



Cascading Risks from COVID-19 to Food Systems

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31 March, 2020



Introduction

This report explores some of the existing stressors caused and worsened by COVID-19 around the world, and demonstrates current and future pathways to protracted food insecurity, unless early actions are taken. Along with the health impacts, COVID-19 has affected labour markets, migration, transportation, the food supply chain, international trade and economic livelihoods. This briefing attempts to highlight risks that could increase food insecurity and to provide potential mitigation measures.

Section 1, key takeaways, looks at cascading food risks and why they are critical to attend to at this time and highlights the urgency to investigate and mitigate them. It also includes the India Case Study, which highlights the perils of acting in haste and what lessons can be learnt from this.

Section 2 deals with food security impact of COVID-19 on vulnerable populations. It characterises different types of risks that are currently present or have a potential to occur. It should be noted that this list is not exhaustive and only includes those most likely to be materially significant.

Section 3 looks into locusts, which are likely to compound the COVID-19 related food systems problems in countries which are already economically precarious and/or in conflict.

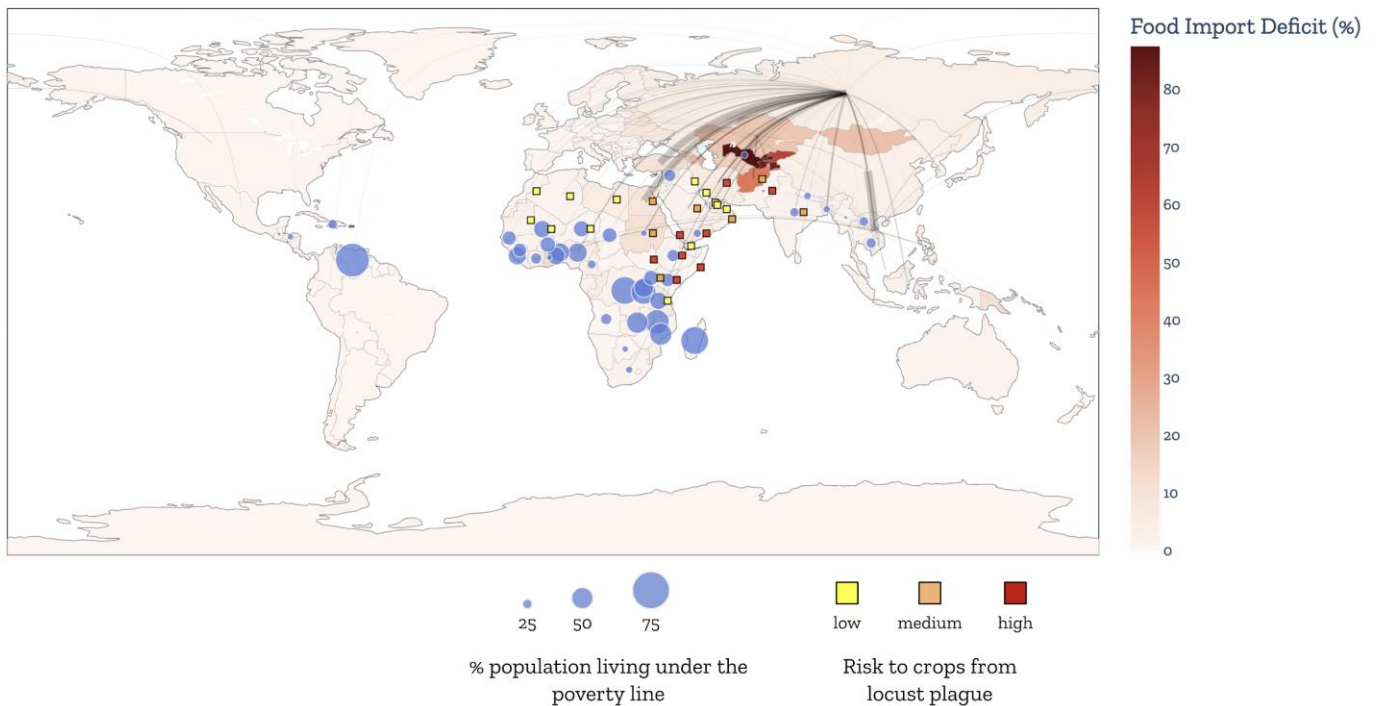
Section 4 investigates trade-related risks of COVID-19. It covers the potential of food export bans and restrictions, importance of key exporters as well as the impact of global stock distribution.

Finally, conclusions provide a summary of potential mitigation measures to be adopted by industry, governments and the global community.

The diagram below overlaps vulnerability, current locust infestations and existing trade restrictions



Fig. 1 - Impact from food export restrictions as of 28 March, 2020 including vulnerable populations and additional risk from locusts



The South Asian subcontinent, Western Africa, and Venezuela have the highest number of economically vulnerable people. However, current policy and risk extend vulnerability to the Horn of Africa, parts of the Middle East and Central Asia, especially Iran. This leads to a potential increase in the large absolute numbers of those already food insecure in the upcoming weeks.



Key Takeaways

The loss of day wages and informal sector income and employment caused by COVID-19 lockdowns deprives families around the world of income, rendering them unable to purchase food, which has already been seen in India.

