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India's Agricultural Economy during the Covid-19 Lockdown: An Empirical Assessment*

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I

INTRODUCTION

This paper is an analysis of India's agricultural economy through the first 21 months of the Covid-19 pandemic. While the Indian economy shrank during the pandemic, the agricultural sector grew at more than 3 per cent per annum. Yet, most independent assessments of the agricultural sector reveal a state of distress. How can this paradox be explained? To answer this question, the paper uses empirical information to understand the shifts in production, trade, supply chains, prices, credit flows, rural employment and rural incomes during the lockdown. The objective is to arrive at a rounded evaluation of the pandemic's impact on the agricultural economy.

The paper is arranged in four sections. In the remaining part of this first section, I discuss one aspect of the crisis in rural India, which is not adequately discussed among agricultural economists: excess rural mortality. The second section lays out the context and the rationale for the paper. The third section analyses the impact of the pandemic on different spheres of the agricultural and rural economy. The fourth section is the concluding section.

Excess Mortality in Rural India

The spread of the Covid-19 pandemic in the rural areas of India is yet undocumented. For India as a whole, the Government of India notified a cumulative total of 509,358 Covid-19 deaths till 15th February 2022.¹ However, independent estimates – using excess death estimations and primary methods – indicate a major underestimation. Different estimates – using all-cause mortality data from the civil registrations systems or household-level data from the Centre for Monitoring Indian Economy (CMIE) – suggest a range for Covid-19 related deaths of 3.4 million to 4.9 million till June 2021 (Banaji and Gupta, 2021; Anand *et al.*, 2021; Ramani, 2022; Rukmini, 2021).

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There are very few studies that have attempted estimation of the rural equivalents of national mortality. Some scholars have argued that the first wave of infections in 2020 largely bypassed the rural areas. However, others have argued that the rural areas were equally badly affected as urban areas during the first wave, the reasons being the massive return of migrants and the continuation of economic activities in agriculture (Mohanani *et al.*, 2021).

During the second wave, however, there is consensus on the rapid rise of mortality rates in the rural areas. Using data from the Health Management Information system (HMIS), Jha *et al.* (2022) estimated that the total number of all-cause deaths in rural India rose from 2.95 lakh in April and May 2020 to 6.95 lakh in April and May 2021. In other words, there were 4 lakh excess deaths in rural India during just these two months, which constituted 84.3 per cent of the total excess deaths in India. In the months of April and May 2021, the number of excess deaths in urban India was only 74,841. Benchmarked to April-May 2019, the number of excess deaths were higher in April-May 2021 by 221 per cent in rural Madhya Pradesh, 212 per cent in rural Gujarat, 163 per cent in rural Maharashtra, 133 per cent in rural Karnataka, 89 per cent in rural Himachal Pradesh, 82 per cent in rural Punjab and 81 per cent in rural Andhra Pradesh.

Banaji *et al.* (2021) argued, using a sample of 61 village cases reported in the media, that there might have been 2-3 excess deaths per 1000 population in the villages they studied in April and May 2021. Only less than 10 per cent of the deaths were officially declared so. According to them, rural fatality rates could have been higher than urban fatality rates during the second wave, as most of the deceased persons were never tested for the infection.

Given the poor state of public health – combined with lack of awareness, poor levels of testing and institutional facilities for quarantine – the health impact of the pandemic was undoubtedly overwhelming in rural India (see Sundararaman and Ranjan, 2020). This aspect of the rural society has received scant attention from agricultural economists; they must, in the coming years, extend their attention to the establishment of a comprehensive public health system in rural India.

We shall now move on to explain the context of, and rationale for, the paper.

II

THE CONTEXT AND THE RATIONALE

Agriculture Prior to the Pandemic

To begin with, the rural economy of India was in a state of distress even prior to March 2020. This distress had also been increasingly intensifying between 2011-12 and 2019-20. All official data on agriculture and the rural economy lead us to such an unequivocal inference.

First, agricultural growth rates in India were falling after 2011-12. The index of production of all principal crops grew at 3.1 per cent per annum between 2003-04 and 2010-11, but only at 1.8 per cent per annum between 2011-12 and 2019-20 (Ramakumar, 2022). While the growth of food grain production fell from 2.5 per cent per annum to 2.2 per cent per annum, non-food grain production fell more sharply from 4.3 per cent per annum to 1.4 per cent per annum.

Secondly, terms of trade were turning adverse for the farmers after 2011-12. The sectoral deflator in agriculture—the difference between the rates of growth of gross domestic product from agriculture at current and constant prices—rose from 7.9 in 2005-06 to 16.0 in 2009-10, and then fell sharply afterwards from 13.1 in 2010-11 to 4.0 in 2018-19 (Ramakumar, 2021). To make things worse, from November 2016 – the month of demonetisation – the wholesale price indices in agriculture witnessed a steady fall. In other words, the economics of agriculture was marked by acute price disincentives even prior to the pandemic.

Thirdly, data from the Situation Assessment Surveys (SAS) of 2012-13 and 2018-19 showed that real monthly incomes of agricultural households from “cultivation” fell in absolute terms from Rs. 2855 to Rs. 2816, i.e., by 1.4 per cent (Ramakumar and Kamra, 2022). Even as the total real incomes of agricultural households grew by 25.6 per cent, the fall of real incomes from cultivation – clearly, an outcome of shrinking profitability rates across crops – was a worrisome feature.

Fourthly, rural labourers too faced deterioration in their standards of living. The size of the rural workforce, as per the NSSO's UPSS status, fell from 328 million to 312.1 million between 2011-12 and 2017-18 (Basole and Nath, 2021). Average real wage rates for male and female rural labourers engaged in agricultural operations ceased to grow after 2016-17 (Ramakumar, 2022). Between 2011-12 and 2017-18, the mean real consumption expenditure of rural households fell by 8.8 per cent, while the mean real consumption expenditure on food of rural households fell by 5.9 per cent (Subramanian, 2019).

In other words, the pandemic hit a rural economy that was already in considerable distress. The regular protests by farmers and workers in different parts of India – beginning from the Long March in Maharashtra in 2018 and followed up in Delhi and different parts of the country in 2019 – reaffirmed the presence of a certain disappointment and frustration among the peasantry.

The Lockdown

The nature of the virus and infections demanded lockdowns. At the same time, it was essential to allow time for the population to adapt to the rigours of a lockdown. However, India's national lockdown from 24 March 2020 was announced suddenly, without preparedness on its health care challenges or socio-economic complexities (Ramakumar, 2020a; Narayanan and Saha, 2020). While a few states had announced regional lockdowns before 24 March, they were announced with sufficient notice.

The suddenness of the announcement and the enormity of its implications caught the farmers and rural labourers unaware. The rural regions of the country were preparing for the harvest of the *rabi* crop, mostly wheat. Rural labourers, who seasonally migrated to other rural regions for the harvest operations, shelved their plans. Migrant workers in the urban and semi-urban regions, who were natives of villages across the country, were left stranded without shelter, food or income (Srivastava, 2020).

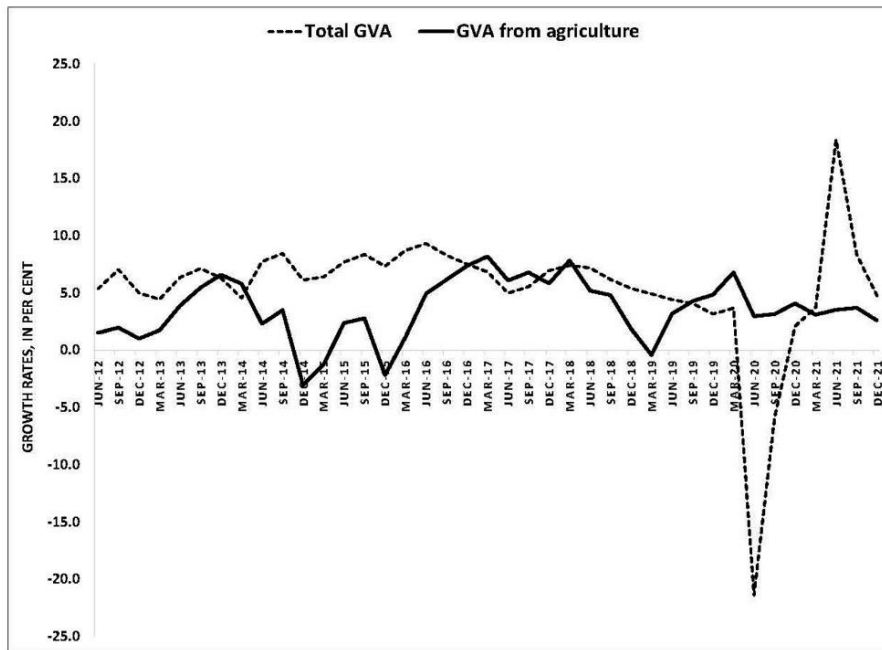
The lockdown during the first wave, which was announced initially for 21 days on 24 March 2020, was later extended till 3 May, 17 May, 31 May and 30 June. Between July and December 2020, the lockdown was increasingly relaxed in phases.

The Paradox of Agricultural Growth

Across the world, the Covid-19 pandemic has led to a sharp shrinkage of the gross domestic product (GDP). Globally, output grew by -3.1 per cent in 2020 and, given the low base, by 5.9 per cent in 2021 (IMF, 2022). Corresponding global data on agricultural growth rates are yet unavailable. However, OECD (2020) had forecasted that economies with a larger share of agriculture and mining may suffer “smaller initial effects” than other economies though output may subsequently be affected by a fall in global commodity demand. Studies from the USA have argued that agricultural production was “very resilient” during the pandemic (Beckman and Countryman, 2021). Survey data from five sub-Saharan African countries in April-August 2020 also show that the impact of the lockdown on agriculture was “less pronounced” than the other sectors (Amankwah and Gourlay, 2021). More people were entering agriculture than exiting, and agriculture was acting as a “buffer” for low-income households.

National accounts data for India also show a similar phenomenon. According to the Government of India’s *Economic Survey 2021-22*, agriculture was “the least impacted by the pandemic-related disruptions” (p. 4) and recorded “buoyant growth” (p. 234) in 2020-21 and 2021-22 (Government of India, 2022). As per the first revised estimates for 2020-21, while the growth rate of real Gross Value Added (GVA) was -4.8 per cent, GVA from agriculture and allied sectors grew at 3.3 per cent (see Figure 1). In 2021-22, the growth rate was maintained at 3.3 per cent.

A few other indicators in agriculture also performed promisingly. First, the total food grain production in 2020-21 stood at a record level of 308.7 million tonnes, which was about 11 million tonnes more than in 2019-20 (Government of India, 2022). The trend was similar for pulses and oilseeds too. Secondly, the total value of exports of agricultural and allied products rose from Rs. 2.49 lakh crores in 2019-20 to Rs. 3.06 lakh crores in 2020-21; in other words, export values grew by 22.6 per cent (*ibid.*). Between April and November 2021, agricultural exports further grew by 23.2 per cent over April and November 2020. Thirdly, the total fertiliser sale rose from 59.9 million tonnes in 2019-20 to 66 million tonnes in 2020-21 and 54 million



Source: National Accounts Statistics (Various issues).

