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Economic feasibility of strawberry cultivation in Himachal Pradesh

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Abstract

Strawberry is a new diversification alternative in low hills of Himachal Pradesh. This zone has comparative advantage in strawberry cultivation over other zones of the state. This study was carried out in Paonta Sahib block of Sirmour district. Majority of strawberry cultivators had around 0.08 ha land under strawberry and that can be attributed to higher labour and capital requirements, risky nature of the crop and marketing problems. Total cost (Cost C_3) of strawberry cultivation was Rs 18,312 per bigha (0.08 ha). Total income from Strawberry cultivation was Rs 32,314/bigha while net income of was Rs 14003. Sensitivity analysis showed that this crop can maintain its profitability despite rise in costs by 50 per cent and decline in gross income by 30 per cent. Diseases, bird attack, shorter shelf life of fruits and marketing were the major problems and constraints in strawberry cultivation.

Introduction

Himachal Pradesh is a hilly state and Nature has showered its blessings on this scenic state in the form of perennial rivers, diverse fauna & flora, and varied agro-climatic conditions. Agro-climatic conditions in the state range from sub-tropical to dry temperate and provides market niche to produce some premium agricultural commodities. The farmers of state have harnessed this gift of nature by producing wide range of off-season vegetables and temperate horticultural produce. They have carved special status for themselves in national agricultural markets. This transition in farming has drastically improved the socio-economic conditions of the farmers, majority of whom are small and marginal farmers.

However, like green revolution, cash crop revolution of the state has also started showing the signs of fatigue and its further spread has limited scope due to various constraints like limited irrigation facilities, complex of diseases and pests triggered by monoculture of few vegetables and fruit crops and market gluts. Therefore, now urge is being felt to explore new diversification alternatives so that higher income generation capacity of farms could be sustained particularly in low hills which have not benefited much from cultivation of vegetable and fruit crops. Located in Shivalik foothills, climatic conditions (sub-tropical) of this zone are quite similar to plains. Nearly 40 per cent cropping area of the state falls in this zone only. But the farmers of this zone are not able to compete with their counterparts in plains due to absence/low possibility of farm mechanization, poor irrigation facilities and higher cost of cultivation. Therefore, new crop avenues with comparative advantage over plains need to be explored, so that people of these areas can also march towards cash crop revolution alongwith their counterparts in other mid and high hill zones of Himachal Pradesh. The agro-climatic conditions of low hills in Himachal Pradesh and Uttaranchal have been most congenial for cultivation of strawberry. Its cultivation has only recently received great attention due to high profitability, delicacy, nutritional superiority over other fruits and increasing demand from agro-processing industries. A number of large fruited varieties like Chandler, Pajaro, Etna, Sweet Charlie, Selva, etc., have been successfully cultivated in low hills (Pramanick *et al.* 2005). It is high value fruit crop and the farmers in hills can earn income both from selling fruits as well as planting material. The development of high value agriculture has been rather slow in low hill zone as compared to mid and high hill zones of Himachal Pradesh (Sharma, *et. al.* 2004). There is also potential for getting year round production under protected cultivation (Ra Sangwook *et al.*, 1998). Strawberry cultivation has emerged as one of crop diversification alternatives in low hills having comparative advantage over

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other zones of the state as well as neighboring states. This is a new introduction and its potential need to be explored. So, this study was carried out with objectives to study the economics of production and to suggest strategies to popularize strawberry cultivation in Himachal Pradesh.

Methodology

This study is based upon primary and secondary data. Primary data were collected from 45 strawberry growers in the year 2004-05 on well-prepared and pre-tested schedule through interview method. Primary data were collected from Paonta Sahib Block of Sirmour district where strawberry cultivation has picked up momentum in the recent years. Secondary data was collected from Department of Horticulture, Himachal Pradesh and relevant web sites of national and international organizations. Tabular method was used for analyzing the data.

Results and Discussion

Global and Indian Scenario: Total production of strawberry in the world in the year 2004 was 3.22 million tonnes. USA, Spain, China, Poland, Mexico, Japan and Italy are the major strawberry producing countries in the world. The United States is the world's leading producer of strawberries for both the fresh and frozen markets. Spain is the world's leading exporter of fresh strawberries, followed by the United States. The world's top exporter of frozen strawberries is Poland. China has also increased its strawberry production rapidly in recent years to become one of the major strawberry producers in the world. Compared to China, India is yet to mark its presence in the world strawberry market. Data on strawberry acreage was hardly available, which clearly points towards negligible existence of this crop in Indian farms.

