



Production and marketing of off-season vegetables in Himachal Pradesh

Sultan Singh and S.K. Chauhan*

Department of Agricultural Economics, Extension Education & Rural Sociology
CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176 062, India.

*Corresponding author: skchauhan1958@gmail.com

Manuscript Received: 25.05.2018; Accepted: 23.07.2018

Abstract

The present study was conducted in Chhota Bhangal, one of the remotest area of district Kangra, Himachal Pradesh. Since the region has vast potential for production and marketing of off-season vegetables. A two-stage random sampling technique was employed for the selection of 10 vegetable growing villages and the 60 growers from selected villages through proportional allocation method in the second and final stage of sampling. The findings of the study revealed that the total production on an average farm was highest for cabbage (57.53 q/ household) followed by cauliflower (15.11 q/ household). The plastic net bags, gunny bags and corrugated boxes were used as the packaging material for most of the vegetables. Channel I (Producer Local trader Commission agent-cum-wholesaler Retailer Consumer) was the most important channel for all the cole vegetable crops. In case of problems relating to production of vegetables, high incidence of pest and diseases was reported top most problems by the farmers. In case of problems relating to marketing of produce, unfavorable price received by producers was the most prominent problem recorded at first place using Garrett's mean score of 70.70 on an all farm situation.

Key words: Off-season vegetables, marketing channels, post-harvest losses, hilly areas, pre-cooling, pests and

Vegetables occupied an area of 9.5 million hectares during 2014-15 with a total production of 167 million tonnes having average productivity of 17.6 tonnes per hectare. Vegetable production registered a quantum jump of 66 per cent between 2001-02 and 2014-15. The major vegetable crops grown in the country are potato, tomato, onion, brinjal, cabbage, cauliflower, peas, okra, chillies, beans, melons, etc. West Bengal has been maintaining the lead in vegetable production in the country, contributing about 16 per cent to total production, while Uttar Pradesh is producing almost 14 per cent of vegetables in the country with the difference being that the productivity of vegetables in Uttar Pradesh is as high as 21 tonnes per hectare against 19 tonnes per hectare in West Bengal (Govt. of India, 2016).

Himachal Pradesh being a hilly state, more than 90 per cent of the population lives in villages and depends mainly upon agriculture. The most important accompanying change in the state's agriculture has been its transformation from cereal-based subsistence agriculture to vegetable dominated commercial agriculture, especially under temperate agro-climatic

zones. Himachal Pradesh has earned much reputation by producing different seasonal and off-season vegetables. The area under vegetable crops in the state has increased from 49.86 thousand ha in 2005-06 to 75.23 thousand ha in 2015-16. Consequently, the production of vegetables which was 9.30 lakh tonne in 2005-06 has gone up to 16.08 lakh tonne in 2015-16. According to the data available with the National Bank for Agriculture and Rural Development (NABARD) Himachal Pradesh, the vegetable production in the state is 19.5 tonnes per hectare, which is higher than the national productivity of 17.5 tonnes per hectare during 2015-16. Vegetable cultivation is rapidly gaining popularity among farmers in the hill state of Himachal Pradesh, which has become a 'natural glass house' for production of off-season vegetables in the region. The state has a huge bio-diversity and its agro-climatic conditions are congenial for the production of off-season vegetables round the year. It is with this background a detailed study was proposed to accomplish the specific objectives to study the production & utilization pattern and marketing operations of off-season vegetables and to analyze the

constraints in the production and marketing of off-season vegetables.

Materials and Methods

The present study was conducted in Chhota Bhangal area of district Kangra, Himachal Pradesh. Since the region has vast potential for production and marketing of off-season vegetables, it was purposively selected for the present study. A two-stage random sampling technique was employed for the selection of 10 vegetable growing villages out of 22 in the first stage and the 60 growers from selected villages through proportional allocation method in the second and final stage of sampling. Based on allocation of area under crops, six major vegetables viz., cabbage, cauliflower, broccoli, radish, potato and coriander leaves (spice) were selected for detailed analysis.

The study was based on the primary data collected for the agricultural year 2015-16.

