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## Impact of COVID-19 on the marketing of farm produce, Crop prices, and food security in Raipur district of Chhattisgarh

**Pratiksha Tripathi and Hulas Pathak**

### Abstract

India is mostly an agricultural country, making farming the most essential profession. From the industrial hub to the final consumer, the COVID-19 pandemic significantly impacted the agricultural supply chain. This paper begins by examining the various strategies that affect farm product marketing. The majority of respondents about 65 percent reported that the marketing of farm products was impacted adversely due to the COVID-19-related restrictions. 73.33 percent of respondents reported price of farm products decreased during the COVID-19 pandemic. 47.50 percent of sampled farmers reported quality of farm products decreased especially vegetable growers due to a lack of storage facilities, lack of transportation facility and high transportation costs, and restrictions imposed by the government due to the COVID-19 pandemic. 63.57 percent faced difficulty finding a market for their farm products during the COVID-19 crisis. The highest difference in prices before and after the lockdown was seen in bottle guard -765.30 rupees with a difference percent -67.75 percent. However, there was a significant amount of fluctuation in crop prices, which exposed producers to price risk. To protect farmers from the risk of fluctuating prices, the government ought to think about creating a price stabilization fund. 58.66 per cent of sampled households were food secure, while approximately 5.33 per cent were severely food insecure and the remaining 36 per cent were moderately food insecure. As a result, the government should implement the necessary controls to stop the pandemic without interfering with the food supply chain and while taking into account the citizen's food security.

**Keywords:** COVID-19, Coronavirus, marketing, prices, Pandemic

### 1. Introduction

Global pandemics are not a novel occurrence for humanity, since there have been several instances of different pandemics (Table 1.1). Every pandemic had an impact on global human activity and economic development. The first case of COVID-19 in India was reported on January 30, 2020, in Kerala, when a woman with two students returned to the state from Wuhan city. The Indian government quickly implemented a Janata Curfew to contain the COVID-19 pandemic (22 March), Lockdown-1 (25 March – 14 April): total lockdown, except critical supplies, Lockdown- 2 (15 April-3 May) with a conditional easing on April 20 in the agricultural sector, including plantations, harvesting activities, dairy, aquaculture, and repair facilities Lockdowns-3 (4 May – 17 May) and 4 (18 May – 31 May) with slight modifications to the green zone (no cases in the previous 21 days) and lockdown-4 (18 May–31 May), with a few slight changes to earlier orders. Many crops faced restrictions just before the rabi (winter) season harvest window. Shortly afterwards, the government relaxed some of these restrictions on a variety of critical agricultural activities, including farming operations, input production and commercialization, intra- and inter- state movement of sowing and harvesting machinery, and agricultural commodity procurement. During April and May, the government extended these exemptions to other agricultural value chain actors. Despite measures to mitigate the impact of the lockdown on agricultural activities, a slew of obstacles hampered normal harvest operations. While the national government permitted the normal operation of licenced market yards (mandis), where the majority of agricultural produce is sold, many state marketing boards in charge of running mandis kept them closed during the first two weeks of April (Narayanan, 2020) [8]. The government also launched the "Aarogya setu app" to help us identify infection risks early.

In India, agriculture contributes 12 per cent of total exports and 13.9 per cent of overall GDP, and approximately three-fourths of the population depends on these sectors for their livelihood. The rural population of the country is around 70 per cent.

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Furthermore, of the country's 50.7 crores poor, more than 80 per cent live in rural areas. Agriculture and other related sub-sectors in India and many other countries have suffered significantly as a result of the COVID-19 outbreak and the ensuing long-term lockdown. Farmers' output was greatly impacted by the inadequate supply of agricultural inputs, including fertilizer, insecticides, and most critically, agricultural labours, during the height of harvest in the first phase of the lockdown. Due to exorbitant expenditures, an increase in debt, an inability to sell their produce at fair rates, and crop losses, the lockdown's interruption placed a significant financial burden on farmers. Due to market disruptions, many farmers, particularly those who grow vegetables, pulses, and oilseeds, have been compelled to sell their products to local dealers for poor rates. Raipur district was listed as a highly infected district in Chhattisgarh concerning COVID-19 infection. Raipur being the capital of Chhattisgarh had a major role in the supply chain which is largely disrupted in the COVID-19 pandemic. Food security and agriculture are two of the most crucial areas of human

growth (Abdelhedi and Zouari, 2018; Lopez-Ridaura *et al.*, 2019). With its detrimental consequences on the economy, markets, migrant and non-migrant employees, and human health and well-being, the COVID-19 pandemic is a worldwide concern. Although government programmes and sector plans to enhance the agriculture industry have made great strides, vulnerability among rural farmers still poses a problem because it is connected to poverty and food insecurity. It is necessary to examine the circumstances before and after the COVID-19 epidemic in order to have a clear picture. There have been a few studies focusing on the effects of the COVID-19 pandemic on agriculture in Chhattisgarh. As a result, this research evaluates the impact of some variables, including farm produce production and marketing, farmer income, migrant and non-migrant worker factors, and challenges faced by farmers in Raipur. The findings of this study will assist the government and its development partners in taking the necessary steps to address COVID-19's effects in Chhattisgarh's Raipur district.

