

Agri-food Sector and Food Security Amid Covid-19: Impact and Issues

Mamta Rani and Rupinder Kaur

Department of Economics, Punjabi University, Patiala-147002

Abstract

Agriculture is increasingly being viewed as a business opportunity rather than merely a source of survival. Food, feed, and fodder are all provided by the agri-food sector. The Covid-19 Pandemic has been a disastrous catastrophe that threatens both lives and livelihoods all around the world. It aggravates global food systems and threatens food and nutrition security. The present paper intends to examine the impact of Covid-19 on the agri-food sector and food security. It also pinpoints the issues in the post-Covid-19 and policy implications related to the agriculture sector and food security. The paper is based on secondary data, taken from various reports, research papers, journal articles, and websites. The study demonstrates that food insecurity occurred as a result of mobility restriction, disruption in food production, availability, and distribution amid Covid-19. The present paper offers policymakers a comprehensive perspective on policy development in the food security and agri-food sectors.

Keywords: Agribusiness, Agri-food Sector, Food Security, Food Systems, Supply chain.

JEL Classification: I38, H53, E61

Introduction

Agriculture is essential for any country's survival. Micro, small and medium businesses as well as huge companies, are supported by the agricultural food system. Agriculture and related industries are critical to India's economy, as they employ the vast majority of the country's workforce. Many other sectors that use agricultural raw materials are linked to these businesses and industries. There are encouraging indicators of revolution in agriculture and related activities in India. Acceptance of management practices at the farm level and in agricultural businesses has resulted in visible progress. The contribution of agribusiness to India's national income is growing. Agricultural and food industries have a greater impact on improving food security (Pawlak and Kolodziejczak, 2020). Food security is mainly determined by three factors, i.e., availability of food, accessibility to food for all people, and the capacity of people to afford nutritious food.

The physical, economic, and societal repercussions of Covid-19 had affected people all around the world. Many governments had responded by implementing strict lockdown in their country to prevent the virus from spreading further. Some countries enforced export restrictions which impacted trade patterns for staple foods. The pandemic has triggered

an economic crisis which represents a major threat to food security in almost all countries. Many poor individuals have been pushed deeper into poverty as a result of economic and environmental shocks caused by the pandemic.

The agriculture sector was also hit hard by the pandemic. Some agricultural activities and supply chains were hampered during Covid-19, including input distribution, transportation, and processing of farm products. Food availability and access were limited due to disruptions in food supply chains (Delgado and Zhou, 2020). The supply of agricultural products on the market has decreased as a result of the lockdown in response to the Covid-19 Pandemic. The supply of perishable goods such as milk, eggs, and fruits was particularly affected due to restrictions. According to the dairy producers of the United States, farmers spilled about four million gallons of milk every day in the country (Mulvey *et al.*, 2020). The poultry breeders have been seriously impacted as a result of misinformation that chickens possess Covid-19 (Dev, 2020). Many countries encountered difficulties in procuring the agricultural inputs required to maintain agricultural production and food security. Public food services were also severely disrupted during the pandemic such as mid-day meals being suspended due to the closure of schools and anganwadis in the country (Dreze and Somanchi, 2021).

Although, various types of programs have been initiated

by the governments to strengthen agri-food systems and achieve food security and nutrition goals. However, global hunger increased by 10 million in 2019 as compared to 2018, and by around 60 million in the previous 5 years. As reported by the current edition of the State of Food Security and Nutrition in the World, about 690 million human beings globally went hungry in 2019 (FAO, 2020a). The Covid-19 crisis has exacerbated the problems that a large number of people already experience in obtaining affordable and nutritious food articles. According to the annual report of the United Nations, if sustainability issues are taken into account, a global shift to healthy foods will assist to halt the resurgence of hunger while saving enormous amounts of money (FAO, 2020a). The pandemic has highlighted the critical need to reform the world's food systems. The present study makes an effort to study the impact of Covid-19 on the agri-food sector and food security in India, to identify the issues in the post-Covid-19 era, and make policy recommendations for recovery from the crisis.

