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## The increasing hunger concern and current need in the development of sustainable food security in the developing countries

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### ABSTRACT

**Background:** COVID-19 has affected millions of people worldwide. Recently, international agencies have revealed that poverty and hunger could kill more people than COVID-19 victims. Many global workforces have lost their jobs during this pandemic situation. In developing countries, most of the workers and their families live hand to mouth, depending on daily wage, and loss of income would be a hunger pandemic. Globally, the proportion of undernourished and hungry people have been on an upswing due to climate changes and violent conflicts. The millions of people are facing chronic malnourishment and COVID-19 menaces undermining the endeavour of philanthropic and food security. COVID-19 has increased the risk of livelihood by the shortage of food and distraction of the supply chain especially in the developing countries where rural expanses depend on agriculture production and seasonal jobs. So, if they are forced to limit their activities, their livelihoods will be demolished. **Scope and approach:** COVID-19 is increasing the jeopardy of food prices over the world, which would prompt a crisis in several developing countries. The government organizations in developing countries are doing well to protect people from the current pandemic. But they are also in critical situation regarding food supply chains and are facing difficulties in providing nutrient-rich foods. The susceptible people are fraught to secure household income and manage their food. In this review, we have explored the food security approach, food supply chain and risk of food shortage. Every country in the world needs to implement effective interventions to maintain open trade and food supply chains, ensure access to nutrients for all at affordable prices and develop co-operation to preserve the flexibility of universal food markets.

### 1. Introduction

The COVID-19 epidemic is confidently leading to exacerbating food security by eroding various informal food supply chains. The biodiversity of food and agriculture is (also known as agrobiodiversity) the main conceptual focus here. The three different aspects that possibly relate to disruption in the formal food chains are transportation and logistics, formal retailing and the seed system. To achieve more resilience, the

agrobiodiversity knowledge framework could be possible means to deal with every complexity in the way of food securities (Ker & Cardwell, 2020).

On the other hand, the COVID-19 pandemic offers chances for sustainable agri-food production while the multi-agency converging innovation hubs have the potential to accelerate the socio-economic recovery and accelerate green innovation (Rowan & Galanakis, 2020). The current COVID-19 pandemic and its compulsory social quarantine

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aggravate these barriers, making regular food access solutions lacking to carry on their well-intentioned plans. The capability to order groceries and home goods on mobile devices (for instance) may seem incidental. Yet, it also shows the deep drawbacks of ostracized people and the dividing nature of structural racism (O'Hara & Toussaint, 2021).

The basic role of agriculture biodiversity is identified in increasing adaptability processes which require support for strategic policies and programs. The improvement in sustainability of the food system by agrobiodiversity is needed in urban-rural areas to strengthen the community movements and organizations. These disturbances caused by pandemic illustrate the use of agriculture diversity as a mitigation resource in familiar food chains. The current pandemic has resulted in worldwide food scarcity and is intimidating to establish the enduring malnutrition and adverse health effects. Focussed between the maximum food-deprived in the world, such policies and actions by states, Non-Governmental Organizations (NGOs) and relief organizations are intensifying these negative impacts. One big challenge is the fragmentation of casual food chains and the minimal attempts to date the harness of their potential for resilience (Zimmerer & de Haan, 2020). Some informal food retailers, low-cost logistics, storage and food manufacturing could provide the world's reliable source of a healthy diet for a huge population (Crush & Young, 2019; Fan, Cho, & Rue, 2017). This food system connects poor rural and urban consumers and employees with smallholder farmers, thereby providing reasonable food and substantial jobs for food-insecure people (Rahmanian et al., 2013). Researchers have created the capacity to well expect droughts and they can begin early alerts to potential pandemics. While science does not have all the responses, governments that depend on scientific advice are likely to handle human and natural failures in a better way. Positively, these disasters will lead to additional dependence on science in tackling trends such as climate change (Mishra, Bruno, & Zilberman, 2021).

