International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2018; 6(1): 1955-1957

Received: 28-11-2017
Accepted: 30-12-2017

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Economic analysis of pea based production system in cold arid desert in Ladakh Region

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Abstract
A case study was conducted at Igoo and Sakti village of cold arid desert of Ladakh region during 2017, with the Objectives to study the analyze per kanal costs, returns and profitability of Pea production in the study area and to evaluate the cost of production per quintal of Pea on different size farm groups. Data were collected using structured questionnaire on farmers output, production input variables (farm size, labour used, compost, cost of seed, harvesting cost). All data on resource use, production cost and outputs were converted to per kanal equivalent. A total numbers of 20 farmers were surveyed in Igoo and Sakti village. A random survey of farmers having large areas under Pea are surveyed. It reveals that overall cost of cultivation of pea crop was Rs/Kanal 7811.66/-. The large contribution have been observed in family labour use with Rs 15333.33/- and shared of 50.13 percent to the total cost. The cost of cultivation of Pea per Kanal in small, medium and large groups is Rs. 23435, Rs 28870 and Rs. 39450 respectively and the average cost of cultivation is 30585 & cost of cultivation per kanal is 7811.66. But overall, estimated gross return of Pea was Rs/ha 21000/- and obtained net return was Rs. 13188.34 /-.

Keywords: cost of production, returns and profitability

Introduction
Pea (*Pisum sativum* L.), a member of the family Fabaceae, is one of the most important cool season vegetable crops grown throughout the world. In India, it is cultivated over an area of about 421 thousand ha with an annual production of 4006 thousand million tones in 2012-13 (Anonymous, 2012-13) [1]. Whereas, in J&K, it is cultivated over an area of about 2.79 thousand ha with an annual production of 58.08 thousand million tones in 2012-13 (Anonymous, 2012-13) [1]. It occupies a position of considerable worth because of its importance in agricultural economy of the country. Ethiopia is probably the main centre of origin of the peas. It is very palatable and nutritious for human consumption and is taken fresh, canned, frozen or in dehydrated form. It contains higher proportion of digestible proteins along with carbohydrates, vitamins and mineral matter. Pea is a cool season crop and is mainly grown in Uttar Pradesh, Bihar, Haryana, Himachal Pradesh, Punjab and Jammu & Kashmir. However, Uttar Pradesh accounts for 70 per cent of the total output of peas in India. In Himachal Pradesh, the districts of Lahaul and in J&K, the district of Leh has growing peas in high valley.

In Leh district the farmers engaged in Pea cultivation has good income from the pea. In high valleys of Leh the farmers are solely depend on pea as cash crop and they mainly growing pea as single crop. There are huge numbers of buyers available in Leh district during the season. The stalk of pea is used as fodder to feed the animals in winter season.

Keeping in view the above facts, the present study was planned and executed to economic analysis of pea and optimize seed yield along with improved seed quality on the other, with the following objectives:

Objectives of the study
1. To analyze per kanal costs, returns and profitability of Pea production in the study area.
2. To evaluate the cost of production per quintal of Pea on different size farm groups.

Data collection
Data were collected using structured questionnaire on farmers output, production input variables (farm size, labour used, compost, cost of seed, harvesting cost).

All data on resource use, production cost and outputs were converted to per kanal equivalent. A total numbers of 20 farmers were surveyed in Igoo and Sakti village. A random survey of farmers having large areas under Pea are surveyed.

Cropping practices employed by farmers

Pea was predominantly grown as sole crop by (100%) while 0% of farmers engaged in intercropping. Although Arkel were the most grown varieties of pea in the area. This wasattributed to the following: marketability, shelf life, size and storability. With respect to the method of seed.

Table 1: Cropping practices adopted by farmers

Characteristics	Categories	Percentage
Cropping system	Pea	100%
	Pea intercropping	0%
Pea variety	Arkel	100%
Method of seed planting	Direct seeding	100%
	Transplanting	0%
Farm size	3Kanal Small	60%
	6 Kanal Medium	30%
	10Kanal Large	10%

Table 2: Input use for cultivation of Pea in sample farms (in Kanal)

S. No	Particular	Farm Size			Average
		>3 Kanal Small	6 Kanal Medium	<10 Kanal Large	
1.	Seeds	45 Kg	90 Kg	150 Kg	95 Kg
2.	Manure in Kg	450 kg	900 Kg	1500 Kg	950 Kg
		Fertilizer in Kg			
3.	Urea	0	0	0	**0**
4.	DAP	0	0	0	**0**
		Labour in Mandays			
5.	Family Human Labour	30	40	45	38.33 Days
6.	Hired Human Labour	10	0	0	10 Days

Note:- 1 Kanal is equivalent to 5445 Sq. feets or 0.125 Acre.

