

COVID-19 IMPACTS ON AGRICULTURE AND FOOD SYSTEMS OF INDIA

Suparna Ghosa¹, Sarangapani Nivarthi², Suhas Balla³

^{1,2,3}Department of Agriculture, JAIN (Deemed-to-be University), Bengaluru, India
¹suparna.ghosal@cms.ac.in, ²dr.sarangapani.nivarthi@cms.ac.in, ³b.suhas@jainuniversity.ac.in

Abstract

The agricultural industry has played a crucial role in alleviating poverty, rising wages, and ensuring food security for the poor. According to the World Bank, under a pre-COVID-19 scenario, 80 percent of the world's needy people are in underdeveloped regions depending upon agriculture. The sector, which once accounted for 4% of global GDP, is now under stress due to the COVID-19 pandemic, which has created concerns about price differences in agricultural commodities trade and distribution, a fragmented supply chain and a shortage of logistical services, negative impact on farmer health, a shortage of workforce to carry out operations, and growing operating costs for complying with regulations. The current study presented the scenario of agricultural sector after COVID-19 outbreak. It also suggested some strategies to deal with the current situation. The three-week lockdown in India coincided with the harvesting of rabi crops like wheat, mustard, pulses, and others. Farmers lacked labour for harvesting due to migration to their homelands, lacked sufficient logistical support to market their product, and government minimum support price operations were lagging. The Indian agricultural sector's activities have been interrupted both before and after harvest.

Key words: Agriculture, Coronavirus, Economy, Pandemic, Virus

Introduction

The COVID-19 epidemic, which started in the Wuhan city of China, has rapidly spread to other nations, with multiple instances recorded around the world. India is recorded with 56,342 positive cases registered as of May 8th, 2020. With an inhabitant of about 1.34 billion, India is considered as the world's second highest crowded nation that have faced problems in monitoring the diffusion (transmission) of SARS COVID-19 among its people. To control the spread of this outbreak, multiple strategies were adopted, including computational modelling, statistical tools, and quantitative analyses, along with the speedy development of effective treatments. The Indian Ministry of Health and Family Welfare have aware the people about the incident and took the required measures to stop spreading and transmission. In order to achieve this target, the federal and government of state took a necessary measures and established a number of wartime protocols. Furthermore, to reduce the transmission of the virus, the government of India imposed a 55-days lock-down across the region, that commenced from March 25th, 2020. This pandemic was inseparably connected to the country's economy, as it has severely hindered manufacturing sectors and people all over the world are currently cautious of doing business in the affected areas. The recent corona virus outbreak in some nations is close to the MERS (Middle East respiratory syndrome) and SARS (Severe acute respiratory syndrome) occurrences in China and Saudi Arabia, respectively, in 2003 and 2012. SARS and COVID-19 are both caused by the coronavirus, which affects the respirational area and causes considerable disease breakouts around the world.

Despite being new coronavirus family member, there are some evidences that SARS-CoV-2 is close to human coronavirus HKU1 and 229E strains in the recent research for a coronavirus treatment. According to these sources, immune systems of the human gets weak, allowing it to spread easily and rapidly across human populaces by coming in close contact with an affected individual. Severe acute respiratory syndrome corona virus-2 is more contagious than SARS-CoV[1]. Agriculture continues to be a vital part of India's economy. The sector meets the entire country's food consumption needs while also ranking among the largest agricultural exporters in the world. In recent years, the sector has faced a number of challenges, but none seem to be as serious as the national and global travel boundaries imposed throughout this pandemic. The Punjab and Haryana from northern Indian states are considered as the powerhouse of the agricultural sector, despite the fact that migrant labour from East India performs the bulk of the farming work in these states. When nationwide

lockdown was declared in India in March, the immediate response was like a massive migration of workers back to their rustic homes. This completely disrupted the reaping practice which typically begins in the middle of April, resulting in significant liquidity issues. One of the crops that has been especially hard hit is the June crop. The situation also points out that India's agriculture sector's supporting infrastructure has been obstructed by labour shortage. Irrigation equipment production in India has been hampered by stifled operations in the manufacturing sector, with drainage related manufacturing presently functioning at 30% of its prospective. There's still the shipping industry to remember. Cross-border movement has been severely restricted, preventing the movement of crops and, as a result, their sales declined[2].