Figure 1. Year-on-Year Growth Rates of Quarterly Gross Value Added (GVA) at Constant Basic Prices, by Economic Activity, Base Year 2011-12, in Per Cent Per Annum.

tonnes in 2021-22 (till December 2021). Fourthly, the sale of tractors grew in 2020 and 2021 compared to 2019. The total number of tractors sold in India rose from 7.05 lakh in 2019-20 to 8.99 lakh in 2020-21 and 7.17 lakh in 2021-22 (till January 2022).

These figures have led to the conclusion that agriculture was the “bright spot” (RBI, 2021a), or the “silver lining” (Government of India, 2021), in the economy during the pandemic. The argument has been that agriculture had not just bucked the trend or was resilient but was a leading sector of growth.

In this paper, I examine this claim from a critical perspective. I shall not confine myself to the macroeconomic aggregates but use a mixture of disaggregated official data, and the results of independent surveys in rural areas. The objective is to arrive at a composite account of what happened in Indian agriculture during the pandemic. My argument would be that the macroeconomic aggregates hide significant elements of distress in the rural economy in 2020-21 and 2021-22; there were major economic losses to households and firms that were not ameliorated by any intervention of the government.

In the next section, an attempt is made to delineate the major economic impacts of the pandemic on the rural economy.

III

IMPACT OF THE PANDEMIC

In the initial months of the pandemic, an attempt had been made to sketch the potential impacts of the pandemic on global and Indian agriculture (see Ramakumar, 2020b). In this paper, I have built on that framework to understand the state of Indian agriculture 21 months down the line. The impacts of the pandemic on agriculture can broadly be divided into seven themes: (a) crop production; (b) supply chains and markets; (c) production in the allied sectors; (d) prices; (e) credit; (f) rural employment; and (g) rural incomes and consumption.² In this section, I shall review each of these themes separately.

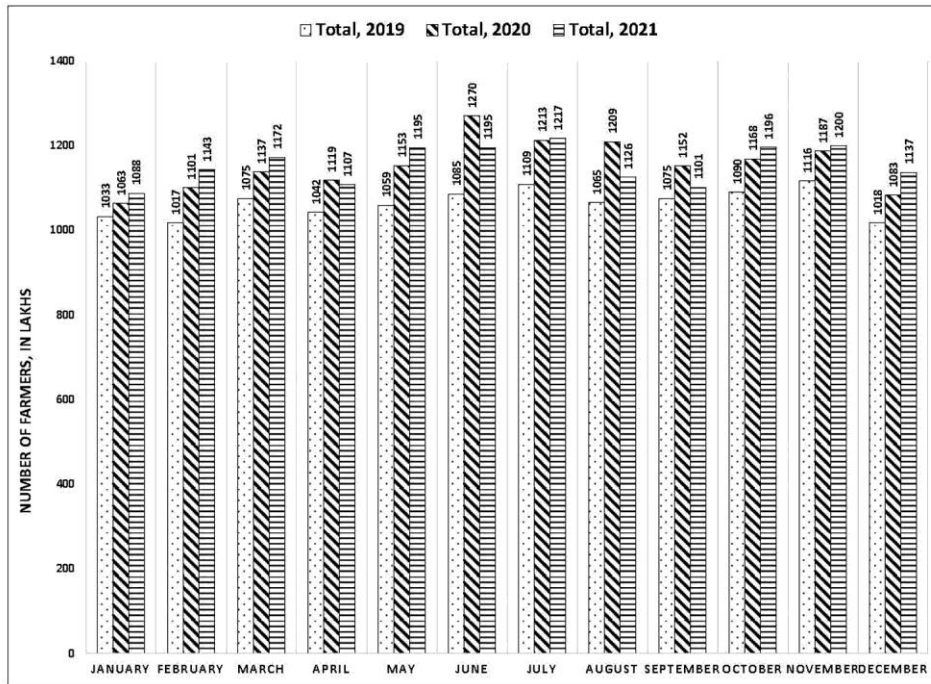
(A) Crop Production

As discussed, agricultural production in India rose during the pandemic (Figure 1). The rise in production was assisted by good monsoons in 2020 and 2021. According to the Union government, the rise in production was also a result of government interventions to improve credit availability, raise investments, expand market facilities, promote infrastructure and ensure input availability (Government of India, 2022). As I shall argue in the following sections, there is little data to support these claims of the government. To begin with, the rise in production was partly attributable to an important factor ignored in the government's claims: a distress-driven rise in acreage.

The Rise in Area Sown

After March 2020, lakhs of unemployed workers returned to their villages. Apart from those finding their own ways back home, there were *shramik* trains that plied from 1 May 2020. Between 1 May and 25 May, 44 lakh passengers returned home in 3274 trains.³ Between 1 May and 31 August, 63.2 lakh passengers returned home in 4621 trains.⁴ The largest number of trains left Gujarat, Maharashtra and Punjab, while the largest number of trains culminated in Uttar Pradesh, Bihar, Jharkhand, Odisha and West Bengal.

The loss of livelihoods and the absence of alternative jobs forced workers to enter agriculture in the *kharif* and *rabi* seasons of 2020. Data from the Consumer Pyramids Household Surveys (CPHS) of CMIE show that the number of workers in rural India who identified themselves as farmers was higher by 93.8 lakhs in May 2020, 184.4 lakh in June 2020, 104.3 lakh in July 2020 and 143.9 lakh in August 2020 compared to the corresponding months of 2019 (see Figure 2). In February 2021 too, when the *rabi* harvest began, there were 125.6 lakh more workers who identified themselves as farmers compared to February 2019. These numbers remained as high in the *kharif* months and the *rabi* months of 2021-22 also.



Source: CPHS-CMIE

Figure 2 Number of Persons Working as Farmers, Rural India, CPHS-CMIE, Monthly, 2019, 2020 and 2021, in Lakh Numbers.

Field data show that these workers brought back fallow lands into cultivation either through self-cultivation or tenancy (see Modak and Bhattacharya, 2021). Actual area sown with major *kharif* crops showed a major rise in 2020 to levels higher than the normal area sown (see Table 1). Year-on-year, the area sown with all crops and cereals grew by 5.1 per cent each, and the area sown with oilseeds grew by 10.2 per cent. The trend continued into the *rabi* season of 2020, where area sown with all crops grew by 3.8 per cent, or to 110 per cent of the normal area sown. Here again, the area sown with cereals and oilseeds increased by the largest proportion. The figures for area sown corrected themselves downwards in 2021-22, but they remained higher than in 2019-20.

Household surveys of the World Bank, conducted over three rounds in May, July and September 2020 in six States, shows interesting patterns in the rise of acreage across households (World Bank, 2021). There was a significant and inverse statistical relationship between a household's consumption expenditure and its rate of acreage increase. In other words, it was among the poorer households that the acreage rise was predominant, and it was here that most of the increase in area sown was concentrated.

TABLE 1. AREA CULTIVATED AND GROWTH IN AREA CULTIVATED, MAJOR CROPS, KHARIF AND RABI SEASONS, INDIA, 2020-21 AND 2021-22, IN '000 HA AND PER CENT

Season/crop (1)	Actual area (‘000 ha)		Year-on-year growth rate (per cent)		Actual area as a share of normal area (per cent)	
	2020-21 (2)	2021-22 (3)	2020-21 (4)	2021-22 (5)	2020-21 (6)	2021-22 (7)
<i>Kharif</i> season (as on end-September)						
All crops	1,12,036	1,11,527	5.1	-0.5	104.9	103.9
Food grains	73,345	73,763	4.8	0.6	103.2	103.2
Cereals	59,483	59,606	5.1	0.2	102.2	102.9
Pulses	13,863	14,158	3.5	2.1	107.6	104.6
Oilseeds	19,798	19,536	10.2	-1.3	111.2	108.5
<i>Rabi</i> season (as on end-January or early-February)						
All crops	68,077	70,083	3.8	1.2	109.8	110.2
Food grains	59,758	59,804	3.6	-1.8	109.2	107.2
Cereals	43,274	42,977	4.3	-2.8	107.6	104.7
Pulses	16,485	16,827	2.0	1.0	113.8	113.9
Oilseeds	8,319	10,279	4.6	22.7	113.7	131.9

Source: CMIE Economic Outlook.

Two conclusions follow. First, it was a rise in area sown, coupled with fortuitously good monsoons, that triggered the rise in agricultural production in 2020-21 and 2021-22. Secondly, the increase in area sown was, in turn, distress-led i.e., triggered by the widespread loss of livelihoods and employment, and the consequent return migration.

Rise in Harvest and Ploughing Costs

When the lockdown was announced in March 2020, the harvest of the *rabi* crop of 2019-20 had not yet begun in many northern Indian States, especially Punjab and Haryana. Soon after the *rabi* harvest, ploughing for the next *kharif* crop was to begin. Large numbers of workers were needed for both the tasks. These States regularly attracted lakhs of seasonal migrant workers from other States, such as Uttar Pradesh, Bihar, Odisha and Rajasthan, to complete these operations. Even if farmers used mechanical harvesters, three or four skilled workers were needed to operate each harvester. The total number of seasonal migrant workers is placed at 10 lakh workers in Punjab and 6 lakh workers in Haryana, with 80 per cent of them travelling from Bihar (Samant, 2020).

As migrant workers could not travel, labour shortages were experienced both for *rabi* harvest and *kharif* ploughing. Field surveys showed a complex situation on the ground. First, in the villages that were heavily dependent on seasonal migrant workers, daily wages rose (Modak *et al.*, 2020). Secondly, in those villages that saw a return of migrant workers, excess labour supply led to lower wages. Thirdly, there was a widespread thrust on mechanisation of operations in most villages. However, as equipment dealers were shut down and supply of machines was fixed, rents on machines rose (see also FICCI, 2020). Modak and Bhattacharya (2021), who reported results of telephonic surveys from 13 villages in India for 2020-21, showed that

machine rents rose by 10-50 per cent compared to 2019. Studies also reported the absence of machine operators and service providers – who were also, in many regions, migrant workers – as another constraint on mechanisation (Kumar *et al.*, 2021). Finally, mechanisation was an option only for the larger landowning households. For smaller landowning households, the only option was to rely intensively on family labour.

Consequently, harvest and ploughing operations were disrupted. Ceballos *et al.* (2020) reported from surveys in Haryana and Odisha that 41 per cent of the wheat farmers in Haryana and 80 per cent of the black gram farmers in Odisha spent more on the *rabi* harvests of 2019-20. In Haryana and Odisha, respectively, 25 per cent and 73 per cent spent more on labour and 23 per cent and 38 per cent spent more on machine rents. Harvest operations had to be advanced or delayed in many contexts, which may also have adversely affected the productivity of crops, but reliable data are not available to answer the question. Another telephonic survey of 331 respondents showed that 37 per cent of farmers were unable to harvest in *rabi* 2019-20 (APU, 2020). Jaacks *et al.* (2021) reported results of a telephonic survey of 1437 farmers in 12 States, where 11 per cent of the farmers were unable to harvest their crop in April-May 2020.