COVID-19's effects on conventional and emerging food systems, such as household, small and middle-class businesses and public markets, would most likely be serious (Barrett, 2020). The operation of informal supply chains in western South America and other places reflect vast agriculture biodiversity. The generation and distribution of agricultural biodiversity through the familiar division is a critical and flexible source of low-cost perishables (fruits and vegetables), non-perishables, and local foods for urban and rural communities. This production of agroecological resilience involves stabilizing yield, insuring against adverse weather, and fostering sustainability of the agroecosystems in general. Such advantages are important to an inclusive producer, including smallholders, the indigenous public as well as food chains and the general consumption of communities (Zimmerer et al., 2019). Nevertheless, agricultural diversity is already decreasing in Western South America and across the world (Pilling, Bélanger, & Hoffmann, 2020). Global supply chains for good quality products, such as horticultural foodstuffs for wealthy consumers, have extended quickly around developed countries over the past three decades. They have modified the food processing and marketing in developed countries and have also influenced supply chains (Maertens & Swinnen, 2012).

This commentary review aims to introduce unpredicted stresses on food security systems making several instant consents. The rapid response of food supply chains has underscored the importance of an open and predictable international trading environment, which allows firms to tap into new sources of supply when existing sources are compromised. In this review, we have also explored the policy and policymakers that have mainly avoided the blunders made during the food crisis and have also taken an assortment of other phases, which have facilitated safeguarding the sustained effectiveness of food supply chains. The promising solutions are required to extend the digital platform to empower extra trade which can reinforce food and nutritional security. Worldwide, the COVID-19 has created trouble for food supply chains that need promising provision. This can provide immediate reimbursement to food and nutritional insecure people while they bargain extremely and vital support to enhance long term food

sustainability.

## 2. Food security concerns in middle east countries

The food chain systems of gulf countries have done well in this pandemic situation to ensure food accessibility. The developments of these valuable chains are more resilient over traditional which are leading in developing countries and it also needs the attention of policymakers. This could offer a chance for the countries to deal with food pandemic. The policy involvements need awareness campaigns for providing nutrition-rich food. The food availability for migrant labourers and other susceptible sections is also a matter of concern. This would need the enhancement of present labour rules and safety grids (Karasapan, 2020).

In gulf countries (Saudi Arabia, Kuwait, Qatar, Oman, UAE, Bahrain, etc), previous food security strategies have been expressed about the food access issues. Farmland ventures, owing to a dynamic combination of financial, socio-economic, and political influences have not exceeded optimistic associated announcements. They will not contribute large amounts of food imports for the middle east countries. Instead, the inability of these policies has caused a shift in emphasis on supply chain management as a way of maintaining food quality. Rather than seeking to counter dependency on food imports, the Gulf countries now embrace and control it (Woertz, 2013, 2020, pp. 1–4; Woertz & Keulertz, 2015). Nevertheless, malnutrition contributing to elevated rates of obesity and diabetes is a risk factor against COVID-19. Food security for disadvantaged sectors of the population such as migrant workers is another issue that also needs more governmental steps such as safety nets, though an extension of these will be politically problematic if it is not unlikely. The middle east countries (this time) raced to gain preferential reciprocal links to food production abroad. Big farmland investments of food poor countries such as Ethiopia and Sudan were revealed. The COVID-19 crisis provides an opportunity to explore solutions to food security and their effect on global food systems. Miscalculations done by Gulf countries have assumed domestic and deputy (agriculture abroad) self-sustenance as the major challenge. But the real challenges are the execution of the supply chain, food diplomacy to make sure the serviceability of polygonal frameworks and dealing with malnutrition and its adverse effects, confirming the food availability for the people at higher risk (e.g. migrant labourers and sea staff) (ALNohair, 2014; Woertz, 2020, pp. 1–4).

## 3. Food insecurity in developing islands

In the case of developing islands such as American Samoa, Anguilla, Aruba, British Virgin Islands, Cook Islands, French Polynesia, Guam, New Caledonia, Niue, Puerto Rico, and U.S. Virgin Islands etc, the COVID-19 has influenced the health as well as food & nutrition. Because of their dependency on tourism and imported food together with weak home-grown food processing structures, they are facing elevation of malnutrition-related mortality due to an imbalanced diet. They need regional solutions to adopt networks thought to promote connectivity, teamwork and resilience (Farrell et al., 2020; Hickey & Unwin, 2020; Leal Filho, Lütz, Sattler, & Nunn, 2020). The steps to ensure adequate food quality in developing islands need to be taken urgently. The main task is to reduce dependency on imported food by enhancing domestic food production systems. The way that is done has to be supported by an awareness of how the food processes in developing islands are functioning. Successful domestic food production systems entail measures to enhance the establishment of storage facilities, marketing, challenging consumer expectations for imported food, restored awareness and skills in local food preparation, etc (Guariguata et al., 2020).