It is known that agriculture sector is the backbone to the economy of the country. Agriculture is the primary sector that generates services, to regulate the circulation of entire economic circle. In India the major population is restricted to the agricultural sector. Due to this corona virus pandemic outbreak the economy of the country has received huge damage and also the consequential lockdowns. The expected global output by the International Monetary Fund was to cut by 4.9 percent in 2020 and GDP of India is predicted to contract as 4.5 percent. In a monthly report published by the department of economic affairs in July stated that agriculture is the silver lining in the year of 2020-21. Due to corona virus induced lockdown the major part of the economic activity had stopped in the month of April-May 2020, but the farming activities was free from these restrictions to enable the continuous reaping Rabi crops and sowing of the kharif crops. Exemption of agricultural practices from COVID-19 restriction was the fundamental factor for maintaining the regularity in the agricultural commodities in the whole period of lockdown across both, developed and underdeveloped areas. The situation of lockdown created many significant problems in front of economic activities and supply chain nationwide. Initially it was expected that this will go on for short period of time and soon the economic activities and services will be in place. Fortunately, in India the rate of transmission was not that rapid as in other countries due to timely taking of mandatory measures by the government to reduce the possibilities of infection, but this impacted the economy uncontrollably. So there were many obvious impacts of pandemic on demand for agricultural products, migration of labor, disturbances in the supply chains.

Agriculture accounts for approximately 17% of India's GDP. Horticulture, with its many sub-disciplines, is India's largest source of vocations. Agri-business is the source of revenue for 70% of families in the region. The outbreak of COVID-19 impacted the world terribly mostly those sectors on which the economy of the country relies on. It was the pinnacle season of the rabi crop in India when COVID-19 appeared. Because of the lockdown situation the workers moved back to their hometowns, rural cost was also declined, there was a situation when the public faced shortage in the daily essential products and due to that people started stocking the stuff. So there were many issues aroused due to the COVID-19 which are shown in Figure 1[3].

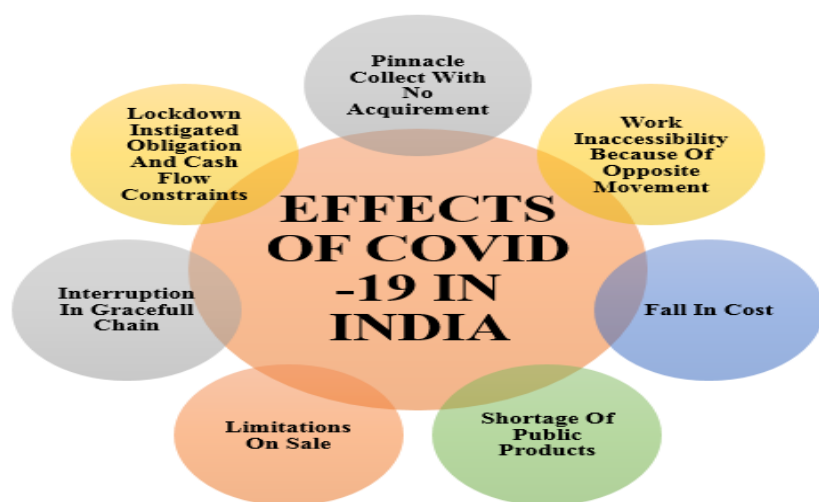


Figure. 1:Impacts Of COVID-19 Pandemic On Indian Economy[3].

The COVID-19 pandemic, dissimilar from foot and mouth disease, Escherichia coli (E. coli), bird flu, has no direct impact on productivity because it is not transmitted by livestock or agricultural products. However, as a result of the epidemic, governments from different nation of the globe have placed major boundaries on goods transport (by land, sea, and air), as well as labour migration. According to reports, the use of trucks for food delivery has decreased to 60% in France after the sanctions, down from 30% before the pandemic. In the absence of immigrant workers due to illness and restrictions on travel imposed by space confinement has direct effect on the supply chain.

