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Economic Analysis of Production and Marketing of Major Vegetable Crops: A Review

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ABSTRACT

Vegetables are imperative to the general health of individuals, providing essential nutrients and thereby reducing risks from dangerous diseases. To study the socio-economic conditions of vegetable growers, analyse their cost of cultivation, to study the resource use efficiency and analyse the market structure and problem associated in production and marketing of vegetables. The sampling technique for investigation and analytical techniques have been explained under the sub heads: selection of the study area, sampling design and sample size, nature and source of data, analytical technique, definition of terms and concepts used and limitations of the study. The main crops grown in the kharif season were maize, tomato, capsicum and beans and that in rabi season were pea, cauliflower and wheat. The most dominating vegetables in the kharif and rabi season were tomato and pea respectively. The cost of cultivation per hectare was highest for tomato, followed by pea and cauliflower. Four marketing channels were prevalent in the study area *viz.*, Channel-A, Channel-B, Channel-C and Channel-D. The maximum quantity of tomato, cauliflower and pea were marketed through Channel-B. The major problems faced by the growers in production of vegetables were non-availability of labours during the peak period, problems of insects and diseases, high wage rates and high chemical prices. The study gives a brief information of socio-economic conditions, crops grown, the cost concepts used, the marketing channels and the problems faced by the farmers prevailing in the various study areas.

Key words: Cost, Marketing, Resource use efficiency, Vegetables.

India has been blessed with a wide range of climate and geographical conditions and is most suitable for growing various kinds of vegetable crops. India is now the second largest producer of vegetables in the world after China. The vegetable productivity in India is 17.70 MT/ha and contributes 14 per cent of the total world production of vegetables. The states comprising West Bengal, Uttar Pradesh, Bihar, Madhya Pradesh, Odisha, Gujarat and Karn ataka are the leading vegetables producers contributing nearly 40 per cent of the total vegetable production of the country. A total vegetable export from India during 2018-2019 was ` 419.48 crores (Anonymous, 2019), sharing 2.25 per cent of total agricultural exports and 0.23 per cent of total national exports. Major importers of vegetables from India are UAE, Nepal, Sri Lanka and UK accounting for around 55 per cent of the total vegetable export from India. It ranks 24th in the export value of vegetables (Vanitha *et al.*, 2014).

Vegetable consumption is enormously rising, reflecting the customer's increased income, want for assorted variety and awareness about dietary advantages. Conventional marketing practices are giving way in developing countries to the more present day practices of the developed countries: super markets, distance transportation, global marketing, different processing and packaging practices, quality standards, supply chain management and product diversity. These changes have increased pressure on conventional, small and poor farmers to keep up with the requirements of good seed, efficient practices, hiring of skilled manpower, market awareness and the ability to provide safe and high quality produce.

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Agriculture is the main occupation of the people of Himachal Pradesh. The total area under vegetable cultivation in the state is 8,861 thousand hectares with a total production of 1776.02 thousand MT in the year 2019-2020 (National Horticulture Board, 2020). The major vegetables grown in the state are cabbage, okra, tomato, capsicum, chillies, french beans, radish, pea, carrot, cauliflower, spinach, ginger and potato.

There are a number of problems associated with the production and marketing of vegetables. The important ones are non-availability of skilled labours, higher cost of inputs, greater fluctuations in their prices and a high percentage of losses in their handling and transportation. Productivity of vegetable crops is unable to reach its optimum level. Low productivity may be attributed to poor infrastructure, poor irrigation, small and fragmented land holdings and low

investment capacity of the farmers, fragile ecosystem and inaccessibility to technology. The perishable nature of the vegetables also results in inability on the part of producers to manage supply in assembling markets. These parameters need to validate time to time for policy making and for the farmers to take judicious farm decisions.

The Socio-economic parameters

These parameters provide a background to understand the health scenario in a country by providing data on education, gender, poverty, housing, amenities, employment and other economic indicators.

Zhu *et al.* (2008) revealed that the vegetable production industry has grown incredibly over the last 40 years in Shanghai which incorporates greenhouse crop production. Confronting the prerequisite of improving quality and farmer's income to join into WTO and to be more competitive in the market, Shanghai has started to adjust vegetable varieties, improve crop production conditions, expand their organic cultivation and develop contamination free healthy vegetables.

Asmatoddin *et al.* (2009) studied the Socio-economic status of tomato producer in Western Maharashtra. The results revealed that on an average, family size of *kharif,* rabi and summer tomato grower farmers was 5.97, 5.47 and 5.59 respectively. Education status of family members at overall level in kharif, rabi and summer season *i.e.* illiterate, primary, secondary, graduate farmers were 7.78, 24.44, 45.56 and 22.22 per cent respectively.

