Marketing efficiency and problems of peach crop in Himachal Pradesh of northwestern Himalayan region

PARDEEP SINGH, MANOJ K VAIDYA and DIVYANSHU

Department of Social Sciences, Dr YS Parmar University of Horticulture and Forestry Nauni, Solan 173230 Himachal Pradesh, India
Email for correspondence: pardeepmahal1994@gmail.com

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ABSTRACT

In the present study a sample of 60 farmers cultivating peach, five pre-harvest contractors, five forwarding agents, five wholesalers and five retailers were selected randomly. Results indicated that the majority of the producers sold their produce through pre-harvest contractors which deprived them from getting benefitted from actual market prices. Large price spread between producer's price and consumer's rupee for peach was frequently observed in markets. Producers received 52.71 per cent of the consumer's price in the channel-C in which large quantity of produce was marketed. Among these costs packing material, Mandi tax and commission charges were the major items. The share of middlemen including retailers appeared to be reasonable. Highest efficiency was observed in channel-A (27.82) followed by channel-E (14.03), channel-B (1.57), channel-D (1.17) and channel-C (1.11). Though channel-A was found efficient yet the volume transacted was very less (4.52%). Problem of availability of buyers and harassment by middleman were found statistically significant. A considerable portion of the consumer's rupee in these markets was consumed by intermediaries. This indicates inefficiencies and shortfalls in the marketing system. Thus for better disposal of peach produce, the producer-industry linkages need to be developed as the crop has potential for processing and preservation. Model of cooperative farming should be developed to ensure better marketing. Information on market potential, price and market intelligence is required to be collected through market survey so that proper marketing strategy could be formulated.

Keywords: Peach; market; efficiency; share; channel

INTRODUCTION

India is the second largest producer of fruits in the world. Country has made good progress in fruit production with a total production of 97,358 thousand MT from an area of 6,506 thousand ha in 2018 (Anon 2018). Horticulture sector has a significant impact on the growth of the country's economy and it is expected that in future also it can make significant contribution towards accelerating the agricultural growth and contribution in GDP.

Himachal Pradesh is having the advantage of varied climate ranging from sub-tropical to dry temperate. Horticulture sector in the state has made remarkable contributions in the upliftment of the socio-economic conditions of the farming community. The niche advantages for fruits have in the past been exploited by the growers wherever natural conditions, socio-economic and institutional environment were favorable.

Peach (*Prunus persica* Batsch) is an important stone fruit crop. It belongs to family Rosaceae and is cultivated for table purposes as well as for processing. It is highly valued for its taste and attractive colour. The fruit is a good source of sugars, proteins, minerals and vitamins. Peach orchards however are predominant in Sirmaur district of Himachal Pradesh where commercial plantation of peach exists. The main cultivars of peach being grown in mid-hills of the state are July Elberta, Red Haven, Early White Giant, World's Earliest etc. Out of these, July Elberta accounts for 75 per cent of the total production of peach in the state. Most of the peach cultivars require 500-1000 chilling hours below 7.2°C to bloom normally in the spring (Singh et al 2018, 2019, Singh 2017).

The peak harvesting period for different peach cultivars in mid-hills is mid-May to mid-July. Peaches are marketed immediately after harvesting as these are perishable and fragile in nature. The high temperature and humidity cause significant losses after harvest and estimated losses range from 20 to 30 per cent. The present study was undertaken in Himachal Pradesh to analyze the marketing system of peach.

METHODOLOGY

Selection of market and market intermediaries

To examine the various marketing aspects of peach, a sample of 60 farmers cultivating peach, five pre-harvest contractors, five forwarding agents, five wholesalers and five retailers were selected randomly from the Rajgarh and Solan markets of Himachal Pradesh to study the functioning of market in Himachal Pradesh. To study the nature and extent of the market, secondary data were collected from the production markets of Solan and Rajgarh APMC (Singh 2017).