The COVID-19 crisis, in particular, triggered serious disruptions in some labor-intensive industries, including production of livestock, cultivation, plantation, reaping, and yield processing. The crisis, however, threatens the capacity of farms and agricultural businesses to operate due to a labour shortage caused by illness and distances while doing harvest is maintained. These circumstances slowed the products distribution and inputs of agriculture, posing difficulties in guaranteeing a steady supply of food to marketplaces. Consumers were unable to eat out due to the limitations and cooked their meals at home. Furthermore, because of the risk of being infected by COVID-19 in stores, customers avoided going to markets and supermarkets. The supply network affected not only manufacturers, suppliers, and buyers, but also foodstuff handling plants which are labour intensive. Due to rapid transmission of the virus, meat processing food industries production was ceased because workers were afraid of getting infected of getting sick. As a result of these factors, it was estimated that pork production capacity would drop by about 25% by late April 2020. The COVID-19 pandemic shifted the stock demand stability, putting minor manufacturers and workers in a risky position.

The lockdowns disrupted the retail processes and severely inadequate travel, strictly restricting the movement of products, and closing processing plants that engross agricultural commodities. As the nation starts to open up again, the consequence of the COVID-19 lockdown on numerous sub-sectors can be anticipated by examining which are likely to recuperate and which will last to struggle. (Figure 2)[5].

SUB	SECTOR	SHORT TERM IMPACT	MEDIUM TO LONG-TERM IMPACT
	POULTRY	The poultry sector saw substantial losses due to reduced institutional demand, while the prices of chickens fell by over 25%.	The sector will potentially shift its strategy from large corporate farms to other more decentralized business models-particularly with the return of urban migrants to their rural homes.
	VEGETABLES	The impacts of the lockdowns on the sector was high due to disruptions in transportation services, especially in rural areas away from urban centers.	The current situation presents a huge opportunity to move away from the agriculture produce marketing committee (APMC) regime and explore direct-to-consumer.
	DAIRY	The impact of lockdown on the sector was moderate, in the form of drop in procurement prices by 30% from farmers due to reduced demands from institutional buyers.	Dairies have tried to minimize losses by converting milk into skimmed milk powder. In the medium term, the status of the dairy sector will depend on how fast the demand for fresh milk picks up post lockdowns.
	AGRICULTURE INPUTS	The supply of inputs was disrupted in the initial days as the movement of stock has ceased across geographies. The sale of the fertilizer has increased due to good monsoon and a bumper rabi crop.	The availability of inputs for kharif season has improved after easing up of lockdown rules.
	FARM MECHANIZATION	The tractor sales have declined more sharply in the last quarter of 2019-20 and first quarter of 2021-21	The surplus availability of labor in rural areas may lead to reduced demand for mechanization in the medium term.
	FARM LABOUR	50 million internal migrants have returned home during lockdowns. States like Punjab and Haryana have deficit labor while eastern states like Bihar, Jharkhand have surplus labor.	The situation will remain the same in the medium term, so kharif sowing may be affected by lack of labor in regions like Punjab and Haryana.

Figure. 2: Short Run and Long Run Effect of COVID-19 Disease Lockdown On the Different Sub-Sectors[5].

Strategy For Reinforcement The Agricultural Area In The Aftermath Of Covid-19

Discussing on the effect of COVID-19 on the agriculture sector of India enabled to reach at a approach for reinforcement the segment against the calamity and sustainability matters posed by the pandemic (Figure 3).

➤ **Social Safety Nets:**

The impending shutdown paused the development, resulting in job and income losses as well as a drop in demand. Government and private sector initiatives should aim to reduce food-stuff loss and leftover while also stimulating demand also food consumption. Application of good food-stuff organization practices, such as making spending inventory and preparing the heavy meal, is recommended to reduce food waste at the household level. Alternatively, the sharing of 'food vouchers' or 'combo boxes' containing a hamper of products, particularly bio fortified food-stuff such as zinc and iron-rich puffed rice and millet, would assist the country in achieving food protection.

