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Economic analysis of banana production from Western Maharashtra

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Abstract

The present study has been undertaken to estimate the input utilization, costs and returns of banana production from Western Maharashtra. The primary data on input utilization, cost of cultivation were collected by personal interview/survey method with the help of specially designed schedule for banana growers for the year 2016-17. For the estimation of cost of cultivation the standard cost concept *viz.*, cost-A, cost-B, cost-C and B: C ratio was used for estimation of cost and return structure. The results were presented with the averages, means and proportions etc. in tabular form. Cost of marketing was added to the cost of cultivation to arrive at the cost of production. The results of the study revealed that, per hectare magnitude of total human labour worked out to 344.07 man days. The use of bullock labour, machine power, number of seedlings/suckers, manures, micronutrients, irrigation charges and plant protection charges were 6.52 pairdays, 54.53 hrs. 3696.33 number of suckers, 621.26 q, ₹. 5737.17, ₹. 18015.19 and ₹. 6134.25, respectively. The use of potash (1579.03 kg.) was more than that of nitrogen (788.10 kg) and phosphorus (275.30 kg), at the overall level. Per hectare cost 'A', cost 'B' and cost 'C' was worked out to ₹. 365138.77 (59.99 %), ₹. 578824.00 (95.09 %) and ₹. 608704.48 at overall level, respectively. The B: C ratio was estimated to 2.06 at overall level while it was higher in large (2.10) than medium (2.04) and small (2.02) size group at total cost. It was clear that, banana was profitable crop as B:C ratios are greater than unity.

Keywords: input utilization, costs and returns from banana production

Introduction

Production of banana is long haul process and incorporates different strides. Developing bananas does not need much exertion but rather to accomplish significant returns requires skills, commitment and legitimate planting techniques. In old days, generally growers used suckers as planting material but in new era, tissue culture seedlings are suggested for planting as they are healthy, ailment free, uniform in development and early yielding. Banana production was upheld by a proficient water system framework such as drip irrigation, which keeps up the proportion of soil air and soil water for bringing lively growth of bundles on time. The planted yield prepares for harvest within 12-15 months of planting and the fundamental gathering period of banana is from September to April.

The nature of Indian agriculture is undergoing a change in recent years, indicated by number of recent studies. Maharashtra being one of the advanced state in agricultural production. By implication, changing agriculture means, at the micro level a farm is subjected to changes in input use structure over a period of time in response to technological advancement, price changes and agricultural, infrastructural development. This might have led to changes in input use structure depending upon the extent of technology transformation at the farm level. The physical quantities as well as monetary values of various inputs used, directly affect the cost of cultivation and therefore use of different inputs *viz;* human labour, bullock labour, machine, suckers, manures, fertilizers, irrigations, micronutrients and plant protection measures, etc. have been studied. The costs and returns are equally important in determining relative profitability from production and maintaining the banana orchard. In the view of the above, an attempt has been made in the present study, to note the variations in respect of input utilization, cost of cultivation and to compare the different costs and the profits at different costs with their net returns and benefit cost ratios of banana cultivation for present study.

Objective

To study the input utilization, costs and returns from banana production.

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Hypothesis

The input use, costs and returns from banana production differ on different size of the farms.

Methodology:

Banana is one of the most important fruit crop grown in Maharashtra. The Jalgaon, Pune and Solapur these three districts of Western Maharashtra were purposively selected for the study. On the basis of maximum area under banana cultivation the study was restricted to three tehsils from each district, thus forming total of nine tehsils. Further, based on availability of samples, two villages from each tehsil was selected which constituted total, eighteen villages from three districts for the present study.

The village wise list of banana growers were obtained from the Tehsil Agricultural Office. For present study, 15 growers were randomly selected from each village, i.e. 5 each from small (up to 1 ha.), medium (1.01 to 2.00 ha.) and large size group (above 2.01 ha.) on the basis of total area under banana cultivation of the sample banana growers. Thus, total 270 growers were selected for the present study (270 samples from which 90 each from small, medium and large size groups were selected, randomly). The primary data on input utilization, cost of cultivation were collected by personal interview/survey method with the help of specially designed schedule for banana growers for the year 2016-17.