Busari *et al.* (2013) studied the impacts of socio-economic characteristics of women vegetable growers on the gross edge in two zone of Osun state. Study shows that larger part (76.15%) of women vegetable growers fall between the ages of 41-60 years with a mean age of 50.85 years and 42.31 per cent of women vegetable growers had education up to primary standard. While 24.61 per cent got secondary education. All of the women vegetable growers were married. There is no noteworthy distinction in the socio-economic characteristics of women vegetable growers in the study zone. Likewise, there is no significant contrast in the gross margin of women vegetable grower groups in the study area. The mean gross margin obtained from the study depicts that the vegetable production is an essential income earner for rural women in the study area.

Mishra and Kalyan (2015) analysed the individual and socio-economic profile of vegetable growers of eastern Uttar Pradesh of India. The investigation revealed that 35.61 percent of the vegetable growers had high school education, about 61.5 per cent had medium level of cultivating experience and about 25.37 per cent of vegetable growers were the member of two organizations. The annual family income of about 56.59 per cent of farmers were found in the medium income category *i.e.* ` 55001 to ` 190000. The study shows that 57.07 per cent of vegetable growers had medium level of financial status.

Ramachari *et al*. (2016) conducted study in Majholi block of Jabalpur District in Madhya Pradesh. The study reveals that majority of the pea growers had (40.00%) medium technological gap followed by (30.40%) high and only (29.60%) had low regarding overall improved pea production technology. The study also concluded that in order to reduce technological gap in pea production, training should be given in production technology. The farmers should adopt the recommended production practices and extension services should be effectively implemented in rural pea growing areas.

The socio-economic status of the farmers showed that most of the vegetable growers had medium level of financial status. Women actively participated in farming activities. Also, some technological gaps were seen which could be overcome by providing proper training.

Cost and return

Cost concepts mounted by CACP (Commission for Agricultural Costs and Prices) are used to calculate the cost of cultivation and farm income measures. Return on investment is a performance measure used to evaluate the efficiency or profitability of an investment or compare the efficiency of a number of different investments. It tries to directly measure the amount of return on a particular investment, relative to the investment's cost.

Kambhar (2000) studied the input use, to assess per hectare cost and returns, to examine the marketing costs, market margins and price spread of rabi onion and recognize the issues faced by the farmers in production and marketing of rabi onion in Pune region. The study shows that per hectare average gross returns and net benefit were ` 65239.76 and ` 20736.70 respectively. The per rupee returns were 1.46 which show that it is profitable venture, per quintal average marketing cost was found to be ` 54.06. The major constraints faced by the onion cultivators were non accessibility of quality seeds at lower rates, high fertilizers cost, wage rates and non-accessibility to loan facility in time. In marketing of onion the significant challenges expressed by the farmers were price variations, high transport cost and high commission charges.

Singla *et al*. (2006) studied the financial aspects of production and factors impacting the productivity of green peas in Punjab based on the primary data collected from pea producers. The outcomes of the study reveals that the green peas and wheat are the main crops in rabi season. It has been observed that 75.85 per cent of the farmers purchase pea seeds from dealers directly. The yield of green peas has been found highest in small farms among all the farm-size categories. The total cost incurred has been higher in large followed by small and medium farmers because of more utilization of inputs by the former. The gross and net returns have been worked out higher in large as compared to small and medium farmers because of realization of higher expenses by them and exploring of different markets due to their higher marketable surpluses.

Bala *et al.* (2011) examined the cost and return structure for the promising enterprise of off-season vegetables in Himachal Pradesh and concluded that the per hectare cost

was highest for tomato followed by cabbage, cauliflower and lowest for peas cultivation. Cost of cultivation per quintal has been found to be highest for peas followed by cauliflower, tomato and cabbage. Gross returns as well as net returns per hectare have been observed to be highest for tomato followed by cauliflower, cabbage and peas. The study has suggested promoting the cultivation of off-season vegetables and enhancement of the irrigation potential in these areas.

Dastagiri *et al.* (2013) investigated about the production trends, marketing efficiency and export competitiveness and concluded that the gap between prices received by the farmers and those paid by urban consumers is large, indicating disorganized marketing arrangements. The study found that the area under total vegetable cultivation is grown at the rate of 4.12 per cent and the production growth rates were 6.48 per cent. The study showed that in most of the cases, marketing cost, transport cost, labour charges were adversely affecting the marketing efficiency.