Fertiliser Use and Costs

According to the Union government, the rise in fertiliser sales during the lockdown demonstrated that agriculture was unaffected by the lockdown. However, official data and field studies present a different state of the fertiliser sector in 2020-21 and 2021-22.

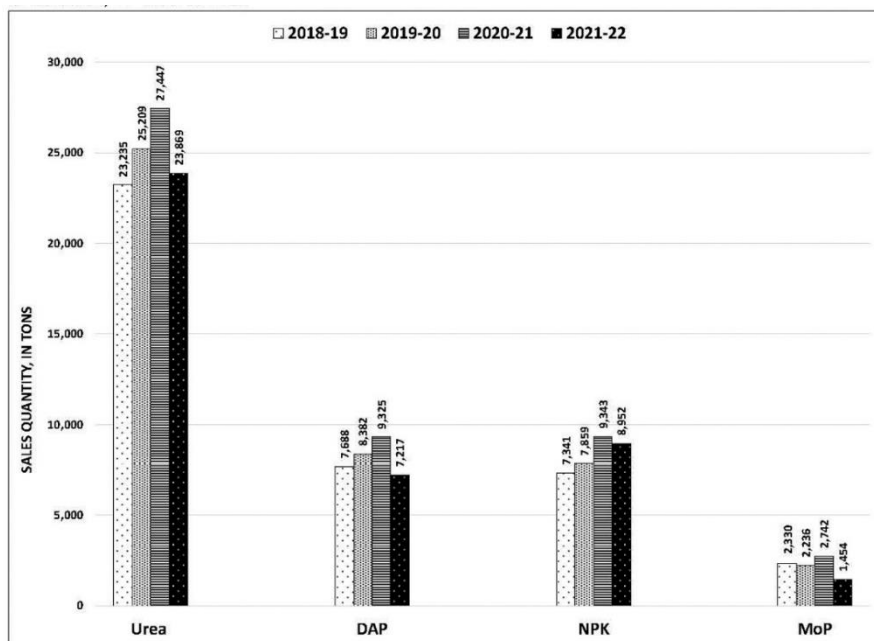
To begin with, the rise in fertiliser sales in 2020-21 over 2019-20 was illustrative of three distinct phenomena. One, a larger area was cultivated with crops in 2020-21, and it was only natural that fertiliser use would rise. Household surveys showed that higher fertiliser expenditures in 2020 were positively associated with a rise in acreage between 2019 and 2020 (World Bank, 2021). Two, there is evidence that fertiliser dealers and larger farmers resorted to panic-buying and storage of fertilisers in anticipation of fertiliser shortages. Most raw materials for fertiliser production, and some end-products, were imported and international trade was reasonably expected to be disrupted for a prolonged period.

Secondly, there was considerable shortage of fertilisers in 2020-21 owing to supply chain disruptions. Telephonic household surveys tell a different story compared to the official narrative. Surveys by the Foundation for Agrarian Studies (FAS) showed limited stocks of fertilisers in village retail shops in many villages. NABARD (2020), based on inputs from its district-level officers, reported that 58 per cent of the sample villages experienced a shortage of agricultural inputs, including fertilisers. The overall quantum of fertiliser shortage in *kharif* 2020 was estimated to be 11.2 per cent. Surveys of the World Bank showed average household-level

fertiliser expenditures fell by 13 per cent in *kharif* 2020 compared to *kharif* 2019, and 57 per cent of the households reported a fall in fertiliser expenditure (World Bank, 2021).

Thirdly, shortage of fertilisers quickly translated to higher fertiliser prices at the retail level. Modak and Bhattacharya (2021) reported that fertiliser costs per acre in *kharif* 2020 were higher by Rs. 200 to Rs. 500 than in 2019. World Bank (2021, p. 42) noted that 35 per cent of the respondents reported a rise in fertiliser prices in *kharif* 2020. NABARD (2020) reported an average of 10 per cent rise in fertiliser prices in the country; in States like West Bengal, the rise was up to 16 per cent. The rise in fertiliser prices was another burden on the costs of cultivation for farmers during the lockdown.

More evidence on the transient nature of the rise in fertiliser use in 2020-21 comes from Figure 3, which shows that fertiliser use fell in 2021-22. For urea, di-ammonium phosphate (DAP) and Muriate of Potash (MoP), the cumulative fertiliser use in April-December 2021 was lower than not just in April-December 2020 but also in April-December 2019. The proximate reason for the fall in fertiliser use was a rise in fertiliser prices between 2020 and 2021. Global supply chain disruptions and a steady rise in the global prices of raw materials, such as phosphoric acid and ammonia, led to a fall in the imported quantity and a massive upward pressure on domestic fertiliser prices in 2021 (CRISIL, 2021). Between July 2020 and July 2021,



Source: CMIE Economic Outlook.

Figure 3. Sales of Fertilisers in India, 2019-20 To 2021-22, Cumulative Figures for April-December, in '000 Tonnes.

the price of imported urea rose from \$243 per MT to \$507 per MT (a 109 per cent rise); the price of DAP rose from \$323 per MT to \$615 per MT (a 90 per cent rise); and the price of MoP rose from \$230 per MT to \$280 per MT (a 22 per cent rise).⁵

In response, the Union government raised fertiliser subsidies in 2021-22 over and above the budgeted estimate. However, this rise in subsidy allocation was inadequate, as retail fertiliser prices continued to rise (CRISIL, 2021). To give an instance, w.e.f. April 2021, the Indian Farmers Fertiliser Cooperative Ltd (IFFCO) had raised the Maximum Retail Price (MRP) for one 50 kg bag of NPK 10:26:26 from Rs. 1175 to Rs. 1775; of NPK 12:32:16 from Rs. 1185 to Rs. 1800; and of DAP from Rs. 1200 to Rs. 1900. However, in May 2021, the Union government announced a hike in fertiliser subsidies and asked producers not to raise the MRPs.⁶ The subsidy for DAP was raised from Rs. 500 per bag to Rs. 1200 per bag. The Prime Minister was officially quoted as saying that “farmers should get fertilisers at old rates despite the international rise in prices”.

This promise, however, remained unfulfilled (see Table 2). On the one hand, cooperatives like IFFCO partially obliged, by keeping the prices of DAP unchanged at Rs 1200 per bag. On the other hand, other private producers did not scale back prices to the original levels of 2019; in fact, they continued to raise prices. Data collected by me from fertiliser dealers in rural Maharashtra showed that between April-May 2020 and January 2022, except in the case of urea, there was a significant rise in fertiliser prices.⁷ Even IFFCO raised the prices of different NPK fertilisers between 2020 and 2021.

TABLE 2. RETAIL PRICES OF DIFFERENT FERTILISERS CHARGED BY PRODUCERS, 2019 TO 2021, IN RS PER BAG

Type of fertiliser (1)	MRP charged by IFFCO (Rs./bag)			Prices of other producers (Rs./bag)		
	Oct 2019 (2)	Nov 2020 (3)	Dec 2021 (4)	Apr 2020 (5)	Sept 2020 (6)	Dec 2021 (7)
Urea	-	-	-	266	266	266
NPK 10:26:26	1175	1175	1440	1375	1600	1675
NPK 12:32:16	1185	1185	1450	-	-	-
NPK 20:20:0:13	975	925	1290	-	-	-
NPK 15:15:15	-	1025	1140	-	-	-
NPK 19:19:19	-	-	-	1900	2100	2550
DAP	1200	1200	1200	1200	1400	1600
MoP	-	-	-	875	1015	1750
SoP	-	-	-	1800	2100	2200

Sources: IFFCO; fertiliser agents in rural Solapur, Maharashtra.

Note: The prices for other producers are not MRPs; MRPs are higher than the sale prices. For NPK, MoP and SoP fertilisers, one bag is of 25 kg. For DAP and urea, one bag is of 50 kg.

The sharp rise in fertiliser prices contributed to two outcomes at the farm level: one, a fall in fertiliser use; and two, higher costs of cultivation, even as output prices stood depressed (see next section). In addition to fertilisers, farmers also faced difficulties in procuring certified seeds and pesticides and a rise in their prices. On an average, seed prices were higher by 8.8 per cent and pesticide prices were higher by 9 per cent during *khari* 2020 (NABARD, 2020; see also Modak and Bhattacharya,

2021). In the absence of certified seeds, most farmers relied on farm-saved seeds that generally yielded less than certified seeds. More data are required to assess the impact of such practises on productivity.

In summary, the disruptions in harvesting of *rabi* crops and ploughing for *kharif* crops and higher input prices reduced production efficiency, raised costs and reduced the net incomes of producing households.

(B) *Supply Chains and Markets*

There were major supply chain disruptions in the input and output markets of agriculture at the global level (see Ramakumar, 2020b). In modern logistics management, each link in the supply chain sequence is defined and determined with accuracy; they must function like a well-oiled machine. Any disruption in the sequence, due to a late arrival or return of a container or the absence of workers to load or unload trucks at any point, could wreak havoc in the entire chain. Logistics managers use the term “supply bullwhip effect” to denote situations where a small change in demand at one end is extensively and disproportionately amplified as the signal is transmitted down the supply chain. In 2020, as the demand for some goods rose and others fell at disproportionate rates, global and domestic market networks struggled to cope.

Global Trade and Exports

In 2020, global merchandise trade shrank by 5.1 per cent (WTO, 2021). But trade in agricultural products did not decline as much; it shrank by only 2.3 per cent. In 2021, agricultural trade is expected to revive faster than total merchandise trade.

Unlike for the world, agricultural exports from India did not shrink in 2020-21. The total export value of agriculture and allied products grew from Rs 2.49 lakh crore in 2019-20 to 3.05 lakh crore in 2020-21 i.e., by about 23 per cent. The growth continued into 2021-22; value of exports between April and December 2021 was higher than between April and December 2020 by 40.2 per cent (see Table 3).