Cost of Cultivation for Pea in Sample Farms

The cost of cultivation indicates the investment on the variable inputs used in the cultivation and the services rendered by fixed assets. The cost input used by cultivators in the cultivation of pea was calculated for contribution of each input in total costs in all the three different size farm groups. The cost of cultivation of pea of sample farms is worked out in Rs/Kanal and presented in Table 2. It reveals that overall cost of cultivation of pea crop was Rs/Kanal 7811.66/-. The large contribution have been observed in family labour use with Rs 15333.33/- and shared of 50.13 percent to the total cost.

Among the materials input cost seeds shared the maximum (28.89 %) followed by manure and fertilizer, irrigation (15.53 %), Hired Labour (5.45%), irrigation (0%) and in plant protection which shared nearly, 0 percent. The cost of cultivation of Pea per Kanal in small, medium and large groups is Rs. 23435, Rs 28870 and Rs. 39450 respectively and the average cost of cultivation is 30585 & cost of cultivation per kanal is 7811.66. The table clearly indicates that, the cost of cultivation of pea per Kanal in large size group is higher than small and medium farm groups followed by medium size group. Major cost on family labour use involved in Pea in small, medium and large groups is found to be Rs. 12000, Rs. 16000 and Rs. 18000 respectively & family labour cost per kanal land is Rs.4000/- and hire labour cost per kanal land is 1666.66/-. This shows that in total costs were family labour, accounted for a major chunk of the total expenditure reported by Khunt *et al*. (1996) [2]. The materials input cost have been next to the labour use cost, which was ranging from Rs./Kanal 2145 to 21450.

Table 3: Cost of cultivation of Pea on different sample farms (Rs/Kanal)

Particular	>3 Kanal Small	6 Kanal Medium	< 10 Kanal Large	Average	1 Kanal cost
	Inputs				
a)Hired Human Labour	5000	0	0	1666.66 (5.45 %)	1666.66
b) Family Labour	12000	16000	18000	15333.33 (50.13 %)	4000
c) Cost of seed	4185	8370	13950	8835 (28.89%)	1395
d) Manure and fertilizer	2250	4500	7500	4750 (15.53%)	750
e) Irrigation	0	0	0	0	0
f) Plant protection	0	0	0	0	0
g) Rental value of owned land	0	0	0	0	0
Total Input Cost	23435	28870	39450	30585(100%)	7811.66

Profitability in cultivation of Pea

A brief summary of the costs and return of Pea by farm size is represented on gross return received; net returns obtained after subtracting the total cost of cultivation of Pea, yield per quintals of Pea production and benefit received on per rupee investment in Pea cultivation is Rs 1.688/- (Table 4). Overall, estimated gross return of Pea was Rs/ha 21000/- and obtained net return was Rs. 13188.34 /-.

Table 4: Gross return of Pea

S. No	Particular	Farm Size
		1 Kanal
1.	Production of Pea (Quintal /Kanal)	6 Quintals
2.	Gross return (Rs/kanal)	Rs 21000 / Kanal
3.	Total Cost(Rs/kanal)	Rs. 7811.66
4.	Net return(Rs/kanal)	Rs. 13188.34
	B:C Ratio	1.688

Conclusions

The yield of peas has been higher on small than medium and large farms because of better management in small farms. The costs incurred on seeds, manure, family labour and hired labour are more in large farms. The gross and net returns have been found higher in large farms due to realization of higher prices because of cultivating early-maturing varieties and exploring other markets due to higher marketable surpluses. This crop, being highly labour-intensive, will help provide employment to the family members on the farm itself, particularly in the case of small and marginal farmers. It will provide impetus to the diversification programme of the state government, besides improving the soil health, being a leguminous crop.

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