

Production Economics of Strawberry in Haryana, India

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ABSTRACT

The present study was conducted in Hisar and Bhiwani districts of Haryana which was selected purposively on the basis of highest area and production of Strawberry cultivation in the state. One block from each district and two villages from each block were selected. Saharwa and Satrod (Hisar-1) and Chanana and Siwani (Siwani) were selected purposively since they have the highest number of strawberry growers in the district. 120 growers were selected from which 43, 30, 30, and 17 farmers were from Satrod, Saharwa, Chanana and Siwani, respectively depending upon the availability of strawberry growers in the region. On the basis of the nature of the data, simple tabular analysis was carried out. The cost concept namely cost A, cost B and cost C and various economic tools were used for the estimation of per ha cost of strawberry cultivation. The overall average cost of strawberry production in both districts of Haryana was found to be ₹ 937.18 thousand per hectare. The total cost of cultivation was highest in case of large category growers followed by medium and small category. The overall net return earned by strawberry growers was ₹ 1174.80 thousand per hectare. Cost of production of per kg of Strawberry was highest in large ₹ 78.57 per kg, followed by medium ₹ 74.33 per kg. and small ₹ 71.34 per kg. Benefit-Cost ratio of Strawberry cultivation calculated under cost A was 2.79, Cost B was 2.56 and Cost C was 2.25.

Keywords: Production, cost, strawberry, Haryana

Strawberry is known to be originated from France and belongs to Rosacea, Rose family (*Fragaria X ananassa*). The major known cultivar of strawberry are *ofra*, *camarosa*, *chandler*, *sweet charlie*, *fair fox*, *black more*, *elista* and *seascape*. It is a fair source of vitamin C, 100 gm edible portion of strawberry contains 89 gm water, 0.07 gm protein, 0.5 gm fats, 8.4 gm carbohydrates and 59 mg ascorbic acid and is commercially consumed as fresh fruits, processed products like ice cream, soft drink, confectionary and chewing gum and preserved like jam, jellies, and squashes which can be used in off-season (Galletta and Bringhurst, 1995). It is one among the fruits having an immense potential and high economic value. Its cultivation is widely practiced around the world, at present the world's leading producers of strawberry are USA (30.4%) followed by Turkey (7.0%), Spain (6.0%), Egypt (5.5%) and Mexico (5.3%) (FAOSTAT, 2015). Strawberry cultivation is confined to the hilly region of the country in India. Strawberry cultivation is becoming

increasingly popular in west and north India, especially in Maharashtra, Himachal Pradesh, Haryana and Punjab due to its good returns from cultivation as well as the availability of markets to sell the produce. It is suitable for semiarid and subtropical zone, ideal fruit crop for Maharashtra, Himachal Pradesh, Haryana and Punjab. India is the second largest producer of fruit in the world after China. Its share in the world's output of fruits is 11% because of its varied agro-climatic conditions. Recently, strawberry is successfully being cultivated in the plain area of Maharashtra, around Pune, Nashik, Sangali towns and Hisar and Bhiwani districts of Haryana state.

Haryana, one of the 29 states of the country has an immense scope for strawberry production as its climatic condition is highly favourable for the crop. The growers also can receive comparatively higher profit on selling the fruit due to its high value in nature. Hence, producing strawberry is becoming an alternative source of income for the

farmers. Unfortunately, despite of strawberry being profitable, it could not be extended may be due to unavailability of information about the profitability of the crop. There are also dearth of knowledge about the appropriate marketing channel and marketing strategies to be followed for getting the remunerative shares of the producers in consumer's rupee. Shortage of runners (seedlings) which are not readily available in their farm has become a matter of concern in the recent past. On the contrary, organised market for strawberry made the traders/middlemen the major players in the marketing of strawberry. Taking all these into consideration, an effort has been made to study the economics of the production of strawberry in Haryana.

Database and Methodology

The study has been conducted based on both primary and secondary data. Primary data was collected from the sample farmers through personal interview with the help of pre-tested and well structured survey schedule. The primary data pertains to the general information, assets, cropping pattern, details on various inputs used in strawberry cultivation viz. runner (seedling), fertilizers, manure, plant protection, labour and cultivation practices such as land preparation, source of irrigation, drip irrigation, inter cultural and harvesting and labour used in strawberry cultivation and problems faced by the producer during the crop year of 2015-16.

