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**Research Article**

# Food System and Food Insecurity in COVID-19 Outbreak

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**ABSTRACT**

The Covid-19 pandemic has affected all aspects of human day to day life. It introduces changes in consumer patterns. It has increased the concern about the potential increase in food insecurity resulting from the global distress. Government all around the world took strong measures to minimize the spread of the corona virus, which ultimately lead to change the behavior, life style and consumption pattern of consumer. While studying on the above said changes that took place due to the pandemic, we came across many researches that shows that change in consumer pattern lead to change in demand and supply of various food items, consumer became more and more aware towards their health and safety while giving consideration to local and low priced items. However change in purchasing power also resulted in less food wastage and positive inclination towards natural and herbal products. Lockdown also gave an opportunity to enhance culinary habits and cooking skills. At the time of lockdown food system got severely affected as it largely hit the food security of poor and vulnerable section of society who are directly involved in food system. The disease simultaneously affected farm production, transport, agriculture, food demand, food security and food supply chain with a major impact on society.

**Keywords:** Covid-19, Food supply system, Food demand system, Food security, Lockdown.

## Introduction:

Corona virus disease (Covid-19) is an infectious disease caused by the SARS-CoV-2 virus. The first known case of this disease was discovered in Wuhan, China in December 2019. The outbreak of Covid-19 was so sudden and it spread in the world at a very high pace. The most common way by which this illness spreads is through close contact with someone who has the infection.

WHO declared Covid-19 as a world pandemic on 11th March 2020, more than 1,18,000 cases were detected and around 4291 people were died. (WHO report, 2020). As the Covid-19 spread in the world it resulted in loss of human life and challenges for the world. The social and economic structure of the world got disturbed, millions of peoples faced risk of poverty, poor health and loss of their livelihoods. (Perez-Escamilla et al., 2020)

In order to slow down the transmission of the virus, various major countries took strong actions and imposed restrictions on daily life event like complete lockdown, social distancing and closing of public place, offices and educational institutes. All these restrictions had major impact on all spheres of human life worldwide like education, economy, health, food system, culture, agriculture etc. (Fanelli, R. M. 2021)



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Food security describes the availability of food and a person's ability to afford adequate quantity of safe and nutritious food for development of an active and healthy life style. All the human being has physiological need for food, water and shelter. Various nutrients are supplied by food. Food is one of the most crucial aspects of human performance and wellbeing. Almost every country has food security as one of their development goals. Food security as agreed at the 1996 worlds foods summit, is a situation that exist when all the people at all the times have physical, social an economical excess to sufficient, safe and nutritious food that meet their dietary needs and food preference for an active and healthy life and on the contrary food insecurity is when the above conditions are not fulfilled. World food summit, (1996).

Food Insecurity is different from hunger. When food and nutritious are scarce or unavailability of food in required quantity and not affordable for a healthy life style, whereas hunger and food insecurity are related while they both are different from each other. Hunger is a physical and personal phenomena which affects at individual level, whereas food insecurity is a lack of financial resources for food necessities which affect at household level. Hunger is a global term, whereas food insecurity is not experienced by everyone. Food system plays most important part in ensuring food security in the world. Food system includes all the activities that involve harvesting, growing, processing, packing, storage, transportation, marketing and consumption. Food system is very complex as it comprises of different factors.

## Literature Review:

Ben Hassen "et al.", (2020) study the impact of covid-19 lockdown restrictions on behaviour, attitude and awareness of consumer on account of food consumption. A survey has been conducted during 24$^{th}$ May to 14$^{th}$ June 2020. Total 579 respondents answer the questions related to food shopping, consumption, wastage and other food related activities. The result shows that 29.14% of respondents purchased grocery online for the first time. They have never shopped online in the past. 33.79% respondents purchased local food items, 32.4% of respondents increased their consumption of fresh fruit and vegetables, 32.3% respondents started consuming healthy diet and 54.5% respondents increase their time spent on cooking. This research conclude that consumer prefer more healthy food like; fruits, vegetable instead of junk food and unhealthy diet.

Hassen, "et al"., (2021) study examine the impact of covid-19 restrictions on eating habits and behaviour of consumer regarding food. A cross sectional survey was conducted in Russia. 1297 valid response were collected with a well-structured questionnaire. The result of the study shows that, consumer started to reduce number of shopping visits in retail stores and started stock piling of non-perishable items. Consumer started online shopping for grocery items. Consumer also changes their behaviour regarding food. Most of the consumers reduced food wastage and started consuming healthy food instead of unhealthy food like snacks, sweets etc. These restrictions also dropped the demand of restaurant, bar and pubs.

