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Effect of COVID-19 on small vegetable growers of Punjab: An economic analysis

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Abstract

Food reaches the consumer's plate through supply chains, but COVID-19 significantly disrupted these chains. Vegetables are highly perishable crops and the impact on their supply chains led to huge losses for growers. This study was conducted on small vegetable growers of Malerkotla, a major vegetable hub of Punjab. Primary data was collected by interviewing 120 farmers and 30 market intermediaries. The sample selection was based on multistage simple random sampling. About 25 per cent of vegetable growers across all crop rotations reduced or stopped cultivating one or more crops in 2020-21. The human labour costs were lower for both cucumber and capsicum due to peak harvest season during COVID-19, however the impact was mitigated by the involvement of family labour. The study reveals that the major vegetables such as cauliflower, cucumber, capsicum, bittergourd and brinjal caused farmers to suffer huge losses. The returns from all these vegetables were lower than in the previous year. Comparatively, capsicum growing farmers suffered extreme losses, with returns of only Rs. 4,690. The quantity of produce arriving at the market decreased from 1,685 quintals in 2019 which reduced to 1,203 quintals in 2020 mainly, due to restrictions on transportation. Farmers received lower prices or were unable to sell at all. There is a need to build resilient local supply chain networks.

Keywords: COVID-19, small vegetable growers, prices, marketing constraints

Introduction

COVID-19 came up as a severe crisis for economies around the world. The COVID-19 recession saw the fastest, steepest downgrades in consensus growth projections among all global recessions since 1990 (Gopinath 2020) [8]. Many emerging and developing economies were already experiencing sluggish growth before the pandemic; the shock of COVID-19 exacerbated their existing challenges (World Bank 2021) [22]. Supply bottlenecks and decline in consumer demand led to substantial losses during the pandemic (Guan *et al* 2020) [9]. Among the most severely affected sectors was the food industry (Habanyati *et al* 2022; Ilesanmi *et al* 2021) [10, 13]. Food is a basic necessity and its nutritional value of food is crucial for human dietary requirements.

The pandemic caused producers to lose nearly an entire year's worth of production. According to the producers, crops were left to perish in the fields. Many of vegetable growers shifted to working as agricultural labourers, while others considered changing professions altogether (Anonymous 2020) [3]. This significant shift likely occurred due to substantial losses in farm income especially vegetable production (Alam and Khatun 2021; Gadal *et al* 2020; Jaacks *et al* 2021) [1, 6, 14]. Vegetable production is heavily dependent on seasonal labour, and due to their highly perishable nature, vegetables are especially vulnerable to loss. Disruptions in transportation meant producers were unable to deliver produce to terminals or retail markets, impacting crops like watermelon, tomatoes,

and chili peppers (Siddiquei and Khan 2021) [17]. Due to the seasonal labour demands and perishable nature of vegetable crops, they were susceptible to harvest losses (Kumar *et al* 2021) [16]. Short shelf life further delayed timely supply to markets (Halder and Pati 2011; Kalle *et al* 2021) [11, 15]. A noticeable decline in vegetable arrivals was observed. Limited supply led urban consumers to pay higher prices (Singh *et al* 2020; Gayathri and Karthikeyan 2022) [19, 7]. This scenario highlighted the distance and inaccessibility of wholesale markets from vegetable-growing regions. Indian farmers faced multiple issues including logistics breakdowns, supply chain disruptions, and labor shortages. Restrictions on inter-state movement contributed to substantial economic losses for Indian states (Jaacks *et al* 2021) [14]. Although agricultural markets in Punjab showed some resilience, vegetable markets specifically experienced considerable supply chain disruptions (Vatta *et al* 2022) [21]. The Malerkotla district is a major vegetable hub of Punjab (Singh *et al* 2019) [18]. It is a highly concentrated area of vegetable growers specifically the villages near to the vegetable market in the city. A variety of vegetables are found in this area which are cauliflower, radish, cabbage, cucumber, chilli, capsicum, okra, bittergourd, tomato and brinjal. Small vegetable growers of Malerkotla have suffered huge losses. Small-scale vegetable growers in Malerkotla suffered substantial losses, particularly due to their limited landholding. Lack of transportation access further compounded the challenges faced by low-income households during COVID-19. Therefore, it is essential to

evaluate the effects of COVID-19 on small vegetable growers to develop strategies for resilience in the future. Given this context, the present study aims to analyze the impact of COVID-19 on the cost and returns of key vegetable crops grown by small-scale growers in Malerkotla, Punjab, with a focus on identifying challenges and potential resilience strategies.

