



# **Addressing Impact of COVID-19 Post Pandemic on Farming and Agricultural Deeds**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

COVID-19 global pandemic has badly hit the business of farmers whose story has largely been in the shadows. The main objective of this article is to highlight the connection of global pandemic with agricultural and food systems. For this, secondary data were collected through online portals, daily national newspapers, and published scientific articles and analyzed. The result shows that from pandemic to lockdown, locust to heavy rainfall, unsold crops to rotten crops, financial crisis to acute hunger, has brought agricultural activities to standstill, where people value only those who can produce food for them. It is high time for action and priority must be given to the farmers who are putting their hard work to thrive the whole world as that of police and health workers. The government needs to take vigorous steps to facilitate farmers using automated machinery facilities like autonomous tractors, seeding robots, robotic harvesters, drones and ICTs, toll-free numbers; enhancing quality seeds, fertilizers and direct financial funding on vulnerable farmers to build agricultural sector resilience to the pandemic.

*Keywords: Global-pandemic; lockdown; agriculture; vulnerable; food security; resilience.*

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## 1. INTRODUCTION

The world has changed only in a few months which has led to unexpected consequences. The outbreak of novel coronavirus disease, comprehensively named as COVID-19 which was first developed in China [1], caused by a novel coronavirus SARS-Cov-2 has left no sectors untouched [2]. With the death of thousands and dramatic impacts across the global economy, it has compelled governments around the world to prepare contingency plans and packages along with the contemplation about our future [3,4]. Consequently, this has brought the world to a standstill. The Shutdown of industries, factories, and all other business has led our planet to recover itself. Compared to last year, we can observe a noticeable drop in carbon and nitrogen dioxide emission, coal consumption. Residents in (Venice) Italy are in shock by seeing the fishes playing hide and seek in the clear water of the canals, the sky has got a clearer view and its actual color [2]. Besides these, the agricultural sector is facing significant hurdles because of amid concerns COVID-19 pandemic and lockdown as it forces the countries to restrict their border entries (The Kathmandu Post, 2020).

Self-isolation, social distancing, and travel restrictions have emerged the issues of food securities because agricultural agencies are permanently-partially closed. The deficiency of migrating laborers, stoppage of transportation, and shutdown of borders have crumbled the market prices making the producers unprofitable [5]. In weather-dependent agriculture, even the smallest delay in planting or harvesting crops can cause less production and a massive loss for farmers that ultimately bring about a food crisis (The Kathmandu Post, 2020). Everything waits but vegetables won't wait for the lockdown to end before perishing. So, they must be treated as frontline workers by banning profiteering and illegal trades [6]. On one side, the world is coping with global Zero hunger efforts, on the other side COVID-19 is provoking poverty of 14 to 22 millions of people around the world, especially farmers [7],IFPRI, 2020. Another real problem started when the deadly invaders, crop-eating insects (Locusts) have damaged tons and tons of agricultural productivities [8]. The lockdown has truly proved agriculture is the backbone in every country and offered a solitary situation to manufacture strength about food arrangement, Law-based agro-based frameworks to assist the farmers worldwide [9]. The objective of this

review is to assess every possible immediate challenge due to Covid-19 pandemic across the world and suggest mitigation measures by extension of the agricultural system to access a sustainable food system during and even in the post-crisis period.

## 2. METHODOLOGY

During our study, relevant information related to COVID -19, its impact and resilience strategies of farmers were taken into account, from different secondary sources as articles, newspapers. Different UN specialized agencies; The World Health Organization (WHO) reports, Food and Agriculture (FAO) reports, WTO (World Trade Organization) reports and different online portals like goggle scholar and research gate are the major sources of evidence for this study [10,11]. All these information were arranged and piled in sequential order, after continual exploration, finally, a full review article was prepared.

## 3. DISCUSSION

About 25% of people in the world are directly involved in agriculture in which, 92.02% of people of Burundi (highest in the world) and 65% of people of Nepal (highest in Asia) are dependent on agriculture. In India (42.38%) and in China (about 25%) people are dependent on agriculture (TGE, 2020) whose total populations are 1.353 and 1.393 billion respectively in 2018. The detailed list of employment percentages in agriculture of the top 20 countries of the world is given in Table 1.