The marketable and marketed surplus was obtained as follow:

$$MS_1 = Q - (C + F)$$

$$MS_2 = Q - (C + F) - L$$

where,

MS_1 = Marketable surplus

MS_2 = Marketed surplus

Q = Vegetable production in a season

C = Home consumption of the vegetable during the season

F = Kind payments, gifts during the season

L = Losses of the vegetable during the season

To know the constraints in cultivation and marketing of vegetables, Garrett's ranking technique was employed. Basically it gives the change of orders of constraints and advantages into numerical scores. The major advantage of this technique as compared to simple frequency distribution is that the constraints are arranged based on their importance from the point of view of respondents. Hence, the same number of respondents on two or more constraints may have been given different rank. Garrett's formula for converting ranks into per cent is given by:

$$\text{Per cent position} = \frac{100 \times (R_{ij} - 55)}{N_j}$$

where,

R_{ij} = Rank given for i^{th} factor by j^{th} individual

N_j = Number of factors ranked by j^{th} individual

The per cent position of each rank was converted

into scores referring to the table given by Garrett and Woodsworth, 1969. For each factors, the scores of individual respondents were added together and divided the total number of the respondents for whom scores were added. These mean scores for all the factors were arranged in descending order, ranks were given and most important factors were identified. Finally, these problems were clubbed into high, medium and low severity levels under different aspects as follow (Chauhan 2000):

Mean (\bar{X}) plus standard error and above : High

Mean (\bar{X}) plus/minus standard error : Medium

Mean (\bar{X}) minus standard error : Low

Results and Discussion

Production and utilization pattern of off-season vegetables

It can be seen from the Table 1 that total production on an average farm was highest for cabbage (57.53 q/ household) followed by cauliflower (15.11 q/ household) and 14.51q/ household for radish. Production of potato and broccoli on an average farm was 13.39 q/ household and 6.20 q/ household, respectively. Coriander was having the least production of 2.23 q/ household. The per cent share of utilization to total production among major vegetables ranged from 0.49 per cent in cabbage to 22.55 per cent in potato on an average farm. This high proportion of the utilization (22.55 %) in potato crop includes stored seed for the next year crop. The marketed surplus of all the vegetables varied from 70.94 per cent in potato to 92.41 per cent in coriander on an average farm. The difference between marketable and marketed surplus of the vegetable crops was due to the post-harvest losses which varied from 5.80 per cent in coriander to 10.00 per cent in broccoli on an average farm.

Marketing of vegetables

Marketing, as we know is a process of communicating the value of a product from producers to consumers, for the purpose of selling the product. The high production potential of vegetable crops affects the orderly marketing system in the absence of needed infrastructures, such as assembling, grading, sorting, packing and transportation. These marketing practices are indispensable, helping in the creation of time, place, form and possession utilities. Therefore, it was considered essential to examine various marketing systems/practices of vegetables in the study area.

Harvesting of produce

The harvesting time of the vegetables in the area starts from the middle of August and lasts till the middle of the October. The number of times different vegetable crops harvested by the growers has been depicted in Table 2. The table revealed that the average number of harvests/lots was 6 each in case of cabbage and cauliflower whereas; it was 4 and 5 in case of radish and broccoli, respectively. The number of lots harvested was more in cabbage and cauliflower due to their long cropping season and demand extending to a

considerable long period of time. The number of harvest cuttings in case of coriander spice was three. Potato crop sown in such a way as to realize early and late harvest. The crop harvested early meant for table purpose and to fetch good price in the market particularly in that time when rainy season is in its peak and the supply of potato from plain becomes almost negligible. The late harvest of potato meant for seed for next year crop grown at home and rest for market as seed to plain areas within and outside state.

Table 1. Production and utilization pattern of off-season vegetables

		(q/ household)					
Sr. No.	Particulars	Vegetables					
		Cabbage	Cauliflower	Radish	Broccoli	Potato	Coriander
1.	Total production	57.53 (100)	15.11 (100)	14.51 (100)	6.20 (100)	13.39 (100)	2.23 (100)
2.	Utilization	0.28 (0.49)	0.24 (1.59)	0.14 (0.98)	0.13 (2.09)	3.02 (22.55)	0.04 (1.79)
i.	Home consumption	0.20 (0.35)	0.14 (0.93)	0.10 (0.70)	0.10 (1.61)	2.99 (22.33)	0.02 (0.89)
ii.	Gifts	0.03 (0.05)	0.04 (0.26)	0.01 (0.07)	0.01 (0.16)	0.01 (0.07)	0.01 (0.45)
iii.	Kind payments	0.05 (0.09)	0.06 (0.40)	0.03 (0.21)	0.02 (0.32)	0.02 (0.15)	0.01 (0.45)
3.	Marketable surplus (1-2)	57.25 (99.51)	14.87 (98.41)	14.37 (99.02)	6.07 (97.91)	10.37 (77.45)	2.19 (98.21)
4.	Losses	5.53 (9.61)	1.44 (9.56)	1.15 (7.92)	0.60 (10.00)	0.87 (6.51)	0.13 (5.80)
5.	Marketed surplus (3-4)	51.72 (89.90)	13.43 (88.85)	13.22 (91.10)	5.47 (87.91)	9.50 (70.94)	2.06 (92.41)

