constraints of Banana production and marketing

For finding the importance of different production and marketing problems five-point scale was used based on the farmer's perception about them. It comprises very high importance, high importance, normal importance, less importance and the least importance to the different problems using numeric value 1, 2, 3, 4 and 5 respectively. The index of importance was conducted by using the following formula;

$$\text{Iimp} = \sum (S_i f_i) / N \text{ Where, Iimp} = \text{Index of importance } S_i = \text{Scale value } f_i = \text{Frequency of importance given by the respondents } N = \text{Total number of respondents}$$

## 4. RESULT AND DISCUSSION

This chapter deals with the finding and result of the study from analyzed data. The finding and results were arranged and described as per the objectives of the study.

**Table 1: Socio-economic characteristics of the surveyed household**

S.N	Particulars	Frequency
<b>1</b>	<b>Gender of respondents</b>	
a)	Female	29 (36.25)
b)	Male	51 (63.75)
<b>2</b>	<b>Age</b>	
a)	0-25	5 (6.25)
b)	26-50	63 (78.75)
c)	51-75	12 (15)
<b>3</b>	<b>Average age of HH heads</b>	39.15
<b>4</b>	<b>Education</b>	
b)	Illiterate	11 (13.75)
c)	Literate	27 (33.75)
<b>5</b>	<b>Family type</b>	
a)	Nuclear	29 (36.25)
b)	Joint	51 (63.75)
<b>6</b>	<b>Land holding Size</b>	
a)	Large (> 20 katta)	24 (30)
b)	Medium (10-20 katta)	22 (27.5)
c)	Small (<10 katta)	34 (42.5)
<b>7</b>	<b>Membership of Cooperatives</b>	52 (65)
<b>8</b>	<b>Source of income</b>	
a)	Agriculture	37 (46.25)
b)	Business	15 (18.75)
c)	Remittance	14 (17.5)
d)	Service	10 (12.5)
c)	Wage labor	4 (5)
<b>9</b>	<b>Training</b>	
a)	Yes	40 (50)
b)	No	40 (50)

NOTE: Data in parenthesized represent percentage.

Source: Field survey, 2018

The study represents a brief description of the socio-economic characteristics of sample household that were selected. Decision making behavior of individual person is determined to a large extent by his socio-economic characteristics. Among the respondents, 64% were male and the rest 36% were female. The majority of male adopters were found in high adoption category which indicates that they are more capable in promoting

banana production technology as compared to their female counterparts. While it shows that average age of the respondents was 39.15. Among the total banana growers, 6.25% of banana growers within the age of 0-25 majority 78.75% of the farmers were within the age of 26-50 years, while 15% of the farmers were 51-75 years of age. This means that respondents were not too old. They are still in their active age. Age has significant influence on decision making process of farmer with respect to risk, aversion and adoption of improved technology and production related decision. The majority of respondents 33.75% were literate followed by illiterate 13.75%.

The result shows that average family size of the respondents was 5.962. The majority of respondent 63.75 were from joint family, while others from nuclear family 36.25. Average land holding of sample household was 32.462 kattha. Mostly small landholding farmer 42.5% are adopting the banana cultivation followed by large 30% and medium 27.5% land holding farmers. The majority of farmers 65% were involved in farmers group and/or women farmers group either a general member or executive member whereas 35% had no membership. Agriculture is the major source of income of majority of farmers 46.25 % followed by business 18.75 % and wage Labor 5%. Agriculture is the major source of income for all category of banana cultivator. There is direct relationship between source of income and the adoption of improved banana cultivation practices. The concerning farmers were attending training programs, among total interviewed 50% of them had attended training while 50% didn't attend training program related to banana cultivation.

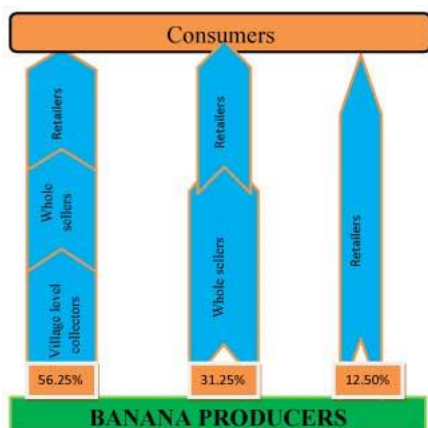
#### 4.1 Cost and benefit analysis

Year	Investment phase	2	3	4
Production (Kg/plant)		12	16	18
Production (Kg/ha)		10800	14400	16200
Total income	0	378000	504000	567000
Variable cost	235134.40	130052.68	143057.984	157363.778
Fixed cost	3500	3500	3500	3500
Total cost of production/ha	238634.40	133552.68	146557.984	160863.778
Cost of production per GHARI	149.15	83.47	91.60	100.53
Cost of production per kosa	1.55	0.87	0.95	1.05
Profit	-238634.4	244447.32	357442.016	406136.222
B/C ratio		1.8303438	2.43891193	2.5247214
Cost per kg		12.365989	10.1776378	9.92986284

Source: Field study 2018

Table 2 shows that in the first year of farm setup, initial investment was high and there was no return. In first year of farm setup total cost of production was Rs 238634.4 and return was zero. Similarly, in second, third, fourth year the cost of production of banana is 133552.68, 146557.984, 160863.778 with return 378000, 504000, 567000 respectively. In subsequent year cost of production goes on decreasing due cutoff of variable cost of production. But after three-year new plantlets have to be brought again so, cost of production climbs a bit. B/C ratio goes on increasing from second year to fourth year. The benefit cost analysis shows that B/C ratio in first year is greater than unity (1.83) which is also supported by Adhikari and Regmi but high as compared to the result by researchers conducted a study on production and marketing of banana in Gorakhpur district of Uttar Pradesh (Adhikari and Regmi, 2011; Mishra et al., 2000).