Compound growth rate (CGR)

The compound growth rates for different variables were computed by fitting the exponential function to the figures of area, production and productivity of peach of Himachal Pradesh for the period of 2008-09 to 2015-16. The ordinary least square method was used to fit the power function of the following form $Y= ae^{bt}$ (Singh 2017, Kudamala et al 2019). It was converted into log linear function with the help of logarithmatic transformation as under:

$$Ln\ Y = Ln\ a + t\ b$$

where Y= Dependent variable (area, production, productivity etc), t= Independent variable (time in a year)

Compound growth rate (CGR) was calculated by using the following formula:

$$CGR = b*100$$

For significance testing, t-value was calculated using formula:

$$T - statistic = \frac{CGR}{SE\ (CGR)}$$

Market analysis

Marketing margin: Marketing margin of middlemen calculated as the difference between the total payments (marketing cost + purchase price) and receipts (sale price) of the middlemen was calculated as per the formula as follows:

$$A_{mi} = P_{Ri} - (P_{pi} + C_{mi})$$

where A_{mi}= Absolute margin of middlemen, P_{Ri}= Total value of receipts per unit (sale price), Pp_i= Purchase value of goods per unit, C_{mi}= Cost incurred on marketing per unit

$$GMM = \frac{Consumer's\ price - Producer's\ price}{Consumer's\ price} \times 100$$

where TGMM= Total gross marketing margin

It is useful to introduce the idea of producer's gross margin (GMM_p) which is the portion of the price paid by the consumer that goes to the producer.

The producers' margin was calculated as:

$$Producer's\ share = \frac{Consumer's\ price - Gross\ marketing\ margin}{Consumer's\ price} \times 100$$

The net marketing margin (NMM) is the percentage of the final price earned by the intermediaries as their net income after their marketing costs are deducted.

The percentages of net income that can be classified as pure profit (ie return on capital) depends on the extension to such factors as the intermediaries' own (working capital) costs. The equation shows that a higher marketing margin diminishes the producer's share and vice versa. It indicates welfare distribution between production and marketing agents.

$$NMM = \frac{Gross\ margin - Marketing\ cost}{Consumer's\ price} \times 100$$

where NMM= Net marketing margin

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Higher NMM or profit of the marketing intermediaries reflects reduced downward and unfair income distribution which depresses market participation of smallholders.

Price spread: The difference between the price paid by the consumer and price received by the producer is the marketing margin or price spread. Generally the economic efficiency of marketing system is measured in terms of price spread. Smaller the price spread, greater is the efficiency of the marketing system.

Margin was calculated as per Kashyap and Guleria (2015):

$$\text{Marketing margin (MM)} = \text{Selling price (SP)} - \text{Purchase price (PP)}$$

$$\% \text{ Sale receipt} = \frac{\text{Margin}}{\text{Total sale receipt}} \times 100$$

$$\% \text{ Total marketing cost} = \frac{\text{Total marketing cost}}{\text{Total sale receipt}} \times 100$$

Marketing efficiency of the marketing channels

In case of marketing channels, the marketing efficiency is concerned with the movement of goods from producer to consumer at the lowest possible cost consistent with the provision of services desired by the consumer. The marketing efficiency of various channels in the study area has been computed by using Acharya's method (Acharya and Agarwal 2001, Kashyap and Guleria 2015) as under:

$$ME = \frac{RP}{MC + MM} - 1$$

where ME= Marketing efficiency, RP= Retailer's price, MC= Total marketing costs, MM= Total marketing margins

Chi-square test

To test whether there were any significant differences among marginal, small and medium farms of Sirmaur district for the problems faced by them, chi-square test in m x n contingency table was applied where m and n are the number of marketing problems faced by the farmers of Sirmaur (Singh 2017, Kudamala et al 2019).

