



## An Economics analysis of Banana Cultivation in Wokha District of Nagaland, India

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Received: 2.11.2019 | Revised: 29.11.2019 | Accepted: 6.12.2019

### ABSTRACT

The present research study was conducted in Wokha district of Nagaland, India. All together 60 banana growers were identified by following a multi stage stratified random sampling technique for detailed survey. From the study on the economic analysis and profitability of banana cultivation it was found out on an average per hectare total cost of banana cultivation was Rs. 59041.30. Share of variable cost and fixed cost constitute Rs. 55493.83 (93.99%) and Rs. 3547.47 (6.01%) respectively. The annual average gross income per hectare was found to Rs. 157980.33 with an average net return of Rs. 101819.82. The benefit cost ratio over total cost was found out to be 2.68 which is economically feasible enterprise.

**Keywords:** Wokha, Banana, Cost, Economic, Benefit Cost Ratio, Profitability

### INTRODUCTION

The origin of Banana (*Musa* sp.) is South East Asia. It belongs to family *Musaceae*. At the world level, the area, production, and productivity of Banana was 5 million ha., 1036 million t. and 20.7 mt/ha, respectively. (Horticulture Database 2012-13). Banana is grown with rich biodiversity in NE Region of India. Maximum genetic variability of *Musa acuminata* and *M. balbisiana* occurs in NE India. *M. flaviflora* is localized to Manipur and Meghalaya (Asati & Yadav, 2011). Banana as a fruit is grown in all parts of Nagaland and is one of the major important fruit crop in Nagaland state. In Nagaland banana is cultivated in about 6,690 Ha, with an annual

production of 53,900 MT. The area under banana cultivation is high in kohima district followed by Mokochung and Wokha district respectively. (*Directorate of Horticulture, Government of Nagaland, 2012-13*). However due to the geographical isolation of the region from the main land India, farmers are encounter multiple production and marketing deficiencies which discourage farmers to take up large scale production. Therefore, an attempt is made in the present study to examine the economics of banana cultivation in Wokha district of Nagaland.

Objective: To study the economics of banana cultivation in Wokha district of Nagaland, India.

**Cite this article:** Murry, N., & Das, S. (2019). An Economics analysis of Banana Cultivation in Wokha District of Nagaland, India, *Ind. J. Pure App. Biosci.* 7(6), 140-145. doi: <http://dx.doi.org/10.18782/2582-2845.7873>

**MATERIALS AND METHODS**

The study on economics of banana cultivation was carried out in Wokha district of Nagaland, India. The sampling design (Dhondyal & Wills, 1967) and analytical techniques (Chandel, 1984) were followed. The study was conducted in tow R.D blocks viz. Wokha and Chukitong under Wokha district of Nagaland.

A sample of 60 banana growers was selected following multi stage stratified random sampling technique. In the first satge 2 R.D blocks viz; Wokha and Chukitong were selected. In the second stage, three villages from each block were selected by random sampling. Then in the final stage, list of banana farmers in the selected villages were considered which were selected randomly from the list of the selected banana growers. The selected farmers were divided into three groups viz. Marginal (0.01 to 1.00 ha), Small (1.01 to to 3.00 ha) and Medium (3.01 & above), respectively, based on the area under banana cultivation. *The cost of cultivation for banana was estimated with the help of cost concept used in farm management studies which were discussed as under:*

*Cost A<sub>1</sub>= It includes hired human labour + seed cost + marketing charges + transportation cost and depreciation + interest on working capital.*

*Cost B<sub>1</sub>= Cost A<sub>1</sub> + interest on fixed capital excluding land.*

*Cost B<sub>2</sub>= Cost B<sub>1</sub> + Rental value of owned land.*

*Cost C<sub>1</sub>= Cost B<sub>1</sub>+ imputed value of family labour.*

*Cost C<sub>2</sub>= Cost B<sub>2</sub>+ imputed value of family labour.*

*Farm business income= Gross return – CostA<sub>1</sub>.*

*Family labour income = Gross return – CostB<sub>2</sub>.*

*Net income = Gross return – Cost C<sub>3</sub>.*

**Benefit cost ratio:**

*Benefit cost ratio on variable cost= Gross income / Variable cost.*

*Benefit cost ratio on total cost= Gross income / Total cost.*

**RESULTS AND DISCUSSION**

For the purpose of drawing conclusive interpretation and results from the study the data obtained from the survey was subjected to various statistical tools. The findings from the study were presented as under.