Table 1: Category wise Strawberry growers

Categories	Area under orchard (Ha.)	Number of Growers
Small	≤0.60	83
Medium	More than 0.60 to 0.80	43
Large	≥0.80	31
Total		157

Hisar and Bhiwani districts of Haryana were purposively selected because recently, strawberry is being successfully cultivated in the plain area of Hisar and Bhiwani districts of Haryana state. Hisar district comprises of nine blocks. Out of the nine blocks, Hisar-1 block was selected purposively for the study based on the highest area and production of strawberry. Bhiwani district comprises of twelve blocks. Out of the twelve blocks, Siwani block was selected purposively for the study based on

the highest area and production of strawberry. A list of strawberry growers of the selected villages was prepared based on the area under strawberry. Finally, two villages namely Sahadawa, Satrod Khurd from Hisar-1 block of Hisar district and Chanana and Siwani villages from Siwani block of Bhiwani district were selected for the study.

Table 2: Classification of strawberry grower

Categories	Area under orchard (Ha.)	Number of Growers
Small	≤0.60	63
Medium	More than 0.60 to 0.80	33
Large	≥0.80	24
	Total	120

The list of strawberry grower has been prepared along with the area of individual farmers and the complete list was categorised into three categories viz., small (up to 0.60 ha), medium (More than 0.60 to 0.80) and large (>0.80 ha) (Table 1). Hence, Out of 157 growers, a sample of 120 strawberry growers was drawn randomly proportionate to the size of population in the respective category. Out of 120 growers 63, 33, 24 farmers from small, medium and large category of strawberry grower were selected respectively (Table 2).

To work out the economics of production, different cost estimates viz., establishment cost and maintenance cost which includes cost A, cost B, and cost Chas been worked out. Construction of plan in any business activity entails some initial cost. Such initial costs are called establishment cost in the business analysis. The establishment cost per hectare of strawberry cultivation has been estimated considering the quantity of inputs and labour used and their respective market price and wages that prevailed in the study area. It includes the cost on pump set, drip irrigation, investment for on fencing etc.

RESULTS AND DISCUSSION

Fruit crops being perishable in nature, the strawberry orchard should preferably be located at a place where transportation to the market is easy and economical. Further, the cultivation of strawberry needs a fertile soil and it necessitates proper selection of site. The rental value of land in Hisar and Bhiwani district, on an average has

been observed as ₹ 57020 per hectare per annum. The establishment cost of strawberry cultivation is presented in Table 3.

Table 3: Establishment cost of strawberry growers' under different categories

(₹ in thousand/ha)				
Particulars	Small	Medium	Large	Overall
Drip irrigation	72.08 (46.82)	61.40 (42.29)	55.33 (38.40)	65.79 (43.99)
Permanent fencing	36.80 (23.91)	37.55 (25.87)	39.13 (27.16)	37.47 (25.06)
Low tunnel	45.05 (29.27)	46.23 (31.84)	49.63 (34.44)	46.29 (30.95)
Total cost	153.93 (100)	145.18 (100)	144.08 (100)	149.55 (100)

Note: Figures in parentheses are percentage to the total

The initial cost (establishment cost) of cultivation consists of land drip irrigation, permanent fencing, plastic mulching and low tunnel. From Table 3 it was evident that the total cost of establishment of strawberry orchard per ha was the highest in small category of orchard which was followed by medium and large category with the amount of ₹ 153.93 thousand, ₹ 145.18 thousand and ₹ 144.08 thousand per ha, respectively. Overall, it was estimated ₹ 149.55 thousand per ha across the categories. The cost incurred for strawberry required adequate water for its better growth and production, therefore irrigation facilities was required to meet the water requirement for the crop hence, the cost incurred on drip irrigation was estimated to be 46.82 per cent of total cost in small category, followed by medium (42.99%) and large (38.40%) category of farms. Fencing is also required for the protection of strawberry orchard from Nilgai (Blue Bull) and Chital like wild animals which exists in large number in the study area. The cost incurred for fencing was estimated the highest on large farms followed by medium and small category of farms and it contributed 27.16 per cent, 25.87 per cent and 23.91 per cent of the total establishment cost respectively.