This is a critical and urgent issue across many low-income countries across Sub-Saharan Africa, South Asia and parts of the Middle East.

Unless a well distributed cash transfer system is established, a lockdown would shift many of the vulnerable poor into impoverishment and leave them unable to purchase food.

Distributing money to all citizens presents challenges, especially to the unbanked or undocumented, and countries are encouraged to explore all available options, e.g. engaging electoral commissions, distribution through cooperatives/village networks, military, telecommunications (mobile money) and local government. Inflationary concerns from finance ministries of cash transfers should be counterbalanced with macroeconomic trends.

Food export bans could plunge food importing nations into food deficits, and many of the global poor into malnutrition through price effects and actual shortages. Multilateral efforts must be made to ensure that trade continues to flow and to reward continued global cooperation.

The complexity of feedback loops should not be underestimated. Fears of economic vulnerability and plunging incomes could lead to pre-emptive export bans to depress local prices and ensure affordability. Food export bans could lead to an increase in global prices and feed into an increase in local prices. **The total effect of several stresses to the food system is greater than the sum of its parts and may trigger feedback loops that lead to worse outcomes.**

The concurrent locust crisis is unpredictable both in terms of its possible scale and where locusts will travel. The regions most affected have already warned of negative impacts on food security. If the exponential growth of these swarms remains untreated,



they could spread into the world's breadbaskets, such as Punjab, India, where they would cause significant production loss.

There are incredibly vulnerable regions, where food stocks will dwindle in upcoming months. The analysis of the selected factors shows concurrent shocks of COVID-19 and the locust crisis will disproportionately affect some of the poorest countries, especially those currently involved in conflict. Governments and the donor community need to implement early, preventive actions to avoid potential food crises, particularly in these countries:

Eritrea	Ethiopia	Somalia	Kenya	South Sudan	Iran	Pakistan
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COVID-19 will have other cascading effects which are uncertain and difficult to predict.

Below, a selection is briefly presented and will be explored in more detail in future work.

- **Loss of labour, and movement of key agricultural workers:** When the peak number of COVID-19 cases coincides with harvesting times, there could be repercussions across the supply chain. A lack of key workers for harvesting food or transporting and distributing food could lead to production loss or waste. This could be worsened by government policies of movement restriction, especially in countries which require migrant agricultural workers.
- **Trade disruption and delays:** There have already been port disruptions due to a lack of key workers. As COVID-19 spreads throughout India and Sub-Saharan Africa there is a distinct possibility of rapid spread and peaks of a much higher proportion than has been seen elsewhere. This is due to higher urban population density, lower trust in governance, and likely less stringent measures taken by governments. A loss of key workers on this scale could lead to port closures, and possibly affect train and lorry freight. Delays in freight would impact food flows, and could delay shipments to vulnerable food importing nations.



India Case Study

- On 24 March, India announced a nation-wide lockdown for 21 days with 4 hours notice.
- This left an overwhelming proportion of India unable to work, with the vast majority having no cash to purchase food or pay rent.
- It took two full days (26 March) for cash assistance to be announced, with cash transfers through the BJP (dominant political party) which does not have offices in all neighbourhoods.
- As of 30 March, there has been population movement in Delhi and across several states where many of the most vulnerable have received no cash and have been unable to afford and purchase food and water.
- Direct food aid is part of the government's announced support package. This may drive existing food businesses (traders/wholesalers) out of business, which in the medium/long run would cause more food insecurity, loss of income and hardship.
- Without work or money, migrant workers have become desperate to return home. They have been seen moving in large crowds and packed in government organised buses, all of which is likely to further spread the COVID-19 virus.



Lessons Learnt

- **Lockdowns, movement restrictions and industry shutdowns should be carefully considered. Before governments implement restrictions or shutdowns, they should be able to ensure that those who are locked down can maintain their food purchasing power.** Policies designed to save lives during the Covid-19 pandemic should not prevent any human from accessing food and goods necessary for survival.
- **Lockdown announcements should be made with a sufficient warning period and announcement of cash transfers.** If not, mass transmigration is likely, often on crowded transport, possibly further spreading the COVID-19 outbreak.
- **If restrictions on formal/informal employment and movement are made, the vulnerable poor who lose purchasing power should be identified in advance, and plans for cash transfers and their implementation should be devised beforehand.**
- **Where the vulnerable poor are identified, transfers should be given indiscriminately.** If not, there may be civil unrest where some groups have received aid and others have not.

In the event that a government decides that it does not have capacity for maintaining lockdowns, or that the costs will outweigh the benefits, given food systems in their country, the new challenge for government becomes protecting health systems, doctors and nurses and community workers, setting up triage and COVID-19 treatment centres with viable treatment strategies (lying prone, CPAPs as suggested by FDA, oxygen lines etc) in order to protect ICUs for even more fatal illnesses.



