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Background Paper

Bouncing Forward Sustainably: Pathways to a post-COVID World Resilient Food Systems

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Abstract

COVID-19 and the global lockdown have triggered a humanitarian and socioeconomic crisis, which threatens to undermine the progress towards eradicating poverty and hunger. We are confronted with a new reality for sustainable development. How food systems will be transformed during the socioeconomic recovery will play an important role in determining whether the Sustainable Development Goals and Paris Agreement are still within our reach.

COVID-19 exerts supply and demand-based shocks on food systems. The global lockdown to contain the COVID-19 pandemic has led to the worst economic crisis since the Great Depression. The economic impact on developing countries is further compounded by depreciation of local currencies, loss of income from remittances and declining prices for export commodities.

The impact on supply chains has been heterogeneous, but COVID-19 revealed vulnerabilities in some complex and specialized supply chains, where the link between producer and consumer has been broken. While the outlook for global food supply is strong and the prices for most agricultural commodities have remained stable or even declined, the global lockdown and other containment measures may lead to local constraints in food supply and price spikes. Rising levels of poverty and unemployment have further exacerbated food insecurity in developing and developed countries, particularly in urban areas. Without rapid mitigative action, the pandemic may double the number of people at risk of dying from acute hunger, threatening severe famines in vulnerable countries.

Recovery from global lockdown requires an emphasis on building more resilient food systems. COVID-19 reinforces the need to rebalance the focus on economic efficiency of our global food system with a greater emphasis on resilience and social and environmental sustainability. Strategic decisions taken during the economic recovery phase, signals sent by policies and fiscal policy packages have the potential to lock-in development pathways for the coming years. The following considerations should be taken into account when structuring the recovery process:

i) expanding social safety nets to ensure food and nutritional security;
ii) assessing systemic risks in food systems and the role of trade and self-sufficiency;
iii) advancing innovation and the adoption of sustainable technologies and practices; and
iv) strengthening the accounting and management of natural capital.

A comprehensive approach to COVID-19 recovery and sustainable development demands further emphasis on interdisciplinary cooperation and systems thinking. It requires also a strengthening of the science policy interface, so that feed-back loops between impacts and scenario analysis, fact-based policy design, and implementation are improved. Coupled with an emphasis on open data and information access, important scientific contributions to decision making processes include:

i) strengthening near real time monitoring capabilities across the development and environmental dimensions of food systems; and
ii) providing integrated assessments of the implications of strategic choices for sustainable development pathways in a post COVID-19 world.

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Resilient food systems in a post COVID-19 world

1. Introduction: COVID-19 and sustainable development

Within months the COVID-19 pandemic has changed the world as we know it. The pandemic has revealed our global inter-dependencies and vulnerabilities, causing loss of life and personal grief and wreaking havoc on health and economic systems. Many of the knock-on effects of this crisis will only become apparent over the coming months and years. While some countries are still suffering increasing infection rates, other countries are slowly emerging from the crisis, undertaking steps to restart public life and their economies. How governments and the international community manage this recovery phase will have larger social, economic and environmental implications.

Essentially, we are at the crossroads towards or away from a sustainable development trajectory, depending on how we collectively decide to respond to this pandemic. We can broadly distinguish two alternatives, which embody different views on how to respond to this global disruption. One option would focus on rebuilding society and the economy as we know it, i.e. reverting to business as usual. The alternative would be to choose a recovery path, which would harness the disruption caused by COVID-19 to catalyze a broader transformation towards resilient and green economies. The first option takes a singular focus on the specific shock caused by COVID-19. The alternative option emphasizes systems thinking with the aim to strengthen general preparedness of society to a variety shocks and looming threats by promoting integrated solutions. It is currently unclear which of these contrasting alternatives will predominate, i.e. the extent to which the international community will succeed in coupling near-term responses to COVID-19 with longer-term transformations of human systems towards greater resilience and sustainability.

In recognition of the shifting contexts and multiple demands placed on our food systems, this discussion note presents an overview of the initial impacts of the pandemic and global lockdown, and outlines considerations for sustainable development pathways in a post-COVID-19 world and the potential role of the scientific community in informing decision-making processes.