While the rise in export values is commendable, few cautionary notes may be in order. First, in many crops/products, the rise happened from very low base values. For instance, even after a remarkable growth of wheat exports of 809 per cent, the value of wheat exports formed just 1.3 per cent of total value of exports of agricultural and allied products in 2020-21. Secondly, much of the increase in exports may be transient. If we consider a threshold of Rs 20,000 crore, the major export commodities of India are only six: rice, marine products, oils and oilseeds, spices, meat and meat preparations and sugar. Among these, there was a remarkable growth of exports in rice, oils and oilseeds, spices and sugar. These exports were due to the temporary withhold of exports by traditional export leaders and the stockpiling of food by import-dependent countries. Once normalcy returns, these markets are

TABLE 3. CHANGES IN THE VALUE OF EXPORTS OF AGRICULTURAL AND ALLIED PRODUCTS, INDIA, 2019-20 TO 2021-22, IN PER CENT

Crop/product (1)	Share of export value in total agricultural export value, 2020-21 (2)	Increase in export value, 2020-21 over 2019-20 (3)	(per cent)
			Increase in export value, April-Dec 2021 over April-Dec 2020 (4)
Rice	21.4	43.8	60.3
Marine products	14.5	-7.2	19.3
Oils and oilseeds	11.0	39.5	17.2
Spices	9.7	15.2	12.2
Meat and preparations	7.8	2.0	4.1
Sugar and molasses	7.2	51.2	150.5
Raw cotton	4.6	85.3	292.1
Fruits and products	3.5	7.1	28.0
Vegetables and products	2.8	24.8	30.6
Tobacco	2.1	1.4	4.3
Tea	1.8	-4.2	-7.4
Coffee	1.7	2.0	46.6
Wheat	1.3	809.0	3082.0
Poultry and dairy products	0.9	10.4	66.2
Pulses	0.6	30.9	58.2
Natural rubber	0.1	-20.2	-56.9
Total agricultural exports	100.0	22.6	40.2

Source: CMIE Economic Outlook.

Notes: Oils and oilseeds include essential oils, vegetable oils, oilseeds, oil meal and castor oil; fruits include fresh fruits and processed fruits and juices; vegetables include fresh vegetables and processed vegetables.

expected to dry up. Thirdly, even among the major export commodities, export values for marine products fell in 2020-21 (though growth picked up in 2021-22). Finally, international shipping costs were on a relentless rise after June 2020. Both the IGC Baltic Dry Index and the IGC Grain and Oilseed Freight Index (GOFI) quadrupled between June and October 2021, which was likely to adversely affect the present and future margins from global trade.

In summary, even if the rise in agricultural export values represented only a small quantity, they did contribute to easing the glut in the domestic market. It is to this domestic market that we now turn.

Domestic Supply Chains

Domestic agricultural markets were severely disrupted. In fact, at every sequence of the supply chain from the producer to the consumer, there were several bottlenecks. Beginning from delays in procurement, these bottlenecks ranged from absence of traders for village purchase, shortage of trucks, shortage of truck drivers, complete and partial closure of *mandis* and shutdown of retail markets for food items. As accurate forecasting of demand and supply became difficult, firms turned risk-averse and, due to the bullwhip effect, trade shrank far more than was necessary.

Market arrivals are an important indicator of the extent of disruption in supply chains. Here, I use data for 22 commodities from the commodities database of the

CMIE, which puts together AGMARKNET data from 3289 markets in the country. These commodities are paddy, wheat, jowar, maize, barley, gram, black gram (*urad*), pigeon pea (*arhar*), green gram (*mung*), lentil (*masur*), potato, tomato, onion, cabbage, cauliflower, peas (*matar*), lady's finger, banana, mango, cotton, soyabean and groundnut (see Table 4).

TABLE 4. MARKET ARRIVALS OF SELECTED MAJOR COMMODITIES IN 2020 AND 2021 BENCHMARKED TO 2019, AGMARKNET, INDIA

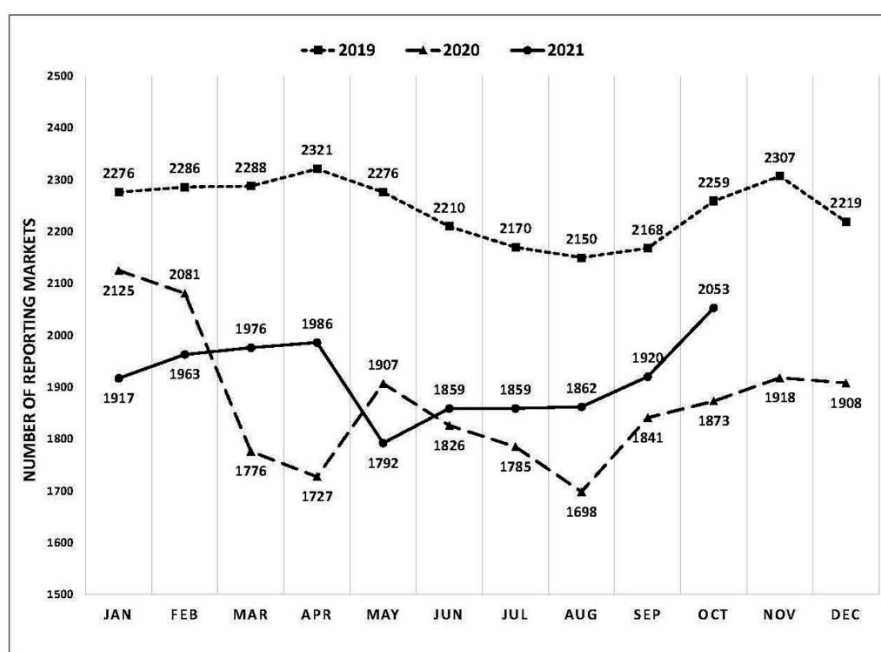
Crop (1)	Share of arrivals in 2020 and 2021 as a share of arrivals in 2019 (per cent)			
	March to August 2020	September to December 2020	March to December 2020	January to December 2021
	(2)	(3)	(4)	(5)
Paddy	83.5	76.9	77.9	72.3
Wheat	61.1	61.5	61.1	78.1
Jowar	44.1	67.7	56.4	74.0
Maize	131.4	59.7	82.7	83.0
Barley	58.1	58.8	58.1	38.7
Gram	42.0	54.4	44.4	66.2
Black gram	46.0	79.9	66.2	68.4
Pigeon pea	46.2	59.0	48.7	96.6
Green gram	78.6	95.7	86.9	92.2
Lentil	76.7	41.8	68.3	88.8
Potato	48.9	57.1	51.9	73.0
Tomato	85.3	97.2	91.0	117.2
Onion	37.9	105.8	55.8	95.6
Cabbage	67.9	70.6	69.2	99.0
Cauliflower	54.6	74.2	65.2	91.9
Peas	41.4	35.7	38.3	54.9
Lady's finger	72.8	83.0	76.4	97.9
Banana	83.8	62.2	74.4	69.6
Mango	51.9	66.2	51.9	44.9
Cotton	60.7	52.3	54.3	51.3
Soyabean	45.4	66.4	59.9	65.0
Groundnut	81.2	94.2	90.9	103.3

Source: CMIE Commodities.

There was a drastic reduction in the market arrivals of agricultural goods. Table 4 provides the commodity-wise market arrivals between March 2020 and December 2021 as a share of the corresponding market arrivals between March and December of 2019. Between March and December 2020, the market arrivals for all the 22 crops were less than in 2019. Only in the case of six out of 22 commodities were the market arrivals in 2020 above 75 per cent of the market arrivals in 2019. In 13 commodities, the market arrivals in 2020 were between 50 and 75 per cent of the market arrivals in 2019. In three commodities, the market arrivals in 2020 were less than 50 per cent of the market arrivals in 2019. Further, there was no distinct improvement in arrivals across commodities between March-August 2020 and September-December 2020.

Markets did not return to normalcy even in 2021. It was only in 11 out of the 22 crops that arrivals in 2021 were more than 75 per cent of that in 2019.

What do lower market arrivals imply? Figure 4 shows the number of reporting markets in the AGMARKNET portal. A market was considered closed in a month if it did not report data on prices or arrivals for even one day of the month. Defined thus, the number of reporting agricultural markets fell from March 2020 with a slow revival beginning only from August 2020. Even in October 2021, the number of reporting markets had not been restored to the levels in 2019.



Source: CMIE Commodities.

Figure 4. Number of Reporting Agricultural Markets, AGMARKNET, India, Monthly, 2019, 2020 and 2021.

Markets were shut down on a large scale after March 2020. In most regions, markets were operational only for two or three days a week. Many large private traders were not operational because of disruptions in truck services. When trucks were available, truck drivers were not available as many drivers had returned home. Consequently, the quantities of crops that did not arrive in the markets may have been sold informally, if not dumped, at lower prices than in the regulated markets (see also Rawal and Verma, 2020). Media reported many instances where farmers dumped their produce on the roads in desperation. Such distress sales are likely to have resulted in significant income losses for the farmers.

Two arguments are put forward by official circles in this context. First, public procurement rose during the lockdown, which compensated for the shutdown of markets. This claim is misleading, as procurement was mainly limited to rice, wheat and pulses; for the rest of the crops, particularly the perishables, there was no

procurement. Even for rice, wheat and pulses, the quantity of procurement was inadequate to account for the shortfall in market arrivals. Contradictory guidelines at the central and state levels and difficulties in transporting also created constraints in the procurement of rice, wheat and pulses (see Ramakumar, 2020b for a review).

The second argument is that with the three farm laws that came into operation in June 2020, several private markets and start-ups moved into direct purchase from the farmers, which might have made market shutdowns less important. This claim would also be misleading. One, the Supreme Court of India had kept the three farm laws in abeyance in January 2021, and the government had repealed them in November 2021. There is no discernible shift in the market arrivals after either of these months. Two, except for anecdotal media reports, there are no data available on the quantities handled by these so-called alternative channels. This holds true also for the other interventions claimed by the government, such as the All-India Agri Transport Call Centre or the mobile app called “Kisan Rath”. In the absence of such data, it would be impossible to agree with the claim.

(C) Production in the Allied Sectors

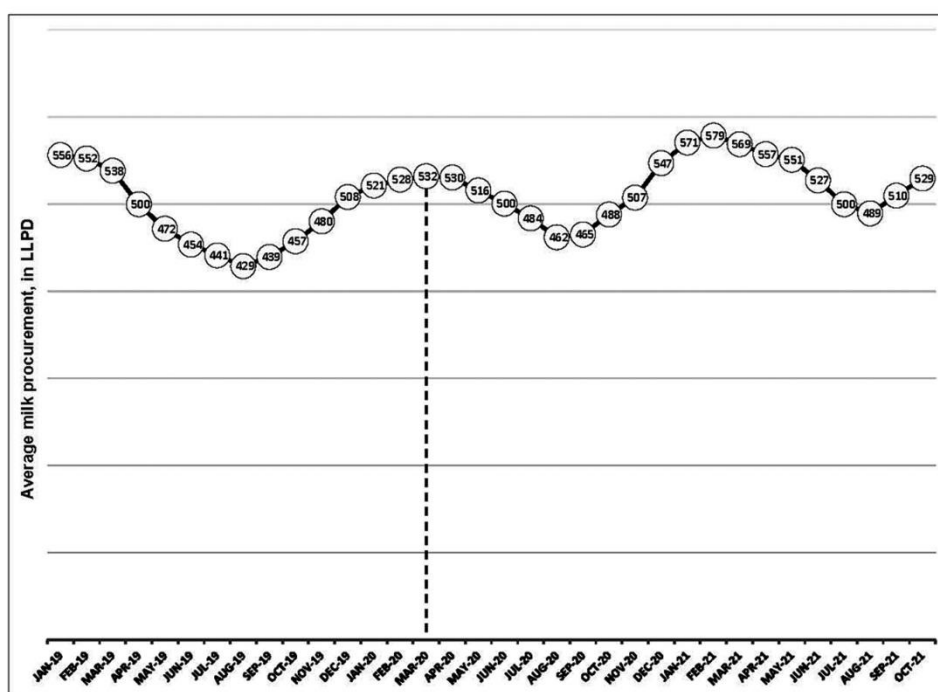
This sub-section discusses how the lockdown affected the production and marketing of milk, egg, poultry chicken and meat.