Figures in the parentheses show percentages to total production in each crop

Table 2. Frequency of vegetable crop harvests

Sr. No.	Vegetable	Range of harvests	Average lots of pickings (No.)
1.	Cabbage	4-7	6
2.	Cauliflower	4-7	6
3.	Radish	3-5	4
4.	Broccoli	4-6	5
5.	Potato	2	2
6.	Coriander	2-4	3

Assembling

Assembling of the produce at one place was the foremost marketing practice performed by the vegetable growers in the study area. Assembling was done in the field itself because of higher additional cost borne that occur to transport the produce to residential places. The other reason was the location of some of the farms nearer to the road head.

Cleaning/washing

It was observed that cleaning of selected vegetables was done by washing the harvested produce with water to remove soil and to give attractive and fresh look to these vegetables. In case of radish, all the farmers performed cleaning operation whereas in case of other vegetables this operation was not performed at all. Washing with water, in a way, also promoted pre-cooling operation indirectly.

Grading/sorting

Grading is one of the most important market functions from the market point of view as it helps to fetch higher prices of produce. The grading of vegetables by the growers, as such, was not commonly practiced in the study area. However, instead of systematic grading, sorting was practiced into different lots having uniform size. Different price of sorted lots encouraged the farmers to perform this practice in the study area.

Packaging

Packaging is one of the important and necessary functions performed in the marketing of vegetables and to take it to the marketing channels. The mode and type of material used for packaging of vegetables in

the study area has been explained in Table 3. In the study area, packaging was done manually for all the vegetables. The plastic net bags, gunny bags and corrugated boxes were used as the packaging material for most of the vegetables. The capacity of gunny bags varied from 40 to 50 kg, whereas, that of plastic net bags varied from 30 to 45 kg. Similarly, the capacity of corrugated boxes was 20 to 35 kg depending upon the type of vegetable. The cost of the packaging material varied according to their capacity. The average cost of plastic net bags, corrugated boxes and gunny bags was Rs 6, Rs 20 and Rs 15, respectively.

Storage

Scientific storage facilities in the study area were not available. Except the potato crop where some proportion of the total production was stored in their dwelling houses as a seed for next crop and for home consumption during winter, all other vegetables were sold immediately after harvest to local traders or commission agents.

Transportation

Transportation is an indispensable marketing function at every stage right from the place of harvest to the point of consumption. Quick and efficient transportation is the main step towards good marketing systems. Vegetable commodities being highly perishable in nature require quick disposal to avoid spoilage and loss in quality which need efficient network of transportation. Most of the vegetable growing villages in the study area were not connected with all-weather link roads which posed the main challenge to vegetable marketing in the study area.

Table 3. Mode of packaging of different vegetables

Sr. No.	Vegetables	Material used	Capacity (kg)	Average cost of packaging material (Rs/unit)
1.	Cabbage	Plastic net bags	35-45	6
2.	Cauliflower	Plastic net bags	30-40	6
		Corrugated boxes	25-35	20
3.	Radish	Plastic net bags	20-30	6
4.	Broccoli	Corrugated boxes	20-30	20
5.	Potato	Gunny bags	40-50	15
6.	Coriander	Thin gunny bags	20-30	8
		Corrugated boxes	20-25	20

The majority of the growers manually transported their produce from field to roadside. Horses and mules were also used commonly by these growers where farms were at distant places. Jeep, tempo, truck etc., were the other means of transportation for transporting the produce from study area to the markets located at 40 to 250 km distance. The loading/unloading operations were done by the labourers of the local traders on the road heads. However, in the market, the labourers of the commission agent-cum-wholesaler at the market helped them to unload their produce.