Farmers and agricultural workers are the unsung heroes whose stories have largely remained in shadows. Climatic disasters like erratic rainfall, high temperature and drought [12,13] are always the major threats to the farmers. After December 2019, COVID-19 is another major threat. Farmer's shoulders are quite heavy since the outbreaks of pandemics have added the responsibilities to tackle global food insecurities [14]. By this time, farmers are hesitating about whether they should start planting and how much since they are compelled to store their unsold produce for a longer period of time, leading to a reduction in food quality as well as an increase in the cost of production, as agriculture produce are mostly perishable in nature [15]. Almost 4 million gallons of milk is being dumped across the nation as assessed by dairy ranchers in America due to the closure of dairy companies which has resulted in the world's food landscape change

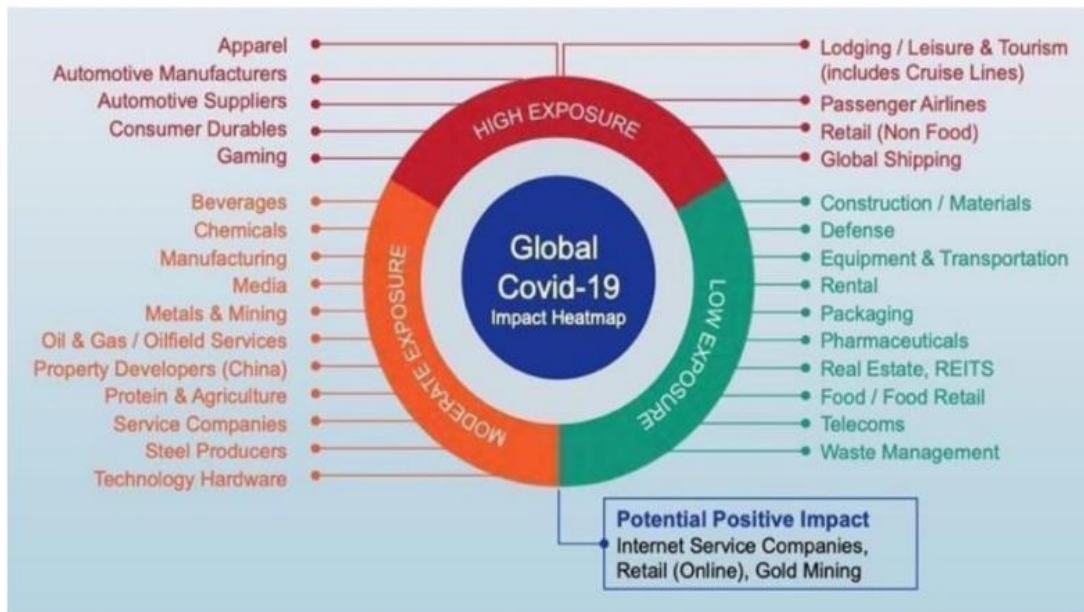
dramatically in just a month [3]. In the context of Nepal, dairy products worth 41063035.00\$ seems on the verge of deterioration, while dairy products worth 16425214.00\$ have been damaged (Nepali Sansar, 2020). The main agricultural issues are that the farmers have to face logistics difficult to get inputs such as; seeds, fertilizers, and insecticides. China, being the country with the largest producer and exporter of the fertilizer in the world has affected the international fertilizer trade, because of its severe lockdown. Livestock farmers are mainly stuck in these problems in which 38.5% of them are listed in the major challenge "logistics disruption", compared to 35.6% of all agricultural enterprises, 19.7% for nonagricultural enterprises and 18.9% for the service sector [16].