2. The shifting contexts for our food systems

Our current food systems have succeeded in increasing the world's food supply at a faster pace than the rising demand of a growing and more affluent population. Global trends emphasize production efficiency. To meet rising demands, agricultural markets are increasingly integrated. Between 2000 to 2016 the global aggregate value of trade increased three-fold, reflecting changing patterns of consumption, the rising influence of emerging economies and the growing trade in food products between developed countries. In least developed countries (LDCs), particularly in Sub-Saharan Africa (SSA), population growth rates outpaced agricultural productivity gains – contrary to the global picture – and a growing trade deficit in agricultural commodities has been observed.

Globally, there is a trend towards net exporting and net importing regions, whereby agricultural exports tend to originate from a relatively small number of countries, while imports are more widespread. In increasingly interconnected food systems, trade has become essential for ensuring food security of importing countries, while providing livelihoods and income opportunities for exporting countries.

Multiple food systems often coexist next to each other, including modern, mixed and traditional food systems[1]. On one end of the spectrum, modern food systems includes large international agri-businesses, predominantly headquartered in industrialized countries, with global and complex just-in-time supply chains and large market shares[2]. On the other end of the spectrum and characteristic of traditional food systems, we find small-holder and subsistence farmers, who often have very limited access to financial capital, input and markets. Agriculture remains a major source of livelihood in many developing countries. Reforming food systems and developing agri-businesses are seen as major opportunities for helping end poverty on the continent and creating a 1 trillion business opportunity for African economies by 2030[3].

However, our current global food system is confronted with several challenges. Due to climatic impacts, conflicts and economic downturns, global progress in addressing malnutrition has grinded to a halt in recent years. Prior to the outbreak of the pandemic, over 820 million people were undernourished[4], many more suffered from food insecurity and micronutrient deficiencies. While chronic hunger remains a pervasive problem in developing countries and particularly in Sub-Saharan Africa, the prevalence of obesity and associated non-communicable diseases is on the rise globally.

Our food systems are also associated with large environmental externalities. The agriculture, forestry and other land uses (AFOLU) sector contributes 23 percent to the net anthropogenic greenhouse gas emissions[5]. Agricultural activities and land use changes are major driver of biodiversity loss, environmental degradation, and water and air pollution. Packaging of food contributes to the problem of accumulating plastic waste in terrestrial and marine systems.

To resolve trade-offs and strengthen synergies between various economic, social and environmental objectives linked to our food systems, integrated solutions are needed, which combine a variety of supply and demand side policies and measures. Various assessments and initiatives have underlined the benefits of systems thinking, showcasing how a combination of supply and demand based measures, such as the improvement of agriculture and livestock productivity, upscaling of sustainable land management practices, changing behaviors and food habits towards healthier diets, can help resolve trade-offs and generate synergies between multiple development and environmental objectives[6]. For example, the shift towards diets characterized by a higher intake of plant-based foods and lower consumption of animal-based foods is broadly regarded as essential for addressing malnourishment and associated non-communicable diseases, such as obesity and diabetes, while

[1] HLPE, 2017: http://www.fao.org/3/a-i7846e.pdf
[2] In several European countries there is also an emphasis on modern family farms which at the cost of subsidies contribute to the vitality of rural areas, maintenance of traditional and cultural agricultural landscapes, and a high level of self-sufficiency.
[3] World Bank, 2020: http://documents.worldbank.org/curated/en/327811467990084951/pdf/756630v10REPLA0frica0pub0301101 3web.pdf
[4] FAO, 2019: http://www.fao.org/state-of-food-security-nutrition
[5] IPCC, 2019: https://www.ipcc.ch/srccl/
[6] e.g. Smith et al. 2013, Havlik et al. 2014, IPCC 2014, IPCC 2019, Willet et al. 2019 (EAT-Lancet Commission)
[9] https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf

also reducing the pressure on land, protecting the climate and enhancing environmental sustainability[9]. Research has generally shown that addressing the existing caloric deficit to eliminate hunger is possible without negative effects on the environment, particularly if accompanied by shifts in diets in the overconsuming population.

3. Emerging impacts of COVID-19 on food systems

The humanitarian and socioeconomic crisis of COVID-19 and global lockdown are shifting now the boundary conditions for development at a time when a rapid transformation towards sustainable food and land-use systems is needed to prepare for and manage global change processes.