The detail of approximate chi-square test is given as under:

$$\sum_{j=1}^{L}\sum_{i=1}^{K}\frac{(O-E)^2}{E} \sim \chi 2\,(L-1)(K-1)\,df$$

where O= Observed values, E= Expected values, K= Number of problems, L= Number of farm size groups

RESULTS and DISCUSSION

Area, production and productivity of peach in Himachal Pradesh

The level of growth in output is jointly determined by the growth rate in area and yield. The purpose of this analysis was to examine the performance of total fruits and peach cultivation in the state and to see if there had been any noticeable changes during 2008-09 to 2015-16. This helped in finding out the underlying factors responsible for such performance and thereby permitting a broad judgment about the overall production possibilities in times to come.

From Table 1 (Fig 1) it is depicted that the compound annual growth rate of area, production and productivity of total fruits in Himachal Pradesh was 1.50, 7.20 and 5.70 per cent respectively from 2008-09 to 2015-16. Production and productivity were increasing significantly at 5 per cent level but area was not increasing significantly. While in case of peach it was observed decreasing with 0.30, 3.50 and 3.20 per cent respectively. Production and productivity showed fluctuating trend during the period under reference.

Marketing channels

The marketing channel means the route through which a commodity travels from producer to the final consumer. The agencies involved in the marketing of peach in the study area were forwarding agents, wholesalers and retailers. The marketing channels shown in Table 2 were observed in the study area in the marketing of peach.

Wholesaler was most commonly involved in channels B, C and D. Wholesaler sells/auctions the fruits in the market. In the study area about 68.75 per cent of the produce was disposed off through these channels (Table 2). Some of the farmers sold their produce through pre-harvest contractors. The total

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Table 1. Area, production, productivity and compound growth rate of total fruits and peach in Himachal Pradesh (2008-09 to 2015-16)

Component	Total fruits			Peach		
	Area ('000 ha)	Production ('000 MT)	Productivity (MT/ha)	Area ('000 ha)	Production ('000 MT)	Productivity (MT/ha)
Coefficient (b)	.015 (.0012)	.072 (0.058)	.057 (0.058)	-0.003 (0.001)	-0.035 (0.06)	-0.032 (0.06)
CAGR (%)	1.50	7.20**	5.70**	-0.30	-3.50**	-3.20**

CAGR= Compund annual growth rate, **significant at 5 per cent level

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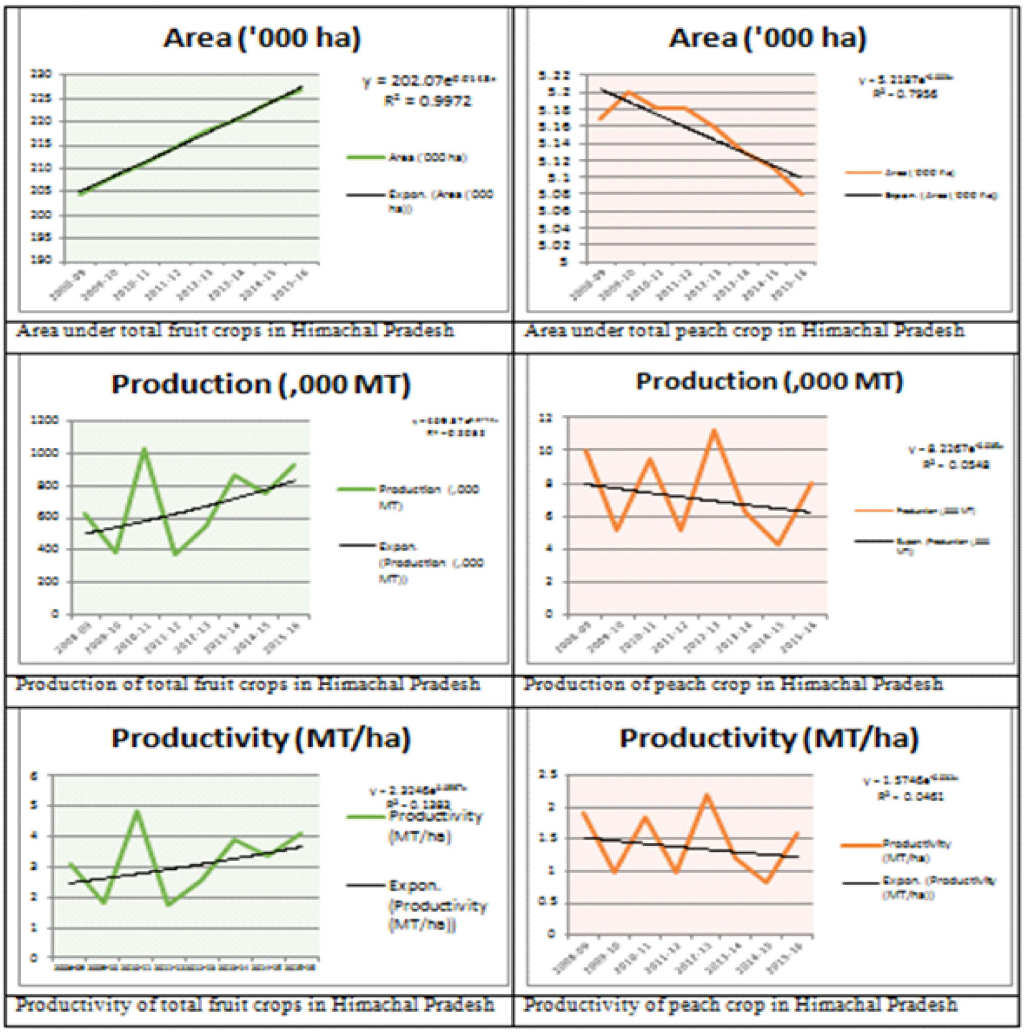


