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Food systems and COVID-19 in Latin America and the Caribbean:
The opportunity for digital transformation

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1. Editorial

The impacts of COVID-19 are growing daily. The pandemic has triggered not only a health crisis, but also an economic one. Its consequences and duration are still unknown, but we know, for example, that its impact on poverty rates and food security has no recent precedent. According to some estimates, global poverty will increase by 548 million as a result of the COVID-19. There will also be an increase in the number of food insecure people, estimated at 183 million. Poverty in our region is expected to increase by 4.4 percent, that is, an additional 30 million people.

In such a scenario – in which achieving economic, social and environmental sustainability is increasingly indispensable for the planet – the agrifood system needs urgent and innovative solutions. In this respect, digitalization is a recommendable path to follow.

Digitization has become a key driver for rural transformation, creating new opportunities for farmers. The future of agrifood systems will depend, to a large extent, on how agricultural stakeholders will be able to take advantage of the digital transformation to improve inclusiveness, efficiency and environmental impacts.

2. Key messages

- The digitalization of agriculture and food systems can have positive impacts in economic, social, environmental and institutional terms, especially in the post-pandemic recovery process.
- Currently, the adoption of digital technologies among small producers is low, so they may be excluded during the post-pandemic recovery process.
- The lack of specific public policies, low e-literacy, poor connectivity, lack of advice or actionable services, and low capacity are some of the factors hindering the transition.
- However, the pandemic has accelerated the digitalization processes, with *e-commerce* being the most visible.
- The digital transformation of the agrifood sector should take an inclusive, efficient and sustainable approach. This approach requires significant action by governments to establish enabling policy frameworks and incentives.
- Governments' efforts to achieve a digital transformation of the agrifood sector should focus on infrastructure and connectivity, accessibility, the level of education and institutional support, designing services for the unconnected.
- A general framework of incentives that could be used by governments could include (i) smart demand and supply subsidies; (ii) support for incubators, accelerators, innovation clusters; and (iii) better access to appropriate financial products (angel investors, venture capital, debt, equity, quasi-equity, crowdfunding) for new enterprises, micro, small and medium-sized enterprises (MSMEs) and service providers.
- Digital transformation in the agrifood sector can occur at any link in the value chain. Opportunities exist at the on-farm and off-farm levels.

3. The role of technologies in food systems development

3.1. Digitalization to improve the agrifood system

Digitalization contributes to improving the efficiency and management of agrifood supply chains, and to bridging the urban-rural division by increasing public awareness and participation (World Bank, 2019). Hence, the application of specific digital technologies can have a significant impact on the productivity of crops, livestock, forestry, fisheries and aquaculture, improving farmers' incomes and welfare.

Digitalization benefits all actors in agrifood systems, as its implementation can help reduce crop losses, decrease herd deaths, improve yields, manage risks, optimize product storage, avoid food spoilage, and maximize profits. The use of technology throughout the value chain translates into tangible improvements in food security, being especially relevant in the most vulnerable populations (USAID, 2018); for example, it helps to reduce production losses, due to better risk management, or to allow better farm product marketing.

The use of digital technology, at the farm level, helps farmers make evidence-based decisions and alerts. Data on soil, climate, irrigation, markets, diseases and pests, as well as the availability of private loans or government subsidies, form part of the information available for decision-making at the on-farm level. Decision-makers will have real-time (or near real-time) information on market prices, projected end-of-season yields, the number of beneficiaries of government programmes and subsidies, the effectiveness of preventive actions to protect against diseases and pests or of disaster mitigation measures (FAO and ITU, 2019). Traders and wholesalers should also have a better understanding of the quantity of products available and plan appropriate activities to improve prices and product quality based on the available evidence. Banks, insurance and other financial institutions will also be able to better design their products, customizing them for rural communities. Finally, consumers will benefit from traceability, food safety, quality and price of food products.

In short, digitalization is an important advance for the agrifood system. It is also a particularly relevant advance in times of pandemic, when decisions need to be taken that will allow the process of recovery and adaptation to a new scenario to begin quickly. In other words, data analysis and management will make it possible to take more informed decisions about the changes or corrections that need to be made in the private sector, or the most appropriate way to focus measures and policies in the public sector.

Figure 1/ The role of digitalization in agriculture

Source: FAO, based on FAO-ITU (2016).