Paul, J., & Rana, J. (2012) examine the behaviour and awareness towards organic food. For this purpose researcher collected data from 463 respondents by questionnaire from a face to face interview method, used various statistical tools and results shows that various factors like demographic (income, age), health benefit and availability effect the consumption of organic food. Higher income group consume more organic food in comparison to lower income group. Women and younger people are more health conscious so they consume more organic food. Consumers who are more inclined towards healthy life style give more preference to organic food instead of inorganic food. Most of the consumer consumes inorganic food due to the non-availability, higher price and no taste of organic food.



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McDaniel, "et al.", (1986), in his study mainly emphasis on three consumer activities: buying, preparation and consumption during the time period of inflation. This study gives more consideration to macro-economic factors such as saving, income, demand, employment rather than micro economic factors. It explains the impact of inflation on individual consumer. For this study, researcher mailed questionnaire to 750 household covering a city with 5,000 of population situated in Arkansas State and receive 650 usable response. The result concluded that over 90% of the respondents pay more attention on buying fewer luxury, snacks and grocery items. Inflated price affect food preparation and consumption method. Consumer tries to do minimum wastage, while preparation of food. Consumer prefers economical food over costly food during the inflation time period. It also shows that out of the three income groups the lower income group are more significantly affected by change in food prices. They spend a large percentage of their household budget on food items and are more inclined to engage in adaptive behaviour.

Fanelli, R. M. (2021) examined about in his study about the impact of covid-19 lockdown on food consumption behaviour of Italian consumer stay in Molise. A survey was conducted among 2142 average number of respondents with age 18 and above. Result of the study shows that first covid-19 lockdown affect the food shopping system, consumer started buying food item from small retail stores in place of malls and super market to avoid crowded places. Consumer also preferred to buy fresh fruits and vegetables than readymade food due to their health consciousness. Consumers tried to minimise food wastage and supported food safety and hygienic food for healthy life style. Most of the people started cooking at home. This lockdown provided people with more time to change overall food system from buying to consuming food.

Barman, A. "et al.", (2021) investigates the impact of covid-19 lockdown restriction on food supply system. Various activities include in food supply system starts from production and end with consumption. These activities include producing food crops, manufacturing food items, packaging, transportation, distribution, wholesale and retail store. All these activities got disturbed by government restrictions, shortage of labour, transport restrictions, change in consumer demand and behaviour. During covid-19 food safety and security became major issues for government and general public. Food safety include clean, safe, hygienic and sanitized packaging, whereas food security means everybody has minimum food to fulfil their nutritional requirement.

Jribi, S. "et al.", (2020) examined in his study about the impact of covid-19 on behaviour attitude and awareness regarding food wastage. The researcher conducted the survey with data collected from 284 respondents of Tunisia. The survey was conducted through well-structured questionnaire in French language, during 2 weeks of covid-19 lockdown (from 24$^{th}$ march to 7$^{th}$ April 2020), 72% of the respondents were women. The result shows that the covid-19 lockdown would impact 93% of the respondents, their food wastages level and shopping habits. The food waste prevention was driven more by loss of income, food availability etc. than through pro- environmental concern. The main reason for wasting food was over cooking, over buying, and lack of proper storage facilities.

Aday, S., & Aday, M. S. (2020) examined about the impact of Covid-19 on food supply system. Food system include growing crops, production, manufacturing, processing, transportation, distribution and fulfil the demand of consumer. Researcher investigates the impact of this pandemic on all of the above food supply activities. These activities are mainly affected because of shortage and migration of man power, restricted transportation and distribution, food trade policies, closure of food production and supply units. Obtaining raw material and insuring food continuity to end consumer was also a major reason of concern. Labour intensive food plants are more affected as the production was reduced or closed as the worker either migrated to their native places or they would feel that they will get sick at work. This affected he production capacity of various food facilities negatively. Food supply industries have to face the challenge of producing and to supply the food and have to be flexible



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enough to loose and tighten the restrictions according to the severity of virus. It was also important to maintain the level of food safety, security and hygiene.

Deconinck, K., "et al.", (2020) examine that food industries have to face major challenges during lockdown period for sooth food supply as well as to face the restrictions of lockdown. Various issues like shortage of labour availability of seeds and pesticides for farms and transportation were faced by the food suppliers. Inadequacy of workforce was a major issue due to no mobility of labours. Some food sectors like fruit vegetables are dependents upon the seasonal labours. Seed availability was not a major problem like lake labour shortage but still it disturbed the production for few months. Availability of pesticides was also affected because of restricted export-import as china is one of the major supplier of pesticides.