Sreedhara *et al.* (2013) studied the financial aspects of capsicum production under protected cultivation in Northern Karnataka. The study reveals that the cost of establishment of capsicum production under protected condition was ` 2,51,109 for each unit and the total cost of cultivation of capsicum production under protected conditions was ` 55,080 per units. The total variable cost was ` 20,374 per unit. Among all the variable costs, the labour cost was highest (` 10,291) followed by expenditure on material cost (` 8,487). The extent of total fixed cost was most elevated (` 34,707) compared to total variable cost (` 20,373). The total yield of capsicum production under protected conditions was seen as 5.50 tons per unit. The total returns and net returns from capsicum production under controlled conditions were ` 1,54,734 per unit and ` l,15,279 per unit respectively.

Lokapur and Kulkarni (2014) investigated the cost and returns structure of major vegetables in the Belgaum area. The results showed that the average per hectare usage of human labour was (78.77 man days) in case of potato followed by onion (70.25 man days), tomato (66.37 man days) and green chilli (48.13 man days). The total cost incurred by the farmers on potato cultivation was highest of (` 47299.86/ha) as compared to onion (` 31240.2/ha), green chilli (` 25797.37/ha) and tomato (` 27532.42/ha). The high cost in potato was due to high seed rate. The gross returns in case of potato was (` 130410.60/ha) followed by onion (` 124518.60/ha), tomato (` 64969.70/ha) and green chilli (` 55250.00/ha). The net returns were found highest in case of onion (` 93278.43/ha) and least in case of green chilli (` 29452.63/ha).

Choudhary *et al*. (2017) conducted a study in Dhari block of Nainital district, Uttarakhand for selected four vegetables covering maximum area. On this basis, pea, cabbage, french bean and tomato were selected. The costs and returns from each vegetable crop was analyzed and found that the returns per rupee invested on pea, cabbage, tomato, beans were 1.56, 1.25, 1.20 and 1.10 respectively. Thus, it was concluded that vegetables are advantageous for growers to adopt cultivation in this region.

The cost and return structure was mainly affected by marketing cost, transport cost, labour charges which adversely affected the marketing efficiency. Also, it was seen that the off-season vegetable production should be encouraged as it gave profitable returns.

Resource use efficiency

Resource use efficiency is when all the goods and factors of production in an economy are distributed or allocated to their most valuable uses and waste is eliminated or minimized. Every scarce resource in an economy is used and distributed among producers and consumers in a way that produces the most economic output and benefit to consumers.

Sankhayan *et al*. (1971) worked out the resource productivity and allocative proficiency on seed potato cultivation in Himachal Pradesh by using Cobb-Douglas and Quadratic Production Functions. The inputs like land, human labour, bullock labour, seed, composts and fertilizers were chosen for potato and maize crop. The analysis showed that constant returns to scale was observed for seed potato farms. In case of maize crop, diminishing returns to scale was observed. The farm resources within crop were ideally allocated in the case of seed potato.

Rathore *et al*. (1973) carried out the resource use efficiency and return from commercial crops of Himachal Pradesh. Five commercial crops, potato, ginger, tomato, french bean and chilli were studied and Cobb-Douglas production function was fitted to each crop on per hectare basis. The results show that human labour use alone accounts for more than 33% of the total cost in all crops. The ratio of marginal value product to the factor cost for the selected commercial crops indicated that increased bullock labour use will be productive yet the small size of terraced plots permits restricted utilization of the resources.

Thakur *et al*. (1990) studied about the resource-use, farm size and returns to scale for the tribal district of Lahaul-Spiti in Himachal Pradesh. Cobb-Douglas production function was fitted to work out the elasticities of production of inputs. It was observed that factors of production were not proficiently used. The elasticity coefficients of inputs, especially labour does not vary altogether between marginal, small and large farm size. Farm size was significant factor to influence the productivity of inputs at farm level.

Venkataramana and Gowda (1996) analysed the resource-use efficiency in tomato cultivation in Kolar area of Karnataka by fitting Cobb-Douglas production function in order to determine the productivity of every resource in the production of tomatoes. The outcomes of analysis reveals that the marginal value product and factor cost ratio on account of small farmers for land, compost and staking materials were greater than unity, showing under-usage of these inputs in tomato production.