For the estimation of cost of cultivation the standard cost concept viz., cost-A, cost-B, cost-C and B: C ratio was used for estimation of cost and return structure. The results were presented with the averages, means and proportions etc. in tabular form. Cost of marketing was added to the cost of cultivation to arrive at the cost of production.

Results and Discussion

Input utilization structure for banana

It is clear from the Table 1 that, per hectare magnitude of the male and female labour for banana cultivation on selected banana grower farms worked out to 185.03 and 159.04 man days, respectively. The use of bullock labour, machine power, number of seedlings/suckers, manures, micronutrients, irrigation charges and plant protection charges were 6.52 pairdays, 54.53 hrs. 3696.33 number of suckers, 621.26 q, ₹. 5737.17, ₹. 18015.19 and ₹. 6134.25, respectively at overall level. Among different plant nutrients used the use of potash (1579.03 kg.) was more than that of nitrogen (788.10 kg) and phosphorus (275.30 kg). It was observed that, fertilizer use was excess as compared to recommended levels (200:70:400 kg of NPK/ 1000 plants). Among the different size group, use of manure was higher in small (629.79 q/ha) as compared to large (626.34 q/ha) and medium (608.50 q/ha) size group, respectively.

Table 1: Input utilization structure for banana (Per ha)

Sr. No.	Particulars	Unit	Size group			Overall
			Small	Medium	Large	
1	Total human labour	Mandays	347.25	344.61	342.92	344.07
	a. Male		184.49	185.72	184.77	185.03
	b. Female		162.76	158.89	158.15	159.04
2	Bullock labour	Pairdays	10.36	6.07	5.78	6.52
3	Machine power	hrs.	43.10	54.51	57.54	54.53
4	Suckers	No.	3498.10	3562.15	3825.37	3696.33
5	Manures	Q	629.79	608.50	626.34	621.26
6	Fertilizers	kg.				
	N		803.99	793.25	780.97	788.10
	P		275.06	277.42	274.14	275.30
	K		1651.11	1575.67	1562.06	1579.03
7	Bio fertilizers/ Micronutrients	₹.	6201.60	5664.90	5656.89	5737.17
8	Irrigation charges	₹.	18269.30	17965.65	17977.01	18015.19
9	Plant protection charges	₹.	6231.96	6034.77	6165.76	6134.25

Except phosphatic fertilizer (275.06 kg/ha), the nitrogenous and potassic fertilizers (803.99 and 1651.11 kg/ha) were highly used in small as compared to medium (793.25, 277.42 and 1575.67 kg/ha) and large (780.97, 274.14 and 1562.06 kg/ha) size group, respectively.

Among the different size group of holdings, per hectare use of total human labour (347.25 mandays) and bullock labour (10.36 pairdays) were the highest in small as compared to medium (344.61 mandays and 6.07 pairdays) and large (342.92 mandays and 5.78 pairdays) size group, respectively. Also, it has been observed that, the expenditure on bio-fertilizers, micronutrients, irrigation and plant protection charges were more or less same among the size group. The use of machine power increased with the increase in size group and with decrease in bullock labour. It was concluded that, the major items of input for banana cultivation were human labour, seedlings, fertilizers and irrigation etc. Similar result found with Birari *et al.* (1999) [2]. The bullock labour has been replaced by various machineries viz., power tiller and other tractor operated equipment's also there was saving

in bullock labour due to drip irrigation than conventional farming. The labour requirement was less in drip farms because in addition to saving of labour in irrigation operation, ploughing and intercultivation as the number of these operations require less since drip method supplies water at the root zone of crops resulting less weeding problem also (Dave *et al.*, 2016) [4]. But, in present study findings are similar with Patil, 2005 [10]. Their findings revealed that, banana crop was labour intensive because operations like irrigation, weeding, planting, plant and fruit care operations requires lots of labour. So, human labour required round the year for various operations. The other important items of input were machine power, micronutrients and plant protection. The major varieties used for banana cultivation by the sample farm were Grand- Naine (G-9) tissue cultured variety, Basrai and Shrimanti. More than 90 per cent growers cultivated G-9 variety. The planting distance of 5 x 5 and 6 x 5 foot were mostly used in Jalgaon district to prevent heat and wind velocity and hence, the plantations are done at short distances (High density planting). Thus, the number of plants per

hectare was about 4375 and 3625, respectively. The planting distance of 7 x 5 foot was mostly used in Pune and Solapur districts. Thus, the number of plants per hectare was nearly about 3125. The prices of tissue culture plantlets were higher than traditional sucker's cultivation.