Strawberry cultivation in Himachal Pradesh: The area under strawberry in the state in 2004-05 was only 27 ha (2004-05) and production was 425 tonnes. It shows that its cultivation is picking up in Himachal Pradesh. The strawberry cultivation was initially started in Solan, Mandi, Sirmour and Kullu districts but it could acquire significant acreage in Paonta Valley of Sirmour districts only. Its cultivation has failed to pick up in other areas of the state since farmers in those areas have many other profitable crop alternatives. Total production in Paonta Valley is about 250 tonnes out of which nearly 60 per cent is procured by processing industries in the state and rest is sold to consumers through retailers or by direct sales.

Socio-Economic Features of Strawberry Growers: Majority (94%) of the sampled farmers were earning their livelihood from agricultural activities. Rest depended upon services (Govt. & Private) besides earnings from agriculture sector as well. Average family size of the strawberry farmers was 6.59 members, out of which about 75 percent was the active labour force. This factor favours adoption of strawberry cultivation, since its labour requirement is comparatively higher than the traditional crops of the area.

The average land inventory of strawberry producer was less than one hectare and majority of the farmers were small and marginal. Irrigation availability on about 85 % of land holding was another important feature of the sampled farms, as assured irrigation facility is the basic requirement for strawberry cultivation. It might be one of the important reasons that strawberry cultivation has come up in a big way in Paonta Valley, thereby, making this area as strawberry producing hub in the state.

Cropping pattern of the area is influenced by availability of assured irrigation facilities, climatic factors and available institutional structures. Paddy-wheat is the major crop rotation on the irrigated fields, while under unirrigated condition maize-wheat rotation dominated the scene. Strawberry was the third major crop of the sampled farmers. Majority of strawberry cultivators had around 0.08 ha land (1 or less than 1 bigha) under strawberry. Nearly one-third of the sampled farmers had 1.5-3 bigha area under strawberry. Only 11 per cent farmers had more than 5 bigha area under strawberry. Lower acreage under this crop can be attributed to higher labour and capital requirements, risky nature of the crop and problems in marketing. Chandler is the major plant variety of the area as about 95 per cent were cultivating this variety only.

Economics of strawberry cultivation

Cost of cultivation: Total cost (Cost C_3) of strawberry cultivation on one bigha (0.08 ha) was estimated to be Rs 18,312 out of which share of variable cost (cost A_1) was 35.9 per cent (Table 1). Planting material accounted for about nearly two third of variable cost. However, this cost is incurred in first year only. Thereafter farmers get planting stock from their own fields. This crop is highly labour intensive and nearly half of Cost C_3 was labour cost only. Though most of the farmers

use their family labour, yet its opportunity cost has been included in cost estimates. Compared to most prominent crop rotation of the Paonta valley (Paddy-wheat), cultivation of strawberry is more capital and labour intensive. This is the reason why farmers are taking up its cultivation on small scale only. This crop is more risky than the traditional crops of the area as it has very low shelf life and market conditions are also not very congenial at present due to lack of proper institutional mechanisms for its marketing.

Production: Fruits and nursery planting material are two major outputs from strawberry cultivation. Average yield strawberry in the study area was 6.16 q/bigha (77 q/ha) where as potential yield is more than 8 q/bigha (100 q/ha). Strawberry nursery raised from the same plot is another major source of income for farmers. They see it as their net income, since returns from fruits sometimes just covers the running cost and opportunity cost of the labour.

Income: Income generated from sale of strawberry fruits was Rs 12,314 per bigha (Table 2). Farmers can fetch up to Rs 30/kg if they are able to explore distant markets and retail it directly to the consumers. Many strawberry growers were retailing their produce to consumers by setting up temporary outlets along road side. Sale of nursery plants generated about Rs 20,000 per bigha by selling about 50,000 plants. This is the modest estimate and farmers can increase this income by producing quality plants, maintaining their purity and establishing linkage with the potential buyers. Strawberry plot of one bigha can produce upto one lakh nursery plants and price of single plant can go upto Rs 2 depending upon its quality and variety. But for realising this return, farmer should be well versed with latest technologies and progressive enough to explore marketing avenues.

Table 1. Economics of strawberry cultivation

Particulars	Rs. per bigha*	Rs. per ha	%
Land preparation	240	3,000	1.3
Planting material	4,137	51,713	22.6
FYM (q)	855	10,688	4.7
Fertilizer	280	3,500	1.5
Plant protection DM45 500g, Bavistin 200g & Ridomil 80g	240	3,000	1.3
Irrigation	440	5,500	2.4
Interest on working capital @10% for 12 months	619	7,738	3.4
A_1	6,572	82,150	35.9
Interest on owned fixed capital	275	3,438	1.5
B_1	6,847	85,588	37.4
Rental value of land	800	10,000	4.4
B_2	7,647	95,588	41.8
Imputed value of Family labour	9,000	1,12,500	49.1
C_1	15,572	1,94,650	85.0
C_2	16,647	2,08,088	90.9
Managerial cost (10% of C_2)	1,665	20,813	9.1
C_3	18,312	2,28,900	100.0