Data Source and Methodology

The present study was conducted in Malerkotla district (2021) of Punjab. Since Malerkotla was recently declared separate district, any relevant secondary data has been considered under its former association with Sangrur district. According to the 2011 census, Malerkotla urban agglomeration had a population of 135,424 comprising 71,376 males and 64,048 females. The literacy rate was 70.25 percent. Malerkotla is the only Muslim-majority district in Punjab. As per the horticultural statistics of India, Punjab ranks 10th and Sangrur (formerly including Malerkotla) ranks 3rd in cauliflower production. Punjab also ranks 5th and Sangrur ranks 1st in cucumber production (Anonymous, 2018)^[2].

Sampling design

Multistage simple random sampling was used to select the respondents. In the first stage, two blocks - Malerkotla and Ahmedgarh - were selected for village-level data collection. In the second stage, three villages from each block were selected randomly. In the final stage, 20 farmers were selected from each village. Thus, the total sample size consisted of 120 small vegetable growers. The primary criterion for selection was landholding size - only farmers with land less than or equal to five acres were considered. To assess supply chain disruptions, data was also collected from the Malerkotla vegetable market. A sample of 30 market intermediaries - including vendors, wholesalers, commission agents, and retailers - was surveyed to understand the impact of COVID-19 on their livelihoods and on the supply chain in general. The market committee of the Malerkotla vegetable market was contacted to clarify certain technical aspects. All data was collected while ensuring anonymity of the farmers and market intermediaries, and ethical approval was obtained from the university.

Table 1: Sampling of farmers from different villages

Block	Selected villages	Sample Size
Malerkotla	Dalelgarh	20
	Jamalpur	20
	Sangala	20
Ahmedgarh	Sherwanikot	20
	TakharKhurd	20
	Kelon	20
Total	6 Villages	120

Personal interviews were conducted with both farmers and market intermediaries using structured and pre-tested schedule. The key vegetable-growing villages in each block were identified with the help of the area's Horticulture Development Officer. From Malerkotla block, the selected villages were Dalelgarh, Jamalpur, and Sangala. From Ahmedgarh block, the selected villages were Kelon,

Takharkhurd, and Sherwanikot. A random sample of 20 vegetable growers was selected from each of these six villages.

Few factors which were found to be irrelevant to the study were removed from the schedule used for final data collection after pre testing. The information related to socio-economic profile of the household, farm size, cropping pattern, area under major vegetable crops, seed rate, input-use, production, costs incurred during cultivation, returns obtained, production and marketing constraints faced by the vegetable growers, etc. were gathered from the sampled respondents. The schedule related to market intermediaries included socio-economic profile, employment and data of quantity of the vegetables bought and their prices. The data pertaining to the agricultural year, 2019 and 2020 were compared to check the income difference of the growers. Secondary data was collected from *agmarknet.gov* for the market prices of major vegetables in the study. The tabular method of data analysis was employed in the study. The cost of production of the selected vegetables was calculated as per the definition given by Commission on Agricultural Costs and Prices (CACP).

Results and Discussion

The information collected from vegetable growers and market intermediaries in Malerkotla district, Punjab was analyzed and the results are presented below.

Socio-Economic Profile of Households

Family Structure and Size

Average family size was approximately 5.46 members. Joint families were about 31 in number which is about 25.83 per cent. Among the sample, 31 households (25.83%) were joint families, while 89 households (74.17%) were nuclear families. On average, 4 family members worked on the farm, and 4.29 worked off-farm. About 41 percent of farm labourers were male, averaging 1.65 per household. Females comprised around 30 per cent (1.22 per household), and children made up 29 per cent (1.17 per household). [Edited] Thus, most on-farm labor was provided by male family members.

Age-wise Distribution

Since farming is labour-intensive, the age and composition of family members involved significantly influence farm efficiency. Respondents were grouped by age: under 25 years, 25-35, 36-45, 46-55, and above 55 years. The largest group (37%) was aged 25-35, followed by 34.17 per cent in the 36-45 age groups. Fifteen percent of respondents were aged 46-55, while 8.3 per cent were older than 55. Only 5.8 per cent were under 25. This indicates a relatively young farming population, which may be more open to adopting modern farming practices.

