Food and Agriculture Organization of the United Nations

Assessing the impacts of the COVID-19 pandemic on the livelihoods of rural people

A review of the evidence

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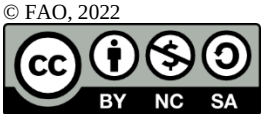

Abstract

Beyond COVID-19's devastating health impacts, efforts to contain the spread of the virus have exacted a massive economic and social cost on urban and rural populations alike. This paper examines the welfare implications of the COVID-19 pandemic on rural livelihoods using nationally representative data from 54 countries, combined with a systematic review of published, survey-based evidence. To enrich the analysis, a food system country typology is used to capture key structural differences in the organization of rural economies and the vulnerabilities to rural livelihoods due to the COVID-19 pandemic and associated lockdown measures. The report focuses on three key livelihood dimensions: income, coping strategies and food security. The evidence in the report shows a median value of 67 percent of rural households across the 54-country sample report income losses due to COVID-19, and this figure is identical to the reported losses in urban areas. This suggests that despite lockdown measures being concentrated primarily in urban areas, the impacts of these measures rippled through rural spaces and upended rural livelihoods. Rural incomes in countries in the rural and traditional food systems were particularly affected, with a median value of 77 percent of rural households reporting total income losses due to COVID-19. The adverse effects of the crisis are shown to vary across different income dimensions: a median value of 83 percent of respondents with non-farm enterprise income indicating income losses, 74 percent indicating income loss from family farms, 72 percent from remittances, and 58 percent from wages. Through this analysis, the report provides insights on how COVID-19 is influencing rural livelihoods, how its impacts vary between countries and food system typologies, and, ultimately, how policymakers and the international community need to respond in order to foster an inclusive and sustainable recover

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Abbreviations and acronyms

FAO	Food and Agriculture Organization of the United Nations
HH	Households
ILO	International Labour Organization
IMF	International Monetary Fund
LAC	Latin America and the Caribbean
OxCGRT	Oxford Coronavirus Government Response Tracker
RDD	Random digit dialing

Introduction

As of 2 August 2021, more than 4.2 million people have officially lost their lives to COVID-19 worldwide, with millions more suffering from long-term and debilitating health consequences. Beyond the coronavirus's devastating health impacts, efforts to contain the spread of the virus are exacting a massive economic and social cost. The International Labour Organization (ILO, 2021) estimates that in 2020, 8.8 percent of total working hours were lost. Informal workers and small-scale enterprises have been particularly hard hit. In a survey of 4 520 businesses in 45 countries worldwide, 80 percent of microenterprises and 70 percent of small firms reported facing significant financial difficulties as a result of the pandemic (ILO, 2020). Informal workers – who constitute a large part of the rural workforce – are particularly vulnerable and are found to be 3 times more likely than formal wage earners and 1.6 times more likely than self-employed and informal workers to have lost their job as a result of the pandemic (ILO, 2021). The impacts of job-market disruptions have been particularly pronounced for women, who have seen employment rates drop by five percent in 2020, compared to 3.9 percent among men (ILO, 2021). Along with a disproportionate loss of employment, women have overwhelmingly shouldered the burden of care and home schooling during lockdowns.

As a result of disruptions in economic activities caused by the pandemic, the International Monetary Fund (IMF) estimates that in 2020 the global economy contracted by 3.3 percent (IMF, 2021). This has pushed an estimated 97 million more people into poverty (IMF, 2021; Gerszon Mahler *et al*., 2021). Per capita income losses are particularly acute in emerging and developing countries, where the fiscal and institutional capacity to respond to the crisis is highly constrained (IMF, 2021; Bundervoet *et al.*, 2021). Well-designed and targeted recovery and mitigation polices are required in order to avoid a sustained reversal in global progress to reduce poverty and hunger.

Public policy responses to combat the adverse economic and social impacts of COVID-19 are complicated by the high levels of heterogeneity in impacts. This also complicates efforts to generate a process of sustainable and inclusive recovery. Emerging data on the economic and social impacts of the pandemic highlight variations in impacts among socio-economic groups, genders, occupations, regions and countries (Béné *et al.*, 2021; Egger *et al.*, 2021; Bundervoet *et al*., 2021). Important, but underappreciated, facets of the pandemic are its impacts on rural people. During the early phase of the crisis, some predicted that rural areas would be spared from its negative impacts, because lockdown measures were focused primarily in urban areas and food and agriculture related activities were generally exempted (*The Economist*, 2020; Reardon, 2020; Laborde *et al*., 2020). However, as the pandemic persists and new evidence emerges, it is becoming clear that rural spaces, including those in developing countries, are experiencing

substantial economic hardship as a result of the pandemic (Liverpool-Tasie *et al.,* 2021; Egger *et al.,* 2021; Bundervoet *et al*., 2021; Béné *et al.*, 2021; Josephson *et al.,* 2020).

Rural economies do not operate in isolation from urban areas and national and global economies. Rather, rural spaces are interwoven with national and global markets through complex networks of production, trade, migration and remittance flows. These linkages, combined with disproportionately higher levels of pre-pandemic poverty and food insecurity, make rural places and rural livelihoods acutely vulnerable to adverse economic impacts of the pandemic. Moreover, informality is a key feature of rural life in many countries. As a result, rural people are less likely to have access to contributory social insurance such as health insurance and unemployment benefits, and to other services, such as credit and insurance, which help to reduce the livelihood risks of the pandemic. Of course, the degree of integration of rural spaces into global and national markets, pre-pandemic poverty and food insecurity rates, and institutional capacities to contain the pandemic and manage its impacts are highly variable within and between countries.

In this paper we focus specifically on differences in the welfare impacts of COVID-19 on rural livelihoods between countries using nationally representative data that we disaggregate by food system typology. This typology captures key structural differences in the organization of rural economies and the vulnerabilities to rural livelihoods due to the COVID-19 pandemic and associated lockdown measures. In particular, we draw on household survey data collected from 54 countries[1] through the World Bank's COVID-19 High Frequency Monitoring Dashboard to generate descriptive data on COVID-19 impacts in rural areas across three dimensions: income, coping strategies and food security. These descriptive data are disaggregated into four food system categories and contextualized and validated through a systematic review of rigorous, survey-based studies of COVID-19 impacts in rural areas. Through this analysis, the report provides insights on how COVID-19 is influencing rural livelihoods, how its impacts vary between countries and food system typologies, and, ultimately, how policymakers and the international community need to respond in order to foster an inclusive and sustainable recovery.

[1] Data from the World Bank COVID-19 High Frequency Monitoring Dashboard have been downloaded on 22 April 2021. The dashboard is periodically updated.

Food systems, lockdowns and COVID-19 vulnerability in rural spaces

Food systems encompass the entire range of actors, processes, infrastructure and value-adding activities involved in the production, aggregation, distribution, consumption and disposal of agricultural and food products, including forest and fishery products (FAO, 2018). They are embedded within broader economic, societal, political and environmental contexts, and interact closely with other key economic and social systems, including health, trade and energy, among others. As a result, there is a great deal of variation in the structure and configuration of food systems within and between countries, with important implications for the economic well-being of food system actors, dietary and nutritional outcomes for consumers, and the environmental implications of food production and distribution (Global Panel on Agriculture and Food Systems for Nutrition, 2016; HLPE, 2017). Key points of heterogeneity between food systems include: variations in the degree of formalization in transactions and employment arrangements between and within food system nodes, levels of technological sophistication, length and complexity of supply chains, and levels of consolidation, among others.

Our motivation for using a food system lens to explore differences in impacts of COVID-19 on rural livelihoods is influenced by three factors. First, rural livelihoods are fundamentally tied to prevailing food systems both directly – through employment in food system activities including primary agricultural production and associated non-farm activities – and indirectly, through income-generation activities. (These activities depend on expenditures by food system actors, such as retail shops and non-agricultural manufacturing and services located in rural spaces.) Second, dominant structural features and arrangements that characterize a food system reflect broader tendencies in the economic and institutional configurations of a society. These may have important implications for the capacity of rural people to maintain their livelihoods during lockdown periods and to cope with the livelihood risks and income uncertainty that lockdowns bring. For example, in highly formalized food systems, most economic transactions involve various forms of legal contracts and are often underpinned by complex financial arrangements, such as forward contracting. These institutional arrangements can help to spread the costs and risks of managing the adverse economic impacts of the crisis on incomes, leading to potentially lower levels of welfare losses for rural people in these countries. Conversely, in more traditional food systems, transactions are typically small-scale and conducted in spot markets with limited use of credit or other financial tools. These market arrangements are highly sensitive to mobility restrictions imposed to curb the spread of COVID-19 (Van Hoyweghen *et al.*, 2021; Hirvonen *et al.*, 2021). Moreover, in more traditional food systems, employment and businesses are often informal, seasonal and unregistered. As a consequence, many individuals in these systems lack access to social protection systems, such as unemployment benefits, and have difficulty accessing

insurance and credit markets. This limits the capacity of individuals in traditional food systems to manage covariate and idiosyncratic shocks with formal mechanisms.

Finally, food systems differ in the extent to which they are integrated into local, national and global markets through input and output supply chains, and labour arrangements. Variations between traditional and modern food systems in terms of the length and complexity of supply chains and market linkages influence the level of exposure of a food system to disruptions caused by lockdown measures, with implications for the livelihoods of rural people that depend on these systems. For example, lockdown measures curtailed the movement of people and goods between countries, which had negative repercussions for food systems with long and complex supply chains (*Time*, 2020; Nedumaran *et al*., 2020). Perishable agricultural products and products with high income elasticity of demand are particularly vulnerable to disruptions in mobility and trade (Stephens *et al*., 2020; Shahidi, 2020).

To account for heterogeneity in food systems, we make use of a country-level food system typology developed by Johns Hopkins University and the Global Alliance for Improved Nutrition.[2] This typology groups countries into one of five food systems categories, which represent a continuum from traditional to industrialized and consolidated systems. The typology is based on four criteria measuring different dimensions of food system transformation. The first is "Agriculture value added per worker," measured in constant 2010 US dollars. This variable measures a key feature of food system modernization, which is that as labour productivity increases and wages rise, capital gradually replaces labour in agricultural product, leading to an increase in the value add of agricultural workers. As a result of this process, labour is released from the agricultural sector into industry and services, leading to more diversified rural economies. The second is the share of dietary energy from cereals, roots and tubers. These variable measures dietary transformations, which are often both drivers and outcomes of food system transformations. In particular, as incomes grow and food systems modernize, diets shift away from being dominated by carbohydrates to be more diversified and richer in animal proteins, fruits and vegetables. The third is the number of supermarkets per 100 000 people. This variable measures the extent to which informal food retail shops and associated small-scale supply chains, which dominate more traditional food systems, are replaced by large-scale, vertically integrated, and formalized food retail outlets and supply chains. Finally, the typology includes the share of urban population to total national population. This variable serves as a proxy for the dynamic process of urbanization that occurs as food systems transform and labour is released from the agriculture sector and exits rural areas.

[2] More information available at: https://foodsystemsdashboard.org/

Based on these variables, each country is assigned a score, which is then sorted from lowest to highest. This score is based on the sum of its ranks on each of the four indicators. As an example: a country ranked tenth on agriculture value added, fifteenth on share of dietary energy from cereals, roots and tubers, seventeenth on number of supermarkets per 100 000 population, and eighth on urbanization corresponds to a score of 50. The food system typology is created by separating the distribution of scores into quintiles, with the lowest quintile representing the most modern food system type and the highest quintile representing the most traditional food system type. **Table 1** presents the five food system typologies, along with the median values and interquartile ranges (25 percentile to 75 percentile) for each of the variables used to calculate the score to sort each country in each food system typology.[3]

Of course, it is important to recognize that country-level typologies can mask important differences that exist subnationally, across geography and different food commodities. This is because food systems are dynamic, with multiple types often existing in parallel, and transforming over time and embedded in territorial spaces, each of which have their own specificities that characterize food systems. However, for the purposes of this paper, food system typologies are a useful tool for understanding commonalities and differences in the impacts of the pandemic on rural spaces at a national level.

Table 1. Food system typologies classification by score: median and interquartile ranges

	Agricultural value added per worker, constant 2010 USD	***Share of dietary energy from staples***	***Number of supermarkets per 100 000 population***	***Percent of total population living in urban areas***
	Mean (interquartile ranges)			
Rural and traditional	814 (522–1 218)	0.67 (0.58–0.71)	0.34 (0.24–0.45)	0.34 (0.24–0.37)
Informal and expanding	2,428 (1 559–3 344)	0.58 (0.51–0.62)	0.65 (0.51–1.83)	0.52 (0.43–0.59)
Emerging and diversifying	5,511 (3 907–6 955)	0.46 (0.41 0.51)	4.00 (2.02–5.85)	0.57 (0.50–0.68)
Modernizing and formalizing	14,382 (10 519–20 331)	0.39 (0.35 0.43)	7.15 (3.92–14.25)	0.76 (0.66–0.84)
Industrialized and consolidated	53,180 (27 84 –80 456)	0.29 (0.27–0.31)	13.97 (10.73–22.70)	0.83 (0.77–0.91)

Source: The Global Alliance for Improved Nutrition and Johns Hopkins University. 2021. Data sources and methodology. In: Food Systems Dashboard [online]. [Cited 16 November 2021.] https://foodsystemsdashboard.org/data-sources-and-methodology

[3] More detailed information on the methodology followed to construct the food system typologies can be found at: Food Systems Dashboard - Diets and Nutrition

Differences across typologies of food systems are evident in terms of the stringency of COVID-19 lockdown measures implemented and the extent to which mobility has been curtailed during the pandemic. As shown in **Table 2**, among the 54 countries included in this report, those with rural and traditional food systems experienced considerably less reduction in mobility to and from workplaces and through major transit centres relative to other food systems (see **Annex 8** for information disaggregated at country level). For example, on average countries with rural and traditional food systems witnessed a 14 percent reduction in workplace mobility, compared to 27, 32 and 34 percent in countries with more complex food systems. This stark difference is only partially explained by differences in the stringency of lockdown measures (see **Table 2**). In rural and traditional food systems, mobility and face-to-face contact are necessary for many economic activities, and teleworking options are less available. Conversely, in more complex food systems, face-to-face interaction is often not essential for many economic activities, in part due to more expansive internet coverage in these countries, and in part due to the strength of institutions. Take for example the very different experience of buying grain in a rural and traditional food system compared to a more developed food system. In the latter, grading systems and strong legal frameworks enable grain buyers to purchase grain without needing to physically inspect it or to take physical control of it. Conversely, in rural and traditional systems, these institutional arrangements are often lacking, and physical inspection of grain and social relationships between buyer and seller are essential (Sitko and Jayne, 2012; Sitko and Jayne, 2014).

