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Original article**Effect of first and second wave of Covid 19 on dairy, food and agricultural sectors and economy of India**Bhopal Singh*¹ and Rekha Rani²

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INTRODUCTION

COVID-19 is a viral infectious disease caused by novel corona virus and known as severe acute respiratory syndrome-related corona virus-2 (SARS-CoV-2). fever, cough, cold, tiredness, headache, loss of aroma, rashes on skin, shortness of breath, chest pain etc. are the most common symptoms. Nowadays, new variant of the disease is KP.3.1.1 belongs to Omicron family spreading but the rate of its effect is low due to the immunity development, vaccines and hygienic maintenance practices followed by most of the people. Latest news also reported that XEC variant of the disease spreading in European countries. Recently, world health organization (WHO) published the report of first quarter of the year (Jan-Mar, 2024) and stated that 9.8 million persons (approximately 22% of the world population) took the COVID-19 vaccine across.

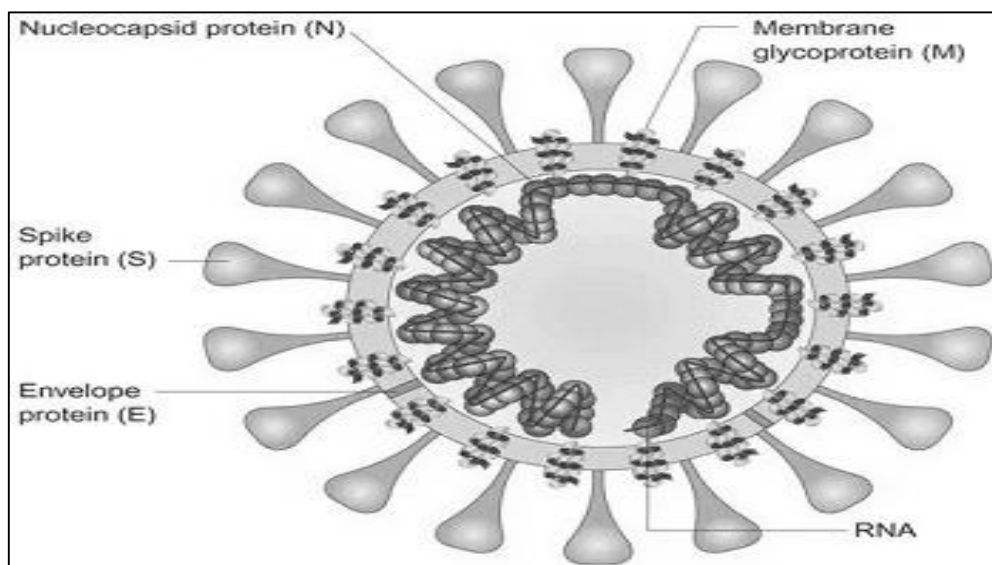


Fig. 1: Structure of SARS-CoV-2

1. Effects of first wave of COVID-19 on Indian Dairy Processing Sector

Ever since the country shut down for the COVID-19 lockdown on 22nd March 2020. Indian dairy industries suffered a 25-30% drop in demand. While the first two days did witness a 15-20% surge in demand with consumers hoarding milk and other dairy products, but there was consistent fall in demand from the third day onwards. The demand of dairy products decreased simultaneously because the products are consumed only persons level. This was the result in 15% lowest demand due to the people stayed in their house so that out-of-home consumption, like restaurants, road-side eateries, marriage and other events decreased. However, milk procurement did not fall because dairy cooperatives or other private or unorganized dairies were pressurized to follow through the central government orders of not tampering to the livelihood of dairy farmers resulting in the surplus of milk in most of the states. In this situation, so many small or private dairies sold their milk and milk based products to nearest cooperative or government dairy industry because all institutes, hotels, hostels etc. were closed and these were the most preferable market for the small dairy farmers. Cooperatives dairies including Saras, Amul, Mother dairy, Sanchi, Mahananda, Verka and others bought a minimum of 5lakh liters of extra milk on daily basis for the support of farmers. In contrast, the cooperatives dairies of Jharkhand and West Bengal state were not bought the milk because they were not able to process the huge quantity of milk hence, there was no choice for the farmers to throw the milk publicly. This was the great loss for farmers. The local milkmen, who collect the milk from farmers were not able to collect and supply of the loose milk due to ban on outside movement of people. The disturbance in this arrangement also against the business of local dairy farmers.