The IMF considers the global lockdown triggered by the pandemic the worst economic crisis since the Great Depression, expecting the global economy to contract by at least 3% in 2020[7]. The pandemic has led to supply and demand shocks across economic sectors. Impacting developed and developing countries across the globe, the crisis has led to wide-spread unemployment, shifts to part-time work and loss of disposable income and purchasing power. Many developing and emerging countries are impacted by the depreciating of their currencies and loss of remittances. Declining prices of several important commodities due to the global lockdown have been observed[8], further impacting on the revenue of commodity exporting countries.

The pandemic threatens to undermine global progress towards alleviating poverty and universal food security. Halving the incidence of extreme poverty, defined as people leaving on less than 1.90 USD per day, was one of the main success stories of the Millennium Development Goals (MDGs). In comparison to 1990, poverty levels have dropped from around 2 billion people (36% of global population) to 630 million (8 %) by 2019. Poverty is now on the rise again. In April, the World Bank estimated that an additional 49 million people would fall into extreme poverty due to the global lockdown. Research from King's College suggests that a 5 percent contraction in average per capita income could push 80 to 140 million more people falling into monetary poverty, while a 20 percent drop would add 420 to 580 million people[9]. The socioeconomic impacts of the pandemic further exacerbate inequalities within and between countries.

Poverty and chronic hunger are closely linked. The head of the World Food Program David Beasley has warned that unless rapid mitigation measures are undertaken, the world may face "multiple famines of biblical proportions", potentially doubling the number of people at risk of dying from acute hunger from 135 million to 265 million people by the end of 2020[10]. The pandemic threatens to unravel global progress towards universal food security by 2030, as stipulated in the second global goal of the SDGs.

[7] IMF 2020. Note: This assumes an end of the pandemic during the second half of the year. IFPRI calculates with -5% contraction.
[8] https://openknowledge.worldbank.org/bitstream/handle/10986/33624/CMO-April-2020.pdf
[9] https://www.kcl.ac.uk/news/half-a-billion-people-could-be-pushed-into-poverty-by-covid-19
[10] https://insight.wfp.org/wfp-chief-warns-of-hunger-pandemic-as-global-food-crises-report-launched-3ee3edb38e47

These warnings come as the outlook for global food supplies remained largely stable and global food reserves are high. Due to good harvests last year and early this year, the stock to utilization ratios are considerably higher than during the 2007/2008 financial crisis. Primary agricultural production has not been severely affected by the crisis to date. However, the impact on the food supply may look considerably different at regional and local levels, when the link between producers and consumers breaks down due to lockdown measures and associated impacts. For example, in Africa, Latin America and Asia supply chains rely heavily on human capital and access to local and informal markets. Hence, the implication of containment measures, is threatening the supply of food staples and local food prices. Price spikes may be observed locally due to impact of travel bans, closure of markets and other measures undertaken to contain the spread of the virus.

COVID-19 and the lockdown measures have led to multiple demand shocks. Rising levels of poverty, loss of income and physical distancing measures have rapidly changed consumer behavior. This has led to a mismatch of supply and demand. Oversupplies, especially acute in the food chain for restaurants and canteens, due to demand shortage and disruption of transportation have led to stock increase for cereals like corn. Increases in food loss and waste are observed across regions, particularly for perishable food groups, such fish, fruits and vegetables, where (cold) storage options are limited. Furthermore, in countries like the US, the industry is organized in ways that make it virtually impossible to reroute food produced for restaurants towards grocery stores, amplifying the quantity of food loss, while people lined up in food banks.

Lockdowns, travel bans, and other physical distancing measures further exacerbate the vulnerabilities of poor people. Overcrowded living conditions, precarious and often informal employment, and the absence of disposable income make many of the recommended sanitary and protective measures to fight the spread of COVID-19 difficult to implement in practice. Instead poor people may be confronted with impossible choices between protection from COVID-19 and seeking some basic daily income to obtain food. The absence of basic services and infrastructure further adds to the vulnerability of poor people, particularly in developing countries where lack of access to water and sanitation may further facilitate the spread of the virus.

