

# Economic and food security implications of the COVID-19 outbreak

An update focusing on the domestic fallout of local lockdowns

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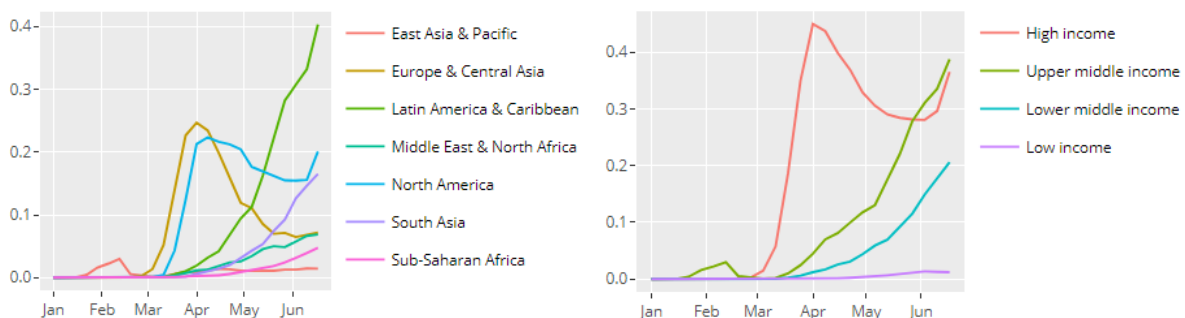
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## The evolving pandemic poses an evolving threat to food security

Global food security has been deteriorating in recent years due to conflicts, climate shocks, economic downturns and desert locust. The COVID-19 pandemic could drive up the increase in acute hunger over the past four years to more than 80 percent. The global economic outlook looks increasingly grim, reflected in the IMF’s revision of its estimates to -4.9 percent global GDP contraction in 2020, 2.1 percentage points below the April forecast. Moreover, the geographic spread of COVID-19 cases has continued to evolve – and with it the challenges that poor countries face (Figure 1). After China, Europe and the US, Latin America has emerged as the epicenter of the pandemic. South Asia’s curve of weekly new cases has a worryingly steep slope too. As of mid-June, two out of three new confirmed cases are in low- and middle-income countries. While these countries are trying to cope with the fallout of an increasingly severe global economic recession, they are also battling the disease at home. This brief, therefore, shifts attention from the external to the domestic shock, complementing the analysis of countries at risk of worsening food insecurity in earlier updates.

Figure 1: Weekly new confirmed cases of COVID-19 (in millions) across regions and country income groups



Sources: [Our World in Data](#); and own calculations.

The food security costs of a domestic COVID-19 outbreak and the ensuing restrictions can dwarf those of the global economic recession or hiccups in international food trade. While the picture is still

incomplete, early indications from IFPRI country studies suggest that this is the case, at least for now.<sup>1</sup> For example, in Nigeria they find a 38 percent reduction in GDP during the country's five-week lockdown, a staggering contraction both in speed and magnitude.<sup>2</sup> Behind such numbers are families losing their income including many living hand-to-mouth, dependent on unprotected informal daily wage workers, whose economic access to food is immediately jeopardized. The threat to economic access to food comes hand in hand with one to physical access. Movement restrictions can put local food supply chains at risk. Whereas food imports play an important role in poor countries, especially for an adequate supply of staples, their relevance pales relative to that of the domestic food system. The latter accounts for about 80 percent of what people eat in Africa and Asia, and more than 90 percent in Latin America.<sup>3</sup>

Concerns around the delicacy of lockdowns in developing countries have been voiced, but the potential unintended consequences are only beginning to unravel. Benefits are far less obvious in lower income contexts than in China, Europe or the United States; and trade-offs different. Isolation measures help to 'flatten the curve' and delay infections, thus enabling health systems to cope and preventing deaths, but what is the rationale for spreading out infections in time when health systems are so weak – Mali and Mozambique each have one ventilator per million inhabitants<sup>4</sup> – that they are immediately overwhelmed and inaccessible to a large part of the population? An attempt to quantify the economic value of social distancing policies puts it at 240 times larger in the United States than in Nigeria or Pakistan;<sup>5</sup> India's nationwide lockdown, which ended after 2.5 months on 1 June amidst new infections hitting record highs, has been exposed as a choice between lives and lives in the absence of appropriate social protection measures;<sup>6</sup> and Malawi's National Planning Commission recently found that even in case of a moderate lockdown, costs vastly outweigh benefits.<sup>7</sup> The London School of Health and Tropical Medicine calculates that when closing vaccination clinics in Africa more than 80 children die due to the lack of routine immunization for each COVID-19 death averted.<sup>8</sup> Similarly, the Johns Hopkins Bloomberg School of Public Health shows that, in the worst-case scenario, 1.2 million children under-five could die over the next six months because of COVID-19 specific disruptions to health services and increased child wasting.<sup>9</sup> Needless to say, the threat to food security, which has been flagged repeatedly including by prominent observers such as Nobel laureates Amartya Sen and Abhijit Banerjee,<sup>10</sup> is one of the most worrying repercussions of lockdowns in low and middle-income countries.

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<sup>1</sup> IFPRI blog post [COVID-19 lockdowns are imposing substantial economic costs on countries in Africa](#)

<sup>2</sup> IFPRI presentation [Nigeria: Impacts of COVID-19 on Production, Poverty & Food Systems](#)

<sup>3</sup> Barrett et al, 2019, Structural transformation and economic development: insights from the agri-food value chain revolution. Mimeo, Cornell University

<sup>4</sup> The Economist, [Africa is woefully ill-equipped to cope with covid-19](#)

<sup>5</sup> Barnett-Howell and Mushfiq Mobarak, [Should Low-Income Countries Impose the Same Social Distancing Guidelines as Europe and North America to Halt the Spread of COVID-19?](#), Yale Y-RISE Policy Brief

<sup>6</sup> Ray, Subramanian and Vandewalle, [India's lockdown](#), VOX CEPR Policy Portal

<sup>7</sup> National Planning Commission, [Medium and long-term impacts of a moderate lockdown \(social restrictions\) in response to the COVID-19 pandemic in Malawi: A rapid cost-benefit analysis](#)

<sup>8</sup> London School of Hygiene & Tropical Medicine, [Benefit-risk analysis of health benefits of routine childhood immunisation against the excess risk of SARS-CoV-2 infections during the Covid-19 pandemic in Africa](#)

<sup>9</sup> Robertson et al, 2020, [Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study](#), The Lancet Global Health, Volume 8, Issue 7

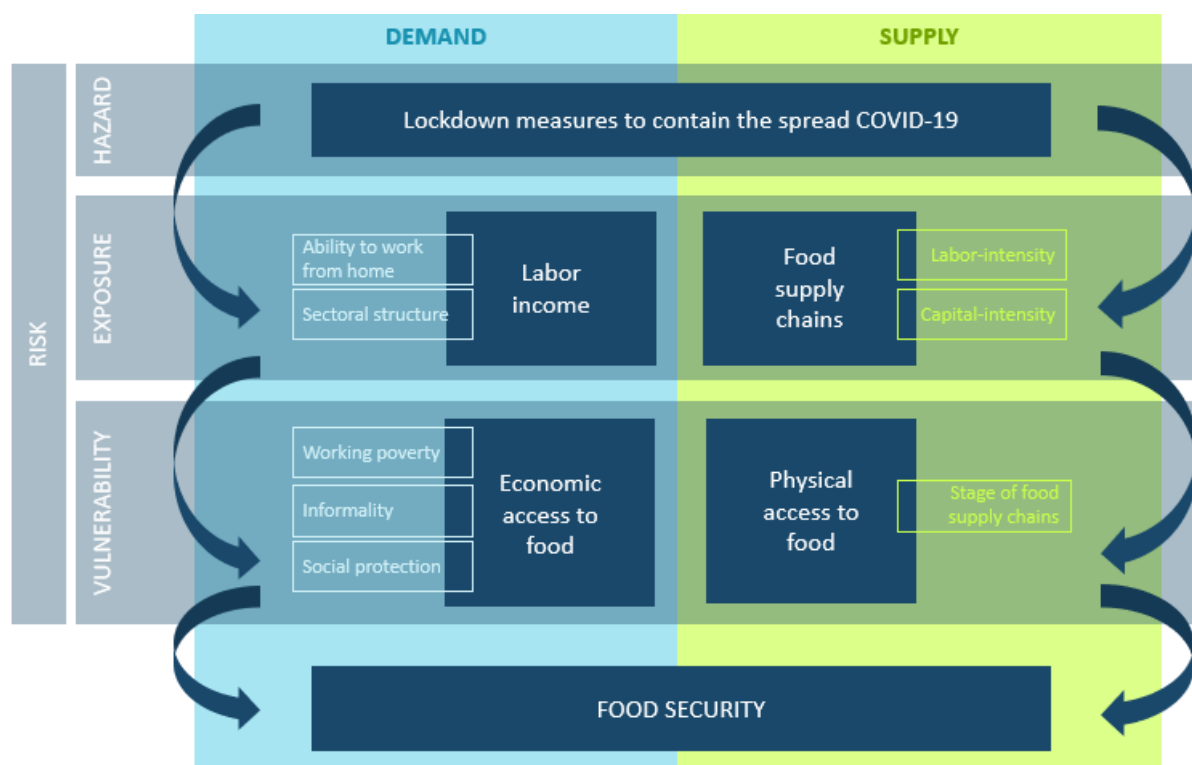
<sup>10</sup> The Indian Express, ['Huge numbers may be pushed into dire poverty or starvation...we need to secure them'](#); Financial Times, [India: the millions of working poor exposed by pandemic](#)