In this part of the country, generally temperature remains more than 30° C during the month of September to October i.e. sowing time of strawberry, and remains lower less than 3° C during the month of December and January, both the extreme weather

condition leads to serious damage to the crop, therefore, farmers' use plastic sheets as low tunnel to protect their crop from abrupt weather conditions. However, the costs incurred for low tunnel for various categories have contributed 34.44 per cent on large farms, followed by medium (31.84%) and small (29.27%) category of farms. Similarly, per hectare overall establishment cost across the different farm categories was estimated as 43.99 per cent on drip irrigation, 30.95 per cent on low tunnel and 25.06 per cent contributed as cost of permanent fencing.

From the discussion it may be concluded that the category wise establishment cost was found to be the highest on small category farms followed by medium and large category of farms. Hence, large share of investment was observed on drip irrigation across the various categories of farms. The drip irrigation is a pivot component of establishment cost to start the strawberry cultivation.

Table 4: Operational cost of strawberry orchard

(₹ in thousand/ha)				
Particulars	Small	Medium	Large	Total cost
Land preparation	12.00 (1.76)	11.58 (1.53)	9.93 (1.23)	11.47 (1.58)
Bed Preparation	3.75 (0.55)	3.53 (0.47)	3.30 (0.41)	3.60 (0.49)
Manure	33.58 (4.91)	31.26 (4.14)	24.01 (2.98)	31.03 (4.26)
Hired Human Labour	72.69 (10.63)	134.78 (17.86)	194.99 (24.19)	114.23 (15.70)
Runners	319.45 (46.73)	324.71 (43.03)	327.54 (40.63)	322.51 (44.32)
Replacement cost	31.45 (4.60)	31.69 (4.20)	32.92 (4.08)	31.81 (4.37)
Urea	2.14 (0.31)	2.19 (0.29)	2.24 (0.28)	2.17 (0.30)
DAP	8.08 (1.18)	9.15 (1.21)	10.07 (1.25)	8.77 (1.21)
MOP	2.07 (0.30)	2.20 (0.29)	2.26 (0.28)	2.14 (0.29)
Zinc	4.87 (0.71)	5.30 (0.70)	5.98 (0.74)	5.21 (0.72)
Sulphur	1.30 (0.19)	1.24 (0.16)	1.29 (0.16)	1.28 (0.18)
Growth regulator	5.79 (0.85)	5.95 (0.79)	7.77 (0.96)	6.23 (0.86)

Total Chemical Costs	24.25 (3.55)	26.03 (3.45)	29.61 (3.67)	25.81 (3.55)
Irrigation	25.31 (3.70)	25.78 (3.42)	23.57 (2.92)	25.09 (3.45)
Plant protection cost	88.21 (12.90)	85.78 (11.37)	76.57 (9.50)	85.21 (11.71)
Picking	16.00 (2.34)	15.68 (2.08)	14.99 (1.86)	15.71 (2.16)
Miscellaneous	5.09 (0.74)	6.54 (0.87)	7.52 (0.93)	5.97 (0.82)
Depreciation	19.26 (2.82)	21.34 (2.83)	22.89 (2.84)	20.56 (2.83)
Sub Total	651.04 (95.24)	718.69 (95.24)	767.83 (95.24)	692.99 (95.24)
Interest on working capital	32.54 (4.76)	35.92 (4.76)	38.38 (4.76)	34.64 (4.76)
Total	683.58 (100.00)	754.61 (100.00)	806.21 (100.00)	727.63 (100.00)

Note: Figure in the parentheses are percentage to the total.