Rising levels of food insecurity reveal the absence or weaknesses of social safety nets. Nobel laureates Abhijit Banarjee and Esther Duflo have advocated regular cash transfers to provide a universal basic income to help buffer the poor against immediate food insecurity in India[11]. COVID-19 uncovered also insufficient social protection in several developed countries, particularly in urban areas. This is for example illustrated by the rising number of food banks in major cities, increasing in Amsterdam for example by 30%, and the increasing number of people to be considered food insecure. In New York, 1.1 million people are estimated to suffer from food insecurity, 5 million persons in households with children under 18 are experiencing conditions of food insecurity in the UK[12].

The impact on supply chains has been heterogeneous. In Europe, border closures revealed the dependency of food systems on migrant and seasonal labor. In the US, the meat packing industry has become a hotspot of Coronavirus infections, revealing food safety and sanitation issues and shining a light on the dependency of

[11] https://www.theguardian.com/commentisfree/2020/may/06/vulnerable-countries-poverty-deadly-coronavirus-crisis
[12] https://foodfoundation.org.uk/new-food-foundation-survey-five-million-people-living-in-households-with-children-have-experienced-food-insecurity-since-lockdown-started/

modern food systems on highly specialized supply chains. Shutdowns of large processing plants created bottlenecks in the meat supply, while also exacerbating food loss and waste. With the closure of some slaughterhouses and decreased demand, many animals had to be culled without entering the food market. In the US, the disruption of ethanol refineries also generated a shortage of dried distiller grains that are usually used as protein ingredients in the livestock sector, and had to be substituted with other feed types, leading to higher costs and productivity decreases.

The global trade system continued to function with differential impacts on food commodities, export restrictions could largely be avoided. Some specific trade restrictions have been implemented for limited amount of time (e.g. Vietnam for rice, Russia for wheat) but lessons from the 2007-2008 crisis have been learned and no major disruption in international trade of main commodities have been observed. Additionally, stocks were already at high levels, therefore the crisis did not trigger any panic stock-piling behavior from institutional agents. The decreased demand for food, feed but also biofuels has led on some major markets such as corn or sugar to large surplus and drop of prices. The pandemic has also delayed efforts for further economic integration in Africa, as the start date for the African Continental Free Trade Area (AfCFTA), originally scheduled for July 1, 2020 has been postponed[13].

In some cases, the impacts of the COVID-19 crisis on food systems could be reduced by innovation and other adaptive measures. For example, the increasing use of drones allowed agricultural monitoring, the use of e-commerce platforms offered restaurants to a partial adaptive response to physical distancing measures and closures.

In other cases, the impacts of COVID-19 crisis were exacerbated by existing vulnerabilities and additional shocks. Before the pandemic gained a foothold in the African continent, Eastern Africa was already confronted with a locust outbreak threatening to destroy harvests and trigger food emergencies. In Western Africa, the humanitarian and socioeconomic impacts of COVID-19 are superimposed on an ongoing regional food crisis and an could affect additional 50 million people as a result of the combined effects of confinement, market closures, barriers to trade and loss of income. Countries in these regions are confronted with managing multiple shocks and crises at the same time, while changes in export and import quantities for key commodities may have wider knock-on effects. In general, the COVID-19 crisis has significantly disorganized the humanitarian and food aid sector and increased vulnerabilities during emergencies.

The global lockdown and associated changes in human behavior are having a range of impacts on the environment. Due to reduced transport and economic activities, global emissions are expected to drop by around 8 percent in 2020[14]. Air pollution in several urban areas has been significantly reduced, offering a glimpse into an alternative future, showing benefits of improved local environmental conditions for quality of life. However, it is uncertain to which extent these positive changes can be sustained and leading to a transformation of human environment interactions, once economic activities resume again. Furthermore, the shadow of the pandemic, capturing much of the political and public attention and leading to constraints in

[13] https://www.un.org/africarenewal/magazine/may-2020/coronavirus/implementing-africa%E2%80%99s-free-trade-pact-best-stimulus-post-covid-19-economies
[14] IEA, 2020

monitoring and enforcement capacities, may facilitate opportunities for pushing back against conservation efforts, enabling illegal land-use changes, environmental destruction and pollution. For example, the deforestation rate of the Amazon in April 2020 is 64% higher than in April 2019 and the first three months saw 50% higher deforestation rates than last year[15] .