## Framing food security risk from local lockdowns

To analyze the risk from COVID-19 induced domestic shocks to food security, we will separately consider the demand side – income losses reducing economic access to food – and the supply side – disruptions of supply chains hampering physical access to and availability of food. We understand risk as a combination of hazard, exposure and vulnerability; and vulnerability to comprise both the susceptibility to suffer harm and the lack of capacity to cope with it.<sup>11</sup> The hazard is a perilous event that occurs and potentially impacts (in this case) a country's economy and food security, whereas exposure describes the extent to which a country is affected through various transmission channels. Susceptibility refers to the predisposition to suffer from the hazard once exposed and coping capacity to the resources available to weather the storm. While exposure and vulnerability can go together, this is not necessarily the case. Recalling the example of countries' exposure to a global economic recession through dependence on primary commodity exports, the case of Mexico exemplifies this. While exposed through oil exports, the country is not vulnerable. It has hedged its oil price, guaranteeing not to sell below USD 49 per barrel; and is now cashing in USD 6 billion following the steep plunge in oil prices.<sup>12</sup>

Figure 2 gives an overview of the framework we use to think about food security risk from local lockdowns, highlighting aspects alluded to in the introduction and detailed in this brief. The structure also serves to develop a country risk classification based on indicators pertaining to its different elements, which we present at the end. We combine the domestic risk classification with the external risk classification developed in earlier updates, pinpointing countries that are at risk both due to a domestic shock and due to spillovers from the global economy.

Figure 2: Impact of lockdowns on food security



<sup>11</sup> While these elements are typically considered in risk frameworks, some hold coping capacity as distinct from vulnerability (e.g. AEW Risk Assessment v.1.4) while others take vulnerability to comprise exposure, susceptibility and lack of resilience (e.g. Birkmann et al, 2013, [Framing vulnerability, risk and societal responses: the MOVE framework](#)).

<sup>12</sup> Bloomberg, [A \\$6 Billion Windfall: Mexico's Massive Oil Hedge Is Paying Off](#)

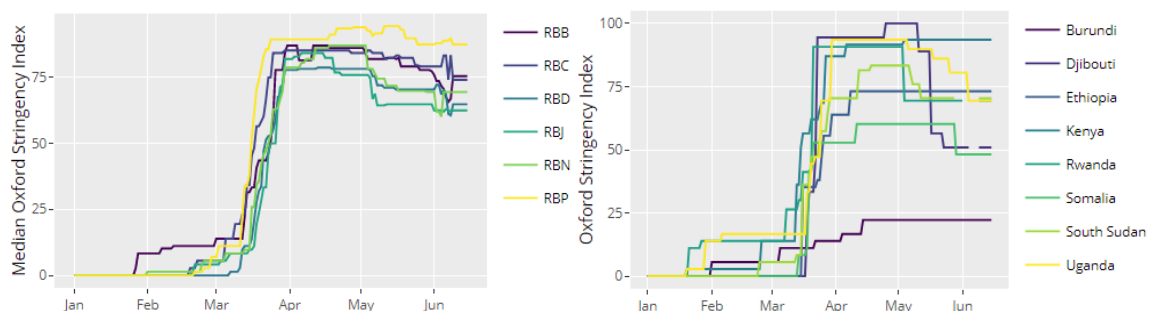
Whereas it is hard to judge whether the supply- or the demand-side will have bigger repercussions on food security, for now income loss and the reduction in access to food has come out as the primary risk factor. It is inherent in the complexity of food systems that it is difficult to gauge the scale of disruptions that is in the cards, especially in the longer term. Of course, this also hinges on the duration and further evolution of the pandemic. However, FAO states that ‘disruptions in the food supply chain are minimal so far’.<sup>13</sup> Meanwhile, based on ILO estimates of reductions in hours worked and the ensuing lost incomes, WFP estimates that in countries most vulnerable to food insecurity, 121 million people will be pushed into food insecurity by the end of 2020.<sup>14</sup>

### The hazard: government response varies widely – and with it the domestic shock

A first step in thinking about food security risks triggered by COVID-19 outbreaks in poor countries is considering the hazard. For the external shock the phenomenon causing disruption is the same across countries – a global recession and concerns around food imports. This is not the case for the domestic shock. Here, the hazard has a health (the local outbreak) and a policy (the containment measures) dimension, both of which vary by country. Even when confronted with outbreaks of similar size, government responses can be very different. Cognizant of their weaker health systems, El Salvador, Guatemala and Venezuela responded with complete lockdowns within less than five days of the first confirmed case of COVID-19 in the country, much faster than their richer Latin American neighbors.<sup>15</sup> We will largely ignore the health dimension – the difference in magnitude between 6 million confirmed cases of COVID-19 in low- and middle-income countries and nearly 90 percent of their population, that is, nearly 6 billion people, required to stay at home for some time, makes policy measures imposed to contain the spread of the virus the primary source of economic havoc; and puts countries with more fragile health systems and possibly earlier or stricter responses at particular risk.

In our risk classification, we use the Oxford Stringency Index to quantify the rigidity of government response to the Coronavirus pandemic. As IFPRI simulations suggest that GDP losses accumulate proportional to the duration of the lockdown, increasing from USD 18 billion for five weeks to USD 36 billion for ten weeks of lockdown for the case of Nigeria,<sup>16</sup> we consider not only the current value of the stringency index, but its level over time. Figure 3 illustrates how much policy measures to distance people have differed across regions and across countries within a region according to this indicator.

Figure 3: Oxford Stringency Index across Regional Bureaux (left) and countries (right) for the example of East Africa



Source: [University of Oxford](#). Notes: WFP’s Regional Bureaux are RBB in Bangkok (Asia and the Pacific); RBC in Cairo (Middle East, Northern Africa, Eastern Europe and Central Asia); RBD in Dakar (West and Central Africa); RBJ in Johannesburg (Southern Africa); RBN in Nairobi (East Africa); and RBP in Panama (Latin America and the Caribbean).

<sup>13</sup> [FAO key messages on Novel Coronavirus \(COVID-19\)](#)

<sup>14</sup> WFP Global Response to COVID-19: June 2020

<sup>15</sup> Economist Intelligence Unit, [A pandemic-induced recession bears down on Latin America](#)

<sup>16</sup> IFPRI presentation, [Nigeria: Impacts of COVID-19 on production, poverty and food systems](#)

While a useful approximation, the Oxford Stringency Index focuses on policy prescriptions. Meanwhile, their consequences for the economy depend on whether people and businesses follow them – which cannot be taken for granted. The Economist muses that ‘it is hard to think of any policy ever having been imposed so widely with such little preparation or debate’, excusing lockdowns as a ‘desperate measure for a desperate time’.<sup>17</sup> They clearly have not been designed with the world’s poor in mind; and are often impossible for them to comply with. Isolation and other key recommendations to contain the virus – staying informed about local disease incidence and latest advice on how to protect yourself; washing hands regularly with soap and water – imply requirements on people’s homes such as piped water or a private water source. Out of the poorest 40 percent of households only 6 percent meet these globally, and virtually none do in sub-Saharan Africa.<sup>18</sup> Considering not only the home environment but also a permanent source of income or savings as a necessity, for the example of Mozambique only 2 percent of the rural and 17 percent of the urban population are fully ready for a lockdown.<sup>19</sup>

Moreover, differences in the details of policies that are relevant for their food security fallout can escape the index. For example, in sub-Saharan Africa informal food trade is considered an essential service in most countries and left operational during lockdowns, albeit in a substantially modified environment (e.g. with alternative trading days for alternative products or non-food traders removed). However, this is not the case everywhere. In Burkina Faso as well as some cities in Kenya and Nigeria, informal markets have been completely closed; and compliance at times imposed violently by destroying stalls.<sup>20</sup> Given the importance of informal trade in sub-Saharan African food systems – urban poor access up to 70 percent of their food from informal retailers by some estimates – such variation in policy details can be decisive with food security in mind. Meanwhile, in the framework of the Oxford Stringency Index these differences disappear.