Differences in food system typologies are also reflected in data related to governance capacity and effectiveness. As shown in **Table 2**, measures of governance effectiveness, which include data on infrastructure quality, coverage of public services, political stability and bureaucratic quality, improves monotonically from rural traditional food systems to modernizing and formalizing food systems. A similar trend is observed with regulatory quality, which includes measures related to the ease of starting businesses, tariff and non-tariff policies, agricultural market access, and investment climate for rural businesses, among others. These differences have important implications for the institutional capacity of governments in these country groups to respond to the adverse economic impacts of the pandemic. Taken together, differences in levels of lockdown stringency and changes in mobility in response to the pandemic, coupled with difference in regulatory capacity and quality, are important factors for understanding differentiated impacts of the pandemic between food systems.

Table 2. Averages of stringency index, mobility trends and governance effectiveness by food system typologies

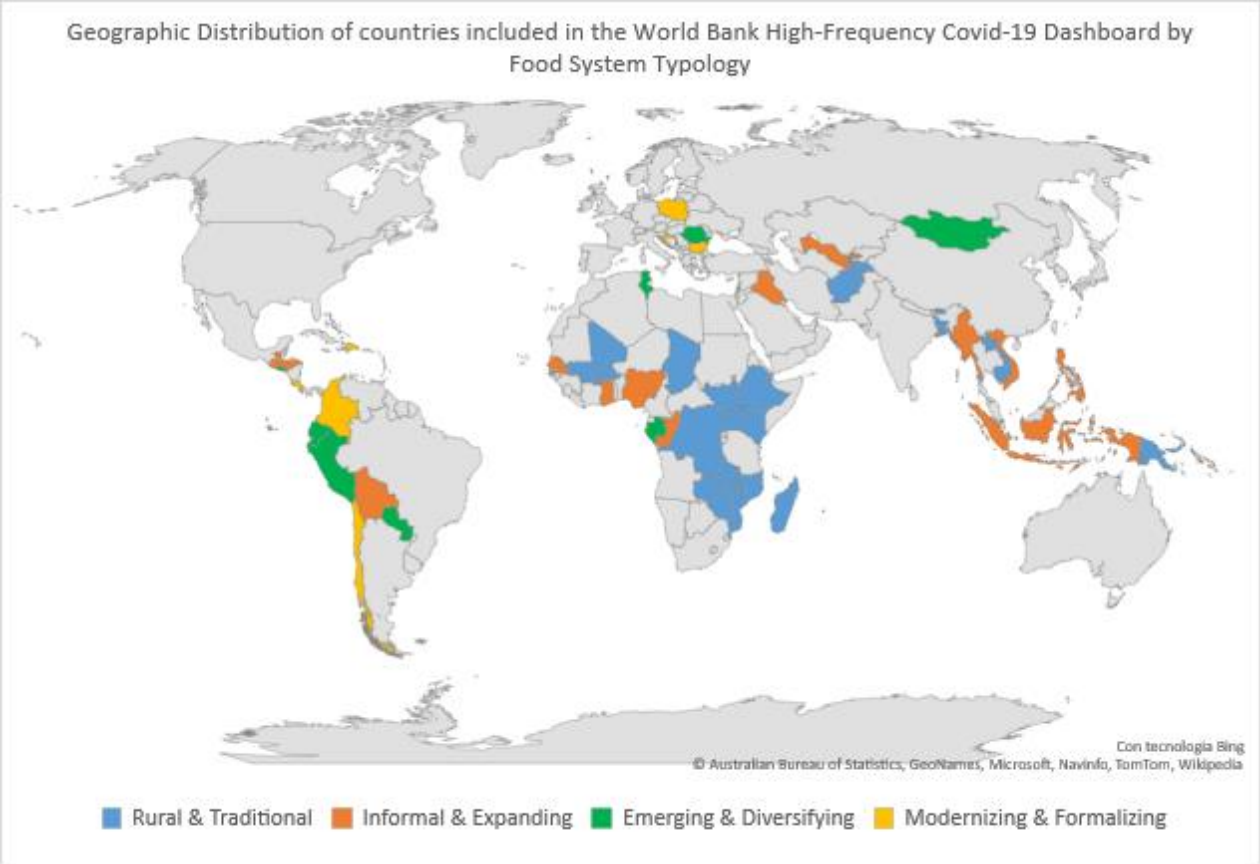
Food system Typology	Stringency Index	Google Mobility Trends		Worldwide Governance Indicators (WGI)	
	Mean levels April–August 2020	Workplaces (% change from baseline – mean levels April–August 2020)	Transit Stations (% change from baseline – mean levels April–August 2020)	Govt. Effectiveness (Mean levels 2019)	Regulatory Qual. (Mean levels 2019)
Rural and traditional (N=23)	68.95	-13.59%	-31.31%	-0.96	-0.81
Informal and expanding (N=14)	76.14	-27%	-40%	-0.5	-0.58
Emerging and diversifying (N=10)	73.1	-31.54%	-41.59%	-0.18	-0.02
Modernizing and formalizing (N=7)	70.75	-34%	-44.70%	0.36	0.6

Source: Self-elaborated. Data sources and methodology. In: Oxford COVID-19 Government Response Tracker (OxCGRT) [online]. [Cited 18 November 2021.] https://ourworldindata.org/covid-stringency-index; Google COVID-19 Community Mobility Data. [online]. [Cited 18 November 2021.] https://www.google.com/covid19/mobility/; and Worldwide Governance Indicators. [omline]. [Cited 18 November 2021.] www.govindicators.org

Data sources

In this paper, we rely on two primary sources of data. The first is nationally representative household survey data collected by the World Bank and systematized in the COVID-19 High Frequency Monitoring Dashboard. As of 22 April 2021, information comes from 54 countries across different geographic regions, namely sub-Saharan Africa (20 countries), Latin America and the Caribbean (12 countries), East Asia and the Pacific (9 countries), Europe and Central Asia (6 countries), Near East and North Africa (4 countries) and South Asia (3 countries). **Figure 1** shows the geographic distribution of the countries included in the World Bank dashboard by food system typology (the complete list of countries disaggregated by food system typology and geographic region can be found in **Annex 1**). The data we use in this study come from low- and middle-income countries and include four of the five food system typologies: rural and traditional (23 countries), informal and expanding (14 countries), emerging and diversifying (10 countries), and modernizing and formalizing (7 countries).

Figure 1. Geographic distribution of countries included in the World Bank High Frequency COVID-19 Dashboard (22 April 2021) by Food System Typology



Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.
Final boundary between the Sudan and South Sudan has not yet been determined

Source: Bing. 2021. COVID-19 Household Monitoring Dashboard. Cited 29 November 2021. World Bank. https://www.worldbank.org/en/data/interactive/2020/11/11/covid-19-high-frequency-monitoring-dashboard modified by the authors.

Data come from different national questionnaires collected through high-frequency phone surveys, which have been harmonized by the World Bank into 95 indicators covering 13 different topics (see **Annex 2**). This harmonization process allows comparability across countries. It is worth noting that some questions might be missing from some national survey, therefore the number of countries varies depending on the indicator. Also, surveys have been repeated in several waves to allow monitoring across time since April 2020, though such waves have not been executed simultaneously in all 54 countries, meaning that the same wave (first, second, third, etc.) might have been collected in different months for different countries.[4] Finally, the number of times such surveys have been repeated is not homogenous across countries.

[4] Further information available at: COVID19DashboardTechnicalNote.pdf (worldbank.org)

This paper focuses on 19 indicators across three topics, namely: food security, coping and income.[5] The full list of indicators is found in **Table 3** (see **Annex 3** for explanation of the indicators used). Different methodologies have been used to design nationally representative samples. Where countries had recently conducted a representative household survey, contact information of respondents was used to create a representative subsample. When this approach was not possible, contact information was retrieved from other sources, such as government registries, telecommunications companies or marketing firms. In Latin America and the Caribbean (LAC), samples are generated through a Random Digit Dialling (RDD) process, ensuring coverage of all landline and cell phone numbers active at the time of the survey.

While these phone surveys have proved to be useful data collection tools during the pandemic, they do have some limitations that are important to mention. First, individuals without access to a phone or with limited network coverage, which normally belong to the poorest and most remote social categories, are under-represented in the sample. Second, they are affected by high levels of non-response and attrition. Third, a trade-off had to be made between the breadth and depth of the questions asked, and the length of the calls. Fourth, all questions are asked to a single respondent per household, therefore individual-level answers might be biased by respondent selection. Finally, in countries where the High-Frequency Phone Surveys Panel is a sample from existing pre-COVID-19 national surveys, the designated respondent is the household head, therefore data on employment might differ from those measured by conventional Labour Force Surveys due to characteristics related to being the head of household, such as gender and age. To correct for such biases, household-level weights have been applied to the data in the dashboard. Since countries in the LAC region adopted the RDD sampling process, weights differ slightly. In such countries two sets of weights have been generated to correct for selection bias due to the probability of phone-ownership and non-response rate, one at household level and one at individual level. Moreover, weights have been adjusted for attrition in subsequent survey waves.[6]

Finally, it is important to clarify that due to the way questions have been formulated in the questionnaire (see **Table 3**), it is not possible to draw a direct causal relationship between the impacts reported by households and COVID-19. On one hand, such impacts occurred during the pandemic, and the pandemic certainly constituted an unexpected and unprecedented shock. On the other hand, other factors, such as weather shocks, pests (e.g. locust attacks) or political unrest, might have contributed too.

[5] Please note that this paper does not follow the same topic classification used in the World Bank High Frequency COVID-19 Dashboard. We created our own set of topics based on the variables found in the systematic literature review, and then adapted the World Bank classification to fit in such framework.

[6] For more information on weights, refer to the COVID-19 High Frequency Monitoring Dashboard Technical Note (covid19dashboardtechnicalnote.pdf (development-data-hub-s3-public.s3.amazonaws.com).

Hence, while COVID-19 cannot be identified as the only cause for changes in welfare outcomes, it definitely played a central role in determining the impacts reported in the surveys.

Table 3. List of indicators from World Bank High Frequency COVID-19 Monitoring Dashboard included in the analysis

Food Security: [7]

- **Ability to access any staple food in the past 7 days – all staple food items (% of households {HH})**
- **In the past 30 days, went without eating for a whole day due to lack of money (% of HHs)**
- **In the past 30 days, were hungry but did not eat due to lack of money (% of HHs)**
- **In the past 30 days, ate only a few kinds of foods due to lack of money (% of HHs)**
- **In the past 30 days, were unable to eat healthy/nutritious or preferred food due to lack of resources (% of HHs)**

Income:[8]

- **Experienced decrease in total income since the beginning of the pandemic (% HHs)**
- **Experienced decrease in remittances since the beginning of the pandemic (% of remittance receiving HHs)**
- **Experienced decrease in wage income since the beginning of the pandemic (% HHs with wage income as a source of livelihood in the past 12 months)**
- **Experienced decrease in income from non-farm family business since the beginning of the pandemic (% HHs with non-farm business income as a source of livelihood in the past 12 months)**
- **Experienced decrease in farm income since the beginning of the pandemic (% HHs with farm income as a source of livelihood in the past 12 months)**
- **Currently employed/working (% of respondents above 18 years old)**
- **Engaged in farming activities (% of HHs)**
- **Engaged in non-farm enterprises (% of HHs)**
- **Unable to perform normal farming activities (crop, livestock, fishing) (% of HHs)**
- **Stopped working since COVID-19 outbreak (% of respondents who worked before pandemic and above 18 years old)**
- **Unable to work as usual in the past week (% of respondents in wage employment and above 18 years old)**

Coping:[9]

- **Sold assets to pay for basic living expenses during the pandemic (% of HHs)**
- **Used emergency savings to cover basic living expenses during the pandemic (% of HHs)**
- **Reduced consumption of goods (essential or non-essential) during the pandemic (% of HHs)**

Source: COVID-19 High Frequency Monitoring Dashboard Technical Note: covid19dashboardtechnicalnote.pdf [online] [Cited 18 November 2021.] development-data-hub-s3-public.s3.amazonaws.com

The second data source comes from a systematic mapping of available empirical literature in English, French and Spanish on the impacts of COVID-19 in rural spaces. This exercise involved a combination of machine learning, web-based search queries and

[7] For analytical purposes, we used only food security data collected in June 2020.
[8] For analytical purposes, we used only data collected on the first survey wave for each country to assess the impact on income since the start of the pandemic. All first-round waves used were collected no earlier than April and no later than August 2020.
[9] All available survey rounds have been used to analyze impact on coping strategies.

manual categorization. A full description of the review strategy is provided in **Annex 4**. This evidence review serves three main purposes in this paper. First, it allows us to validate the impact measurements coming from the World Bank COVID-19 High-Frequency Monitoring Dashboard against other quantitative data sources. This is important because, as discussed in Brubaker *et al*. (2021), there are structural differences between phone survey respondents included in the World Bank datasets relative to the wider population, which are not completely eliminated through individual weighting. In particular, in Ethiopia, Malawi, Nigeria and Uganda, they found that respondents are significantly more likely to be household heads or their spouses, and they tend to be older, more educated and more likely to own a household enterprise than the general population (Brubaker *et al*., 2021). Even if many of the papers identified in our systematic review use phone surveys, and thus will not be able to correct for such biases, having an alternative source of information adds insights to the analysis. Second, the papers identified through the systematic mapping exercise often provide contextual information on the impact pathways that is not available in aggregate national statistics. Therefore, we make use of the findings from the literature to provide contextual insights explaining how and why patterns and variations in outcomes occur. Third, we used the systematic review to fill gaps on topics of interest to this paper when World Bank data was not available, as in the case of specific variables related to agricultural production.

Results

This section summarizes evidence on the impacts of the COVID-19 pandemic in rural areas across three livelihood domains: income (including agricultural production), coping strategies and food security. For each domain, national-level descriptive evidence is compiled from the World Bank's COVID-19 High Frequency Monitoring Dashboard and disaggregated by country food system typology. These data are validated and contextualized with data derived from a systematic mapping of quantitative literature on the impacts of COVID-19 in rural spaces.