#### 4.2 Marketing channel



While describing how the producers reach their banana to the consumers, it was found that 56.25 % of the banana producers choose the largest channel to reach the consumers. In this channel three levels of market actors like village level collectors, whole sellers followed by the retailers are involved which is also supported (Poudel, 2011). While 31.25 Percent of the producers sell their commodity through the intermediate channels. There is always less market share and spread in case of short market channels. Only 12.50 percent of the individuals choose this channel in which only retailers act between the producers and consumers.

Particulars/ Marketing functionaries	Rs/kg
Marketing cost at producer's level	0
Loading, unloading, weighing	1
Transportation charge	1
Other including marketing charge	2
Sub total	5
Farm gate price	35
Marketing cost	4
Retailers price	50
Market margin	15
Producers share	70%
Price spread	30%

Table 3 shows that 70% of final price of banana which occupied by the producer's share which is contradictory to the result presented by Adhikari and Regmi and 30% of price of banana is shared by market agent (Adhikari and Regmi, 2011).

Yield of banana	Coefficient
Education status	40.56***
Family size	5.89*
Gender of HH head	50.65***
Household income	5.63***
Membership in group or cooperatives	74.75***
Age	0.71
Training received	22.54***
Propagation	1.52
Expense on planting materials	739.51***
Expense on fertilizers	40.40***
Expense on micronutrients	9.69**
Expense on pesticides	9.03**
Expense on labor	1.84
Expense on draft	1.06
Expense on marketing and transport	3.59

Table 4 provides the results of multi linear regression model to determine the critical factors that affects the yield of banana at study site.

#### 4.3 Social factors

The result revealed that the social factors like educational status of the family, sex of the HH head have highly significant effect on yield at 1 % level with positive signs, while family size have significant effect at 1 % but age of the HH head have no significant effect on banana yield. The increase in level of education increases the yield by 40.56 units. The results show that highly the person is educated more the income from banana is increased it is because they are more familiar to cultivation practices and production technology of banana. The yield of banana having male HH head increase by 50.65 units as compared HH head having female member head. If the size of family members increases the probability increase in yield of banana is 5.89 units.

#### 4.4 Household income

House hold source of income has positive significant effect on banana production at 1 percent level. The additional increase in household income increases the banana yield by 5.63 units.

#### 4.5 Training and membership

Training and membership of cooperatives was found to have positively significant at 1 percent level. An individual who has received training on agriculture produce 22.54 units more as compared to the individuals not receiving training. Similarly, individuals who are members of Cooperative have produced 74.74 more than not.

#### 4.6 Expenses on planting materials fertilizers, pesticide and micronutrient

The results revealed that the variables like expenses on planting materials,

fertilizers have positive significant effect on yield at 1% level. Similarly, expenses on micronutrients and pesticide have positive significant effect on yield at 5% level.

#### 4.7 Major constraints in banana production

The major constraints of banana production were ranked by using problem ranking tool. There are altogether six problems which are ranked according to their index value. Among all disease and pest infestation was the major production problem which is supported (Singh, 1999). Gunasekaran also reported that diseases and pests are the most important production of banana but only after the wind (Gunasekaran, 2016). Other constraints faced by farmers were drought and natural calamities, and agriculture loan.

**Table 5: Constraints in banana production**

Constraints	Index value	Rank
Incidence of disease and pest	0.77	I
Destruction due to wind	0.75	II
Unavailability of quality planting material	0.70	III
Scarcity of labor	0.68	IV
Irrigation problem	0.63	V
Lack of knowledge on production package	0.59	VI

#### 5. CONCLUSION

About 33.05% respondents were literate while 13.75% respondents were illiterate in the study area. The selected two wards were male dominated community with 63.75% male population while female, 36.27%. About 46.25% household's main occupation was agriculture and rest of the people were engaged in service, remittance and business. Respondents belonging to joint family were 63.75%. While 36.25% were belong to nuclear family. Training facility was provided to 50% of respondents about 65 % respondents were member of FG or cooperative. Majority of the farmers 56.25% follow the producers- village level collectors-wholesaler-retailer- consumers. The major production problem was disease and pest followed by wind destruction, unavailability of quality planting material, scarcity of labor, irrigation problem and lack knowledge on production package. Marketing problem was storage facility, seasonal supply, market information and post-harvest loss. B/C ratio in first years was 1.83 which goes on increasing up to production cycle. The total cost of production of banana in first year was Rs 238634.40 and it is decrease in second year and again increase in third and fourth year due to replacement of crop. 30% of price of banana is shared by market agent, similarly producers' shares was 70% and market margin Rs15. Although there is great potential for banana production in Nepal, there are few commercial banana plantations and current productivity is low.

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