Data Sources and Methodology

The study is based on secondary data. The data were taken from various government reports, research papers, journal articles, and websites of the Food and Agriculture Organisation. Data of all India's year-on-year inflation rates for the agri-food sector for November 2021 is taken from the website of the Ministry of Statistics and Programme Implementation.

Results and Discussion

Impact of Covid-19 on the Agri-food Sector and Food Security in India

Agriculture is extremely important in India because of worries about food security, employment, and the supply of wage products. Despite gaining food self-sufficiency in terms of production, India still has a quarter of the world's hungry people and over 190 million undernourished people (FAO, 2021). The Covid-19 pandemic exposed the flaws in India's agri-food sector. It had an impact on agriculture in mainly two key areas, i.e., food supply and food demand (Cullen, 2020). Many essential components of the food system value chain were jeopardized as a result of these two factors.

Impact on Food Availability

Production was harmed as a result of labor mobility restrictions, and because of fast-changing regulations putting pressure on supply chains. The pandemic had also impacted other agricultural activities like crop harvesting, livestock, and fisheries. Hotels, restaurants, and confectionary shops were closed due to lockdown in many countries. The supply of milk and dairy products had been badly impacted. Dairy producers are being compelled to dump milk and milk products after a significant drop in their demand and the closure of the milk production sector. The timely delivery and

use of agricultural inputs had been impeded by transportation delays. Due to the restrictions of the pandemic, food arrivals in wholesale marketplaces plummeted while wholesale prices of the goods increased in the country. Figure 1 depicts the influence of pandemic lockdown on food arrivals in wholesale markets and wholesale prices in India. The data shows that food arrivals in wholesale marketplaces plummeted by 64 percent on average while wholesale prices increased by around 10 percent as a result of the shutdown in the country.

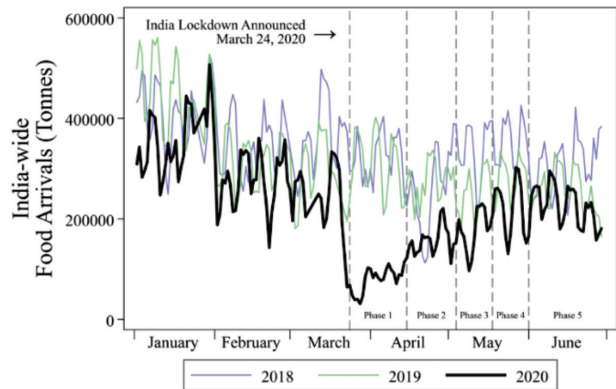


Fig. 1. Wholesale volumes plummet during the lockdown in India

Source: Lowe et al. (2021). India's food supply chain during the pandemic

Notes: The y-axis variable is a seven-day moving average of aggregate tonnes of food arrivals to the 1804 mandis that reported arrivals in tonnes to Agmarknet at least once in March 2020. The data covers January 1 to June 30, 2018, to 2020. The initial data point is January 7, as the variable is a seven-day moving average.

Impact on Food Prices

Since the beginning of the nationwide lockdown in the country, both retail and wholesale prices have increased (Saha, 2021). Food prices have risen substantially when transportation services halted and new supplies have become scarce in India, Table-1 depicts the All-India year-on-year inflation rates of the agri-food sector for November 2021. It shows that fruits have a combined inflation rate of 6.03 percent, while meat and fish have a rate of 5.55 percent. Oil and fats have the highest combined inflation rate of 29.67 percent whereas vegetables have the lowest inflation rate of -13.62 percent.