Strawberry is a seasonal crop and requires cost to perform petty operations time to time. The operational cost of strawberry cultivation includes cost of preparation of land, bed preparation, manure, hired labour, runners, replacement cost, fertilizers with growth regulator, irrigation, plant protection, picking and miscellaneous charges and are presented in Table 4. The total operational cost in case of small category of farms was accounted to be ₹ 683.58 thousand per ha in which the major cost was incurred on runners and it accounted to be 46.73 per cent of the total cost. Second major cost was observed on plant protection i.e. 12.90 per cent followed by cost incurred on hired human (10.63%), costs of manure (4.91%), replacement cost (4.60%), irrigation (3.70%), fertilizers costs (3.55%), picking (2.34%), preparation of land (1.76%), and bed preparation (0.55%). On medium category of farms, the total operational cost was worked out to be ₹ 754.61 thousand per ha in which the major share was contributed by cost of runners (43.03%), followed by hired human labour (17.86%), plant protection (12.90%), replacement cost (4.20%), manure (4.14%), fertilizers costs (3.45%), irrigation (3.42%) picking (2.08%), preparation of land (1.53%), and bed preparation (0.47%). Similarly, the total operation cost in case of large category of farms was estimated to be ₹ 806.21 thousand per ha. Among the total operational cost, the major cost

was found on runners (40.63%) followed by hired human labour (24.19%), plant protection (9.50%), replacement cost (4.08%), fertilizers costs (3.67%), manure (2.98%), irrigation (2.92%), picking (1.86%), preparation of land (1.23%), and bed preparation (0.41%). Overall, the total operational cost across different categories of farms was estimated to be ₹ 727.63 thousand per ha. The overall highest operational cost accounted to be 44.32 per cent on runners followed by hired human labour (15.70%), plant protection (11.71%), replacement cost (4.37%), manure (4.26%), fertilizers costs (3.55%), irrigation (3.45%), picking (2.16%), preparation of land (1.58%) and bed preparation (0.49%) in the study area.

Table 5: Marketing cost of strawberry

(₹ in thousand/ha)

Particulars	Small	Medium	Large	Total cost
Cost on packing Material	192.50 (65.29)	179.62 (64.36)	167.38 (63.31)	183.93 (64.66)
Cost on packing	15.24 (5.17)	15.58 (5.58)	16.15 (6.11)	15.52 (5.46)
Cost on transportation	81.25 (27.56)	78.49 (28.12)	75.87 (28.70)	79.42 (27.92)
Unloading Charges	5.87 (1.99)	5.41 (1.94)	4.98 (1.88)	5.57 (1.96)
Total	294.86 (100.00)	279.10 (100.00)	264.38 (100.00)	284.44 (100.00)

Note: Figure in the parentheses are percentage to the total

Hence, the study revealed that a major share of investment in operational cost was found to be on runners among the various components of operational cost as the runners were purchased from outside the state (Himachal Pradesh) which incurred a high cost. Therefore, the capacity building of farmer in reproduction of runners is required to reduce the cost which was incurred by the farmers to purchase the runners. Strawberry is a highly perishable fruit of the world, therefore, the marketing cost is a major component of the study.

The marketing cost of strawberry includes the cost of packing material, packing charges, transportation and unloading charges given by the producer farmer which are presented in Table 5. The marketing cost was maximum in case of small category of farms, which accounted to be ₹ 294.86 thousand per ha followed by medium i.e. ₹ 279.10 and large

category of farms i.e. ₹ 264.38 per ha. in which the major cost was incurred on packing material and it accounted to 65.29, 64.36 and 63.31 per cent of total marketing cost on small, medium and large category of farms respectively. Second major cost component was transportation cost. It was observed to be the highest on large category of farms i.e. 28.70 per cent followed by medium (28.12%) and small category of farms (27.56%). Other marketing cost was packing cost, which incurred 6.11, 5.58, and 5.17 per cent of large, medium and small category of farms, respectively, whereas the unloading charges was accounted as 1.99 per cent on small, 1.94 per cent on medium and 1.88 per cent on large category of farms.

Overall, the total marketing cost, across the different categories of farms was estimated to be ₹ 284.44 thousand per ha in which the highest marketing cost accounted to be 64.66 per cent on packing materials, followed by transportation 27.92 per cent, packing cost 5.46 per cent and unloading charges 1.96 per cent in the study area.