Around 820 million people are facing chronic hunger and 13 million are facing acute severe insecurity [15], IFAD, UNICEF, et al., 2020. More

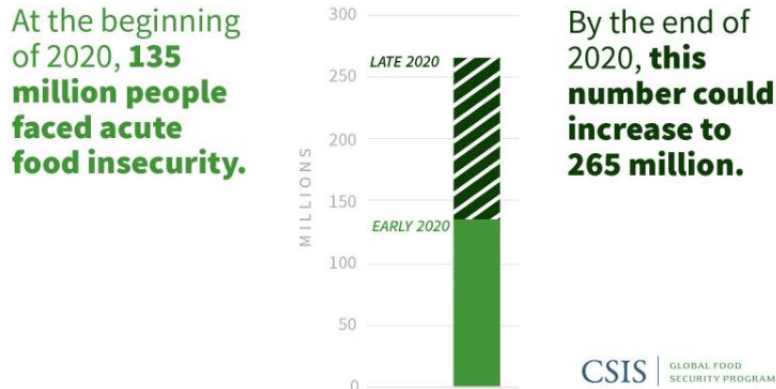
than 1.4 million people i.e. 14% population in Bolivia is suffering from food scarcity as they don't have reliable economic sources to buy caloric food, and approx. 7 % of them are suffering from chronic hunger. India, where, nearly 16500 farmers obligate to suicide even before this pandemic, we cannot portray how this covid-19 psychologically and economically affects them [17]. Rajkaran Shukla from Uttarparadesh (India) was compelled to suicide in his own field as he couldn't pay the debt due to the loss caused by the scarcity of laborers for harvesting crops [18]. There are lots of cases like Rajkaran Shukla around the globe where ranchers are compelled to be killed not by disease yet by basic mental pressure. In the context of Nepal, one person has already died of acute hunger and others are on the verge of starvation in Pathari's Musahar Community (The Kathmandu Post, 2020). The figure below shows the data of people facing acute food insecurity.

**Table 1. List of the top 20 countries of the world**

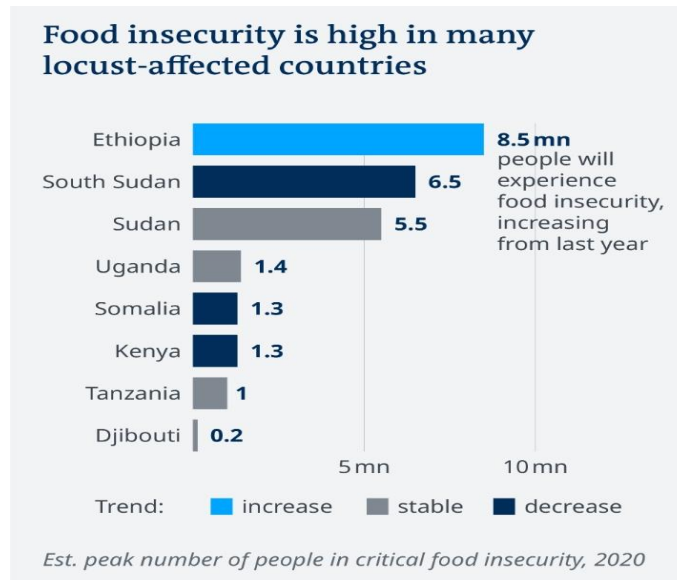
S.N.	Countries	%	S.N.	Countries	%	S.N	Countries	%
1.	Burundi	92.02	8.	G.-Bissau	68.14	15	Mali	62.59
2.	Somalia	83.11	9.	Zimbabwe	66.54	16.	Laos	62.42
3.	C.A. Republic	77.32	10.	Ethiopia	66.13	17.	Rwanda	62.41
4.	Chad	76.56	11.	D.R Congo	65.43	18.	Guinea	61.74
5.	Niger	75.06	12.	Tanzania	65.31	19.	Eritrea	61.21
6.	Uganda	72.67	13.	Nepal	65.00	20.	Euro Area	60.39
7.	Mozambique	70.33	14.	Madagascar	64.22			