Educational Status

Education plays an important role in social behavior of any person. It helps a person to make better decisions in his life. Vegetable growers have an important responsibility of working on their enterprise and getting better yield. It is thus important to know the education status of the vegetable growers to understand their understanding and ability to learn new things. Out of 120 vegetable farmers 45 farmers

were educated till middle school which contributes about 37.5 per cent. Following 32.7 per cent farmers that was about 38 farmers had studied in high school, 18 farmers (15%) were uneducated and 11 per cent farmers had completed degree and higher degree level education. Five per cent of vegetable growers had primary level of education. Thus most of the vegetable growers have either completed middle school or high school.

Education influences an individual's decision-making ability and adaptability. Of the 120 respondents, 45 (37.5%) were educated up to middle school, and 38 (32.7%) had completed high school. Eighteen respondents (15%) were uneducated, while 11 per cent held graduate or higher degrees. Only 5 per cent had completed primary school. Thus, the majority had at least middle or high school education, suggesting moderate literacy among the growers.

Landholdings and their Utilization

The average operational landholding was 2.70 acres, including 1.34 acres of owned land and 1.38 acres of leased-in land. Leased-out land averaged just 0.02 acres. About 2.26 acres - 83.70 per cent of the total operational holding was under vegetable cultivation. This highlights a strong reliance on vegetables as a primary source of income.

Area under major vegetables grown by small vegetable growers

Understanding the distribution of cultivated area is important for evaluating COVID-19's impact on vegetable production. The frequency distribution for five major vegetables-cauliflower, cucumber, capsicum, bitter gourd, and brinjal- was analyzed for 2019–20 and 2020–21 and plots smaller than 0.25 acres were excluded from economic

analysis due to their subsistence nature.

Cucumber had the largest average area under cultivation. Most vegetable growers reduced the cultivated area in the year following COVID-19, fearing continued low prices and further losses. Early-season crops of cucumber and capsicum provided better returns due to early market entry.

In the case of cauliflower, the area under 1–1.5 acres declined from 30.83 per cent to 28.33 per cent. There was a shift toward smaller land categories: 0–0.25 acres increased to 30.83%, and 0.25–0.5 acres rose slightly to 0.83%. Area under 1.5–2 acres remained unchanged (11.67%), but land ≥2 acres dropped from 15 per cent to 11.67 per cent. Thus, the vegetable growers had either reduced their area for the particular crop or moved to negligible area for the cultivation which shows the after effect of Covid-19 restrictions and difficulty in buying inputs for next crop.

Cucumber had been grown predominantly on the area between 1-1.5 acres which was 30.83 per cent which had increased to 32.50 per cent in 2020-21. It shows 1-1.5 acres of area to be a preferable farm size for growing cucumber even in disruption which happened due to the shift from earlier area preference and change in the behavior of area selection of the vegetable growers. There had been a significant reduction in area which was greater than equal to two acres from 21.67 per cent to 16.67 per cent. An increase in area was observed in 1.5 to 2 acres which was a shift from 11.67 to 13.33 per cent. There had been a significant increase in area which was between 0.25- 05 acres of land from 0.83 to 2.50 per cent in the year 2020-21. 16.67 per cent of area distribution was for the area between 0 to 0.25 acres of land. There had been a decrease in the area between 0.5-1 acres from 20 per cent in 2019-20 to 18.33 per cent in 2020-21.

Table 2: Area under major vegetables cultivation

Particulars	Frequency distribution of area of cultivation (%)									
	Cauliflower		Cucumber		Capsicum		Bittergourd		Brinjal	
	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21
Area (in acres)										
0-0.25	28.33	30.83	15.00	16.67	65.00	65.00	48.33	49.17	70.00	70.00
0.25-0.5	-	0.83	0.83	2.50	5.00	5.83	1.67	3.33	4.17	5.00
0.5-1	14.17	16.67	20.00	18.33	15.83	15.83	14.17	14.17	9.17	11.67
1-1.5	30.83	28.33	30.83	32.50	10.83	10.00	25.83	24.17	13.33	10.00
1.5-2	11.67	11.67	11.67	13.33	-	0.83	1.67	2.50	3.33	3.33
>= 2	15.00	11.67	21.67	16.67	3.33	2.50	8.33	6.67	-	-
Total	100	100	100	100	100	100	100	100	100	100