4. Considerations for transitions towards sustainable food and land use systems

Prior to the emergence of COVID-19, there was an increasing recognition that continuing with business as usual was no longer viable, as the transformation of food and land-use systems plays a central role in making progress towards the Sustainable Development Goals (SDGs) and other key international policy objectives, such as the Paris Agreement on Climate Change[16]. Changes in land use practices and dietary shifts are needed to improve food security and human health, meet environmental objectives, and strengthen resilience of livelihoods and economic sectors.

The evolution of the global food system to date has largely been driven by economic efficiency considerations. In the recovery from COVID-19, it should be avoided that responses to one global crisis are traded off against the preparedness for other planetary emergencies. Current stimulus packages are largely focused on buffering against the immediate social and economic impacts of the COVID-19 crisis[17]. As countries shift towards the design and implementation of longer-term response measures, the question arises whether these should be predominantly driven by economic considerations or whether greater emphasis should be placed on re-balancing with other key social and environmental concerns, placing an emphasis on integrated solutions which optimize for multiple objectives and constraints.

Building on reflections on the above considerations, this implies that stimulus packages aimed at recovering from socioeconomic impacts of the lockdown would need to be scrutinized to ensure that the restructuring of food systems does not lead to backward steps on SDG indicators. Conditionality clauses on public investments are one possible option to find the right balance between progress towards sustainability and efficiency of the recovery. Additional public and private investments beyond the agricultural sector will also occur in response to the crisis, triggering potential access to new technologies, consumption modes, and market configurations, which may offer opportunities to recover faster and ease access to more sustainable pathways. The persistence of (positive and negative) behavioral changes emerging from COVID-19 pandemic should be considered in influencing the boundary conditions for pathways in a post-COVID-19 world towards more resilient and sustainable food and land-use systems.

[15] https://edition.cnn.com/2020/05/14/americas/coronavirus-amazon-brazil-destruction-intl/index.html

[16] e.g.: Caron et al 2018, TWI2050, EAT-Lancet Commission Report 2019, Schmidt-Traub et. al. 2019, FOLU Growing Better Report 2019

[17] For example, in April 2020, the US unlocked a budgetary package of 19 billion USD to rescue the food sector, with 16 billion USD targeted to farmers (including 4 billion for row crops), and 3 billion for domestic food aid. In the case of livestock alone, US farm organizations estimate losses to amount to 14 billion USD. In Japan, a similar package of about 5 billion USD was also announced the same month to support the agricultural, fisheries and forestry.

We believe the following considerations should inform recovery efforts from COVID-19 to strengthen the general resilience and sustainability of food and land use systems:

i) *Strengthening social safety nets for universal food and nutrition security and enabling the transition to healthy diets.* COVID-19 has underlined the tight coupling of poverty (and other forms of inequality) and food security. Rising levels of unemployment and income losses revealed weaknesses in social safety nets in developing as well as developed countries. In general, the pandemic and global lockdown have led to shifts in consumption behavior with potentially positive or negative outcomes for dietary transitions. *Should the provision of a minimum basic income for vulnerable households be considered as part of comprehensive strategy to tackle poverty and food security linkages in the recovery phase of COVID-19? Can the recovery from COVID-19 be utilized to facilitate a general transition towards healthier and more environmentally friendly diets that are also suited to households facing reduced spending power?*

ii) *Improving resilience of food systems re-balancing self-sufficiency and international trade.* Trade is considered essential to the food security of importing countries. A small number of countries are often responsible for a large share of exports of key commodities. COVID-19 has impacted developed and developing countries across the globe within a short timeframe and has revealed the vulnerabilities and complexities of some of the international supply chains. When aiming to strengthen the resilience of food systems, it should also be considered that countries are often exposed to multiple socioeconomic and environmental hazards and shocks, which may differ considerably in the spatial and temporal signature from the shock of the COVID-19 pandemic. *There needs to be a greater emphasis on evaluating systemic risks embedded in our current food systems and the role of trade in mitigating such risks. Can the increasing integration of agricultural markets be accompanied by a greater emphasis on more adaptive and flexible supply chains? In which circumstances is trade essential for bolstering food security? In which cases does trade rather become an obstacle to food security? When is an increased emphasis on regional or local self-sufficiency desirable? How can concerns about the resilience of livelihoods and economic sectors be combined with an emphasis on environmental sustainability of food production and land-use systems?*