Mode of sale

In the study area, growers generally assembled their produce at the roadside where it was sold to the local traders or other vegetable traders after weighing. Each local trader possessed an electric weighing machine. The mode of payment to the producers by local traders was through cash and payments were made immediately after sale proceeds, but in most of the cases, the payments were made after two to three weeks. Vegetables were transported to different areas like Palampur, Dharamshala, Jassur etc. within the state and Pathankot, Amritsar, Jalandhar, Hoshiarpur etc., outside the state by the different vegetable traders and village youth cum vegetable growers. After unloading the produce, producers/local traders kept their lots in queues in front of commission agent's shop for sale. Most of them had personal contact with commission agents. The commission agents were found to fix the prices on the basis of the quantum of arrivals, previous day prices and price trends in main wholesale markets, quality of produce and number of bidders, etc.

Marketing channels

The marketing channels identified for marketing of different vegetables in the study area are as follows:

Channel I (Producer—Local trader—Commission agent-cum-wholesaler Retailer — Consumer)

Channel II (Producer—Commission agent-cum-wholesaler — Retailer — Consumer)

Channel III (Producer — Consumer)

It is evident from the Table 4 and Table 5 that out of the three channels, channel I (Producer — Local trader — Commission agent-cum-wholesaler — Retailer — Consumer) was the most important channel for almost all the vegetable crops. In case of coriander,

100 per cent of the marketed surplus was disposed of by all the growers through this channel followed by radish where 87.47 per cent of the total marketed surplus was disposed of by 90.38 per cent of the growers, broccoli where 69.78 per cent of the total marketed surplus was disposed of by 80.64 per cent of the growers and cabbage where 68.01 per cent of the total marketed surplus was disposed of by 91.30 per cent of the growers.

Channel II (Producer—Commission agent-cum-wholesaler — Retailer Consumer) was another important for other vegetable crops where 92.28 per cent of the total marketed surplus was disposed of by 75 per cent of the growers followed by potato crop where 71.54 per cent of the total marketed surplus was disposed of by 73.68 per cent of the growers, cauliflower where 40.43 per cent of the total marketed surplus was disposed of by 21.21 per cent of the growers.

Channel III (Producer—Consumer) was not that much significant because below one per cent of the total marketed surplus in all the vegetables was disposed of through this channel. Mohind, 2011 identified the marketing channel (Producer Farmers Marketing Group Retailer Consumer) in the study area but this channel was absent in the present study as Farmers Marketing Group (FMG) became defunct due to difference of opinion within the group.

Problems in production and marketing of vegetables

The opinion survey was conducted to know the problems of farmers relating to production and marketing of vegetables. The results of detailed analysis of the opinion survey has been presented in Table 6. It can be seen from the table that in case of problems relating to production of vegetables, high incidence of pest and diseases was reported top most problems by the farmers with average Garrett's score of 67.45 on an all farm situation. The study by Hosali and Lokapur, 2015 also highlighted the problem of high incidence of pest and diseases in production of cauliflower. The high cost of inputs and poor quality of seed were rated at second and third place, respectively with respective average Garrett's score of 65.70 and 57.87 on an all farm situation. The next major problems were labour scarcity and animal menace

Table 4. Marketing channels patronized by vegetable growers

Sr. No.	Vegetable	Channel I	Channel II	Channel III	Total growers
1.	Cabbage	42 (91.30)	11 (23.91)	21 (45.65)	46
2.	Cauliflower	29 (87.87)	7 (21.21)	8 (24.24)	33
3.	Broccoli	25 (80.64)	8 (25.80)	9 (29.03)	31
4.	Radish	47 (90.38)	8 (15.38)	8 (15.38)	52
5.	Potato	36 (94.73)	28 (73.68)	12 (31.57)	38
6.	Coriander	23 (100.00)	-	-	23

Figures in the parentheses show percentages to total number of growers for each crop

Table 5. Sale of vegetable produce through marketing channels

Sr. No.	Vegetable	Channel I	Channel II	Channel III	Total marketed surplus
1.	Cabbage	2110.64 (68.01)	981.27 (31.63)	11.29 (0.36)	3103.20 (100)
2.	Cauliflower	477.44 (59.25)	325.77 (40.43)	2.59 (0.32)	805.80 (100)
3.	Broccoli	228.8 (69.78)	97.15 (29.63)	1.95 (0.59)	327.90 (100)
4.	Radish	693.85 (87.47)	96.69 (12.19)	2.66 (0.34)	793.20 (100)
5.	Potato	157.79 (27.68)	407.74 (71.54)	4.47 (0.78)	570.00 (100)
6.	Coriander	123.60 (100.00)	-	-	123.60 (100)