**Economics of banana Cultivation:****Cost of banana Cultivation per hectare across various size group:**

In the present study the cost of inputs incurred for banana cultivation such as cost of planting material, human labour, marketing, interest on working capital were considered as a component of variable cost. Whereas, cost such as rental value of own farm land at the prevailing rate in study area, depreciation on implements and interest on owned fixed assets were considered for as component of fixed cost. The estimated of per hectare cost of banana cultivation of sample farmers in the study are presented in Table 1.

From the table 1 it shows that the per hectare cost of banana cultivation for the sample farmer was Rs. 58305.08, Rs. 58852.23, and Rs. 59966.57 respectively for marginal, small and medium group of farmer with an average of Rs. 59041.30. This indicate that the cost of production increased as increase in farm size increases. Kumar 2011, finding in the study on production of banana is also on similar trend. It is also evident from the table that on all average for all the groups of farmers, the inputs cost is found to be highest for family labour which accounts for Rs. 24670.41 (41.79%), followed by hired human labour Rs. 17640.01(29.88%), interest on working capital Rs. 5044.89 (8.54%), marketing cost Rs. 5681.35(9.62%) and planting material cost Rs. 2457.17 (4.16%) respectively. The share of variable cost and fixed cost for the cost of cultivation of banana was found out to be Rs. 55493.83 (93.99) and Rs. 3547.47 (6.01%) respectively. Sangolkar 2012, also reported similar finding on the study on Banana production in Wardha district of Maharashtra. The fact that the contribution of human labour encompasses the highest percentage which accounts for almost fifty per cent of the total cost is because in tribal

society like Nagaland farming is not available natural resources and intensive use of depending on external inputs and make use of family labour.

**Table 1: Item wise break up of per hectare cost of cultivation of banana across various Farm size groups**

Sl. No.	Particulars	Marginal	Small	Medium	Average	
<b>Variable cost</b>						
<b>A.</b>	1	Human Labour	24563.04	25124.04	24324.16	24670.41
		i) Family Labour	(42.13)	(42.69)	(40.56)	(41.79)
		ii) Hired Labour	16590.13	17043.01	19286.89	17640.01
			(28.45)	(28.96)	(32.16)	(29.88)
	2	Marketing cost	5922.83	5638.23	5482.98	5681.35
			(10.16)	(9.58)	(9.14)	(9.62)
3	Planting Material	2788.08	2455.15	2128.27	2457.17	
		(4.78)	(4.17)	(3.55)	(4.16)	
4	Interest on working capital	4986.41	5026.04	5122.23	5044.89	
		(8.55)	(8.54)	(8.54)	(8.54)	
5	<b>Total variable cost</b>	<b>54850.48</b>	<b>55286.47</b>	<b>56344.53</b>	<b>55493.83</b>	
		<b>(94.07)</b>	<b>(93.94)</b>	<b>(93.96)</b>	<b>(93.99)</b>	
<b>Fixed cost</b>						
<b>B.</b>	1	Rental value of owned land	2500.00	2500.00	2500.00	2500.67
			(4.29)	(4.25)	(4.17)	(4.23)
	2	Depreciation on implements	340.93	380.00	420.80	380.79
			(0.58)	(0.65)	(0.70)	(0.64)
3	Interest on fixed capital excluding land	550.00	900.00	690.00	713.34	
		(0.52)	(0.60)	(0.42)	(0.52)	
4	<b>Total fixed cost</b>	<b>3454.60</b>	<b>3565.76</b>	<b>3622.04</b>	<b>3547.47</b>	
		<b>(5.93)</b>	<b>(6.06)</b>	<b>(6.04)</b>	<b>(6.01)</b>	
<b>C.</b>	<b>Total cost(A+B)</b>	<b>58305.08</b>	<b>58852.23</b>	<b>59966.57</b>	<b>59041.30</b>	
		<b>(100.00)</b>	<b>(100.00)</b>	<b>(100.00)</b>	<b>(100.00)</b>	

The figure in the parenthesis indicate percentage in total.

**Farm profit Measures on sample farms:** The cost concept of Cost A<sub>1</sub>, Cost B<sub>1</sub>, Cost B<sub>2</sub>, Cost C<sub>1</sub> and Cost C<sub>2</sub>, were considered for the

purpose of analysing farm profit of banana cultivation. Farm profit measures of samples banana growers is represented in table 2.

