Comparative economics and production constraints of leguminous vegetables in vindhyan region

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Abstract : This study was designed to analyse the comparative economic aspect of leguminous vegetable production such as cowpea and garden pea in underprivileged district of Mirzapur in Vindhyan region which is predominantly a rainfed area. The data were collected from 50 respondents selected randomly and were analyzed by descriptive statistics and gross margin analysis. The findings of the study revealed that per hectare cost of production of garden pea and cowpea were Rs. 29210.87 and Rs. 31461.03 respectively and the corresponding gross incomes were Rs. 94285.59 and Rs. 97261.33 accordingly. The estimated net return of producing garden pea and cowpea were Rs. 65074.72 and Rs. 65800.30 respectively. The results indicated that garden pea growers received the higher B:C ratio (2.23) compared to cowpea (2.09) producers. Some of the major problems identified were lack of quality seeds (60% and 75% in garden pea and cowpea respectively), inadequacy of farm inputs (73.33% in garden pea and 65% in cowpea), labour problem and menace of wild animals. Other problems identified by the farmers were high cost of agro-chemicals and pest management.

Key words: Comparative economics, production constraints, leguminous vegetables

Introduction

On the basis of social and economic status in India, the Planning Commission has declared 150 districts as disadvantageous of which 17 districts are from Uttar Pradesh. Mirzapur district of Vindhyan region in Uttar Pradesh is one of them (Source: http://www.naip. icar.org.in). Most of the parts of Vindhyan region are rainfed and the district is said to be disadvantaged mainly because of the scarcity of water and backwardness of

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the farmers. The productivity of crops was very low due to inadequacy of irrigation water. Farming round the year was not possible, especially in summer season. Majority of growers followed the traditional rice-wheat cropping system which not only giving the low returns but also depleted soil fertility of the area. Moreover, the cultivation of such crops became less profitable because of small and fragmented land holdings in the area. Scheduled Caste/Scheduled Tribe population was dominated in both the selected blocks of Mirzapur district as 39.9 % in Padari and 44.8% in Madihaan with scanty land holding. (Baseline survey reports of NAIP sub-project 2009). After analysing the situation of that region, recommendation was given to cultivate cash crops like vegetables which used to give better remuneration in marginal land holdings. Leguminous vegetables were found suitable for that locality as they require less irrigation and nutrients since plants are able to fix the atmospheric nitrogen into soil due to their root nodules thus restoring the fertility of soil. An estimated 10 to 20 percent of the annual nitrogen input to soils comes from symbiotic nitrogen fixation (Leikam *et al.* 2007). Two main leguminous vegetables, garden pea and cowpea were recommended and popularised in Mirzapur district of Vindhyan region. Increased production of these vegetables from intensified cropping system can play a key role for income generation in distress conditions because of the multiple uses of pea and cowpea grain and fodder in human and animal diet (Rachie 1985). After such successful intervention it became necessary to analyse the economics of such intervention and find out the constriction farmers were facing at grassroots. In order to address such issues present study was designed with a specific objective to determine the profitability and basic constraints of leguminous vegetable production.

Materials & Methods

The present study had been conducted in two blocks namely, Padari and Madihaan of Mirzapur district with

30 pea growers and 20 cowpea growers selected randomly. Data were collected through a well prepared and pre-tested schedule through personal interview method. The varieties used for the study were Kashi Kanchan of cowpea and Azad Pea-3 and Kashi Udai of garden pea.

Descriptive and inferential statistics were used in this study. Descriptive statistics was used in describing the constraints of garden pea and cowpea production. The inferential statistics was used for budgeting techniques (Gross margin analysis). Gross margin analysis is used to evaluate the efficiency of an individual business (Olukosi and Erhabor 1988). The gross margin is the difference between gross farm income and the total variable cost of production while the net farm income is the difference between the gross margin and the total cost of production less the sum of total fixed cost. The concept was used to estimate the profitability of producing leguminous vegetables in the study area.

The gross margin model states as follows:

$$GM = GI - TVC \ldots\ldots\ldots\ldots(I)$$

$$NFI = GM - TFC \ldots\ldots\ldots\ldots(II)$$

Where

GM = Gross margin per hectare

GI = Gross income per hectare

TVC = Total variable cost per hectare

NFI = Net farm income per hectare

TFC = Total fixed cost per hectare

The variable cost involved purchasing cost of different inputs, transportation, labour, bullocks/machinery and interest on working capital, while the fixed costs include rental value of owned land.