One strategy explored in developing the islands involves the creation of responsive value chains for nutrition that link local farmers with consumers by centralizing food production. These 'farm-to-fork value chains could improve the local capability for agricultural production

through enhancing nutritional supply in local diets (Karpyn, 2018). The current pandemic has disclosed the weakness of the Pacific food framework to externalities and has had broad effects, despite the modest number of COVID-19 cases recorded up to this point. Measures adopted to moderate hazard from the pandemic have heavily affected the travel industry, settlements, and international business among different parts of the political economy of the area and are therefore affecting food frameworks, food security and employment. Of specific concern will be the interplay between loss of wages and the accessibility and reasonableness of imported food items. So, the reinforcing provincial manufacture and intraregional exchange could fortify the local economy and give the medical advantages of consuming privately delivered and reaped food items. However, the crucial production, handling and capacity challenges remain and should be constantly overwhelmed to influence a move away from rack stable food items, especially during periods when human development is confined and during post-pandemic recovery (Farrell et al., 2020; Leal Filho et al., 2020).

#### 4. The unprecedented stress on agriculture and workforces

Agrobiodiversity plays a very important role in food production and economic growth by engaging a large share of male and female employees. This is also providing food and nutrition security commonly in developing countries. Male and Female employees act as a food producer, retailers, brokers, and are expected to have various impacts. A pandemic can intensify the gender differences and thus policy solutions can minimize the effects of the shocks. They give some viewpoints and country details of the crisis and reactions to the crisis may be a failure or provide incentives in the food system for gender equality. Agriculture and agriculturally based industries are important to agricultural sustainability and education. They provide food and contributes to economic empowerment by signing a big sharing proportion of people mainly in developed countries. COVID-19 outbreak is projected to have a major effect on food markets, both by delayed efforts to curb the disease transmission and the economic slump. The global food chain requires adapting new truths (Ragasa & Lambrecht, 2020; Rowan & Galanakis, 2020). More specifically to crop health, re-designing differentiated harvesting systems that are less dependent on artificial ideas will enhance the cropping systems resilience with upbeat effects on soil health. Lessons realized from the COVID-19 should promote the growth of more resilient food systems that can easily face similar further pandemic actions. Although several impacts of COVID-19 on crop security have already been noted, the true impact of the pandemic stays

indefinite, and thus, a review is required to measure the impact of COVID-19 on the crop protection sector, involving impacts on global plant health (Lamichhane & Reay-Jones, 2021). Based on their analysis of how COVID-19 control efforts will adversely impact rural livelihoods, food, income, and nutrition security, Griffith, Pius, Manzano, and Jost (2020) suggested aiming high transmission risk areas and activities with public health actions to protect market access and ensure agility. The current pandemic pursues to devastate health and economy worldwide, counting development in maternal and child nutrition. The impact of COVID-19 is likely to increase the undernourished people and poverty (Akseer, Kandru, Keats, & Bhutta, 2020), as shown in Fig. 1.