The rate of loose milk decreases day by day because of the lack of consumer demand so that the income of farmers decrease drastically hence, most of the small dairy farmers stopped giving compound cattle feed to their animals. They were afraid by the higher production as well as lower income so that they fed them dry or green straw only. Irrespective of the market situation, a mammalian animal has to be milked daily for its good health. On one hand, it increased the cost of dairy farming and on the other, the situations were leaving them with surplus milk with no trade taking place. Corona virus and the resultant lockdown also led to drop in the prices of white butter from an average of 290-310 to 250-260 INR (Indian rupees) per kg.

The southern states of the country collected approximately 30-35% additional milk on daily basis but they marginally drop in the rate of its procurement, whereas, in Maharashtra, it was noticed to fall in the price from 31 to 27 INR. The cooperatives dairies converted that surplus milk into skim or whole milk powder (SMP and WMP) and butter. There were lack of such products for the shortfall situations before the pandemic and Indian dairy industries were planed to import SMP and butter-oil from New Zealand. As a result, the SMP prices dropped globally from 340 to 230 INR/Kg. Eventually the inclination in demand settled down at 10-12% from 35%. During this period, out-of-home intake was stopped, so that the customers purchased *paneer*, *ghee* as well as different vareities of cheese in large quantities from local market and noticed that the sell of paneer increased drastically over 80% in April, 2020 whereas, the demand and sell of ice-cream and frozen desserts, milkshakes as well as lassi was decreased due to the cold nature of these products and doctors were prescribed to not use cool produces. In a fact, almost half of the yearly annual turnover of frozen

dairy products covers in the summer season of March to May but in 2020 it was not obtained so that so many industries stopped their production. This was due to the health consciousness of the people as well as the fear of infection.

At the end the dairy companies created new ways to reach consumers. Firstly, Creamline and Lactalis India dairy industries started direct sell of milk and other milk based value-added products. For this they set up vans with all their products and parked in residential localities, for which the response of consumers was good. They also tried to generate large-scale employment to the people who lost their mode of income during the pandemic, be it the owners of roadside tea stalls or juice shops, to sell their products in the areas these people lived in.

2. Effects of first wave of Covid 19 on Indian Food and Agricultural Sector

India feeds both their own population and the world's, as the seventh-largest exporter of agricultural products. Like every other country, India also tried to navigate the COVID-19 crisis without severely disrupting food supply chains. The country remained under a strict lockdown that began March 23, 2020 with designated containment zones of varying degrees. In areas where disease was spread most, no one was allowed in or out. However, India's government declared farming an essential service, leaving farmers and producers exempt from the lockdown, critical for a country in which 43.9 per cent of the workforce is employed in agriculture. While farmers and producers continued to work, it did not necessarily that they were able to overcome logistical challenges due to lack of transport facilities or that they were able to bring their produce to a market full of consumers. Moreover, with suspended public transportation the rural workers were not able to reach workplace and an estimate of 40-50 million seasonal migrant workers were involved in post harvest to overcome the job problem. Adding additional complexity to the situation, India experienced a reverse migration, as those urban workers who could travel, started leaving cities for rural communities.

(a) **Agriculture and supply chains:** Preliminary reports of COVID-19 showed that the non-availability of migrant labour interrupted some harvesting activities, particularly in northwest India where wheat and pulses were being harvested in very huge amount. There were disruptions in supply chains because of transportation problems and other issues. Prices declined for wheat, vegetables, and other crops, yet consumers were often paying more. Media reports showed that the closure of hotels, restaurants, sweet shops, and tea shops during the lockdown depressed food and agricultural commodities sales. In the meantime, poultry and other related farmers were suffered more because people ignored to eat egg and meat products, hence, so many people lost their job along with the the shutdown of business. This was due to the due to wrong information about meat products spread through the social media and news channels that chicken/ meat or poultry eggs are the carrier of COVID-19. However, no one can deny thus because everyone knows that virus can be infected from anywhere.

(b) **Consumer prices increased on average whereas producer's cost crashed:** The demand of food and agricultural goods decreased mostly in unban areas, workers were converted in large number of migrants, results into the significant descent in manufacturer's cost. A report of producer price index revealed that after a brief rise in the prices of goods, it decreased to three times more

as compared to before lockdown by the end of May, 2020. This was also found to be consistent with the other findings, in which researchers confirmed it through the telephone surveys with farmers. The dramatic collapse in prices of perishables goods was also noticed in many news paper reports. At the same time, the cost of consumable food items also raised in cities and in some cases it was doubled as actual price, owing to the increased frictions in the supply chain in the form of limited availability of labor as well as higher prices of transportation along with uncertainties around logistics. This gap was increased sharply between wholesale and retail cost during the first phase of the lockdown.