Impact on Food Distribution

Food distribution systems had been severely interrupted in almost all countries. The development of online grocery deliveries is one aspect of food distribution that is changing dramatically due to the Covid crisis. The grocery industry had been sluggish to adopt online grocery delivery before the outbreak of the pandemic. Online grocery deliveries may be especially beneficial for the elderly and other vulnerable individuals. Customers can also place an online order for

Table 1. All India's year-on-year inflation rates of agri-food sector for November 2021

Food items	Rural			Urban			Combined		
	Nov. 20 Index (final)	Nov. 21 Index (Prov.)	Inflation Rate (%)	Nov. 20 Index (final)	Nov. 21 Index (Prov.)	Inflation Rate (%)	Nov. 20 Index (final)	Nov. 21 Index (Prov.)	Inflation Rate (%)
Cereals & products	144.6	146.9	1.59	149.0	151.0	1.34	146.0	148.2	1.51
Meat & Fish	188.5	199.8	5.99	195.7	204.9	4.70	191.0	201.6	5.55
Egg	173.4	171.5	-1.10	178.3	175.4	-1.63	175.3	173.0	-1.31
Milk & Products	154.0	159.1	3.31	154.2	159.6	3.50	154.1	159.3	3.37
Oil & Fats	150.0	198.4	32.27	140.7	175.8	24.95	146.6	190.1	29.67
Fruits	145.9	153.2	5.00	149.7	160.4	7.15	147.7	156.6	6.03
Vegetables	225.2	183.7	-18.43	240.9	229.2	-4.86	230.5	199.1	-13.62
Pulses & Products	159.5	165.4	3.70	161.5	165.1	2.23	160.2	165.3	3.18
Sugar & Confectionery	114.4	122.1	6.73	117.1	123.1	5.12	115.3	122.4	6.16
Spices	163.5	170.8	4.46	161.9	167.3	3.34	163.0	169.6	4.05

Source: Ministry of Statistics & Programme Implementation, <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1780967>

pickup at the retail location using click and collect services. During the Covid crisis, online food delivery businesses such as Zomato, Swiggy, and Uber Eats have also surged in popularity

Supply Chain Disruption

The pandemic had a major impact on the economy's supply chain. The five phases of the food supply chain include agricultural production, postharvest management, processing, distribution, and consumption (Hamid and Mir, 2021). Since the start of Covid-19, restrictions on the movement of products and labour mobility had been imposed by governments all over the world. These circumstances caused delays in the delivery of grain and agricultural supplies, as well as challenges in maintaining the supply of food to market. The coexistent demand and supply shocks had rolled food markets, revealing supply chain susceptibility. There had been instances of food being discarded due to a lack of demand or difficulty in delivering these food items to the marketplaces (Yaffe-Bellany and Corkery, 2020). Due to the restricted transport services, food products were unavailable to a huge segment of the population. The supply chain for vital agricultural inputs had been disrupted resulting in a price hike owing to a shortage in supply.

Migration of Labour

The pandemic had a negative impact on labourers' income and livelihood. Harvesting activities had been hampered due to a lack in the availability of migrant laborers. This hampered a record wheat harvest in northern India. Migration of workers throughout the rabi harvest and kharif preparation

was a huge difficulty for the food and agribusiness sectors in March-April 2020 (Kharbikar *et al.*, 2020). Many migrant labourers also worked in manufacturing and service industries that use agricultural raw resources. Covid-19 has highlighted the vulnerability of migrant labourers livelihoods, posing a threat to their food security and well-being. Changes in the industrial sector have an impact on the wages of labourers, lowering overall demand and harming the economy.

Labour Scarcity

The agriculture sector had struggled to manage the tremendous burden during the pandemic due to the shortage of sufficient labour. Manpower shortage had wreaked havoc on several labour-intensive industries like cattle rearing, horticulture, harvesting, and agricultural processing. Covid-19 has had a particularly negative impact on labour-intensive food production industries. It also caused disruptions in transportation and distribution networks and harmed agricultural infrastructure in India.

Issues in the Post Covid-19 Era

Economic Recession

With the imposition of a lockdown order in March 2020, all economic activities came to a halt. The abrupt stop of all activities made difficulties in every sector of the economy. The commercial and economic activity came to a complete curb when all manufacturing and trading establishments were shut down. GDP and Government income were bound to collapse in such a situation. India's GDP dropped to its lowest point in the first quarter of 2021. In absolute terms, GDP in the first quarter of 2020-21 was Rs. 32.38 lakh crore

(constant prices), which was 9.2 percent lower than GDP in the first quarter of 2019-20 (The Indian Express, 2021). Both short-term and long-term policies are required to combat economic recession.

