



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; SPI: 2858-2861

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Economic analysis of green pea production in Jabalpur district of Madhya Pradesh

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Abstract

The present study is based on economic analysis of green pea production in Jabalpur district of Madhya Pradesh in the year of 2014-15. The primary data related to cost and returns of green pea crop was collected from 60 green pea farmers of five villages of Jabalpur district under three size of groups, each group containing 20 farmers in each class. The results showed that green pea production on sample farm was 105910.97 Rs/ha which was increased as the farm size increased. The average net income was found 94256.26 Rs/ha and in case of small, medium and large farmer was 99629.17 Rs/ha, 95660.05 Rs/ha and 87479.58 Rs/ha respectively. Average input-output ratio was 1:1.80 per cent. Input-output ratio of green pea varied from 1:1.90 per cent to 1:1.70 per cent. It was observed that input-output ratio was found minimum in large farmers revealing to extra ordinary difference between the different size farms.

Keywords: Green Pea production, Cost concepts, Profitability, Benefit-cost ratio.

Introduction

Pea probably originated in southwestern Asia, possibly north-western India, Pakistan or adjacent areas of former USSR and Afghanistan and thereafter spread to the temperate zones of Europe (Kay, 1979; Makasheva, 1983). Based on genetic diversity, four centres of origins, namely, Central Asia, the Near East, Abyssinia and the Mediterranean have been recognized (Gritton, 1980). Non-pigmented peas to be used as a vegetable were grown in United Kingdom in the middle Ages (Davies *et al.* 1985). Pea was introduced into the Americas soon after Columbus and a winter type pea was introduced from Austria in 1922. Pea was taken to China in the first century (Makasheva, 1983). Pea were reported to be originally cultivated as a winter annual crop in the Mediterranean region (Smart, 1990). Pea is the fourth leading legume in terms of consumption in the world and an important vegetable and field crop of India. Total area of pea in the country is 420.9 thousand hectare with the production of 4006.2 thousand metric tonnes and productivity of this crop 9.5 in metric tonnes per hectare while in Madhya Pradesh this crop covers is 53.45 thousand hectare with the production of 534.00 thousand metric tonnes and productivity of this crop 10.00 in metric tonnes per hectare (Anonymous, 2013). Green pea is cultivated in the area of 2.24 million hectares with the production of 16.97 million tonnes and productivity 7.6 t/ha in 2011. The major green pea producing countries in the world; China, India, UK, USA and Egypt (Source; Vegetable Statistics, 2011, IIVR). Green pea is cultivated in the area of 370000 hectares with the production of 3571000 tonnes and productivity 10 t/ha in 2011 (Source; Vegetable Statistics, 2011, IIVR). Green pea is cultivated in the area of 57802 hectares with the production of 5.809 lakh tonnes and productivity 10.05 metric tonnes/ha in 2014-15. M.P. is the second largest green pea producing state of India (Source; MP Horticulture statistics, 2014-15). The main production areas in MP are Jabalpur & Tikamgarh. (Source; National Horticulture Mission, 2005). Pea is a major rabi crop of Mahakoshal region of MP (Source; MP Horticulture Statistics, 2014-15). In Patan block of Jabalpur District, it is cultivated in the area of 7000 hectares with the production of 42000 metric tonnes in 2014-15. (Source; Office of Deputy Director of Horticulture, Jabalpur (M.P.), 2014-15).

Pea occupy a position of considerable value because of its importance in the agricultural economy of the state like Madhya Pradesh. The importance of Peas as pulse and as a vegetable crop in human diet. It is a major pulse crop of Jabalpur district and Patan block in particular where it is grown for both vegetable and pulse purpose and is highly remunerative. Farmers, by adopting improved package of practices getting expect yield about 100 quintal green pea per hectare but "Field pea" can be about 20-25 quintal grain from per hectare of land.

Methodology

For the present study, primary data were collected from green pea growers. The investigation

was conducted purposively in Patan block of Jabalpur district because, it has the larger area under green pea in the district. Three villages were selected randomly the selected district. A list of green pea growers was prepared and further categorized in to three size of group on the basis of size of land holding. In addition, a sample consisting of 20 farmers were selected from each village i.e., Barhi, Chandwa and Gwari using multistage sampling technique. Thus, total 60 farmers were considered for detailed investigation to fulfill the stated objectives.

Concepts used in study

Imputed cost

Include the value of family labour /managerial input of the farmer, rent of owned land and interest on owned fixed capital for which the farmer does not incurred any cash expenses.

Total cost

The sum of fixed and variable costs make total cost for producing per hectare crop or per unit /number of livestock.

I Cost analysis

A. Operational cost

It are the expenses related to the costs of running a business operations. These are two types fixed costs and variable costs.

(1) **Fixed costs:** These costs are related to fixed resources and overhead costs. Rent, interest, depreciation, taxes and wages of the permanent labour constitute fixed costs.