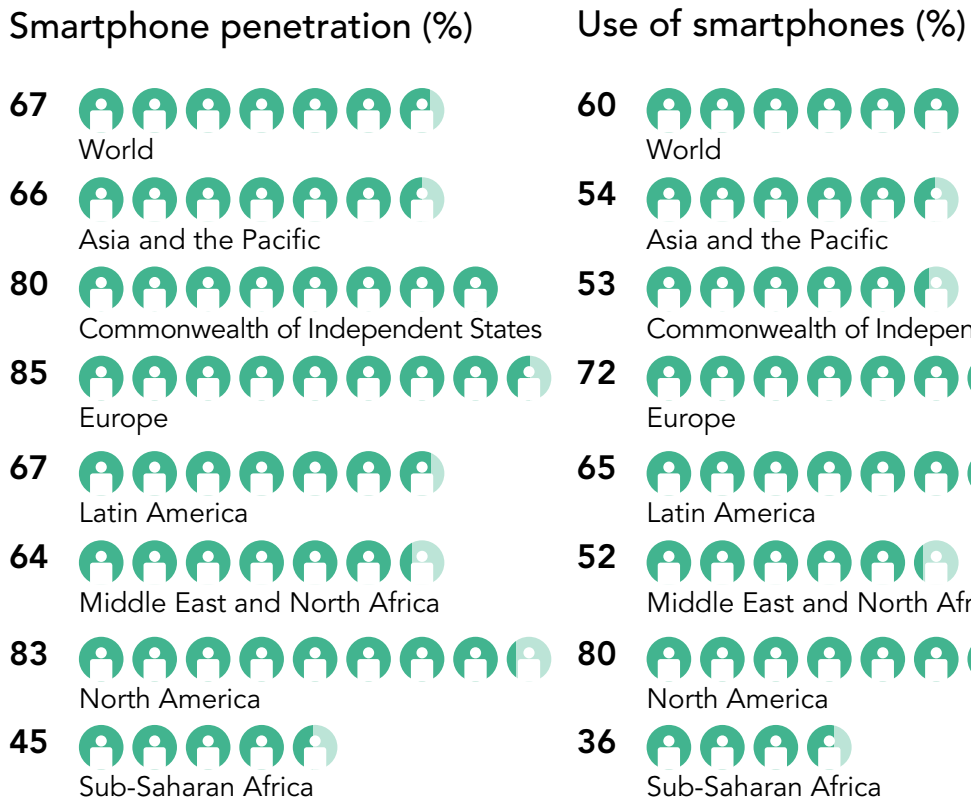
The post-pandemic world will require technology and information systems to become even more efficient and accessible, namely, digital services will have to be targeted at vulnerable groups (such as women, youth, indigenous people and those living in more isolated rural areas); the required digital skills will also have to be strengthened to reap the full benefits of these technologies.

3.2. Challenges in the digital transformation

Digital transformation can be defined as the migration of companies and societies to a stage in which digital technologies become the backbone of their products and services, giving rise to the development of new forms of operation and new business models. It has also been called the Fourth Industrial Revolution (Oliver, 2020). However, certain basic conditions must be met for the use of digital technologies and, therefore, for the digital transformation of the agrifood sector. These include changes in infrastructure and connectivity – mobile subscriptions, network coverage, Internet access and electricity supply –, accessibility, education level – literacy, Information and Communication Technology (ICT) education –, as well as changes at institutional support levels (FAO, 2019a).

The mobile ecosystem[1] in Latin America and the Caribbean is conducive to the development of digital services. The region has a unique mobile subscriber base, more than 416 million, of which 78 percent (326 million) have access to the mobile Internet. It is projected that by 2025, 90 percent of mobile subscribers will be mobile Internet users (GSMA, 2019a).

Figure 2/ Smartphone penetration and use (%) by region, 2018



Source: (GSMA, 2019b)

In the region, 66 percent of women use mobile Internet, a rate higher than the global average of 48 percent. Thus, the gender gap in mobile internet use is only 2 percent, well below the global 23 percent (GSMA, 2019c).

In rural areas, however, the reality is different. To begin with, network coverage is still limited. While globally 90 percent of people have access to the Internet (through the third-generation network – 3G – or higher quality), only one third of rural populations in the Least Developed Countries (LDCs) enjoy similar coverage (GSMA, 2019b).

[1] Business model through which mobile devices coexist with an interdependent series of applications, services, accessories and software.

On the other hand, in emerging economies and rural areas, poor technological infrastructure, high technology costs, low levels of e-literacy and digital skills, and limited access to services are a significant barrier to the use of digital technologies (FAO, 2019a). Today, with new demands due to COVID-19, this gap between rural and urban areas is even more evident.