(c) Heterogeneity of impacts and some improvements over time: In some large or metro cities, average retail prices were not fall but increased only for a few commodities although in smaller cities and towns, retail prices raised an average of more than 20% in the two months following the lockdown. In addition, the range of monetary value across urban areas increased significantly during the lockdown, suggested continuing challenges. Manufacturer cost for the perishables goods collapsed moreover retail prices for fruits and vegetables fluctuated widely over time and space; increased substantially in some areas, demised in others and raised since the lockdown. In contrast, producer prices remained higher for cereals because of active participation of government in the procurement. Retail price of cereals was not boosted in urban markets owing to the public distribution system (PDS) that supplied grains to consumers along with large scale grain distributions to vulnerable populations by civil society organizations. However, the retail cost of legumes, edible oils, processed and packaged goods such as biscuits and flour, raised sharply. The role of traditional retailers was very strong because up to 90% of the Indian market was served by small-scale stores, called *kirana* shop, and other informal players such as push-cart as well as street vendors; about 8% by supermarkets and/or other modern outlets; and 2% by online merchants. The *kirana* stores and informal street retailers most successfully managed to negotiate the challenges of the lockdown. Informal retailers received assistance at the back end from B2B (business to business) retailing supply chain management firms. While these retailers also rely on hired workers, mostly dependant on family labour hence, they were less affected by the shortages of labour than modern retailers. Street vendors of fresh produce also kept supply chains functioning. Findings from a survey of over 50 retailers in 14 locations across India suggested that some people who lost jobs in cities and could not go back to their home or shops due to lockdown restrictions; switched to vending fresh produce and grocery. In a newspaper reported that, in Porvorim (Goa), one fruit vendor said that around 30 people in his neighbourhood, including a car mechanic, opened up fruit and vegetable shops because they were out of work and could not return home. The low entry barriers to informal retail led to an expansion in the number of informal retailers of food during the lockdown. Limited labour availability and movement restrictions severely hampered the operations of modern organized retailers. Online take away or restaurant food delivery orders dropped by 75% in April compared to January and overall e-commerce fall down by 83% over this period. In contrast to this, electronic or e-grocery demand raised by 27%. due to highly sophisticated system of procurement and stocking. Only a few online orders were completed owing to proper organization situations including the availability of labor.

(d) **High food insecurity:** Under the national lockdown, people in urban areas were likely more vulnerable to food insecurity than those in rural areas, especially those dependent on wage employment. In one survey conducted during the lockdown, an estimated 96% people said that they were not received rations from the government due to eligibility or implementation problems, among them 72% replied that their rations would run out in two days, and almost 90% were not receiving wages. Meanwhile, In rural areas, the fall in producer prices and farmers feel difficulties for selling their produce, expressed lower prices with greater availability of a variety of foods. Yet, in many regions, food security was high, mainly because of a large loss in incomes.

(e) **Effects of first wave of Covid 19 on Indian Economy**

The COVID-19 outbreak had a major global impact, particularly the nationwide lockdown that paralyzed social as well as financial lives. India had also seen the multi-sector effect of the pandemic as economic activity slows down. The pandemic affected the production, services, visits, travel, transport, shipping, import, export, retail, wholesale, bank, hotel, restaurant, real estate, healthcare, computer science. technology and media.

(f) **Unemployment rate of several sectors:** The number of pandemic cases increased day by day, so the government blocked transport services and applied restricted mobilization within the country. This resulted in 40 million people in the country, mostly in the unorganized sector, lost their jobs. The labour sector, which was associated with construction companies, daily wage labourer in civil work as well as created under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA, 2005), were worst hit as people could not find work during the period. Travel restrictions and quarantines affected thousands of people as they left factories so that shortened labor and parts, supply chains running on a shoestring, triggered sell-off warnings across technology, auto, consumer goods, pharmaceuticals and other industries.

(g) **Food and Agriculture:** The food and agriculture sector contributed the most to gross domestic product (GDP) at 16.5%, and 43% to employment, respectively. The major share of the food processing sector is related to dairy products (29%), edible oils (32%) and cereals (10%). However, during the pandemic period, harvesting process was completely imbalanced because it begins in the mid of April, created severe liquidity problems. Labour shortages have also impacted the infrastructure which indirectly supports in the India's agricultural sector like warehouses, godown etc.