Poudel, P. B., "et al.", (2020) examined about the impact of covid-19 restrictions on food and agriculture sector. Covid-19 restrictions have affected almost every sector around the globe, out of which food and agriculture sector were one of the most severely affected sectors. The pandemic rules and regulations interfere in the supply chain as mobility of labour and input material cannot be operated smoothly amidst pandemic. It also affect the fishery live stock, poultry, dairy production and production of crops like Maize, sunflower, Wheat, Barley etc. This situation creates a serious problem of food security and it needs government assistance to handle the problem.

Gerritsen, S., "et al.", (2021) investigate the impact of Covid-19 lockdown on food behaviour like change in grocery shopping, eating, cooking and upto which extent changes in diet plan. For this purpose researcher conducted an online survey with 3028 adult's age ranging between 18 to 87 years in which 89% of the respondents were women. The time period for data collection was 24$^{th}$ April to 13$^{th}$ May 2020. During this time period the government restrictions were at 3$^{rd}$ and 4$^{th}$ level. Most of the people was staying home and also minimise their movement and limited their economic activities. These decrease the grocery shopping of readymade food and increased the cooking of fresh food. This lockdown also change the diet chart of family. People shift to unhealthy foods like snacks, drinks and alcohols. Impact of lockdown on cooking, eating and grocery shopping was at great extent. Government should start advertisement for healthy food and spread awareness to avoid unhealthy food.

Henry, R. (2020) study the change in food demand and supply and also changes in crop production system. Food security is a most serious problem in developing countries rather than developed countries. In developing countries consumer income has more effected and this created the risk of food crisis and food shortage. Pandemic restrictions fuelled the issue of shortage of labour, strict transportation policies and restrictions on supply of food items. People started buying more rice due to the risk of food shortage in near future. Researches related to food and agriculture got interrupted, food researches conferences were cancelled and food research laboratory were closed. To eliminate the concern of food shortage various innovations and techniques were introduce and people started becoming more self reliant for crop production instead of depending on other sources.

### Objective of the study:

- To study the impact of Covid-19 on demand and supply of food.
- To study the impact of demand and supply of food on food security.

### Data Collection:

In order to conduct this research, the diligent researcher has carefully gathered a comprehensive array of data from a variety of reliable secondary sources. Many countless hours has been spent towards thorough examination and analysis of 50 scholarly research papers, reputable journals, insightful articles and reliable news sources. With fastidious attention to detail, the investigator has assiduously



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collected the requisite information from these varied sources, guaranteeing a comprehensive and well-rounded comprehension of the topic at hand.

## Discussion:

Food system is one of the important spheres of life that got badly affected by Covid-19. Restrictions on business activities, transportation and migration of work-force have complicated the interaction between the various aspects of food system. These restriction significantly affected food producing, processing, packaging and logistic, consumption behavior and purchasing power of consumer. This pandemic has affected agro-industry from producers to consumers in two aspects, one from demand side and other from supply side. Both aspects demand and supply of food directly related to food security.

**Impact of covid-19 on food demand system:** The requirement for nourishment plays a pivotal role in shaping and influencing a broad spectrum of policies that are directly connected to the domains of sustenance and farming. This crucial element, which encompasses the requirements and aspirations of individuals and communities for nourishment, serves as a fundamental foundation in the formulation and development of diverse tactics and rules concerning the creation, dissemination, and utilization of food resources. The acknowledgment and comprehension of this noteworthy facet are crucial in guaranteeing the proficient and productive administration of nourishment systems, as well as in tackling the diverse challenges and intricacies that emerge within the domain of food safety and farming. The requirement for a commodity is established by various elements, such as buying power, earnings, and the longing for that specific merchandise or assistance. These three components play a pivotal role in influencing the magnitude of demand in the market. Acquiring capacity alludes to the capability of consumers to acquire commodities and amenities based on their accessible monetary assets. It considers elements like remuneration, earnings, and general prosperity. Nevertheless, it is crucial to acknowledge that amidst the unparalleled circumstances of the Covid-19 outbreak, there have been noteworthy alterations in consumer conduct and financial capability, which have subsequently exerted a profound influence on the general requirement for diverse indispensable goods, encompassing sustenance. The worldwide health predicament has resulted in a plethora of alterations in the way people perceive and tackle their buying choices, causing a domino effect on the economy and the dynamics of the market. As individuals wrestle with the ambiguities and obstacles presented by the pandemic, their priorities and inclinations have experienced a metamorphosis, thereby impacting their consumption behaviours. Furthermore, the fiscal limitations encountered by numerous individuals owing to employment terminations, diminished earnings, and economic volatility have additionally intensified the predicament, culminating in. There are numerous pivotal elements that have had a noteworthy influence on food demand throughout the years. These elements have played a pivotal role in moulding the way we consume and engage with food on a worldwide level.