iii) *Advancing technological innovation and sustainable practices.* Access to technologies have helped to buffer against some of the impacts of COVID-19, as illustrated by the proliferation of e-commerce and other examples of deploying digital technologies to keep supply chains open. To ensure also environmental sustainability, it is important to sustain innovation, technology development and diffusion, and improvement of agricultural practices. *How can it be avoided that the reduced fiscal space of countries, impacts on investment streams and official development assistance reinforce and widen the technology gap between developed and developing countries?*

iv) *Improving the accounting and management of natural capital.* The importance of managing human environment interactions is underlined by the emergence of COVID-19 and other zoonotic diseases. The impacts of global lockdown have led to regional improvements in environmental conditions, such as reduction of air pollution, but may also undermine capacities for environmental protection and regulation. There are concerns that the recovery from COVID-19 will be accompanied by an easing of environmental protection with detrimental effects for biodiversity, climate change and environmental pollution. *There is a need to strengthen the monitoring and accounting of natural capital and ensure that natural capital stocks, which are critical for the earth's life support system, are protected in the economic recovery.*

5. Thoughts on the role of the scientific community

Clearly, it should be avoided that responses to one global crisis are traded off against the preparedness for other planetary emergencies. To ensure this, the scientific community can make important contributions by rapidly advancing an integrated understanding of the immediate socioeconomic and environmental impacts of the COVID-19 pandemic and how these may reshape current development situation of countries in relation to the SDGs and associated targets. These efforts need to be coupled with a focus on assessing how a different strategic emphasis during the economic recovery phase of countries may impact on sustainable development pathways in general and the transformation of food and land-use systems specifically over the longer-term.

For rapidly detecting and responding to near term impacts, there is a critical need for real-time data not only to monitor infections, symptoms and morbidity rates, but also to identify the direct impact of the pandemic on *good health and wellbeing* (SDG 3) as well as other global goals such as *no poverty* (SDG 1), *zero hunger* (SDG2), *decent work and economic growth* (SDG 8) and *reduced inequalities* (SDG 10). It is vital that data collection efforts are maintained and enhanced in the wake of the pandemic. New technologies and data sources such as earth observation, mobile data and citizen science, public participation in scientific research, offer tremendous opportunities to produce timely data that could translate into informed decisions as a response to Covid-19. This includes also advancing the integration of early warning, monitoring and forecasting systems and placing an emphasis on open data and information access.

For assessing longer-term implications for sustainable development pathways, this calls for systemic analyses, exploring alternative post COVID-19 development narratives and evaluating different policy scenarios. This includes assessments of different starting conditions in their implications for the solution space for sustainable development pathways. For example, *what potential implications do different assumptions about the magnitude and duration of the contraction of the global economy, the timing of the economic recovery of countries have for development pathways, e.g. with regards to innovation, diffusion of improved practices and shifts to more efficient livestock and crop production? How will impacts of COVID-19 on poverty and inequality delay progress to the respective SDGs?*

Expanding on the shared socioeconomic pathways (SSPs) and other scenarios, different narratives on predominant policy choices may need to be explored and assessed in their implications of achieving more resilient food and land-use systems. This may include, inter alia, a comparison of: i) A more fragmented world versus a world characterized by international collaboration, considering the implications of different levels of trade constraints and domestic food production on food security, economic performance and environmental sustainability criteria, ii) changes in lifestyle and human behavior, e.g. considering the implications of diet shifts in their implications for human health, demand on land, and management of natural capital.

A comprehensive approach to COVID-19 recovery and sustainable development will require further emphasis on cross-disciplinary and interdisciplinary cooperation and systems thinking. It requires also a strengthening of the science policy interface, so that feed-back loops between impacts and scenario analysis, fact-based policy design, and implementation are improved.

Disclaimer: This is an early working draft to inform the consultations on resilient food systems. References and additional cross checks will be applied before finalization.