Fig 1. Graphical representation of area, production and productivity of total fruits and peach in Himachal Pradesh

quantity marketed through this channel was worked out to be 47.71 per cent of the total produce sold in the study area (Table 2). Forwarding agent was most commonly involved in channel-D. Forwarding agents collected the produce from the doorsteps of the producers and further sold it to wholesalers when collected in sufficient amount; 10.43 per cent of the produce was disposed of through this channel. The processing unit also played an important role in purchasing produce from the producers. Producers generally sold their lower grade fruits to the processing units like HPMC, HIMCU, Minchie etc

Table 2. Quantity of peach marketed through various channels

Marketing channel	Marketing intermediaries	Total share in quantity marketed (%)
Channel-A	Producer – Consumer	4.52
Channel-B	Producer – Wholesaler – Retailer – Consumer	10.61
Channel-C	Producer – Pre-harvest contractor – Wholesaler – Retailer – Consumer	47.71
Channel-D	Producer – Forwarding agent – Wholesaler – Retailer – Consumer	10.43
Channel-E	Producer – Processing unit – (Consumer)	26.73

where it was processed and preserved after value addition and further sold to consumers through their own marketing networ; 26.73 per cent of the produce was sold to processing industries. This channel establishes a direct relationship with the consumers. This channel promises higher share of producer in the consumer's rupee; 4.52 per cent of the total produce was marketed through this channel (Fig 2).

Marketing costs

To estimate the marketing costs, various marketing functionaries were contacted in the local market at Rajgarh and Solan.

Cost incurred by the producer: The cost of marketing and margins of different functionaries involved in various marketing channels were analysed (Table 3). The data reveal that in case of channel-A producer sold the produce directly to the consumer and the total marketing cost incurred by the producer was worked out to be Rs 116.84 per quintal. In channel-B producer sold the produce to the wholesaler in the market and the total marketing cost incurred by the producer was worked out to be Rs 185.17 per quintal. In channel-D producer sold the produce to the forwarding agent in the local area and the total marketing cost incurred by the producer was worked out to be Rs 125.75 per quintal.

In channel-E producer sold the produce to the processing unit in HPMC and the total marketing cost incurred by the producer was Rs 150.71 per quintal. In channel-C producer sold the produce to the pre-harvest contractor. There was no marketing cost to be borne by the farmer as the pre-harvest contractors collected the produce from the doorsteps of the producers.

Cost incurred by the wholesaler: The wholesaler was involved in the marketing channels B, C and D.