**(1) Change in consumer's buying pattern:** During the preliminary phase of the primary lockdown, customers throughout the country discovered themselves struggling with a plethora of worries, varying from their individual health and welfare to the steadiness of their financial condition. Confronted with an ambiguous future and the imminent potential of scarcities, individuals undertook it upon themselves to actively tackle these hurdles by embracing a tactic of acquiring in large quantities. By undertaking this action, they aspired to decrease the frequency of their shopping excursions, thereby diminishing their exposure to potential health hazards and adhering to the suggested principles of social distancing. In recent times, an evident change in consumer behaviour has been noticed, as individuals have started to redirect their buying preferences towards petite retail stores instead of the traditional choices of supermarkets and shopping centers. The justification behind this change can be ascribed to the congested and potentially less secure surroundings that are frequently linked with bigger business establishments. Throughout the quarantine period, a



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substantial amount of grocery stores and retail centers encountered fines and repercussions for diverse causes. These sanctions were enforced due to non-adherence with the stringent rules and protocols established by the authorities to guarantee public welfare and hinder the transmission of the virus. These sanctions served as a method of implementing the essential measures and holding enterprises accountable. In light of the worldwide outbreak, customers have progressively shifted towards internet buying as a method to reduce their contact with the virus and alleviate the possible danger of acquiring it. With the ease and availability of online marketplaces, individuals are now capable of meeting their purchasing requirements from the coziness and security of their own residences. By embracing this digital metamorphosis, consumers are not only safeguarding their well-being but also adjusting to the novel standard of the contemporary world. In anticipation of unexpected situations, they started to conscientiously amass a considerable stockpile of diverse non-perishable and consumable goods, encompassing a variety of frozen sustenance items as well as an array of preserved and jarred vegetables. (Hassen “et al.”, 2020)

**(2) Change in shopping basket:** In recent epochs, there has been a conspicuous alteration in consumer demeanor, with individuals placing amplified significance on endorsing local enterprises and selecting economical sustenance alternatives, as opposed to indulging in costly labelled commodities. Furthermore, aside from their predilection for acquiring substantial amounts of nourishment, they also possessed a robust proclivity for choosing commodities that were adequately packaged instead of opting for unboxed sustenance. In recent times, there has been a noticeable change in consumer conduct, with an increasing amount of people choosing natural, botanical, and ecological products instead of their synthetic and chemically-infused alternatives. This burgeoning trend demonstrates an elevated consciousness among consumers concerning the plausible well-being and ecological hazards linked to the ingestion of synthetic tastes and chemical enhancements. As individuals grow more aware of the influence their decisions have on their welfare and the environment, they are actively pursuing substitutes that correspond with their principles and foster a more eco-friendly way of living.

**(3) Reduce food wastage:** Throughout the duration of the lockdown, when diverse communal occasions like weddings, ceremonies, and assemblies were subjected to notable limitations, a captivating consequence materialized in the shape of diminished squandering of nourishment. In recent times, there has been a noteworthy change in the way individuals tackle food surplus. Instead of merely disposing of surplus nourishment, individuals and society at large have started to adopt a more eco-friendly mindset, actively pursuing methods to employ and reutilize these remains. This alteration in behaviours has not only had a beneficial effect on diminishing waste, but it has also nurtured a heightened sense of accountability and consciousness regarding our utilization patterns. By acknowledging the significance of each fragment and making deliberate decisions to reduce excess, we are collectively progressing towards a more enduring future. The decrease in food wastage has demonstrated to be exceedingly advantageous in numerous manners. Not only does it aid in lessening the scarcity of food items, but it also plays a noteworthy role in diminishing the outlay on these vital commodities.

A study with 284 respondents done in Tunisia showed that 85% respondents wants to improve their household food waste prevention behavior and claimed to decrease wastage of their future purchases to zero and ensured to cook, store and eat food properly. (Jribi “et al.”, 2020)

**(4) Culinary habits:** Throughout the prolonged duration of confinement, a substantial amount of individuals discovered themselves with a surplus of leisure time and a yearning to maximize it. Consequently, they redirected their focus to their kitchens, enthusiastic to investigate and enhance their gastronomic skills. With restricted choices for eating out and a necessity to adjust to the novel standard, individuals commenced to amidst the unparalleled circumstances of the quarantine, an



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extraordinary phenomenon surfaced as individuals from diverse backgrounds discovered themselves with a surplus of time at their disposal. Among these individuals were those who, in the commotion and activity of their everyday lives, seldom had the chance to explore the gastronomic realm. Nevertheless, amidst the abrupt transition to a comparatively inactive way of life and the urgent requirement to embrace more nourishing eating routines, these individuals were obliged to delve into the domain of culinary arts in their personal dwellings.