**Fig. 1. The COVID-19 heat map**  
 Source: Moody's, Covid-19 Impact Heat Map



**Fig. 2. People facing acute food insecurity**  
 Source: CSIS, Global Food Security Program



**Fig. 3. Food insecurity in locust-affected countries**  
 Source: IPC GRFC 2020, IPC Phase 3 or higher

Void shelves can be frightening, but void fields and barns would be devastating (TAFBF, 2020). The functioning of the agricultural system is not the same as other beneficial frameworks as they are exceptionally defenseless against these pandemics. Due to the fear of pandemic and its spread, the Pokhara municipality stopped the import of vegetables from the neighboring districts due to which consumers are facing the skyrocketing market price while the farmers are regretting the rotten crops in the fields and facing the consequences [19]. On the other hand, the deadly invaders Locusts have distressed the

farmers so badly. After wreaking havoc in East Africa, swarms of Locusts have entered India from Pakistan causing an agrarian catastrophe. In addition, the current monsoon rainfall can enable them to multiply their eggs which may cover the face of the whole land leaving no green [20]. The Food and Agriculture Organization having a locust monitoring and warning system already warned about locust swarm invasion in India and Pakistan before 2 and half a month, but instead of considering this as a deadly pandemic, they ignored them. The figure below shows the food insecurity in locust affected countries.

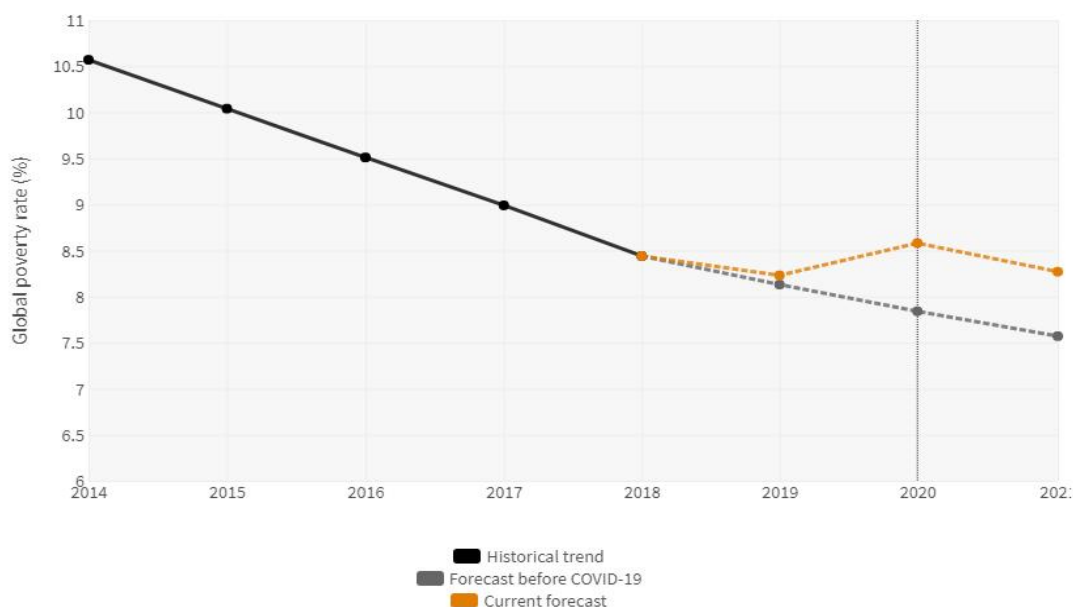
People need food and they need farmers as well, thus new passages have been relied on to improve food structures by encouraging farmers to create acceptable, nutritious, socially valued and widely accessible food [21]. It is clearer than ever if we really want to improve supply chains in order to cope up shortly or for a long time, we need to change the way we produce, trade, travel, and consume. Millions of farmers are responding creatively to mitigate this pandemic disruption by applying non-traditional farming. One can grow organic vegetables in their own backyard using hydroponics, sack gardens, plastic water bottles, etc. Rooftop gardening has lushed people's houses with different vegetables thriving terrace farming (TRN, 2020). An umbrella organization of agricultural cooperatives, NACCFL (Nepal Agriculture Cooperative Central Federation Limited), is now working in the frontline to market the vegetables in 3 steps which includes a collection of demand from customers through online and direct calls, packaging agro-produces and finally the home-delivery (World's Farmer Organization, 2020). The International Institute of Environment and Development (IIED), which helps producers in their farming business, initiated a project called Empowering Producer In Commercial Agriculture (EPIC) has been assisting the local government of Gadawa, Dang and many other parts of Nepal to discover small scope producers and landless societies [22].

