



AN ECONOMIC ANALYSIS OF GARLIC CULTIVATION IN KOHIMA DISTRICT OF NAGALAND

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Received: 11/08/2017

Edited: 16/08/2017

Accepted: 25/08/2017

Abstract: The study was conducted during the agricultural year of 2013-14 in Kohima district of Nagaland. The study was comprised of 60 sample farmers from two blocks, namely, Sechi-Zubza and Jakhama. Three villages were selected from each block and 10 farmers were randomly selected from each village. The selected farmers were classified into three groups, namely, Marginal (0.01-1ha), Small (1.01-2ha) and Medium (2.01ha & above) based on the land holding. The different cost concepts and concepts of income were used. The total available land for use was 167.9 ha. The total area of garlic cultivation was 3.3 ha (1.97%). The total garlic production was 74.9q. The average total garlic production across various size groups was 23.61q. On average for all sample groups of farmer, the total cost of garlic production per hectare was estimated at Rs 75,841, and the average yield was 23.95q with gross income of Rs 2,15,520. The average net return from garlic cultivation was Rs 1,51,071.72. The average benefit-cost ratio based on total cost was 2.86.

Key words: Garlic, production, economics, benefit-cost ratio.

Introduction:

Garlic (*Allium sativum* L.) is known as one of the most important bulbous spice crops in the world. In Nagaland, during 2013-14, the area and production of garlic were 250 ha and 2500 MT respectively (Anonymous, 2014). India is placed in second by area, production and productivity of garlic in the world (Anonymous, 2016). It is globally used for its pungent and spicy flavour as a seasoning or condiment which has higher nutritive value than other bulb crops. It is said to have antibiotic substances for which it is usually used for medicinal purposes.

Material & Methods:

The study was conducted in Kohima district of Nagaland covering two blocks, namely, Sechi-Zubza and Jakhama, during 2013-14. The study adopted multi-stage sampling while selecting 60 garlic growers from six (6) villages which have sufficient garlic growers. The randomly selected farmers were further stratified into three groups namely, Group I, marginal (less than 1 ha), Group II, small (1.01 - 2 ha) and Group III, medium (2.01 ha and above) based on the area under land holding by using cumulative root frequency rule (Gupta and Kapoor, 2001). The different cost concepts and concepts of income were used (Sudheer, 2015).

Table 1: Land holding pattern across various size groups (Field Survey: Punyü, 2015)

Group	Land holding (ha)	No. of sample farmers
Marginal	<1	9 (15)
Small	1.01-2	19 (31.67)
Medium	2.01 and above	32 (53.33)
Total		60 (100)

(Figures in parentheses indicate percentage to the total)

Results and Discussion

Area and production of garlic across various size groups: Table 2 showed that the total production of garlic was 74.9q from the total area of garlic cultivation of 3.3 ha. The average production of garlic was 22.69q. The highest in production was

medium with 38.6q (51.53%) and the least was marginal 12.6q (16.82%). The area under garlic cultivation was the highest in medium with 1.9 ha (53.33%) and the lowest in marginal 0.51 ha (15.57%).

Table 2: Area for garlic production across various size groups (ha) (Field Survey: Punyü, 2015)

Size group	No. of sample farmers	Total area of garlic cultivation (ha)	Production (q)	Average (q)
Marginal	9 (15)	0.51 (15.45)	12.6 (16.82)	24.70
Small	19 (31.67)	0.92 (27.88)	23.7 (31.64)	25.76
Medium	32 (53.33)	1.9 (57.57)	38.6 (51.53)	20.32
Total	60 (100)	3.3 (100)	74.9 (100)	22.69

(Figures in parentheses indicate percentage to the total)

Economics of garlic production

Across various size groups cost of cultivation was estimated based on various cost concepts like Cost-A, Cost-B and Cost-C along with per hectare gross and net income following tabular analysis (Sangtam *et al.*, 2012) and are discussed below.