Capsicum saw 65% of area under negligible or no cultivation in both years. There had been an increase in the area from five per cent to 5.83 per cent in the category of 0.25-0.5 per cent. The area between 0.5-1 acres remained same that was 15.83 per cent. The percentage of area distribution reduced from 10.83 to 10 per cent and 3.33 to 2.50 per cent in case of categories 1-1.5 acres and area greater than equal to two acres. In 2019-20 there was no crop area under 1.5-2 acres of land but it increased to 0.83 per cent in 2020-21 that implies a shift in crop area by the growers. Overall, no significant shift in area was observed in case of capsicum due to small sample size of capsicum farmers.

About 48.33 per cent of area for bitter gourd was almost negligible or zero in 2019-20 which further increased to 49.17 per cent. It shows growers either left growing

capsicum or grown it only for domestic use. For area less than 0.5 acres the percentage increased by 3.33 per cent from 1.67 per cent in 2019. Area between 0.5 to 1 acres remains same as 14.17 percent for both years. There was reduction in area under 1 to 1.5 acres from 25.83 per cent to 24.17 per cent in consecutive years. Similarly area greater than equal to two acres also reduced from 8.33 to 6.67 per cent and the area under 1.5-2 acres increased from 1.67 to 2.50 per cent.

For brinjal, about 70 per cent of area was less than 0.25 acres or zero because the farmers carried out subsistence farming. The area from 0.25 to 0.5 acres was about 4.17 per cent in 2019-20 and later in 2020-21 it was about 5 per cent. An increase in frequency from 9.17 per cent to 11.67 per cent was observed in case of 0.5-1 acres of area and the category 1-1.5 acres observed a decrease in frequency from

13.33 to 10 per cent. The category of land 1.5-2 acres remains same for both years (3.3 per cent).

Effect of COVID-19 on cultivated area and crop rotation

The major crop rotation was bittergourd or cucumber-cauliflower-cucumber; due to the popularity of the crops among farmers in their surroundings and ease of cultivation of given crop rotation. This crop rotation was followed by about 56 vegetable growers which constitute about 46.7 per cent of the total 120 farmers. Second major crop rotation identified was bittergourd or brinjal-cauliflower-cucumber or capsicum by 34 farmer's i.e., 28.3 per cent. Brinjal or cucumber or capsicum – cauliflower- cucumber or capsicum here mostly one of the crops was grown in summer or some early varieties of capsicum. About 30 farmers followed this category of crop rotation which was about 25. Table 3 represents the distribution pattern of small vegetable growers according to the change in area due to factors related to COVID-19. For crop rotation bittergourd or cucumber-cauliflower-cucumber the area under all the crops remained same for 43 farmers which were about 76.8 per

cent of total 56 vegetable growers. 13 vegetable growers (23.2%) either reduced or left growing any one or more number of crops in the cropping pattern. In case of bittergourd or brinjal-cauliflower-cucumber or capsicum crop rotation, 25 vegetable growers followed this rotation (73.5 per cent). About nine vegetable growers (26.5%) out of 34 had left and reduced their crop area in the particular crop rotation for any one or more number of crops.

Crop rotation of brinjal or cucumber or capsicum-cauliflower-cucumber or capsicum had about 22 of 30 vegetable growers (73.3%) who didn't made any changes in area of any crop. Out of total 30 vegetable growers about 26.7 per cent left or reduced the area of any one or more number of crops. Thus, it was observed that almost 1/4th of the farmers in all respective crop rotations had reduced the area under cultivation. Some almost left growing the crop in next year due to severe losses in the pandemic year to their already harvested crop. An earlier study found that 24 per cent of respondents reduced cropping area and 29 per cent reported planting fewer crops (Blanna *et al* 2020). per cent of the respective total.

Table 3: Major crop rotations followed by small vegetable growers & change in area under cultivation during pandemic

Crop rotation	No. of farmers	No. of farmers with change in area
Bittergourd or Cucumber-Cauliflower-Cucumber	56 (46.67)	13 (23.21)
Bittergourd or Brinjal -Cauliflower-Cucumber or Capsicum	34 (28.33)	9 (26.47)
Brinjalor cucumber or capsicum – Cauliflower- Cucumber or Capsicum	30 (25.00)	8 (26.67)
Total	120 (100)	30 (25.00)

Note: Figures in parenthesis represent percentage of respective total.