Dairy

In India, milk is primarily marketed in the liquid form; only one-fourth of the milk is converted into milk products. A major part of the demand for milk originates from sweet shops, restaurants, hotels and catering services (HoReCa), all of which were closed down during the lockdown. According to Government of India (2020), the total demand for milk fell by 25 per cent during the early phase of the lockdown, which later settled at around 10-12 per cent in the second phase of the lockdown (Chandel *et al.*, 2020) and remained subdued throughout the year.

There were two implications. First, there was surplus milk with the producers. While India continued to produce 0.514 MT of milk per day, demand for milk had fallen to 0.18 MT of milk per day (Chandel *et al.*, 2020). The higher household demand for milk was hardly sufficient to compensate for the lower demand from the HoReCa sector. There were efforts to raise procurement, but there were supply chain disruptions as well as labour shortages in the milk processing plants, cold storage units and warehouses.

Consequently, though average procurement rose from around 472 LLPD between March and December 2019 to 503 LLPD between March and December 2020, there was also a fall of average monthly procurement from 532 LLPD in March 2020 to 462 LLPD in August 2020 and 507 LLPD in November 2020 (Figure 5). In other words, dairy federations and milk unions could not sufficiently step in to procure the surplus milk. In 2021, average procurement rose to 538 LLPD between January and October, which helped better absorb the excess supply of milk.

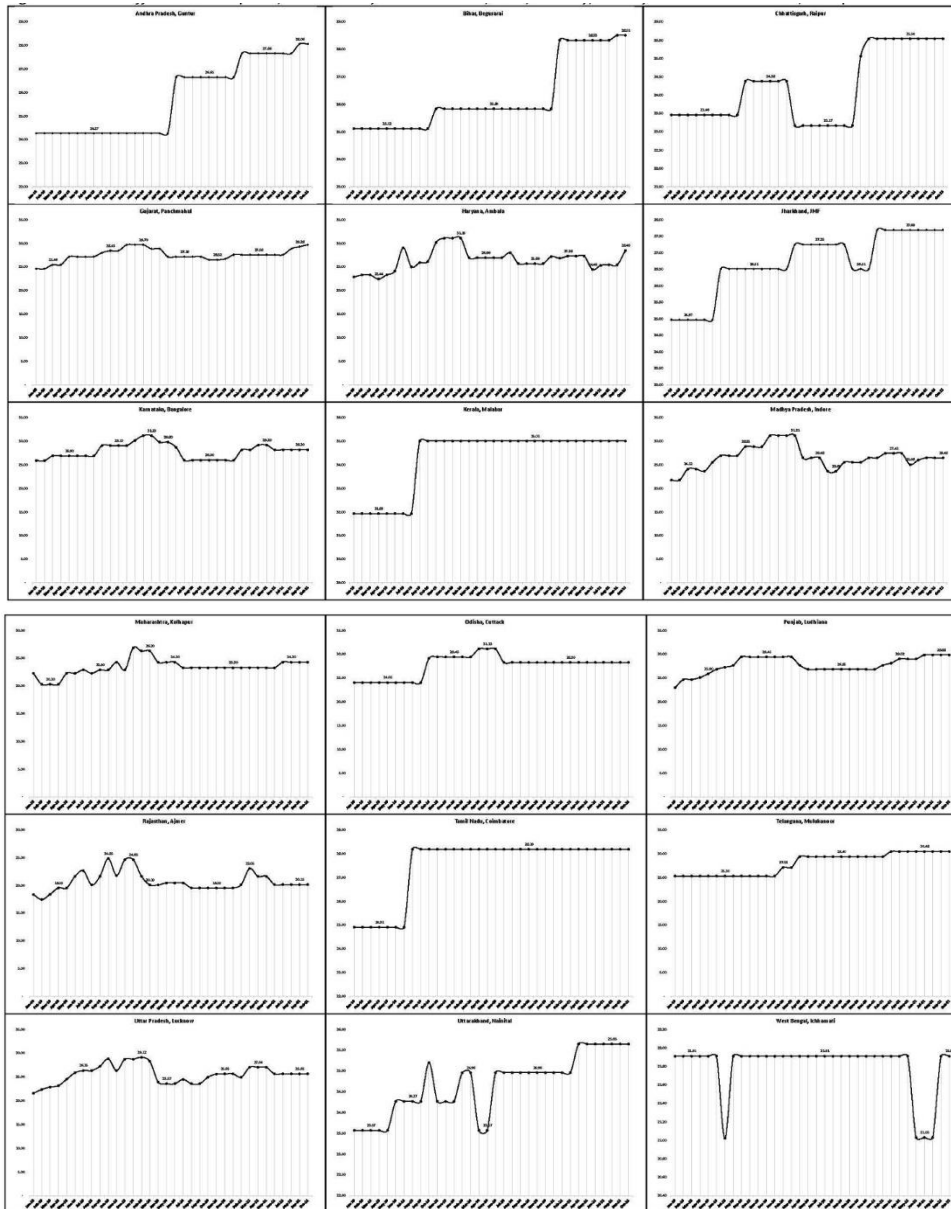


Source: National Dairy Development Board.

Figure 5. Average Procurement of Milk by Dairy Federations and Milk Unions, Monthly, India, January 2019 To October 2021, in Lakh Litres Per Day (LLPD).

Secondly, the procured surplus milk had to be converted to skimmed milk powder, but capacities for such conversion could not be created or expanded overnight. To complicate matters, the prices of skimmed milk powder also declined. Consequently, even though the national closing stocks of skimmed milk powder increased from 67,792 tonnes on 15 March 2020 to 158,624 tonnes on 31 May 2020, many dairies were forced to announce either milk holidays and/or a reduction of procurement prices.

In Figure 6, extensive data on the cow milk prices announced by selected dairy unions in 18 Indian States between 2019 and 2021 are provided.⁸ Out of the 18 unions examined, 11 unions cut milk prices after March 2020. These price cuts extended from Rs. 1 per litre in Raipur to Rs. 3 per litre in Kolhapur, Rs. 5 per litre in Bangalore, Lucknow and Ajmer and Rs. 8 per litre in Indore. In four unions – Malabar, Coimbatore, Begusarai and Ichhamati – prices remained unchanged. In three unions – Guntur, JMF and Mulukanoor – prices were raised by Rs. 1 per litre to Rs. 2 per litre. Among the 11 unions that cut milk prices, only three unions – Raipur, Ludhiana and Nainital – raised prices afterwards to bring them back to the levels of January-February 2020. In the remaining eight unions, milk prices in October 2021 were still lower than in January-February 2020.



Source: National Dairy Development Board.

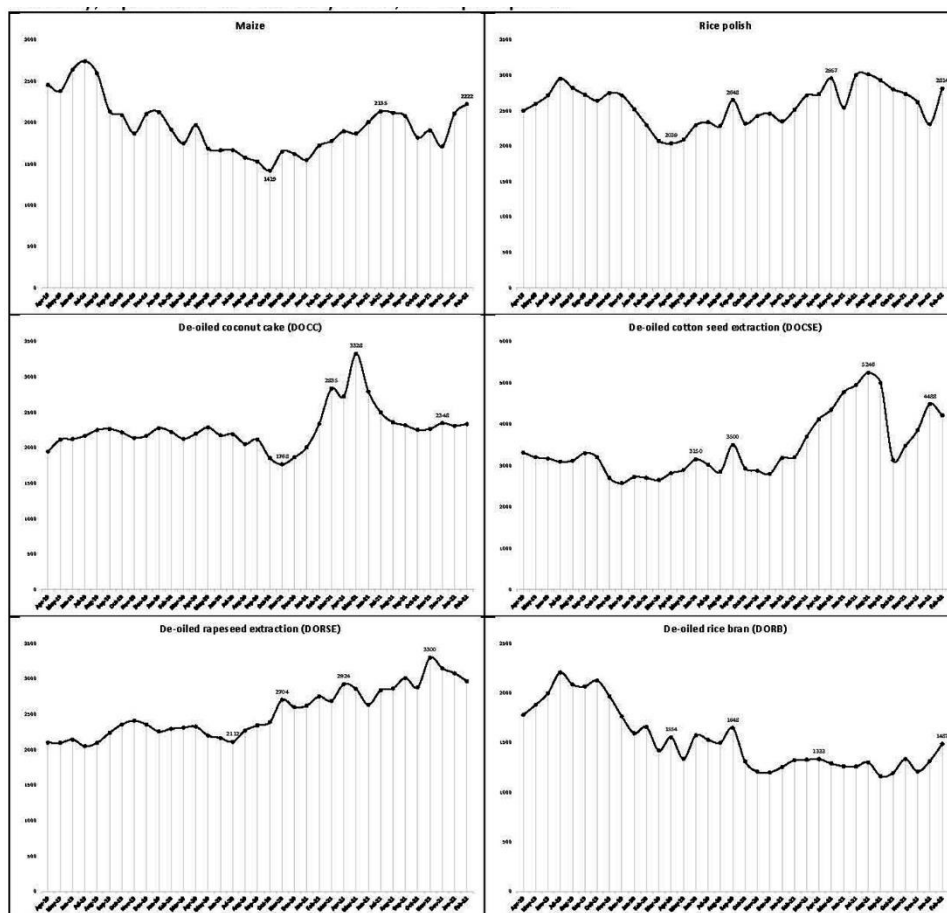
Figure 6. Trends in Official Cow Milk Prices, Selected Dairy Unions in States, India, Monthly, January 2019 to October 2021, in Rs. Per Litre.

Milk prices announced by the dairy unions are an upper end of the prices that producers received. Bhandari *et al.* (2021) noted that even when dairy unions did not reduce milk prices, the prices of milk sold by producers to milk vendors and

consumers – a significant part of the total milk sales – fell sharply. Consequently, in some States, the average milk price fell from Rs. 30-35 per litre to Rs. 17-20 per litre. In a global comparison of milk prices, IFCN (2020) classified two regions as the “epicentres of the dairy crisis” based on the percentage fall in milk prices in 2020: these were United States (29 per cent) and India (19 per cent).⁹

In summary, the inadequacy of milk procurement, combined with widespread falls in milk prices announced by unions, acutely affected the economics of milk production at the producer-end. Chandel *et al.* (2020) estimated for April-May 2020 that the total economic loss for the producers was Rs. 112.3 crore per day.

Yet another constraint on milk production was the rise in feed costs and difficulties in procuring feeds. Firstly, the prices of raw materials used to make animal feed rose sharply (see Figure 7). There are strong global correlations between



Source: The books of Kerala Feeds Ltd, Government of Kerala.