The disparities among countries occur because of their various developmental stages. The rural people have high jeopardy of Corona and are vulnerable to such surprise. The policymakers of the Greater Mekong Subregion should reinforce strategies that preserve the role of rural villagers in the safety net. Although the feasibility of such rapid response initiatives is still uncertain and could be measured after comprehensive effect tests have been completed, COVID-19 significantly raises the burden for policymakers in Greater Mekong Subregion countries to make accurate instructions from the pandemic (Waibel, Grote, Min, Nguyen, & Praneetvatakul, 2020). Now, it is a reasonable time to re-evaluate past policies and establish a cohesive collection of rural development policy initiatives that must consider agriculture and the role of rural areas in forthcoming growth. The small-scale business in rural areas and managing natural resources would be good for innovations and in developing communicable technology. In turn, substantial strengthening in health services in rural zones, including major changes in health outcomes, would help to sustain and increase the vulnerability of rural communities to future emergencies (Waibel et al., 2020). COVID-19 also has environmental significance such as the reduction of air pollution because of a broad range of economic slow-down activity. The inferences of a pandemic on sustainability have affected a defined food health measurement, ranging from production, storage, and consumption. Along with this, it has also affected sustainable food security, availability and accessibility, livelihood, trading and political management (Sarkis, Cohen, Dewick, & Schrö) as shown in Fig. 2.

The farmers and labourers are the backbone of our food system and play their role in harvesting, transforming, and distributing the food. During this crisis, they should be supported and protected systematically. Women also play a key role in this, but they often are not similarly compensated or recognized. Thus, they should be considered as a functional and essential share and should be treated equally. They need

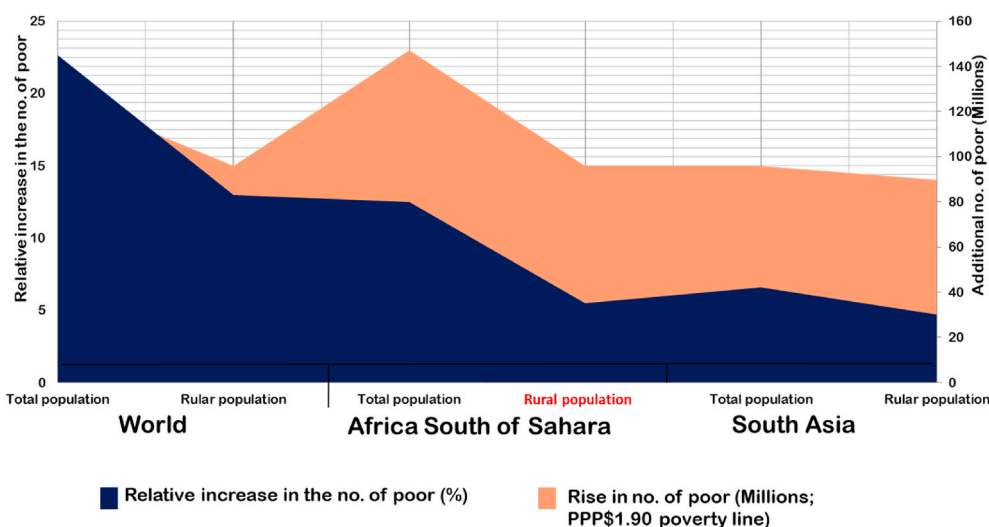


Fig. 1. Impact of COVID-19 global economic crisis on extreme poverty. The data were quoted from IFPRI. ▲ indicates the relative increases in the number of poor (%) (David Laborde, 2020).

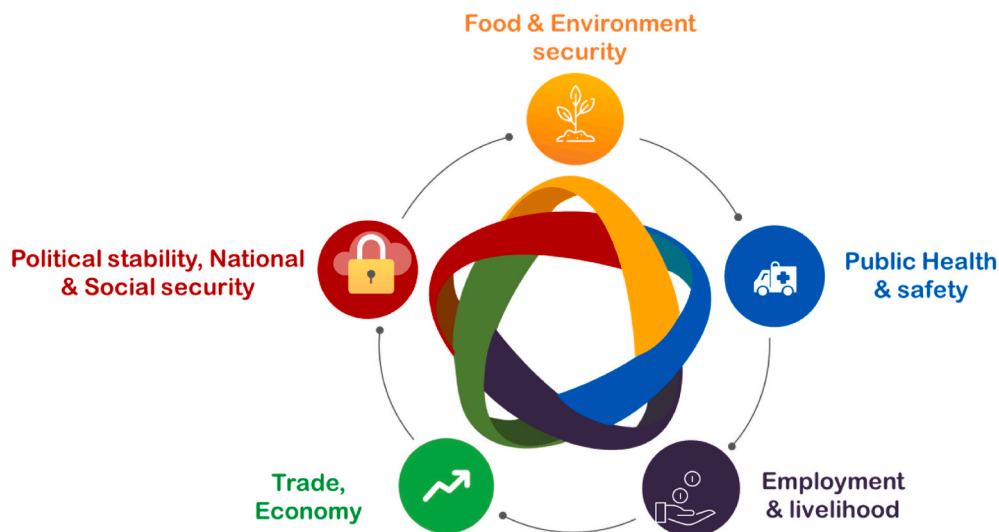


Fig. 2. The impacts of Covid-19 on sustainability.