To achieve an inclusive digital transformation requires all parties to do their best. In the region, the Digital Agenda for Latin America and the Caribbean (eLAC, 2020) was drawn up to catalyse regional cooperation on digital issues. This agenda provides focused technical assistance on inclusion, digitalization of production, skills development in the population; it establishes a framework for the promotion of open government and governance that stimulates collaboration among countries.

However, the development of public e-services has been particularly slow in the agricultural and rural sector, and there are still few countries providing e-farming services. It should be noted that those countries that prioritize the use of ICT in agriculture generally have an improved business environment and a better policy and regulatory framework for agribusiness. This seems to be a relevant factor in achieving the goal (FAO, 2019a).

Still, about 80 percent of "digital transformation" projects fail. Other assessments – by Forbes, McKinsey Digital, and Tony Saldanha – arrive at similar figures and all agree that companies, for one reason or another, fail to transform themselves digitally (Oliver, 2020).

There is no single path to achieve digital transformation, which does not prevent, of course, evaluating the processes of digital transformation on their merits, in terms of design and accessibility. A common mistake is to rely blindly on digital technologies, dismissing the human factor. A hybrid approach is required that combines the digital and the human, particularly in rural areas, where – at least in the early stages of implementation – people tend to distrust digital technologies.

In addition, companies and state bodies should focus on interoperability (infrastructure, platform, application, service and data) for the provision of enhanced and customised services. This requires harmonization of data collection, storage, management and retrieval.

A general incentive framework that governments could use could focus on:

- provide smart subsidies on both demand and supply;
- support incubators, accelerators, innovation groups; and
- improve access to appropriate financial products (angel investors, venture capital, debt, equity, quasi-equity, crowdfunding) for start-ups, small and medium-sized enterprises (SMEs) and service providers.

For the agrifood sector, it is essential to expand universal access to digital services, for example by developing digital skills and capabilities to foster a stronger digital ecosystem and by designing services for the unconnected.

4. On-farm digital technologies

4.1. Digital extension and agricultural advisory services

Agricultural Extension and Advisory Services (AEAS) refers to any public or private organization (farmers' organizations, private companies, etc.) that facilitates the access of farmers and other rural actors to knowledge, information and technologies, enabling interaction with other actors and helping them to develop their own organizational and management skills, practices and techniques in order to improve their livelihoods and well-being (Christoplos, 2010).

The AEAS system is quite pluralistic. It includes a diverse network of actors, often present in communities: formal and informal; public extension agents, advisors and private companies; producer and community organizations, and Non-Governmental Organizations (NGOs).

One trend in AEAS is the use of emerging digital technologies and tools, which enable more efficient communication between people and organizations. These include a wide range of digital services, tools and technologies, which are used according to local needs and capabilities: from simple message services (SMS) and radios, to drones and artificial intelligence. The "state of the art" technology is generally used by private actors and agritech companies; public extension systems and advisory services, on the other hand, usually use tools – based on ICTs – to facilitate communication between producers and advisors.

Agricultural extension and advisory services can improve the agricultural sector's access to digital innovations – through both established and emerging technologies – benefiting family farming, especially its most vulnerable sectors. digitalization, in turn, can facilitate inclusion by providing vulnerable groups, such as youth and women, with the possibility of becoming important actors in the digital transformation or new rural entrepreneurs.

Finally, AEAS can contribute to minimizing the impact of COVID-19 through the following areas of action (FAO, 2020d):

- **Raising awareness of COVID-19 in rural areas:** to help reduce the spread of the virus and to ensure that rural producers are adequately supported in terms of production, protection and compliance with new standards.
- **Assessing the situation in the field and advocating for solutions to farmers' needs:** this will allow governments to be kept informed and thus provide personalized services that enable rapid and appropriate decision-making to ensure health and food supply.
- **Ensuring continued support to rural producers in a situation of physical distancing:** AEAS can provide reliable sources of contacts and critical elements to ensure food production and improved access to inputs, seeds, transport and finance during the pandemic.
- **Building partnerships to overcome market disruptions and ensure supply chain functioning:** agricultural extension and advisory services can improve farmers' access to e-commerce, facilitating the promotion of short value chains and local production.
- **Helping to address emerging social problems:** by facilitating access to social protection services through the development of social safety nets, consultancy on alternative income generation opportunities, and local conflict resolution.

In this context, AEAS are in a unique position to promote increased production and quality of agricultural products, as well as to assess the situation in the field, raise awareness among farmers, and inform governments during and after the pandemic.