Cost of garlic production across various size groups

The cost of production included the cost of inputs like seeds, human labour, FYM, interest on working capital, rental value of land, depreciation on implements and interest on owned fixed assets.

Table 3 revealed that average cost of production per hectare was Rs.75,841.97, where the

cost of family labour constituted the highest being 54.85 per cent, followed by hired labour 24.86 per cent, interest on working capital by 9.19 percent, planting material by 4.26 per cent and FYM by 2.88 per cent. Out of total cost the share of variable cost and fixed cost was estimated to be 95.90 per cent and 4.10 per cent respectively. Among fixed cost, rental value was the most important cost item at 3.24 per cent.

It was estimated that per hectare cost of garlic production was Rs. 71,031.86, Rs. 74,995.65 and Rs. 81,498.43 for marginal, small and medium groups respectively.

Table 3: Item wise break up cost of garlic cultivation across various size groups (Rs) (Field Survey: Punyü, 2015)

SI No	Particulars	Marginal	Small	Medium	Average	
A	Variable Cost		39130.43 (55.08)	41416.89 (55.23)	44260.27 (54.31)	41602.53 (54.85)
	1	Human labour				
		(i) Family labour	16304.34 (22.95)	18119.85 (24.16)	22130.01 (27.15)	18851.41 (24.86)
		(ii) Hired labour				
	2	FYM expenditure	1956.52 (2.75)	2381.47 (3.17)	2213.12 (2.71)	2183.70 (2.88)
	3	Planting materials	4043.47 (5.69)	3209.80 (4.28)	2434.30 (2.98)	3229.19 (4.26)
	4	Interest on working capital	6527.53 (9.19)	6752.85 (9.00)	7324.50 (8.98)	6868.29 (9.05)
5	Total Variable Cost	67962.29 (95.68)	71880.90 (95.85)	78362.2 (96.15)	72735.12 (95.90)	

B	Fixed Cost		2300	2300	2300	2300
	1	Rental value of owned land	(3.24)	(3.24)	(3.24)	(3.24)
	2	Depreciation on implements	312.32 (0.44)	325.41 (0.43)	335.13 (0.41)	324.29 (0.43)
	3	Interest on fixed capital excluding land	457.25 (0.64)	489.34 (0.65)	501.10 (0.61)	482.56 (0.64)
	4	Total Fixed Cost	3069.57 (4.32)	3114.75 (4.15)	3136.23 (3.85)	3106.85 (4.10)
C	1	Total cost (A+B)	71031.86 (100)	74995.65 (100)	81498.43 (100)	75841.97 (100)

(Figures in parentheses indicate percentage to the total)

Profit measures of sample groups: Table 4 revealed profit measures and cost concept of Cost A₁, Cost B₁, Cost C₁, Cost C₂, of sample groups from garlic production.

Table 4: Profit measures of sample groups (Rs) (Field Survey: Punyü, 2015)

Particulars	Farm size groups			
	Marginal	Small	Medium	Average
Average yield (q/ha)	25.2	26.33	20.31	23.95
Average price (per q)	9000	9000	9000	9000
Gross income (per ha)	226800	236970	182790	215520
Total fixed cost (TFC)	3069.57	3114.75	3136.23	3106.85
Total variable cost (TVC)	67962.29	71880.90	78362.20	72735.12
Total cost (TFC + TVC)	71031.86	74995.65	81498.43	75841.95
Cost A ₁	27187.66	28407.95	32223.94	29273.18
Cost B ₁	27644.91	28897.29	32725.04	29755.75
Cost B ₂	29944.91	31197.29	35025.04	32055.74
Cost C ₁	66775.34	70314.18	76985.31	71358.28
Cost C ₂	69075.34	72614.18	79285.31	73658.28
Cost C ₃	75752.53	79645.59	86983.84	80793.98
Family business Income	199612.34	208562.05	150566.06	186246.82
Family Labour Income	199155.09	208072.71	150064.96	185764.25
Net Income	160024.66	166655.82	126534.69	151071.72
BCR based on variable cost	3.34	3.29	2.34	2.99
BCR based on total cost	3.19	3.16	2.24	2.86

Cost A₁ : The average cost A₁ per hectare was estimated at Rs. 29,273.18. The cost A₁ was observed to be the highest in medium and the lowest in marginal. It was observed that among the various items of cost A₁ in garlic production, value of family labour was the highest at Rs 41,602.53 per hectare. The cost A₁ per hectare increased with the increase in farm size as a result of more family labour utilized by all groups.