Poverty and Hunger

More people have become destitute and food insecure as Covid-19 and its economic ramifications expand to the world’s poorest regions. During the pandemic, over 500 million individuals around the world were unable to obtain enough and sufficient food during the pandemic with at least 155 million people experiencing extreme food insecurity (Luiselli, 2020). According to estimates, the pandemic will likely raise the number of people living in poverty by around 150 million people globally, or 20% of present poverty levels (Laborde *et al.*, 2020). Another estimate demonstrated that over half a billion people may be plunged into poverty as a result of the Covid-19 pandemic’s economic impact (Mardones *et al.*, 2020). Working poverty is more common among agriculture labourers. A quarter of agricultural workers are living in extreme poverty (ILO, 2020). The capacity of many people to get food was harmed as a result of the crisis and they were unable to purchase a healthy diet (FAO, 2020b). India’s poverty rate could double or treble as a result of the economic turbulence of the pandemic. According to a study conducted in India, an additional 150-199 million people will fall into poverty in the post-Covid-19 period, most of whom will be from rural regions due to the country’s fragile rural economy (Ram and Yadav, 2021). In 2020, poverty drove a large number of people to commit suicide, which is also a big issue to address.

Inflationary Pressures

Inflationary pressures are a source of concern in the post-Covid-19 era. Higher food prices due to pandemics have led to a wider spike in inflation. The food and Agricultural Organization (FAO) has cautioned that rising costs are putting poorer people in danger in nations that rely on imports (Reuters, 2022). Policies for recognizing the effects and repercussions of wholesale price changes and the relative

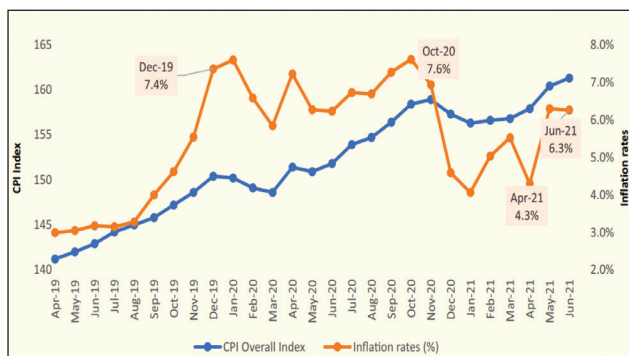


Fig. 2. CPI: Index and Inflation rates (%) from April 2019 to June 2021 in India
 Source: Saini *et al.* (2021). India’s food inflation Imbroglia.

worth of agricultural outputs on our agricultural management decisions should be developed (Stephens *et al.*, 2020). Figure 2 shows that the consumer price index (CPI) has increased from December 2019 to October 2020 in India. CPI has risen steadily since February 2021, reaching a high of 6.3% in June 2021 in the country. Thus, policymakers must also deal with the issue of inflation.

Inequality

The pandemic-induced global economic slump has exacerbated the existing societal imbalance in most countries (Ashford *et al.*, 2020). Inequality is widening both across and within countries, Minorities have been hurt worse by the economic recession due to the pandemic (Goldin and Muggah, 2020). Over the last three decades, income and wealth inequality has increased in virtually all major advanced economies. Figure 4 shows pre-tax national income shares for the world’s 10 largest economies, including seven advanced economies and three emerging economies. It shows that inequality has increased at a rapid rate in the United States. The rise in inequality has been most noticeable at the top of the income scale. Inequality has risen sharply in India during the last decade. Income and wealth inequality will continue to be major challenges in the post-Covid-19 era. Understanding the impact and repercussions of current economic inequality, as well as the relative resilience of agricultural systems that rely on agricultural income and stability, should be a top priority in policymaking.