Food security impact of COVID-19 on vulnerable populations

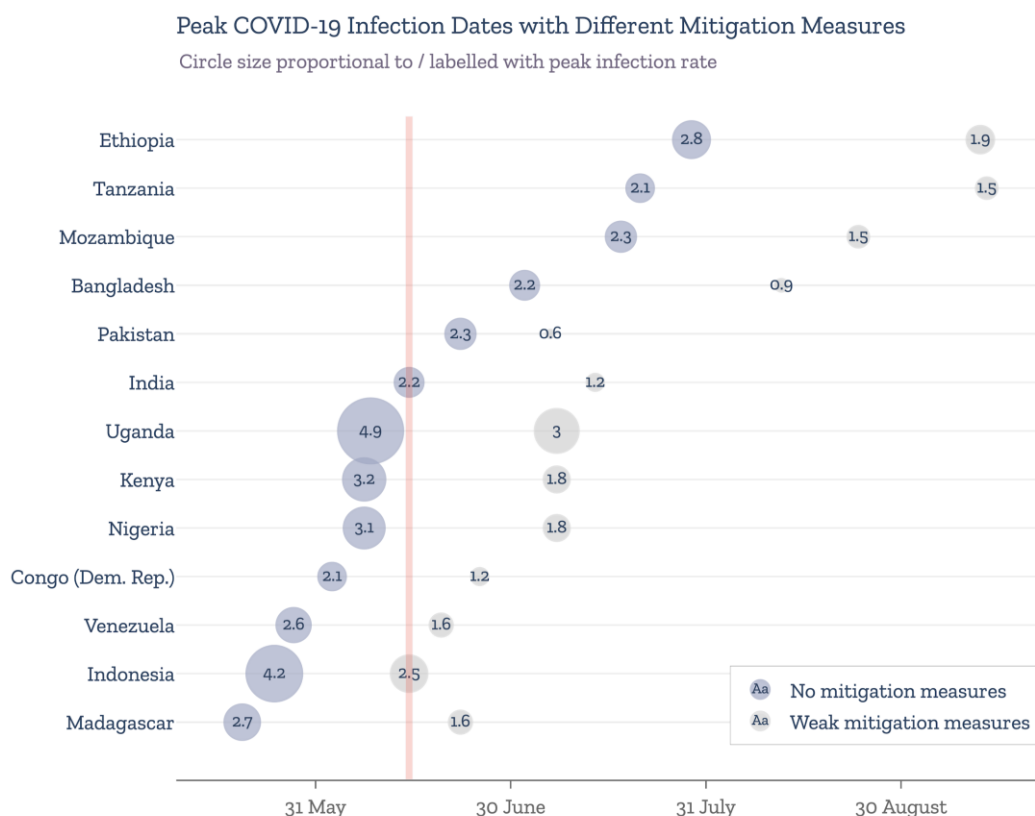
This section highlights countries/regions with an exceptionally high proportion/absolute number of citizens without purchasing power and compares this with the stages of the COVID-19 outbreak. The goal is to show where food insecurity could increase either due to the outbreak or as a result of industry shutdowns and movement restrictions.

There are a number of countries with large, financially vulnerable populations in which COVID-19 outbreaks have yet to peak. In India, for example, over 80% of non-agricultural workers are estimated to earn incomes in the informal sector (ILO). Many of these workers are in financially precarious situations and have been unable to afford or purchase food during the lockdown.

Fig. 2 shows high-risk countries with large populations living in poverty, compared to the estimated peak infection rate and date of the COVID-19 outbreak, assuming minimal global mitigation. Halting industry to reduce spread of COVID-19 appears to have a larger negative impact on food security than COVID-19 itself.



Fig. 2 - Estimated peak of COVID-19 infections, given no or some mitigation action
 (Source: <http://epidemicforecasting.org/>, 30 March 2020)



Ethiopia, Bangladesh and Tanzania have especially large numbers of vulnerable citizens. They are still in the early stages of the outbreak (right of vertical line), with limited mitigation measures to date, but these countries have over 103 million already vulnerable people, who may lose access to food, if the necessary measures aren't put into place, or if lockdowns were to occur without precautionary measures.

For most countries currently battling the virus, movement restrictions and industry shutdowns were welcomed from a medical standpoint, as these actions can minimize the rate at which the virus spreads and possibly suppresses the outbreak.

However, without sufficient economic and supply chain planning, such measures will increase local food insecurity. Governments, supported by NGOs and multilateral organisations, need to facilitate direct cash transfers to these at-risk groups. Workers in food production, processing, and distribution should be exempted as key workers within lockdown measures, and prior to lockdown action.



If this is not the case, there are several risks and impacts that are already occurring in some parts of the world and may occur elsewhere:

- 1) **Localised food price rises:** Concern about a failing food supply chains are sufficient for households to start hoarding (as has been seen in the UK and elsewhere), and in itself can cause a short term spike in local food prices. The effect of this would be especially devastating, once combined with COVID-19 related economic shocks and loss of income for daily labourers.
- 2) **Food Riots:** There is strong historic precedent for civil unrest related to food price rises and restrictions in food access. Given the speed at which food insecurity could arise without the necessary precautionary measures, riots could happen in an unprecedentedly short time.
- 3) **Civil disobedience:** If there is an extended lockdown, or shutdown of industry, the informal economy may continue to attempt to operate, as day labourers need the income to avoid starvation and maintain shelter. This could include blatant disregard for public health guidelines and provide an ideal environment for the spread of COVID-19.



Locusts

This section identifies regions already affected by the current locust outbreak, as well as those that might soon be affected, and it considers how these impacts could be magnified by COVID-19 related economic vulnerability and food export bans.