Cost of cultivation

The per hectare cost of cultivation of banana of different size group was worked out and the results are presented in Table

2.

It was seen from the Table 2 that, per hectare cost 'A', cost 'B' and cost 'C' was worked out to ₹. 365138.77 (59.99 %), ₹. 578824.00 (95.09 %) and ₹. 608704.48 at overall level, respectively. The share of major items of expenditure was rental value of land (34.34%), fertilizer (22.92 %), manure (9.29 %), total human labour (8.21 %) and suckers (7.90%) in total cost of cultivation, at overall level. These results are in conformity with Birari *et al.*, (1999) [2].

Table 2: Cost of cultivation of banana (₹/ha)

Sr. No.	Cost Item	Size Group							
		Small		Medium		Large		Overall	
		Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
1	Total hired human labour (mandays)	228.42	49537.21 (7.83)	228.88	50220.20 (8.32)	231.25	49908.13 (8.24)	230.11	49952.76 (8.21)
	a) Male	95.96	26659.92 (4.21)	95.84	26458.30 (4.38)	97.64	26177.41 (4.32)	96.84	26334.15 (4.33)
	b) Female	132.46	22877.29 (3.62)	133.04	23761.90 (3.94)	133.61	23730.72 (3.92)	133.27	23618.61 (3.88)
2	Bullock labour (pairdays)	10.36	5332.85 (0.84)	6.07	3192.63 (0.53)	5.78	3183.92 (0.53)	6.52	3493.49 (0.57)
3	Machine power (hrs.)	43.10	6838.18 (1.08)	54.51	9002.61 (1.49)	57.54	9356.42 (1.55)	54.53	8886.20 (1.46)
4	Suckers (No)	3498.10	45949.87 (7.26)	3562.15	47587.43 (7.88)	3825.37	49000.79 (8.09)	3696.33	48123.17 (7.91)
5	Manures (q)	629.79	58921.11 (9.31)	608.50	55879.58 (9.26)	626.34	56352.61 (9.31)	621.26	56571.44 (9.29)
6	Fertilizers (kg)								
	N	803.99		793.25		780.97		788.10	
	P	275.06	158157.76 (25.00)	277.42	139029.42 (23.03)	274.14	134901.44 (22.29)	275.30	139513.07 (22.92)
	K	1651.11		1575.67		1562.06		1579.03	
7	Bio fertilizers/Micronutrients (₹)		6201.60 (0.98)		5664.90 (0.94)		5656.89 (0.93)		5737.17 (0.94)
8	Irrigation charges (₹)		18269.30 (2.89)		17965.65 (2.98)		17977.01 (2.97)		18015.19 (2.96)
9	Plant protection charges (₹)		6231.96 (0.98)		6034.77 (1.00)		6165.76 (1.02)		6134.25 (1.01)
10	Incidental charges (₹)		5063.47 (0.80)		4323.87 (0.72)		4182.07 (0.69)		4352.27 (0.72)
11	Repairs (₹)		187.28 (0.03)		180.04 (0.03)		181.01 (0.03)		181.60 (0.03)
	Working capital		360690.60 (57.01)		339081.09 (56.17)		336866.06 (55.65)		340960.61 (56.01)
12	Int.on working capital @6%		21641.43 (3.42)		20344.87 (3.37)		20211.96 (3.34)		20457.64 (3.36)
13	Depreciation on imp. and machinery		5089.71 (0.80)		3531.85 (0.59)		3192.08 (0.53)		3569.29 (0.59)
14	Land revenue and other ceases		153.24 (0.02)		152.32 (0.03)		150.08 (0.02)		151.23 (0.02)
	Cost A		387574.98 (61.26)		363110.12 (60.15)		360420.18 (59.54)		365138.77 (59.99)
15	Rental value of land		208175.74 (32.90)		205148.84 (33.99)		211452.16 (34.93)		209013.16 (34.34)
16	Int. on fixed capital @10%		6497.70 (1.03)		4802.03 (0.80)		4118.68 (0.68)		4672.07 (0.77)