**(5) Reduction in purchasing power:** Amidst the unparalleled worldwide pandemic referred to as Covid-19, authorities across the globe enforced stringent limitations and protocols to suppress the transmission of the virus. Consequently, myriad enterprises, occupations, and workplaces were compelled to close temporarily, resulting in a substantial influence on the earnings and fiscal steadiness of individuals and households. This regrettable circumstance, in return, had an adverse impact on the buying power of consumers, especially when it came to necessary goods like sustenance. The amalgamation of these elements forged a demanding and ambiguous economic terrain, wherein individuals had to maneuver through diminished earnings and restricted assets, rendering it progressively arduous to fulfill their fundamental necessities and uphold a gratifying level of existence. In an endeavour to make more sustainable choices and endorse their local community, they commenced actively searching for regional and unbranded commodities at reasonable prices. By selecting these products, they not only supported the expansion of nearby enterprises but also lessened their ecological influence by diminishing the carbon footprint linked with far-reaching transportation. Furthermore, they exerted a deliberate endeavour to counteract food squandering by incorporating tactics such as menu organization, appropriate preservation methods, and innovative approaches to employ remnants. By means of these uncomplicated yet influential modifications,

**(6) Change in food consumption:** Amidst the unparalleled worldwide outbreak of Covid-19, a noteworthy alteration in eating patterns has been noted among the majority of people. In an endeavour to prioritize their fitness and welfare, individuals have consciously made the choice to deviate from the intake of junk food and other detrimental items, instead choosing a nourishing and wholesome diet that encompasses a plethora of nutritious foods and herbal products. This extraordinary metamorphosis in dietary preferences has been propelled by a collective recognition of the significance of upholding a robust immune system and overall well-being during these demanding circumstances. By adopting a nourishing diet abundant in vital nutrients, vitamins, and minerals, individuals are In accordance with the discoveries of an all-encompassing examination carried out in the stunning nation of Italy, it has been unveiled that a vast majority of roughly 90% of the participants have encountered a remarkable surge in their utilization patterns, particularly in the domains of spaghetti and produce. This captivating information illuminates the changing dietary patterns of the Italian populace, showcasing a notable transition towards a heightened recognition and enjoyment of these delightful culinary classifications. Based on the survey findings, a substantial majority of participants, precisely 87.4%, indicated a rise in their intake of milk and dairy items. This surge in consumption coincided with another noteworthy trend, as 85.4% of participants also indicated a surge in their consumption of crisp vegetables. Fascinatingly, whilst these two culinary classifications encountered a spike in favour, the utilization of specific alternative commodities has progressively diminished among the surveyed individuals.

In a recent survey conducted in three European countries, namely Denmark, Germany, and Slovenia, fascinating insights were uncovered regarding the consumption habits of individuals during a specific period of time. The study focused on the intriguing phenomenon of people gravitating towards comfort food, revealing a notable increase in its consumption. This captivating discovery sheds light on the evolving preferences and behaviours of individuals in these diverse cultural contexts. Many individuals often find themselves engaging in stress and emotional eating, a behaviour that can lead to



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a heightened intake of foods and beverages that are rich in sugar. These indulgences commonly include popular treats such as chips, chocolate, ice-cream, alcohol, and an assortment of savoury snacks.

**Impact of covid-19 on food supply system:** The sustenance supply network plays a pivotal role in linking the agriculture sector, where sustenance is produced on farms, to the ultimate consumers who utilize it. This elaborate system encompasses a broad spectrum of activities, including but not restricted to the creation, fabrication, packaging, circulation, retention, and vending of food products. By effortlessly incorporating these diverse phases, the food distribution network guarantees that food reaches consumers proficiently and successfully. From the original cultivation of crops or rising of livestock to the ultimate acquisition by consumers, every stage in the supply chain contributes to the overall procedure of bringing food from farm to table. This extensive network of interlinked activities is crucial for sustaining a consistent and dependable stream of nourishment, fulfilling the needs of consumers, and guaranteeing the accessibility of a wide array of food items in the marketplace. There are numerous distinct elements that can exert a substantial influence on the food provision system. These elements can vary from ecological circumstances and calamities to financial factors and governmental regulations. Every single one of these elements plays a vital role in deciding the availability, approachability, and cost-effectiveness of nourishment for individuals and communities.