(h) **Online Business / Internet Business Sector:** The online business in today's economy plays a major role which contributes 10% to the Indian GDP and showed a drastic affect in the employment sector in the financial year 2019, nearly 8%. Its major segments are the household and personal care products (50 %), healthcare segment (31%) along with the food and beverages sector (19%). Due to threat of pandemic and social distancing, the tendency of the consumers to overstock on essential product and commodities such as rice, flour and lentils increased at a rapid rate. As a result, sell of Fast moving consumer goods (FMCG) companies increase, and the trade of distorted supply chains had been revised. The e-commerce sector faced slower growth due to supply chain pressures and consumer expectations from businesses to offer new distribution channels with an emphasis on direct routes to customers. Some other outcomes includes, daily essentials

commodities observed a significant increase (200%) in searches related to hygiene and health care supplements, lifestyle related products sales fell from 15% to 30% due to consumers' intensified the cost fluctuation along with an increase in the number of search queries targeting individual purchases and uncertain buyers.

3. Effects of second wave of Covid 19 on Indian Dairy Sector

The second phase of the pandemic started in February, 2021 and faced reduction in out-of-home consumption and reduction in the number of functions, parties and events where the demand of dairy products always remained high. The consumption of buttermilk, lassi, ice-cream, and flavoured milk was also affected due to reduction in the number of visits to retail outlets along with the people became more concerned about fresh produce for consumption. Research and development (R&D) sections of the industries also stopped for designing of new dairy products like, protein powder, custards and premium cheese variants. Overall, the dairy sector had noted good demand in the financial year 2021 because milk and milk products were categorized in essential commodities. Although companies lost out on business linked to hospitality and in-home consumption remained strong. India's dairy sector is vast with participation of home grown dairy cooperatives along with multinational companies (MNC's) with high demand of dairy products such as butter, *ghee* and *paneer*. Analysts also recorded the benefits through market share gains and the trend was likely to sustain. Direct distribution of dairy products to large societies using own logistics and apps developed by dairy companies, and higher support to trade helped companies to improve market share. Prolonged stay-at-home orders are likely to benefit consumption of tetra packs milk as well as dairy whiteners.

4. Effects of second wave of COVID-19 on Indian Food and Agricultural Sector

The latest surge of the pandemic had raised concerns about its potential effects on agriculture sector, which was in the midst of the *rabi* crop season. In Gujarat, agricultural produce marketing committee (APMC) was suspended for trading for a week so that there were high stock of farmer's crops, including wheat, cumin, cotton, pulses, groundnuts, and castor beans, in addition to vegetables like potatoes as well as onions. In South India, where many laborers work on farms, especially in plantations, Bihar, West-Bengal (WB), Assam, and Chhattisgarh are in shock to return home for voting in the state assembly elections and to celebrate the Lunar New Year festival. The southwest monsoon was a month away that time, and assumed that it will reach northern states by July 1. Therefore, there was still a hope of opportunity to manage COVID-19 effectively to prevent any damage in the *kharif* crop sowing season. Similarly, in MP, APMC was closed from April 17th, 2021. Initially, chickpea (*chana*) prices were above the Minimum Support Price (MSP) of 5100 INR per quintal. Physical trading was almost non-existent in MP, there's a fear that prices will drop, leading to expectations of the government's National Agricultural Cooperative Marketing Federation of India (NAFED) to step in and purchase chickpea at the MSP. In the same way, in Maharashtra and Rajasthan, the majority of APMC markets were became non-operational. Following the chaos caused by the sudden nationwide lockdown from March 24 to May 30th, 2021 led to widespread rural-to-urban migration. Government was understandably hesitant to implement a similar strict lockdown across the country. As a result, the supply chain was not badly affected, and the transportation of agricultural produce started in continuation from production to

consumption areas. However, there might be a drop in demand due to the second wave's impact on the affluent urban consumers. The Indian Meteorological Department (IMD) predicted a normal rainy season that year and it was assumed that if the COVID-19 situation was managed through localized or small lockdowns and accelerated vaccination drives, farmers will have the opportunity to plant the *kharif* crops. For agriculture to significantly contribute to the Gross Value Addition (GVA) in the year, it was crucial to prevent or control the infection in rural areas by utilizing all available resources. The global commodity prices were high, offering farmers a chance to profit from the export of crops like cotton, guar gum, maize, and soybeans during the *kharif* season. To seize this opportunity, it was necessary to control COVID-19 effectively.

5. Effects of second wave of COVID-19 on Indian Economy

An unprecedented rise in COVID-19 cases is likely to slow down India's economic recovery, but the overall impact will be milder in comparison to the year 2020's devastation. Experts say that extent of economic loss during the second wave will primarily depend on how fast the chain of infections can be broken. While COVID-19 containment rules are less rigid compared to last year's nationwide lockdown, economic activity is gradually declining as more states opt for stricter norms to contain rapidly rising daily cases. At the moment, cases are rising sharply as India reported nearly 3.8 lakh cases and over 3,000 deaths.