Effect of COVID-19 on cost and returns of major vegetables

Cost for all the vegetables increased irrespective of the increase or decrease in any particular cost component. The highest cost of cultivation was in case of capsicum i.e., ₹42204 in 2019 and increased to ₹42406 in 2020.

Variable cost of cucumber ₹34051 in 2019 increased to ₹34653 in 2020. The cost for cauliflower increased from ₹30964 to ₹32648. The returns in 2019 were ₹53045 for cauliflower, ₹104052 for cucumber and ₹47913 for capsicum. Cucumber and capsicum growing vegetable growers suffered huge losses during pandemic. Vegetable farmers in our study sample had the most substantial harvesting disruptions, which is similar with findings from a prior survey conducted across four states, which revealed 69 per cent of vegetable farmers believed prices were too low to continue production (Harris *et al* 2020) [12]. Additionally, a research in Haryana and Odisha observed that the majority of farmers (61% and 74%, respectively) held their produce since they were unable to sell it right away (Ceballos *et al* 2020) [5]. The intensity of losses was severe due to peak harvest season of early-sown varieties and highly perishable nature of both cucumber and capsicum. It is concluded that not a single crop was profitable in the pandemic year among all the major vegetables. The cost incurred in case of brinjal was ₹30305 in 2019 and ₹31179 in 2020. The cost incurred

by farmers in cultivation of bittergourd in 2019 was ₹28756 and ₹ 30271 in 2020. The returns were better when a shift in lockdown restrictions and transportation bans was observed. About 47 per cent of farmers followed (bittergourd-cauliflower-cucumber) crop rotation. This crop rotation was not profitable to the vegetable growers. The total returns for year 2020 were ₹100649 while returns were ₹193017 in 2019. Here the overall cost was ₹93771 per acre per year in 2019 and ₹ 97572 per acre per year in 2020. In case of, (Bittergourd or brinjal-cauliflower-cucumber or capsicum) crop rotation farmers incurred a loss of about ₹210075 than earlier year. The profits in earlier year 2019 were ₹396950 and the total cost in this crop was ₹166726 per acre per year. The total cost in 2020 for this crop rotation was ₹171234 per acre per year and profits were ₹186875.

Table 4: Overall Cost-returns from major vegetables

Major vegetables	Cost		Returns	
	2019	2020	2019	2020
Cauliflower	30964	32648	53045	24384
Cucumber	34051	34653	104052	49871
Capsicum	42204	42406	47913	4690
Bittergourd	28756	30271	35920	18353
Brinjal	30305	31179	157003	89577
Total	166280	171157	397933	194916

Table 5: Overall cost and returns from major crop rotation

Crop Rotation	Cost		Returns	
	2019	2020	2019	2020
Bittergourd-cauliflower-cucumber	93771	97572	193017	100649
Brinjal-cauliflower-cucumber or capsicum	137524	140886	362013	168522
Bittergourd or brinjal-cauliflower- cucumber or capsicum	166726	171234	396950	186875

Around 25 per cent farmers follow (Brinjal-cauliflower-cucumber or capsicum) crop rotation. The total cost for this rotation in 2019 was ₹137524 per acre per year and increased to ₹140886 per acre per year in 2020. Returns for this crop rotation declined in 2020 to ₹168522. In year 2019, the returns were about ₹362013, substantially higher than the returns of 2020.

It shows that overall all crop rotation incurred losses in 2020 due to pandemic. This led to a huge gap in farmer's income than the previous year returns under the vegetable cultivation. Many farmers reduced the area under cultivation for their next crops after the losses in lockdown months due to fear of wastage of produce on farm. It was observed that supply chains got disturbed and to know how the produce which used to be collected by market intermediaries for distribution to urban areas was affected and how this had impact on small vegetable growers, we have surveyed 30 market intermediaries and results are presented in the following section.