### Demand-side exposure: Lockdowns will decimate income of millions of workers in poor countries

By the end of May 2020, the International Labour Organization (ILO) estimated that 94 percent of the world’s workforce lived in a country with some form of workplace closures. The lockdown measures and related closure of most workplaces to contain the spread of COVID-19 severely curtail people’s ability to work. Worryingly, the impact on employment appears to be much larger than initially expected. ILO recently drastically revised its projected decline in aggregate global working hours for the second quarter of 2020, raising it from their first estimate of 6.7 percent to now 14 percent. This is equivalent to a staggering 400 million lost full-time jobs. With more than 18 percent, the Americas see the largest reduction.<sup>21</sup>

Not everybody’s work has been exposed to these disruptions to the same extent. ILO assessed the sectoral impact of the crisis based on real-time economic and financial data, identifying several key sectors suffering from a drastic fall in output.<sup>22</sup> These include, for example, wholesale and retail trade, manufacturing, and accommodation and food services. Some of these sectors are labor-intensive, employing millions of low-paid, low-skilled workers, whose livelihoods lockdown measures put at risk.

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<sup>17</sup> The Economist, [Lifting lockdowns: the when, why and how](#)

<sup>18</sup> Brown, Ravallion and van de Walle, 2020, [The World’s Poor Cannot Protect Themselves from the New Coronavirus](#), NBER Working Paper No. 27200

<sup>19</sup> UNU-WIDER blog post [Is Mozambique prepared for a lockdown during the COVID-19 pandemic?](#)

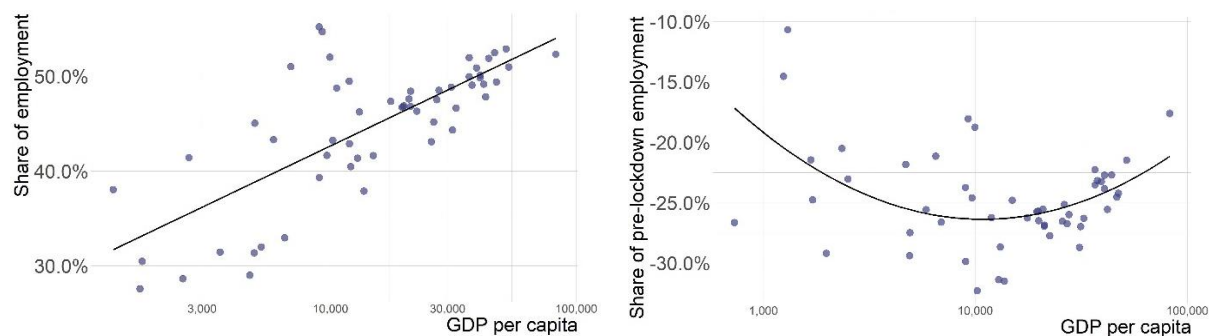
<sup>20</sup> IFPRI virtual event on [COVID-19: Emerging problems and potential country-level responses](#)

<sup>21</sup> ILO, [ILO Monitor: COVID-19 and the world of work. Fifth edition](#)

<sup>22</sup> ILO, [ILO Monitor: COVID-19 and the world of work. Second edition](#)

Service and sales workers make up 30 percent of employment in low-income countries.<sup>23</sup> Linked to sector and occupation among other factors, the ability to work from home can shield workers from the crisis. However, while this might be possible for a large part of the employed in rich countries, the share of people who can work from home is significantly lower in poorer countries ( Figure 4, left).

Figure 4: Impact of local lockdowns on employment: Share of those who can work from home (left) and the reduction of employment following a hard lockdown (right)



Sources: [Online simulator](#) accompanying Gottlieb et al, 2020, *Lockdown Accounting*; and own calculations. Notes: GDP is in PPP and the scale logarithmic. Regarding the right-hand side, a hard lockdown is characterized by all but a limited number of essential sectors closed down. It is modelled on policies in Italy and New York State. Percentages refer to a year of implementation of the policy. The impact of shorter lockdowns is proportional (e.g. a 24 percent drop in effective employment resulting from a year-long policy means that a month-long policy corresponds to a 2 percent drop).

Analysis of the effect of lockdown policies on employment across countries shows that middle-income countries tend to be hardest hit ( Figure 4, right). Sectors deemed essential are often exempt from certain measures and less heavily affected. The agricultural sector is one of these, which can somewhat cushion the repercussions for low-income countries, typically characterized by a large share of employment in agriculture. While high income countries generally benefit from a higher ability to work from home, it is middle-income countries that are likely hit hardest. Non-essential sectors often play an important role in their economies while the share of those able to work from home is low.<sup>24</sup>

For the risk classification at the end of the paper, we use information on the sectoral structure of a country’s economy to indicate exposure to income loss following a local lockdown. We take the share of employment in sectors with impact classified by ILO as ‘high’ or ‘medium-high’ to quantify differences across countries in exposure on the demand side.

### Demand-side vulnerability: A toxic combination of informality, working poverty and lack of social protection leaves many highly vulnerable

Being unable to work leaves some people worse off than others. Countries with a high share of informally employed, high working poverty and underperforming social protection systems leave many people vulnerable. As captured by a voice in a recent ILO brief, being unable to work can mean the choice between dying “from hunger or from the virus”.<sup>25</sup> With over two billion people or 62 percent of all those working worldwide employed in the informal economy,<sup>26</sup> millions of people face a growing risk of hunger. This situation is particularly worrisome in low- and middle-income countries

<sup>23</sup> Gottlieb et al, 2020, [Working from home across countries](#), Covid Economics, Issue 8

<sup>24</sup> Gottlieb et al, 2020, [Lockdown accounting](#), Covid Economics, Issue 31

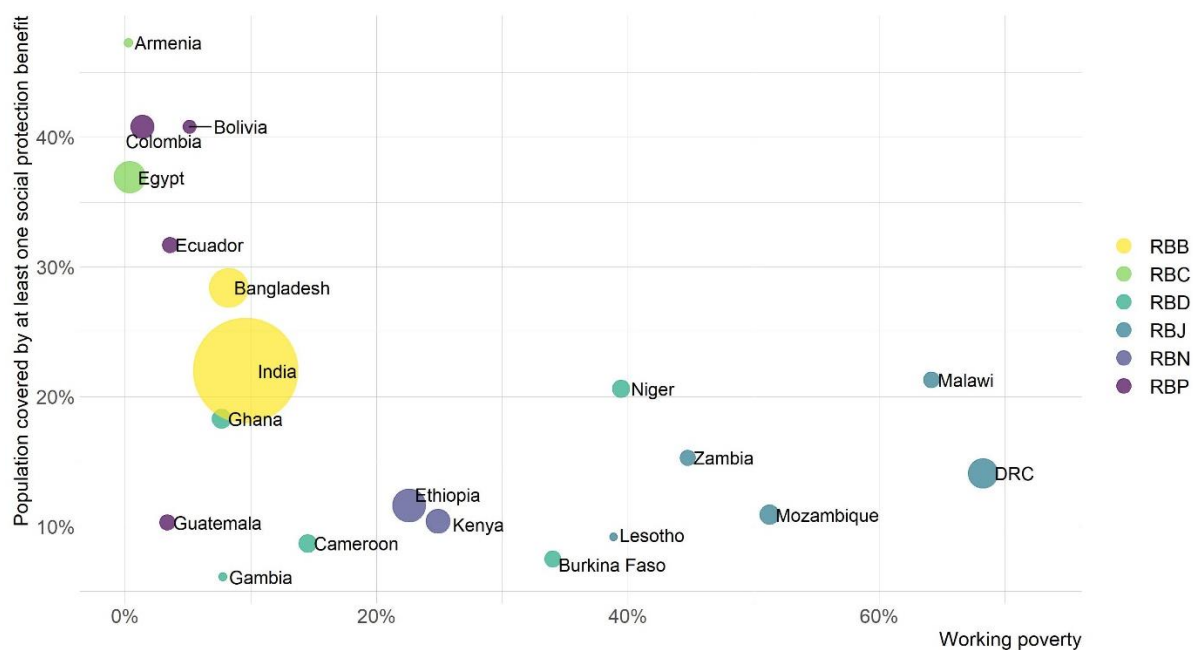
<sup>25</sup> ILO brief, [COVID-19 crisis and the informal economy](#)

<sup>26</sup> ILO brief, [COVID-19 crisis and the informal economy](#)

where informal employment represents 90 and 67 percent respectively of total employment. With most of the economic stimulus plans in low-income countries directed towards the formal economy,<sup>27</sup> it is likely that workers in the informal economy will be left in an even more precarious position after the pandemic.