Income

Rural people frequently adopt diversified livelihood strategies in order to augment incomes and reduce consumption risks associated with primary agricultural production (Davis *et al.*, 2010; Davis *et al.*, 2016; Barrett *et al.*, 2001). While diversified livelihood strategies are effective for mitigating many sources of covariate and idiosyncratic risks, such as weather shocks and price spikes, the COVID-19 pandemic is different. Efforts to contain the spread of the virus have led to business closures, restrictions on trade and domestic mobility, and disruptions in markets for agricultural outputs, inputs and labour, which affect different facets of people's livelihoods simultaneously. The multidimensionality of risks and stressors created by the pandemic is unique, as is its global scope.

In this section we summarize the evidence on the reported impacts of the pandemic on incomes across multiple domains (wage income, remittances, non-farm family businesses and farm income). **Table 4** summarizes data on the share of households that report income losses in these four domains from 45 countries for the first wave of High-Frequency Phone Survey data collection.[10] The data presented in **Table 4** are the median values and ranges, and are disaggregated by urban and rural, as well as by food system typologies.

A key outcome from the data presented in **Table 4** is that across the four income domains, the median share of households reporting incomes losses for all countries is similar or even higher in rural areas compared to urban. This result challenges the conventional wisdom that the consequences of the pandemic are most acute in urban areas, where lockdown measures were often more stringently enforced (Sanchez-Paramo, 2020). It also highlights the strong economic interconnections that exist between

[10] Please note that waves do not refer to the same months across different countries. First waves of data collection were conducted between April and August 2020.

urban and rural spaces as a result of trade and migration. Moreover, these results are indicative of the fact that rural livelihoods are in general more vulnerable to economic shocks, due to higher levels of poverty and more limited access to financial risk management tools, such as insurance and credit.

In terms of total income, the data show that at the median 77 percent of rural people in rural and traditional food system countries report income losses due to COVID-19. This is the highest median value for any group included in the sample. The high share of rural households in experiencing income losses in this food system is likely due to a combination of factors. First, rural households rely heavily on traditional input and output supply chains that are highly vulnerable to mobility restrictions. Second, they experience high levels of informality in wage employment and non-farm enterprises, which limits access to social insurance and financial instruments. Third, rural households have high levels of pre-pandemic poverty and food insecurity, which limits their capacity to cope with income shocks. Interestingly, only in the modernizing and formalizing food system countries are income losses by rural people substantially lower than for urban people (62 vs 72 percent median values). As discussed in more detail below, this is partially driven by the fact that households in these countries are less likely to report income losses from farm and wage sources.

Wage income opportunities in rural spaces are typically tied to the broader food system, through wage earning on-farm, and in off-farm or non-farm businesses. This includes seasonal or permanent wage labour on farms, and employment in local small and medium-scale enterprises involved in agricultural sector services and trading, processing and retailing of agricultural products. While many countries exempted agricultural and food-related activities from lockdown measures, movement restrictions, market closures and health concerns led to reductions in hours worked and availability of wage employment in rural areas.

The impacts of COVID-19 lockdown measures on wage earning varies between food system typologies. As shown in **Table 4**, median values of households reporting wage income losses in all countries are identical between urban and rural places. However, across food system typologies, results show that a smaller share of respondents reported wage income loss in modernizing and formalizing food systems (49 percent) compared to the other food systems (57 to 58 percent). In more developed food systems, formal wage employment and associated wage insurance is more widespread, which protected some workers' wages during lockdown periods. Moreover, teleworking options for rural jobs are more widespread in these food systems, given the higher levels of internet connectivity and the greater capacity in these countries to conduct economic activities remotely.

Conversely, high levels of informality in wage employment in less developed food systems is an area of particular concern. Empirical evidence from the literature shows, for example, that the implementation of nationwide curfews in Burkina Faso, Mali and Senegal reduced the number of hours businesses operated, contributing to job loss rates for informal rural workers of between 33 percent and 48 percent (Balde *et al.*, 2020). Similarly, Josephson *et al.* (2020), find that in multiple countries in sub-Saharan Africa, non-farm income sources face the highest probability of being most affected by lockdown policies, with serious implications for non-farm wage-earning opportunities.

Remittances from internal and external migrants are an important source of household income in many rural spaces, particularly in low- and middle-income countries. National survey data indicates that income loss from remittances is a widespread issue for many rural households. As shown in **Table 4**, across all countries, 72 percent of households at the median report a loss of remittance income in rural areas compared to 61 percent in urban areas. This is likely driven by the higher overall dependence on remittances in rural spaces compared to urban spaces. Interestingly, the share of households reporting income losses from remittances increases at the median from 66.5 percent of households in rural and traditional food systems, to 73.5 percent in modernizing and formalizing systems. This is likely because labour migration is more common for rural people in modernizing and formalizing food systems than in other food systems, due to greater dynamism in local urban labour markets, the high costs of migration, and higher overall levels of human capital development. It is also worth noting that ranges of the proportion of households reporting income losses from remittances are small in the rural and traditional and informal and expanding food systems, and become progressively larger in the more advanced systems. This suggests that in more advanced food system countries there is greater heterogeneity in terms of reliance on remittances than in the more traditional systems.

Evidence from the systematic literature review highlights the challenges associated with the loss of remittance income on rural households. In Burkina Faso, Senegal and Mali, for example, Balde *et al.* (2020), find that roughly 55 percent of individuals who have difficulty in satisfying their basic needs indicate that they have experienced a drop in the amount of remittances received as a result of the COVID-19 pandemic. Moreover, the loss of remittance income often also entails coping with a wave of migrants returning to rural areas. For example, in India, millions of seasonal and migrant labourers across the country travelled back to their home states and harvest operations became directly dependent on the supply of local labour, equipment and inputs (Ceballos *et al.*, 2020). How long these migrants remain in rural areas and how they are re-integrated into the social and economic fabric is likely to have important implications for future development trajectories for these areas. For example, substantial return migration may

affect local wage rates and reduce incentives to invest in labour-saving technologies and increase household dependency ratios.

Non-farm businesses in rural areas include a wide range of local services, small- and medium-scale retail shops, food and non-food retail shops, and processing firms, among other things. These industries are either part of the food system or they derive income from food systems through purchases by food system actors. They are sensitive to pandemic lockdown measures through both reductions in demand – spurred by declining purchasing power – as well as supply-chain disruptions due to mobility restrictions. The data presented in **Table 4** show that households with non-farm business income experienced the highest levels of reported income loss due to COVID-19 in both urban and rural areas, with 83 to 84 percent of household indicating a loss of income from this source. Interestingly, there is no observed differences at the median across food system typologies.

The ranges around these median values are also fairly small, particularly in the rural traditional and informal and expanding food system countries, where between 69 and 93 percent of rural households report income losses in non-farm businesses. Conversely, in emerging, diversifying, modernizing and formalizing food systems, the ranges of adverse impacts on non-farm businesses are considerably larger, suggesting more heterogeneous impacts in these countries. Greater heterogeneity in more advanced food system countries may be driven by differences in the flexibility of non-farm businesses in "pivoting" to new operating modalities in response to lockdown restrictions, as well as variations in public support for businesses in the early days of the pandemic.

Table 4. Share of Households Reporting Income Loss by Income Source and Total[11]

	Wage Income		*Remittances*		*Non-farm family business*		*Family Farm*		*Total Income*	
	(% of Households)									
	Rural	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
All countries	27–76	32–74	42– 86	40–86	32–94	33–93	41–84	0–89	26–90	30–85
Median	(58)	(58)	(72)	(61)	(83)	(84)	(74)	(71)	(66.5)	(67)
Rural & traditional	32–76	39–72	66– 67	54–64	79–93	40–87	62–84	70–83	62–83	62–81
Median	(57)	(60)	(66.50)	(69)	(85)	(80)	(78)	(76.5)	(77)	(68)
Informal & expanding	57–71	52–66	5–68	40–61	69–91	80–90	74–84	0–82	26–71	30–72
Median	(57)	(53)	(62)	(50.5)	(84)	(88)	(79)	(41)	(55)	(57)
Emerging & diversifying	57–75	45–62	58–77	54–72	32–94	33–93	71–81	65–81	59–90	51–81
Median	(58)	(56.5)	(72.5)	(59.5)	(83)	(84)	(76)	(72)	(74.5)	(66.5)
Modernizing &formalizing	27–76	32–74	42–86	45–86	45–94	76–93	41–74	40–89	46–83	51–85
Median	(49)	(49)	(73.5)	(65.5)	(83)	(85)	(59)	(61)	(62)	(72)

Source: World Bank COVID-19 High Frequency Monitoring Dashboard

[11] To analyze the impact of COVID-19 on income loss, only data from the first wave of each national High-Frequency Phone Survey have been used. Data have been collected between April and August 2020 depending on the country.

The indicator on farm-income-measures reported income loss due to reduced production, prices, and sales of crop, livestock, forestry and fishery products. The COVID-19 pandemic affects farm income through disruptions in output and input markets, price volatility and labour supply constraints. Labour intensive production systems, such as fruits and vegetables, as well as products with a high-income elasticity of demand are likely to be particularly sensitive to the adverse income effects and mobility restrictions stemming from efforts to contain the virus. For example, Salazar *et al.* (2020) find that 40 percent of Argentinian, Bolivian (Plurinational State of), Paraguayan, Peruvian and Dominican farmers report that a drop in demand for farm products contributed to reduced overall sales, while 67 percent of these farmers reported a lower sale price than expected for their products. Even in fragile country contexts, the pandemic has affected prices and demand for agricultural products. In Somalia, for example, 69 percent of interviewed households reported they faced difficulties in selling their crops because of reductions in demand and prices (FAO, 2021c). Similarly, in Afghanistan 43 percent of the producer reported unusual difficulties in selling their production due to a sharp drop in prices (FAO, 2021d).

The World Bank High-Frequency Dashboard data show that at the median 74 percent of rural households in all food system typologies reported a loss of farm income due to COVID-19, and 71 percent of urban households that are engaged in agriculture report a decline (**Table 4**). The median values are highest in rural and traditional food systems, with 77 percent of households reporting a reduction of farm income. In these countries, agricultural production is typically small-scale and relies on traditional input and output market arrangements, which are more sensitive to disruptions caused by mobility restrictions and closure of traditional retail markets. Indeed, as described in detail in **Box 1**, small-scale family farms have been profoundly affected by the pandemic across multiple dimensions, including their overall income, access to productive resources, and access to markets. Conversely, the lowest share of farm households reporting income loss due to COVID-19 are found in the modernizing and formalizing food system countries, where production occurs at a larger scale, supply chains do not rely on face-to-face interactions, and risk management instruments – such as price insurance – are generally more widespread. The concentration of reported income loss in rural and traditional food system countries is particularly worrying, given the high rates of pre-COVID-19 poverty and food security in rural spaces in these countries, where even a small drop in income can have deleterious impacts on a households' ability to access a nutritious diet.

Box 1. A global snapshot of small-scale producers' and family farmers' challenges and strategies in response to the pandemic

In the context of the United Nations Decade of Family Farming (UNDFF), the Food and Agriculture Organization (FAO) launched a global on-line consultation on family farmers' challenges and solutions in the context of COVID-19. The main mechanism of this consultation was an on-line survey targeted to family farmers and small-scale producers, disseminated through a broad range of family farming organizations, and utilized between October 2020 and January 2021. The on-line survey was either self-administered or filled in by organizations after targeted in-person interviews. In total, the survey collected data on 3 592 family farmers from 71 countries around the world.[12]

The analysis based on the data collected points to the economic implications of the pandemic amongst small-scale producers and family farmers. Close to 90 percent of respondents reported that, during the six months prior to the survey, their **agricultural income** was below their normal levels. While almost half of respondents depended on diversifying their income sources in non-farm activities at the time of the survey, only about 15 percent reported being able to work more or as usual in those types of activities. Interestingly, farmers reporting normal agricultural income levels were also more likely to carry on normal non-farm activities, suggesting that income diversification in the agricultural but non-farm economy (e.g. processing) provides better resilience to the producer livelihood.

Commercialization of agricultural output was notably challenged by the pandemic as more than 80 percent of respondents were selling "less than expected" or "not at all" at the time of the survey. This reflects the effect of market and mobility restrictions as part of local lockdown measures. Among those maintaining normal sales levels, agricultural income levels were also more likely to have remained normal, indicating stable commercialization strategies as instrumental to farmers' resilience.

Constraints in **access to productive resources** emerged with 60 percent of respondents reporting insufficient or no access to agricultural labor at the time of the survey, with the majority being those relying uniquely on family labor. In terms of agricultural inputs, about 50 percent of crop producers reported access constraints to seeds at the time of the survey, while access to other inputs and assets, such as fertilizers, pesticides, fodder, machinery, veterinary products, fishing gears and vessels, was constrained for 60 to 70 percent of producers. In terms of post-harvest services and extension, close to 80 percent of producers reported insufficient or no access.

Input **market restrictions** on opening hours or closures, reported by 65 percent of respondents, were significantly related to access constraints for all inputs but seeds, reflecting a difference in terms of the modality of obtaining seeds versus other inputs. Indeed, crop producers disproportionately reported accessing seeds through their own

[12] The final sample is not representative of the global population of family farmers, nor is it inclusive of those without connections to family farming networks; however, it does provide a snapshot of producers that are connected to producer and civil society organizations. Through its implementation in family farming settings across the world, this survey also served to validate the questionnaire as part of rigorous sample design in targeted contexts and is now underway.

production and other non-commercial sources, while access to fertilizer and pesticides was reported to take place mostly through market sources.

Nearly 60 percent of producers **sustained their agricultural activities** during the six months prior to the survey by adopting coping strategies – primarily by looking for new sales channels – but also by diversifying production, applying for agricultural support, and applying for new loans. Liquidity was a common problem, as about 75 percent of producers reported insufficient or no access to credit. Social assistance benefits, such as cash transfers, helped to fill that gap, but the receipt of such support varied considerably across regions. Nevertheless, receipt of such social assistance seems to have been key in encouraging farmers to adopt resilience strategies, as results showed that those producers were more likely look for new sales channels.

Authors of the box: Katia Covarrubias, Victor Cordonnier, and Ana Paula de la O Campos.

While the World Bank High Frequency Monitoring Dashboard data do not provide details at farm-level on production, empirical papers identified through the systematic literature review provide some insights. In total, 16 survey-based studies examined the ways in which COVID-19 has affected farm production, focused mostly in rural and traditional and informal and expanding food system countries (n=12). We categorized evidence from these studies in four main channels through which COVID-19 seems to have affected production: Access to hired labour, sales, productive inputs, and productive capacity.[13] The results show a high degree of heterogeneity within channels and between country typologies.