**Table 2: Farm profit measures of samples banana growers (in Rs)**

	Particulars	Farm size group			
		Marginal	Small	Medium	Average
1	Average yield(q/ha)	123.98	122.52	118.07	121.52
2	Average price (per q)	1300.00	1300.00	1300.00	1300.00
3	Gross income per hectare	161174.00	159276.00	153491.00	157980.33
4	Total fixed cost (TFC)	3454.06	3565.76	3622.04	3547.27
5	Total variable cost (TVC)	54850.48	55286.47	56344.53	55493.83
6	Total cost (TFC+TVC)	58305.08	58852.23	59966.57	59041.30
7	Cost A <sub>1</sub>	30287.44	30162.43	32020.37	30823.42
8	Cost B <sub>1</sub>	30910.11	30847.56	32721.61	31490.10
9	Cost B <sub>2</sub>	33401.11	33347.56	35221.61	33990.10
10	Cost C <sub>1</sub>	55464.15	55971.60	57045.77	56160.51
11	Cost C <sub>2</sub>	57964.15	58471.60	59545.77	58660.51
12	Cost C <sub>3</sub>	63760.57	64318.76	65500.35	64526.56
13	Farm business income	130886.56	129113.5	240217.5	258476.67
15	Family Labour income	130272.89	128428.44	120769.39	126490.23
16	Net income	105709.85	103304.40	96445.23	101819.82
17	BCR based on variable cost	2.94	2.88	2.74	2.85
18	BCR based on total cost	2.76	2.71	2.56	2.68

It can be seen from table 2 that, the per hectare Cost  $A_1$  ranges from Rs. 30287.44 for marginal group, Rs. 30162.43 for small group and Rs. 32020.37 for medium groups of farmer with an average of Rs. 30823.42. The cost  $A_1$  was found out to be highest in medium and lowest in small group of farmers. The per hectare Cost  $B_1$  was found out to be Rs. 30910.11, Rs. 30847.56 and Rs. 32721.61 for marginal, small and medium group respectively with an average of Rs. 31490.10. The per hectare Cost  $B_2$  was found out to be highest in medium group which was Rs. 35221.61 and lowest in marginal group which was Rs. 33401.11. The average Cost  $B_2$  was found to be Rs. 33990.10 per hectare. The Cost  $C_1$  was Rs. 55464.15, Rs. 55971.60 and Rs. 57045.77 per hectare for marginal, small and medium group of farmers respectively with an average of Rs. 56160.51 per hectare in the study area. The per hectare Cost  $C_2$  was found out to be Rs. 57964.15, Rs. 58471.60 and Rs. 59545.77 per hectare for marginal, small and medium group respectively with an average for all the three groups of Rs. 58660.51 per hectare. The average of cost  $C_3$  for all groups of farmer was Rs. 64526.56 per hectare. Cost  $C_3$  for marginal, small and medium groups of farmer was Rs. 63760.57, Rs. 64318.76 and Rs. 65500.35 per hectare respectively. Cost  $C_3$  was found to be highest in medium group which was Rs. 65500.35 and lowest in marginal group which was Rs. 63760.57. Anil et al. (2011) and Naduvrnamani et al. (2007) also reported similar findings in the earlier study.

**Gross income:** The average yield of banana per hectare was found to be 123.98 q/ha, 122.52 q/ha and 118.07 q/ha for marginal, small and medium group of farmers respectively. The average yield for all the group of farmers was found to be 121.52 q/ha. Considering the prevailing price of banana in the study area which is Rs. 1300.00 per q the gross income was found to be Rs. 161174.00, Rs. 159276.00 and Rs. 153491.00 for marginal, small and medium group respectively with an average gross income of Rs. 157980.33. Rane and Bagade, 2006 in

their study on economics of production and marketing of banana in Maharashtra also revealed on similar findings. From the study it was revealed found out that gross income per hectare was highest in marginal group of farmer and lowest in medium group of farmer.

**Farm business income:** From the study it was found out that the farm business income was found to be highest for medium group of farmers which was Rs. 240217.5, followed by Rs. 130886.56 and Rs. 129113.5 for marginal and small farmers respectively. The overall farm business income for all the group of farmers was found to be Rs. 258476.67. Ahmedmukul and Rahman, 2013 also reported similar findings. The higher value of farm business income for the medium group of farmers as compared to that of marginal farmer is because of the fact that in case of bigger land holding the use of resources particularly variable inputs shows economies of scale in production process.

**Family labour income:** The family labour income per hectare was Rs. 130272.89, Rs. 128428.44 and Rs. 120769.39 per hectare for marginal, small and medium group of farmer respectively. The average family labour income was Rs. 126490.23 per hectare. Family labour income was highest in marginal group and lowest in medium group of farmer in the study area. This revealed that, marginal and small farmers employed more family labour, whereas medium group of farmer utilized more hired labour than owned labour for the cultivation of banana.