Priscilla and Singh (2016) analysed the resource use efficiency in Thoubal district of Manipur. The vegetable covered under study were cabbage, cauliflower and peas. To find the resource use efficiency in vegetable production,

log linear production function was fitted independently for each of the three vegetables taking yield as the dependent variable and per hectare expenditure on seed, plant protection chemicals, concoction fertilizers, human labour, machine and bullock labour as the explanatory variable. It was observed that the vegetable was not cultivated according to the package of practices and that these harvests were taken without thinking about resource productivity and the resource use efficiency.

It is seen that the resource use efficiency is worked out by using Cobb-Douglas and quadratic production functions. The elasticity coefficients of inputs used were land, human labour, bullock labour, seed, composts, plant protection chemicals, machines and fertilizers.

Marketing

Agricultural marketing covers the services involved in moving an agricultural product from the farm to the consumer. These services involve the planning, organizing, directing and handling of agricultural produce in such a way as to satisfy farmers, intermediaries and consumers.

Mohapatra (1999) in his research study, "Production and Marketing of Onion in Bolangir District of Orissa" analysed the cost of production of onion. The study comprised of cost of production, various marketing operations, the price spread and marketing efficiency of various channels operating in the onion marketing and identified various constraints in onion marketing. Three marketing channels have been identified in the marketing of onion in the study area *viz:*

Channel-I: Producer-Consumer

Channel-II: Producer-Trader-Consumer

Channel-III: Producer-Trader-Wholesaler-Retailer- Consume.

Channel-I marketing cost was only ` 4 per quintal, Channel - II was ` 30 per quintal and in the Channel - III was ` 59 per quintal. The producer received the maximum share of consumer rupee in channel-I (97-99%), followed by channel-II (79 09%) and channel-III (53 03%). It indicates that the marketing efficiency was highest in case of channel-I followed by channel-II and channel-III.

Radha and Easwara (2001) in their study, "Economics of Production and Marketing of Major Vegetables grown in Karimnagar District of Northern Telangana Zone of Andhra Pradesh." revealed that there are three main marketing channels were identified in the area *viz.*

I - Producer-Consumer

II - Producer-Retailer-Consumer

III - Producer-Primary Wholesaler-Secondary Wholesaler-Retailer-Consumer

The study revealed that about 90 percent of the vegetables produced in the district were marketed through channel-III.

Pramanik and Prakash (2010) evaluated the marketable surplus and marketing efficiency of vegetables in Indore district of Madhya Pradesh. The results of the study reveals that the marketable surplus of tomato, potato and cauliflower was found to be 90%, 89% and 95.5% respectively. It is concluded that marketing efficiency is influenced by market intermediaries and transitory nature of the products. In case of cauliflower, marketing efficiency is most noteworthy in case of Channel I. Post-harvest loss during marketing is recorded highest in case of tomato (16%) and least in cauliflower (4%).

Kotnala *et al.* (2013) studied the marketing pattern and marketing efficiency of major vegetable *viz*. tomato, green pea, cabbage and brinjal in Ramnagar of Nainital area in Uttarakhand. The most preferred marketing channel followed by all the three size group of farmers was producer-commission agent-distributer-retailer-purchaser as more than 91 per cent of the farmers had sold their produce through this channel. The marketing costs and marketing margins as per the customer's prices were higher; marketing efficiency was extremely low for green pea followed by tomato, brinjal and cabbage.

The major marketing constraints were high cost of packaging material, shortage of transport facilities and absence of market information related to costs. All these problems could be tackled by providing timely supply of crucial inputs at reasonable prices, apart from providing good transportation facilities and market outlets.

Problems

Due to wide fluctuation in prices, high wage rates, lack of technical knowledge, non-availability of healthy plant material, spurious chemicals and lack of irrigation and storage facilities, vegetable growers face a lot of problems in production and marketing.

Sharma *et al.* (2000) evaluated the various problems associated with vegetable marketing and opportunities in Himachal Pradesh. The study shows that the marketed surplus reduced to nearly 90 per cent, 95 per cent and 93 per cent of total production of tomato, pea and cauliflower mainly due to post harvest losses. The major constraints in marketing of vegetables were high cost of packaging, insufficient transportation facilities and lack of market information about prices.

Kumar and Singh (2002) studied the problems of vegetable production in Bharatpur district of Rajasthan and revealed that the vegetable growers faced the problems of non-availability of inputs at right time, poor and insufficient quality of inputs, non-availability of desired tomato varieties in the market, high cost of inputs, lack of knowledge about the correct method of their use and absence of subsidy. The study pointed out that these problems discouraged the vegetable growers to give boost to vegetable farming. They suggested that extensive demonstrations of improved and high yielding varieties of vegetable crops should be laid, provisions should be made for timely supply of crucial inputs at reasonable price to sustainable vegetable production on a profitable basis.