Sr. No.	Cost Item	Size Group							
		Small		Medium		Large		Overall	
		Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
	Cost B		602248.42 (95.19)		573061.00 (94.94)		575991.02 (95.15)		578824.00 (95.09)
17	Total family labour (mandays)	118.82	30449.96 (4.81)	115.72	30573.35 (5.06)	111.67	29333.19 (4.85)	113.96	29880.47 (4.91)
	a. Male	88.53	25008.75 (3.95)	89.88	25840.63 (4.28)	87.13	24899.58 (4.11)	88.19	25209.45 (4.14)
	b. Female	30.29	5441.21 (0.86)	25.84	4732.72 (0.78)	24.54	4433.61 (0.73)	25.77	4671.02 (0.77)
	Cost C		632698.38 (100.00)		603634.34 (100.00)		605324.21 (100.00)		608704.48 (100.00)
18	Output (q)								
	Main produce	1115.96	1249816.3	1112.23	1231701.3	1117.75	1269548.2	1115.77	1254895.39
	Bye produce	0.36	157.52	0.24	105.57	0.18	65.15	0.22	90.98
19	Cost C net bye produce		633737.79		603528.78		605259.06		608784.41
20	Per quintal cost (₹/q)		572.20		548.03		547.58		555.94

(Figures in parentheses are percentages to the total cost)

The per hectare total cost of cultivation of banana was highest in small (₹. 632698.38) followed by large (₹. 605324.21) and medium (₹. 603634.34), among the size group. It was mainly due to expenditure incurred was more on suckers/seedlings, manures and fertilizer inputs than other size group farms. As regards the various components of cost of cultivation, cost 'A'

was maximum i. e. ₹. 387574.98 in small followed by medium and large size group with ₹. 363110.12 and ₹. 360420.18, respectively. The per cent share of cost 'A' contributed in the total cost varied from 59 to 61 per cent of total cost of cultivation in three size group. However, it included most important items like hired human labour and suckers (7-8 %), manures (9 %), fertilizers (22-25%) and

irrigation (2-3 %) which share nearly 40 to 45 per cent, collectively. The cost on hired human labour is ₹. 49952.76 at overall level while in case of small, medium and large size group, it was found ₹. 49537.21, ₹. 50220.20 and ₹. 49908.13 per hectare, respectively and share in total cost of cultivation varied from 7 to 8 per cent. The fertilizer cost was next important item which contributed ₹. 158157.76, ₹. 139029.42, ₹. 134901.44 and ₹. 139513.07 in case of small, medium, large and at overall level, respectively and give its share from 22 to 25 per cent among the size group. The interest on working capital and depreciation on implements and machinery was more or less same except depreciation in small, a bit more than other size group. The share of interest on working capital was more in the case of small followed by the medium and large size group.

The cost 'B' shared 33 to 36 per cent in the total cost of cultivation which comprises of the rental value of land and interest on fixed capital. The reason for high rental value of land was that, high gross value of output of banana crop. Since, the value of banana production was high side, estimated rental value also turns out to be very high. The interest on fixed capital measures the interest for the investment in fixed items for initial supportive structure like drip irrigation and machinery and equipment, etc. Its share is 0.60 to 1.00 per cent of total cost of cultivation.

The cost 'C' includes the imputed value of family labour. Its share is 4 to 5 per cent. The per hectare imputed value of family labour was worked out to ₹. 30449.96, ₹. 30573.35 and ₹. 29333.19 for small, medium and large size group, respectively. The items of cost like rental value of land, planting material, manure, fertilizers were the major items of cost of cultivation in all the size groups of farms (Patil, 2005) [10]. The main yield (1115.77 q/ha) and bye produce (0.22 q/ha) were obtained at overall level, while in case of small (1115.96 and 0.36 q/ha), medium (1112.23 and 0.24 q/ha) and large (1117.75 and 0.18 q/ha) size group, respectively. Consequently, per quintal cost of cultivation of banana was found minimum for large size group (₹. 547.58) followed by medium (₹. 548.03), whereas small farmers invested ₹. 572.20 to produce one quintal of banana crop. There was significant increase in all items of cost as well as the level of cost A, B and C, per hectare yield was decreased, whereas the gross returns, net returns and per quintal cost of production