Unemployment

Unemployment is another major concern for policymakers. Millions of people were laid off as a result of the national lockdown in the country. People’s purchasing power was eroded due to a considerable drop in incomes in specific sectors. Enormous job losses during the pandemic

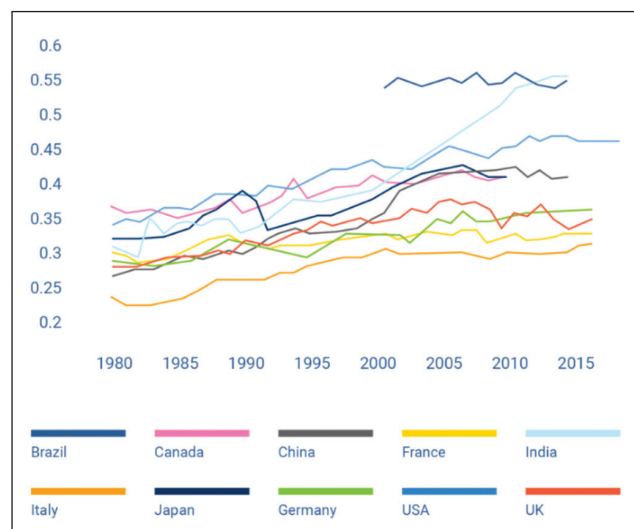


Fig. 3. Share of Richest 10% in National Income
 Source: Qureshi, (2020). Tackling the inequality pandemic: is there a cure?

resulted in increased hunger while also compromising the food system's survival (Clapp and Moseley, 2020). According to a report published by Pew Research Centre in Washington D.C. on March 18, 2021, 75 million people fell into poverty as a result of the pandemic, while 320 lakh people lost their middle-income status. India is the worst-hit country, with more than 60 percent of those who are severely affected being Indians. Figure 3 depicts the percentage of unemployment rate in India from 2019 to 2020. The figure shows that India's unemployment rate has increased considerably in April 2020, reaching 23.5 percent.

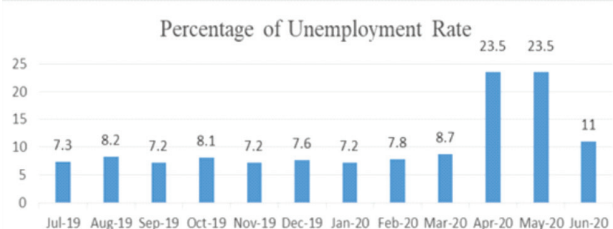


Fig. 4. Unemployment Rate in India from 2019 to 2020
 Source: Akriti et al. (2021). Covid-19 and its impact on livelihood: an Indian perspective.

Human Nutrition and Health

Covid 19 pandemic had a significant impact on the dietary situation of the poorest and most vulnerable segments of society which would be considered a major issue. Food insecurity and related nutrition deficits have been increased by disruptions in agriculture operations during the pandemic. People's eating habits shifted toward more processed meals and fewer fruits and vegetables also resulting in poor nutrition (CFS, 2020). Poor quality diets have been related to both physical and mental illness. However, to mitigate the impact of Covid-19 on food and nutrition security, a recommended approach for maintaining adequate nutrition from individual to global levels was been developed (Naja and Hamadeh, 2020). More research is needed to fully comprehend Covid-19's immediate and long-term effects on food intakes related to human health and nutrition.

Conclusion and Policy Implications

The Covid-19 outbreak has devolved into a complicated food crisis. It put unforeseen strains on food security and spawned several new issues. The food supply chain had interrupted, prices of some specific items have increased, earnings have collapsed and thus food insecurity has increased due to the pandemic. Higher food costs, combined with economic inequality, may significantly influence food availability and access for impoverished households in the future. The experts advocated for the transformation of food systems to establish a more comprehensive and sustainable society beyond the pandemic.