Results & Discussion

The costs and returns of garden pea and cowpea production as shown in table-1 indicated that the average yield of garden pea was found to be 92.3 q with a B:C ratio of 2.23 while average yield of cowpea was recorded 145.44 q with B:C ratio of 2.09. Vegetable cultivation always requires higher number of mandays and this is very clear when we have a perusal on table-1 where growers were found to be spending more than half of their production cost on human labour *i.e.*, 57.06% (Rs. 16,525) in cowpea and 29.08% (Rs. 7766.85) in garden pea which was mainly due to non-adoption of mechanized farming in that area. The cost on human labour is particularly high in cowpea because of raised bed type of land preparation and manual hoeing/weeding. These operations were commonly not needed in garden

pea. The study conducted by Ojo *et al.* (2008) also showed that cost of hired labour constituted maximum portion of the total cost of production in cowpea farming followed by fertilizers. Similar findings were also reported by Modu *et al.* (2010) where expense on hired labour was maximum (29.7%) for producing cowpea. The highest expense in case of garden pea was Rs. 8011.11 (29.99%) for seed whereas the expenditure on seed in cowpea was Rs. 1120 (3.87%). The large difference in expenditure on seeds as shown in fig.-1 may be simply attributed to lower seed rate of cowpea as compared to garden pea. The data in Table-1 further indicated that growers were spending only 11.34 and 9.75 per cent money on nutrient management in pea and cowpea respectively because being the leguminous crops they have low nutrient requirement especially nitrogen because of nodules in roots.
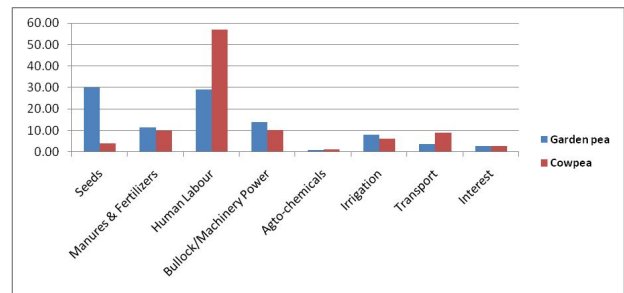

Figure 1: Expenditure share (%) on different components of investment

Management of diseases and insect pest was not a serious problem for the growers where they were spending only about 1 percent (Rs. 347.85/ha in garden pea and Rs. 350/ha in cowpea) of the production cost which was also justified by Ojo *et al.* (2008). The expense on water management was Rs. 2182.17 (8.17%) in garden pea whereas it is Rs. 1750 (5.69%) in cowpea. As cowpea is predominantly grown in rainy season in the study area, the cost of irrigation in cowpea is comparatively low although water requirement is higher than garden pea. From the table-1 it can be seen that relatively low transportation charges per hectare (3.78% and 8.36% for garden pea and cowpea respectively) was incurred which illustrates that growers were selling the produce in the local markets only. The summation of the costs of variable inputs in addition to interest on all these working capital together gave the total variable costs which were Rs. 26710.87 and 28961.03 per hectare for garden pea and cowpea production respectively.

Table-1 shows that per hectare total cost (sum of total variable cost and total fixed cost) for producing garden pea and cowpea were Rs. 29210.87 and Rs. 31461.93 respectively. The average per hectare gross income was Rs. 94285.59 and Rs. 97261.33 and net income was Rs. 65074.72 and Rs. 65800.30 from garden pea and cowpea respectively. Average return to each Rupee spent in production is a vital criterion for measuring the

profitability of growing any crops (Khayer *et al.* 2011). In this study B: C ratio is the ratio of Net Farm Income (NFI) to total cost of production (TVC+TFC) which were 2.23 and 2.09 for producing garden pea and cowpea respectively. In determining the comparative profitability of garden pea and cowpea it was found that per hectare Gross Income and Net Farm Income of garden pea were slightly lesser than those of cowpea but the B:C ratio was still higher because of low cost of production and higher market rate of the produce as apparent in table-1. Considering benefit cost ratio of garden pea and cowpea it is evident that garden pea cultivation is relatively more profitable than cowpea in vindhyan region.

prevalent in case of cowpea. Furthermore, the area seriously needed substantial extension services by the government agencies, research institutes and local NGOs to facilitate the availability of quality seeds of HYVs and to make the farmers aware about better utilization of available resources.

Another problem in production of these vegetables which had been assigned 3rd rank by the respondent, in the area included unavailability/high cost of human labour. Some of the important reasons identified were i) local landless labours preferred to go to nearby towns for earning daily livelihood because of irregular nature of employment in agriculture and ii) several government

Table-1: Cost and Returns analysis of Garden pea and Cowpea (Rs./ hectare)

Investment components	Garden pea		Cowpea	
	Cost (Rs.)	Expenditure Share (%)	Cost (Rs.)	Expenditure Share (%)
Variable Costs				
Seeds	8011.11	29.99	1120.00	3.87
Manures & Fertilizers	3028.16	11.34	2825.00	9.75
Human labour	7766.85	29.08	16525.00	57.06
Bullock/Machinery Power	3686.67	13.80	2975.00	10.27
Agro-chemicals	247.85	0.93	350.00	1.21
Irrigation	2182.17	8.17	1750.00	6.04
Transportation	1010.07	3.78	2572.50	8.88
Interest on working capital	777.99	2.91	843.53	2.91
Total Variable Cost	26710.87	100.00	28961.03	100.00
Total Fixed Cost				
Rental value of land	2500		2500	
Cost of Production (TVC+TFC)	29210.87		31461.03	
Avg. Yield (Qt.)	92.3		145.44	
Avg. Marketable Price (Rs/Qt)	1021.50		668.75	
Returns (Rs.)				
Gross Income (GI)	94285.59		97261.33	
Gross Margin (GM)	67574.72		68300.30	
Net Farm Income (NFI)	65074.72		65800.80	
B:C Ratio	2.23		2.09	

