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Upliftment of Rural Economy Through Protected Cultivation

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ABSTRACT

More than 80 per cent of the farmers in India are small and marginal. Polyhouse technology has emerged as a boon to such resource poor farmers. To assess the costs and benefits drawn by the farmers through crop cultivation in polyhouses, a study was conducted in Kullu and Mandi districts of Himachal Pradesh, India. A sample of about 50 polyhouse units of varied sizes was randomly selected in five developmental blocks of two districts. The total cost of construction was Rs. 100500, Rs. 216250 and Rs. 481600, respectively for polyhouses of 100 sq.m., 250 sq. m. and 500 sq. m. and farmers had to invest only 20% of the total cost. It was observed that about 85 per cent of the farmers grew capsicum, tomato or cucumber in their polyhouses as main crops and exotic vegetables like iceberg lettuce, pok choi and celery as covering crops. It was estimated that a farmer could have net returns up to Rs.1.42 lacs per annum from a 500 sq. m. polyhouse. Thus, the crop cultivation in polyhouses can work wonders for the marginal and small farmers provided the extension services for transfer of scientific crop production technology in polyhouses are further speeded up endeavourly.

KEYWORDS: Polyhouse technology, entrepreneurship, investment pattern, economics.

Introduction

Agriculture is the mainstay of the economy of Himachal Pradesh contributing around 22% to the state income and engaging 67% of the working population. Because of predominance of hilly terrain, only 11% out of total geographical area of 55.7 lakh ha is available for cultivation. Around 86.4% of the holdings are marginal and small and the average size of holding is around 1.1 ha which is decreasing continuously due to increasing population pressure on limited arable land.

Under the given circumstances and climatic conditions, cash crops are one of the silver-linings for increasing livelihood and entrepreneurship opportunities in the state.

The farmers of Himachal Pradesh are producing various season and off-season vegetables in open environment, which bring more returns than traditional crops. During 2008-09, the total area under vegetables in the state was 58,740 ha. with a production of 1.1 million tonnes. The production can be enhanced by bringing additional area under vegetables, using improved agro techniques and promotion of protected cultivation of vegetables (Singh et al. 1999). In hilly regions, it is not possible to plant various off-season vegetables well in time in spring/ rainy season due to prevalence of low temperature and high rainfall in the months of February-March and August-September, respectively.

Hence, most of the areas of the state necessitate growing of most of the potential summer vegetables in protected structures. Thus, the protected cultivation technology holds special significance for Himachal Pradesh.

Protected cultivation involves protection of from adverse environmental conditions and offers distinct advantages of quality, productivity and favourable market price to the growers (Singh and Sirohi 2008). In the times to come, protected vegetable production is likely to be common commercial practice not only because of its potential but out of sheer necessity.

In Himachal Pradesh, the polyhouse technology was popularized among the farmers with the implementation of 'Pandit Deen Dayal Kisan Baagwan Samridhi Yojna' amounting to Rs 353 crore. A significantly large number of polyhouses have been constructed in different districts of the state. To have an insight into the benefits drawn by the farmers through crop cultivation in polyhouses, the present study was conducted with the following objectives:

1. To examine the investment pattern in different types of polyhouses
2. To work out the economics of crop cultivation in polyhouses

Methodology

The present study was conducted in Kullu and Mandi districts of Himachal Pradesh, India. At the first stage of sampling, three development blocks namely Kullu, Naggar and Banjar in Kullu district and two blocks namely Mandi Sadar and Sundernagar in Mandi district, having maximum number of polyhouses were selected. A sample of about 30 polyhouse units of varied sizes from Kullu district and 20 polyhouse units from Mandi district was randomly selected. Thus, a total sample of 50 polyhouse units was considered for the study. The data were collected for the agricultural year 2011-12. The primary data were collected using well structured schedules through survey method. Secondary data were collected from District Agriculture Office, Kullu and concerned officials of selected blocks. The data were analyzed using tabular analysis. The averages and percentages were calculated to facilitate the comparison and interpretation.

Results

Investment pattern on different size polyhouses

The Government of Himachal Pradesh is providing 80 per cent subsidy on the construction of polyhouses which has given tremendous boost to the adoption of this technology by the farmers. The investment pattern on different sizes of polyhouses can be seen from Table 1. The total cost of construction has been shown to be Rs. 100500, Rs. 216250 and Rs. 481600, respectively for polyhouses of 100 sq.m., 250 sq. m. and 500 sq. m. It can be analysed from the table that the cost of drip system for irrigation and fogger accounted for about 12.4%, 11% and 10% of the total cost, respectively. Farmers had to invest only 20% of the total cost which amounted to be Rs. 20100 for a 100 sq. m. polyhouse and Rs. 43250 and Rs. 96320 for 250 sq. m. and 500 sq. m. polyhouses, respectively.

Table 1 Size and Investment Pattern in Polyhouses (Rs.)

Investments	100 sq. m.	250 sq. m.	500 sq. m.
Estimated cost of polyhouse	88000	192500	434000
Assistance on polyhouse	70400	154000	347200
Estimated cost of drip and fogger	12500	23750	47600
Assistance on drip and fogger	10000	19000	38080
Total cost of polyhouse	100500	216250	481600
Total assistance (80%)	80400	173000	385280
Farmer's Investment (20%)	20100	43250	96320

Cropping Sequences

The most important cropping sequence followed by the sampled polyhouse farmers was: Capsicum/ Tomato/ Cucumber- Iceberg lettuce/ Celery/Pok Choi/spinach/onion/coriander.