A debate has erupted on the best policy approaches to the food crisis created by the Covid-19 outbreak. Many observers have identified flaws in the current food system

and advocate for significant reforms whereas some observers consider the world's food chain to be highly resilient and do not believe in the requirement of major policy reforms (Clapp and Moseley, 2020). However, the pandemic has brought attention to the need for the transition of food systems. It also highlighted that those persons who are malnourished in any manner are more susceptible to the disease.

For a successful recovery from the crisis, food system resilience must be strengthened. Food policies must be flexible enough to allow for a variety of methods and to fully account for the uniqueness of each situation (CFS, 2020). A better food supply secured by boosting agricultural production and widening the spectrum of agricultural land use appears to be a viable strategy for eradicating hunger (Pawlak and Kolodziejczak, 2020). It becomes apparent that, as food consumption matures, people require higher quality food, more diversity, and greater food security. Thus, along with buffer food stock plans, the governments would adopt a variety of well-designed policies targeted at reducing agri-food industry challenges and improving food security.

The importance of maintaining and strengthening supply chain resilience cannot be overstated. The Covid-19 problem has demonstrated the power of digital technologies, assisting in the improvement and efficiency of supply chains. To keep food chains intact, problems can be predicted and the situation of sudden shortage can be controlled. Digital technologies and artificial intelligence must be used to assist supply chains to work better and more efficiently. New technology may make it easier to connect supply and demand, which would be particularly advantageous in the perishable goods supply chain. Though the National Agricultural Cooperative Marketing Federation of India (NAFED), corporations, and other aggregators are active in organized value chains, policies should make the mobile purchase of perishable goods easier and more profitable (Kumar et al., 2020). To connect merchants to organized processors and input suppliers, a digital platform must be established. This would assist in the prevention of losses while also enhancing access to inputs, market data, and technologies. Also, supply chain resilience requires strong and reliable supply chain partnerships (Hobbs, 2020).

Because risk and uncertainty are unavoidable components of modern business, saving farmers, farming, and agricultural and migrant workers have become a pressing requirement. Covid-19 has caused larger losses to farmers related to the food crops and food items such as fruits, vegetables, flowers, dairy, and fish. Capital scarcity is a major impediment to increasing agricultural output and diversity. Thus, adequate financial aid should be given to these farmers (Kumar et al., 2020). Moreover, perishable food commodities should be handled with greater sophistication, and businesses that deal with them should be more adaptable and efficient. Along with food safety management, agriculture's digitization and

industrial quality criteria must be strengthened.

There is no doubt that agricultural and migrant labourers will benefit from a national database linked to Aadhar that will allow them to roam inside and across states during emergencies. The new One Nation One Ration Card program launched by the Indian government allows recipients to collect subsidized food anywhere in the country, regardless of where they live (IBEF, 2021). However, it is necessary to establish a safety net for migrant labourers, which should make their future hardships easier to bear. In an emergency, the money from the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) could be utilized to pay wages to labourers as well as provide an immediate job for labourers returning to work. For addressing rising challenges in agriculture and food security, increasing agricultural research and development (R&D) investment is crucial. Moreover, increased farm revenues and employment creation in the non-agricultural and agri-food industries can help to alleviate poverty and inequality. It is necessary to adopt new policies aimed at solving issues related to the agri-food sector and enhancing food security.