➤ **Risk Management for Price and Revenue:**

Corona virus pandemic had a minor or non-existent impact on food estimated cost (excluding for root vegetable). Food estimated cost, on the other hand, are subject to high volatility, putting farmers at risk of losing money. To protect farmers from price risk, the supervision must consider a value maintenance account.

➤ **Shift in the Focus from Primary to Secondary Agriculture:**

Processes that add importance to principal agricultural production processes, as well as businesses that derive raw supplies from harvest residues, derivative, and leftover, ought to be encouraged. Postharvest machineries for curative and scented plants, which provide raw supplies to the Ayurvedic medicine, pharmaceutical, makeups, and food flavor trades, may boost export prospective and make jobs.

➤ **Family Farming:**

Family farmers do more than just grow food; they also protect biodiversity, harvest wholesome and native foodstuffs, and implement novel methods and technologies to resolve societal, monetary, and conservational issues.

➤ **Collective Farming:**

Crop farmers can form cooperatives, Farmer Producer Organizations (FPOs), or Farmer Producer Companies (FPCs) and collaborate in global food system's network. Economies of scale can be achieved by aggregating (the inputs used and the output produced). These stages collectively will have the prospective to overcome tasks of making and publicizing threats of the agriculturalists.

➤ **Investment in Agricultural Research and Development:**

Without a question, involving the private sector stimulates productivity and enhances system performance. Agrarian research and enlargement, insurance, banking, automation, cold storage, mechanization, and numeral procurement and circulation (e-marketing) should be prioritized by the private and public sectors.

➤ **Reforms in Agricultural Finance:**

To wake up the sector, access to low-cost loans must be made available, especially to minor and peripheral property owners. To protect the livelihoods and welfare of the people, steps such as reforming agronomic credits and payment timetables, deferring the classification of long-run credits as Non-Performing Assets (NPA), and interest grant on available credits during the suspension era must be enforced.

➤ **Stakeholder Partnerships:**

By raising awareness and using Information and Communication Technologies (ICTs), such as social website networks, stakeholder alliances help to close information and knowledge gaps. The idea here is to educate people to keep hygiene of marketplace officials, and to disinfect marketplace adding to follow social-distancing which are vital for smooth working of the marketplaces in lieu of COVID-19 emergency[6].

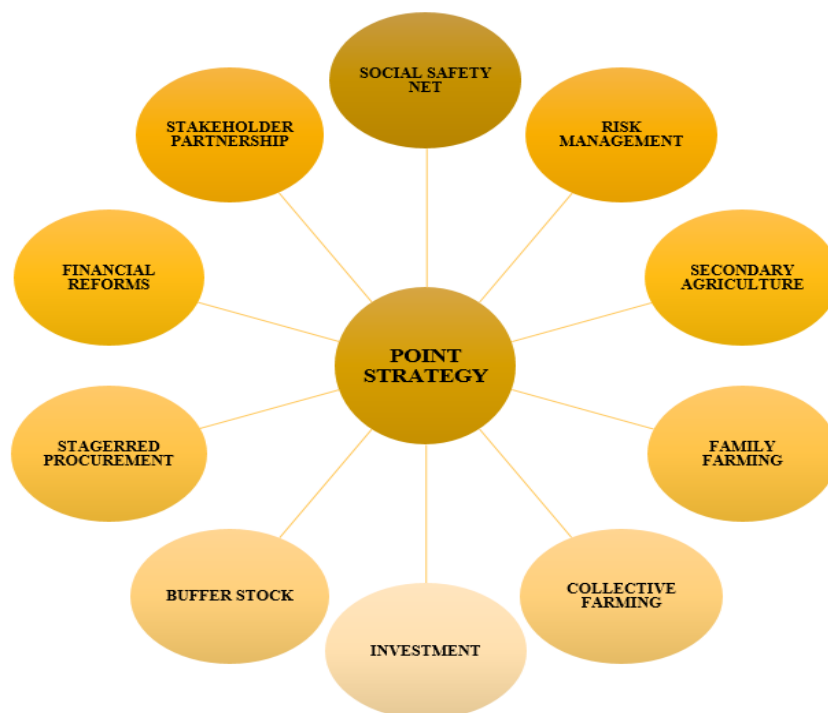


Figure. 3: Post-COVID-19 Pandemic Agricultural Segment Reinforcement Strategy [6].