**Table 1:** Main pandemics from the 20th century

Name	Period	Type	Death toll	Reference
Spanish Flu	1918-1919	H1N1	More than 50M	Farmer (2019)
Asian Flu	1957-1958	H2N2 virus	1.15M	Du <i>et al.</i> (2009)
Hong Kong Flu	1968-1970	H3N2 virus	700,000 and 1M	Wang-Shick (2017)
HIV/AIDS	1981-present	Virus	32M (estimate, March 2020)	WHO (2020b)
COVID-19	2019-Present	Coronavirus	More than 63 million (June 2022)	WHO (2020c)

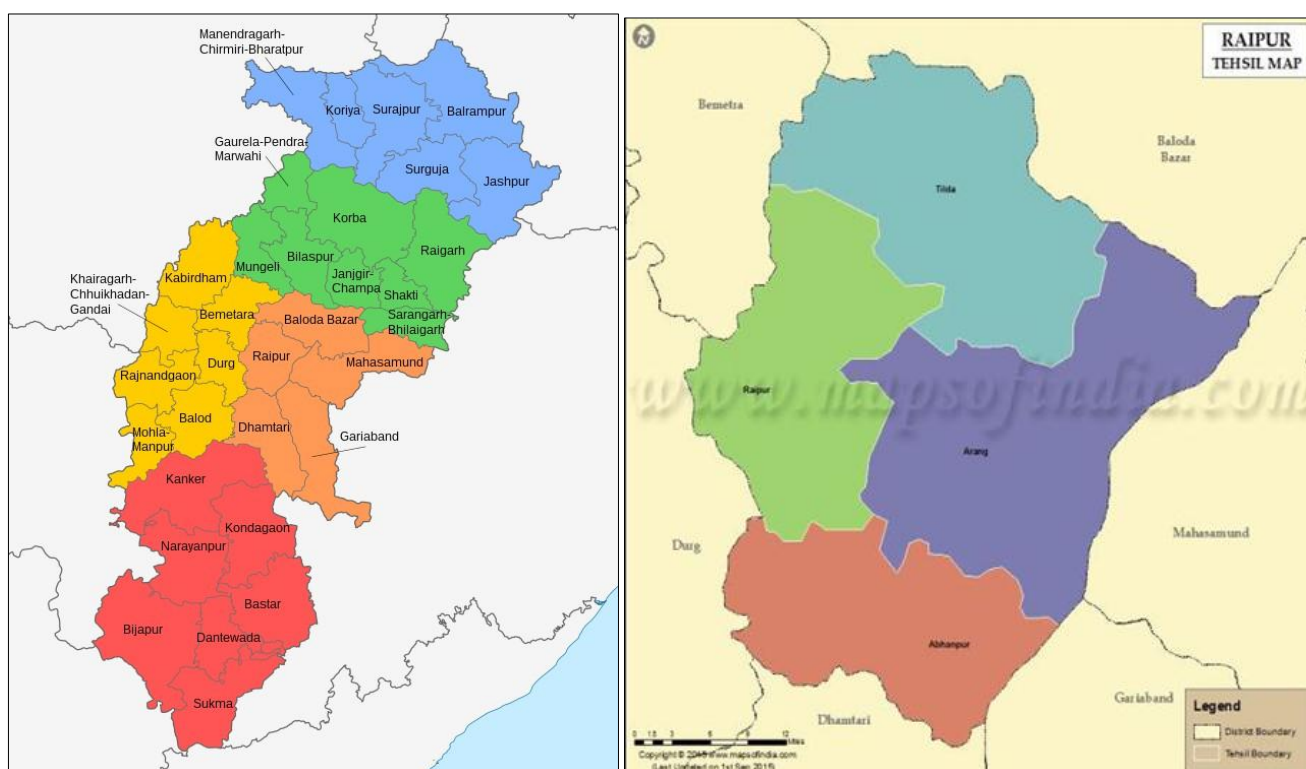
(M: Million)

## 2. Methods and Materials

### 2.1 Survey Sample

Chhattisgarh state consists of 32 districts subdivided into three agro-climatic zones. Raipur district is selected purposively being one of the most important agricultural districts of Chhattisgarh. It was also the most COVID-19-

affected district in the state. A suitable number of villages based on their numbers in the blocks of Arang and Abhanpur were randomly selected. Further, a total of 300 farmers were randomly selected using the snowball sampling technique for primary data collection.