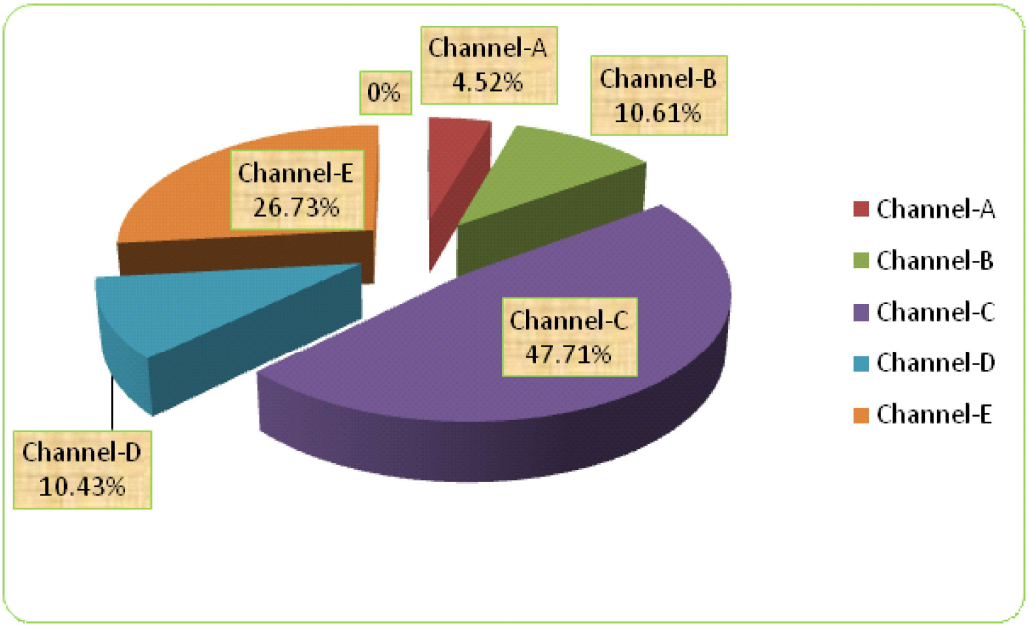


Fig 2. Per cent share in total quantity transacted through different marketing channels

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The commission charges, transport and tax constituted the important items of marketing costs. In channels B, C and D wholesaler spent Rs 703.75, 705.61 and 705.75 per quintal respectively in the marketing out of which room rent, commission charges and transportation cost accounted for Rs 603.76, 605.16 and 605.26 per quintal respectively.

Marketing cost incurred by the pre-harvest contractor: The pre-harvest contractor was present in the marketing channel-C. The total marketing cost incurred by the pre-harvest contractor in this marketing channel was Rs 391.39 per quintal. The major items of costs were commission charges (Rs 154.39/quintal) followed by transportation cost (Rs 72.64/quintal).

Marketing cost incurred by the forwarding agent: In channel-D forwarding agent spent Rs 401.68 per quintal in the marketing of which commission charges were the major cost that accounted for Rs 331.40 per quintal. The forwarding agent's marketing margin was found to be Rs 95.24 per quintal.

Price spread among different marketing channels

From the data given in Table 4 it can be observed that producer's price varied from Rs 2,115.00 to 3,250.45 among different channels. The price spread was maximum in channel-C (47.29%) followed by channel-D (46.06%), B (38.95%), E (6.65%) and A (3.47%). The highest producer's share was found in channel-A (96.53%) followed by channels E (93.35%), B (61.05%), D (53.94%) and C (52.71%). Marketing margin varied between 12.71 to 16.81 per cent and marketing cost between 3.47 to 31.82 per cent.

Marketing efficiency of different marketing channels

The results of marketing efficiency which is an indicator of overall performance of the marketing channels have been presented in Table 5. The results indicate highest efficiency in channel-A (27.82) followed by channels E (14.03), B (1.57), D (1.17) and C (1.11). Though channel-A was found efficient yet the volume transacted was very less (4.52%).