Bottlenecks in leguminous vegetable production

The identified problems which directly or indirectly affect legume vegetable production in the study area include: inadequacy in farm inputs, lack of improved varieties, unavailability/high cost of human labour, high cost of agro-chemical, loss by wild animals (Neil gai; *Boselaphus tragocamelus*) and incidences of insect-pest infestation. Table-2 indicates that inadequacy of farm inputs such as farm implements and some vital farm requirements such as agro-chemicals, fertilizers, etc. (73.33%) and lack of quality seeds (60.00%) were found to be the most important problems in garden pea production as well as cowpea production (65% and 75% respectively). Growers were purchasing seeds from some local dealers or fellow farmers without knowing even the name of the variety and this practice was more

welfare schemes were running in rural areas which causes shortage of human labour at the farmers' fields. The result of table-2 strangely indicated the problem of wild animals as a constraint in production at 4th rank with 33.33% respondents in garden pea and 50.00% in case of cowpea. In fact this was one of the most serious constraints for the production of any crops in Mirzapur district. These animals damage the standing crop by eating and in some harsh cases their herd, during a fight, run wildly through the crop fields resulting in the total loss of crop. Other production problems found were high cost of agro-chemicals and incidences of insect/ pest attacks which were limiting the cultivation to some extent. For this, farmers were advised to cultivate varieties which have resistance against diseases and insects pests. Operations like soil solarisation in summer and mulching might be practised by growers to reduce

Table 2. Rank of Production constraints for Garden pea and Cowpea

Major Constraints*	Garden pea			Cowpea		
	Frequency	Percentage (%)	Rank	Frequency	Percentage (%)	Rank
Inadequacy of farm inputs	22	73.33	I	13	65.00	II
Lack of quality seeds	18	60.00	II	15	75.00	I
Unavailability/high cost of human labour	11	36.67	III	12	60.00	III
Wild animals	10	33.33	IV	10	50.00	IV
High cost of agro-chemicals	8	26.67	V	8	40.00	V
Insect-pest infestation	7	23.33	VI	7	35.00	VI
Total	76	100.00		58	100.00	

* Multiple Responses existed.

any vegetation other than crop plants, hence minimize the overall uses of harmful weedicides. Musa *et al.* (2010) reported that some of the major problems in cowpea production included pest infestation (90%), inadequacy of farm inputs (87.50%) and lack of credit to the farmers in Taraba State of Nigeria.

Finally, it is concluded that despite of high potential crops, garden pea and cowpea fetched a B:C ratio of 2.23 and 2.09 respectively only which may be due to high cost of cultivation and lower market price of the produce. It was, therefore, recommended that farmers of such disadvantageous district should be properly enlightened and educated about the various government schemes in agriculture sectors and timely provision of adequate agricultural incentives (inputs etc.) to enhance their productivity and income for livelihood security.

सारांश

वर्तमान अध्ययन वर्षा आधारित विन्ध्य क्षेत्र के मिर्जापुर जनपद में दलहनी सब्जी फसल लोबिया एवं मटर उत्पादन की तुलनात्मक आर्थिक पहलू के विश्लेषण हेतु किया गया है। इस अध्ययन के प्राप्त आंकड़ों के विश्लेषण से यह देखा गया कि मटर एवं लोबिया की प्रति हेक्टेयर की खेती में क्रमशः रू. 29210.87 /– एवं रू. 31461.03 /– की लागत लगी है एवं सकल आय क्रमशः रू. 94285.59 /– एवं रू. 97261.33 /– प्राप्त हुई है। इस प्रकार अनुमानित शुद्ध लाभ मटर एवं लोबिया में क्रमशः रू. 65074.72 /– एवं रू. 65800.30 /– प्रति हेक्टेयर प्राप्त हुई। प्राप्त परिणाम यह दर्शाती है कि किसानों को लाभ लागत अनुपात मटर में 2.23 एवं लोबिया में 2.09 प्राप्त हुआ। इस क्षेत्र की प्रमुख समस्यायें गुणवत्तायुक्त बीजों का अभाव (मटर एवं लोबिया में क्रमशः 60 एवं 75 प्रतिशत), कृषि आदानों की अपर्याप्तता (मटर में 73.33 एवं लोबिया में 65 प्रतिशत) है। इसके अलावा दलहनी सब्जी फसल उत्पादन में अन्य समस्यायें श्रमिकों का अभाव, जंगली जानवरों का प्रकोप, कृषि रसायनों की बढ़ती कीमते, कीट रोग की समस्यायें इत्यादि है।

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