In terms of hired labour, the share of farm households that were not able to access hired labour ranged between 21 and 84 percent in the identified papers. Both the high and low ends of this distribution are found in rural and traditional food systems. On the one hand, 84 percent of respondents in Malawi report challenges hiring farm labour, while in the United Republic of Tanzania, 21 percent of households report a similar challenge (Carreras *et al.*, 2020). A possible explanation for this is a difference in the governments' approach towards lockdown. The Stringency Index by the Oxford COVID-19 Government Response Tracker (University of Oxford), which measures the severity of national lockdowns on a sale from zero to 100 based on nine indicators including workplace closures, shows that at the time of the survey (June to July 2020), lockdown measures in Malawi were 30 points more stringent than in the United Republic of Tanzania (60 for Malawi and 30 for the United Republic of Tanzania).

The share of households reporting adverse effects of COVID-19 on farm sales is extremely heterogeneous across countries. The range is from just 5 percent in Zimbabwe (rural and traditional) to 100 percent in Paraguay (emerging and diversifying). In Zimbabwe, maize destined for localized markets is the primary agricultural product sold. The localization of

[13] For the complete list of indicators found in the literature for impacts on income, please refer to Table 6.

the value chain and the low-income elasticity of demand for maize in Zimbabwe explain the limited disruptions in sales. Conversely, Paraguay is a highly diversified food system, with considerable production of meat and milk for local and export markets. These perishable commodities also have a high-income elasticity of demand. Disruptions in supply chains and drops in demand likely explain the high share of farm households reporting reductions in agricultural sales. Indeed, across all rural and traditional and informal and expanding food system countries for which data exist, the highest share of households reporting disruptions in sales was 56 percent, well below the 88 to 100 percent range reported for emerging and diversifying food systems. This may be due to differences in the length and complexity of the supply chains which farmers are selling to in these food systems. In less advanced food systems, many farmers produce staple food crops destined for local markets. These relatively shorter supply chains are exposed to fewer potential risks of disruption than the longer and more complex supply chains found in emerging and diversifying systems.

Supply chains for inputs, including seeds and fertilizers, also experienced significant disruptions due to the pandemic. These disruptions include delays in the distribution of inputs within countries due to mobility restrictions as well as breakdowns in cross-border trade due to delays at border crossings and shipping ports. The ranges of farm households reporting challenges with accessing inputs are lowest in rural and traditional food systems, where the use of commercial inputs is relatively less widespread. On the upper-end of the distribution, 85 percent of households in Peru (emerging and diversifying typology) report input access challenges, specifically an increase in prices. Input policies may play a role in household level differences in input access. In Peru, a rural voucher grant policy was in place before COVID-19, however there was no established input distribution programme. This is not the case in other countries within the region. For example, in Paraguay, seed kits, inputs and technical assistance are being granted to vulnerable families while in the Dominican Republic, some farmers received inputs and the government carried out a programme for plough mechanization. The existence of these programmes helped to moderate the share of households exposed to increasing input costs due to the pandemic (Salazar *et al.*, 2020).

Finally, similar to other outcomes, the empirical evidence on the impacts of the pandemic on productive capacity, including reductions in area planted, delays in planting, reductions in livestock holdings, and higher production costs, exhibits substantial heterogeneity between countries and food system typologies. This outcome ranges from just 3 percent of households in Zambia, to 82 percent in Somalia. In Zambia, impacts on productive capacity were diverse. While only 3 percent of farmers reported a delay in planting due to the COVID-19 pandemic, many more (49 percent) experienced difficulties in transporting the harvest to the point of sale (Nchanji *et al*., 2020). In Somalia, the high number of affected households is likely explained by the confluence of conflict

and insecurity, low rainfall conditions, an outbreak of desert locust and the COVID-19 pandemic, which caused the majority of respondents to report "unusual difficulties" with production (FAO, 2021c). These contextual factors highlight the diverse ways in which COVID-19 affects agricultural production within and between countries, and the ways in which COVID-19 can intensify the adverse impacts of traditional risks to production.

Coping strategies

How households cope with the income and food security shocks created by the COVID-19 pandemic will shape their long-term resilience and welfare. Poorer households with limited resources, savings, or access to insurance, credit and social protection may cope with income shocks by reducing consumption, including that of essential goods such as food and health care, and liquidating productive assets and divesting from productive investments such as health and education (Nikoloski *et al.*, 2018; World Bank, 2013). Coping strategies such as these can help households meet their immediate needs, but have lasting effects on household welfare and push households into low equilibrium poverty traps that are hard to escape (Dasgupta, 1997; Carter and Barrett, 2006). Conversely, relatively better-off households may rely on borrowing or drawing down savings to cope with shocks. In places where institutions are strong, insurance and social protection may offset the necessity for adopting coping strategies. It is expected, therefore, that the types of coping strategies adopted, and the share of households that relied on such coping strategies, will vary between urban and rural spaces, as well as between countries in different food system typologies.

Table 5 shows descriptive data on three coping strategies collected through the World Bank High Frequency Dashboard in 40 countries, disaggregated by urban/rural and food system typologies. The data show that across all countries, reduced consumption of goods is the most commonly adopted coping strategy, with a median value of 42 percent of households in all countries relying on this strategy. Interestingly, the data show no significant differences between urban and rural places or across food system typologies for this variable at the median. However, the ranges between countries for this variable are large. In Malawi, a rural and traditional food system country, only two percent of households indicated that they reduced consumption to cope with COVID-19. Conversely, in Indonesia, an informal and expanding food system country, 82 percent of households answered yes to the same question. These large differences are likely driven by variation in pre-pandemic food insecurity levels and the stringency of lockdown measures. At the time that surveys were administered, Indonesia had a stringency index 20 points higher than Malawi (Hale *et al.*, 2021), while in the three years prior to the pandemic, moderate to severe food insecurity affected 81.8 percent of people in Malawi compared to 6.2 percent in Indonesia (FAO, 2021g).

Aggregated indicators of reduced consumption mask important substantive and contextual differences that are important to consider. In total, 17 survey-based papers were identified reporting on rural households engaging in coping strategies in response to the pandemic. Drawing on this literature, we find a wide range of impacts on consumption, particularly food consumption. On the low end of the distribution, evidence shows that 32 percent of households in rural Bangladesh reduced food consumption to cope with COVID-19 income losses, while in Liberia, 94 percent of rural households reported a similar response (Rahman *et al.*, 2020, FAO, 2021b) . Of this total, 46 percent of respondents reported reducing cereal consumption, while 28, 23, 24 and 22 percent of the respondents indicated that they reduced consumption of fruits, vegetables, milk products, and other carbohydrates, respectively. This shows a strong decrease in the consumption of staple and non-staple foods, which partly can be explained by a decrease in purchasing power due to price increases during this reference period (as is the case for cereals), and to a decline in household incomes (FAO, 2021b). Evidence also shows a significant reduction in consumption of non-food goods, such as in Yemen where 67 percent of interviewed households reported a reduction in essential non-food expenditure and 54 percent in productive inputs (FAO, 2021e).

Table 5. Share of households adopting coping strategies during the pandemic[14]

	Reduced consumption of goods during the pandemic		*Sold assets to pay for basic living expenses during the pandemic*		*Used emergency savings to cover basic living expenses during the pandemic*	
	(% of Households)					
	Rural	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
All countries	2–82	5–79	0–21	0–28	3–59	4–57
Median	(42)	(42)	(4)	(2)	(15)	(16)
Rural and traditional	2–78	5–71	0–16	0–28	3–40	5–37
Median	(42)	(42)	(4)	(2)	(15)	(16)
Informal and expanding	40–82	42–79	1–21	0–13	11–59	11–57
Median	(45)	(44)	(4)	(2)	(15)	(16)
Emerging and diversifying	14–64	19–63	1–12	0–5	4–26	5–32
Median	(41)	(42)	(7)	(3)	(20)	(16)
Modernizing and dormalizing	14–54	11–57	1–5	0–3	5–23	4–27
Median	(46)	(42)	(2)	(2)	(9)	(10)

Source: self-elaborated. Data sources and methodology. In: World Bank COVID-19 High Frequency Monitoring Dashboard.

Use of emergency savings to cover basic living expenses is the second most common coping strategy captured in the World Bank COVID-19 High Frequency Monitoring Dashboard data, with a median value of 15 and 16 percent for all countries in rural and urban areas respectively. As with the reduced consumption outcome, the ranges for this outcome are large (3 to 59 percent), suggesting substantial country heterogeneity, but with minimal observed variation between urban and rural spaces at the median.

[14] To analyze impact of COVID-19 on coping strategy, data from all available waves of high frequency phone surveys have been used. Data have been collected between April 2020 and January 2021.

Between food system typologies, the data show that this coping strategy is most common in rural areas in emerging and diversifying food system countries (20 percent median value) and less common in modernizing and formalizing food system countries (nine percent). This may be explained by differences in the severity of the income shocks in these country groups and differences in coverage by social protection. In our systematic analysis, we only have evidence for the use of savings as a coping for rural and traditional countries. Within this typology, we see a large variation with a highest value of 83 percent for Bangladesh and a lowest of 30 percent in Kenya. This particular sample for Kenya refers to subsistence farmers of which fewer than half have savings at a formal institution (Shell Foundation, 2020). In Bangladesh, as mentioned, according to Rahman *et al.* (2020), savings were the most prevalent coping mechanism among rural households. Also in Yemen, 39 percent of households reported using savings as coping mechanism (FAO, 2021b).

The final and least common outcome variable related to coping strategies in the World Bank COVID-19 High Frequency Monitoring Dashboard is sale of assets. While the median values for this coping strategy are low, households in rural areas and households in less advanced food system countries are more likely to rely on the sale of assets as a coping strategy. These data are consistent with findings from Josephson *et al.* (2020), who find that in Ethiopia, Nigeria, Malawi and Uganda rural households are more likely to liquidate assets as a COVID-19 coping strategy than urban ones. In rural areas, many of the assets available to a household are productive in nature, such as farming equipment and livestock. Reliance on this coping strategy, therefore, raises concerns about the longer-term consequences of the pandemic on the productive capacity of rural households. Indeed, Christensen *et al*. (2018) demonstrate that asset sales curtail a households' ability to generate adequate income for a long time after a shock and lead to lower human capital accumulation. Evidence from the systematic review shows variation in sale of assets as a coping mechanism related to difference in the availability of alternative coping mechanism and resource endowments. For example, in Bangladesh, only 4 percent of households liquidated assets, while many more relied on savings (83 percent). Conversely, among livestock-owning households in Afghanistan, 49 percent reported selling livestock as a coping mechanism in order to be able to afford food. (FAO, 2021d). Also in Yemen, 19 percent of surveyed households reported selling household goods as a coping mechanism, while in Sudan, 286 out of 448 key respondents that were interviewed, reported selling productive assets (FAO, 2021b; FAO, 2021f).

Of course, there are many more coping strategies that households can adopt that are not included in these three outcome variables. The systematic literature review shows that in addition to these three outcomes, rural households also rely on reducing investments in farm and non-farm enterprises and relying on borrowing and social networks. In Bangladesh, 35 percent of rural households relied on borrowing, while 10

percent relied on family and neighbours (Rahman *et al.*, 2020). In Liberia, 51 percent of surveyed households reported incurring debt, while in Yemen, a very high 86 percent of households reported borrowing money or buying food on credit (FAO, 2021b; FAO, 2021e).

Food security

Food security is comprised of four dimensions: access, availability, utilization, and stability. Through its effects on household income and food markets, including markets for nutrient-rich fruits, vegetables and proteins, the COVID-19 crisis adversely affects food security along its multiple dimensions. The State of Food Security and Nutrition in the World (2021) estimates that between 720 and 811 million people in the world faced hunger in 2020. This represents an increase of between 118 and 161 million more people who were facing hunger in 2020 than in 2019. Yet, questions remain about the extent to which the pandemic has increased food insecurity in rural places. On the one hand, high levels of poverty and pre-COVID-19 food insecurity makes rural populations, particularly in rural and traditional food system countries, highly vulnerable to adverse changes in food prices and incomes. On the other hand, in these countries, many food consumers are also food producers, and local food supply chains tend to be fairly short. These factors may mitigate some of the adverse effects of the pandemic on rural food insecurity.

Before proceeding to discuss the results it is important to highlight that the variables used to report on food security in this report provide only a very partial, indirect picture of food security conditions. These variables correspond to questions that would be normally treated as components of a single measurement scale, and would need to be jointly analysed to provide a reliable, comparable assessments. The percent of affirmative responses to each of these questions, which are the reported indicators at national level only, do not permit to estimate the prevalence and severity of food insecurity and compare them across countries and cultures. However, due to limitation to accessing household-level data for all countries included in this study, these indicators are the only option we have and should be interpreted with care.

With this caveat in mind, **Table 6** presents country-level medians and ranges for 18 countries, disaggregated by rural and urban areas and by food system typology. The first indicator refers to food access, particularly access to staple food items for a seven-day recall period. It shows that staple food access at the median is high for all countries, with limited differences between urban and rural. These median results, however, mask considerable heterogeneity. The ranges for the share of households reporting challenges with accessing staple foods are wide. In some rural and traditional and modernizing food system countries, for example, the share of households that are able to access staple foods reach 64 and 79 percent, respectively.

The second dimension of food security presented in **Table 6** combines indicators that refer to reported reductions in the quantity of food consumed. The first dimension measures the percentage of households reporting not having eaten for a whole day, while the second computes the percentage of households that are hungry but not able to eat. At the median, reported reductions in food quantity for both indicators are marginally higher in rural (27 percent reporting being hungry but not eating, 12.5 percent going a whole day without eating) than urban places (25 percent for the first indicator and 9 percent for the second, respectively). Median values are lowest in emerging and diversifying food system countries. Reductions in quantities of food consumed are likely linked to both a contraction in household income and increases in food prices. It is important to note that these two indicators are based on 30-day recall period, and therefore cannot be attributed directly to the COVID-19 pandemic. However, as shown by Bundervoet *et al.* (2021), using the same datasets, declines in income due to COVID-19 are significantly associated with an increased probability of reporting food insecurity.