**Net return:** From the analysis it was found out that, the average net return obtain by the farmer from banana cultivation was found out to be Rs. 101819.82. The net return per hectare was highest for marginal group of farmers which was Rs. 105709.85 followed by Rs. 103304.40 and Rs. 96445.23 for small and medium group of farmer respectively. Guledgudda et al. (2002) also revealed similar findings on their research on economics of banana cultivation and its marketing in Haveri district of Karnataka.

**Benefit Cost ratio:** It was found out that, the benefit cost ratio over variable cost per

hectare from banana cultivation in the study area was found to be 2.94, 2.88 and 2.74 for marginal, small and medium group of farmer respectively. The average benefit cost ratio over variable cost was 2.85. The Benefit Cost Ratio over total cost for all the sample group of farmers in the study area was 2.68. The result from the finding of benefit cost ratio analysis implies that cultivation of banana is profitable in the study area. Mali et al. (2003) in their study on economics of production and marketing of banana in Jalgaon district of Western Maharashtra also reported similar findings.

### CONCLUSION

From the study on economics of banana cultivation in Wokha district of Nagaland, it was found out that, the per hectare cost of banana cultivation for the sample farmer Rs. 59041.30. It was concluded that, the inputs cost is found to be highest for family labour which accounts for Rs. 24670.41 (41.79%), followed by hired human labour Rs. 17640.01(29.88%), interest on working capital Rs. 5044.89 (8.54%), marketing cost Rs. 5681.35(9.62%) etc. The fact that the contribution of human labour encompasses the highest percentage which accounts for almost fifty per cent of the total cost is because in tribal society like Nagaland farming is not depending on external inputs and make use of available natural resources and intensive use of family labour. The average yield of banana farm in the study area was found to be 121.52 q/ha. Considering the prevailing price of banana in the study area which is Rs. 1300.00 per q the gross income was found to be Rs. 157980.33 with an average net return of Rs. 101819.82. From the analysis it was also concluded that the benefit cost ratio over variable cost was 2.85 and the benefit cost ratio over total cost was found to 2.68. The result from the finding of benefit cost ratio analysis implies that cultivation of banana is profitable in the study area.

**Author statement:** This manuscript is an original research work and has not been published or submitted in any other journal.

**Conflict of Interest:** There is no conflicts of interest associated with this publication.

**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

### REFERENCES

- Ahmedmukul, A.Z & Rahman, W. (2013). Production and Profitability of banana in Bangladesh-An economic analysis. *International journal of Economics, Finance and Management Sciences*. 1(3), 159-165.
- Anil, J. K., & Dileep, K. (2011). Economic Appraisal of Kinnow Production and its Marketing under NorthWestern Himalayan Region of Jammu. *Agricultural Economics Research Review*, 24 (1), 283-290.
- Asati, B.S., & Yadav D.S. (2011). Himalayan Ecology diversity of horticultural crops in north eastern region. *ENVIS Bulletin* 12(1), Division of Horticulture, ICAR Research Complex for NEH Region, Umroi Road, Umiam – 793103, Meghalaya
- Chandal, S.R.S. (1984). A Hand Book for Agricultural Statistics. Atul prakashan Mandir, Pandu Nagar, Kanpur.
- Dhondyal, S.P., & Wills, J.E. (1967). A Guide to Research Methodlogy in Agricultural Economics and other Social Sciences. Lions Publication, Kanpur.
- Guledgudda, S.S., Vishweshwar, Shripad & Olekar, J.N. (2002). Economics of banana cultivation and its marketing in Haveri district of Karnataka. *Indian Journal of Agricultural Marketing*. 16(1), 51-58.
- Kumar, G. (2011). Production and nutritive importance of banana in India. *International Journal of Commerce and Business Management* 4(2), 374-378.

- Mali, B.K., Bhosale, S.S., Shendage, P.N., & Kale, P.V. (2003). Economics of production and marketing of banana in Jalgaon district of Western Maharashtra. *Indian Journal of Agricultural Marketing*, 17(1), 68-70.
- Naduvrnamani, Raghavendra, & Mamle Desai, N.R. (2007). Economics of red banana production under the contract farming in Karnataka. *Karnataka Journal of Agricultural Sciences*. 20(4), 933.
- Rane, A.A., & Bagade, S.R. (2006). Economics of production and marketing of banana in Sindhudurg district, Maharashtra. *Indian Journal of Agricultural Economics*, 20(1), 38-45.
- Sangolkar, U.B. (2012). A study of Banana production and marketing in Wardha district of Maharashtra, International Research. *Journal of Agricultural Economics and Statistics*., 3(1), 72-76,