It was observed that about 85 per cent of the farmers used to grow capsicum, tomato or cucumber as the main crop in their polyhouses, the crop period for which was elongated up to 9-10 (April-Dec.) months. Thus, the farmers could supply their produce during the period when it was not available in open fields and could fetch quite high prices. Tomato crop could bring rich dividends to the farmers during rainy season when it was not possible to produce tomato in open fields due to heavy rainfall. Cucumber fetched highest price during Sept.-Oct. About 90 per cent of the farmers marketed their produce in the local markets because the benefits of higher prices at distant markets were swept away by the additional marketing costs for distant markets coupled with the risk of non-payment by the outside traders. Majority of the

farmers preferred to market capsicum as green because they could pick three to four green fruits in the time required by a green fruit to acquire red or yellow colour. Also, the local market for coloured capsicum was thin and the farmers had to send it to the distant markets. Thus, the higher price offered for coloured capsicum in the distant markets was mitigated by higher yield of green capsicum marketed locally avoiding the transportation costs and risks involved in the distant marketing.

During the remaining 2-3 months the farmers grew the exotic vegetables like Iceberg lettuce, Pok choi and Celery for which again they earned pretty well by having forward contracts with the outside traders. All these leafy vegetables (mostly used for salad purpose) have good demand in the big hotels in the cities. There were some private companies operative in the area which encouraged the farmers to grow these crops in their polyhouses. They provided the farmers with the planting material and other critical inputs along with the technical know-how to grow these crops. These companies also made forward contract with the farmers to pick up the produce at a pre-decided price. Thus, the market related risk of the farmer was reduced to zero and they could make efficient use their polyhouses. Some of the farmers also cultivated crops like spinach, onion, coriander and pea after the main crops and marketed the produce in the local markets itself.

Economic Evaluation of Vegetable Cultivation in Poly House

The economics of different vegetables grown in polyhouse has been given in Table 2. The economics has been worked out for the three main crops i.e. capsicum which is grown as main crop and then celery and lettuce, one of which is grown following capsicum. It can be observed from the table that in case of capsicum, human labour constituted the maximum proportion (57.7%) of the total variable cost followed by the cost of planting material (15.9%). The chemical fertilizers and plant protection chemicals also contributed significantly towards the total variable cost. As the farmers supplied their produce in the local markets only, the transportation costs formed a meager proportion of the total variable costs. Depreciation and interest on the farmer's investment were taken into consideration while working out the total cost of cultivation. The gross returns realized from capsicum from a 500 sq. m. polyhouse were about Rs. 1.38 lakh which gave the net returns up to Rs. 97 thousand.

Table 2 Economics of vegetable cultivation in a polyhouse (500sq.m)

Sr. No.	Particular	Capsicum	Celery	Iceberg lettuce
	Variable costs			
1	Land preparation	1500	1500	1500
2	Planting material	5500	2000	2500
3	Vermicompost	1000	-	1000
4	Chemical fertilizers	2000	500	500
5	Plant protection chemicals	2000	200	300
6	Irrigation charges	500	400	200
7	Transportation	1000	-	-
8	Human labour	20000	2000	4500
9	Miscellaneous charges	500	100	500
10	Total working capital(1-9)	34000	6700	11000
11	Interest on working capital @ 6% p.a.	680	50	83
12	Total variable cost (10+11)	34680	6750	11083
13	Fixed cost (14+15)	6501	2167	2167
14	Depreciation	2167	722	722
15	Interest @6% p.a.	4334	1445	1445
16	Total cost(12+13)	41181	8917	13250
17	Total production	43q	40q	45q
18	Gross returns	138200	54000	58500
19	Net returns	97019	45083	45250

In case of celery and lettuce, the net returns from only one of which were to be included to work out the annual net returns, the total variable cost was Rs. 6,750 and Rs.11,083, respectively. Human labour charges and planting material cost were the major components of variable cost. Transportation charges were nil because the forward contractors picked the produce from the polyhouses of the farmers itself. The farmers did not incur any cost for marketing of produce. The fixed costs involved in the production of these crops were also very low owing to very short duration (3 months only) of these crops. Thus, the total cost for the production of celery and lettuce turned out to be Rs. 8,917 and Rs. 13,250, respectively. The average production realized in polyhouses was 40 quintal for celery and 45 quintal for lettuce thus, giving gross returns to the tune of Rs. 54,000 and Rs. 58,500, respectively. The net returns realized from both the crops were about Rs. 45,000. Therefore, the net annual returns obtained from a 500 sq.m. polyhouse were around Rs. 1,42,000 when the net returns from any one of the celery or lettuce were added to the net returns from capsicum.

Conclusions

A manifold increase in the resource-use efficiency in crop production can be obtained through protected cultivation when compared with the open field conditions. Thus, the crop cultivation in polyhouses can work wonders for the marginal and small farmers provided the extension services for transfer of scientific crop production technology in polyhouses are further speeded up endeavourly.

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