Vasava and Pandya (2003) conducted study to overcome the major problems of mango and tomato growers of tribal and non-tribal areas of South Gujarat. Study reported the various problems that were being faced by the growers viz high price of farm yard manure (FYM) and chemical

fertilizers, lack of knowledge regarding plant protection measures and fertilizer application, lack of storage facilities, lack of processing units, lack of knowledge about storage and processing, lack of road facility at village level, low price of produce, problem of middlemen and quick deterioration of products. They suggested that farmers should themselves prepare farm yard manure (FYM) and reduce the cost, establish cold storage and processing units at block level through the co-operative agricultural service societies and the government should support the agro-based industries. Training regarding storage and processing should be organized by the departments and state agricultural universities, government should fix MSP and marketing should be done through co-operative agricultural service societies.

Sharma *et al.* (2004) conducted a study to know the resources contributing to shift of land from traditional crops to vegetables and the problems faced by 200 vegetable growers of Punjab. The study revealed that 90.5 per cent entered into vegetable cultivation due to the reason of easy cash payment. More than fifty per cent of the respondents were interested in increasing the area under cultivation, 60.5 per cent faced the problem of high cost of fertilizers whereas 48.5 per cent faced the problem of complexity of procedure for getting loan from banks and 97.5 per cent reported that no minimum support price was fixed by Government. The problems such as vegetable glut in the market, lack of regulated market, lack of storage facilities and exploitation by commission agents were faced by 79.0, 46.0, 38.0 and 51.5 per cent of respondents respectively.

Thyagarajan and Prabu (2005) studied the recommended technologies adopted by the tomato growers of Tamil Nadu and reported that the problems faced by the tomato growers were mainly wide price fluctuations, lack of knowledge to identify pests and diseases, high cost of labour, inadequate water supply, non-availability of credit, exploitation by the middlemen by charging high rate of commission and brokerage, lack in adequate transport and market facilities and lack of storage facilities at the village level. They suggested that fixing a minimum economic price for tomato throughout the entire season, arranging intensive training programmes for tomato growers especially covering identification of pests and diseases, scientific storage, arranging adequate credit facilities and strengthening the existing rural marketing facilities with cold storage would help to overcome these major constraints.

Samantaray *et al.* (2009) evaluated the various constraints in vegetable production of tribal vegetable growers in Orissa. The major constraints highlighted in the study were lack of post-harvest technologies, absence of storage facilities, inadequate training programme and inadequate demonstration of new technology. It was also observed that the lack of proper follow up service, lack of location specific recommendations, lack of community awareness and lack of effective supervision were also contributing to the low production. Thus, organizing training programmes, proper demonstration of improved technologies and post-harvest technologies to the farmers would not only encourage them but also make them more economically independent.

Kumar *et al.* (2010) studied the problem faced by tomato growers in Belgaum district of Karnataka. The study revealed that majority of the farmers (75.83%) faced the problem of lack of technical knowledge about improved cultivation practices and post-harvest technology, 65 per cent of the respondents faced the problem of high fluctuation in market price, followed by high transportation cost (62.53%), labour shortage and high wage rates (55.83%), lack of irrigation facilities and power shortage by (46.66%) farmers.

Khan and Khan (2012) conducted a study on the marketing of agriculture crop in rural Indian economy. The study revealed that the local rural markets were the best option for the marginal and small farmers to dispose off their perishable surplus to get quick returns. Due to the lack of infrastructural facilities in the study area, most of the farmers preferred local rural markets instead of going to the specialised markets or near-by town area. The variation in the transaction of agricultural produce was mainly due to a number of factors like higher market demand, accessibility, nature of produce, transportation facility, market-size, fair price *etc*. The average price of individual crop also varies from market to market due to the various socio-spatial factors.

Patel *et al.* (2013) reported various constraints faced by vegetable growers in his study conducted in North Gujarat. The major production constraints faced by the vegetable growers were higher production cost, higher prices of insecticides/ pesticides. Problems of higher price fluctuations in the market and lack of transportation facilities. Small farmers had reported the problems of credit facility and lack of information about high yielding variety of vegetable crops. Further, reported the lack of marketing information and lack of co-operative marketing societies as the major marketing constraints.