References

- Akriti K, Satpathy I and Patnaik B C M 2021. Covid-19 and its impact on livelihood: an Indian perspective. *Eurasian Chemical Communications* 3: 81-87. http://www.echemcom.com/article_122792_e02e42cb81bc614dedff5fbc1777505a.pdf
- Ashford N A, Hall R P, Arango-Quiroga J, Metaxas K A and Showalter A L 2020. Addressing inequality: the first step beyond Covid-19 and towards sustainability. *Sustainability* 12: 5404. <file:///C:/Users/Pc/Downloads/sustainability-12-05404-v3.pdf>
- CFS 2020. Impacts of Covid-19 on food security and nutrition: developing effective policy responses to address hunger and malnutrition pandemic. Committee on World Food Security, HLPE Issue Paper, Rome. <https://www.fao.org/3/cb1000en/cb1000en.pdf>
- Clapp J and Moseley W G 2020. This food crisis is different: Covid-19 and the fragility of the neoliberal food security order. *The Journal of Peasants Studies* 47: 1393-1417. <https://www.tandfonline.com/doi/pdf/10.1080/03066150.2020.1823838?needAccess=true>
- Cullen M T 2020. Covid-19 and the risk to food supply chains: how to respond? Food and Agriculture Organization of the United Nations. <https://www.fao.org/3/ca8388en/ca8388en.pdf>
- Dev S M 2020. Addressing Covid-19 impacts on agriculture, food security and livelihoods in India. Food Security, Poverty and Inequality, 33-35. <https://ebrary.ifpri.org/utills/getfile/collection/p15738coll2/id/133824/filename/134027.pdf>
- Delgado C and Zhou J 2020. The impact of Covid-19 on critical global food supply chains and food systems. SIPRI, Stockholm International Peace Research Institute, <https://www.sipri.org/commentary/topical-backgrounder/2020/impact-covid-19-critical-global-food-supply-chains-and-food-security>
- Dreze J and Somanchi A 2021. The Covid-19 crisis and food security. Ideas For India. <https://www.ideasforindia.in/topics/poverty-inequality/the-covid-19-crisis-and-food-security.html>
- FAO 2020a. As more go hungry and malnutrition persists: achieving zero hunger by 2030 in doubt, UN Report Warns, Food and Agriculture Organization of the United Nations. <https://www.fao.org/news/story/en/item/1297810/icode/>
- FAO 2020b. Food security under the Covid-19 pandemic. Food and Agriculture Organization of the United Nations. <https://www.fao.org/3/ca8873en/CA8873EN.pdf>
- FAO 2021. India at a glance, FAO in India. Food and Agriculture Organization of the United Nations. <https://www.fao.org/india/fao-in-india/india-at-a-glance/en/>
- Goldin I and Muggah R 2020. Covid-19 is increasing multiple kinds of inequality. Here's what we can do about it. World Economic Forum. <https://www.weforum.org/agenda/2020/10/covid-19-is-increasing-multiple-kinds-of-inequality-here-s-what-we-can-do-about-it/>
- Hamid S and Mir M Y 2021. Global agri-food sector: challenges and opportunities in Covid-19 pandemic. *Frontiers in Sociology* 142. <https://www.frontiersin.org/articles/10.3389/fsoc.2021.647337/full>
- Hobbs J E 2020. Food supply chains during the Covid-19 pandemic, *Canadian Journal of Agricultural Economics* 68: 171-76. <https://onlinelibrary.wiley.com/doi/epdf/10.1111/cjag.12237>
- IBEF 2021. One nation one ration card - access to foodgrains anywhere. India Brand Equity Foundation. <https://www.ibef.org/blogs/one-nation-one-ration-card-access-to-food-grains-anywhere>
- ILO 2020. Covid-19 and the impact on agriculture and food security. International Labour Organization. https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/briefingnote/wcms_742023.pdf
- Kharbikar H L, Radhika C, Naitam R K, Daripa A, Malav L and Raghuvanshi M S 2020. Consequences of Covid-19 pandemic and lockdown on food and agribusiness sector in India. *Food and Scientific Reports* 1: 13-18. https://foodandscientificreports.com/assets/uploads/issues/1591119106consequences_of_covid-19_pandemic_and_lockdown_on_food_and_agribusiness_sector_in_india.pdf
- Kumar A, Padhee A K and Kumar S 2020. How Indian agriculture should change after Covid-19, *Food Security* 12: 837-40. <https://link.springer.com/content/pdf/10.1007/s12571-020-01063-6.pdf>
- Laborde D, Martin W and Vos R 2020. Impacts of Covid-19 on global poverty, food security, and diets: insights from global model scenario analysis. *Agricultural Economics* 52: 379-