The third dimension considered in **Table 6** measures reported reductions in diversity of diets. This dimension combines the indicators "ate only a few kinds of foods due to lack of money" and the indicator "unable to eat healthy/nutritious or preferred food due to lack of resources." Therefore, when we are talking about reductions in food quality, we mean reductions in nutrient-rich food productions, such as fruits, vegetables and animal proteins. Results suggest that reductions in dietary diversity are widespread, with median country values of 57 percent in rural areas for the households reporting having eaten only a few kind of foods, compared to 53 percent in urban areas across all countries. Median values are relatively stable across the three food system typologies present in our sample with all typologies showing great variability. For the second indicator in the dietary diversity dimension, which computes the percentage of households unable to eat healthy and nutritious food, we see a more pronounced difference between the rural and urban spaces across all countries (55.5 percent–46.5 percent). This divide is particularly acute in rural and traditional country typology (59 percent rural, 47 percent urban) and informal and expanding countries (46 percent rural, 38 percent urban). These differences highlight challenges faced in rural areas in general, and in rural and traditional food systems in particular, in accessing nutritious foods in the context of COVID-19.

Reductions in food quality reflect declines in purchasing power, where income losses push households to forgo expenditure on higher cost and higher quality foods. In addition, access to higher quality foods is also affected by disruptions in markets for these products, which tend to be perishable and labour- intensive, and thus exposed to supply chain disruptions due to the pandemic. Our systematic review confirms that impacts in food quality range widely for all country typologies (between 13 percent and 82 percent

of respondents affected). At the lower end, we have Myanmar (informal and expanding), in which the share of mothers reporting not eating enough healthy food in rural areas rose from 13 percent in September to 20 percent in October. In Zimbabwe (rural and traditional), we find that 82 percent of households resorted to eating only a few kind of foods, due to a lack of money and other resources (Headey *et al.*, 2020; Mutyasira, 2020). In Venezuela, in September 2020, more than 70 percent of respondents reported "not having enough food or limiting the diversity of their diet," and more than 50 percent reported "consuming less healthy and nutritious food." (FAO, 2021a). The report also points out how the pandemic has likely affected farmers' income (limiting the marketing of products) and consumers' access to food due to the rise in prices, implying a contraction in demand (in fact 17 percent of respondents reported a price increase). For the rural population, these effects may translate into income losses in the primary sector, thus suggesting an issue in the availability of disposable income necessary to buy quality food, rather than an issue related to access. (FAO, 2021a).

The situation in terms of reduction of food quality is particularly worrying in rural sub-Saharan Africa where reports of limited access to high quality and diversified diets in the context of COVID-19 are common. Carreras *et al*. (2020) find that 92 percent of respondents in Kenya, 82 percent in Nigeria, 73 percent in Zimbabwe, and 78 percent in Malawi report "not being able to eat healthy food." Similarly, 90 percent of respondents in Kenya report "eating only few kinds of food," compared to 81 percent in Nigeria, 82 percent in Zimbabwe, and 78 percent in Malawi (Carreras *et al.*, 2020). These are all rural and traditional or informal and expanding food systems, where poverty rates are high and income losses in rural areas are widespread.

Reductions in incomes and increased prices appear to be the main driver of food insecurity challenges in these countries. Carreras *et al.* (2020) find that only a small number of respondents (for a sample of farmers from Nigeria, the United Republic of Tanzania, Zimbabwe, Ethiopia, Ghana, Kenya, Malawi) report a reduction in the availability of foods, while a larger number of respondents encountered increases in food prices. In fact, 65 percent of respondents report an increase in prices in grains, while only 30 percent report that the physical availability of grains had been negatively affected in local markets in all the above-mentioned countries. Percentages are similar for white roots, tubers and plantains, but for other more nutrient-rich food such as fruits, vegetables and animal proteins, we see lower numbers: 26 percent reporting a decrease in availability for meat and poultry, 16 percent for dark leafy vegetables, 19.6 for other vegetables, 26.4 percent for other fruits, 20 percent for eggs, 26.6 percent for milk and dairy products. In terms of prices, 52.2 percent of respondents report increases for white roots and tubers and plantains, 47.5 percent and 54.1 percent for milk and milk products and meat and poultry respectively.

Table 6. Share of households experiencing food insecurity[15]

	ACCESS		*QUANTITY*				*DIETARY DIVERSITY*			
	Access to any staple food		*Without eating for a whole day*		*Hungry but did not eat*		*Ate only a few kinds of foods*		*Unable to eat healthy/nutritious food*	
	(% of Households)		**(% of Households)**				**(% of Households)**			
	Rural	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
All countries	64–99	76–99	1–37	2–29	3–65	3–60	19–83	17–78	30–94	27–79
Median	(92.5)	(92.5)	(12.5)	(9)	(27)	(25)	(57)	(53)	(55.5)	(46.5)
Rural and traditional	64–97	76–99	2–37	2–23	3–65	3–53	37–83	33–71	40–94	36–79
Median	(86.50)	(86)	(13)	(9)	(26)	(26)	(57)	(54)	(59)	(47)
Informal & expanding	94–99	96–99	1–37	2–29	5–59	4–60	19–75	17–78	30–79	27–77
Median	(94)	(96)	(10)	(8)	(28)	(25)	(49)	(43)	(46)	(38)
Emerging & diversifying	93–97	96–98	7–15	8–11	24–32	19–27	NA	NA	NA	NA
Median	(95)	(97)	(8)	(9)	(25)	(22)	(NA)	(NA)	(NA)	(NA)
Modernizing & formalizing	79–92	79–93	NA	NA	NA	NA	NA	NA	NA	NA
Median	(85.50)	(86)	NA	NA	NA	NA	(NA)	(NA)	(NA)	(NA)

Source: self-elaborated. Data sources and methodology. In: World Bank COVID-19 High Frequency Monitoring Dashboard.

In **Table 7,** we explore the evolution of food security outcomes between June and November 2020 for a sub-set of countries. This enables us to explore the evolution of food insecurity outcome from the beginning of the pandemic, when lockdown measures were particularly strict, to later in 2020 when many countries had loosened their restrictions. We note that at the time of writing, only a few countries have data available later than August 2020, and they all belong to the rural and traditional category, therefore evidence is limited. Despite this limitation, two key results emerge from **Table 7**. First, in virtually all cases and for most indicators, a higher share of rural people report food insecurity challenges in these countries. This is consistent with global measures of food insecurity. Second, in almost all cases, food insecurity declines between the survey waves. This is likely due to the loosening of lockdown restrictions in many countries. Moreover, the high reported food-insecurity outcomes in the in the first wave of data collection points to the strong impacts of lockdown measure on food security in rural and traditional food systems. As lockdown measures re-intensify in response to the spread of more transmissible variants of the virus, immediate concerns for food insecurity among vulnerable populations, including in rural areas, must be placed high on the policy response agenda.

[15] All indicators refer to June 2020.
Full Indicator names:
-Ability to access any staple food in the past seven days – all staple food items (% of HHs)
-In the past 30 days, went without eating for a whole day due to lack of money (% of HHs)
-In the past 30 days, were hungry but did not eat due to lack of money (% of HHs)
-In the past 30 days, ate only a few kinds of foods due to lack of money (% of HHs)
-In the past 30 days, was anyone unable to eat healthy/nutritious or preferred food due to lack of resources (% of HHs)

Table 7. Food security evolution between June and November 2020

Percentage of households						
Country Typology	**Country**	**Rural**		**Urban**		**Indicator**
		June	**November**	**June**	**November**	
Rural and traditional	Burkina Faso	97	95	96	98	Able to access any staple food in the past seven days – all staple food items (% of HHs)
	Malawi	69	79	81	85	
	Malawi	37	20	23	12	In the past 30 days, went without eating for a whole day due to lack of money (% of HHs)
	Tajikistan	2	2	2	5	
	Malawi	65	49	44	34	In the past 30 days, were hungry but did not eat due to lack of money (% of HHs)
	Tajikistan	3	4	3	6	
	Uganda	25	11	25	6	
	Malawi	81	72	67	56	In the past 30 days, ate only a few kinds of foods due to lack of money (% of HHs)
	Tajikistan	41	35	38	39	
	Uganda	57	43	60	29	
	Malawi	79	72	68	58	In the past 30 days, was anyone unable to eat healthy/nutritious or preferred food due to lack of resources (% of HHs)
	Tajikistan	40	35	36	35	
	Uganda	59	44	57	26	

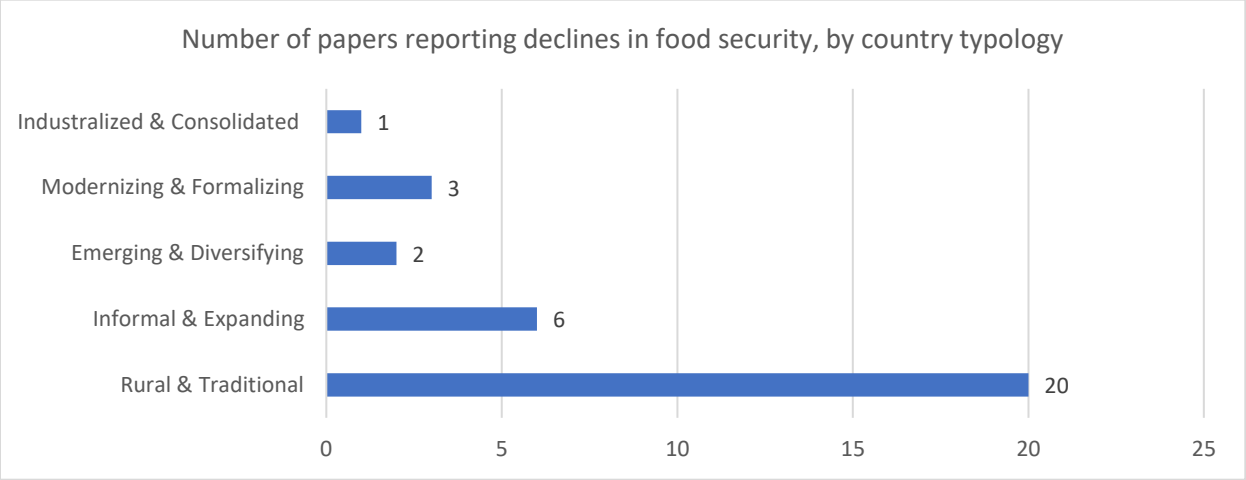
Source: self-elaborated. Data sources and methodology. In: World Bank COVID-19 High Frequency Monitoring Dashboard.

The results found through the World Bank COVID-19 High Frequency Monitoring Dashboard data are largely confirmed by existing literature from other survey-based studies. In total, 32 survey-based studies of COVID-19 impacts reported that rural households experienced negative impacts on the diversity and quantity of food consumed (**Figure 2**), with considerable heterogeneity between countries.

Adverse effects in terms of the quantity of food consumed are not limited to rural and traditional food- system typologies. In Latin America, Salazar *et al*. (2021) find that 39 percent of surveyed farmers between August and November 2020 report household income as insufficient to buy food and meals for the household. When the responses are disaggregated by country we can see that Paraguay (emerging and diversifying) is the country with the highest rate of negative responses at 66 percent. Paraguay is followed by the Dominican Republic (modernizing and formalizing) at 47 percent, and Peru (emerging and diversifying), at 35 percent. Additionally, for these countries in the last month before the survey was implemented, 56 percent of respondents were worried that their household will run out of food and eight percent of households had an adult who only ate once or did not eat at all for a whole day in the past month. Relating to our previous point on food quality, Salazar *et al*. (2021), also report that almost half of the

respondents (48 percent) mentioned that they stopped having a healthy and nutritious diet and started to have a diet based on a limited variety of foods.

Figure 2. Number of papers reporting declines in food security in rural areas, by country typology



Source: self-elaborated using data from the Systemic literature review

In rural and traditional food system countries, 55.8 percent of respondents across all countries ate less than desired, with the highest rate found in Nigeria (informal and expanding) at 79 percent, followed by Malawi (rural and traditional) at 70 percent, while 66 percent of respondents in Kenya (rural and traditional), and 62 percent for Zimbabwe (rural and traditional) reported similar challenges. Also, many respondents declared they had to skip meals, such as 79 percent in Nigeria (informal and expanding), 57 percent in Malawi (rural and traditional), and 54 percent in Kenya (rural and traditional) (Carreras *et al*., 2020).

The indicator for skipping or reducing meals is fairly prevalent in the literature and we see it reported in various countries by a high number of respondents, with percentages ranging from 45 to 87 percent for Malawi, Kenya and Sierra Leone. For this same indicator in the informal and expanding typology, there is a larger range of values, with the lowest being Myanmar with only four percent of rural mothers reporting having skipped a meal in October 2020, and the highest in Nigeria with 73 percent of households reporting skipping or reducing meals. Taking a closer look at the informal and expanding typology, the literature shows that the sub-Saharan African countries within it (73 percent for Nigeria and 41 percent of Senegal) are in line with results from other African countries and are not consistent with results from other informal and expanding food system countries (Egger *et al.*, 2021; Amare *et al*., 2020; Headey *et al*., 2020; Ambler *et al.*, 2020, IPAR, 2020). This suggests a regional pattern rather than one determined by country typology.

Again, the evidence provided by Egger *et al.* (2021) shows that 48 percent of rural Kenyan households, 69 percent of landless agricultural households in Bangladesh, and 87 percent of rural households in Sierra Leone were forced to skip meals or to reduce portion sizes to cope with the crisis. Apart from Kenya where the indicator for missed meals was also coupled with a high percentage of households reporting reduced market access (67 percent), the evidence from the other samples (four percent for Bangladesh, three percent for Bangladesh landless rural agricultural laborers, and 16 percent for Sierra Leone), suggests that the main issue is the lack of resources to buy food in adequate quantity and not access in itself.

Conclusion and looking forward

The global vaccination effort is currently underway but remains marred by supply constraints in many – mostly developing – countries, and high levels of vaccine hesitancy. Moreover, new COVID-19 variants are emerging that appear to be more contagious than the original. As a consequence of these factors, the virus is likely to continue to circulate globally for the foreseeable future. Policymakers must therefore anticipate the possibility of future lockdowns and take appropriate steps to mitigate their adverse effects, while at the same time putting in place measures to support the recovery process. The purpose of this paper is to draw attention to the impacts of COVID-19 on rural households and to contribute to policy debates related to supporting COVID-19 mitigation and recovery efforts for rural areas.

This paper highlights the profound impact that the COVID-19 pandemic and its containment measures is having on rural communities and associated food systems. Based on this, a few emerging trends are evident. First, the share of households reporting income loss due to COVID-19 in rural areas was as bad as or worse than in urban areas. Despite the fact that containment measures appeared mostly concentrated in urban settings, the majority of rural people across the globe report that their income has been adversely affected by the pandemic. Acknowledging this fact and building policies to address the negative impacts in rural areas is a critical first step to an effective and equitable recovery.