In many low- and middle-income countries, a combination of working poverty and low coverage of the population by any form of social protection exacerbates the negative welfare impact of lockdowns. Often hinging on a daily income, poor workers without social protection are left with little to cope when losing their earnings. Using up savings or selling productive assets to assure food security can easily set them on a path of sustained poverty. In Burkina Faso, DRC, Lesotho, Mozambique and Zambia, more than 30 percent of workers are poor, while less than 20 percent of the population benefit from any social protection scheme (Figure 5). Even worse, being in the lowest income quintile in sub-Saharan Africa leaves people with no more than a 4 percent chance of receiving assistance from the government.<sup>28</sup>

Figure 5: Vulnerability to income loss



Source: ILOSTAT. Notes: Bubble size indicates population. Colors are according to WFP's Regional Bureaux (see note below Figure 3).

Albeit unclear if they reach the poorest households, governments have put in place additional schemes to soften the impact of the pandemic. 124 countries have provided or plan to provide COVID-19 specific cash transfers. While these measures cover 15 percent of the world's population, gaps in coverage across different regions are substantial. In Africa, a region with substantial needs, the coverage is only a paltry 2 percent.<sup>29</sup> The cash transfers have been noted to be generous in size but in many instances, they are destined to last for a short time, on average for just 2.9 months or until the end of the pandemic. In countries with very low pre-existing coverage of social protection, it is likely that these COVID-19 specific cash transfers may not reach all the vulnerable populations. Perhaps

<sup>27</sup> ILO brief, [The impact of the COVID-19 on the informal economy in Africa and the related policy responses](#)

<sup>28</sup> The Economist, [Lifting lockdowns: the when, why and how](#)

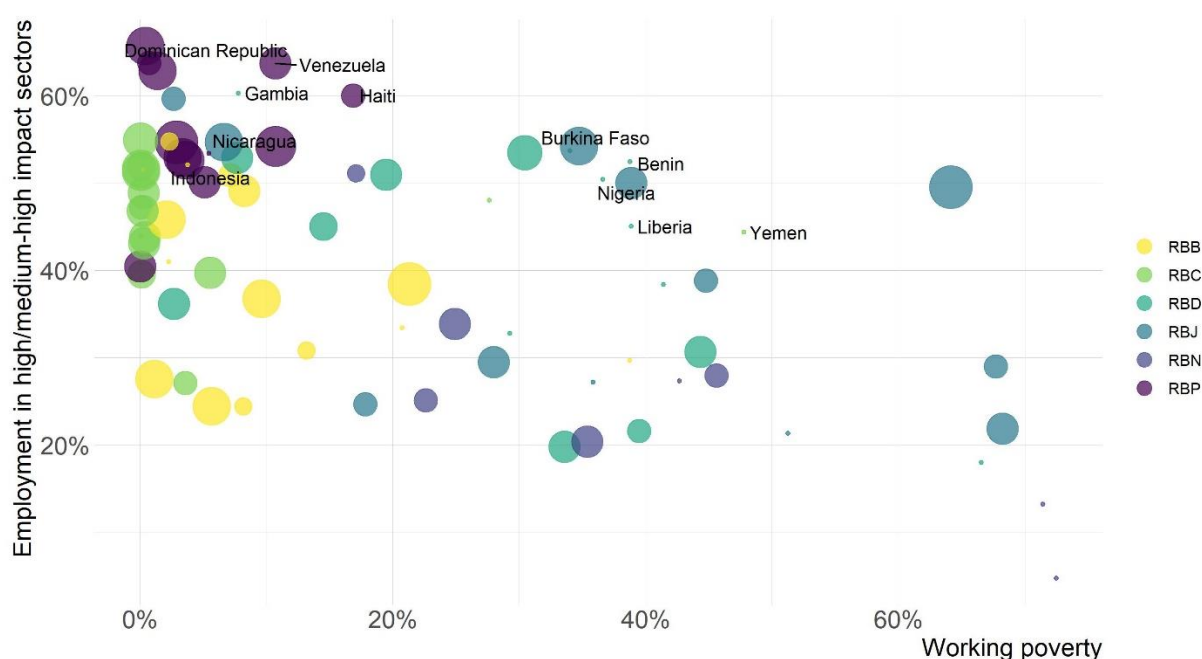
<sup>29</sup> Ugo Gentilini et al, [Social Protection and Jobs Responses to COVID-19: A Real-Time Review of Country Measures](#), "Living paper" version 10

more worrying is the fact that some of the fragile countries suffering from conflict such as Burundi, Eritrea or Yemen do not have any COVID-19 specific social protection measures.

For a comparison across countries, we use the working poverty headcount in combination with the Oxford Economic Support Index to measure vulnerability to lose access to food upon job loss. Data on informality and social protection coverage for countries relevant to this brief is scarce and, hence, not suitable to pinpoint countries at risk. However, both indicators are correlated with working poverty (with a coefficient of more than 0.8 when looking at correlation between ranks, which is relevant for our risk classification).

Figure 6 brings together both exposure and vulnerability measures related to food security risk from income loss. Several countries stand out for having a relatively large share of employment in highly impacted sectors coinciding with a high prevalence of working poverty and low economic support to cushion income losses due to COVID-19. These include Benin, Burkina Faso, Dominican Republic, the Gambia, Haiti, Liberia, Indonesia, Nicaragua, Nigeria, Venezuela and Yemen.

Figure 6: Exposure and vulnerability to income loss



Sources: [ILOSTAT](#); and own calculations. Notes: Bubble size indicates the government's economic support with bigger bubbles associated with more wider support measures. Colors are according to WFP's Regional Bureaux (see note below Figure 3). Countries named are those with a particularly worrisome mix of a high employment share in heavily hit sectors, high working poverty and limited COVID-19 related economic support measures.

### A bleak picture emerges from early surveys

There is emerging evidence from around the world showing how the pandemic is reducing people's income and thus increasing incidence of food insecurity. Results from WFP surveys in June show a notable increase in households using crisis or emergency coping strategies. Consistent with the global spread of COVID-19, these negative coping strategies are increasingly used by households across all regions where WFP operates. Among the surveyed countries, the situation appears to be particularly worrisome in Cameroon, Chad, Colombia, Democratic Republic of Congo, Honduras, Malawi, Mali and Niger, where over 50 percent of households report resorting to coping strategies such as spending savings, borrowing money, selling productive assets or means of transport, consuming seed stocks,



reducing non-food expenditures or relying on less expensive food, reducing the number of meals or limiting portion size.<sup>30</sup>

A web survey in Lebanon carried out by WFP in May, covering Lebanese population as well as Syrian and Palestinian refugees, suggests that the COVID-19 outbreak and related containment measures have pushed around half of the Syrians into unemployment and nearly one out of every three Lebanese. One in five respondents saw their salary being reduced. To bridge income gaps, two-thirds have resorted to one or more livelihood-based coping strategies in the past month, above all spending less on food. In combination with soaring food prices, accessing food has become a major source of concern.<sup>31</sup> Fifty percent of Lebanese, 63 percent of Palestinians and 75 percent of Syrians felt worried about not having enough food to eat over the past month. Forty-four percent of the Syrian refugees reported eating only one meal during the previous day. One in five Lebanese and Palestinians respondents reported the same.