(2) **Variable costs:** These costs are related to the variable resources and changes with the level of output.

$$\text{Cost of production (Rs/q)} = \frac{\text{Total cost}}{\text{Yield}}$$

Profitability concept

1. **Total production:** Total quantity of output produced by a firm for a given quantity of inputs.

Total production = Main product + by product

2. **Gross income:** It is the total value of main product and value of by product.

Gross Income = Value of main product + Value of by product

3. **Net income:** It is net profit after deduction of all cost items, variable and fixed gross income.

Net Income = Gross Income – Total Cost

4. **Cost of production (Rs/q):** The expenditure incurred in producing a unit quantity of output is called cost of production.

$$\text{Cost of production (Rs/q)} = \frac{\text{Total cost}}{\text{Yield}}$$

Average variable cost: It is the amount spent on the variable inputs to produce an unit of output.

$$\text{Average variable cost} = \frac{\text{Total Variable cost}}{\text{Yield}}$$

(b) Average fixed cost

$$\text{Average fixed cost} = \frac{\text{Total fixed cost}}{\text{Yield}}$$

Cost concepts

Cost A₁: All actual expenses in cash and kind incurred in production by owner operator.

Cost A₂: Cost A₁ + rent paid for leased in land.

Cost B₁: Cost A₂ + interest on value of owned fixed capital assets (excluding land)

Cost B₂: Cost B₁ + rental value of owned land.

Cost C₁: Cost B₁ + imputed value of family labour.

Cost C₂: Cost B₂ + imputed value of family labour.

Cost C₃: Cost C₂ + 10 percent of cost C₂ to account for managerial input of the farmer.

Cost C₃ is more comprehensive and represents the total cost of cultivation. It is very important when farming is considered to be strictly commercial preposition.

Benefit cost ratio

B.C.R. =	Gross income
	Total cost

Result and Discussion

Cost and return of Green pea production

Table 1 show that the family labour was maximum used in small size (73 days) followed by medium size (56 days) and large size (41 days). Hired human labour increased as per increase in the size of farm from 48 days, 72 days and 91 (small, medium and large). Total human labour days employment was maximum in large size (132 days) followed by medium (128 days) and small size (121 days), respectively. Machine power cost was maximum in large size (Rs. 5413) followed by medium (Rs. 3997) and small size (Rs. 3541), respectively. Seed cost was maximum in large size (Rs. 19351) followed by medium size (Rs. 17626) and small size (Rs. 17513), respectively. Plant protection charges was maximum in large size (Rs. 1477) followed by medium size (Rs. 1439) and small size (Rs. 1258), respectively. Manures & fertilizers cost was maximum in large size (Rs. 9671) followed by medium size (Rs. 8344) and small size (Rs. 6790), respectively. Irrigation charge was maximum in large size (Rs. 5512) followed by medium size (Rs. 4757) and small size (Rs. 4143) group, respectively.

On the basis of above observation the conclusion is that small size farm invested more, on human labour, Higher allocation on human labour was a result of sufficient availability of family labour.

Table1: Inputs use under different size of farms for Green pea cultivation (Rs/ha)

Sr No.	Particular	Small	Medium	Large	Average (Rs/ha)
1.	Family labour (days)	73	56	41	56.66
	Hired labour (days)	48	72	91	70.33
	Total human labour(days)	121	128	132	132.00
2.	Machine powercost(Rs.)	3541	3997	5413	4317.00
3.	Seed (Rs.)	17513	17626	19351	18163.33
4.	Plantprotection(Rs.)	1258	1439	1477	1391.33
5.	Manures & Fertilizers (Rs.)	6790	8344	9671	8268.33
6.	Irrigation (Rs.)	4143	4757	5512	4804.00

Table 2 show that the Hired human labour cost in the form of wage was substantially higher in large size farm Rs. 18200 (maximum) and Rs. 9600 in small size (minimum) and

medium size farm Rs. 14400. Land revenue was maximum in large size (Rs. 27) followed by medium size (Rs. 21.5) and small size (Rs. 21), respectively.

Table 2: Cost of Cultivation of Green pea under different size farms (Rs/ha)

S No.	Cost item	Small	Medium	Large	Average (Per (Rs/ha))
A. Labour cost					
1.	Value of family labour	14600	11200	8200	11333.33
2.	Value of hired human labour	9600	14400	18200	9746.66
3.	Value of machine Operation (H+ O)	3541	3997	5413	4317.00
4.	Other variable cost	1544	1758	1831	1711.00
	Sub total	29285	31355	33644	31428.00
B. Material Cost					
1.	Value of Seeds	17513	17626	19351	18163.33
2.	Value of fertilizer & manure	6790	8344	9671	8268.33
3.	Value of plant protection	1258	1439	1477	1391.33
4.	Irrigation charges	4143	4757	5512	4804.00
	Sub total	29701	32180	36020	32633.66
C. In-direct cost					
1.	Taxes, land revenue	21	21.5	27	23.16
2.	Depreciation	2401	2566	3404	2790.33
3.	Interest on working capital (@ 5%)	2219.30	2616.75	3073.20	2636.41
4.	Rental value of own land (1/6 of Gross income)	34875	35229.16	35275	35126.38
5.	Interest on fixed capital (@ 10%)	1153	1227	1439	1273.00
	Sub total	40669.30	41660.41	43218.20	41849.30
	Grand total	99655.30	105195.41	112882.20	105910.97