Cost B₁ : The per hectare cost B₁ was estimated with inclusion of interest value of own capital asset excluding land to Cost A₁ which was the highest in medium (Rs 32,725.04) and the lowest in marginal (Rs 27,644.91). The average Cost B₁ was Rs 29,755.75 per hectare.

Cost B₂ : The per hectare Cost B₂ with inclusion of rental value of owned land to Cost B₁ was the highest in medium (Rs 35,025.04) and the lowest in marginal (Rs 29,944.91). The average of Cost B₂ was Rs 32,055.74 per hectare.

Cost C₁ : The per hectare Cost C₁ was worked out by including the imputed value of family labour to cost B₁. The average for all groups was estimated to be Rs 71,358.28 per hectare.

Cost C₂ : The per hectare Cost C₂ was worked out by including the imputed value of family labour to Cost B₂. The Cost C₂ was the highest in medium (Rs 79,285.31) and the lowest in marginal (Rs 69,075.34). The average was estimated to be Rs 73,658.28 per hectare.

Cost C₃ : Cost C₃ was worked out by including Cost C₂ to 10 percent of the total cost on account of managerial function performed by the farmers. The average of Cost C₃ for all groups was Rs 80,793.98 per hectare.

Gross income

The average yield per ha was 23.95q while gross income was Rs 2,15,520. Considering the prevailing price of garlic was Rs 9,000 per q in the study area, the study revealed that per hectare gross income was the highest in small (Rs 2,36,970) and the lowest in medium (Rs 1,82,790).

Family labour income

The family labour income was calculated by deducting cost B₁ from gross income. The average family labour income was Rs 1,85,764.25 per hectare. It was observed that the family labour income was the highest in small and the lowest in medium.

Net income

The average net income was Rs 1,51,071.72. The net income per hectare was the highest in small (Rs 1,66,655.82) and the lowest in medium (Rs 1,26,534.69).

Benefit cost ratio

The benefit cost ratio over variable cost was 3.34, 3.29 and 2.34 for marginal, small and medium groups respectively. The average BCR over variable cost was 2.99. The benefit cost ratio over total cost was the highest in marginal (3.19) and the lowest in medium (2.24). The average BCR based on total cost was 2.86.

Conclusions

The following conclusions emerged from the study:

1. The per hectare total cost of garlic production in the average of all sample groups was Rs. 75,841.97. Amongst all the input items, the share of family labour cost constituted the highest (54.85 per cent) in the total variable cost.
2. The average gross income per hectare from garlic cultivation was Rs 2,15,520. The study revealed that per hectare gross income was the highest in small (Rs 2,36,970) and the lowest in medium (Rs 1,82,790).
3. The average net income from garlic cultivation was Rs 1,51,071.72. The net income per hectare was the highest in small (Rs 1,66,655.82) and the lowest in medium (Rs 1,26,534.69). Garlic cultivation was economically profitable in the study area.
4. The average benefit cost ratio from garlic production based on variable cost was 2.99 while the benefit cost ratio based on total cost was 2.86. The benefit cost ratio over variable cost was the highest (3.34) in marginal group and the benefit cost ratio based total cost was the highest (3.19) in marginal group.
5. Garlic cultivation was profitable in the study area and more profitable particularly for smaller size groups.

Policy Implications

The above results showed that garlic cultivation was economically profitable to the garlic growers and therefore, appropriate strategy should be undertaken by the concerned department for more production and better marketing so that the farmers would get better price of their produce.

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