to be supported and protected from exploitation to avoid the disruption of the food system (Satterthwaite, McGranahan, & Tacoli, 2010). The government should take distinct actions to ensure continuous support. For the extension facilities, the delivery should be digital to farmers. The subsidized delivery and other support should not be affected. However, producing food by itself will make the households easier rather than purchasing from the market from fluctuating market prices. The promised households were in a very bad state about food security measures than the employed. Though, the promised households look to own more assets. The regular and negotiable deals seem to help in buying assets but lead to an increase in food insecurity (van der Ploeg, 2020; Williams & Kayaoglu, 2020).

COVID-19 and related alleviation trials are featuring flexibility as well as weakness of food frameworks and complications for food security. The organizations are trying to assess pandemic impact, just as the recognized section focuses on actualizing readiness attempts. This is critical to accept a food domain typology framework that depends on various sorts of food conditions and individuals approach to look at how their relationship with food situations move with disturbances like Covid-19 and, eventually influences food safety (Ahmed et al., 2020; Farcas et al., 2021). In the case of India, the current pandemic impact has multi-layered shock on vegetable farmer's growth, sales, costs, incomes, and diets. It has affected the farmers on producing, purchasing, marketing and profits. More than 80% of farms reported a reduction in revenue, and more than 20% reported catastrophic declines. For households, 62% reported dietary disturbances. Most farm households registered less exposure to nutritious foods. Approximately 80% percent of families recorded capability to maintain the essential food intake, about half of households, the greatest declines in intake were in non-milk products from fruit and animal sources. The woman farmers in relations require regular protection and support for both livelihoods and health to maintain the continuous work. COVID-19 impact and consequential strategy impedance in horticultural households on both livelihoods and diets carry the possibility of the Indian economy rolling back. Informal food chains, mainly nutritious foods availability, must be included in current and forthcoming policy strategies (Harris, Depenbusch, Pal, Nair, & Ramasamy, 2020).

##### 5. Food security risk in the African continent

Agriculture remains a core basis of livelihood and food security for most of the rural population in African countries like Benin, Ghana, Cameroon, Congo, Ethiopia, Guinea, Kenya, Liberia, Nigeria, Tanzania, Uganda etc. The movement restrictions in response to measuring

COVID-19 has put implications on food security. It is mainly affecting significant staple crops in various African countries and probably worsening food security challenges. To provide a suitable food supply in these countries, there is a need to develop good policies and strategies to antagonising the problems to decrease hunger. These learned lessons will help African countries to rethink their plan and policies for sustainable economic development (Ayanlade & Radeny, 2020).

In tackling COVID-19, African governments must not overlook the jobs just like the food and nourishment security of their residents. With over 70% of the work power in the informal field with no social assurance and medical coverage, the pandemic could devastatingly affect wages and jobs just as food and nourishment security for laborers and the food chain. If inventive arrangements are not found and individuals are stressed over what to eat and other fundamental needs, they won't regard the lockdown and physical distancing that are essential to fight the COVID-19 pandemic. It will lead numerous individuals in Africa and other developing nations to a higher chance of viral infection (Lawson-Lartego & Cohen, 2020).