A significant increase in COVID-19 cases was expected to hinder India's economic rebound, but the overall effect will likely be less severe than the destruction seen in 2020. Experts reported that the economic alteration during the second phase will mainly depend on the speed of viral infection. Although COVID-19 containment measures were less strict as compared to first wave of pandemic although the economic activities were gradually declined because so many state government implemented stricter control measures. Many retail as well as wholesale businesses have suffered badly owing to the localized lockdowns, but the motility of goods and services continued and companies were permitted to operate. This opportunity helped in significantly reducing the economic fallout. The impact on industrial output during the second wave was expected to be less severe than first wave of pandemic. Lessons from other countries suggested a weaker link between reduced mobility and economic growth. Sectors such as manufacturing, agriculture, and those that support work-from-home and online services are expected to remain springy. It was also predicted by the economists of State Bank of India that this wave will last shortly when the recovery rate reached at 77.8%. Also it was noted that the wave reached its peak in mid-May with a subsequent drop in active cases by using strict precautions. Moreover, adult vaccination program was started from 1st May, 2021, also helped curb further infections.

In this scenario, India's economic recovery was nearly to decreased. Second wave was not significantly affected the salaried employee but impacted again on low income group. In April (2021), the unemployment increased due to loss in businesses and industrial operations, different type of lockdowns for individuals in different containment zones, and many more other limitations. There was a significant strain on other areas such as consumer durable, aviation, and real estate. Individuals were concerned about their family members, health, services, education, employment, and future financial goals as the second wave intensified. Economist suggested that low consumer confidence could negatively impact India's economy, prompting the government to take more

proactive measures to regain stability. As a result, India managed to recover from its economic losses.

6. Current Scenario in India

Nowadays, the pandemic is in a control way and not much dangerous as in the first and second wave of COVID-19. The dose of vaccine reached to every human being so that the possibility of disease is almost zero. Rate of unemployment increased significantly after the COVID-19 first and second wave due to the shutdown of many industries. However, the rate is still growing. Population growth, higher literacy rate and safety of job are might be the reasons for this. In the present scenario, according to the data of March, 2023, the national unemployment rate is 6.56% with the highest of 28.50% in Rajasthan, which is the largest state of India in the area covered. UP have the highest population in the country but only 4.3% unemployment in the state. This may be due to the highest possible resources in the state (Source: Economic Times of India). In Contrast to this, 'The Indian Express' published the rate of unemployment was highest in Lakshadweep (9.7%) and Lowest in Tripura (1.4%) during the period, July 2022 to June 2023 (Source: Periodic labour force survey, 2022-23; <https://www.reddit.com/r/unitedstatesofindia>). In the year 2020, unemployment was highest from 2014-2024 due to the sudden full stop of all process activities in the country. It was recovered in next year when this rate was reduced to 5.98%. It was estimated that this rate will down to 3-4% in the year 2023-24. According to the Economic Times of India (Jan-Mar, 2024), Indian women are more unemployed than men. Jammu and Kashmir (J&K), Kerala, Uttarakhand (UK), Telangana and Himachal Pradesh (HP) have the lowest women unemployment rate as 48.6, 46.6, 39.4, 38.4 and 35.9%, respectively. Similarly, the men unemployment was higher in Kerala, Bihar, Orissa, Rajasthan (RJ) and Chattisgarh as 24.3, 21.2, 20.6, 20.6 and 19.6%, separately. In contrast to this, Delhi, Gujarat, Madhya Pradesh (MP), Haryana and Karnataka have to lowest female unemployment rate such as 5.7, 10.9, 13.5, 13.7 and 15%, moreover, Delhi, Gujarat, Karnataka, HP and MP found to have lowest men unemployment rate as 2.5, 8.5, 10.1, 10.2 and 11.7%. (Source: Economic Times of India. September, 2024). India is the largest milk producer in the earth with 230.60 million tonnes of milk per year in 2022-23 (Source: Ministry of Animal Husbandry and Dairying, India; National Dairy Development Board, 2024), also the largest exporter of spices (Spice Board of India, 2024). Recently (30th June, 2024), Ministry of Food processing Industries (MoFPI) approved mega food parks (41), cold chain projects (399), agro-processing clusters (76), food processing units (588), creation of backward and forward linkages projects (61) and operation green projects (52) under the Pradhan Mantri Kisan Sampada Yojana (PMSKY) to overcome this type of situations in the future. Moreover, agri-food export increased from 13.7% in 2014-15 to 23.4% in 2023-24. Under the scheme of Pradhan Mantri Formalization of Micro Food Processing Enterprises (PMFME), 92549 micro food processing enterprises have been approved for the period of 2021-21 to 2024-25 for the strengthening of the GDP.