There is an unprecedented locust outbreak across the horn of Africa and parts of the Middle East/Asia. It is the worst situation seen in Ethiopia for 25 years, and the worst in Kenya for 70 years. Locusts are particularly damaging to juvenile crops rather than mature crops, and a swarm of locusts of 1 km² can consume as much as 35,000 people.

The situation has worsened considerably from last Autumn, plunging 20.2 million people into food insecurity (FAO). Locust swarms, like pandemics, also multiply exponentially, and it is estimated that if left unchecked swarms would grow 400x by June (FAO) compared to January. This exponential growth is particularly concerning, especially if swarms continue to multiply after this time.

Cereal crops (rice, maize, sorghum, millet, barley) provide the bulk of calories across the at-risk regions so the effects would be particularly severe if these are affected.

Historical precedent, as in Ethiopia in 1997, shows the locust impact reduced cereal production by c. 1.5%. This current swarm is estimated to be larger, so there may be a larger production loss. Moreover, in 1997, prices of some affected crops increased by up to 10%, so a modest yield loss could be accompanied by a more substantial local price shock.

Fig. 3 (below) shows areas currently affected by locust outbreaks and those at risk in the immediate future.



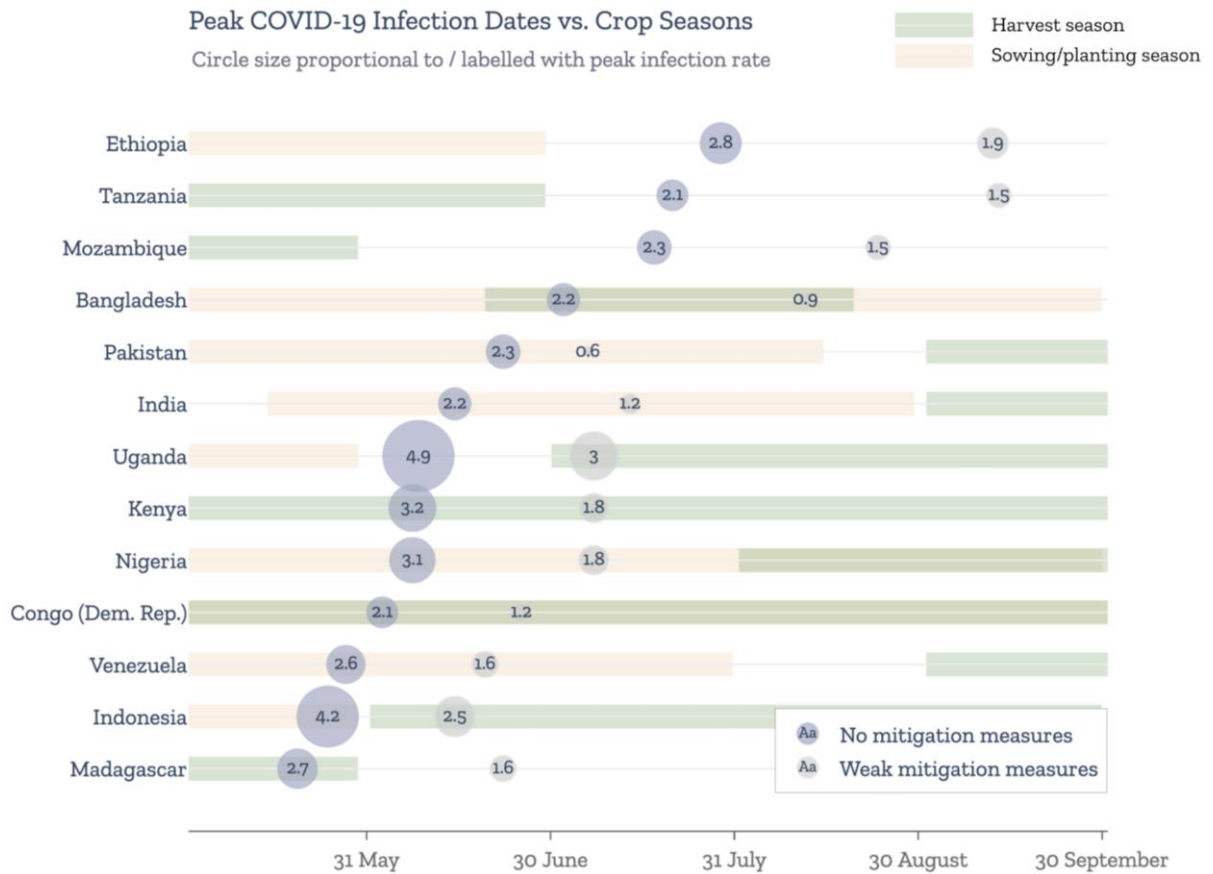
Fig. 3 - Locusts Forecast (FAO)



There is particular concern regarding the intersection of risk. Figure 4 is an extension of figure 2 and shows where the peak COVID-19 outbreak overlaps with harvests that could be affected by locust infestations. Coinciding localised price rises and increased vulnerability will have a major impact on food affordability and access.