The adverse impacts of the pandemic on rural livelihoods come through multiple channels, including through reductions in farm and non-farm enterprise income, wages and remittances. The implications of this multi-dimensional income loss for rural households and the future of rural development are substantial. For example, the development of non-farm enterprises in rural communities is a critical element in the process of rural transformation. These enterprises create incomes for their owners, as well as generating employment multipliers in rural economies. The large number of rural, non-farm businesses globally reporting income losses is worrying, and it likely means that a substantial share of these enterprises will go out of business. The challenge for policy makers, particularly in less developed food- system countries, is that many of these businesses are informal and do not have access to formal sources of credit and insurance to ease expenditures. Thus, creative approaches to providing grants or low-interest loans, using local micro-credit systems and other mechanisms is necessary to support these businesses through the crisis and through the recovery process. Depending on the requirements for accessing these programmes, these can also be used to create incentives for formalizing these businesses.

The loss of farm income is also an area of concern for rural areas, particularly in rural and traditional food systems. Disruptions in food, inputs and labour markets and rapid changes in prices are undermining the incentives for farmers to invest in farm improvements, as well as their capacity to do so. This is likely to have implications in the short-term for labour productivity in agriculture, which is particularly worrying for countries in less developed food systems where productivity growth is necessary to drive broader structural transformation processes. Without sufficient incentives and functional supply chains, farmers will be unable to invest in the technologies needed to support productivity growth. In this respect, effective public support for maintaining and strengthening input and output markets is critical.

Second, due to the widespread informality of employment in rural areas, access to contributory social protection and other formal risk-management tools are highly constrained in rural areas, while the coverage of social assistance is still low and/or inadequate compared to need. In the absence of formal risk-management tools, rural households are relying to a large extent on adverse coping strategies in order to manage the impacts of the crisis on their consumption. This includes liquidation of productive assets and foregoing investments. If not addressed through appropriate policy instruments, widespread reliance on these strategies may have long-lasting implications for rural poverty and future food system development pathways. Investments that prevent people from falling into poverty are less costly and more effective than policies designed to pull people out of poverty.

Third, the report highlights the challenges rural households face in terms of food security during the crisis. While food-insecurity levels in rural places have long been a concern, particularly in rural and traditional food system countries, the crisis is exacerbating this challenge. As shown in this report, while supply chain disruptions are a concern, the physical availability of food items in rural places has not been substantially disrupted. Instead, the loss of income due to the crisis, combined with upward pressure on prices has made access to food – particularly nutritious, non-staple foods – a major challenge for rural households in many countries.

Finally, a hallmark of the pandemic's impact is that it has been highly heterogeneous in rural communities. Variations between sub-groups within countries and between countries are evident in the data. This heterogeneity is not necessarily explained by the level of development of the food system; for many of the outcomes analysed in this paper report the ranges of median impacts are wide for all the food system typologies. The relative vulnerability of a population to the economic and social impacts of the pandemic, combined variations in the stringency of lockdown measures and the capacity of public institutions to address the crisis, underpin the variability of impacts. Acknowledging and addressing the structural inequalities that make people more

vulnerable to this and to other crises must be at the top of any recovery and mitigation policy agenda.

Based on these findings, the following recommendations should be considered for addressing the impacts of the crisis and supporting an effective recovery. First, public assistance programmes must be modified and augmented in order to better reach rural populations, many of whom do not have access to formal, contributory social insurance systems. This will require both financial resources and investments in strengthening the system needed to identify and target those in need. Indeed, the countries that responded the most quickly and most effectively to the pandemic were those that already had in place well-developed social safety-net programmes and systems that allowed them to rapidly scale up and increase assistance. In the context of vulnerable small-scale farm households, a combination of flexible cash combined with interventions to support and strengthen food and input markets can help reduce reliance on short-term, adverse coping strategies, while also enabling productive investments in farm activities that have been hindered by the pandemic.

Second, innovative policy tools for supporting rural non-farm enterprises is critical, particularly the small- and medium-scale enterprises that predominate in rural and traditional and informal and expanding food systems. For informal businesses, this may involve a cash grant system. However, developing the systems to target these enterprises is a significant challenge in many countries, because they are often not formally recognized or registered in public systems. For more formal enterprises, which are concentrated in more advanced food systems, financial tools such as low-interest loans or tax credits may be more appropriate and feasible.

Finally, food security in much of the world is a persistent challenge that has been made worse by the crisis. The pandemic creates a new opportunity to develop policies and programmes aimed at addressing multiple dimensions of food security in rural spaces. Nutrition-sensitive interventions that enable rural households to access more nutritious and diversified diets, and stimulate local production and markets for these products, should be considered an essential element of building back better in rural areas.

Ultimately, in order to support and sustain rural transformation processes in an inclusive and sustainable manner, well-targeted and adequately funded support for rural spaces is necessary. The COVID-19 crisis is undoubtedly an unprecedented challenge, but it also a unique opportunity to invest in recovery efforts that can foster a more equitable and inclusive way forward. For this to happen, rural communities must be a central part of efforts to build back better.

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Annexes

Annex 1. List of countries included in the World Bank COVID-19 High Frequency Monitoring Dashboard (22 April, 2021)

Food system typology	Country name	Region
Rural and traditional	Cambodia	East Asia & Pacific
	Lao PDR	East Asia & Pacific
	Papua New Guinea	East Asia & Pacific
	Tajikistan	Europe & Central Asia
	Djibouti	Near East & North Africa
	Occupied Palestinian Territory	Near East & North Africa
	Burkina Faso	sub-Saharan Africa
	Central African Republic (Bangui/Bimbo)	sub-Saharan Africa
	Chad	sub-Saharan Africa
	Democratic Republic of the Congo	sub-Saharan Africa
	Ethiopia	sub-Saharan Africa
	Kenya	sub-Saharan Africa
	Madagascar	sub-Saharan Africa
	Malawi	sub-Saharan Africa
	Mali	sub-Saharan Africa
	Mozambique	sub-Saharan Africa
	South Sudan	sub-Saharan Africa
	Uganda	sub-Saharan Africa
	Zambia	sub-Saharan Africa
	Zimbabwe	sub-Saharan Africa
	Afghanistan	South Asia
	Bangladesh	South Asia
	Bhutan	South Asia
Informal and expanding	Indonesia	East Asia & Pacific
	Myanmar	East Asia & Pacific
	Philippines	East Asia & Pacific
	Solomon Islands	East Asia & Pacific
	Viet Nam	East Asia & Pacific
	Uzbekistan	Europe & Central Asia
	Bolivia (Plurinational State of)	Latin America & Caribbean
	Guatemala	Latin America & Caribbean
	Honduras	Latin America & Caribbean
	Iraq	Near East & North Africa

Annex 1. List of countries included in the World Bank COVID-19 High Frequency Monitoring Dashboard (22 April, 2021)

	Ghana	sub-Saharan Africa
	Nigeria	sub-Saharan Africa
	Democratic Republic of the Congo	sub-Saharan Africa
	Senegal	sub-Saharan Africa
Emerging and diversifying	Mongolia	East Asia & Pacific
	Romania	Europe & Central Asia
	Ecuador	Latin America & Caribbean
	El Salvador	Latin America & Caribbean
	Peru	Latin America & Caribbean
	Paraguay	Latin America & Caribbean
	Saint Lucia	Latin America & Caribbean
	Tunisia	Near East & North Africa
	Gabon	sub-Saharan Africa
	Mauritius	sub-Saharan Africa
Modernizing and formalizing	Bulgaria	Europe & Central Asia
	Croatia	Europe & Central Asia
	Poland	Europe & Central Asia
	Chile	Latin America & Caribbean
	Colombia	Latin America & Caribbean
	Costa Rica	Latin America & Caribbean
	Dominican Republic	Latin America & Caribbean

Source: World Bank. "COVID-19 High Frequency Monitoring Dashboard". The World Bank Group. Washington, DC. 2021. COVID-19 High-Frequency Monitoring Dashboard (worldbank.org)

Annex 2. Topics and indicators available in the World Bank COVID-19 High Frequency Monitoring Dashboard (22 April, 2021)

Topics:	Indicators:
Assets & services	Access to water and soap, internet services
Coping	Asset sale, reduced consumption, use of savings
Demographic	Age, gender, education, household size, dependency ratio, disability
Education	Engaged in educational activities, previous enrolment in school
Financial	Access to financial institutions (ATM, Bank, Mobile Money)
Food security	Indicators of food security and access to staple foods
Health	Access to medical services
Housing	Homeowner, recently moved, number of rooms, ability to pay rent
Income	Self-reported income shock, decline in remittances
Knowledge	Awareness of government regulations and adoption of preventive behavior
Labor	Stopped working, changed jobs, sector of work
Preventive behaviours	Adopted handwashing and social-distancing practices
Safety nets	Receipt of assistance and type received
Subjective wellbeing	Life satisfaction now and in one year, concern about COVID-19

Annex 3. List of indicators from the World Bank COVID-19 High Frequency Monitoring Dashboard included in the analysis.

Food Security:

- **Able to access any staple food in the past seven days – all staple food items (% of HHs)**: household-level dummy variable indicating whether household was able to access any staple food in the past seven days. The indicator takes the value of one if the answer is "yes".
- **In the past 30 days, went without eating for a whole day due to lack of money (% of HHs)**: dummy variable indicating whether any adult in the household went without eating for a whole day due to lack of sufficient income in the past 30 days. The indicator takes the value of one if answer is "yes". This indicator is part of the standard Food Insecurity Experience Scale (FIES).
- **In the past 30 days, were hungry but did not eat due to lack of money (% of HHs)**: dummy variable indicating whether any adult in the household was hungry but could not eat due to lack of sufficient income in the past 30 days. The indicator takes the value of one if answer is "yes". This indicator is part of the standard FIES.
- **In the past 30 days, ate only a few kinds of foods due to lack of money (% of HHs)**: dummy variable indicating whether any adult in the household ate only few kinds of food due to lack of sufficient income in the past 30 days. The indicator takes the value of one if answer is "yes". This indicator is part of the standard Food Insecurity Experience Scale (FIES).
- **In the past 30 days, was anyone unable to eat healthy/nutritious or preferred food due to lack of resources (% of HHs)**: dummy variable indicating whether any adult in the household was unable to eat healthy/nutritious food due to lack of sufficient income in the past 30 days. The indicator takes the value of one if answer is "yes". This indicator is part of the standard Food Insecurity Experience Scale (FIES).

Income:

- **Experienced decrease in total income since the beginning of the pandemic (% HHs)**: household-level dummy variable indicating whether household experienced a decrease in income compared to pre-pandemic levels. The indicator takes the value of one if the answer is "yes".
- **Experienced decrease in remittances since the beginning of the pandemic (% of remittance receiving HHs)**: household-level dummy variable indicating whether household experienced a decrease in remittances since the start of the pandemic. The indicator takes the value of one if answer is "yes," if the household was receiving remittances before the pandemic, and experienced a decrease compared to pre-pandemic levels.
- **Experienced decrease in wage income since the beginning of the pandemic (% HHs with wage income as a source of livelihood in the past 12 months)**: household-level dummy variable indicating whether household experienced a decrease in wage income since the start of the pandemic. The indicator takes the value of one if answer is "yes," if wage was a source of income for the household in the previous 12 months, and it experienced a decrease compared to pre-pandemic levels.
- **Experienced decrease in income from non-farm family business since the beginning of the pandemic (% HHs with non-farm business income as a source of livelihood in the past 12 months)**: household-level dummy variable indicating whether the household experienced a decrease in non-farm business income since the start of the pandemic. Indicator takes the value of one if answer is "yes" if non-farm business was an income source in the previous 12 months, and household experienced a decrease compared to pre-pandemic levels.
- **Experienced decrease in farm income since the beginning of the pandemic (% HHs with farm income as a source of livelihood in the past 12 months)**: household-level dummy variable indicating whether the household experienced a decrease in farm income since the start of the pandemic. Indicator takes the value of one if answer is "yes," farm was a source of income in the previous 12 months, and household experienced a decrease compared to pre-pandemic levels.

- **Currently employed/working (% of respondents above 18 years old)**: household-level dummy variable indicating whether survey respondent is currently employed. Indicator takes the value of one if the answer is "yes".
- **Engaged in farming activities (% of HHs)**: household-level dummy variable indicating whether survey respondent is engaged in farming activities. Indicator takes the value of one if the answer is "yes".
- **Engaged in non-farm enterprises (% of HHs)**: household-level dummy variable indicating whether survey respondent is engaged in non-farming activities. Indicator takes the value of one if the answer is "yes".

- **Unable to perform normal farming activities (crops, livestock, fishing) (% of HHs)**: household-level dummy variable indicating whether survey respondent was unable to perform normal farming activities. Indicator takes the value of one if the answer is "yes".
- **Stopped working since COVID-19 outbreak (% of respondents who worked before pandemic and above 18 years old)**: household-level dummy variable indicating whether survey respondent is engaged in non-farming activities. Indicator takes the value of one if answer is "yes," if respondent was working before the pandemic, and he or she is not working anymore since the COVID-19 outbreak.
- **Unable to work as usual in the past week (% of respondents in wage employment and above 18 years old):** household-level dummy variable indicating whether survey respondent was unable to work as usual the previous week. Indicator takes the value of one if answer is "yes" if respondent was working in wage employment the week before, he or she is not working anymore.

Coping:

- **Sold assets to pay for basic living expenses during the pandemic (% of HHs)**: household-level dummy variable indicating whether household had to sell assets to cover basic expenses during the pandemic. Indicator takes the value of one if the answer is "yes".
- **Used emergency savings to cover basic living expenses during the pandemic (% of HHs)**: household-level dummy variable indicating whether household used emergency savings to cover basic expenses during the pandemic. Indicator takes the value of one if the answer is "yes".
- **Reduced consumption of goods (essential or non-essential) during the pandemic (% of HHs)**: household-level dummy variable indicating whether household reduced consumption of essential and non-essential goods during the pandemic. Indicator takes the value of one if the answer is "yes".