was increased (Birari *et al*, 1999) [2]. The study revealed that small banana growers incurred higher cost of production than medium and large size group. This was attributed to the more intensive use of inputs, effective personal supervision and farm management in small farms. Hence, the yield per hectare realized by small size group was also significantly larger than that of medium size group in physical and monetary terms.

It was expected that, as the size of farm increases, the cost of cultivation would decline. The opposite relationship between cost of cultivation and size of group, it was due to the various machineries, irrigation structure, initial investment for raising the new orchards were maximum as compared to the smaller size group. This indicated that, per hectare cost of cultivation of banana varies across the size group.

Profitability of banana cultivation

An attempt has been made to compare the different costs and the profits at different costs with their net returns and benefit cost ratios for banana cultivation. The details are given below. The per hectare costs, returns, gross income and B: C ratios of banana cultivation is presented in the Table 3 and graphically shown in fig 1. It was observed from the Table 3 that, the production of banana per hectare is highest on large size group of farms as compared to small and medium because of higher investment on hired labour, adopted new plant technology and optimum doses of fertilizers and manures. Similarly, per hectare gross income was also observed highest in large (₹. 1269613.42) followed by small (₹. 1249973.88) and medium (₹. 1231806.95) size group mainly due to the low cost of cultivation (₹. 605324.21/ha) in large than medium (₹. 603634.34/ha) and small (₹. 632698.38/ha) size group. The per hectare gross income received by the banana cultivators was ₹. 1254986.37 at the overall level. The cost showed decreasing trend with increase in size group of holdings. The per hectare profit at cost 'A', cost 'B' and cost 'C' were worked out to be ₹. 889847.60, ₹. 676162.36 and ₹. 646281.89 at overall level, respectively.

Among the different size groups profit was the highest in large (₹. 909193.23, ₹. 693622.40 and ₹. 664289.21) than medium (₹. 868696.83, ₹. 658745.96 and ₹. 628172.61) and small (₹. 862398.89, ₹. 647725.46 and ₹. 617275.50) size group, respectively. The profit decreased with decline in size group.

Table 3: Profitability of banana cultivation (₹/ha)

Sr. No.	Particulars	Unit	Size group			Overall
			Small	Medium	Large	
1	Production	Q	1115.96	1112.23	1117.75	1115.77
2	Gross income	₹.	1249973.88	1231806.95	1269613.42	1254986.37
3	Rate	(₹/q)	1120.09	1107.51	1135.86	1124.77
4	Cost					
	i) Cost 'A'	₹.	387574.98	363110.12	360420.18	365138.77
	ii) Cost 'B'	₹.	602248.42	573061.00	575991.02	578824.00
	iii) Cost 'C'	₹.	632698.38	603634.34	605324.21	608704.43
5	Profit at					
	i) Cost 'A'	₹.	862398.89	868696.83	909193.23	889847.60
	ii) Cost 'B'	₹.	647725.46	658745.96	693622.40	676162.36
	iii) Cost 'C'	₹.	617275.50	628172.61	664289.21	646281.89
6	B:C ratio					
	i) Cost 'A'		3.23	3.39	3.52	3.44
	ii) Cost 'B'		2.08	2.15	2.20	2.17
	iii) Cost 'C'		2.02	2.04	2.10	2.06

The B: C ratio was estimated to 2.06 at overall level while it was higher in large (2.10) than medium (2.04) and small

(2.02) size group at total cost. The lower per hectare cost of cultivation in large size group has resulted into higher B: C

ratio, even though the productivity was more on small size group. The B: C ratio was obtained with ascending trend from small to large size group of banana growers. From the above discussion, it was clear that banana was profitable crop as the output input ratios are greater than unity. The similar conclusions drawn by Kurakute (2009) [8], Hanumantraya and

Kerutagi (2007) [7], Bondar *et al*, 2015 [3] and findings were in opposite with Patil and Desle (2002) [9]. In their study, among the size group of land holding, benefit cost ratio was highest in small size group (1.52) and lowest in large size group due to intensive cultivation for banana help to obtain more returns.