We believe that the success factors for ensuring digital extension services are:

- **Coordination of actions among AEAS actors:** the COVID-19 crisis requires the timely and concentrated provision of a wide range of services, which will be easier to achieve if there is a close collaboration between public, private, NGO, and community actors with health organizations. In practice, this can mean anything from using online platforms to WhatsApp groups, even call centres.

- **Digitalization:** response measures to the novel coronavirus have opened up opportunities for innovation in farmer support. Thus, digital tools and technologies have been used to facilitate and complement face-to-face extension and advisory services.

- **Community contacts:** such as cooperatives, producer organizations, community and farmer leaders, self-help and religious groups, are crucial to ensure timely and widespread information and advice when measures limiting mobility are implemented.

- **Online platforms and virtual communities:** these provide a timely space to facilitate links with other ongoing mechanisms, such as social protection, insurance schemes, self-help and community savings groups, and cross-sectoral partnership, in pursuit of a common goal.

- **Safety and welfare of extension service providers:** in the midst of this health crisis, it is essential to train front-line providers in prevention measures, use of ICTs, conflict management, and effective communication, given that their work involves high levels of stress.

- **Going local:** disruptions in the lack of markets and inputs, increased food loss, limited labour force and logistics, require locally appropriate and innovative solutions to address local challenges. In this scenario, AEAS provide locally appropriate advice and services, enable the promotion of locally available products and training for food production.

- **Inclusion v/s exclusion:** while digital tools and technologies provide an opportunity to close the gap with the most vulnerable, access to such digital services is not automatic and the risk of exclusion of poor and disadvantaged rural groups is high. Local AEAS providers can play a key role in helping rural producers' access and interpret the services and information provided through digital tools and technologies.

- **Co-creation of innovation:** two-way dialogue and co-creation of innovation through digital tools and communication technologies is key to a sustainable transformation of the agrifood system that is resistant to future crises. Therefore, it is urgent to involve rural producers to shape an enabling environment and to integrate local and indigenous knowledge into innovation processes.

- **Empowerment of rural producers:** when technology is used by capable and empowered people, including youth and women, it can have a profound impact on social, economic, institutional, organizational and policy processes, and thus on the lives of family farmers. Hence the importance of investing in the development of an appropriate skill set, capacity building and digital literacy of rural producers with a view to expanding the positive impact of digitalization.

- Public-private partnership: the partnership with the private sector must be strengthened to:

    - ensure adequate infrastructure;

    - improve access to digital services for small farmers and the rural poor; and

    - create an enabling environment.

However, technical training requires robust policies to enable the development of AEAS, particularly among small-scale farmers. In Brazil, for example, 80 percent of the largest farms (more than 10 000 hectares) reported having received technological training. In contrast, 6 percent of the smallest establishments (less than one hectare) reported the same (Census, 2017).

4.2. Online business management tools and services

The business world has been revolutionized by the use of online management tools and services. Despite the advantages in profitability and efficiency, the adoption of these tools by developing countries has been slow, and especially slow for rural agriculture. Notwithstanding the above, the adaptation of tools for land/farm management represents an opportunity for a qualitative leap in terms of performance and efficiency in the use of resources.

There is a great battery of online tools and services to help with business management. Farm management software is very useful, as it not only helps with account and cash flow management, but also with regulatory compliance and tax payment. Additionally, some software can help with logistics, tracking and minimizing production costs, and improving farm profitability. The price/quality ratio of such tools has improved over time, in accordance with Moore's law.[2]

The management of new digital tools requires administrative capacity and access to funding for the purchase of hardware (FAO, 2019a). In the developed world, high rates of tool use are reported in agriculture. In the United Kingdom of Great Britain and Northern Ireland, for example, in 2015, 49 percent of farms reported the use of tools for strategic decision-making, a proportion that is likely to have increased in recent years. Users value their usability, cost-effectiveness, relevance and compatibility with other systems and regulations (Rose *et al.*, 2016).

In the implementation of this type of tool, it is important that online procedures – such as digital banking, online tax payments, municipal procedures, access to state subsidies, and electronic invoicing, among others – allow for the bridging of access gaps (distance and cultural).

To ensure that no one is left behind, it is necessary to ensure that small agricultural producers, despite poor technological infrastructure, high costs of technology, low levels of e-literacy, digital skills and limited access to services, are able to access this software (FAO, 2019a).

In Chile, for example, the improvements to software reported by national companies can be seen. The larger the company, the greater the improvements it reports (INE, 2015).

There is no doubt that the challenge in the coming years will be to generate and analyse massive data. This is also the next step for the agrifood system (Lezoche *et al.* ,2020).

Figure 3/ Companies reporting software improvements by size in Chile (%), 2015