The total costs of strawberry cultivation including family labour per ha have been worked out to be ₹ 896.39 thousand, ₹ 939.79 thousand, ₹ 963.10 thousand on small, medium, large category of strawberry growers, respectively in which more than 91 per cent share was contributed by the variable cost on small, medium and large categories of strawberry growers. The total cost found to be higher on large category of farms was mainly due to more use of hired labour, runners, plastic mulching and fertilizers measures comparative to medium and small category of strawberry growers. Similarly, the cost of runners, hired labour, family labour and plant protection were found to be of higher cost components in the overall cost which shared 34.97 per cent, 12.39 per cent, 12.28 per cent and 9.24 per cent of the overall total cost of strawberry cultivation i.e. ₹ 922.29 thousand per ha.

It may be concluded from the discussion that the total cost of strawberry cultivation including family labour as well as excluding family labour were found to have increased with the increase of strawberry orchard (Table 6). Per hectare cost of strawberry cultivation using cost concepts of various categories of strawberry growers is depicted in Table 7.

Table 6: Cost of cultivation of strawberry in Haryana (2016-17)

(₹ in thousand/ha)

Particulars	Small	Medium	Large	Overall
(A) Variable cost				
Hired labour	72.69 (8.11)	134.78 (14.34)	194.99 (20.25)	114.23 (12.39)
Family labour	132.55 (14.79)	102.85 (10.94)	76.89 (7.98)	113.25 (12.28)
Runners	319.45 (35.64)	324.71 (34.55)	327.54 (34.01)	322.51 (34.97)
Replacement cost	31.45 (3.51)	31.69 (3.37)	32.92 (3.42)	31.81 (3.45)
Manure	33.58 (3.75)	31.26 (3.33)	24.01 (2.49)	31.03 (3.36)
Irrigation	25.31 (2.82)	25.78 (2.74)	23.57 (2.45)	25.09 (2.72)
Fertilizers	24.25 (2.71)	26.03 (2.77)	29.61 (3.07)	25.80 (2.80)
Plant protection	88.31 (9.85)	85.78 (9.13)	76.57 (7.95)	85.21 (9.24)
Plastic mulching	37.78 (4.21)	41.50 (4.42)	42.53 (4.42)	39.75 (4.31)
Picking cost	16.00 (1.79)	15.68 (1.67)	14.99 (1.56)	15.71 (1.70)
Sub Total	781.38 (87.17)	820.06 (87.26)	843.62 (87.59)	804.39 (87.22)
Interest on working capitals (@ 10%)	39.07 (4.36)	41.00 (4.36)	42.18 (4.38)	40.22 (4.36)
Total variable cost (TVC)	820.45 (91.53)	861.06 (91.62)	885.80 (91.97)	844.61 (91.58)
(B) Fixed cost				
Rental value of land	57.10 (6.37)	57.90 (6.16)	55.60 (5.77)	57.02 (6.18)
Depreciation	10.09 (1.13)	9.89 (1.05)	9.45 (0.98)	10.03 (1.09)
Interest on fixed capital (@ 8.75%)	8.75 (0.98)	10.93 (1.16)	12.25 (1.27)	10.63 (1.15)
Total fixed cost (TFC)	75.94 (8.47)	78.72 (8.38)	77.30 (8.03)	77.68 (8.42)
Total cost including family labour (TVC+TFC)	896.39 (100.00)	939.79 (100.00)	963.10 (100.00)	922.29 (100.00)
Total cost excluding family labour (TVC+TFC-family labour)	763.84 (85.21)	836.94 (89.06)	886.21 (92.02)	809.04 (87.72)

Note: Figures in the parentheses are the percentage to the total cost including family labour (TVC+TFC)

Table 7: Cost of cultivation of strawberry by different costs in Haryana (2016-17)

(₹ in thousand/ha)