Figure 7. Average Prices of Major Raw Materials in the Production of Animal Feeds, India, Monthly, April 2019 to February 2022, in Rs Per Quintal.

world oil prices, fertiliser prices and feed prices.¹⁰ In 2020-21 and 2021-22, the prices of maize, rice polish, de-oiled coconut cake (DOCC), de-oiled cotton seed extraction (DOCSE) and de-oiled rapeseed extraction (DORSE) increased significantly. The rise in raw material costs, in turn, led to a significant increase in the MRPs of major animal feed products.

Secondly, supply chain disruptions affected the availability of feed. Media reports indicated that the deficit in the feed market was close to 30 per cent. Godrej Agrovet, one of the largest producers of animal feed in India, reported a fall in the volume of sale by 13.1 per cent in 2020-21 compared to 2019-20 i.e., from 1.3 million MT to 1.1 million MT (Godrej Agrovet, 2021). Higher prices and non-availability led farmers to feed lactating animals with less concentrate feed, and, consequently, milk productivity was expected to have fallen (see also NABARD, 2020).

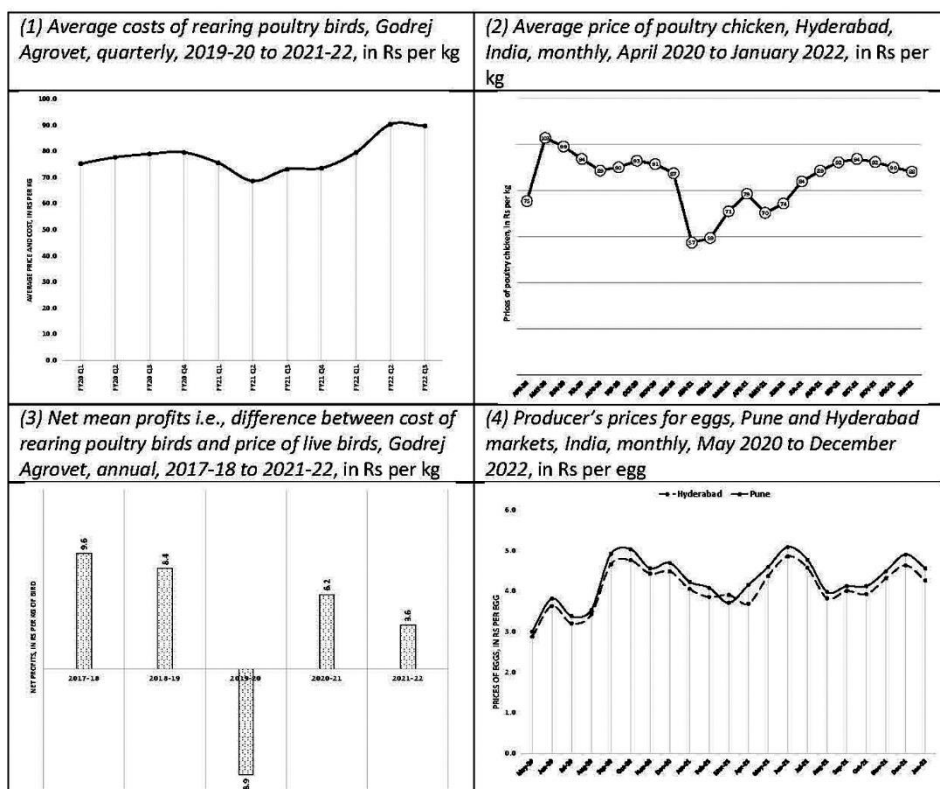
Poultry

There are three different economic agents in the poultry sector: small growers in homesteads, layer nursery owners and broiler farms. Sales in poultry are largely in the form of live birds or fresh meat or eggs; the processed/chilled sector remains underdeveloped in India. This became a major source of vulnerability during the lockdown.

Even prior to the lockdown, the poultry sector was in a state of crisis due to rumours that consuming chicken and eggs increased the chances of Coronavirus infection. Though the government and associations of producers tried to highlight the unscientific basis for these rumours, there was a fall in the domestic consumption. After the lockdown began, as sale channels were disrupted, broiler birds accumulated in the farms and growers were forced to continue feeding them with purchased feed. Faced with few avenues of sale, a rise in feed costs and the unavailability of feeds (see previous section), chicks and eggs, and losses, piled up. Growers culled millions of birds (see Ramakumar, 2020b). In mid-April 2020, the All-India Poultry Breeders Association had tentatively estimated the loss for the poultry industry at Rs 25,000 crore. Even in August 2020, demand was reported to have crawled back to only 70 per cent of the pre-Covid levels as many commercial establishments remained closed.

To assess the extent of impact in the sector in 2020 and 2021, I collected data on the (a) costs and prices in broiler chicken production from a representative medium-sized private hatchery in Hyderabad and Godrej Agrovet, which owns larger hatcheries; and (b) farmer's egg prices in the Hyderabad and Pune markets. The numbers are in Figure 8.

Let us consider poultry chicken. First, the average cost of rearing birds for Godrej Agrovet was Rs 68.60 per kg in the second quarter of 2020-21. From there, it steadily rose primarily owing to the sharp rise in animal feed costs that we discussed in the last sub-section. By the second and third quarters of 2021-22, it had risen close to Rs 90 per kg. Godrej Agrovet is a large firm that enjoyed the economies of scale; for



Sources: Private hatcheries in Hyderabad; Godrej Agrovet; poultry farms and egg traders in Hyderabad and Pune.

Figure 8. Average Estimates of Prices, Costs and Profits in Poultry Chicken and Eggs, 2020 to 2022, India, in Rs. per kg and Rs. per 100 Eggs.

smaller hatcheries, the per kg cost of rearing is likely to be higher. Secondly, the average output price of live birds accessed by the private hatchery in Hyderabad began to fall after April 2020 and plunged to Rs 57 per kg in January 2021.¹¹ Though prices began to recover afterwards, they never rose to above Rs 95 per kg mark. For six straight months in 2021, the prices remained lower than Rs 80 per kg. Thirdly, reflecting these changes in costs and prices, a company like Godrej Agrovet posted a fall of average profit from Rs 6.2 per kg in 2020-21 to Rs 3.6 per kg in the first three quarters of 2021-22.¹² On a quarterly basis, Godrej Agrovet posted an average loss of Rs 2.20 per kg in the third quarter of 2021-22. Medium-sized and smaller hatcheries are likely to have posted larger losses, which were confirmed in my interviews with hatcheries in Hyderabad.

In the case of egg too, farmer's prices fell to Rs. 2.88 per egg in Hyderabad and Rs. 3 per egg in Pune in May 2020 (Figure 8). Nevertheless, retail prices were close to Rs. 5 per egg suggesting huge trader margins in a historically oligopolistic market.

Egg prices at the farmer's level crossed the Rs. 4 per egg mark only by September 2020. After September, egg prices rose till December 2020, but fell again to less Rs 4 per egg by March 2021. Between March and December 2021, the average egg price for the farmers – along a strongly fluctuating trend – was only Rs. 4.20 per egg in Hyderabad and Rs. 4.50 per egg in Pune.

In summary, the poultry sector which was already in frequent loss-making stretches prior to the pandemic, saw a fall of profits during the two pandemic years.

Meat

The meat sector too was faced with unscientific rumours prior to March 2020. During the lockdown, sales fell even further as demand remained depressed. On the supply side, sufficient animals could not be transported from the sourcing States to large abattoirs in other States. Many abattoirs shut down. In Mumbai's Deonar abattoir, the largest in Western India, about 250 water buffaloes and about 3000 sheep and goats were slaughtered daily (see Ramakumar, 2020b). These animals arrived from Rajasthan and Gujarat as well as other districts of Maharashtra. Animal transportation was adversely affected by lockdown restrictions. Finally, this abattoir closed till 3 July 2020; even when it reopened, there were strict restrictions and conditions.¹³ As a result meat traders in Mumbai reported a fall in sales to the tune of 50 per cent at the height of the lockdown (Ganapatye, 2020).

(D) Agricultural Prices

The analysis of price trends during the pandemic is a tough exercise. Standard economic theory offers no useful guide to assess situations where demand and supply fall together into a state of "indeterminacy". Movements in prices, then, are a derivative of the rates of fall of demand and supply, and their intricate feedback relationships. With no reliable information about the short-term variations in demand and supply across fragmented markets, policy makers also struggled to make sense of inflationary expectations during the lockdown. Nevertheless, a few broad conclusions are possible from the available data.

In this paper, an attempt is made to undertake the analysis of price changes at two levels: *mandi*/market prices, and the consumer price indices (CPI). An analysis at these different levels allows us to arrive at tentative conclusions on how the price dynamics affected the producer on the one end, and the consumer on the other.

Prices in the Mandis and Large Markets

If we consider price changes at the *mandi*/market level, which is the closest indicator of the prices that farmers receive in the absence of farm harvest prices, a complex picture emerges.

1. In food grain crops like paddy, wheat, jowar, maize and barley, the tendency was for prices to fall after March 2020 with some seasonal and non-seasonal fluctuations. In general, prices for these crops after March 2020 ruled *below* the corresponding levels of 2019.
2. In pulse crops like gram, black gram, pigeon pea, lentil and peas (and to a lesser extent in green gram), prices rose after May-June 2020 with some seasonal and non-seasonal fluctuations. Here, the prices after May 2020 generally ruled *above* their corresponding levels in 2019.
3. In perishables like vegetables – potato, onion, tomato, cabbage, cauliflower and lady's finger, prices fluctuated considerably after March 2020. In potato and tomato, there was a tendency for prices after March 2020 to stay *above* the corresponding levels of 2019 (with some monthly exceptions). However, in onion, cabbage, cauliflower and lady's finger, the tendency was for prices to stay *below* the corresponding levels of 2019 (with some monthly exceptions).
4. In fruit crops like banana and mango, the broad tendency was for prices to fall after March 2020; even when the prices rose over some stretches, they remained *below* the corresponding levels of 2019.
5. In cotton, prices were falling when the pandemic hit; while prices were rising, they did not rule above the corresponding 2019 levels till March 2021 after which they ruled *above* the 2019 levels.
6. In soyabean, prices were stable till end-2020, after which prices rose to levels *above* the corresponding 2019 levels till December 2021. But in groundnut, prices fell in 2020 to levels *below* the corresponding 2019 levels but rose in 2021 to levels close to the corresponding 2019 levels.

These results are broadly in alignment with the results from household surveys in 2020-21. Modak *et al.* (2020) and Modak and Bhattacharya (2021) reported that the farm gate prices of wheat, maize, banana, tomato, potato and other vegetables fell sharply in 2020 compared to 2019.

Thus, farmers cultivating food grains, vegetables and fruits did not benefit from higher prices during the pandemic even as wide fluctuations in perishable prices may have provided them windfall gains over short periods. Exceptions were tomato and potato. Farmers cultivating pulses, cotton and soyabean largely benefited from higher prices while farmers cultivating groundnut did not benefit from higher prices. An important caveat is in order here: a rise in *mandi*/market prices would not necessarily be a gain for the farmer if the total market arrivals fell. Market arrivals did fall, as we discussed, and this is likely to have erased any potential for an increase in farmer's incomes.