In Latin America and the Caribbean, a region which has recently become the new epicenter of the pandemic, WFP surveys covering nine countries reveal a particularly drastic deterioration in people's livelihood with 69 percent of the respondents reporting a decrease in their incomes as a result of COVID-19. Seven out of ten respondents were worried about not having enough food to eat in the preceding 30 days, more prevalently so in rural than in urban areas. Urban households possibly had the chance to stockpile food before the lockdowns came into force or their economies were severely disrupted. 62 percent of the respondents used crisis or emergency coping strategies which severely affect food consumption.

Surveys by other agencies show a similar trend. BRAC conducted a countrywide survey in late March and early April in Bangladesh, where 93 percent of the respondents saw a decline in their income due to the pandemic. A more worrying finding is perhaps the drastic increase in the poverty headcount. The population below the lower national poverty line rose from previously 24 percent to 84 percent after the pandemic set in. With 14 percent of the people interviewed indicating that they do not have food at home, the decline in people's income has a clear negative impact on their food security.<sup>32</sup> Meanwhile, Population Council surveys in India found that in two states, Uttar Pradesh and Bihar, 54 and 61 percent of the population, respectively, had resources that may last for less than one month in early April.<sup>33</sup>

Early surveys in some African countries paint the same picture of declining incomes and rising food insecurity. In a phone survey in Senegal, 85 percent of the people reported income loss with about a third of the population consuming less than their usual food intake as a result of the pandemic.<sup>34</sup> Meanwhile in Kenya, 68 percent of people in Nairobi's informal settlements reported skipping a meal as a result of lack of income due to the pandemic.<sup>35</sup>

### Unless well-guarded food supply chains can take a hit

The surge in unemployment following the pandemic and the resulting blow to people's purchasing power will also put food supply chains under pressure, particularly for higher value foods. However, the threat to supply chains from local lockdowns goes far beyond that. Even if the pandemic has yet

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<sup>30</sup> [WFP Hunger - COVID Snapshots](#)

<sup>31</sup> WFP, [Assessing the Impact of the Economic and COVID-19 Crises in Lebanon](#)

<sup>32</sup> Prothom Alo, [14pc people have no food at home: BRAC survey](#)

<sup>33</sup> Population Council, [Critical needs during Covid-19 lockdown: Job, Food, Cash, Medicines – Who Needs What?](#)

<sup>34</sup> Center for Global Development, [Five Findings from a New Phone Survey in Senegal](#)

<sup>35</sup> Population Council, [Kenya: COVID-19 Knowledge, Attitudes, Practices & Needs](#)

to cause major food supply chain disruption, its effects don't spare any part of the system and are felt both immediately and in the longer term. Food supply chains rely on physical movement – workers on their way to the farm or processing plants, traders picking up produce and bringing it to a warehouse, buyers and sellers going to the market. Lockdown-style policies paralyze these movements. Examples for immediate effects of containment measures on food supply chains include police confiscating and destroying three tons of fresh fruit and vegetable in Zimbabwe in a bid to enforce the country's lockdown;<sup>36</sup> overnight transportation of perishable foods – necessary as refrigeration is lacking – made impossible by curfews in Mali;<sup>37</sup> or informal cross border trade coming to a standstill in Uganda<sup>38</sup>, where it accounts e.g. for 30 percent of all beans exports<sup>39</sup>, and elsewhere, sparking protest in Ben Gardan on the border between Tunisia and Libya.<sup>40</sup> Meanwhile, looking at longer term implications, with few flights operating and shipment costs multiplying the pandemic delayed delivery of pesticides and equipment to fight the locust outbreak in East Africa, setting back efforts to contain the pest.<sup>41</sup> The World Bank further foresees agricultural production in Africa to contract between 2.6 and 7 percent as a result of the COVID-19 crisis.<sup>42</sup>

The effects of local Coronavirus outbreaks on food supply chains go beyond disruption of physical movement. Disruption brings uncertainty for actors along food supply chains. It becomes harder to predict how prices might evolve, both in input and output markets, with repercussions for investment decisions. An IFPRI study for dairy value chains in Ethiopia found feed prices temporarily up by 40 percent; and laborers' wages rising from 150 to 250 Birr per day.<sup>43</sup> Concerns have also been voiced around food quality and safety, which might suffer as processors find ways of handling fractured supply lines and lower margins; and a prioritization away from nutritious foods to those with higher shelf life.<sup>44</sup> Unpredictable consumer behavior compounds uncertainty. Returning to the example of Ethiopian dairy value chains, a perceived risk to contract COVID-19 through the consumption of animal-sourced products brought down dairy consumption, leaving dairy shop owners with a sharp reduction in demand, triggering increased butter production and making it harder for farmers to sell their milk.<sup>45</sup> While temporary, such hiccups along supply chains can have farther reaching consequences. They might result in farmers without money to buy critical inputs for the next season; or put small retailers, who take the wrong decisions on what products to fill their shelves with, out of business.

### Supply-side exposure: Dependence on labor is key

The pandemic's impact on food supply chains differs between countries. Mobility restrictions deprive supply chains of a key ingredient, workers; and of everything else that needs human help to move. As labor use in the food and agriculture sector varies by country, exposure to COVID-19 containment measures also does. The share of workers employed in food-related sectors is typically higher in low-income than in high income countries; the World Bank puts the difference at up to five times. As an example, the United States needs 10 percent of its workforce to meet domestic food demand,

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<sup>36</sup> AP NEWS, [Virus choking off supply of what Africa needs most: Food](#)

<sup>37</sup> FAO webinar [Estimating the impact of COVID-19 on rural poverty](#)

<sup>38</sup> NewVision, [COVID-19 brings informal cross-border trade to a standstill](#)

<sup>39</sup> Bank of Uganda, Statistics, [Composition of Exports](#)

<sup>40</sup> Carnegie Middle East Center, [Living Off the Books](#)

<sup>41</sup> Bloomberg, [Coronavirus Slowing Desert Locust Response Amid New Swarms](#); World Bank blog post [Coronavirus and commodity markets: Lessons from history](#)

<sup>42</sup> The World Bank, [Africa's Pulse, No. 21, Spring 2020: An Analysis of Issues Shaping Africa's Economic Future](#)

<sup>43</sup> IFPRI virtual seminar on [COVID-19 and its impact on Ethiopia's agri-food system, food security, and nutrition](#)

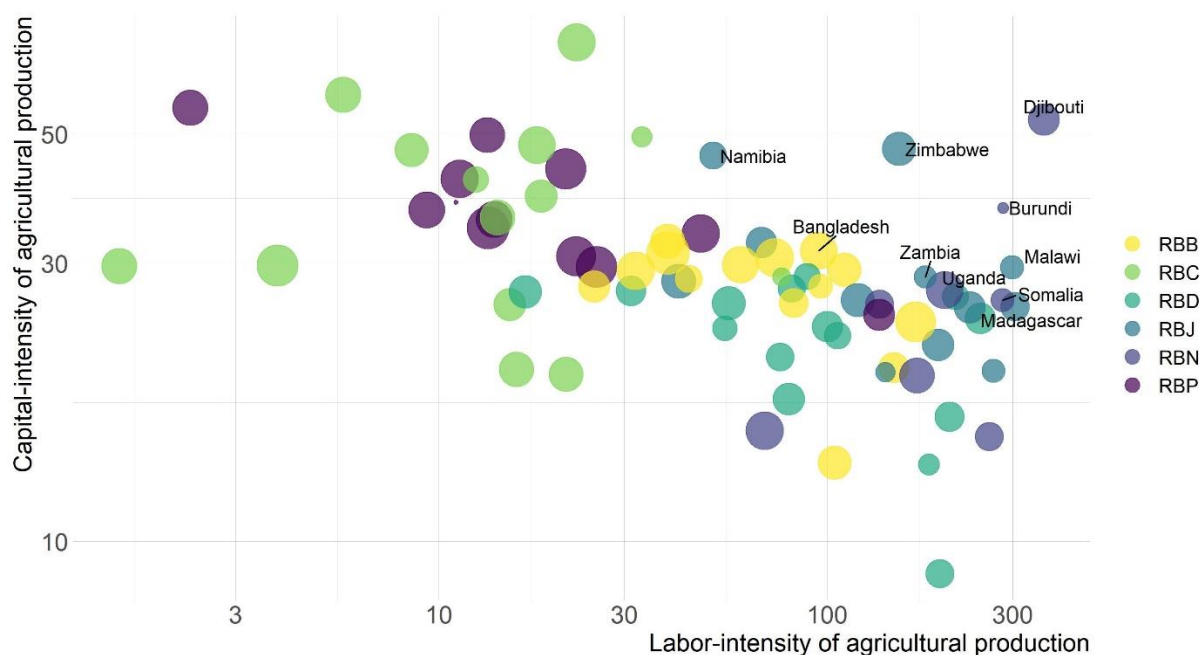
<sup>44</sup> GAIN, [The COVID-19 Crisis and Food Systems: probable impacts and potential mitigation and adaptation responses](#)

<sup>45</sup> IFPRI blog post [COVID-19 is shifting consumption and disrupting dairy value chains in Ethiopia](#)

whereas 60 percent of workers are engaged in food production in Ethiopia.<sup>46</sup> While labor-intensive food supply chains are arguably most exposed to the pandemic, heavy dependence on capital – in particular intermediate inputs (such as fertilizer, pesticides, seeds or feed in case of agricultural production) or fixed capital (such as replacement parts for machines) – also creates risks. With transportation disrupted, missing inputs could bring production to a halt and entire supply chains to stumble. As agricultural production is not possible without some combination of capital and labor, all countries have some degree of exposure.