Sharma and Devkota (2014) conducted study on performance of vegetable marketing system in Kangra district of Himachal Pradesh. Four major vegetable crops *i.e.*, potato, tomato, peas and cauliflower and four farm practices *viz.*, improved seeds, fertilizer applications, plant protection measures and storage and marketing were evaluated. The results revealed that high cost of chemicals, non-availability of disease free seeds, non-availability of chemicals, lack of skilled labour, lack of time, lack of technical knowledge, financial problem, poor shelf life, inadequate supply of storage material, lack of marketing facilities, less support price and fluctuation in prices were the main constraints faced by the vegetable growers in the adoption of recommended farm practices of vegetable crop.

Singla and Singh (2016) studied about the problems associated with the adoption of vegetable production technologies by the growers of Patiala district in Punjab. It was observed that input constraint such as non-availability of improved seed at the time of sowing was reported by 89.16 per cent farmers and high costs of pesticides by 70.83 per cent followed by financial, technical and marketing constraints.

Sajad *et al*. (2016) conducted a study on post-harvest losses at different levels in solanaceous family of vegetables *viz,* tomato, brinjal, potato and chilli in different markets of Jabalpur, Madhya Pradesh. Major economic losses were observed in tomato followed by brinjal, potato and chilli. The results revealed that the overall losses at different stages were around (28.32%) in tomatoes, (25.32%) in brinjal, (21.34%) in potato and (19.18%) in chilli. These losses at different levels can be controlled by development of scientific methods, proper handling, proper storage, transportation and management.

Ankita (2017) conducted the study on value chain analysis of commercial vegetables in Kullu district of Himachal Pradesh and reported that out of four channels, channel-C (Producer-Local trader/commission agent-Wholesaler-Retailer-Consumer) was most preferred channel as 65.38, 50.79 and 58.23 per cent of tomato, cauliflower and pea were traded through this channel. Major problems faced by farmers were shortage of skilled labours, high incidence of diseases and pests, high prices of inputs, price and yield risk, unavailability of good quality seeds and planting material. In case of traders and wholesalers, problems were related to poor and unhygienic condition of market yards and unhealthy competition.

Gupta *et al.* (2017) analysed the problems faced by cauliflower growers in western Uttar Pradesh and study revealed that majority (81.66%) of cauliflower growers reported inferior quality seeds supplied by the input dealers. The other constraints face by growers were unavailability of fertilizers and micro nutrients when required, lack of technically sound labour and lack of knowledge regarding plant protection measures.

Kumar *et al*. (2018) conducted a study in Almora and Nainital districts of Uttarakhand to find out marketing behaviour of the vegetable growers and constraints in marketing of vegetable produce. The major marketing constraints revealed in the study were higher commission rate of middlemen, fluctuating market price, non-availability of nearby market, high transportation charges and high cost of packaging material. He suggested for creation of horticulture based self-help group at village level, strict compliance of rules and regulation of regulated market, guidance on market avenues from time to time to the vegetable growers.

CONCLUSION

It was seen that the major problems that were being faced by the vegetable growers were higher commission rate of middlemen, fluctuating market price, non-availability of nearby market, high transportation charges and high cost of packaging material which could be tackled by creating horticulture based self-help groups, guidance on market avenues from time to time. Other problems that were being faced were problems of non-availability of inputs at right time, poor and insufficient quality of inputs, high cost of inputs, lack of knowledge about the correct method of their use and absence of subsidy. All these problems could be tackled by making provisions for timely supply of crucial inputs at reasonable price to sustainable vegetable production on a profitable basis. Extensive demonstrations of improved and high yielding varieties of vegetable crops would also help.

SUGGESTIONS

The study focused on several problems that vegetable growers faced in the production and marketing of vegetables in the study area. Some of the important suggestions are discussed below:

- Training in modern production methods should be provided to farmers through so that they can get good prices in the market.
- Reinforcing the marketing infrastructure by increasing the number of markets, constructing rural go-downs and providing cold storage facilities for vegetables so that the post-harvest losses can be minimized.
- There is a need for effective scientific transport on Scientific lines and it would be worthwhile to provide refrigerated vehicles to for the transport of vegetable to the distant markets.
- Provision of comprehensive and timely information related to vegetable prices by establishing stations in the state at panchayat /block level so that the farmers get fair prices for their produce.
- To overcome insect pest infestation, there should be training on cultural practices like proper spacing within the rows and between rows to reduce the temperature favourable for their multiplication and to what chemicals should be applied at what stage so that the damage done by these can be minimized.

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Conflict of interest

All authors declare that they agree on all parameters and have no conflict of interest.

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