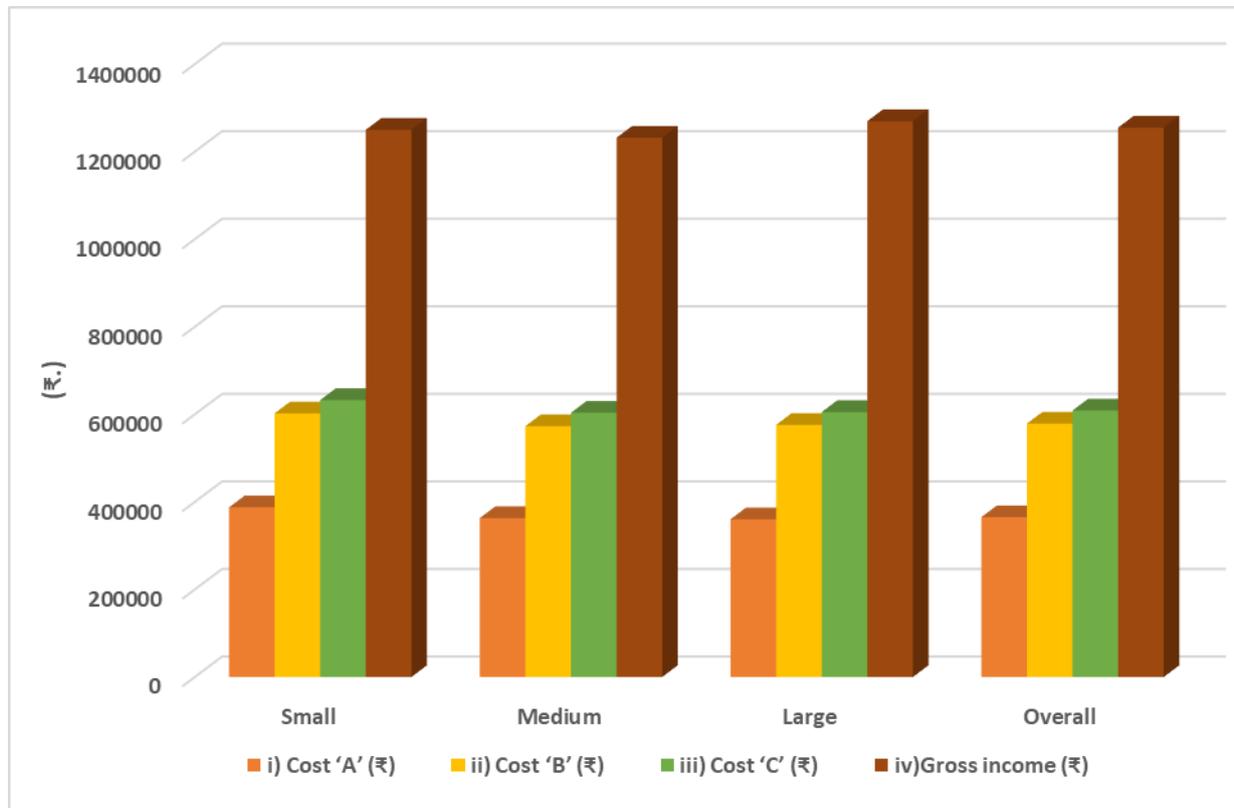


Fig 1: Profitability of banana cultivation

Thus, the null hypothesis put forth that; the input use, cost and return structure of banana production differ on different size of farms have been proved and accepted as similar results were found with Kurakute (2009) [8].

