COVID-19: A Role for Food Science and Technology?

Half of the world's population is presently under lockdown or stay-at-home orders to prevent further spread of the COVID-19 pandemic. Places of social aggregation such as schools, then bars and restaurants, then stores and markets have progressively closed down. This has obvious implications for food systems in both urban and rural areas. Governments as a rule commit to maintaining essential economic activities and food availability but in most cities and many countries food supply depends mainly on food imports which are threatened by restrictions of mobility, closing of borders, speculative transfers and limitation of intervention stocks. The epidemic spreads from well-connected and vibrant cities with high costs of living and cramped housing conditions to rural areas which often offer less choice in terms of health services and food distribution (both retail and mass market). In several countries, the media refers to "health refugees" which left towns before containment became mandatory and means of transportation were grounded, either to reunite with their families, or to move to more spacious and healthy living environments, with obvious implications on the spread of the disease and on local food systems in both urban and rural areas.

The pandemic started in the Northern hemisphere, spread across industrialized countries and overwhelmed health systems, and its impact in emerging and low-income countries is less visible, or less documented. Besides widespread media coverage overshadows that of pre-existing humanitarian crises, such as armed conflicts or locust epidemic. The effect of containment measures - which appear often inappropriate to the local context - on often already fragile economies is likely to have devastating impacts on food security, as pointed by World Bank experts: "trade and value chain disruption, reduced foreign financing flows from remittances, tourism, foreign direct investment, foreign aid, combined with capital flight and disruptions caused by containment measures and the public response". The 2020 Global Report on Food Crises (prepared by the Global Network Against Food Crises) projects that the population in Crisis or worse will rise from a high of 135 million in 2019 to 235 million (to be added to the 821 million chronically hungry people) as a result of COVID-19. "The pandemic may well devastate livelihoods and food security, especially in fragile contexts and particularly for the most vulnerable people working in the informal agricultural and non-agricultural sectors. A global recession will majorly disrupt food supply chains." Various UN reports suggest expected income losses exceeding $220 billion in developing countries alone. Moreover, as most of the global population does not have access to social protection (55%), these losses will reverberate across societies, impacting education, human rights and, in the most severe cases, basic food security and nutrition.

In all countries, intensive agriculture, often export-driven, is facing major constraints. It is labour intensive and faces labour shortages when seasonal and skilled workers cannot travel to the areas of production. It requires transportation to market its products and in some areas road freight is disrupted. This is a major problem for perishable products such as fruits, vegetables or milk in the absence of local storage, cooling and processing facilities, and has resulted in significant food waste as farmers plough vegetable produce back into fields, dairy milk gets dumped and fruits are not being picked. It is a major problem also for livestock, poultry and aquaculture where due to overstocking the choice is between feeding animals that cannot be sold or cull them. Oversized food processing structures (such as meatpacking companies) that have not been able to guarantee the safety of their underpaid workers have had to shut down. In addition, transport restrictions are limiting access to agricultural inputs such as seed, fertilizer, and veterinary services, with serious consequences for the upcoming agricultural campaigns and a significant risk of longer-term food shortage.

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The extent of COVID-19 effects on rural populations varies according to the local context. However, the pandemic and its accompanying measures are clearly affecting small scale producers (including farmers, pastoralists and fisherfolk) who face market disruptions and/or reduced demand, benefit from poor services and have limited resilience. This is particularly true of households who have abandoned traditional food production and processing practices and engaged in export –oriented value chains that have collapsed. And the return of economic migrants to food insecure households and communities adds another unknown.

On the consumer side, confined people have also changed their food practices. While some have more time for preparing food and cooking at home, their purchasing (or other access) practices depend on their retailing environment, culture and social programmes. Psychological distress and anxiety may lead to seeking more comfort foods, with many of those foods being high in calories, sugar, fat and/or salt. When supermarkets are distant and are the usual way to shop for food, when people have to feed big families or organize shop for their neighbours, or when queues are long, people will tend to limit shopping outings and hoard food, choosing long shelf-life products and processed foods, with the risk of further aggravating unhealthy diets. The same is, of course, true of food deserts where fresh foods are difficult to find, as well as of social protection and food bank projects. Food hoarding, disruptions of food production and global supply chains is leading to scarcity and/or an increase in price of certain foods. This combined with employment loss will make some staple food unaffordable to poor people and will affect their diets. With the explosion of home delivery, appropriate food handling and packaging has become a major challenge.