**Fig 1:** Map of the study area

## 2.2 Data Collection

The study required primary data as well as secondary data, primary data was collected from the farmers, migrant, and non-migrant workers using a personal interview method and a well-planned schedule and questionnaire. Secondary data was gathered from Census reports, the Labor Bureau, Labour department, Chhattisgarh, the Government of Chhattisgarh, the Directorate of Economics and Statistics, and various reputable journals, articles, and books. Four farm size categories were defined according to land ownership as marginal (<1 ha), small farms (1.00-2.00 ha), medium farms (2.01-4.00 ha), and large farms (>4.00 ha) (Department of Agriculture 2020). A general module on marketing activities, as well as the costs and availability of agricultural inputs, labor, machinery, and transportation, were included in the survey. A small module on food security before and after the lockdown, based on a modified and reduced version of the Household Food Insecurity Access Scale, was also included. Food security was assessed using three questions from the Food and Agriculture Organization's (FAO) Food Insecurity Experience Scale (FIES) (Ballard *et al.* 2013; Cafiero *et al.* 2018): in the past month, was there a time when you or others in your household (1) worried you would run out of food, (2) skipped a meal, or (3) went without eating for a whole day. Based on the total number of "Yes" responses to the eight questions, households were further classified as food secure, moderately food insecure, or severely food insecure. A household was considered food secure if it did not answer "Yes" to any of the eight questions; moderately food insecure if the number of Yes responses ranged between one and three; and severely food insecure if the number of Yes responses exceeded four. The agricultural years 2019–20 & 2020–21 serve as the study's reference period.

## 2.3 Statistical analysis

Tabular and Percentage analysis were used to find out the impact of COVID-19 on the marketing of farm products, and the Percentage change in prices of farm produces before and during the COVID-19 pandemic. Using chi-square tests, we looked for differences in these parameters based on farm size (for binary and categorical variables). A paired t-test has been used to explore the difference pre and post COVID-19 pandemic. To determine statistically significant results (Arifin,2014). Data cleaning, management, and analysis were conducted using IBM SPSS software.

## 3. Result and Discussion

To reduce the spread of infection, the majority of nations have implemented policies like house quarantine, travel restrictions, and business closures. Such travel restrictions significantly influence product supply at all stages of the product supply chain.

### 3.1 Impact of the COVID-19 on the marketing of farm products

Table 3.1 represents the Impact of the COVID-19 pandemic on the marketing of farm products. A majority of respondents about 65.00 per cent reported that the marketing of farm products was impacted adversely due to the COVID-19 related restrictions, 20.00 per cent had a favorable impact on marketing and the remaining 11.25 per cent neither had an adverse impact nor non- favorable impact on the marketing of farm products and a significant difference was found according to farm sizes ( $\chi^2=40.29$ ,  $df=6$ ,  $p$ -value is  $<0.00001$ ).

**Table 2:** Impact of COVID-19 pandemic on the marketing of farm products

S.N.	Characteristics	Marginal (n=100)	Small (n=120)	Medium (n=50)	Large (n=30)	Overall	P value
<b>Impact on marketing of farm products</b>							
1.	a. No impact	17 (17.00)	6 (5.00)	9 (18.00)	13 (43.33)	11.25 (15.00)	<0.00001
	b. Impacted adversely	75 (75.00)	80 (66.66)	29 (58.00)	11 (36.66)	48.75 (65.00)	
	c. Impacted favorably	8 (8.00)	34 (28.33)	12 (24.00)	6 (20.00)	15 (20.00)	
	<b>Price of farm products</b>						
2.	a. Increased	8 (8.00)	5 (4.16)	3 (6.00)	5 (16.66)	5.25 (7.00)	<0.05
	b. Decreased	82 (82.00)	96 (80.00)	30 (60.00)	12 (40.00)	55 (73.33)	
	c. Remained same	10 (10.00)	19 (15.83)	17 (34.00)	13 (43.33)	14.75 (19.66)	
<b>Quality of farm products</b>							
3.	a. Increased	0 (0.00)	2 (1.66)	0 (0.00)	0 (0.00)	0.5 (0.66)	<0.05
	b. Decreased	39 (39.00)	49 (40.83)	6 (64.00)	1 (63.33)	24.5 (32.66)	
	c. Remained same	61 (61.00)	69 (57.50)	44 (12.00)	29 (36.66)	50 (66.68)	
<b>Markets for agricultural products</b>							
4.	a. More difficult	69 (69.00)	72 (60.00)	29 (58.00)	22 (73.33)	48 (63.57)	<0.05
	b. Easier	0 (0.00)	16 (13.33)	4 (8.00)	7 (23.33)	6.75 (8.94)	
	c. Unchanged	31 (30.00)	32 (26.66)	19 (38.00)	1 (3.33)	20.75 (27.48)	