Urgent action needs to be employed to mitigate the crash that Covid-19 has posed on the agricultural sector and vulnerable farming groups whose livelihood entirely depends on cultivation, along with their health safety and the products market security. Though no intervention can label all frangibility of poor farmers, our concerns should focus on rebuilding the resilience of the agriculture sector [23]. If we are unable to mobilize immediate actions and strategies, the world would lose lots of Shuklas amid this pandemic. So, government sectors, agriculture research, and extension wings, concerned organizations have to come ahead and support vulnerable farmers economically as well as psychologically. The figure below shows the impact of Covid-19 on Global Poverty.

The focus point of the administration in this manner should be to guarantee the lives of every resident. Individuals who have been living on farming or associated activities and those who have lost their pay from work at this lockdown period should be furnished with alternative avenues until the economy bounces back. To

address the grievances of agriculturists and inquiries relating to the declared measures of Government, accessibility of agri- inputs, devoted toll-free helplines/call centers must be built up by the government (Prevention Web, 2020). In the medium- to long-term, governments have to contribute wisely to diversify the agrarian economy from product reliance, which decreases money related vulnerabilities and builds capacity to resist and recover after financial slowdowns and downturns [24]. Information and Communication Technologies (ICTs), autonomous tractors, seeding robots, agricultural drones, IoT (Internet of Things), handy solar powered vegetable and fruit vending vans can be utilized during farm handling, Post-harvesting, stockpiling and food transportation [25]. This can reduce the dependency of farmers on migrant workers though initial investment is high on these technologies. For uninterrupted sowing operations in the community, quality seeds must be reached to farmers. Subsidies must be provided to the manufacturers of automated types of machinery to overcome the labor shortage [26]. The DAE (Department of Agricultural extension), DLS (Department of Livestock Services) and DoF (Department of Fisheries) can collaborate to launch programs for assessing the various field situations and connect for urgent solutions to farmers, which are the frontline responders of Covid-19 ensuring farming production and food security [24].

Approaches have to be implemented immediately; otherwise, post-emergency will be fiercer. So, every nation should announce a moratorium on agricultural term loans, including crop plans, for a certain period of time, maybe 3 to 4 months. As the rainy season is quickly drawing closer, institutional lending of crop loans should be expanded and facilitated for a smooth flow of credit to borrowing farmers. Agri-inputs; seeds, fertilizers, agro-chemicals, etc. must be pre-positioned for easy accessibility and private segments must play a critical part with vital policy support (Prevention Web, 2020). To compete with the global markets of leading producer-countries, technological dispersion is expected to accelerate, after this pandemic. Also, NDP (Net Domestic Product) aimed to increase investment in the agricultural sector as irrigation, increasing productivity and expanding domestic as well as global markets that could empower the farmers (The Kathmandu Post). We should make our local economy much more resilient, that when this same scenario comes to appear in the near future, we won't rely upon the border entries.



**Fig. 4. Impact of COVID-19 on global poverty**

Source: PovcalNet, The global poverty rate is measured as the share of the world's population living on the less than \$1.90 per day

#### 4. CONCLUSION

The unprecedented surge of COVID-19 is really a wakeup call for all of us. This pandemic is clearly testing the whole food chain system. It is high time for action and priority must be given to the farmers who are putting their hard work to thrive the whole world as that of police and health workers. A paradigm shift is needed by digitizing agricultural tools. To guarantee that food independence can be improved everywhere throughout the world, we have to discover new techniques that are less subject to outer factors like atmosphere and climate. As we can see, all of us are paying the costly price of using our environment recklessly. Let's get started from our own kindergarten, recycling wastes into wealth. Producing locally may not be an answer, but as the COVID-19 emergency has high-lightened in the time of crisis, every little bit helps in reducing food insecurity.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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