Literature Review

Maria Nicola et. al summaries the social and economic impacts of corona virus pandemic on discrete characteristics of the world's economy. The corona virus epidemic has caused 4.3 million confirm cases and over 290,000 demises worldwide. It has also upraised concerns about an impending monetary downturn. Social estrangement, self-isolation, and travel restraints have resulted in a decrease in the inhabitants across all monetary sectors, consequential loss of many jobs. The demand for merchandises and mass-produced goods has dropped as schools have locked. Health supplies, on the other hand, have seen a great increase in petition. Due to panic purchasing and storing of food stuffs, the food area is also facing increased demand. Fears of a new downturn and economic crisis necessitate resilient and robust management in healthcare, industry, administration, and the public at large. Instant relief procedures need to be applied and accustomed for those that may drop through the crashes. By ending the author recommended that a wide-ranging social and economic expansion plan counting each sectors plan and an bionetwork that inspires entrepreneurship is also desired so that those with vigorous and maintainable professional replicas can flourish[7].

Shazia Rashid et. al explained the effect of corona virus epidemic on advanced learning and study. The COVID-19 epidemic has sent the worldwide budget into a tailspin and has had a foremost outcome on advanced learning. Face-to-face classes have converted to virtual learning stages as a result of the unexpected closing of university grounds as a social isolation measure to decrease group transmission. This has shifted the prominence to eLearning possessions and networks for effective student communication, which might be out of range and out of financial plan for many scholars. The epidemic has emphasized the faults in today's advanced learning system and the need for additional digital expertise training for instructors in order to reply to the world's fast developing informative atmosphere. Virtual Learning education may become a significant part of the advanced learning system in the aftermath of a pandemic. Post-pandemic education and study plans must be prearranged by advanced learning institutions and campuses to safeguard student learning consequences and educational quality values[8].

Fernando O. Mardones et. al describes about the logical viewpoints on the consequence of the novel corona virus epidemic and worldwide food safety. Pandemic is not a food safety problem, according to global

administrations and prevailing indication based on other respirational viruses, i.e., there is no indication linking food or food packing to the transmission of the disease that causes COVID-19(SARS-CoV-2). Nevertheless, a high grade of attentiveness is necessary for this contact path. The pandemic, on the other side, has had a vast effect on the food arrangement, with direct and indirect effects for individuals, plants, and animals' lives and livelihoods. Given the complexity of the apparatus at risk, some of these effects are likely to take time to evident. The epidemic had a major direct and indirect effects, including boundaries on farm workers, implanting, current and future yields; shifts in agricultural funds and food obtainability; food safety; plant and animal health and welfare; human nutrition and health; and policy changes. All aspects are critical to food security, and "One Health" methods may be able to handle risks in an economical manner by coordinating cross-sectoral investments in human, environmental, and animal health. The consequences of the covid pandemic, including weather change, will be felt most strongly by the poorest and most marginalized countries and populations. Finally, it must be considered that the United Nations Sustainable Development Goals as well as a "Planetary Health" viewpoint in order to make for possible diseases or threats to food-systems[9].

Ashish Girdhar et. al targets to estimate the consequence of novel corona virus on air contamination of numerous nations. The study also observed the connection between air pollution intensities and lockdown processes. On January 30, 2020, the WHO (World Health Organization) confirmed coronavirus infection a Public Health Emergency, and it has spread everywhere around the globe. The worldwide effects of this ailment's epidemic are more shocking and freaking than anyone's worst nightmare. With more than 23 million affirmative coronavirus cases and over 800,000 deaths globally, the virus's capacity cannot be ignored. This contagion has diseased everyone breathing in the world's 209 countries and terrains. It arose as an unconquerable global task the likes of which the flora and fauna has never seen before. As a result, the affected nations have closed their boundaries and enforced their people to stop at home until the epidemic is over. As a result, the sufferers of coronavirus are not only those who are diseased with it, but also those who are affected by government-imposed limitations. The paper examines the epidemic's effects in certain nations, while war-like arrangements endure to be made to combat it. Corona virus pandemic has considerably improved quality of air. Furthermore, due to the lockdown, it had a foremost impact on the markets of different nations[10].