**Note:** Figures in the parenthesis indicate the percentage of the total farm sizes

Also, we can see from the table 73.33 per cent of respondents reported price of farm products decreased during the COVID-19 pandemic, 19.66 per cent reported no change in the price of farm products and only 7.00 per cent reported an increase in the price of farm products and a significant difference was found according to farm sizes ( $\chi^2=31.85$ ,  $df=6$ ,  $p$ -value is  $<0.05$ ). Also, 32.66 per cent of sampled farmers said the quality of farm products remained the same but 47.50 per cent of sampled farmers reported quality of farm products decreased especially vegetable growers due to lack of storage facilities, lack of transportation facility and high transportation costs, and restrictions imposed by the government due to the COVID-19 pandemic. Also, a small size of sampled farmers believed that the quality of farm produced increased and a significant difference was found according to farm sizes ( $\chi^2=19.75$ ,  $df=6$ ,  $p$ -value is  $<0.05$ ).

A majority of respondents about 63.57 per cent faced difficulty finding a market for their farm products during the COVID-19 crisis, 27.48 per cent took their farm products to the same market they used to sell and about 8.94 per cent said they were able to find a market easily during COVID-19 crisis, a significant difference was found in wage for labours according to farm sizes ( $\chi^2=16.86$ ,  $df=6$ ,  $p$ -value is  $<0.05$ ). Perishable goods, including fruits, vegetables, and milk products produced by the district's primarily marginal and small-scale farmers, could not be kept for an extended period due to a lack of cold storage facilities. The Indian government's Minimum Support Price (MSP), which it had established for just a selected number of agricultural products, has its restrictions because it had a drawn-out process and was prohibited from buying more seeds than was allowed by law. As a result, farmers were obliged to sell their produce to middlemen at a cheap price because they lacked storage space or had debt they had to pay back to banks as well as landlords in the form of crop loans. The availability of vegetables and agricultural goods from the farm became scarce, which led to

an increase in their prices, aggravating the situation. Even though certain residential different agricultural markets were permitted to continue operating under certain conditions, the availability and cost of commodities and produce were impacted by problems with logistics and distribution. As envisioned in the sustainability goal, partnership and inter-institutional collaboration (regional and global) are necessary to enhance the weaker and more vulnerable segments of society (Baudron and Liegeois, 2020). By raising awareness and utilizing Information and Communication Technologies (ICTs), such as social media platforms, stakeholder collaborations assist in closing information and knowledge gaps. The purpose of this was to instill in individuals the knowledge that, in the absence of the COVID-19 problem, social distance, maintaining the hygiene of market functionaries, and sanitizing market yards were all vital for the efficient operation of the markets. Between 2014–15 and 2018–19, the estimated annual increase (in real terms) for the agricultural and related sectors was 2.9%. (Government of India, 2020a)<sup>[16]</sup>.

Agriculture was the sole industry to expand by 3.4 per cent in the first period of 2020–21, despite the fact that the Indian economic growth slowed by 23.9 per cent. (ET, 2020). It is past time to recognize that the agriculture industry has the potential to sustain growth while other industries aren't able to, even though farmers already faced significant production and marketing difficulties in normal times. investments made by the public and private sectors in agriculture, finance, insurance, automation, cold storage, logistics, and prioritization should be given to mechanization, digitized procuring, and distribution (e-marketing). The surplus stock in the buffer might be sold to generate cash for the union government.

### Impact of COVID-19 on the price of commodities Produced by sampled farmers

**Table 3.2:** Impact of COVID-19 lockdown on average prices of commodities produced by sampled farmers (Rs. /Quintal)

S.N.	Commodities	Before lockdown	After lockdown	Difference	Difference Percent	Dev (Diff-M)
<b>Cereals</b>						
1.	a. Paddy	1674.19	1653.17	-21.02	-1.25	602.36
	b. Maize	1784.65	1457.51	-327.14	-18.33	296.24
<b>Vegetables</b>						
2.	a. Bitter guard	4518.23	3325.04	-1193.19	-26.40	-569.81
	b. Brinjal	732.85	302.00	-430.85	-58.79	192.53
	c. Bottle guard	1229.53	364.23	-765.30	-67.75	-241.92
	d. ladies finger	5389.88	3400.36	-1989.52	-36.91	-1066.14
<b>Pulses</b>						
3.	a. Arhar/tur	5065.34	4605.31	-460.03	-9.08	163.35
	b. Lak/tiwra	3504.81	3504.81	0	0	623.38
<b>Mean of difference -648.38</b>						