Annex 4. Description of literature review procedure

The literature review involves three stages: first a two-step procedure for harvesting and indexing relevant papers, followed by a further filter of machine- and manual-learning classification. The first step of the first stage of the systematic mapping was a query-based harvesting or scraping of documents from a number of selected web-based sources. Of these sources, some are aggregators, chosen because of their broad coverage, like Google or Crossref, while others are more specialized repositories. These were chosen on the basis of having a strong level of reliability in terms of coverage, and a level of "knowledge validation,"for example, technical reports from reliable institutions such as the World Bank and other UN organizations (see **Annex 5** for the complete list). The effectiveness of the query and the recall and precision of the search depended very much on the capabilities of the search interface of the source and on its level of openness. Some sources utilize application programming interfaces (APIs) which support several filters and advanced queries with operators, while others only support a simple free-text search. Others provide full and direct access to the PDFs, others provide IP or authentication-based access, and others only display PDFs in web viewers. Due to these differences, the queries and filters used on each source were different (see **Annex 5**). The percentage of relevant results that could be downloaded from each source varied, going from almost 100 percent in open institutional repositories, to much lower rates in big aggregators like Google. In general, since this was only the first step of the selection, the approach was to use very broad queries (often just "COVID") whenever complex queries were not allowed. All of the documents identified through the queries were then automatically downloaded and passed to the second step.

For the second step, we performed a topic-based indexing of articles to automatically filter the harvested and web-scraped texts and data and to only retain those relevant for our analysis, namely documents that covered both COVID-19 and rural poverty. The relevant documents contained data showing changes in food security, coping strategies, production and income. To do this, key concepts were identified around seven topics, of which five were mandatory (keywords from each of these topics had to be present): COVID-19, poverty, agri-food/rural, data analysis and "change"; and two optional (keywords from these topics were not mandatory but added to the relevance): value chains and micro-data. These key concepts were expanded into a set of keywords with synonyms and translations into Spanish and French through an algorithm based on multilingual lexical resources (see **Table 1a** for the complete list of concepts and keywords). A text-mining procedure analysed all downloaded documents against these keywords and assigned scores against each topic and a final combined relevance for our research. A total of 1 901 documents above a certain threshold of relevance were retained for the third step (see **Table 2a**)[16].

[16] For the purpose of writing this paper, the last web-based search was conducted on 16 April 2021.

Table 1a. List of mandatory topic and keywords

POVERTY	COVID-19	AGRIFOOD	CHANGE	DATA-ANALYSIS
poverty	COVID-19	agriculture	leap	analysis
income	pandemic	crops	affect	comparison group
household welfare / wellbeing	quarantine	farmers	hit	estimation
credit		alimentation	impact	proportion/percent/rate
assets (incl. investment and capital)		fisheries	change	data
remittances		fishermen	difference	sample
labor supply		food	transformation	survey
employment		forestry	comparison	empirical approach
international migration		hunger	high	method
type of labor: job/occupation		livestock	low	methodology
health services		herdsman/pastoralism	measure	model
insecurity		rural	quantity	
hunger/malnutrition			scarcity	
food security			better	
consumption			effect	
education			improvement	
resilience			worse	
			worsening	
			decrease	
			increase	
			trend	

Source: self-elaborated.

The second stage involved a machine-learning approach using a Logistic Term Frequency-Inverse Document Frequency (TF-IDF) algorithm. In this stage the machine was first trained to classify the documents as "relevant" or "non-relevant" based on a set of papers we provided containing examples of both relevant and non-relevant documents. The machine attributes a score to each paper measuring the likelihood of a paper containing relevant information, and a cut-off point is established to separate those relevant (above the threshold) from those that are not relevant (below the threshold).[17] After the training phase, the model is applied to the whole dataset, so that all of the 1 901 papers downloaded in stage one were classified as "relevant" or "non

[17] The tf–idf is the product of two statistics, "term frequency" and "inverse document frequency" and is a formula that aims to define the importance of a keyword or phrase within a document. "Term frequency" refers to the number of times that a certain term occurs in document in a document while "inverse document frequency" is a measure of how much information the word provides, i.e., if it's common or rare across all documents.

relevant." Then a manual check was conducted to confirm the validity of the model and retrain it if necessary.[18] The model was then re-applied to the whole set of downloaded documents to give a more precise classification based on the retraining of the model. These last two steps of the machine-learning approach were conceived as an iterative process, whereby new samples of documents were periodically checked after the machine categorization and could be repeated until the accuracy of the classification was satisfactory to us. At the end of this iterative procedure, a total of 157 documents were classified as "relevant" by the machine (see **Table 2a**).

For the third stage, once relevant papers were identified, quantitative data related to impacts of the pandemic on income, including farm production, coping strategies and food security in rural areas was extracted from 39 papers and included in our systematic review database (see **Table 2a**).[19] For the purpose of writing this paper, extraction followed a precise set of criteria based on discernible characteristics reported in **Table 3a** with the aim of creating a database of quantitative impacts of COVID-19 in rural areas. Although all of the 157 papers identified by the machine are relevant for understanding the socio-economic impacts of COVID-19 in rural areas, not all of these included the required information at the household level for the indicators of interest. Also, 13 World Bank High-Frequency Phone Survey reports were downloaded through the web-search and rightfully classified as relevant by the machine, though we decided not to extract information from these reports because the data used are already included in our analysis. This explains why the number of papers from which information was extracted (i.e. 39) differs from the number of papers classified as relevant (i.e. 157). For the complete list of extracted papers, see **Annex 6**.

Of course, within each of these broad thematic categories, there is considerable variation between papers in terms of the specific indicators used. To be able to contrast findings from the papers with the nationally representative data collected through the World Bank HFPS initiative, we clustered the unique indicators from the literature into broader categories that are consistent with the harmonized indicators collected by the World Bank. The thematic clusters, specific indicators and number of papers containing relevant information is summarized in **Annex 7**.

[18] This was done by two independent researchers to reduce bias. Documents were sorted according to their relevance score, and the first 30 documents classified as "relevant" and "non relevant" were checked. Indeed, by manually confirming or editing the classification conducted by the machine, the model automatically updates its training parameters (in simple terms it learns which words are most likely to identify relevant documents).

[19] The systematic review database contains information extracted from a total of 39 relevant papers. A total of 13 World Bank HFPS reports were downloaded and categorized as relevant by the machine, though information was not included in the systematic review database since it was
already systematized in the World Bank COVID-19 High-Frequency Monitoring Dashboard. On the other hand, data from one document using the World Bank HFPS data was extracted and included in the Systematic Review Database, since more complex statistical analysis was conducted.

Table 2a. Stages

	N. of papers included
1) *Web-based query search*	1 901
2) *Machine-learning relevance stage*	157
3) *Extraction process*	39

Source: self-elaborated.

Table 3a. Criteria of relevance

Criteria	*Paper requisite*
Data	Includes quantitative data
	Includes outcome indicators
	Contains estimates or measures of impacts
	Rigorous sampling methodology
Level of analysis	Household-level indicators
Area of interest	Analyses impacts on low- and middle-income countries
	Rural areas
	Agricultural sector

Source: self-elaborated.

Annex 5. Complete list of web sources

Name	Type	Website URL	Query
Google Scholar	Aggregator/general	https://scholar.google.com/	Project: Covid-19 and poverty Query: (~ covid-19 OR pandemic) + (~ poverty OR ~ poor OR food * insecurity) + (~ impact OR figures OR ratio OR percentage OR number OR statistic OR trend OR data OR survey) + (~ 'developing countries' OR ~ Africa OR ~ Asia OR 'under-developed' OR ~ farmer OR ~ rural OR ~ fisher OR 'low income')
Crossref	Aggregator/general	https://search.crossref.org/	Query: covid coronavirus pandemic
Core AC UK	Aggregator/general	https://core.ac.uk/search	Query: covid-19
AGRIS	Aggregator/general	https://agris.fao.org/agris-search/index.do	Query: covid-19
GARDIAN	Aggregator/general	https://gardian.bigdata.cgiar.org/#!/	Query: covid-19
World Bank	Institutional repository	https://documents.worldbank.org/en/publication/documents-reports/docadvancesearch	Query: covid-19
WFP	Institutional repository	https://www.wfp.org/publications	Query: 820 (code for COVID-19)
IPA	Institutional repository	https://www.poverty-action.org/publications	Query: 9706 (code for COVID-19)
Relief Web	Institutional & aggregator	https://reliefweb.int/updates?view=reports	Query: covid-19 + topic 4587 (agriculture)
OECD	Institutional repository	https://www.oecd-ilibrary.org/search	Query: covid-19 OR coronavirus OR pandemic
IMF	Institutional repository	https://www.imf.org/en/Publications/Search?	Query: covid-19
RIMISP	Institutional repository	https://www.rimisp.org/biblioteca/	Query: covid-19
Inter American Development Bank (IADB)	Institutional repository	https://publications.iadb.org/en	Query: covid-19

Annex 6. Complete list of extracted papers

Title	Author	Link
Impacts of COVID-19 on Food Security. Panel Data Evidence from Nigeria	Amare, M., Abay, K.A., Tiberti, L. & Chamberlin, J. (2020)	134078.pdf (ifpri.org)
Impact of COVID-19 on Food Systems and Rural Livelihoods in Zimbabwe. COVID-19 Country Report - September 2020	Agricultural Policy Research in Africa (APRA) (2020)	DOC_12_03_2021_19_05_41_492760.pdf
Rapid Assessment of the impact of COVID-19 on Food Systems and Rural Livelihoods in Sub-Saharan Africa.	Carreras, M., Saha, A. & Thompson, J. (2020)	DOC_12_03_2021_18_46_40_289644.pdf
COVID-19: socioeconomic impacts and recovery in Ethiopia	Nechifor,V., Boysen, O.; Ferrari, E., Hailu, K. & Beshir, M. (2020)	DOC_12_03_2021_18_52_33_858953.pdf
Pandemic, informality, and vulnerability: Impact of COVID-19 on livelihoods in India	Kesar, S., Abraham, R., Lahoti, R., Nath, P. & Basole, A. (2020)	DOC_12_03_2021_18_51_44_910712.pdf
A Pathways Approach to Understanding the Impact of COVID-19 on Rural Households	Shell Foundation, Rural and Agricultural Finance (RAF) Learning Lab (2020)	Covid_Learning_Brief_final.pdf (shellfoundation.org)
Effets de la COVID-19 sur les ménages agricoles et ruraux du Sénégal	Initiative Prospective Agricole et Rural (IPAR) (2020)	Effets_de_la_covid-19_sur_les_menages_agricoles.pdf (africaportal.org)
Socioeconomic impacts of COVID-19 in four African countries	Josephson, A., Kilic, T. & Michler, J.D. (2020)	World Bank Document
COVID-19 in rural Malawi: perceived risks and economic impacts	Ambler, K., Herskowitz, S., Maredia, M. & Mockshell, J. (2020)	Template_ProjectNote (ifpri.org)
Falling living standards during the COVID-19 crisis: Quantitative evidence from nine developing countries	Egger, D., Miguel, E., Warren, S.S., Shenoy, A., Collins, E., Karlan, D., Parkerson, D.; Mobarak, A.M.; Fink, G.; Udry, C., Walker, M., Haushofer, J.; Larreboure, M., Athey, S., Lopez-Pena, P., Benhachmi, S., Humphreys, M., Lowe, L., Meriggi, N.; Wabwire, A.; Davis, A., Pape, U.J., Graff, T., Voors, M., Nekesa, C. & Vernot, C. (2021)	Science Journals — AAAS
Impacts of a national lockdown on smallholder farmers' income and food security: Empirical evidence from two states in India	Ceballos, F., Kannan, S. & Kramer, B. (2020)	Impacts of a national lockdown on smallholder farmers' income and food security: Empirical evidence from two states in India - ScienceDirect
The short-term economic effects of COVID-19 and risk-coping strategies of low-income households in Kenya: a rapid analysis using weekly financial household data	Janssens, W., Pradhan, M., de Groot, R., Sidze, E.; Donfouet, H. & Abajobir, A. (2021)	The short-term economic effects of COVID-19 on low-income households in rural Kenya: An analysis using weekly financial household data - ScienceDirect
Pandemic, mobile payment, and household consumption: micro-evidence from China	Liu, T., Pan, B. & Yin, Z. (2020)	Full article: Pandemic, Mobile Payment, and Household Consumption: Micro-Evidence from China (tandfonline.com)

Annex 6. Complete list of extracted papers

Livelihoods, coping and support during Covid-19 crisis	Rahman, H. Z., Das, N., Matin, I., Wazed, M. A., Ahmed, S., Jahan, N. & Zillur, U. (2020)	Microsoft Word - 20 May_PPRC-BIGD Final April Survey Report.docx (bracu.ac.bd)
Economic impacts of the COVID−19 lockdown in a remittance-dependent region	Gupta, A., Zhu, H., Doan, M.K., Michuda, A. & Majumder, B. (2020)	Economic Impacts of the COVID−19 Lockdown in a Remittance-Dependent Region - Gupta - 2021 - American Journal of Agricultural Economics - Wiley Online Library
Poverty, food insecurity, and social protection during COVID-19 in Myanmar	Headey, D., Zaw Oo, T., Mahrt, K., Diao, X., Goudet, S. & Lambrecht, I. (2020)	Poverty, food insecurity, and social protection during COVID 19 in Myanmar: Combined evidence from a household telephone survey and micro-simulations (ifpri.org)
Impacts of COVID-19 on agricultural production and food systems in late transforming Southeast Asia: The case of Myanmar	Boughton, D., Goeb, J., Lambrecht, I., Headey, D.D., Takeshima, H., Mahrt, K., Masias, I., Goudet, S., Ragasa, C., Maredia, M.K., Minten, B. & Diao, X. (2021)	Impacts of COVID-19 on agricultural production and food systems in late transforming Southeast Asia: The case of Myanmar | IFPRI : International Food Policy Research Institute
Unequal pain: a sketch of the impact of the Covid-19 pandemic on migrants' employment in China	Che, L., Heifeng, D. & Chan, K.W. (2020)	Full article: Unequal pain: a sketch of the impact of the Covid-19 pandemic on migrants' employment in China (tandfonline.com)
Agricultural livelihoods and food security in the context of COVID-19: Afghanistan	FAO (2021)	Afghanistan | COVID-19 Monitoring Report | February 2021
Agricultural livelihoods and food security in the context of COVID-19: Venezuela	FAO (2021)	Venezuela (Bolivarian Republic of) | COVID-19 Monitoring Report | January 2021 (fao.org)
Agricultural livelihoods and food security in the context of COVID-19: Somalia	FAO (2021)	Somalia | COVID-19 Monitoring Report | January 2021 (fao.org)
Agricultural livelihoods and food security in the context of COVID-19: Liberia	FAO (2021)	Liberia | COVID-19 Monitoring Report | January 2021
Food security and vulnerability assessment in Armenia	WFP (2021)	WFP-0000124602.pdf (reliefweb.int)