While the health situation is, of course, dramatic and major social problems are emerging, in particular in the informal sector, this unprecedented situation is also generating an extraordinary surge of creativity and innovation to cope with, and adapt to, unexpected constraints. Promising practices are emerging everywhere. These, of course, vary widely according to the size and resources of cities, as well as local culture and lifestyles, but common threads can be found and can inform a necessary transition towards more resilient food systems and diets and more sustainable development in the post-crisis period.

The COVID-19 crisis provides an opportunity to promote and mainstream a more inclusive and food systems approach. The pandemic has exposed vulnerabilities of the current system due to its dependence on productivity-based approaches, its inherent inequalities and a lack of resilience. These weaknesses are particularly glaring as the pandemic is not a natural disaster that has affected infrastructure. Instead, it has affected the movement of global food chains due to lockdowns and restrictions and impacted livelihoods and incomes. This, in turn, is having profound socio-economic consequences such as economic recessions and unemployment with many of the effects yet to unfold.

Therefore, the wider adoption of a holistic food system approach that delivers food security and nutrition and promotes economic, social and environmental sustainability is even more urgent. The COVID-19 pandemic is currently testing the resilience of food systems and is an opportunity to reshape them so they become sustainable – healthy, inclusive and environmentally friendly – and not only productive. It is crucial that authorities and agencies responsible for governance and oversight of the multifaceted agricultural sector and food systems at national and sub-national levels collaborate to implement policy changes to reduce the length of essential supply chains and focus on ensuring food security and nutrition at all times.

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To support the solutions that are being implemented, food science and technology has a major role to play in both the emergency and post-lockdown phase, and preparedness planning. It can contribute to local food security, foster the development of new skills, generate employment – in particular for youth, women and migrants - and contribute to the local economy. Adequate storage and cooling facilities, in-place stabilisation methods, reorganization of value chains towards existing structures, revival of forgotten small-scale processing skills in combination with tested innovative technologies, are all needed to prevent losses from the farm gate throughout the food supply chain. Local processing can minimize nutrient losses, extend shelf life, add value to raw materials, facilitate access to healthy, safe, convenient and affordable foods as well as provide employment for youth and women. And relevant experience from previous or present humanitarian contexts is being harnessed to inform a coordinated and holistic response to the effects of COVID-19.

The management of the epidemic has generated in most places a major social and economic crisis that affects first and foremost the most vulnerable population groups. Massive social protection and food aid programmes are therefore being implemented worldwide, by government, civil society and private sector. There is an added pressure on existing supply chains to maintain food quality and not just food quantity as there is a need to deal with the transportation, storage, and distribution of large volumes of food in short time frames during the lockdown to avoid spoilage and contamination both locally and globally. Such interventions could also aim to promoting healthy and sustainable diets and facilitating access to locally appropriate convenient and safe foods, with specific attention to people with special needs. This will require access to appropriate packaging and the development of culturally appropriate products for specific nutrition needs, on the basis of local raw materials and manufacturing, and with adequate support to the supply chain.

A multidisciplinary and inter-institutional approach is essential to ensure that food science and technology activities remain people-centred rather than technology-driven. To support and develop effective and innovative solutions to COVID-19 related problems, industry, NGOs, the research community, consumers, humanitarian and development organisations as well as donors have to work together, and training will be needed to support actors at all levels.

There is a broad consensus that the present pandemic and its impacts reflect to a significant degree dysfunctional policies and an excessive bias towards globalization and privatization in the last decades, with a focus on productivity gains, generating a global food system that is predominantly focused on productivity gains to the detriment of inclusiveness or resilience. This is particularly the case for food processing (including factory farming, slaughterhouses and standardization) as policies in the last decades have enforced a shift from smaller structures to socially and environmentally unsustainable business models. Dealing with this crisis, therefore, offers an opportunity to reorient and rebalance policies and support local action, that brings together the health and food sector, promotes sustainable food production, ensures social justice and right to food, and overall accelerates the transition to more resilient territories and sustainable diets. It is essential to take advantage of the wake-up call given by the COVID-19 crisis, learn from the extraordinary social and economic circumstances and on-going interventions to build upon this momentum to accelerate the transition to more sustainable development. Ensuring access to safe, nutritious, good quality, affordable and culturally appropriate food in the right quantity at the right time and place during an emergency or a protracted crisis is and will remain an enormous challenge, given increasing uncertainties such as climate change, political and economic instability and expected pandemics.

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Humanitarian Food Science and Technology working group