Sources: Primary data

The shares were kept by the Food Corporation of India more than twice as much as the standard buffer stock and are at least 1,50,000 crore (205 billion US dollars) (Gulati, 2020). In addition to increasing revenues, monetizing the surplus could also expense logistics and upkeep. This sum might be devoted to fostering rural agriculture businesses or expanding capacity, preparing for drought, etc. once more to lessen the necessity for waste through scientific storage is critical. The impact of the COVID-19 lockdown on the prices of commodities produced by sampled farmers is represented in table 4.13. It reveals that the highest difference in prices

before and after the lockdown was seen in bottle guard - 765.30 rupees with a difference per cent -67.75 per cent. Also, the price of paddy, maize, bitter guard, brinjal, lady finger and arhar decreased after lockdown by -1.25 per cent, -18.33 per cent, -26.40 per cent, -58.79 per cent, and -31.91 per cent respectively. Also, the price of Lak/ tiwra remained the same after the lockdown and the price of arhar decreased by -9.08 per cent, respectively. The mean difference was -648.38. To investigate price discrepancies between commodities before and after COVID-19, a dependent t-test was performed. Price before and after COVID-19 showed a statistically significant



difference (t value = -2.99, df = 7, p value = 0.020). Food prices were little or barely affected by COVID-19 (except for vegetables). However, there was a significant amount of fluctuation in food prices, which exposed producers to price risk. To protect farmers from the risk of fluctuating prices, the government ought to think about creating a price stabilization fund.

Crop insurance in India typically only includes yield risk; COVID-19 provided the government with the opportunity to modify the crop insurance programme to include producer income (yield and price) risk (Cariappa *et al.*, 2020b) [3]. Consumers and producers can benefit from futures trading as well by buying or selling standardized commodity agreements

at a pre-determined price for immediate delivery (Sendhil *et al.*, 2013). Farmer Producer Companies (FPCs) could become intermediaries in order to meet the commodity exchanges contractual size requirements. The government may choose a staggered procurement as well as pricing strategy that accounts for such threshold levels in storage cost throughout pandemic situations that disrupt logistics, marketplaces, storage, and so on (Sendhil *et al.*, 2020a) [3], particularly for staples such as rice and wheat, which are produced and consumed by millions. Furthermore, if storage is provided, farmers will be incentivized to maintain the products on-site to avoid distressed sales.

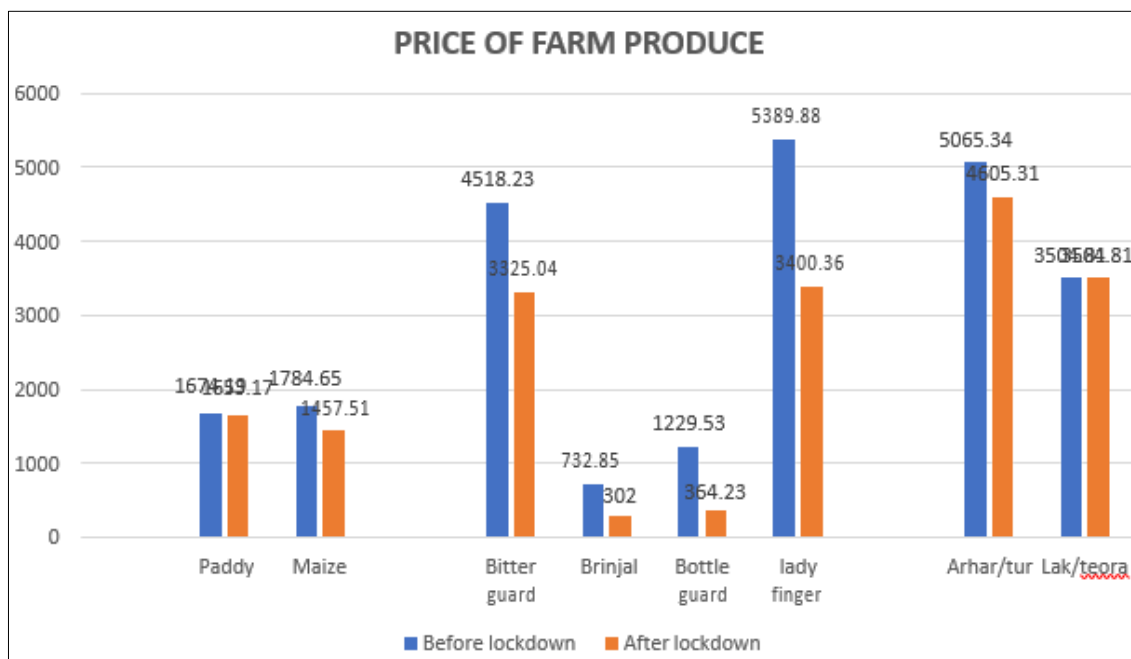


Fig 2: Price of farm produce per quintal

**Government assistance and livelihoods during the COVID-19 lockdown**

Government assistance and agricultural households mean subsistence during the COVID-19 shutdown, as indicated by farm size in table 4.14. majority of the respondent 89.00 per cent overall were aware of the government's support measures for agriculture during the lockdown, compared to 11.00 per cent who were not. Also, 58.00 per cent of the total received extra food rations during lockdown out of them 90.85 per cent received extra rations from the government followed by 8.00 and 1.14 per cent from community members and NGOs respectively. In terms of beneficiary coverage and the average amount of aid delivered, the PDS appeared to be working effectively. In September 2020, 88% of families were covered by the PDS and got about 35 kg of grain each month.