Constraints faced by market intermediaries during COVID-19

The disruption in quantities in market channels had been already discussed in the earlier table but some major constraints to be considered to study the impact of COVID-19 are discussed under this heading. All the constraints faced by market intermediaries are divided into four categories with no problem, low, medium and high in

percentage. Table 6 indicates that the lack of transportation was regarded as a major constraint during the pandemic by the majority of survey respondents. Similar results were observed by (Mahajan and Tomar 2020). The management of such disruptions plays an important role to protect the local market structures. The severity of disruption of transportation facility was low for 23.3 per cent, medium for 20 per cent and high for 10 per cent, and about 73.3 had no problem. The mean score for this constraint was 93.33 which is the highest among all four constraints. Followed by this was delay in procurement due to lack of movement with about 83.3 mean score. Delay in procurement due to lack of movement had low severity among 10 per cent, medium among 16.7 per cent and high among 13.3 per cent of total and around 43.3 per cent had no problem.

Shortage of arrivals at mandi had a mean score of 53.33 per cent. The severity of the problem was as follows: 33.33 per cent reported it as low, 10 per cent medium and no high severity was observed among the market intermediaries. About 56.67 per cent had no problem of arrival at the mandi. Delay in payments was ranked fourth in the constraints. The mean score for the problem was 43.3. The severity of the problem i.e., delay in payments was 13.3 per cent low, 10 per cent medium and 3.3 per cent highly severe. 53.3 per cent of respondents responded as no such problem has been faced by them. The severity of problems was not responded high by many of the sampled market intermediaries still the problems had significant importance.

Table 6: Constraints faced by market intermediaries during COVID-19

Constraints	No problem	Low	Medium	High	Mean score	Rank
Lack of transportation facilities	73.3	23.3	20.0	10.0	93.3	1
Shortage of arrivals at mandi	56.7	33.3	10.0	0.0	53.3	3
Delay in procurement due to lack of movement	43.3	10.0	16.7	13.3	83.3	2
Delay in payments	53.3	13.3	10.0	3.3	43.3	4

Therefore, it could be concluded that lack of transportation led to no movement of produce from farm to market and market to other parts of the state and India. In later stages, the movement was allowed in between the state using passes provided by government but not to any other states led to losses to market intermediaries. The problem of transportation facilities also led to a shortage of arrival at the mandi. Similar results were observed by Tripathi *et al* (2021) [20]. Due to a lack of movement delay in procurement was observed. These factors led to delays in payments which led to an income crunch to both market intermediaries and also to producers. The disruptions caused due to COVID-19 had impact on all the major stakeholders of the supply chain hampering the local supply network. This confirms lends support to previous findings of Singh *et al* (2021) [19].

Conclusion and policy implications

The major vegetables in the study were cauliflower, cucumber, capsicum, bittergourd and brinjal. All the vegetable crops incurred losses especially capsicum due to its highly perishable nature. Farmers got about ₹4690 in returns which is a very negligible amount compared to the returns of previous year. Cucumber growing farmers were able to earn ₹49871 in returns. The harvest season for these crops began when the lockdown and subsequent mobility

restrictions were in effect, and as a result, a significant amount of marketable surplus was squandered on the farm. Most of the farmers with crop rotation (Bittergourd or cucumber or both-cauliflower) faced loss of ₹92368 in returns from previous year. Farmers with crop rotation (Bittergourd-cauliflower-capsicum/cucumber) suffered a loss of ₹185450 while those with crop rotation (Brinjal-cauliflower-cucumber/capsicum) suffered a loss of around ₹210075. The major vegetable had suffered losses. Loss in returns for cauliflower was ₹28595, cucumber ₹54181, capsicum ₹43223, bittergourd ₹17567 and brinjal ₹67426. All the vegetables specifically the summer vegetables faced losses during COVID-19. Market intermediaries dealing with smaller quantities faced huge losses so either they left the market for a short while or reduced the quantity of the produce they were dealing with. Already existing marketing channel from farmer-commission agent-wholesaler-retailer/vendor-consumer was a strong network during COVID-19, but the quantity they were dealing reduced sharply. This reduction was observed due to the constraints faced by market intermediaries like lack of transportation facilities which led to delay in procurement and shortage of procured arrival at mandi further causing delay in payments. There is a need of forming producer cooperative to manage various tasks related to vegetable production and marketing which will help them to minimize post-harvest losses. Thus,

it can be said that there is an important role of these bodies which help the vegetable growers to sustain income in their everyday life. The hindrances in market should be bridged through appropriate vendor management, storage and logistics management. All of these have suffered a lot during pandemic induced lockdowns.

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