* 12.5 bigha = 1 hectare

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Table 2. Economics and profitability indicators of strawberry cultivation

Particulars	Rs. Per bigha	Rs. Per ha
Gross income	32,314	4,03,925
Net income (over cost C_3)	14,002	1,75,025
Family labour income (over cost B_2)	24,667	3,08,338
Farm business income (over cost A_1)	25,742	3,21,775
Farm investment income(over cost C_1)	16,742	2,09,275
Benefit cost ratio	1.76	

Therefore, from total income of Rs 32,314/bigha (Rs 4,03,925/ha), net income of Rs 14002/bigha was obtained while family labour income and farm business income was around Rs 25,000/bigha. With this much capital requirement, no other cropping alternative is more remunerative than strawberry even if we ignore the return from the sale of nursery plants. So, despite its inherent constraints like shorter shelf life & marketing bottlenecks, strawberry yields handsome income to farmer.

Risk bearing ability

It will be prudent to examine the profitability in the light of risks and uncertainties associated with strawberry cultivation. The sensitivity analysis was carried out to check its vulnerability against various production and market related risks. It was found that this crop can maintain its profitability despite rise in costs up to 50 % (Table: 3). This crop generates handsome returns even if gross income declines by 30 per cent. At 50% decline in gross income, it is still profitable over Cost A_1. The worse situation could be when costs rise and returns decline. This crop remains profitable over cost A_1 if costs rise by 50% and income reduces to half. Second year onward, when farmers use their own nursery stock and saves on cost of planting material, this crop will generate profits over cost C_3 also. So this crop can bear various risks associated with its production and marketing. This clearly shows the leverage and comfortable income margins to sustain production even under risk and uncertainty.

Problems and constraints in strawberry cultivation

Planting material: More than 90 % of the farmers were using one variety only i.e. Chandeler. Planting stock of this variety has become old and farmers reported about reduction in fruit size. Though about 10 varieties have been identified by the Dr Y. S. Parmar University of Horticulture & Forestry, Solan (HP), but their planting stock is not easily available. So, new improved varieties should be made available to farmers as monoculture of one variety has increased the vulnerability of crop to diseases.

Table 3. Sensitivity analysis of strawberry cultivation

(Rs/bigha)

Particulars	Cost A_1	Cost C_3	Gross income	Returns over	
				Cost A_1	Cost C_3
	6572	18312	32314	25742	14003
Rise in Costs (%)					
10	7229	20143	32314	25085	12172
20	7886	21974	32314	24428	10340
30	8543	23805	32314	23771	8509
50	9858	27467	32314	22456	4847
Decline in returns (%)					
10	6572	18312	29083	22511	10771
20	6572	18312	25851	19280	7540
30	6572	18312	22620	16048	4308
50	6572	18312	16157	9585	-2154
Rise in costs and decline in returns (%)					
10	7229	20143	29083	21854	8940
20	7886	21974	25851	17965	3878
30	8543	23805	22620	14077	-1185
50	9858	27467	16157	6299	-11310

Marketing: There was no marketing problem till 2004 and farmers were satisfied with the rates received from direct retailing and processing units. With increase in acreage under this crop, problem has started cropping up. Fruits of strawberry are very delicate and have very short shelf life (upto 48 hours). So these had to be marketed fast and this situation is some time exploited by the processors by offering lower prices to farmers. Survey also revealed that most the farmers are depending on the local markets, as daily produce is not large enough to be marketed in distant markets. Information gathered during survey also showed that retail prices in distant markets (Chandigarh) were almost three times higher that the local retail prices. So there is a case for exploring distant markets by pooling the produce of all the farmers for sale in the different markets. Special attractive packing for this purpose needs to be developed so that damage to fruit during transportation is avoided. Presently farmers are selling their produce in cardboard boxes made for selling sweets.

Diseases: The incidence of diseases and damage by diseases was the major problem encountered by growers. Partial adoption of the disease control techniques was the major cause of damage by diseases. So there is urgent need to train the farmers about preventive disease control methods so that losses on this account could be minimized.

Suggestions: This crop was introduced in many locations spread over different agro-climatic conditions in Himachal Pradesh but it has proved successful in lower zone only. Even in this zone, it has remained confined mostly to the Paonta Valley only. There is scope for spreading strawberry cultivation to other parts of the lower zone as well. Since direct sale to consumers have proved to be efficient marketing channel, its cultivation should be propagated in those areas where tourist influx in its harvesting season (March-April) is substantial. Areas located around the national highways in lower zone (Kangra, Una, Hamirpur and Bilaspur) meet this qualification. These areas have very famous Hindu temples and there is huge rush of tourist in these areas due to religious tourism. Besides, roads to famous tourists' places also pass through these districts. Need for development of attractive and cheap packing for strawberry is also being felt so that it could be sent to distant markets as well.

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