However, the average amount of grain received from PDS in September 2020 was about 3–4 kg less than the amount that was centrally announced—7 kg per person per month (The Hindu).

The Rajiv Gandhi Kisan Nyay Yojana (RGKNY), which aims to give farmers a basic income through direct bank payments, was introduced by the Chhattisgarh government. The Rajiv Gandhi Kisan Nyay Yojana of the state government, distributed the first instalment of Rs 1,500 crore as input subsidies to 22 lakh farmers for the 2020–21 Kharif season. In addition, the state government of Chhattisgarh released Rs 7.17 crore directly to the accounts of villages and cattle keepers as payment for cow dung purchased from March 15 to May 15 of this year under the state's multifaceted Godhan Nyay Yojana.

Table 3.3: Government assistance and livelihoods during the COVID-19 lockdown, according to farm size

S.N.	Characteristics	Marginal (n=100)	Small (n=120)	Medium (n=50)	Large (30)	Overall	P value
1.	<b>Aware of government support measures for agriculture during Lockdown</b>						
	a. Yes	86 (86.00)	108 (90.00)	45 (90.00)	28 (93.33)	66.75 (89.00)	0.88
	b. No	14 (14.00)	12 (10.00)	5 (10.00)	2 (6.66)	8.25 (11.00)	
3.	<b>Received extra food rations</b>						
	a. Yes	73	70	22	9	43.50	<0.05

		(73.00)	(58.33)	(44.00)	(30.00)	(58.00)		
	b. No	27	50	28	21	31.50		
		(27.00)	(41.66)	(56.00)	(70.00)	(42.00)		
4.	<b>Food rations provided by</b>							
	a. Government	67	65	21	6	39.75	<0.05	
		(91.78)	(92.85)	(95.45)	(66.66)	(90.85)		
	b. NGO	0	2	0	0	0.5		
		(0.00)	(2.85)	(0.00)	(0.00)	(1.14)		
	c. Community members	6	3	1	3	3.5		
		(8.21)	(4.28)	(4.54)	(33.33)	(8.00)		

**Note:** Figures in the parenthesis indicate the percentage of the total farm sizes

### Impact on the purchasing power of sampled households

Due to decreased income and purchasing power, food demand had been impacted. Panicked Stockpiling by consumers had a negative impact on food availability and cost. However, the nation's pandemic control strategy affected the price of the goods. From Table 4.28 we can see that about 55 per cent of the respondents were sometimes worried about their food would run out, 37.30 per cent did not worried and about 7.70 per cent responded often worried about their Food would be

depleted before they got money to get more. Out of the total 50 per cent of respondents sometimes faced a shortage of food items they bought, 42 per cent did not faced shortage of food items they bought and 8 per cent respondents often faced shortage of food items they bought and they did not had money to get more. 35 per cent of respondents sometimes worried their required medicine would run out before they could afford to buy more 65 per cent of respondents did not worried about their medicines.

**Table 3.4:** Impact on Ability to buy food/medicine

<b>Ability to buy food/medicine during the COVID-19</b>	<b>Often</b>	<b>Sometimes</b>	<b>Never</b>
Concerned that their food would run out before they could afford to buy more	23 (7.70)	165 (55.00)	112 (37.30)
The food they purchased simply did not last, and they did not have the funds to purchase more.	24 (8.00)	150 (50.00)	126 (42.00)
Concerned that their essential medicines would run out before they could afford to buy more	0 (0.00)	105 (35.00)	195 (65.00)
The required medicines that they purchased did not last, and they did not have enough money to purchase more.	0 (0.00)	105 (35.00)	195 (65.00)

### 3.5 Food insecurity during the COVID-19 pandemic

Food security relates to the accessibility and availability of a sufficient supply of consistently healthy food. Immigration controls during the first stage of the COVID-19 lockdown hampered the economy. As the majority of India's labour is employed in the informal sector, this led to cutbacks in people's incomes (Nandi *et al.* 2021). Reduced economic activity also resulted in lower pay. It was anticipated that

households with limited resources would experience an increase in food insecurity as a result of these economic shocks (Meinzen-Dick *et al.* 2011). Food insecurity had also been exacerbated by COVID-19 as a result of higher food costs. Travel restrictions led to supply chain disruptions, which raised the cost of several commodities (Nandi *et al.* 2021; Narayanan and Saha 2020; Cariappa *et al.* 2021) <sup>[8]</sup>.