Table 6. Problems faced by growers in different aspects of off-season vegetable cultivation

(Garrett's score)					
Sr. No.	Particulars	Sum of the scores	Mean	Ranks	Severity level
1.	Problems relating to production				
i.	High incidence of pest and diseases	4047	67.45	I	High
ii.	High cost of inputs (Seed, fertiliser, pesticides etc.)	3942	65.70	II	
iii.	Poor quality of seed	3472	57.87	III	
iv.	Labour scarcity and high wage rate	2517	41.95	IV	Medium
v.	Stray/wild animals and monkey menace	2412	40.20	V	
vi.	Non availability of credit	1610	26.83	VI	Low
2.	Problems relating to marketing				
i.	Unfavourable price for the produce	4242	70.70	I	High
ii.	Lack of link road to farms	4020	67.00	II	
iii.	Market at distant place	3854	64.23	III	
iv.	Lack of market information	3332	55.53	IV	Medium
v.	Faulty weighing practices and delayed payment by traders	2912	48.53	V	
vi.	High cost and non-availability of means of transportation at right time	2710	45.17	VI	
vii.	Road blockage during marketing season	2648	44.13	VII	Low
viii.	Costly packing material	1827	30.45	VIII	
ix.	Lack of standard grades & no separate price for graded produce	1515	25.25	IX	

with respective average Garrett's score of 41.95 (rank IV) and 40.20 (rank V).

In case of problems relating to marketing of produce, unfavourable price received by producers was the most prominent problem recorded at first place by mean Garrett score of 70.70 on an all farm situation. The next prominent problems were lack of link roads and distant market indicated as rank II and rank III, respectively. The problems of lack of market information and faulty weighing practices used by traders were also prominent in the study area as indicated by respective Garrett's scores of 55.53 (rank IV) and 48.53 (rank V). The other problems prominent in the area were high transportation charges, road blockage during marketing season on account of rainy season, costly packing material and lack of standard grades.

Conclusions and Policy Implications

The study found that the total production on an average farm was highest for cabbage (57.53 q/household) followed by cauliflower (15.11 q/household). The harvesting time of the vegetables in the area starts from the middle of August and lasts till

the middle of the October. The plastic net bags, gunny bags and corrugated boxes were used as the packaging material for most of the vegetables. Channel I (Producer Local trader Commission agent-cum-wholesaler Retailer Consumer) was the most important channel for almost all the vegetable crops. In case of problems relating to production of vegetables, high incidence of pest and diseases was reported the top most problem by the farmers. In case of problems relating to marketing of produce, unfavourable price received by producers was the most prominent problem recorded at first place by mean Garrett score of 70.70 on all farm situation. The study necessitated the increase of Govt. supply of subsidised inputs like seed, fertilizer and pesticides. Basic infrastructural facilities such as all-weather roads and modern market yards need to be developed in these difficult but niche area of off-season vegetable production. Scientific community from nearby public/private institutes should frequently visit the area to inform and interact with the farmers, so that they become aware of cost effective methods to prevent pest and disease attack.

References

- Chauhan SK. 2000. Women's participation in household economy: a study of Gaddi tribe. *Journal of Anthropological Survey of India* **49**(1): 15-21.
- Garret HE and Woodworth RS. 1969. *Statistics in Psychology and Education*. Vakils Feffer and Simmons Pvt. Ltd., Bombay. p 329.
- Govt. of India, 2016. *State of Indian Agriculture 2015-2016*, Directorate of Economics and Statistics, Govt. of India, New Delhi, pp: 128-129.
- Hosali R and Lokapur S. 2015. Problems in production and marketing of cauliflower in Belgaon district of Karnataka. *International Research Journal of Agricultural Economics and Statistics* **6**(1): 113-117.
- Mohind AR. 2011. *Economic analysis of supply chain management in vegetables: a case study of Chhota Bhangal, District Kangra (H.P.)*. M Sc Thesis, Department of Agricultural Economics, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur, India. p 80.