Particulars	Small	Medium	Large	Overall
Hired labour	72.69 (7.99)	134.78 (14.10)	194.99 (19.85)	114.23 (12.19)
Cost of runners	319.45 (35.14)	324.71 (33.97)	327.54 (33.35)	322.51 (34.41)
Replacement cost	31.45 (3.46)	31.69 (3.31)	32.92 (3.35)	31.81 (3.39)
Manure	33.58 (3.69)	31.26 (3.27)	24.01 (2.44)	31.03 (3.31)
Irrigation	25.31 (2.78)	25.78 (2.70)	23.57 (2.40)	25.09 (2.68)
Fertilizers	24.25 (2.67)	26.03 (2.72)	29.61 (3.01)	25.80 (2.75)
Plant protection	88.31 (9.71)	85.78 (8.97)	76.57 (7.80)	85.21 (9.09)
Plastic mulching	37.78 (4.16)	41.50 (4.34)	42.53 (4.33)	39.75 (4.24)
Picking cost	16.00 (1.76)	15.68 (1.64)	14.99 (1.53)	15.71 (1.68)
Depreciation	28.14 (3.10)	29.78 (3.11)	30.90 (3.15)	29.15 (3.11)
Sub Total	676.96 (74.46)	746.99 (78.14)	797.63 (81.21)	720.29 (76.86)
Interest on working capital	33.83 (3.72)	37.33 (3.91)	39.87 (4.06)	36.00 (3.84)
Cost A	710.80 (78.18)	784.32 (82.04)	837.49 (85.26)	756.29 (80.70)
Rental Value of land	57.1 (6.28)	57.9 (6.06)	55.6 (5.66)	57.02 (6.08)
Interest on fixed capital	8.75 (0.96)	10.93 (1.14)	12.25 (1.25)	10.63 (1.13)
Cost B	776.64 (85.42)	853.16 (89.24)	905.34 (92.17)	823.93 (87.82)
Family Labour	132.55 (14.58)	102.85 (10.76)	76.89 (7.83)	113.25 (12.08)
Cost C	909.19 (100.00)	956.01 (100.00)	982.23 (100.00)	937.18 (100.00)

Note: Figures in parentheses are the percentage to Cost C

Table 7 reveals that Cost A worked out to be ₹ 710.80 thousand, ₹ 784.32 thousand and ₹ 837.49 thousand per ha on small, medium and large categories of strawberry growers respectively. The cost incurred on purchasing of runners, marketing cost and hired labour were the major components

of Cost A on all categories of the strawberry growers in the study area. The overall Cost A was worked out to be ₹ 756.29 thousand per ha across the different categories of farms, in which 34.41 per cent of runners cost was observed as the major cost component followed by hired labour (12.19%) and plant protection (9.09%). The Cost B on small, medium, large category of strawberry farms worked out to be ₹ 776.64 thousand, ₹ 853.16 thousand and ₹ 905.34 thousand per ha, respectively. Whereas, the overall cost of strawberry cultivation was worked out to be ₹ 823.93 thousand per ha across the different categories of strawberry growers. Cost C has been worked out to be ₹ 982.23 thousand per ha on large category of strawberry growers which was observed as the highest followed by medium (₹ 956.01 thousand per ha) and small (₹ 909.19 thousand per ha) category of strawberry growers. The overall cost of strawberry cultivation was estimated to be ₹ 937.18 thousand per ha across the different categories of strawberry growers.

Hence, Cost A, Cost B, and Cost C were found to have increased with the increase of the size of the strawberry orchard in the study area. The yield of strawberry cultivation was estimated to be higher on small (16007.82 kg/ha) category of strawberry growers followed by medium (15678.20 kg/ha) and large (14992.74 kg/ha) categories of strawberry growers, whereas, the overall yield was worked out to be 15714.16 kg/ha in the study area (Table 8).

The gross farm income was worked out to be ₹ 2109.03 thousand, ₹ 2120.48 thousand and ₹ 2101.98 thousand on small, medium and large categories of strawberry growers, respectively. The overall gross income of strawberry growers was estimated as ₹ 2111.98 thousand per ha. Whereas, the net return including the family labour were worked out to be higher on small (₹ 1199.84 thousand/ha) followed by medium (₹ 1164.47 thousand/ha) and large (₹ 1119.76 thousand/ha) categories of strawberry growers. Similarly, the net return excluding the family labour was worked out to be the highest on small, followed by medium and large categories of strawberry growers which was accounted to be ₹ 1332.39 thousand, ₹ 1267.32 thousand and ₹ 1196.65 thousand per ha, respectively. The farm business income of small, medium and large categories of strawberry growers was worked out to be ₹ 1398.23 thousand, ₹ 1336.15 thousand and ₹ 1264.49

thousand per ha in the study area. The overall farm business income was estimated to be ₹ 1355.69 thousand per ha across the various categories of strawberry growers.