This compounding effect leads to a greater risk. If countries expect production shocks and a vulnerable population, precautionary/provisionary food export bans/restrictions may be put in place, both to ensure sufficient stores, but also potentially to depress local prices when incomes are falling. However, the trade section below shows the potential negative global impacts of a cascade of food bans, so countries should be encouraged to avoid protectionist measures to ensure global market functioning and reduce the likelihood of global price rises.

Fig. 4 - Planting and harvest seasons in comparison to expected outbreak peaks



Estimated peak COVID-19 infection rates overlap with planting/harvesting dates for cereal staples for many of the most precarious countries. If a substantial proportion of key agricultural workers are sick and unable to work, there could be a material reduction in production due to reduced planting or increased waste, as crops cannot be harvested before spoilage.



Trade-related risks of COVID-19

COVID-19 has already caused significant disruptions to global trade. Brazil has experienced disruption to ports, India is quarantining ships for 14 days and Kenya has had difficulty in importing agri-chemicals. This affects the transport and application of insecticide, delaying the ability of nations to respond to the locust crisis.

Without the impact of the Coronavirus, the 2020 global grains balance would be sufficient, with a good crop expected, global stocks close to long run averages and prices not high by historical standards. However, with a small range of countries dominating global grain exports there is a risk that this situation may rapidly change, especially with COVID-19 already disrupting trade.

There are a number of reasons grain shipments are being disrupted by COVID-19:

- Quarantine measures and illness have impacted the logistics sector, with freight unable to be moved and ports short of labour to process cargo. Already some Indian food exporters have had to declare force majeure in recent days as they are unable to meet their contractual obligations within agreed timeframes, and there is the potential for the situation to worsen.
- Concerns about ensuring food security and affordability for their citizens during the crisis has led some countries to impose export bans on food. Currently export bans have been imposed by Serbia, Kazakhstan and Vietnam, as well as Russia imposing restrictions on wheat exports.

In addition, there are a number of reasons why these disruptions may escalate:

- Further quarantine measures may need to be adopted, and, as the virus spreads, labour shortages may become more severe.
- World food prices in dollar terms have not significantly increased; however, many emerging market currencies have declined in value, reducing affordability for consumers. With export bans justified on the basis of containing price inflation, further currency devaluations may lead to further export restrictions.



- In the event of food exports being restricted, global prices may rise sharply. This could lead to a cascade as countries scramble to adopt export restrictions to ensure sufficient domestic supplies and further increase prices.

To help understand these risks further, the current situation in the global grains trade is assessed below.