**Table 3.5:** Food insecurity during the COVID-19 lockdown

<b>Food insecurity during COVID-19 lockdown</b>	<b>Marginal</b>	<b>Small</b>	<b>Medium</b>	<b>Large</b>	<b>Overall</b>
Were worried they would not have enough food to eat.	32 (32.00)	26 (26.66)	6 (12.00)	0 (0.00)	16 (5.33)
Were unable to eat healthy and nutritious food.	43 (43.00)	39 (32.50)	1 (2.00)	0 (0.00)	21 (6.91)
Ate only a few kinds of food.	52 (52.00)	63 (52.50)	7 (14.00)	1 (3.33)	31 (10.33)
Had to skip a meal.	12 (12.00)	16 (13.33)	0 (0.00)	0 (0.00)	7 (2.33)
Ate less than they thought they should	6 (6.00)	9 (7.50)	0 (0.00)	0 (0.00)	4 (1.33)
Their household ran out of food.	2 (2.00)	5 (4.16)	0 (0.00)	0 (0.00)	3 (1.00)
Were hungry but did not eat.	3 (3.00)	2 (1.66)	0 (0.00)	0 (0.00)	1 (0.33)
Went without eating for a whole day.	6 (6.00)	11 (9.16)	0 (0.00)	0 (0.00)	4 (1.33)

**Note:** Figures in the parenthesis indicate the percentage of the total farm sizes

Food insecurity had been made worse by rising costs for the hygiene supplies required to stop the COVID-19 epidemic, as well as other pandemic-related medical expenses, higher prices for basic necessities, and anxiety about the future. We now discuss the projected severity of food insecurity as well as the factors that make households more susceptible to it. Due to a fall in global trade and food supply disruption network of food production, there was food insecurity. From Table 4.29 we found that overall, 5.33 per cent of respondents reported that they were worried that they would not have enough food to eat. 6.91 per cent of respondents were unable to eat healthy and nutritious food. About 10.33 per cent of respondents ate only a few kinds of foods.

About 2.33 per cent of respondents had to skip a meal, 1.33 per cent ate less than they thought they should, 1 per cent of respondents ran out of food, 0.33 per cent were hungry but did not eat and 1.33 per cent went without eating for a whole day during the lockdown. The impending shutdown halted production, which resulted in the loss of jobs, income, and demand. Though only temporarily, the pandemic caused food loss and waste that could have a long-term negative impact on capabilities, especially for the vulnerable sector. The management of food loss and waste should justify public and commercial involvement, revitalizing demand and food intake.

We utilized the FAO's FIES, which includes a collection of

eight common questions about several facets of actual food security (Appendix A, p 106). By giving a value of 1 to "Yes" responses and then a value of 0 to "No" responses, we recorded the answers as binary data. Based on the answers to the eight concerns, Table 4.30 shows the level of food insecurity among the sampled respondents. Based on the total number of "Yes" responses to the eight questions, households were further classified as food secure, moderately food insecure, or severely food insecure. A household was considered food secure if it did not answer "Yes" to any of the eight questions; moderately food insecure if the number of Yes responses ranged between one and three; and severely food insecure if the number of Yes responses exceeded four. Table 4.28 shows the current state of food insecurity based on the above classifications. Overall, 58.66 per cent of sampled households were food secure, while approximately 5.33 per cent were severely food insecure and the remaining 36 per cent were moderately food insecure (Table 4.28). The vulnerable and poorest sections of the population would be severely affected by the increased food insecurity caused by COVID-19. According to the FAO, 113 million people were currently experiencing acute severe insecurity, whereas 820 million people were chronically hungry. Because they were lacking the resources to withstand such shocks, rural households with smaller operational landownership were much more inclined to experience food insecurity. This finding was consistent with Agidew and Singh (2018). According to WHO, farmers with landholdings of less than 1 ha were far more likely to experience food insecurity. As a

result, any disruption in food access caused by the pandemic directly and negatively impacted these populations. To meet their nutritional needs, approximately 10 million children rely primarily on school meals. However, these kids were no longer getting regular school meals as a result of closures and the discontinuation of school meal programmes, which might lower their ability to fight off illnesses. As was previously said, food security comprises assurances concerning the quality of the food consumed as well as its continued availability. It goes beyond simply having enough to eat. Through their separate mechanisms, COVID-19 and the lockdowns that are still in place to stop the chain of transmission were predicted to make the situation of food insecurity worse (Hirvonen *et al* 2021) [18].