Huge agricultural interests in developing nations have heightened over the previous decade. While much is written on the expected antagonistic impacts of these acquisitions on nearby communities, there is a scarcity of proof of these effects. In the case of food security in Madagascar's agribusinesses. The opening agribusinesses appeared to have improved food security, flexibility, and nutrition quality in employees. Contract-based families had commonly more food insecurity than the counterfactual and disengaged families. In any case, female-headed family units appeared to be hindered as far as access to business and contracting chances. Except if consideration is paid to ladies' entrance to business and contracting chances, imbalance might be exacerbated. Interests in any case developing zones may well bring genuinely necessary business and salary opportunities for the farmer, non-farm, and administration areas. Such open doors could assume a job in lessening destitution and improving food security through expanding livelihoods, improving framework and the dispersion of food (Fitawek, Hendriks, Reys, & Fossi, 2020). The lockdown response carried by many governments in crushing the curve of COVID-19 has of course expanded the faith in digital tools to enable work and social contact. In South Africa, the state has held a phased but fortress tactic with adverse impacts on livelihoods and food security, especially those in the casual economy and those with part-time or unstable service. The community action network initiative began to allow neighbourhood aid through WhatsApp groups in Cape Town (Odendaal, 2021).

The movement restrictions dramatically decreased competition, food vendors could have been interested to get the advantage of the perceived



heterogeneity of economic movement by helping their expanded market strength at cost of producer and consumers. The objective proof of increasing wholesale and farm marketing price gaps detected during the COVID-19 crisis (Ihle, Rubin, Bar-Nahum, & Jongeneel, 2020). Impacts on food health vary in severity based, whether the food demand of most families is primarily dependent on the survival of farming that overcomes in many rural areas across the globe, or whether the food supply depends on market processes whose functionality is crucially determined by the stability of the international food supply chains (Ansah, Gardebroke, & Ihle, 2019). These delivery chain interruptions are affecting customer food situations, which combined with COVID-19 alleviation estimates like lock-down, influence food access, dietary selections, and food safety. The weight control plans that we devour and their impact on the metabolic system and nutritious condition also have significant ramifications for the movement and COVID-19 pathogenic (Muscogiuri, Barrea, Savastano, & ).

To assess the effects of a pandemic on food frameworks just as distinguishing passage focuses on executing moderation and readiness attempts, structures, and apparatuses are required that take into consideration recognizable proof of food framework strength. Flexibility is fluidly characterized including the capacity of a framework to assimilate unsettling influence and hold a similar structure and capacities. A food framework's strength approach tends to the puzzling connections inside food frameworks despite aggravations, for example, environmental change, pandemic, just an association of these intensifications. Furthermore, methodologies for inspecting food security emergencies worldwide have concentrated on explicit phases in the food esteem system (Ahmed et al., 2020; Tendall et al., 2015).

The modest farms and labours are required for food production. Hiring labour may be affected due to prospective labourers unwilling to travel to work sites or movement restrictions and social distancing regulations so the numbers of labourers cannot work together. The food channel introduces numerous ways, but the lockdowns affect its productions. Several countries are keeping the retail markets open to continue trading and consumers are also allowed to buy the food products from supermarkets. The limitation on people's movement can lead to the shutting of large and familiar markets, from where a big portion of food products purchased by the urban poor. This turned into a challenging condition for foods with inadequate self-life of food resources like fruits, vegetables, and meat. Resultant movement restrictions may unpleasantly affect the quality and quantity of food (Harvey, 2020).

## 6. Economic recession and sustainable food security

The COVID-19 has shown millions of families into economic misery and has been defined as additional fatal than the 2008 global economic crisis. It has been predicted that half a billion people could be propelled into poverty (Akseer et al., 2020), as shown in Table 1. The accessibility, access, steadiness, usage, and the 'food frameworks' methodology both give all-encompassing structures to investigating food items security. Sen's 'privilege' approach is helpful for disaggregating request symptoms on family unit creation, work, exchange, and movement-based training to food. Drawing on the qualities of every one of these casing works can improve the comprehension of the pandemic's effects on food security. Additionally, indicative territories for governments and different on-screen characters should mediate in the food agenda to ensure the food security of family units left vulnerable by COVID-19. Standard theoretical structures of food security, generally connected with the Food and Agriculture Organization have four columns: accessibility, access, usage, and strength. The accessibility indicates the availability of comprehensiveness to food delivery. Access allows a viable interest for food and neighbourhood of business sectors i.e. physical access. Further, the usages are describing the natural preparation of food which is mostly identified with dietary quality. Lastly, the strength catches the dynamic angle as food is needed in everyday life,