Table 3 show that the operational cost known as cost A_1/A_2 accounted for Rs. 49027.30 in small size followed by Rs. 57539.25 in medium size and Rs. 67968.20 in large farm size. Cost B_1 a sum of cost A_1 and interest on fixed capital amounted for Rs. 1153 in small size, Rs. 1227 in medium and Rs. 1439 in large size group. Cost B_2 a sum of cost B_1 and rental value of own land amounted for Rs. 34875 in small size, Rs. 35229.16 in medium and Rs. 35275 in large size group. The cost C_1 and C_2 was found maximum in large size farm (Rs. 77607.20 and Rs. 112882.20) and minimum in small size (Rs. 64780.30 and Rs. 99655.30) and medium size farm (Rs. 69966.25 and Rs. 105195.41) respectively. Cost C_3 known as total cost per hectare accounted for Rs. 109620.83, Rs. 115714.95 and Rs. 124170.42 small, medium and large size groups respectively.

On the basis of foregoing discussion the major component of cost C_3 (total), operational cost known as A_1/A_2 and Cost B_1 , B_2 & C_2 maximum in large farm followed by medium and small respectively.

Table 3: Cost of Cultivation of Green pea according to cost concept

S No.	Cost	Size group (Rs/ha)			
		Small	Medium	Large	Average
1.	Cost A_1 (A_2)	49027.30	57539.25	67968.20	58178.25
2.	Cost B_1	50180.30	58766.25	69407.20	59451.25
3.	Cost B_2	85055.30	93995.41	104682.20	94577.63
4.	Cost C_1	64780.30	69966.25	77607.20	70784.58
5.	Cost C_2	99655.30	105195.41	112882.20	105910.97
6.	Cost C_3	109620.83	115714.95	124170.42	116502.06

Table 4 showed that the productivity of green pea in term of yield per hectare was small size group 93 q/ha followed by 95 q/ha and 102 q/ha in medium and large size farm, respectively. Gross income a sum of yield multiplied by unit price of green pea had also denoted in the same pattern as followed in productivity. In small size group the obtained gross income was Rs. 209250, medium size group the gross income was Rs. 211375 in medium size and Rs. 211650 in large size. On the basis of various costs as observe in input

wise cost Table as per their cost concept net return per hectare recorded in the order of Rs. 99629.17 for small size Rs. 95660.05 in medium size and Rs. 87479.58 in large size. The benefit cost ratio was higher in the case of small size group 1:1.90 (maximum) followed by 1:1.82 in medium and 1:1.70 (minimum) in large size group.

On the basis of above discussion the conclusion is that net return over cost A_1/A_2 and net return on cost C_3 was comparatively higher in small size farm. The additional bonus point gone in the favours of small size group was higher benefit cost ratio in small size farm indicate that inspire of financial crisis and other constraints this category of farm organized and managed its farm operation effectively compared to medium large size farms in the cultivation of green pea crop. Involvement of higher human labour in this category indicates that under the situation of zero opportunity cost of family labour was appreciably utilized in this category with this intension that in cash payment term it required nothing except food and shelter which was a fixed liability of green pea growers.

Table 4: Profitability of green pea crop under different size groups

Particulars	Size group(Rs/ha)			
	Small	Medium	Large	Average (Rs. (Rs/ha))
Main product (q/ha)	93	95	102	96.66
Price of per quintal	2250	2225	2075	2183.33
Gross income (Rs/ha)	209250	211375	211650	210758.33
Net income	99629.17	95660.05	87479.58	94256.26
Benefit cost ratio	1:1.90	1:1.82	1:1.70	1:1.80

Conclusion

Improved variety seeds though are of higher unit price but provide high productivity and return, therefore, to be used as per capacity of the growers. Bank credit and financial assistance should be available to the individual farmers for increasing the production. Proper allocation and level of increase in fertilizer, irrigation and human labour inter culture to be followed for higher return. Training of farmers in the

areas of production technology, grading, standardization of produce, quality control and modern method of marketing will prove to be a viable move. Scarcity of fund adversely influences the income of green pea, therefore, to garner higher productivity of used input resources there should be effective management of fund borrowing from institutional lenders. The government should establish adequate storages at village level for the purpose of orderly marketing of green pea to benefit both consumers and producers.

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