Consumer Prices

The analysis of trends in consumer price indices (CPI) must be organised more carefully. Two sets of factors can influence these price movements in CPI: demand

for food and/or the extent of supply chain disruptions. It is statistically difficult to separate out the contributions of each from the broader price trends, but the macro-analyses in RBI (2021a) and Government of India (2022) are a useful starting point.

CPI-based food inflation rose from March 2020 till October 2020. It then fell till February 2021 and then remained low and stable within a comfortable band till December 2021. If retail food inflation was 9.1 per cent in April-December 2020, it fell to 2.9 per cent in April-December 2021 (Government of India, 2022).

In 2020-21, a sharp rise in the prices of vegetables and animal products played a major role in keeping food inflation rates high. The retail inflation for animal products occurred even as producer prices, as in milk, eggs, chicken and meat, were under considerable stress (see previous section). Inflation rates in pulses, oils and fats and spices were also in double-digits in 2020-21. The reasons for the high food inflation were supply disruptions, panic purchases and excess-stocking by households, non-availability of labour in the *mandis*, difficulties in transportation, and excess rains leading to crop damages in vegetables (RBI, 2021a). The only commodity group within food where inflation fell in 2020-21 was cereals.

For 2021-22, the fall in food inflation is attributed by Government of India (2022) to a satisfactory supply situation, except in the case of oilseeds where retail inflation remained high owing to rising international prices. What this argument does not reveal is that lower year-on-year inflation rates in 2021-22 were primarily attributable to the higher base levels of 2020-21. In other words, while a better supply situation could have contributed to lower inflation rate, there is no evidence to argue that supply chain disruptions and production shortfalls disappeared in 2021-22. In fact, according to RBI (2021b), consumer prices kept moving up in 2021 given the supply-side restrictions reimposed during the second wave, rising transportation costs due to rise in fuel prices, rising animal feed costs and lower imports. A certain trend in 2021-22 was a creeping rise in the consumer prices of vegetables, cereals, fruits and animal products. Higher consumer prices for food were also a major theme in the assembly elections of 2022 in Uttar Pradesh, Uttarakhand, Punjab, Manipur, and Goa. According to a pre-poll survey, 33 per cent of the voters believed that rising prices of commodities was the “biggest issue” in the elections.¹⁴

Summary

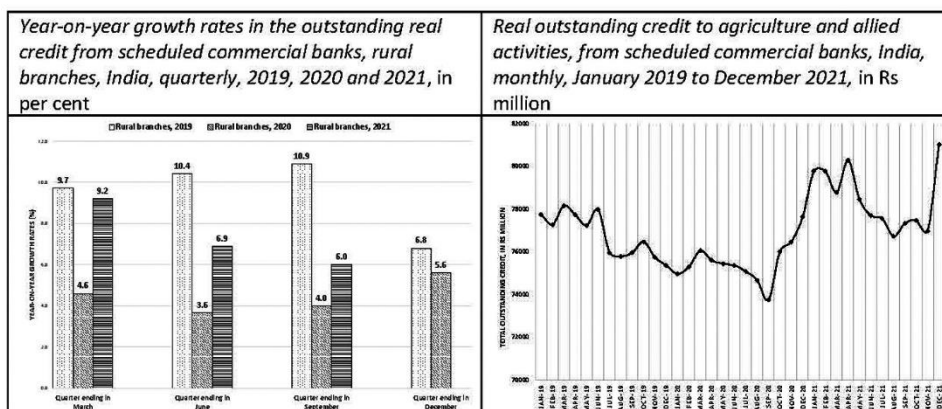
Higher level of inflation, as is well-known, does not necessarily translate to higher farm-gate prices. A careful comparative analysis of prices at the *mandi*/market level and at the consumer level shows that, with exceptions like pulses, potato, tomato, cotton and soyabean, the average prices received by farmers and producers may have fallen while their consumer prices rose. It is clear who the losers were; but more research is needed on who benefited from this phenomenon.

(E) *Agricultural Credit*

We now come to the issue of financing the working capital in agriculture. The growth of agricultural credit was on a decline even prior to the pandemic (Chavan and Ramakumar, 2022). Year-on-year, *real* outstanding agricultural credit – on a CPI deflator – recorded negative growth rates over two years between 2015-16 and 2019-20. For instance, in 2019-20, real outstanding agricultural credit had fallen by 1.2 per cent over 2018-19.

Overall agricultural credit outstanding, on an annual basis, was 3.9 per cent higher in 2020-21 than in 2019-20. However, this was unimpressive given the low base i.e., the negative growth rate in 2019-20. Further, most of the rise in real credit outstanding in 2020-21 was achieved towards the end of the financial year and not during the crop seasons.

To begin with, total *real* credit outstanding from the rural branches of commercial banks recorded a fall in year-on-year growth rates at the end of all the four quarters of 2020-21 (see the first graph in Figure 9). The reason, clearly, was a precipitous absolute fall in the *real* outstanding credit to agriculture and allied activities between March 2020 and September 2020 i.e., the period corresponding to the *kharif* season of 2020-21 (see the second graph in Figure 9). Real credit outstanding picked up only after September 2020. If we consider the first three quarters of April-December 2020, the total *real* agricultural credit outstanding was lower than the total *real* agricultural credit outstanding in April-December 2019.



Source: Reserve Bank of India.

Figure 9. Indicators of Growth in Outstanding Rural and Agricultural Credit, India.

In other words, banks do not appear to have adequately responded to the needs of the agricultural sector in 2020-21 despite the growth of area cultivated, higher number of working cultivators and the rise in cultivation costs. Household surveys reflected a similar situation. According to World Bank (2021), after controlling for effects, every 1 per cent rise in rural household borrowing was associated with a 0.05

per cent rise in acreage and 0.12 per cent rise in fertiliser expenditure. Yet, their survey reported a 11 per cent fall in the household borrowings in September 2020 compared to the *kharif* season of 2019. Modak and Bhattacharya (2021) noted that faced with higher cultivation costs, farmers were forced to borrow from input dealers, moneylenders, and local traders at interest rates of 3 to 6 per cent per month. Niyati and Vijayamba (2021) noted that of their 164 survey respondents in September 2020, 58 respondents availed loans but 80 per cent of them borrowed from the informal sector. In many instances, farmers were denied formal sector KCC loans due to pending dues. Both World Bank (2021) and Modak and Bhattacharya (2021) reported that the fall of borrowing in 2020 was more marked for smaller landowning households than larger landowning households.

In 2021-22, the rural and agricultural credit grew at a faster rate. As Figure 9 shows, outstanding real credit flow from rural bank branches grew faster in 2021-22 over 2020-21, but the quarterly growth rates remained lower than in 2019-20. Real outstanding agricultural credit from banks fell, again, between April 2021 and November 2021 i.e., the *kharif* season of 2021-22, though its average levels were higher than in 2019-20 and 2020-21.

(F) Rural Employment

The livelihoods of the agricultural workforce in rural areas, which includes both cultivators and wage labourers, are not just dependent on the viability of cultivation but also on the larger employment potential in the rural economy – from the agricultural and the non-agricultural sectors. The onset of the lockdown set in motion a complex set of movements of the labour force in the rural areas. Urban and semi-urban workers returned to the villages; seasonal migrant workers arrived in lesser numbers; more workers and work-seekers turned to farming; there were job-losses in the rural non-agricultural sectors; and the government, in response, expanded the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS).

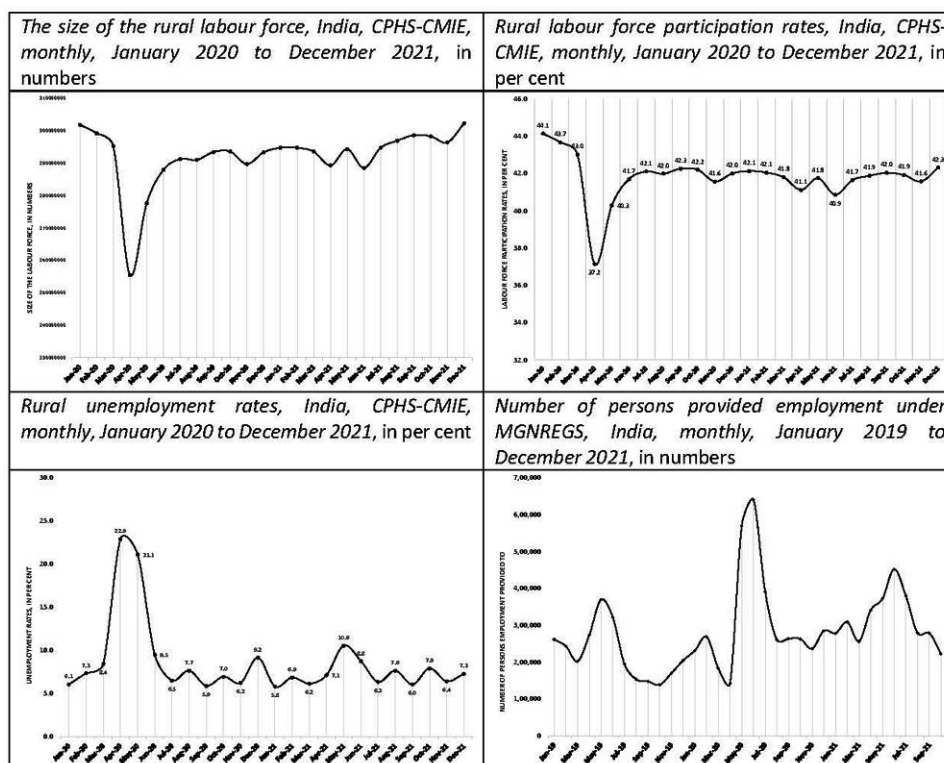
The sum-total of these changes is difficult to judge in the absence of official data. Yet, some broad conclusions can be arrived at from private surveys and independent research.

First, as per the CPHS-CMIE, the total size of the rural labour force in India was close to 30.2 crore in January 2020 (see Figure 10). By April 2020, this fell to 25.5 crore. After April 2020, the size of the labour force increased gradually, but did not regain the levels of January 2020 till December 2021. Secondly, the rural labour force participation rate (LFPR) was 44.1 per cent in January 2020 (Figure 10). LFPR fell to 37.2 per cent in April 2020 and then gradually rose thereafter. However, even in December 2021, the LFPR stood at 42.3 per cent. In no month or quarter after January 2020 did the rural LFPR show any discernible sign of recovery. Thirdly, the rural unemployment rates, which had risen from 6.1 per cent in January 2020 to 22.9 per cent in April 2020 and 21.1 per cent in May 2020, continued to stay at higher

levels right up to December 2021; in December 2021, the unemployment rate was 7.3 per cent.

In summary, the status of rural employment remained precarious through the months of 2020 and 2021. High unemployment rates were a persistent feature of the rural labour markets during the lockdown.