**Table 1**  
COVID-19 global economic recession in 2020.

	Percentage change from base year values				
	Real GDP	Household consumption	Export of goods (value in constant dollars)	Agri-food real value-added	Agri-food exports (value in constant dollars)
World	-5.0	-1.0	-20.9	-1.8	-24.8
Developed countries	-6.2	-0.1	-23.5	-3.1	-23.8
Developing countries	-3.6	-2.5	-18.0	+0.1	-30.5
Africa south of sahara	-8.9	-3.2	-35.2	+3.9	-20.6
South Asia	-5.0	-3.7	-27.1	-2.0	-30.7
South-east Asia	-7.0	-4.2	-27.7	-2.8	-31.9
Latin America	-5.9	-4.4	-30.8	-3.9	-28.5

Real GDP indicates to the Gross Domestic Product, cited from IFPRI, discussion paper 01993, (David Laborde, 2020).

being food secure requires dependability in the other three columns after some time. At the full-scale level, COVID-19 has not yet undermined food accessibility to any observable degree. Nonetheless, there are worries about the watched conduct of certain nations to diminish their food fares to secure national supplies. Inside nations, the horticulture division has ordinarily been excluded from lockdown limitations, to guarantee congruence of food yielding (Devereux, Béné, & Hoddinott, 2020).

The conversation that highlights around low and average pay nations, considers additionally different stuns and stressors that by and large influence neighbourhood food frameworks and their on-screen characters in those nations (climate-related, monetary, political, or social aggravations). The perspective on existing (for the most part dark or media-based) accounts on COVID19 proposes that, except for the individuals who lost individuals from their family to the viral infection. The primary effect of the pandemic gets essentially from the lockdown and versatility limitations forced by national/local governments, and the result that the ensuing loss of salary and obtaining authority has on individuals' food security, specifically poor people. The most conspicuous advances made on family flexibility with regard to food security and philanthropic emergencies to distinguish a progression of exercises that can be utilized to improve our comprehension of food framework strength and it connects to food security with regards to the COVID-19 emergency and different other challenges. The interruptions of national economies following the different types of limitations forced by local or potentially national experts in light of COVID-19 are a case of those stuns/stressors that influence the capacity of local food frameworks to work (Béné, 2020).

## 7. The dire requirement for integration of nutrition interventions in COVID-19

The harmonious compatibility between human nutrition and infections are competently known, and the involvement of nutrition in health are also known. Nutrition plays a significant role in preventing infections. Interruption in the vital necessity of nutrition interference in the prevention of short and long term may lead to exacerbating health problems and can affect the long-term effect on human health and economy. Therefore, awareness of nutritional capabilities and appropriate involvements are important for developing countries. The current pandemic has set a new challenge for the people to sustain a vigorous food diet as it requires maintaining good health and good immunity. It has been proved that a nutritionally balanced diet has a profound impact on the immune system and helps to combat disease vulnerability

including COVID-19 (Hakeem & Sheikh, 2020; Naja & Hamadeh, 2020). A recent study stated that the bioactive compounds found in food help to boost the immune system and have a strong relation with COVID-19. A suitable and balanced nutritional diet offers appropriate nutrients for healthy immunity against respiratory infection like COVID-19. The minerals and vitamins show a significant role in metabolism and improving immune or defence systems and antioxidants found in food ingredients may provide support to prevent tissue damage by inhibiting virus-induced cytokines storms (Mayasari et al., 2020). So, the production and consumption of functional foods and biologically active substances should also be amended in terms of boosting the immunity system and mitigating this pandemic (Charis M. Galanakis, 2021; Khalifa, Li, Mamet, & Li, 2019; Khalifa et al., 2020; Zhu, Khalifa, Peng, & Li, 2018). Therefore, the production of functional foods is very crucial to provide a balanced diet. The application of emerging food processing technologies has been proved to be very important to develop a good functional food product that can provide balanced nutritional components i.e. proteins, carbohydrates, lipids, minerals, vitamins, polyphenols, glucosinolates, polyphenols, aroma compounds, and enzymes. For instance, modern nonthermal technologies are very effective to produce nutritionally safe products without affecting bioactive compounds and other physicochemical properties. They either increase bioactive compounds or help to retain their original qualities found in the raw materials (Barba, Galanakis, Esteve, Frigola, & Vorobiev, 2015; Bursac Kovacevic et al., 2018; Deng et al., 2015; Charis M.; Galanakis, 2018).