Annex 6. Complete list of extracted papers

Malawi household food security bulletin June–July 2020	WFP (2020)	WFP-0000118193.pdf (reliefweb.int)
Malawi household food security bulletin November–December 2020	WFP (2020)	WFP Household Monitoring Round 6 - Dec 11.pdf (reliefweb.int)
Malawi household food security bulletin December–January 2021	WFP (2021)	https://docs.wfp.org/api/documents/WFP-0000122965/download/
Malawi household food security bulletin August–September 2020	WFP (2020)	WFP-0000119235.pdf (reliefweb.int)
The coronavirus pandemic and food security: evidence from West Africa	Adjognon, G.S., Bloem, J.R. & Sanoh, A. (2020)	World Bank Document
2020 rural livelihood assessment report: Zimbabwe	Zimbabwe Vulnerability Assessment Committee (2020)	WASH
Measuring the impacts of covid-19 on food security and vulnerability in Sierra Leone	WFP, FAO & IFAD (2020)	https://docs.wfp.org/api/documents/WFP-0000120232/download/
Immediate impacts on covid-19 pandemic on bean value chain in selected countries in Sub-Saharan Africa	Nchanji, E. B., Lutomia, C. K., Chirwa, R., Templer, N., Rubyogo, J. C. & Onyango, P. (2021)	Immediate impacts of COVID-19 pandemic on bean value chain in selected countries in sub-Saharan Africa - ScienceDirect
Acute food insecurity and short-term coping strategies of urban and rural households of Bangladesh during the lockdown period of COVID-19 pandemic of 2020: report of a cross-sectional study	Das, S., Rasul, M.G., Hossain, M.S., Khan, A., Alam, A., Ahmed, T. & Clemens, J.D. (2020)	Acute food insecurity and short-term coping strategies of urban and rural households of Bangladesh during the lockdown period of COVID-19 pandemic of 2020: report of a cross-sectional survey | BMJ Open
Agricultural livelihoods and food security in the context of COVID-19: Yemen	FAO (2021)	Yemen | COVID-19 Monitoring Report | January 2021
Inseguridad alimentaria en tiempos de covid-19: Evidencia de ocho territorios latinoamericanos	Centro Latinoamericano para el Desarrollo Rural (RIMISP) (2021)	AnCon P1 V2
Challenges for family farming in the context of Covid-19: follow-up after 6 months of crisis	Salazar, L., Schling, M., Palacios, A. C. & Pazos, N. (2020)	DOC_21_04_2021_10_01_04_840423.pdf

Annex 7. Thematic clusters and specific indicators

Thematic clusters	**Specific indicators**
Food security (27 papers):	
	Reduction in food consumption
	Insufficient quantity of food
	Skipped or reduced meals
	Without eating a whole day
	Reported Increased cost of food
	Run out of food
	Insufficient income to buy food
	Poor dietary diversity
	Not able to eat health and nutritious food
	Reduced access to markets
	Unavailability of usual food in markets
	Experienced moderate or severe food insecurity (FIES)
	Poor or borderline food security (FCS)
	Food insecure
Income (27 papers):	
	Decreased income
	Job loss
	Price increase
	Able to access work
	Employed
	Returned to work
	Poverty rate
	Poverty gap
Coping strategies (19 papers):	
	Adopted stress coping strategies
	Relied on savings
	Reduced savings
	Relied on Family
	Relied on borrowings
	Reduced investments
	Adopted negative coping strategies
	Sale of assets or household's goods
	Adopted crisis coping strategies
	Reduction in food consumption
	Selling productive assets
	Borrowed food
	Adopted emergency coping strategies
	Not able to use any coping strategies
	Received assistance from govt. or NGO
Production (11 papers):	
	Able to hire labour
	Reported increase in cost of hired labour
	Not able to hire labour services
	Decrease in sales
	Low market prices
	Low demand
	Faced difficulties in selling products
	Increase in input price
	Insufficient income to buy inputs

Annex 7. Thematic clusters and specific indicators

Problems in accessing inputs
Unavailability of Inputs
Decreased quantity of harvest
Delayed planting
Decrease in area planted
Decrease in livestock owned
Faced difficulties in production
Not able to plant
Higher production costs

Annex 8. Food system typologies, stringency, Google mobility, governance indicators

Food system typology	Country name	Stringency-index[20]	Google mobility trends[21]		Worldwide Governance Indicators (WGI)[22]	
		Mean levels April–August 2020	**Workplaces** (% change from baseline - mean levels April–August 2020)	**Transit stations** (% change from baseline - mean levels April–August 2020)	**Govt. effectiveness**	**Regulatory quality**
Rural and traditional (23 countries)	Papua New Guinea	59.14 (47.22; 83.8)	13.04% (-54%; 27%)	-21.37% (-48%; 0%)	-0.81	-0.54
	Lao PDR	52.69 (20.37; 96.3)	-10.56% (-61%; 9%)	-32.94% (-72%; -11%)	-0.78	-0.71
	Cambodia	48.66 (38.89; 68.52)	-21.07% (-57%; -5%)	-45.25% (-66%; -33%)	-0.58	-0.57
	Tajikistan	48.48 (19.44; 66.67)	-13.78% (-60%; 15%)	-28.72% (-54%; -7%)	-1.05	-1.01
	Djibouti	67.33 (50.93; 94.44)	NA	NA	-0.71	-0.77
	Occupied Palestinian Territory	87.28 (77.78; 96.3)	NA	NA	-0.74	0.03
	Burkina Faso	58.17 (45.37; 89.81)	-3.50% (-69%; 19%)	-19.45%	-0.76	-0.38

[20] The Oxford Coronavirus Government Response Tracker (OxCGRT) project calculates a Stringency Index based on the composite measure of nine metrics: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaign, restrictions on internal movements and international controls. The index is calculated as the mean score of the nine metrics, each taking a value between zero and 100, with higher scores indicating stricter responses. If policies vary at the subnational level, the index is shown as the response level of the strictest sub-region. It is important to note that this index records only the strictness of government policies, and it does not measure or imply the appropriateness or effectiveness of country response. Further information is available at: https://ourworldindata.org/grapher/covid-stringency-index

[21] The Google COVID-19 Community Mobility Data shows how visits and length of stay at different places changed compared to a baseline. The baseline is the median value for the corresponding day of the week during the five-week period January 3rd–February 6th, 2020. The different categories of places for which data have been collected and disaggregated include retail and recreation (bars, museums, cinema, etc.), grocery and pharmacy (supermarkets, local markets, pharmacies, etc.), parks (parks, beaches, public gardens, etc.), transit stations (train station, bus stops, metro, etc.), workplaces, and residential areas. What data are included in the calculation depend on user settings, connectivity, and whether it meets the Google privacy threshold. When such a privacy threshold is not met, and therefore anonymity is not ensured, data are not shown. Further information is available at: https://www.google.com/covid19/mobility/index.html?hl=it

[22] The Worldwide Governance Indicators (WGI) are a research dataset summarizing the views on the quality of governance provided by a large number of enterprises, citizen and expert survey respondents in industrial and developing countries. These data are gathered from a number of survey institutes, think-tanks, non-governmental organizations, international organizations and private sector firms. Details on the underlying data sources, the aggregation method, and the interpretation of the indicators, can be found in the WGI methodology paper: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130. This table contains information on two out of the six computed indicators, and data refer to 2019. Full interactive access to the aggregate indicators, and the underlying source data, is available at: http://info.worldbank.org/governance/wgi/. Estimates of government performance ranges from approximately 2.5 (weak) to 2.5 (strong).

Annex 8. Food system typologies, stringency, Google mobility, governance indicators

				(-53%; 34%)		
	Central African Republic	63.69 (50; 75.93)	NA	NA	-1.75	-1.37
	Ethiopia	79.92 (66.67; 80.56)	NA	NA	-0.63	-0.89
	Kenya	83.61 (70.37; 88.89)	-21% (-60%; 6%)	-24.3% (-47%; -7%)	-0.38	-0.28
	Madagascar	72.20 (60.16; 95.37)	NA	NA	-1.14	-0.73
	Mali	57.40 (47.22; 75)	-6.42% (-69%; 24%)	-32.26% (-57%; -12%)	-1.06	-0.57
	Chad	70.78 (27.78; 88.89)	NA	NA	-1.57	-1.12
	South Sudan	81.05 (73.15; 86.11)	NA	NA	-2.45	-2.05
	Democratic Republic of the Congo	72.38 (40.74; 80.56)	NA	NA	-1.63	-1.51
	Uganda	85.44 (76.85; 93.52)	-27.94% (-67%; 4%)	-53.11% (-76%; -30%)	-0.59	-0.37
	Mozambique	68.42 (56.48; 80.56)	-5.54% (-63%; 9%)	-23.05% (-45%; -13%)	-0.82	-0.72
	Malawi	60.42 (52.78; 64.81)	NA	NA	-0.75	-0.70
	Zambia	50.07 (39.81; 70.83)	-6% (-51%; 13%)	-11.73% (-33%; 3%)	-0.68	-0.55
	Zimbabwe	80.77 (70.37; 87.96)	-23.25% (-80%; 16%)	-45.67% (-83%; -16%)	-1.21	-1.46
	Afghanistan	75.79 (21.3; 84.26)	-21.45% (-68%; 8%)	-26.18% (-53%; 3%)	-1.46	-1.12
	Bangladesh	81.68 (62.96; 93.52)	-29.26% (-66%; 11%)	-43% (-73%; 2%)	-0.74	-0.93
	Bhutan	80.48 (62.96; 97.22)	NA	NA	0.31	-0.33
	Average	**68.95%**	**-13.59%**	**-31.31%**	**-0.96%**	**-0.81%**
Informal and expanding (14 countries)	Solomon Islands	37.82 (33.33 – 69.44)	NA	NA	-1.00	-0.83
	Indonesia	66.79 (50.93 – 80.09)	NA	NA	0.18	-0.09
	Myanmar	79.80 (65.74 – 86.11)	-18.04% (-68%; 3%)	-28.84% (-73%; -5%)	-1.15	-0.76
	Philippines	86.02 (68.98; 100)	-48.27% (-82%; -17%)	-67.13% (-90%; -50%)	0.05	0.01
	Viet Nam	71.97 (55.56; 96.3)	-0.94% (-58%; 24%)	-17.28% (-67%; 2%)	0.04	-0.26
	Uzbekistan	76.72 (51.85; 96.3)	NA	NA	-0.51	-0.99
	Bolivia (Plurinational State of)	92.16 (88.89; 96.3)	-53.81% (-87%; -29%)	-68.55% (-92%; -36%)	0.70	-0.99
	Guatemala	93.81 (87.04; 96.3)	-41.43% (-81%; -18%)	-65%	-0.68	-0.22

Annex 8. Food system typologies, stringency, Google mobility, governance indicators

				(-93%; -51%)		
	Honduras	95.92 (76.85; 100)	NA	NA	-0.61	-0.49
	Iraq	90.83 (82.41; 96.3)	-25.90% (-56%; 0%)	-31.39% (-62%; -3%)	-1.34	-1.18
	Ghana	59.63 (52.78; 86.11)	-14.35% (-59%; 10%)	-20.17% (-62%; 2%)	-0.21	-0.11
	Nigeria	77.86 (65.74; 85.65)	-22.13% (-62%; 10%)	-24.26% (-58%; 3%)	-1.09	-0.86
	Senegal	57.61 (32.41; 77.78)	-22.46% (-70%; 12%)	-37.30% (-62%; 4%)	-0.06	-0.11
	Democratic Republic of the Congo	79.12 (62.04; 97.22)	NA	NA	-1.39	-1.30
	Average	**76.14%**	**-27%**	**-40%**	**-0.50%**	**-0.58%**
Emerging and diversifying (ten countries)	Mongolia	67.7 (60.19; 85.19)	-1.90% (-69%; 23%)	12.84% (-37%; 54%)	-0.19	-0.01
	Romania	59.78 (38.89; 87.04)	-27.88% (-85%; 9%)	-33.25% (-85%; -11%)	-0.28	0.46
	Ecuador	83.32 (73.61; 93.52)	-46.32% (-84%; -5%)	-57.71% (-87%; -36%)	-0.40	-0.82
	Peru	87.85 (75.93; 96.3)	-55.65% (-90%; -25%)	-66.93% (-95%; -43%)	-0.07	0.56
	Paraguay	84.98 (75.93; 94.44)	-19.04% (-82%; 16%)	-50.32% (-89%; -35%)	-0.53	-0.20
	El Salvador	92.1 (80.56; 100)	-51% (-83%; -19%)	-63.52% (-82%; 40%)	-0.47	0.02
	Saint Lucia	NA	NA	NA	0.23	0.23
	Tunisia	53.20 (24.07; 90.74)	NA	NA	-0.10	-0.44
	Gabon	80.2 (70.37; 84.26)	-18.97% (-72%; 11%)	-32.23% (-75%; 2%)	-0.90	-0.96
	Mauritius	48.47 (16.67; 82.41)	NA	NA	0.87	1.00
	Average	**73.1%**	**-31.54%**	**-41.59%**	**-0.18%**	**-0.02%**
Modernizing and formalizing (seven countries)	Bulgaria	49.87 (36.11; 73.15)	-24.07% (-78%; 10%)	-22.86% (-73%; 5%)	0.34	0.53
	Croatia	60.16 (35.19; 96.3)	-26.66% (-86%; 20%)	-25.5% (-80%; 48%)	0.41	0.59
	Poland	59.78 (39.81; 83.33)	-23.24% (-90%; 34%)	-31.16% (-86%; 9%)	0.60	1.01
	Chile	79.43 (73.15; 87.5)	-42.73% (-78%; -18%)	-60.19% (-81%; -46%)	1.06	1.22
	Colombia	87.15 (84.26; 90.74)	-42.82% (-85%; -8%)	-59.88% (-88%; -43%)	0.07	0.40

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	Costa Rica	72.74 (61.11; 81.48)	-35.65% (-84%; -21%)	-53.77% (-91%; -40%)	0.42	0.50
	Dominican Republic	86.16 (75; 100)	-42.66% (-83%; -15%)	-59.43% (-88%; -37%)	-0.36	-0.05
	Average	**70.75**	**-34%**	**-44.7%**	**0.36**	**0.6**

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