T. Ibn-Mohammed et. al in their study critically analyzed the effects of corona virus pandemic on the total economy and bionetworks and chances for globular economy policies. On march 11 of 2020, corona virus pandemic was confirmed as a global epidemic by the World Health Organization, but the consequences are still being felt around the world. Cases began in China and quickly spread around the world, prompting world governments to take drastic measures to isolate cases and reduce the virus's spread. These reforms, on the other hand, have shattered the central foundations of modern sphere financial prudence, as free profession and collaboration have given way to autonomist focus and opposition for limited resources. In light of this, the author provides an acute assessment of the pandemic's constructive and destructive effects, as well as suggestions for how it can be used to improve the situation. The paper warns against depending on epidemic driven profits to achieve maintainable growth goals, and stresses the need for a conclusive, fundamental systemic shift in how we live. It makes the case for rethinking the current global economic growth paradigm, which is formed by a linear budget structure and maintained by exploiting and vitality-guzzling manufacturing procedures, in approval of a more maintainable model based on the globular budget concept. The author summaries real sector-specific commendations on circular economy associated explanations as a catalyst for worldwide monetary development in a strong post corona virus world, based on indication in maintenance of circular economy as a vehicle for harmonizing the dynamic calculation of achieving profit with negligible ecological damages[11].

Discussion

The corona virus epidemic had a huge influence on India, the world's largest democracy. The COVID-19 pandemic caught countries off balance and stunned people all over the world. The Indian government, like other developed and developing countries, acted rapidly to minimize COVID-19's effect on the Indian population. Private companies were closed, production lines were stopped, and employees were told to take cover. The Indian government has passed the country's most comprehensive relief package in its history. For the first three months of the lockdown, the Indian government offered cash transfers and in-kind assistance to Indian families underneath the Pradhan Mantri Garib Kalyan Yojana (PM-GKY) legislation (April, May, and June). The present study discussed about the effect of corona virus epidemic on agricultural and foodstuff sector of India and also what will be the short-run and long-run effects of the epidemic on various sector which ultimately affects the economy of a country. For two factors, India's economic shock would most likely be far more serious. First, the economy was already slowing down prior to COVID-19, exacerbating existing issues such as joblessness, low earnings, rural insufficiency, malnutrition, and extensive inequality. Additionally, India's vast relaxed economy is particularly susceptible. About 91 out of a hundred (422 million) of the 465 million professions in the country were in the service sector. These agriculture, seasonal, and other informal jobs, who do not have daily wages or incomes, will be the hardest hit during the lockout. Present study focused on the possible effects on agriculture, supply chains, food and nutrition welfare, and livelihoods in this article.

Conclusion

An epidemic is not a fresh occurrence in human past; human being has experienced many epidemics throughout past. Pandemics are distinguished by their extreme negative effect on the worldwide economy. The corona virus crisis has brought to light some of India's long-standing agricultural issues. The epidemic has had a major adverse effect on the agricultural sector. Unemployment, restrictions on product export and import, lower rates of production, loss of revenue, wastage, and confusion about the future of agricultural business strategies were all effects of the pandemic. The virus occurrence has turn out to be one of the biggest fears to the worldwide budget and commercial markets. India, as a member of the worldwide village, is not protected to the virus. Though the Indian government along with State administrations treated and monitored the condition carefully to control the COVID-19, it took a month to two months to get a decent image of the issue. It was vital for every Indian to remain vigilant and alert. One way to continue to deal with the current situation is to maintain good hygiene, follow all the instructions and guidelines provided by WHO (world health organization) and government, and also to look at alternatives such as job networks that provide access to solutions to some of these problems.

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