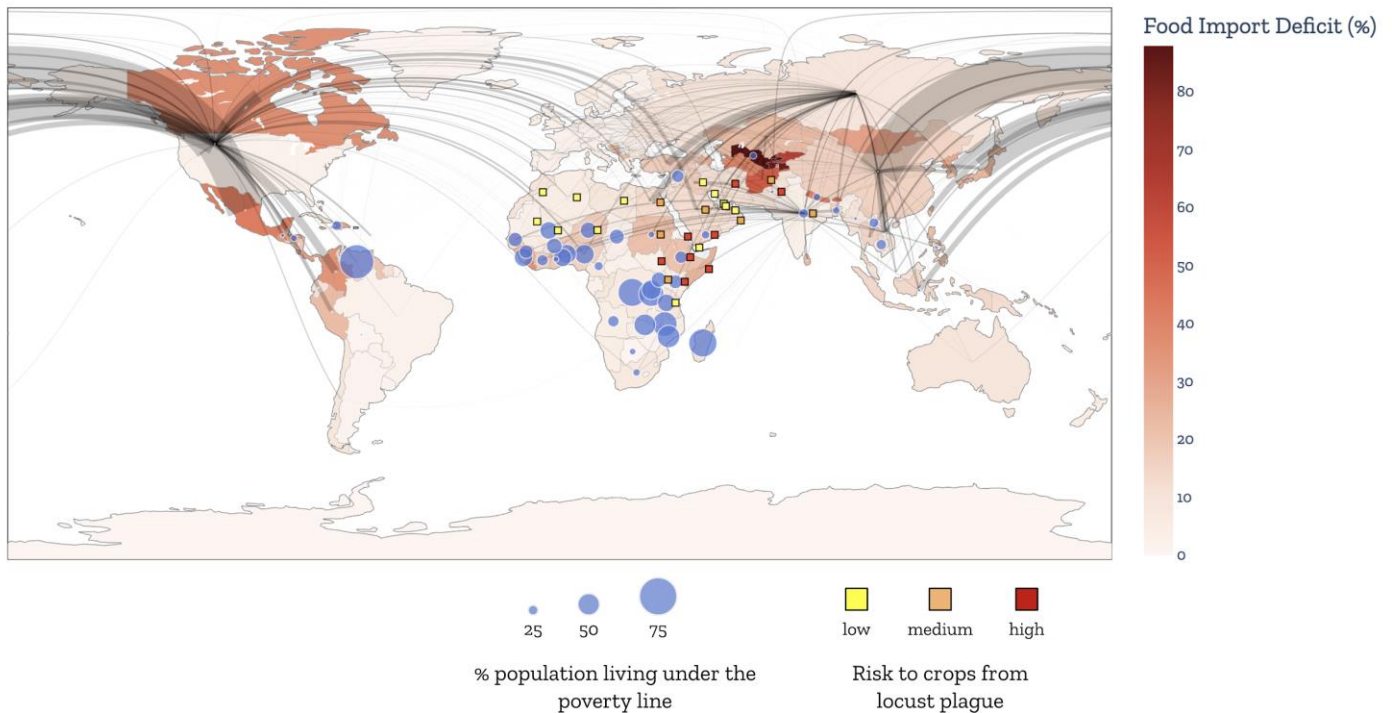
The importance of key exporters

While the global trade in food products is highly complex, the global trade in the three main grains (maize, rice and wheat) is dominated by just a handful of key exporters. Diagrams 1-3 below summarise the average net exports by the top 10 origins in recent years, and show the importance of just a few key countries to the global grains balance. Disruptions to freight have already occurred, or where export restrictions are in place have also been marked.

Russia is the single largest exporter of wheat, accounting for just under a quarter of global exports (Diagram 4). Meanwhile, India is the single largest exporter of rice, accounting for over a third of the total trade since 2017 (Diagram 5). As a result, disruptions to trade or export restrictions at just a few origins could result in significant disruptions to the normal flows of global grains.

Already India has seen disruptions to trade at its major ports due to labour shortages when loading bulk vessels, while Russia has capped grain exports at just 7 million tonnes from April-June in order to ensure sufficient domestic supplies. Given that the peak of the virus is still not in sight, these disruptions may rise in severity or spread to additional countries in the coming months.

Fig. 4 - Cascading example if the USA, Russia, China, Iran, Serbia and India would also restrict on average half of their food exports



Successive export restrictions would plunge much of Central Asia (especially Uzbekistan, Tajikistan, Afghanistan and Kyrgyzstan) and Central America into sizable food deficits (reducing their imports by over 50%).

The impact would also be felt in parts of Central America (especially Mexico, Colombia, Guatemala, Haiti, Jamaica and Honduras), as their import deficit would be 30-40%.

The most affected African countries are Liberia (42% deficit), Guinea (29%), Somalia (25%) and Senegal (24%).

Fears of a poor planting season in China (Financial Times), may lead to China increasing demand for imports for key cereals. If this increases global prices, it would amplify the above effects.



Diagram 1: Annual net wheat exports by top 10 global origins, 2017-2019 average.

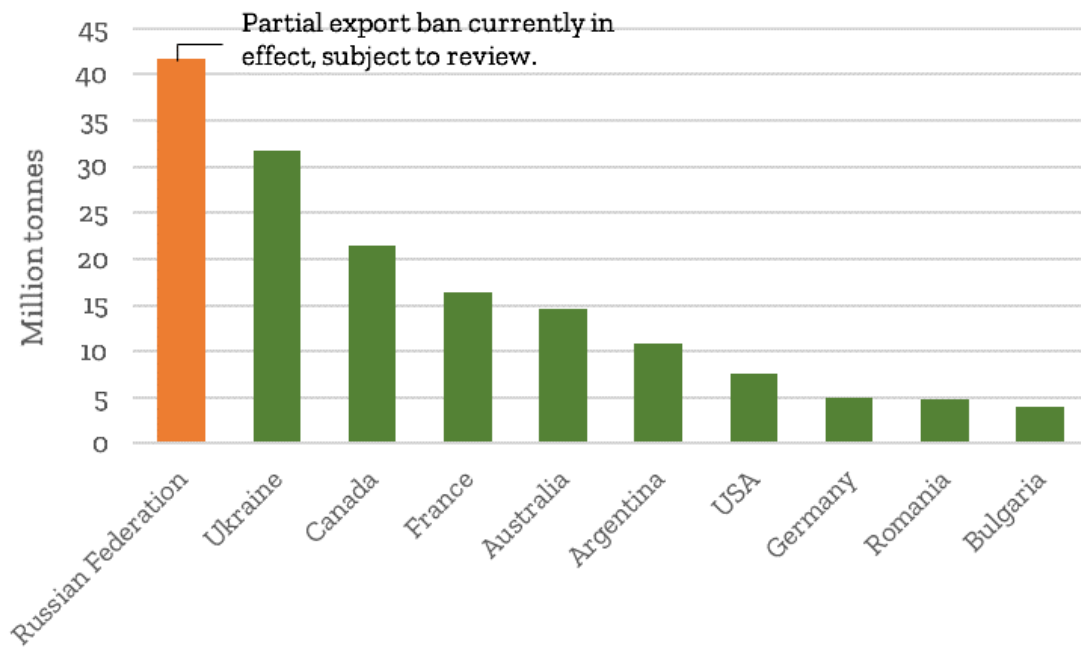


Diagram 2: Annual net rice exports by top 10 global origins, 2017-2019 average.