**(1) Shortage of labour:** Amidst the unparalleled worldwide outbreak referred to as Covid-19, the culinary sector encountered itself struggling with a noteworthy and urgent predicament that endangered its very essence: a profound scarcity of workforce. Owing to the occurrence of migratory labourers returning to their respective indigenous regions, a conspicuous outcome has been witnessed in the domain of production and fabrication of a diverse array of vital sustenance products. Auxiliary sectors, such as packaging, dissemination, and retention, were greatly affected by the shortage and heightened cost of workforce. These sectors encountered myriad obstacles due to the restricted accessibility of proficient labourers and the escalating expenses linked with recruiting and preserving staff members. Consequently, enterprises functioning in these industries were compelled to man oeuvre through an intricate terrain of employment-related challenges, which presented substantial barriers to their overall efficiency and financial gain.

**(2) Transportation:** There are a broad variety of distribution channels that are utilized in order to guarantee that the product is conveniently obtainable to consumers, right from the very location where it is produced. Amidst the prevailing Covid-19 pandemic, authorities across the globe have enforced rigorous measures to suppress the transmission of the virus, encompassing the imposition of limitations on diverse forms of transportation. These limitations have been implemented to guarantee the security and welfare of the overall population, as well as to avert the healthcare system from becoming inundated. As a consequence, individuals have encountered constraints on their capacity to journey and commute, with diminished availability to communal conveyance, restricted. In today's interconnected world, the production of goods has become a prevalent practice. Nevertheless, it is crucial to recognize that the procedure of manufacturing commodities is not devoid of its obstacles. One such predicament that frequently emerges is the predicament of boundary management and transport limitations, which can substantially affect the conveyance of commodities, rendering it a laborious and expensive endeavour. When commodities are fabricated, they generally require to be conveyed from the manufacturing location to their intended targets.

**(3) Change in demand of consumer:** The request for nourishment has considerably diminished in recent times due to a plethora of factors that have generated an ambiance of unpredictability and economic burden. One of the main causes for this decrease is the decrease in individuals' purchasing power, which has been directly affected by the present economic situation. With numerous individuals encountering decreased income and even employment termination, their capacity to afford and



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prioritize sustenance has been significantly diminished. This regrettable circumstance has led to a discernible decline in the overall requirement for food products across diverse sectors of the economy. Due to this specific incident, there was a remarkable decrease in the overall requirement for diverse food items, which consequently had a substantial influence on the distribution network of aforementioned goods.

**(4) Restricted food trade policies:** In order to prevent the occurrence of food shortages and ensure a secure food supply, it is absolutely crucial to implement measures that facilitate the movement of surplus products from areas with an excess to regions experiencing a deficit. By doing so, we can effectively mitigate the risks associated with relying solely on domestic production for meeting our food demands. This approach not only helps in maintaining a stable food market but also safeguards against potential insecurities that may arise due to insufficient food availability. Therefore, it becomes imperative to establish mechanisms that enable the efficient redistribution of surplus food resources, thereby ensuring a balanced and sustainable food system for all. However, due to the implementation of heavy restrictions on import and export activities during the lockdown period, a multitude of consequences ensued, leading to a substantial and far-reaching disruption in the intricate web of the food supply chain. When import-export restrictions were implemented, it created a challenging situation for domestic sellers as they encountered difficulties in finding potential buyers for their surplus supply. This unfortunate circumstance led to significant financial losses for these sellers, exacerbating the already complex economic landscape.

## Conceptual Model:

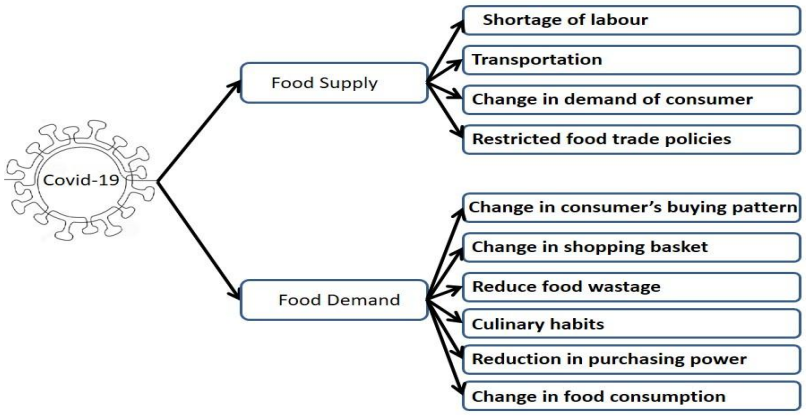



**Figure 1 shows the covid-19 impact on food demand and supply system.**

## Impact of demand and supply on food security:

Food security is a fundamental concept that encompasses the idea of ensuring that all individuals have equal and unhindered access to an adequate and nutritious food supply, thereby enabling them to meet their essential dietary requirements. It is a multifaceted issue that encompasses various dimensions, including availability, accessibility, utilization, and stability of food sources. The ultimate goal of food security is to eradicate hunger and malnutrition by guaranteeing that every person, regardless of their socioeconomic status or geographical location, has the means to obtain and consume sufficient quantities of safe and nutritious During the global pandemic caused by the outbreak of the novel coronavirus, commonly known as COVID-19, one of the most pressing issues that emerged was the severe impact on food security, particularly among the most vulnerable