It is in this context that the Union government announced an expansion of the MGNREGS. The number of persons provided employment under MGNREGS in April 2020 was lower than in March 2020, but rose in May, June and July 2020; the rise was from 1.1 crore persons in April 2020 to 3.3 crore persons in May, 3.8 crore persons in June and 2.7 crore persons in June (see Figure 10). On an average, the number of persons provided employment remained higher in 2020 compared to 2019; the total expenditure on MGNREGS increased from Rs. 71,686 crore in 2019-20 to Rs. 111,170 in 2020-21. Yet, the fact that rural unemployment remained high showed the insufficiency of the expansion of MGNREGS. The trend continued into 2021, but with important caveats: one, the total expenditure on MGNREGS fell from Rs.111,170 crore in 2020-21 to Rs. 98,000 crore in 2021-22; and two, lesser number of persons were provided employment in the summer months of 2021 than in 2020.



Source: CPHS-CMIE; Ministry of Rural Development, Government of India.

Figure 10. Selected Indicators of Rural Employment, India.

The failure of the government to substantially expand MGNREGS appears to be one reason why rural unemployment remained unrelentingly acute in 2020 and 2021. Disaggregated annual data reveal another critical weakness. If we consider the number of *additional* days of employment created in 2020-21 over 2019-20, about 45 per cent of households received only less than 50 days of work (see Table 5). In other words, considering the total number of households provided employment masks the inadequacy of employment days created per household during the lockdown months.

TABLE 5. DISTRIBUTION OF HOUSEHOLDS IN WHICH PERSONS WERE EMPLOYED BY NUMBER OF ADDITIONAL DAYS OF EMPLOYMENT, MGNREGS, 2020-21

Number of days of work (1)	Number of households (2)	Share of households (per cent) (3)
1-14 days	23,88,000	11.7
15-30 days	34,33,100	16.9
31-40 days	15,61,500	7.7
41-50 days	17,72,000	8.7
51-60 days	16,48,600	8.1
61-70 days	14,47,000	7.1
71-80 days	14,49,400	7.1
81-99 days	38,50,900	18.9
100 days	27,11,700	13.3
101-150 days	43,200	0.2
More than 150 days	61,400	0.3
Total	2,03,66,800	100.0

Source: Ministry of Rural Development, Government of India.

(G) Rural Incomes and Consumption

In the broader background of rise in production costs, supply chain disruptions, lower prices, and high levels of unemployment, rural incomes faced extraordinary stress through the pandemic months. Lower rural incomes have a strong feedback relationship with different macroeconomic indicators; for instance, lower output prices can lead to lower rural incomes, but then lower rural incomes – given that most farmers are net buyers of food – can further compress output prices by lowering demand elsewhere.

There is no robust database on agricultural or rural incomes during the pandemic. Rural incomes typically flow from agricultural production, wage employment in agriculture and non-agriculture, self-employment in non-agriculture, remittances and direct cash transfers of the government. In this paper, we discussed multiple pathways through which incomes were depressed in agricultural production, wage employment, self-employment, and remittances. Additional direct cash transfer from the government was nominal.

Almost every household survey during the pandemic showed an absolute fall of incomes in 2020-21. The World Bank's three rounds of surveys in 2020 showed that the median respondent in the rural areas lost 57 per cent of their weekly earnings between March and May 2020 (World Bank, 2021). About 19 per cent and 12 per

cent of the respondents were not working for an income, respectively, in May and September 2020. In March, May and June 2020, 18 per cent, 71 per cent and 40 per cent of the non-agricultural households, respectively, reported zero income. Surveys in April-May 2020 showed that 66 per cent of the rural casual workers had lost employment (APU, 2020). About 35 per cent of the rural households reported not having enough money to buy even a week's essentials; about 65 per cent reported not having enough money to pay the next month's rent.

Surveys also showed a sharp deterioration of household food security during the pandemic. Modak *et al.* (2020) and Niyati and Vijayamba (2021) reported a fall in household food consumption as well as a decline in the diversity of food consumed. World Bank (2021) reported that the share of rural households with at least one sign of food insecurity was 47 per cent in May 2020 and 15 per cent in September 2020. The share of households that reported reduced meal sizes was 25.9 per cent in May 2020, 13.5 per cent in July 2020 and 13.4 per cent in September 2020. Similar results were reported from Haryana and Odisha by Ceballos *et al.* (2020), Lahoti *et al.* (2020) for a national sample and Gupta *et al.* (2021) using panel data from Uttar Pradesh, Bihar and Odisha.

Yet, as discussed in Section 2, macroeconomic indicators for 2020-21 and 2021-22 lead us a different conclusion. This discrepancy across primary surveys and the macroeconomic data needs to be explained beyond the arguments of methodological insufficiencies in the latter. A careful perusal leads us to the following conclusion. For purposes of illustration, I consider two variables as proxies for rural income. First, an average growth rate for "rural consumption", computed by the research wing of the Motilal Oswal group, as a proxy for rural incomes (Motilal Oswal, 2021a, b); rural consumption here is defined as an aggregate of 11 rural economy indicators.¹⁵ Secondly, the value and volume of rural demand for FMCG goods estimated through market surveys by NielsenIQ.

First, when the pandemic arrived in 2020, rural consumption was already slowing down. The year-on-year growth rates in the value of rural consumption were 7.4 per cent in 2017-18, 4.6 per cent in 2018-19 and 3.1 per cent in 2019-20. Similarly, the year-on-year growth of value of demand for FMCG goods had fallen from 16.2 per cent in 2018 to 8.8 per cent in 2019.

Secondly, on the one hand, there were significant disruptions in production and supply chains, price crashes, slowdown in credit flow, and rise of unemployment in the initial months of the lockdown. On the other hand, there was a rise in *rabi* procurement, good monsoon, rise in *kharif* acreage, a favourable turn of the sectoral deflator in agriculture and a rise of government spending in rural areas. Thus, aided significantly by a lower base effect, rural consumption in 2020-21 managed to avoid a negative growth rate; its year-on-year growth rate in 2020-21 was just 2 per cent.

This stress in rural incomes in 2020-21 is also discernible from the quarterly growth rates of the *value* of FMCG goods demanded.¹⁶ Here, the year-on-year growth rates fell to 2.9 per cent in the 4th quarter of 2019-20, -13 per cent in the 1st quarter

of 2020-21 and 10.6 per cent in the 2nd quarter of 2020-21. There was a revival of these growth rates to 14.2 per cent in the third quarter and 14.6 per cent in the 4th quarter of 2020-21. But these were unimpressive rates of growth, given the low bases in the year-on-year comparison – in the 2nd and 3rd quarters of 2019-20, the corresponding growth rates were just 5.3 per cent and 5.2 per cent.

The state of rural consumption and rural demand appear to have moved from *stress* to *distress* in 2021-22. The second wave of infections spread widely into rural India, there were excess rainfalls leading to crop losses, the sectoral deflator in agriculture turned unfavourable due to a sharp rise in farm input prices, the growth of rural non-agricultural wages fell and government spending in the rural areas declined from the previous year. Consequently, rural consumption grew at just 1.6 per cent in the first six months of 2021-22 compared to the first six months of 2020-21. In fact, in the 2nd quarter of 2021-22, rural consumption grew year-on-year at -2.4 per cent.

The fall of rural consumption is corroborated by the growth rates in the *value* of rural demand. Though rural demand grew at 33.7 per cent in the 1st quarter of 2021-22 (thanks to a -13 per cent growth in the 1st quarter of 2020-21), it grew only by 9.4 per cent in the 2nd quarter of 2021-22. NielsenIQ's data further show that the corresponding growth rate of *volume* of demand for FMCG goods was even worse: the growth rate was -2.9 per cent in the 2nd quarter of 2021-22.

In other words, the growth rates of rural income and consumption were severely constrained in 2021-22; all the ameliorating features of 2020-21, if any and however limited they might have been, disappeared in 2021-22. Such a macroeconomic narrative is broadly consistent, though with caveats, with the results that have emerged from primary surveys in the rural areas during the pandemic.

V

CONCLUSIONS

This paper was an attempt to empirically analyse the trends in Indian agriculture, from the point of view of farmer's welfare, during the Covid-19 pandemic. The dominant narrative has been that agriculture was a "silver lining" or a "bright spot", which not just evaded negative growth rates in 2020-21 and 2021-22 but grew rapidly. Such a narrative, however, sat uncomfortably with multiple reports and surveys from the field, which documented continuing distress in the countryside.

Agriculture indeed grew at more than 3 per cent per annum in 2020-21 and 2021-22. The argument in this paper was that these high growth rates do not adequately reflect the downward drifts in the economics of agriculture during the pandemic. Procurement, exports and public spending in the rural areas increased, the sectoral deflator in agriculture turned favourable, and there was a good monsoon. Evidence indicates that these were hardly adequate to ameliorate the adversities imposed by a rise in costs of cultivation, supply chain disruptions, crash of prices, fall in bank credit, fall in remittances and shortage of seasonal migrant workers. Painted into a

corner, rural households faced the fall of incomes by resorting to *absorptive* and *adaptive* livelihood adjustments: they raised acreage, intensified family labour, and reduced food consumption.

The bad appears to have become worse in 2021-22 with an extraordinarily sharp rise in fertiliser prices, animal feed prices and a fall of public spending in the rural areas. Sectoral deflator in agriculture turned adverse and posted one of its worst performances in the previous 25 years. Most data for 2021-22 are not yet available, and the jury might still be out on a definitive statement, but available data do indicate deterioration in the economics of agriculture in 2021-22.

NOTES

- 1) See <https://bit.ly/3Hm86fa>
- 2) Within the allied sectors, fisheries are not covered in this paper.
- 3) See <https://bit.ly/33U5Ttz>.
- 4) See <https://bit.ly/3JWpKYC>.
- 5) See <https://bit.ly/3JOeSfg>.
- 6) See <https://bit.ly/3MeSmye>.
- 7) I am thankful to Tushar Kamble for assisting me in this effort.
- 8) The prices for all the unions are for cow milk, but for the Bangalore union is for mixed milk.
- 9) See <https://bit.ly/3snYqNI>.
- 10) See <https://bit.ly/33S4qE3>
- 11) These were the cumulative prices faced by the hatchery in each financial year. The sharp dip of prices around January 2021 was also owing to the bird flu scare from the end of 2020
- 12) Profits were negative in 2019-20 due to a prolonged bird flu scare.
- 13) See <https://bit.ly/36RaFcy>
- 14) See <https://bit.ly/3soAKIo>.
- 15) These indicators are: 1) real agricultural wages; 2) real non-agricultural wages; 3) farmer's terms of trade; 4) agricultural exports; 5) fertiliser sales; 6) agricultural credit; 7) IIP for food products; 8) reservoir levels; 9) rural sale of two-wheelers; 10) rural sale of tractors; and 11) fiscal rural spending.
- 16) These are growth rates of nominal values of demand, which are likely to be lower if we use real values of demand.

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