We draw on a country taxonomy developed by FAO to gauge differences in the degree of exposure of countries' agricultural production to the pandemic.<sup>47</sup> Whereas FAO's classification takes a broader stance and captures also the pathways through which the global economic recession impacts the food and agricultural sector, we focus on the part relevant in the context of local lockdowns. We use a combination of the share of intermediate inputs and fixed capital in gross agricultural output (as a measure of capital-intensity); and the number of workers needed to produce a unit of gross agricultural output (as a measure of labor-intensity) to quantify exposure of food production to COVID-19. Both are shown in Figure 7 and used in the risk classification below. The countries that stand out for their factor intensity of production are primarily African, including Burundi, Djibouti, Madagascar, Malawi, Namibia, Somalia, Uganda, Zambia and Zimbabwe.

Figure 7: Exposure of agricultural production



Sources: FAO; and own calculations. Notes: Capital-intensity is measured as the share of intermediate inputs and fixed capital in gross agricultural output; labor-intensity as the number of agricultural workers per USD 100,000 gross output. Bubble size indicates the strictness of government response according to the Oxford Stringency Index. Scales are logarithmic. Colors are according to WFP's Regional Bureaux (see note below Figure 3). Countries named are particularly exposed due to a mix of both high labor- and capital-intensity.

<sup>46</sup> World Bank blog post [The containment divide: COVID-19 lockdowns and basic needs in developing countries](#)

<sup>47</sup> Schmidhuber, Pound and Qiao, [COVID-19: Channels of transmission to food and agriculture](#), FAO

## Supply-side vulnerability: Modern food supply chains appear best placed to cope with COVID-19

As the pandemic's fallout can be felt along the entire supply chain, it is crucial to consider not only the farm but also the post-farm sector when categorizing country-level risk. Traders, truckers and retailers have been called 'the life blood, the circulatory system' of African food value chains. With only 20 percent of food produced for self-consumption, the bulk of what Africans eat is purchased after being handled and marketed by diverse actors midstream and downstream food supply chains. This can involve physically moving long distances. For example, maize in Nigeria often travels 500 to 1000 km from farm to fork with urban wholesalers and rural brokers managing the flow of grain, flour or feedstuffs from around 8 million maize producers to 160 million consumers.<sup>48</sup>

Food supply chains not only differ in their length, but also in other aspects that determine to what extent they are at risk to the Coronavirus pandemic. Their vulnerability has been linked to stage of development.<sup>49</sup> We can describe food supply chains as traditional, transitional or modern. While traditional food supply chains are short and local, depend on home microenterprises and work largely without standards, transitional food supply chains are longer and run from rural to urban areas, are characterized by small-and-medium-sized enterprises (SMEs) and wet markets and feature public standards. Neither type is organized through contracts and both are labor-intensive. Modern food supply chains, on the contrary, are capital-intensive and see emerging contractual arrangements. They are long, not only running from rural to urban areas but across countries. Supermarkets and large processors are the main enterprises type.<sup>50</sup>

The post-farm segment of modern supply chains will likely face least COVID-19 related challenges.<sup>51</sup> It is much easier for supermarkets to manage the numbers of customers in the store and enforce social distancing measures than it is to manage the dense masses of vendors and customers in public wholesale markets. Contracts and standards further allow supermarket chains to oversee hygiene practices and food safety along their supply chains. Conversely, it is likely to be hardest for informal SMEs of transitional supply chains to cope with COVID-19.<sup>52</sup> If food processing enterprises, meal vendors or retailers in wet markets – SMEs are often clustered together, with high densities of workers in small space dealing with clients gathering in crowds. Corroborating this hypothesis, Latin America's traditional markets have been stigmatized as hubs of infection after 79 percent of vendors in a fruit market in Lima, Peru, tested positive for the virus.<sup>53</sup> Similarly, the recent new outbreak in Beijing has been traced to have its origin in Xinfadi, an enormous wholesale market.<sup>54</sup>

This makes some regions' food supply chains more vulnerable to the pandemic than others. IFPRI approximates that about 70 percent of African and South Asian food supply chains are in a transitional stage whereas 20 percent are modern; while for Latin America and Southeast Asia the respective shares are 50 percent and 45 percent.<sup>55</sup>

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<sup>48</sup> AGRA, Africa Agriculture Status Report 2019

<sup>49</sup> IFPRI blog post [How COVID-19 may disrupt food supply chains in developing countries](#)

<sup>50</sup> Barrett et al, 2019, Structural transformation and economic development: insights from the agri-food value chain revolution. Mimeo, Cornell University; IFPRI blog post [How COVID-19 may disrupt food supply chains in developing countries](#)

<sup>51</sup> IFPRI blog post [How COVID-19 may disrupt food supply chains in developing countries](#)

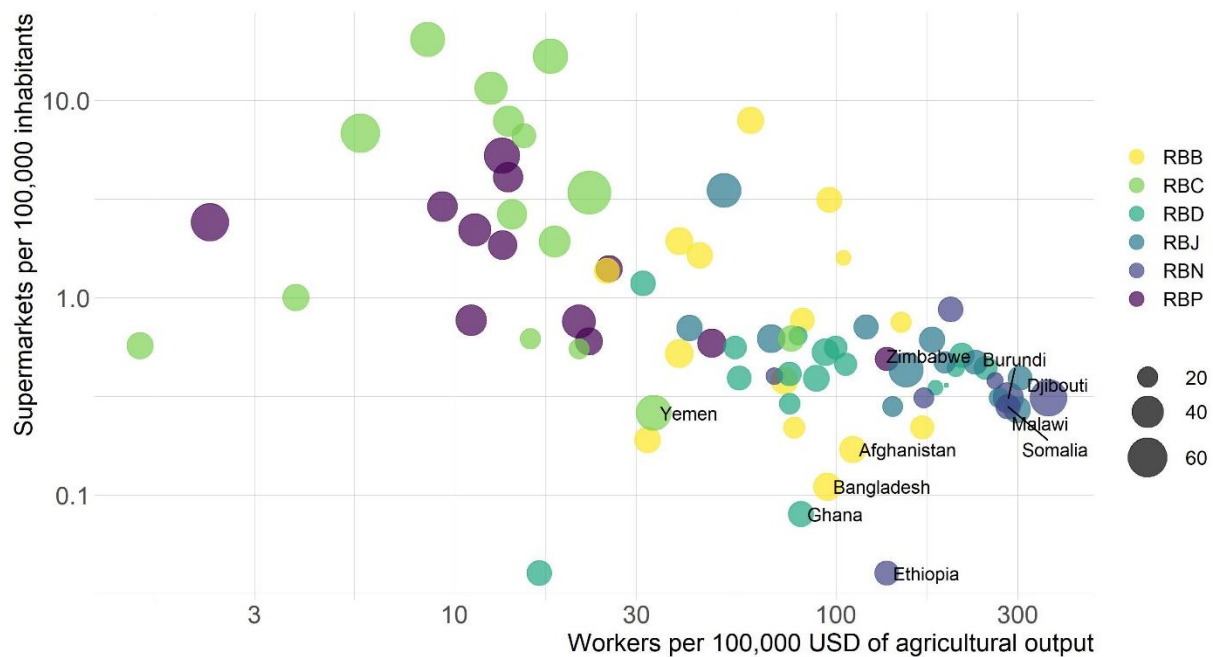
<sup>52</sup> IFPRI presentation on [Inclusive Food Systems: Before and After COVID-19](#)

<sup>53</sup> The Guardian, ['Hubs of infection': how Covid-19 spread through Latin America's markets](#)

<sup>54</sup> ALJAZEERA, ['Back to where we were': Beijing fears second wave of coronavirus](#)

<sup>55</sup> IFPRI blog post [How COVID-19 may disrupt food supply chains in developing countries](#)

Figure 8: Exposure and vulnerability to food supply chain disruptions



Sources: FAO; [Food Systems Dashboard](#); and own calculations. Notes: Bubble size indicates capital-intensity of production (measured as the percentage of intermediate inputs and fixed capital in gross agricultural output). The number of agricultural workers per USD 100,000 gross output indicates labor-intensity of production. Scales are logarithmic. Colors are according to WFP's Regional Bureaux (see note below Figure 3). Countries named are characterized by a particularly worrying mix of high factor-intensity of agricultural production and low supermarket penetration.