Marketing-related problems

An informal discussion with the sampled farmers revealed that the marketing of peach had a few marketing problems. Even though the cultivation of peach was profitable there was still lacuna in the marketing. The main problem of peach producers was lack of timely market information. The producers got the inadequate and misleading information about the market prices by the market functionaries. The payments were also delayed by the middleman to the producers.

Far-off market to sell the produce was reported the problem by about 46 per cent growers. The lack of proper transportation facilities, farmers consent for final sale of produce at offered price in market by wholesalers not taken, lack of inadequate or incorrect price given by the wholesaler after auction and harassment in market were the main marketing problems reported by more than 44 per cent of the respondent growers. The magnitude of these problems was observed similar among various categories of farms.

The major problems in the marketing were tested by chi-square test on the per cent multiple response of the farmers (Table 6). Problem of availability of buyers and harassment by middleman were found statistically significant because these problems were faced by few peach growers.

CONCLUSION

The study revealed that five main marketing channels were found prevalent in the study area for marketing peach crop. Among these channel-C consisting of Producer – Pre-harvest contractor – Wholesaler – Retailer – Consumer was found to be the most preferred channel as 47.71 per cent of the produce was traded through this marketing channel.

Producer's price varied from Rs 2,115.00 to 3,250.45 among different channels. Price spread was maximum in channel-C followed by Channel D, B, E and A and the highest gross marketing margins were found in channel-C and lowest in channel-A. Net marketing margins varied between 12.71 to 16.82 per cent. Producer's share was highest in channel-A followed by channels E, B, D and C respectively. Highest efficiency was found in channel-A followed by channels E, B, D and C respectively. Though channel-A was found efficient but the volume transacted was very less (4.52%) because produce was traded directly to the consumer.

The major problem faced by the farmers was diseases control which ultimately increased the cost

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Table 3. Marketing costs and margin of different functionaries in the different marketing channels of peach in Solan market of Himachal Pradesh (Rs/q)

Component	Marketing channel				
	A	B	C	D	E
Marketing cost incurred by the producer					
Net price received by farmer	3,250.45	2,976.82	2,573.17	2,634.64	2,115.00
Transportation cost	11.84	65.17	-	8.75	35.71
Packing material cost	80.00	80.00	-	80.00	80.00
Loading /unloading	25.00	25.00	-	25.00	25.00
Commission charges	-	-	-	-	-
Mandi tax	-	-	-	-	-
Telephone charges	-	15.00	-	12.00	10.00
Total	116.84	185.17	-	125.75	150.71
Farmer's selling price	3,367.29	3,161.99	2,573.17	2,760.39	2,265.71
Marketing cost incurred by the pre-harvest contractor					
Gross price paid by pre-harvest contractor	-	-	2,573.17	-	-
Loading /unloading	-	-	20.45	-	-
Packing material cost	-	-	80.00	-	-
Commission charges	-	-	154.39	-	-
Telephone charges	-	-	12.45	-	-
Transportation cost	-	-	72.64	-	-
Mandi tax	-	-	51.46	-	-
Total	-	-	391.39	-	-
Pre-harvest contractor margin	-	-	220.82	-	-
Pre-harvest contractor's selling price/wholesaler's	-	-	3,185.38	-	-
purchase price	-	-		-	-
Marketing cost incurred by the forwarding agent					
Gross price paid by forwarding agent	-	-	-	2,760.39	-
Loading /unloading	-	-	-	22.25	-
Transportation cost	-	-	-	75.86	-
Telephone charges	-	-	-	12.46	-
Mandi tax	-	-	-	55.21	-
Commission charges	-	-	-	165.62	-
Total	-	-	-	331.40	-
Forwarding agent's margin	-	-	-	95.24	-
Forwarding agent's selling price/wholesaler's	-	-	-	3,187.03	-
purchase price	-	-	-	-	-
Marketing cost incurred by the wholesaler					
Gross price paid by wholesaler	-	3,161.99	3,185.38	3,187.03	-
Cost components of wholesaler	-	-	-	-	-
Loading /unloading	-	16.75	16.75	16.75	-
Room rent (storage charges)	-	318.54	318.54	318.54	-
Telephone charges	-	20.00	20.00	20.00	-
Transportation cost	-	95.50	95.50	95.50	-
Mandi tax	-	63.24	63.70	63.74	-
Commission charges	-	189.72	191.12	191.22	-
Total	-	703.75	705.61	705.75	-
Wholesaler's margin	-	270.00	250.00	250.00	-
Wholesaler's selling price/retailer's purchase price	-	4,135.74	4,140.99	4,142.78	-
Marketing cost incurred by the retailer					
Gross price paid by retailer	-	4,135.74	4,140.99	4,142.78	-
Cost components of retailer	-				-
Loading /unloading	-	18.75	18.75	18.75	-
Telephone charges	-	10.48	10.48	10.48	-
Transportation cost	-	30.54	30.54	30.54	-
Mandi tax	-	82.71	82.78	82.86	-
Commission charges	-	248.14	248.35	248.57	-
Total	-	390.63	390.90	391.19	-
Retailer's margin	-	350.00	350.00	350.00	-
Retailer's selling price	-	4,876.37	4,881.89	4,883.98	-
Consumer's purchase price	3,367.29	4,876.37	4,881.89	4,883.98	2,265.71