Summary

- The per hectare average human labour utilized for banana cultivation was estimated to 344.07 mandays, at overall level. It was 347.25, 344.61 and 342.92 mandays in small, medium and large size group, respectively. At overall level, the magnitudes of the use levels of inputs *viz.*, bullock labour (6.52 pairdays), machine power (54.53 hrs.), tissue culture seedlings/suckers (3696.33 sets), manures (621.26 q), bio-fertilizers/micronutrients (₹. 5737.17), irrigation charges (₹. 18015.19) and plant protection charges (₹. 6134.25), respectively. Amongst the different plant nutrients used at overall level, the use of nitrogen and potash was at par (788.10 kg and 1579.03 kg), while the phosphorus use was (275.30 kg).
- The per hectare cost of cultivation of banana was worked to the tune of ₹. 608704.48, in which cost 'A' (₹. 365138.77) and cost 'B' (₹. 578824.00) was shared to the extent of 59.99 and 95.09 per cent at overall level, respectively. It was ₹. 632698.38, ₹. 603634.34 and ₹. 605324.21 in small, medium and large size groups, respectively. The per hectare yield of banana was 1115.77 q/ha, at overall level. The productivity of banana in small, medium and large size group were 1115.96,

1112.23 and 1117.75 q/ha., respectively.

- The per hectare average gross income received by banana growers was ₹. 1254895.39 at overall level. It was ₹. 1249816.30, ₹. 1231701.30 and ₹. 1269548.20 in small, medium and large size group, respectively. The average per quintal cost of cultivation of banana was ₹. 555.94, whereas, it was found minimum for large (₹. 547.58) followed by medium (₹. 548.03) and small (₹. 572.20) size group, respectively. The B: C ratio was highest in large (2.10) as compared to small (2.02) and medium (2.04) size group with average B: C ratio of 2.06. This shows that, the earning from per rupee investment in large size group was more than small and medium size groups due to economies of scales.

Conclusions

- Among the different size group of holdings, per hectare use of total human labour (347.25 mandays) and bullock labour (10.36 pairdays) were the highest in small size group. Also, it has been observed that, the expenditure on bio-fertilizers, micronutrients, irrigation and plant protection charges were more or less same for each size group. It was concluded that, the major items of input for banana cultivation were human labour, seedlings, fertilizers and irrigation while other important items of input were machine power, micronutrients and plant protection etc. The bullock labour has been replaced by various machineries *viz.*, power tiller and other tractor

operated equipment's. The major varieties used for banana cultivation by the sample farm were Grand- Naine (G-9) tissue cultured variety, Basrai and Shrimanti. More than 90 per cent farmers used G-9 variety for cultivation. The planting distance of 5 x 5 and 6 x 5 were mostly used in Jalgaon district to prevent temperature and wind speed in orchard, the bananas are planted in garden at short distances (High density planting). Thus, the number of plants per hectare was about 3625 and 4375 and the planting distance of 7 x 5 was mostly used in Pune and Solapur district. Thus, the number of plants per hectare was about 3125. The prices of tissue culture plantlets were higher than traditional sucker's cultivation. There existed a maximum variability in input use structure of banana among different size group of farms.

- ii. It was expected that, as the size of farm increases, the cost of cultivation would decline. But it was not found in the present study, it was due to the various machineries, irrigation structure, initial investment for raising the new orchards were maximum as compared to the smaller size group. This indicated that, the per hectare cost of cultivation of banana differ across the size group. In different items of cost, rental value of land, planting material, manure and fertilizers were the major items of cost of cultivation in all the size group of farms. The reason for high rental value of land was high gross value of output. Since the value of banana production was high, estimated rental value also turned out to very high. In sum up, it was observed that, there existed a wide variation in the production cost of banana among different size group.
- iii. Per hectare gross income received by the banana cultivators was ₹. 1254895.39 at the overall level. The lower per hectare cost of cultivation in large size group has resulted in to higher B: C ratio (2.10). Small banana growers incurred higher cost of production than medium and large size group, it was due to more intensive use of inputs, effective personal supervision and small farm management. Hence, the yield per ha realized by small size group was significantly larger than that of medium size group in physical and monetary terms. Hence, it was clear that banana was profitable crop as the average output input ratios are greater than unity (2.06).

Policy Implication

- i. The tissue culture seedlings supply, if possible co-operative fruit sale societies could tie up with private company and ensure its availability to the banana growers at required time and reasonable prices. In case of water soluble fertilizers, its import if channelized through banana co-operatives will help to reduce the price of fertilizers. This will also help in minimizing the cost of production of banana.

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