It is challenging to find data at country level to gauge the stage of food supply chains. The [Food Systems Dashboard](#)<sup>56</sup> develops a typology to characterize countries' food systems as belonging to one of five different groups ranging from 'rural and traditional' to 'industrialized and consolidated'. We borrow from the food system typology to classify food supply chains and use the number of supermarkets relative to population – closely linked to the way supply chains are organized and how people shop – to approximate the stage of food supply chains and, hence, vulnerability to the Coronavirus pandemic.

Figure 8 brings together exposure and vulnerability indicators for food supply chains, visualizing supermarket penetration in combination with labor- and capital-intensity of agricultural production. It highlights Afghanistan, Bangladesh, Burundi, Djibouti, Ethiopia, Ghana, Malawi, Somalia, Yemen and Zimbabwe as countries of particular concern because of a combination of factor intensive agricultural production and low prevalence of modern food supply chains.

### Bringing the indicators together to categorize food security risk

As already alluded to, we develop a food security risk classification based on indicators introduced in the previous sections. These capture hazard, exposure and vulnerability to local COVID-19 outbreaks and the ensuing containment measures considering both the supply- and the demand-side. Namely, the indicators are

- the Oxford Stringency Index (hazard);
- the share of intermediate inputs and fixed capital in gross agricultural output (supply-side exposure);

<sup>56</sup> Fanzo et al, 2020, [The Food Systems Dashboard is a new tool to inform better food policy](#), Nature Food

- the number of agricultural workers per 100,000 USD of gross agricultural output (supply-side exposure);
- the number of supermarkets per 100,000 inhabitants (supply-side vulnerability);
- the share of employment in sectors categorized by ILO as suffering a high or medium-high impact from the Coronavirus crisis (demand-side exposure);
- the prevalence of working poverty (above the age of 15) (demand-side vulnerability);
- the Oxford Economic Support Index (demand-side vulnerability).

We have chosen indicators that are widely available across countries. Still, data for all six indicators is only available for 75 of the 83 countries examined. The remaining eight – Armenia, DPR Korea, Gambia, Guinea-Bissau, Palestine, São Tomé and Príncipe, Timor-Leste, Togo – have been excluded with their risk, thus, not classified. Issues with data availability are also the reason why not all factors shown in Figure 2 enter the risk classification. Namely, the ability to work from home and informality are missing.

### **Box 1: Details of the risk classification**

#### **. . on the indicators**

The [Oxford Stringency Index](#) accounts for school, workplace and public transport closures, cancellation of public events, stay at home orders and restrictions on domestic or international travel among others; the measures' strictness; and whether they only hold for a targeted area or economy wide. We compute its mean from 1 January 2020 until 15 June 2020. Meanwhile, the Oxford Economic Support Index quantifies income support and debt or contract relief for households. It is based on records if and to what extent governments replace lost salary; and if governments freeze financial obligations such as stop loan repayments, prevent water or other services from running or ban evictions. We use the index' value as of 15 June.

#### **. . on data sources**

Data sources are the University of Oxford for the Stringency and the Economic Support Index; FAO for the supply-side exposure indicators; the Food Systems Dashboard for supermarket penetration; and ILO for the remaining two demand-side indicators.

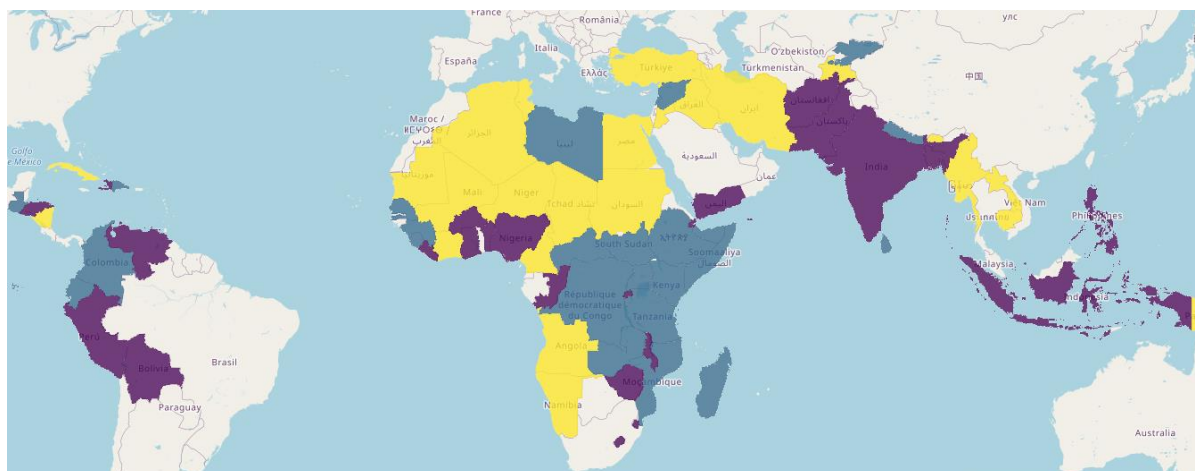
#### **. . on the computation of the risk classes**

In a first step, we rank countries for each of the seven indicators according to increasing risk. The country with lowest risk gets the lowest rank. Increasing risk coincides with increasing values for some indicators (e.g. the number of agricultural workers per output) and decreasing values for others (e.g. the number of supermarkets relative to inhabitants). We then assign a score to each country by summing up the ranks. As there are two indicators for both supply-side exposure and demand-side vulnerability, each of these only enters the sum with a factor of 0.5. For example, if a country ranks 50<sup>th</sup> for the Oxford Stringency Index, comes in 10<sup>th</sup> for capital- and 60<sup>th</sup> for labor-intensity, has the 55<sup>th</sup>-highest supermarket penetration, the 15<sup>th</sup> lowest share of employment in sectors at (medium)-high risk and ranks 40<sup>th</sup> and 45<sup>th</sup> in terms of the working poverty headcount and economic support, respectively, its final score is  $50 + 0.5 \times 10 + 0.5 \times 60 + 55 + 15 + 0.5 \times 40 + 0.5 \times 45 = 197.5$ . Finally, we take the terciles of the scores' distribution to arrive at three risk groups.

Table 1 and Figure 9 show the resulting risk classification across countries. Latin America and the Caribbean emerges as the region with the highest risk on average, closely followed by East and

Southern Africa. Variation across countries is most pronounced in Asia and the Pacific, followed by West and Central Africa.

Figure 9: Food security at risk to food supply chain disruptions and income loss



Notes: Colors indicate countries' food security risk due to local COVID-19 outbreaks. Purple indicates highest risk; blue medium risk; and yellow lowest risk.

In conclusion, we combine our classification of risk from domestic lockdowns with that of risk from the global economic recession developed in previous economic updates. Table 1 shows the two indicators side by side, adding them up to quantify overall risk in the right-most column. Highlights in the first column flag countries that fall into the highest risk category for both domestic and external risk (i.e. have overall risk equal to six) in red; and those that fall into the highest category for one and the second highest for the other (i.e. have overall equal to five) in light red.

## Conclusions and recommendations

In this brief, we have examined the repercussions of COVID-19 induced domestic shocks on food security and developed a framework which allows us to analyze risks both on the supply and the demand side. Combining this with our earlier analysis of the ramifications of the global economic recession, gives us a risk classification of countries which takes into account the risk from both domestic and external shocks.