90. <https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/agec.12624>
- Lowe M, Nadhanael G V and Roth B N 2021. India's food supply chain during the pandemic. Working Paper 21-070. https://www.hbs.edu/ris/Publication%20Files/21-070_c8f4546c-d32a-4bc0-b79f-8e26a6c899ad.pdf
- Luiselli C 2020. Food Security in the face of the Covid-19 Pandemic. UNDP in Latin America and the Caribbean. <https://bit.ly/3uNcssY>
- Mardones F O, Rich K M, Boden L A, Moreno-Switt A I, Caipo M L, Zimin-Veselkoff N, Alateeqi A M and Baltenweck I 2020. The Covid-19 pandemic and global food security. *Frontiers in Veterinary Sciences* **928**. <https://www.frontiersin.org/articles/10.3389/fvets.2020.578508/full>
- Ministry of Statistics and Programme Implementation 2021. Consumer Price Index Number on Base 2012=100 for Rural, Urban and Combined for the month of November 2021. Press Release, <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1780967>
- Mulvey C, Peters R and Rutkowski N 2020. Impacts of Covid-19 on the U.S. Dairy Industry. A Project Submitted to Worcester Polytechnic Institute. https://web.wpi.edu/Pubs/E-project/Available/E-project-051220-153145/unrestricted/Impacts_of_COVID-19_on_the_US_Dairy_Industry.pdf
- Naja F and Hamadeh R 2020. Nutrition amid the Covid-19 pandemic: a multilevel framework for action. *European Journal of Clinical Nutrition* **74**: 1117-21. <https://www.nature.com/articles/s41430-020-0634-3.pdf>
- Pawlak K and Kolodziejczak M 2020. The role of agriculture in ensuring food security in developing countries: considerations in the context of the problem of sustainable food production. *Sustainability* **12**: 5488. <https://www.mdpi.com/2071-1050/12/13/5488>
- Qureshi Z 2020. Tackling the inequality pandemic: is there a cure?. In: *Reimagining the Global Economy: building back better in a post-Covid-19 world*, Eds: B S Coulibaly, K Dervis, H Kharas, Z Qureshi, Global Economy and Development at Brookings. 70-77. <https://www.brookings.edu/research/tackling-the-inequality-pandemic-is-there-a-cure/>
- Ram K and Yadav S 2021. The impact of Covid-19 on poverty estimates in India: a study across caste, class and religion. *Contemporary Voice of Dalit*, 1-15. <https://journals.sagepub.com/doi/pdf/10.1177/2455328X211051432>
- Reuters 2022. World food prices hit 10-year high in 2021. <https://www.reuters.com/markets/europe/world-food-prices-hit-10-year-peak-2021-2022-01-06/>
- Saha S 2021. Indian food prices continue to ride high on second Covid Wave. Tata-Cornell Institute, <https://tci.cornell.edu/?blog=indian-food-prices-continue-to-ride-high-on-second-wave-of-covid>
- Saini S, Das S, Pathula A and Bangari V S 2021. India's food inflation Imbroglio. *Agri-Food Trends and Analytics Bulletin (AF-TAB)* **1**: 9-13. http://icrier.org/pdf/bulletins/AF-TAB_V_I_1.pdf
- Stephens E C, Martin G, Wijk M V, Timsina J and Snow V 2020. Impacts of Covid-19 on agricultural and food systems worldwide and on progress to the sustainable development goals. *Agricultural Systems* **183**: 102873 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7237936/>
- The Indian Express 2021. Q1 growth rate 20.1%, real GDP Still below pre-Covid level. <https://indianexpress.com/article/business/economy/india-q1-april-june-gdp-live-updates-gross-domestic-product-data-7479976/>
- Yaffe-Bellany D and Corkery M 2020. Dumped milk, smashed eggs, plowed vegetables: food waste of the pandemic. The New York Times. <https://www.nytimes.com/2020/04/11/business/coronavirus-destroying-food.html>

Received: April 5, 2022 Accepted: June 21, 2022