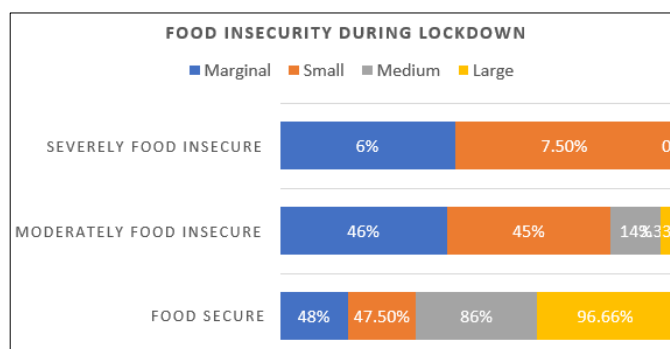


Fig 3: Food insecurity during the COVID-19 pandemic

Table 3.6: Food insecurity situation based on three categorizations

Food Insecurity Experiential Scale	Marginal	Small	Medium	Large	Overall
Food secure	48 (48.00)	57 (47.50)	43 (86.00)	29 (96.66)	44 (58.66)
Moderately food insecure	46 (46.00)	54 (45.00)	7 (14.00)	1 (3.33)	27 (36.00)
Severely food insecure	6 (6.00)	9 (7.50)	0 (0.00)	0 (0.00)	4 (5.33)
Total	100 (100)	120 (100)	50 (100)	30 (100)	75 (100)

Note: Figures in the parenthesis indicate the percentage of the total farm sizes

As a result, the government should implement the necessary controls to stop the pandemic without interfering with the food supply chain and while taking into account the citizen's food security. Implementing effective food management strategies, such as making lists of things and meal planning, is encouraged in order to reduce food wastage at the household level (Principato *et al.*, 2020).

**Conclusion and policy implications**

This Research extracted the ground-level realities in the study area. The results highlighted the facts that the real impact in the case of crop production was seen on the prices of farm produce. 65 per cent reported that marketing of farm products was impacted adversely due to COVID-19 related restrictions. 73.33 per cent respondents reported price of farm products decreased during the COVID-19 pandemic. 32.66 per cent of sampled farmers reported quality of farm products decreased especially vegetable growers due to lack of storage facilities and restrictions imposed by the government due to the COVID-19 pandemic. 63.57 per cent faced difficulty to find a market for their farm products during the COVID-19 crisis. Highest difference in prices before and after lockdown is seen in bottle guard -765.24 rupees with difference per cent -67.75 per cent. Also, the price of paddy, maize, bitter guard, brinjal, lady finger and arhar decreased after lockdown by - 1.25 per

cent, -18.33 per cent, -26.40 per cent, -58.79 per cent, -31.91 per cent and -9.08 per cent, respectively. Also, the price of Lak/ teora remained the same after the lockdown. A dependent t- test showed where there was a significant difference between prices of farm produce before and after COVID-19 lockdown (t value= -2.99, df= 7, p-value 0.020). 89 per cent of people overall were aware of the government's support measures for agriculture during the lockdown. 58 per cent of the total received extra food rations during lockdown out of them 90.85 per cent received extra rations from the government followed by 8 and 1.14 per cent from community members and NGOs. About 55 per cent of the respondents were sometimes worried about their food would run out. Out of a total 50 per cent of respondents sometimes faced shortage of food items they bought. Overall, 5.33 per cent of respondents reported that they were worried that they would not have enough food to eat. 6.91 per cent of respondents were unable to eat healthy and nutritious food. About 10.33 per cent of respondents ate only a few kinds of foods. Overall, 58.66 per cent of sampled households were food secure, while approximately 5.33 per cent were severely food insecure and the remaining 36 per cent were moderately food insecure. Somewhere people will have to look a little beyond just production and have to look at the entire post-harvest ecosystem as to how producers would be able to store the

produce so that they don't need to sell in distress at the same time some focus should be on market linkages so they will be able to sell their produce at the most attractive prices at the most appropriate time. Investments in vital logistics must be increased if the demand for agricultural commodities is to continue. Additionally, start-ups and e-commerce businesses need to be supported with the right policies and incentives. By raising awareness and utilizing Information and Communication Technologies (ICTs), such as social media platforms, stakeholder collaborations assist in closing information and knowledge gaps. With supportive policies, India's agricultural exports, which were worth 38 billion US dollars in 2018–19, might increase even more. It would be in the long-term best interests of farmers to increase their revenue if private sector investments and support were made in the construction and maintenance of export-supportive infrastructure and logistics support. The surplus stock in the buffer might be sold to generate cash for the union government. The shares are kept by the Food Corporation of India more than twice as much as the standard buffer stock and are at least 1,50,000 crore (205 billion US dollars) (Gulati, 2020). In addition to increasing revenues, monetizing the surplus could also expense logistics and upkeep. This sum might be devoted to fostering rural agriculture businesses or expanding capacity, preparing for drought, etc. once more to lessen the necessity for waste through scientific storage is critical.

#### Conflicts of Interest

The authors declare that they have no conflicts of interest.

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