While on the supply side, East Africa stands out as at especially high risk, followed by Southern Africa and Asia, we find that Latin America and the Caribbean as well as West and Central Africa are particularly at risk on the income side. Combining the domestic and external index highlights the food security risk that several Sub-Saharan and Latin-American countries face.

Considering the risk pathways, it is clear that the agriculture sector must be a national priority to ensure disruption free production and supply of food commodities. Any disruption to the agricultural labor or inputs will be detrimental for the food supplies for the next season. We may have ample food stocks now, but they will be not sufficient for the next year.

The importance of social protection has been highlighted in several fora and many countries have rolled out measures to cushion their populations from income losses. External assistance on favorable terms such as concessional loans, grants, debt rescheduling, or debt swaps is key to enable poorer countries to quickly implement large scale social safety net programs. The IMF is so far responding to emergency financing requests from 102 countries worth USD 100 billion. Financing is already approved for over 70 countries and immediate debt service relief for the next six months to 29

countries. The G20 has further agreed to suspend repayment of official bilateral credit for poorest countries and the International Institute for Finance urged private-sector creditors to forgo debt payments until the end of the year without declaring borrowers in default.

However, there are still significant gaps in coverage. As highlighted above, only 4 percent of people in the lowest income quintile in Sub-Saharan Africa receive assistance from the government in normal times; extra efforts are therefore needed to reach those most in need. Moving beyond the rhetoric, the international community needs to significantly step up to support poorer countries' social protection systems so that no one is left behind. This must be done immediately so that people are not forced to sell their productive economic assets which they use to earn a living in normal times. COVID-19 is a global problem that requires global collective action. Until a solution is available and economies are on their paths to recovery, we need to save lives and protect livelihoods.



Table 1: Countries at risk

Country	Region	Food supply chain disruptions				Income loss			Risk from domestic shock	Risk from external shock	Overall risk	
		Hazard	Exposure		Vulnerability	Exposure	Vulnerability					
		Oxford stringency index	Intermediate inputs and fixed capital in gross ag output (percentage)	Workers per 100,000 USD of gross ag output (number)	Supermarkets per 100,000 inhabitants (number)	Employment in high/medium-high impact sectors (percentage)	Working poverty (percentage)	Oxford economic support index				
Burundi		12	37	283	0.31	5	73	0	2	2	4	
Djibouti		41	53	361	0.31	51	17	13	3	3	6	
Ethiopia		36	26	136	0.04	25	23	25	2	3	5	
Kenya	East Africa	50	15	69	0.40	34	25	50	2	1	3	
Rwanda		46	19	170	0.31	28	46	25	3	1	4	
Somalia		29	26	283	0.28	13	71	0	2	3	5	
South Sudan		36	15	261	0.38	27	43	0	2	3	5	
Uganda		49	27	200	0.87	20	35	50	2	1	3	
Benin		Western and Central Africa	34	28	89	0.39	52	39	0	3	2	5
Burkina Faso			38	16	206	0.44	54	34	0	3	1	4
Cameroon	34		23	106	0.46	45	15	38	1	3	4	
Central African Republic	33		26	214	0.51	18	67	0	2	2	4	
Chad	36		9	195	0.36	20	34	50	1	2	3	
Côte d'Ivoire	39		27	31	1.18	51	19	50	1	1	2	
Gambia	41		12	354		60	8	0		2		
Ghana	35		27	81	0.08	53	8	50	3	2	5	
Guinea	40		24	248	0.44	33	29	0	2	2	4	
Guinea-Bissau	31		94	0.53	26	58				1		
Liberia	44		26	56	0.39	45	39	0	3	3	6	
Mali	31		23	54	0.56	31	44	50	1	1	2	
Mauritania	42		18	80	0.64	36	3	50	1	2	3	
Niger	26		14	182	0.35	22	39	25	1	3	4	
Nigeria	43		27	17	0.04	50	37	0	3	3	6	
São Tomé & Príncipe			28	119		60	35			1		
Senegal	40	23	100	0.56	53	30	63	2	1	3		
Sierra Leone	36	21	76	0.29	38	41	0	2	3	5		
Togo			25	76	0.41	55	35			1		
Angola		40	33	68	0.62	30	28	50	1	3	4	

Congo		44	26	120	0.71	54	35	75	3	2	5
DRC		42	22	193	0.47	22	68	50	2	2	4
Eswatini		45	28	41	0.70	60	3	25	3	1	4
Lesotho		41	25	232	0.47	50	39	50	3	1	4
Madagascar	Southern Africa	37	25	304	0.39	29	68	25	2	1	3
Malawi		30	30	299	0.27	50	64	100	3	1	4
Mozambique		29	20	268	0.31	21	51	0	2	3	5
Namibia		35	46	51	3.51	55	7	75	1	1	2
Tanzania		24	20	141	0.28	27	36	0	2	1	3
Zambia		28	28	179	0.61	39	45	25	2	3	5
Zimbabwe		44	47	153	0.43	25	18	25	3	3	6
Algeria		46	20	16	0.62	40	0	38	1	2	3
Armenia			38	14	7.83	37	0			2	
Egypt		42	25	15	6.61	44	0	50	1	1	2
Iran		32	42	12	11.56	51	0	75	1	3	4
Iraq		55	30	4	1.00	43	0	50	1	3	4
Jordan		47	58	6	6.82	52	0	38	1	2	3
Kyrgyzstan		50	72	23	3.40	49	0	50	2	2	4
Lebanon	Middle East and North Africa	47	30	2	0.57	47	0	25	2	3	5
Libya		49	48	18	16.76	44	0	0	2	2	4
Palestine		55	48	12		47	0	50		2	
Sudan		45	19	21	0.55	40	6	50	1	3	4
Syria		42	39	18	1.92	48	28	0	2	2	4
Tajikistan		22	28	76	0.62	27	4	25	1	2	3
Tunisia		46	36	14	2.64	52	0	75	1	1	2
Turkey		44	47	9	20.33	55	0	63	1	1	2
Yemen		25	49	33	0.26	44	48	0	3	2	5
Afghanistan		44	29	111	0.17	30	39	0	3	3	6
Bangladesh		49	32	95	0.11	49	8	50	3	2	5
Bhutan		44	14	105	1.59	28	1	75	1	2	3
Cambodia		30	27	96	3.13	51	7	25	1	1	2
DPR Korea			21	78	0.22	36	17			2	
India	Asia and Pacific	51	31	73	0.38	37	10	75	3	1	4
Indonesia		45	33	39	0.52	52	4	0	3	1	4
Laos		38	26	82	0.77	24	8	13	1	1	2
Myanmar		39	20	148	0.75	41	2	0	1	1	2
Nepal		54	24	169	0.22	24	6	75	2	3	5

Pakistan		50	29	32	0.19	46	2	75	3	1	4
Papua New Guinea		35	28	44	1.64	33	21	0	1	2	3
Philippines		58	31	39	1.93	55	2	13	3	1	4
Sri Lanka		48	30	60	7.92	52	0	0	2	1	3
Timor-Leste		34	32	175		38	21	100		3	
Vanuatu		41	27	25	1.37	31	13	13	1	2	3
Bolivia		50	34	47	0.59	50	5	50	3	2	5
Colombia		48	36	14	4.08	63	1	75	2	3	5
Cuba		46	50	13	5.25	40	0	50	1	1	2
Dominican Republic		48	37	9	2.90	64	1	25	2	2	4
Ecuador	Latin America and the Caribbean	50	42	11	2.21	53	4	75	2	3	5
El Salvador		57	35	13	1.85	66	0	75	3	2	5
Guatemala		55	30	25	1.40	53	3	75	2	1	3
Haiti		41	24	136	0.49	60	17	25	3	3	6
Honduras		54	44	21	0.76	54	11	88	3	2	5
Nicaragua		7	38	11	0.77	53	5	0	1	1	2
Peru		52	31	23	0.60	55	3	100	3	2	5
Venezuela		47	55	2	2.41	64	11	50	3	3	6

Notes: The value of the Oxford Stringency Index is the average value of the index from 1 January to 15 June 2020. Colors indicate countries' food security risk due to local COVID-19 outbreaks. Purple indicates highest risk; blue medium risk; and yellow lowest risk. Countries with missing data (and, thus, missing risk categorization) are shown in grey.