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Table 4. Price spread of peach among the different marketing channels in the Solan market of Himachal Pradesh

Component	Marketing channel				
	A	B	C	D	E
Producer's price (Rs/q)	3250.45	2976.82	2573.17	2634.64	2115.00
Consumer's price (Rs/q)	3367.29	4876.37	4881.89	4883.98	2265.71
Gross marketing margin (GMM) (Rs/q)	116.84	1899.55	2308.72	2249.34	150.71
Total marketing cost ((Rs/q)	116.84	1279.55	1487.9	1554.1	150.71
Net market margin (Rs/q)	-	620.00	820.82	695.24	-
Total gross marketing margin (%)	3.47	38.95	47.29	46.06	6.65
Marketing cost (%)	3.47	26.24	30.48	31.82	6.65
Marketing margin (%)	-	12.71	16.81	14.24	-
Producer's share (%)	96.53	61.05	52.71	53.94	93.35

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Table 5. Marketing efficiency of different marketing channels followed in study area (Rs/q)

Component	Marketing channel				
	A	B	C	D	E
Total marketing cost	116.84	1279.55	1487.90	1554.10	150.71
Consumer's price	3367.29	4876.37	4881.89	4883.98	2265.71
Total net marketing margin	-	620.00	820.82	695.24	-
Marketing efficiency	27.82	1.57	1.11	1.17	14.03

Table 6. Test of significance of problems related to marketing faced by peach farmers in the study area

Problem	Chi-square
Availability of buyers	35.96**
Higher commission	2.11
Wholesalers not taking consent while selling	1.71
Delay in payments	3.21
Harassment by middlemen	17.57**
Lack of transport facilities	2.71
Markets very far off	4.71
Lack of inadequate or incorrect price	2.32

**significant at 5 per cent level

of production, lowered the price in the market and low productivity. It was followed by non-availability of healthy plant material and non-availability of desired brands of pesticides.

Far-off market to sell their produce was reported a problem by about 46 per cent growers; lack of proper transportation facilities and farmers consent for final sale of produce at offered price in market by wholesalers not taken was the main marketing problem reported by more than 44 per cent of the growers. For better disposal of peach produce, the producer-industry linkages need to be developed as this crop has potential for processing as well as preservation. Model of cooperative farming should be developed to ensure better marketing of the crop. Information on market potential, price and market intelligence is also required to be collected through market survey so that proper marketing strategy could be formulated. A sound database of production potential along with the potential needs of the farmers must be created. Provision of subsidy which is available to the farmers for the strengthening of production technologies needs to be extended for the marketing. Short term trainings of the farmers should be organized in the peach producing areas of the state regarding collection techniques, scientific methods of processing and grading in order to enhance the skills of producers to maximize the net profit and reduce wastage of produce.

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