Table 8: Returns from strawberry cultivation in Haryana (2016-17)

(₹ in thousand/ha)

Particulars	Small	Medium	Large	Overall
Production (kg/ha)	16007.82	15678.20	14992.74	15714.16
Gross income	2109.03	2120.48	2101.98	2111.98
Net return including family labour	1199.84	1164.47	1119.76	1174.80
Net return excluding family labour	1332.39	1267.32	1196.65	1288.05
Farm business income	1398.23	1336.15	1264.49	1355.69
Family labour income	1332.39	1267.32	1196.65	1288.05
Net farm income	1199.84	1164.47	1119.76	1174.80
Farm investment income	1332.39	1267.32	1196.65	1288.05
Cost of cultivation/ kg.	71.34	74.33	78.57	73.54
Benefit Cost ratio (BCR)				
Paid out cost (GFI/ Cost A)	2.97	2.70	2.51	2.79
Paid out cost (GFI/ Cost B)	2.72	2.49	2.32	2.56
Total cost (GFI/Cost C)	2.32	2.22	2.14	2.25

The family labour income was worked out to be higher on small category of strawberry growers i.e. ₹ 1332.39 thousand per hectare followed by medium (₹ 1267.32 thousand/ha.) and large (₹ 1196.65 thousand/ha.) categories of strawberry growers, whereas, the overall family labour income was worked out to be ₹ 1288.05 thousand per ha across the different categories of strawberry growers. The net farm income of strawberry growers was estimated to be the highest on small category (₹ 1199.84 thousand/ha) followed by medium (₹ 1164.47 thousand/ha) and large (₹ 1119.76 thousand/ha) categories of strawberry growers. Overall the net returns from strawberry worked out to be ₹ 1174.80 thousand per ha across the different categories of farms. The farm investment income was worked out as ₹ 1332.39 thousand, ₹ 1267.32 thousand and ₹ 1196.65 thousand per ha on small, medium and

large categories of strawberry growers, respectively. The overall farm investment income was ₹ 1288.05 thousand per ha across the different categories of strawberry growers.

The Benefit Cost Ratio (BCR) over paid out cost A of strawberry cultivation over total cost was worked out to be higher on small category of strawberry growers (2.97) followed by medium (2.70) and large (2.51) categories of farms whereas the Benefit Cost Ratio over paid out cost B was worked out to be 2.72, 2.49 and 2.32 on small, medium and large categories of strawberry growers, respectively. Similarly, the Benefit Cost Ratio over paid out cost C was worked out to be higher on small category of strawberry growers (2.32) followed by medium (2.22) and large (2.14) categories of farms. This indicates that strawberry cultivation is profitable in the study area.

Hence, from the discussion it can be concluded that the net returns from strawberry cultivation was observed to have increased with the decrease in the size of the strawberry farms, and it was due to higher yield on small category of farms when compared to medium and large category of farms. It was found that strawberry cultivation in the area was profitable wherein the BCR was found to be more than one (Table 8).

CONCLUSION

The economic analysis of strawberry cultivation during 2016-17 in Hisar and Bhiwani districts of Haryana showed that the growers had to incur overall an average cost of production of ₹ 937.18 thousand per hectare. The total cost of cultivation was the highest in case of large category farmers followed by medium and small categories. Overall average net return earned by strawberry growers in Hisar district was ₹ 1174.80 thousand per hectare. Net returns were highest for small farmers followed by medium and large. Benefit Cost Ratio over paid out Cost C for small, medium and large growers were 2.32, 2.22 and 2.14, respectively. Overall B-C ratio was 2.25.

Hence, the study recommends to realize the economic benefits among the farmers to expand the area and production of strawberry which will help to enhance the income and livelihood of the farmers of the state.

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