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segments of the population. The unprecedented circumstances brought about by this health crisis exacerbated existing inequalities and exposed the fragility of The majority of labourers, a significant portion of the workforce, unfortunately find themselves in a situation where they are not provided with any form of monetary compensation for their hard work, nor are they granted the opportunity to take paid leaves for rest and rejuvenation. Despite their deteriorating health conditions, they were relentlessly compelled to continue their laborious duties without any respite or consideration for their well-being.

During the implementation of the lockdown measures, it became evident that the most vulnerable section of our society, including street vendors, migrants, and daily wage workers, were disproportionately affected by the restrictions imposed. This unfortunate reality posed a significant threat to the limited opportunities that were already available to these low-earning populations, exacerbating their already precarious circumstances. The majority of individuals living in poverty are faced with an incredibly difficult decision: they must weigh the options of either pursuing a means of sustenance to support themselves and their families, or succumbing to the relentless pangs of hunger that plague their daily lives. Based on a comprehensive analysis conducted, it has been revealed that within the vast and diverse nation of India, a staggering number of deaths have been attributed to the dire issue of insufficient access to nourishment. In fact, out of a total of 195 reported deaths, a distressing ratio of 53 individuals succumbed to their fate due to the harrowing consequences of inadequate food resources. This disheartening revelation sheds light on the pressing need to address and rectify the prevailing food scarcity crisis that continues to plague certain regions within the country. (FAO report 2021)

Food safety has been greatly affected by the alterations that have taken place in the food network structure. These modifications have had extensive repercussions, resulting in a plethora of difficulties and worries regarding the availability, reachability, and cost-effectiveness of nourishment for individuals and communities. The convoluted network of interconnections within the nourishment sequence has been disturbed, resulting in a domino effect that has disturbed the fragile equilibrium of our sustenance. Throughout the early stage of the lockdown, a noteworthy and worrisome problem that surfaced was the distressing surge in nourishment uncertainty among susceptible demographics. This troubling circumstance prompted diverse entities, including governmental bodies, non-profit organizations (NPOs), and societal well-being organizations, to step up and take action. Acknowledging the pressing necessity to tackle this crucial issue, these empathetic organizations promptly mobilized their assets and endeavours to offer complimentary nourishment and vital provisions to those in dire straits, notably the destitute individuals and industrious workers who were disproportionately impacted by the confinement measures. By means of their combined efforts, these committed institutions played a crucial part in guaranteeing a specific degree of nourishment stability for these underprivileged populations, providing them with a ray of hope and solace amidst these demanding circumstances.

## Increased Food Insecurity during the Covid-19 Outbreak

The Covid-19 explosion has had a momentous effect on the nourishment system and has resulted in raise food uncertainty. This is mainly because of various elements, such as increasing joblessness, the shutdown of educational institutions impacting the availability of complimentary or discounted school provisions and uneconomically households.

**(1) Rising Unemployment:** The pandemic has led to extensive employment reductions and monetary limitations for numerous individuals and households. This has directly impacted their capacity to afford a sufficient amount of secure and nourishing sustenance. With diminished revenue, individuals may face difficulties in fulfilling their fundamental nutritional requirements, resulting in heightened food uncertainty.



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**(2) Closure of Schools:** Numerous youngsters rely on educational institution meals as a dependable source of nourishment. With the shutdown of schools during the pandemic, availability to complimentary or discounted educational meal has been disturbed. This has specifically impacted susceptible children from uneconomical households, increased food uncertainty among these communities.

**(3) Vulnerability of Low-Income Households:** Underprivileged communities and impoverished households are frequently more vulnerable to food insecurity even in typical situations. The Covid-19 epidemic has additionally heightened these susceptibilities. These populations might encounter restricted entry to reasonably priced and nourishing sustenance and they might lack the means to accumulate or procure sustenance in large quantities during periods of unpredictability. To tackle these obstacles, governments, NGOs, and social welfare organizations have executed diverse strategies to offer nourishment and vital provisions to those in distress.

In general, the Covid-19 epidemic has disturbed the food system and has had a significant impact on food safety. The amalgamation of escalating joblessness, educational shutdowns, and the susceptibility of uneconomically households has contributed to heightened levels of nourishment uncertainty. Attempts to tackle these obstacles and guarantee availability of secure and nourishing sustenance for everyone persist vital throughout and following the pandemic.