To address these issues, we need to develop a suitable food supply chain that can provide healthier food diets, which may have balanced bioactive compounds to improve immunity and improve their food security (Galanakis, Aldawoud, Rizou, Rowan, & Ibrahim, 2020). The sustainable development of the food system would have been a main problem in the current pandemic, this should be revived carefully to avoid a food crisis in the coming future. The current scenario needs specific measures and policies from the state to avoid food shortage and allow transportation to maintain the food supply chains and provide suitable foods to the people. Hence, policymakers should focus to design a fertile ground for sustainable development of food scheme by reforming food production with improved packaging and supply chains, by guiding towards sustainable consumption choice in a combination of tax and education and also by investment in talking food waste into a reliable energy source with biorefineries (Charis. Galanakis, 2020; Giudice, Caferra, & Morone, 2020).

## 8. Conclusion and future prospective

Food security issues differ in nature, strictness also depends on the conditions during an emergency. Any hurdle in crucial food service leads to affect food security. Food security can be obtained through awareness and safety guidelines. For instance, harmless steps in food handling can prevent infections. Further, there are several other steps, which would help to maintain the food security like often hand cleaning and washing, right cooking temperatures, proper freezing, purchasing frozen foods and avoid buying leaky packing meat or other food products (Rizou, Galanakis, Aldawoud, & ). The rapid spreading of the COVID-19 pandemic undermines the position of local food markets that include highly populated areas of urban conglomerations so that they rely on exported food. It has affected various aspects. During the pandemic or crisis, falling production is important to maintain the unceasing food supply between and within the countries. Because the disrupted food supply chains during the crisis lead to an increase in the retail prices at local markets. This increasing retail price may be due to shortage and delayed deliveries processing plants might have required closed or enhanced transaction costs. These increasing costs may have also happened due to the newly set up delivery process, maintaining hygienic conditions, and delays in crossing borders etc. Collaborative governance and increased transportation connectivity are required to ensure strong

and affordable food retailing amidst the COVID-19 pandemic.

The hopeful innovations include a free open market for selling food and customized food delivery also needed in food chains. The actual transition and practicable with current skills to access social media and cash-free payment can support the agrobiodiversity food. The promising solutions are required to extend the digital platform to empower extra trade which can reinforce food and nutritional security. Worldwide the COVID-19 has created trouble for food supply chains that need promising provision that can provide immediate reimbursement to food and nutritionally insecure people while they bargain the extremally and vital support to enhance long term food sustainability. To overcome these problems, the private and government organizations dealing with food-agribusiness are required to develop a novel option to alleviate long term effects. The survival of a fraught business could modernize the product's invention to maintain demands. For instance, the people working in the flower sector could practice greenhouse, cold chains, and storage facilities to strengthen the manufacturing of vegetables at high demand. The world's growing population needs food and it is a great enticement for enhancing investments and invention. The agricultural service movement needs to be free to make the food supply chain open in pandemic conditions. The restriction of trades and closure of borders offers a chance to invent domestic food supply chain systems in developing countries that depend on imported food.

Currently, the contribution package with a short-term loan system needs to be started just to support the small-scale traders and producers. The applied food research could provide a direct benefit to different social organizations that can increase food production and improve nutrition. As it is collectively working on a small island. This research would consider the ideas of engagement among youth, women and the people living in poverty to inform working strategies for increasing community resilience and sustainable food security in pandemic situations. The approaching new strategies for scaleup of local food production and consumption will be crucial in developing countries. There is still a formal analysis of COVID-19 impact on the food system and their factors need to be investigated. However, the various problems are likely to be seen in coming times. Need to remember that the agriculture-based food industries are one of the common sectors which have been regularly protected by governments.

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