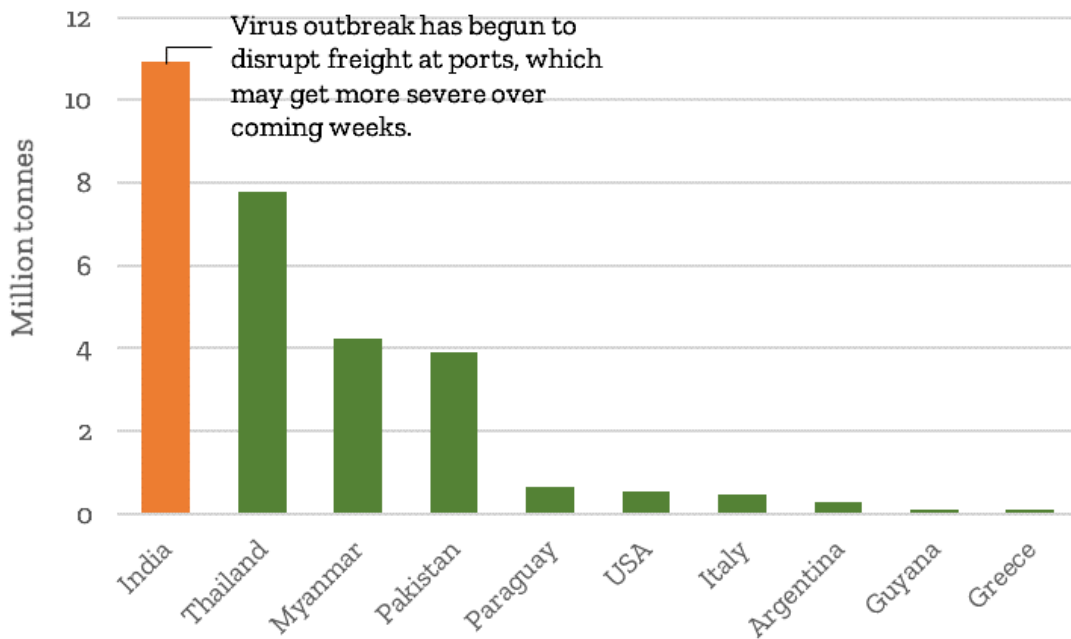




Diagram 3: Annual net maize exports by top 10 global origins, 2017-2019 average.

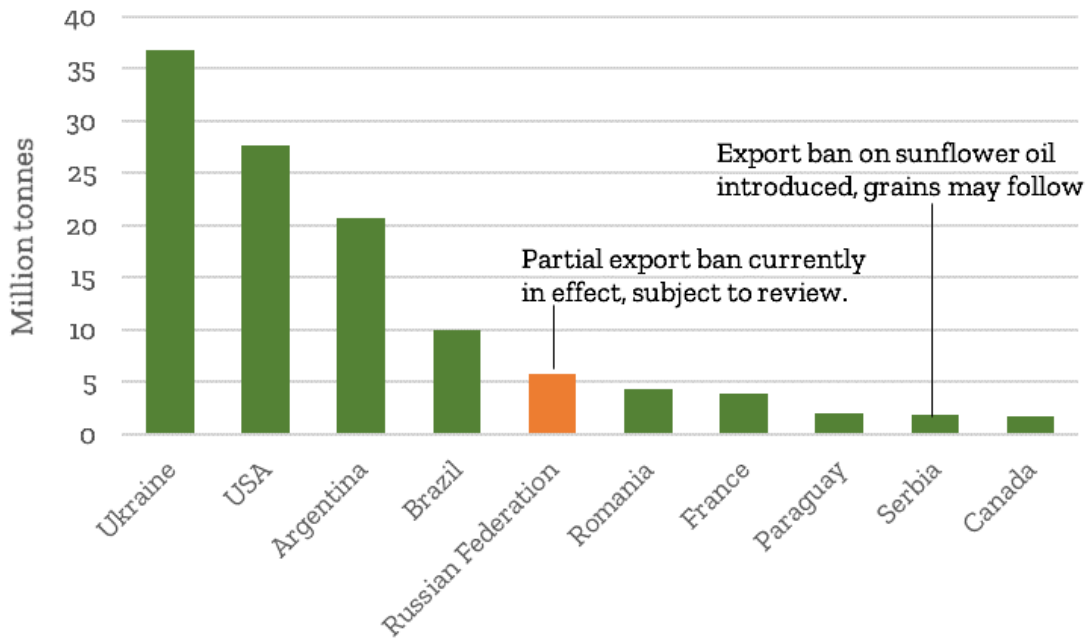


Diagram 4: Share of global wheat exports by top 5 origins, 2017-2019 average

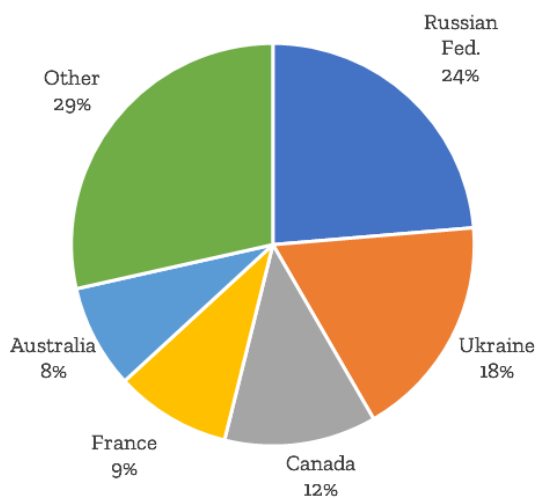
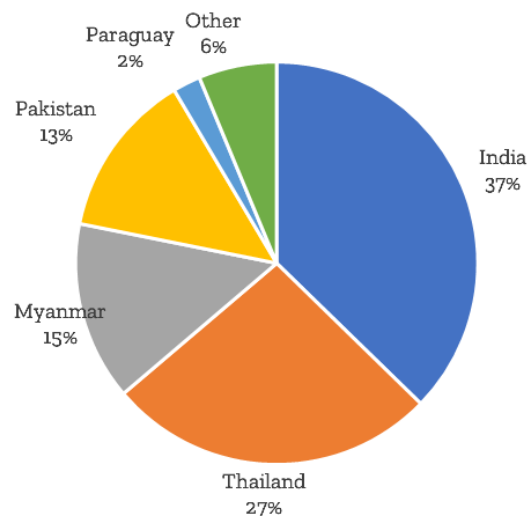