## Conclusion:

The discoveries of this exhaustive investigation offer convincing proof that the ongoing Covid-19 crisis has had a momentous and wide-ranging effect on the entire nourishment system, extending from the preliminary phases of manufacturing all the way to the ultimate recipient. The convoluted network of interconnectivity within the nourishment sector has been greatly modified, requiring a comprehensive analysis of the diverse elements in motion. From the beginning, it is vital to recognize the unparalleled obstacles encountered by food manufacturers in the aftermath of the pandemic. From farmers struggling with manpower to the manufacturer is presently encountering noteworthy difficulties and hurdles due to the scarcity of both workforce and primary resources. This shortage has had a significant effect on their activities, compelling them to navigate through an intricate and challenging setting. With a restricted labour force, the manufacturer is grappling to satisfy the requirements of their clients and accomplish orders in a punctual fashion. Furthermore, the dearth of primary resources has additionally intensified the predicament, as Owing to the diminished mobility of automobiles, transportation has become considerably limited. Owing to the current conditions, diverse establishments like shopping centers, lodgings, eateries, and cafeterias had to temporarily shut their doors. This was accomplished to give precedence to the security and welfare of both patrons and personnel. Nevertheless, it is noteworthy that specific retail establishments were able to recommence operations, albeit with certain restrictions in effect. Whilst these retail stores were capable of unveiling their entrances to the public, they encountered difficulties in upholding a consistent provision of merchandise. This was mainly due to disturbances in the worldwide supply chain caused by the ongoing circumstance. As a consequence, patrons may In recent times, there has been a noticeable change in consumer conduct, particularly when it comes to wellness awareness. Consumers have become progressively conscious of the significance of upholding a robust lifestyle and have commenced to prioritize their welfare. Consequently, there has been an upsurge in the requirement for packaged nourishment alternatives that are not just economical but also endorse excellent well-being. One fascinating trend that has surfaced is the diminished inclination for labelled commodities among consumers. While brand devotion formerly played a substantial role in purchasing decisions, consumers are now placing greater importance on the nourishing worth and cost-effectiveness of the products they purchase. This alteration in perspective has resulted in a shift in the manner in which consumers assess and select their nourishment alternatives. The longing for



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more nourishing sustenance options at reduced costs. Has Amidst the pandemic, there was a conspicuous alteration in consumer conduct towards emphasizing fundamental necessities and conscientiously choosing regional products via virtual platforms. This alteration in buying patterns is probable to endure even after the pandemic diminishes, suggesting a conceivable enduring effect on consumer inclinations and routines.

In recent epochs, a noteworthy multitude of individuals have made the deliberate choice to partake in the craft of culinary within the solace of their own abodes. This novel fascination in gastronomic endeavours has been predominantly driven by the longing to diminish the necessity for regular excursions to bustling marketplaces and to alleviate the predicament of food surplus. When it comes to food inclinations, it's captivating to observe how individuals vary in their selections. It's fascinating to observe that certain individuals have a tendency to gravitate towards the soothing embrace of indulgent solace foods, while others consciously choose nourishing and health-aware food options.

## Limitations:

The scientist has invested a substantial quantity of energy and commitment into their work, ceaselessly endeavouring to collect as much data as feasible. Nevertheless, it is crucial to recognize that notwithstanding their utmost endeavours, there are still diverse constraints that prevail within the investigation. One such constraint is the dependence on auxiliary sources for data gathering, as no first hand data was employed. This implies that the investigator had to depend on data that had already been gathered and examined by others, potentially introducing prejudices or inaccuracies into their conclusions. Notwithstanding these constraints, the investigator has assiduously toiled with the accessible resources to derive significant inferences and augment the prevailing corpus of wisdom in their domain. The worldwide outbreak recognized as Covid-19 has had a significant influence on almost every aspect of human existence. From the manner we labour and interact to the manner we journey and obtain healthcare, no facet of our lives has been left unaffected. Nevertheless, in the midst of this extensive upheaval, it is imperative to concentrate our attention on particular domains that have been greatly impacted, such as the nourishment framework and sustenance stability. The investigation at hand delves profound into the intricate correlation between Covid-19 and the nourishment system, illuminating the obstacles and susceptibilities that have surfaced in this pivotal sector. As we traverse through these unparalleled times, it becomes progressively apparent that the epidemic one supplementary disadvantage that ought to be considered concerning this investigation is the reality that it lacks a distinct emphasis on any specific locality or zone. As a result, this constraint hinders its suitability in deriving definitive conclusions that are exclusive to a particular geographical area.

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