Diagram 5: Share of rice exports by top 5 origins, 2017-2019 average



Source: UN COMTRADE Database



The impact of global food stocks

Should global trade be disrupted, countries will have to instead rely upon grain stocks to meet the shortfall. This could be done either by consuming domestically available stocks, or by grain stocks being imported from origins where the virus' impact is less severe.

The FAO estimates global cereal grain stocks to be around 865 million tonnes as of March 2020, implying a stock to use ratio of 30.9% of one year (~4 months). Under normal market conditions this would be expected to be sufficient in order to prevent price spikes and shortages. However, the current situation is far from normal, and there are a number of factors which may result in price shocks as a result:

- Much of these stocks are held by the largest grain exporters, meaning a disruption to exports via a labour shortage or an export ban would also prevent these stocks being released onto the world market.
- Other stocks are strategically held under the control of governments, rather than private sector agents. While these would be released to protect the food security of domestic consumers, it is unlikely that these stocks would be made available to consumers in other locations.
- In order to incentivise exports from stocks held at non-traditional locations, global food prices would likely need to rise from their current levels. If the global impact to trade is severe enough this could lead to a decrease in affordability for consumers at the same time that their incomes decline due to the virus, thus reducing food security. It also creates the risk of a cascade, with rising prices leading to additional export bans in a vicious circle.

The spread of COVID-19 and corresponding mitigation measures will impact planting and harvesting decisions in 2020. Disruptions in global trade and uncertainty surrounding the supply of fertilizer and seeds will likely decrease the amount of land that is planted in 2020. Shortages of labour due to COVID-19 infection and decreased movement of labourers due to quarantine measures and closed borders will likely impact the planting and harvest seasons. As planting is dependent on weather and season length



considerations, any delays can negatively affect yields. Disruptions in harvesting and processing of foods due to labour shortages will also pose challenges, especially for labour intensive crops, while disruptions to the movement of goods such as enforced quarantines and transport restrictions will impact the ability for food to enter the market.

COVID-19 poses a variety of challenges to food production which will further stress food insecure countries. Many African countries are particularly at risk due to the prevalence of labour-intensive agriculture that is vulnerable to labour shortages from COVID-19 and the concentration of food insecure countries in Sub-Saharan Africa. Peak infection rates of COVID-19 are expected to occur between May and July for many African countries.

Coinciding with the expected peak of COVID-19 infection for many African and South East Asian countries is the locust crisis that continues to develop in the Horn of Africa. In Africa, Somalia, Ethiopia and Kenya are experiencing plague-like numbers of locusts, which are expected to increase over the coming months (March - June) and move to surrounding countries such as Sudan and Eritrea. Swarms breeding in the spring in Saudi Arabia and Iran are also expected to continue to move into areas of Pakistan and India, as well as Sudan and Yemen. These locust swarms have the potential to cause significant damage to food production in the region, which will increase food availability issues due to COVID-19 in affected regions.

This section would like to highlight The Horn of Africa and Gulf States for whom food stocks will dwindle. They may want to consider precautionary action to avoid both a food shortage problem combined with the existing economic crisis, pandemic impacts and distribution challenges.



Conclusion

This report demonstrates the current vulnerability of the global system and phenomena that would exacerbate current stresses on food security and push millions into food insecurity if not handled cautiously. The following recommendations are made based on the findings above:

1. **Provide cash transfers prior to closing industry/limiting movement in countries with significant numbers without purchasing power.** Key workers in food production, processing, and distribution should be exempted from lockdown measures, and transfers should be provided to households prior to a lockdown.
2. **Coordinate action to encourage global free trade without restrictions.** The design of incentives for coordination to discourage countries from enacting food export bans could be valuable here..
3. **Develop more detailed modelling on future food flows.** For example, China's warning on reduced domestic production implies an increase in their imports. How will this impact global food prices, and who will it deprive imports from?
4. **Continuously monitor food export bans/restrictions and model the effect of these bans and restrictions on the most vulnerable populations and countries.** This will provide guidance as to when countries may require interventions, e.g. increasing strategic grain reserves.
5. **Develop more detailed modelling on the likely impact and trajectory of the locust swarms.** More detailed modelling from the FAO or other bodies would inform future policy and agricultural response.
6. **Insecticide from agri-industry should be provided to reduce the locust impact,** and it can be subsidised by the donor community. The earlier insecticides are used, the lower the cost and impact.