Food systems and COVID-19 in Latin America and the Caribbean
Digitalising agriculture for an inclusive transformation of rural societies

Contents

1 Editorial

The digitalisation of agrifood systems has made progress; still, it remains a pending topic in the region, especially among smaller producers and traders in rural areas. It is essential to accelerate this process; digital technologies can speed up the transformation of agrifood systems into more efficient, productive, sustainable and resilient systems, since digitalisation, among other effects, can reduce transaction costs through automation and diversify markets through e-commerce, thus opening up new and better opportunities for employment and income generation.

Accelerating the digitalisation process is not an easy task. To begin with, there is an urgent need to improve the environment in which these technologies are developed and implemented. This requires a state policy that fosters dialogue and collaboration between civil organisations and the public and private sectors, with the ultimate aim of ensuring that the benefits of digitalisation reach everyone, in particular smaller producers and traders and those living in isolated rural areas.

If measures that allow for greater equity in the distribution and use of digital technologies are not implemented, they could, paradoxically, have the opposite effect and become a source of exclusion and widening inequalities.

- Digitalisation has the potential to change the way food is produced, exchanged and consumed by automating processes, reducing costs and diversifying markets.

- Before starting the process of digitalising the agrifood sector, it is necessary to foster the pillars that support a proper digital ecosystem, namely: content development, literacy and training, infrastructure and coverage, platforms and applications ("apps") and access to devices.

- The gaps in these pillars are still large in rural areas compared to urban areas.

- If technologies are expected to be a factor of inclusion and not one of exclusion, it is essential to bridge these gaps.

- It is necessary to incorporate governance criteria to foster a political dialogue between civil society organisations and the public and private sectors to identify and reduce these gaps, especially among small producers and those living in more isolated rural areas.

- Although there are many digital platforms and applications for agrifood systems, ttwo major difficulties remain: the lack of digital literacy and the lack of connectivity.

- A higher number of professionals and skilled users is recommended to develop and use digital technologies.

- Finally, there is a need to improve road connectivity (roads, highways) and digital connectivity (access to and speed of internet) in rural areas, especially the most isolated ones.
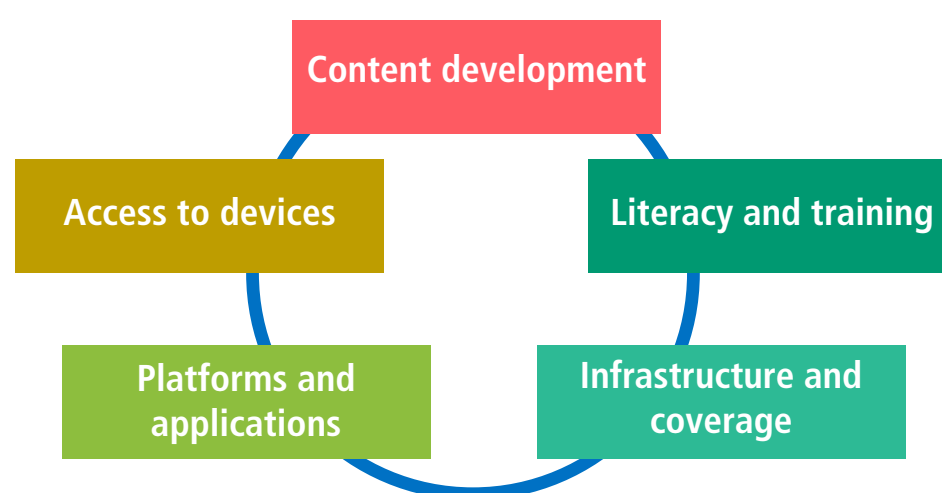
Digital technologies will play a critical role in the transformation of agrifood systems, as they are potentially capable of changing the way food is produced, exchanged and consumed, as well as fostering the efficiency, inclusiveness, productivity, sustainability and resilience, opening up new opportunities for income and employment generation in rural territories.

The benefits of digitalisation are not limited to accelerating the transformation of agrifood systems; they can also contribute to to post-pandemic economic recovery in the countries (OECD, 2021).

However, digital technologies can only become an active driver of transformation in an appropriate ecosystem. Such an environment considers at least five pillars, which, when linked together, facilitate the integration and adoption of technologies that support productive development (GSMA, 2016).

Figure 1. Pillars of a digital ecosystem for productive development.

Source: Adapted from GSMA, 2016.

Technological progress is generally driven by the private sector. Consequently, it is the responsibility of the public sector and non-profit organisations to ensure that vulnerable rural households have access to the fruits of technological progress. In particular, it would be up to them to design and implement actions to bridge the digital access, usage and availability divides.

If we do not succeed in bridging these divides, there is a risk that only a few will benefit from technological development. In such a scenario, digitalisation would be a factor of exclusion rather than inclusion.

In order to address these divides, the Food and Agriculture Organization of the United Nations (FAO) has decided to launch this year the *Aldeas Digitales* (digital villages) initiative, through which a specific support package will be made available in the area of digital innovation, according to the requests and situations of the sites. The first stage will focus on rural tourism, followed by agrifood systems.

3.1. Content development

Content development can be defined as the design of information, services or platforms that enable the exchange, collection and dissemination of data, with the aim of solving a public problem. Therefore, these contents are generally considered as public goods, as they have characteristics of low exclusion and low competition. They are usually provided by the state and publicly funded, as they potentially benefit all members of the community and free-riding makes it difficult to charge users directly for these services (FAO, 2002).

These contents are relevant to users' decision-making; in the case of agrifood systems, content development is related to weather information, early warnings to prevent disasters, markets for agricultural and livestock goods, services or government procedures and support. However, public digital provision has generally been particularly slow in the agricultural sector (FAO, 2019).

In order to achieve a digital transformation of agrifood systems, we suggest to articulate and facilitate the implementation of some of the central concepts related to content generation, such as:

- Hazard prevention, diagnosis and control: Digital technologies can be used to identify a variety of hazards to agriculture, issuing timely and personalised alerts and recommendations to reduce damage and losses among farmers.

- Forecasting, modelling and monitoring disaster risk at scale: Advances in data storage, processing and analysis create opportunities for regional risk and disaster management.

- Cloud-based platforms for policy and investment planning: Multiple data sources that are available at regional or local level can be compiled, analysed and presented on GIS-based platforms. Visualisation and use should be user-friendly for the design, implementation or intensification of agricultural development programmes or the prioritisation of public investments. An example of this is the Hand-in-Hand initiative, in which innovation and transformation of agrifood systems is based on the implementation and use of a Geospatial Platform and Data Lab for statistical innovation.

The challenge with such initiatives is that they generally tend to be funded by government agencies, multilaterals or NGOs, so that once the resources run out, the continuity of the project is lost and producers are discouraged from participating in new initiatives. It is necessary to enter into a business model that makes the digitalisation process self-sustainable (Loukos and Arathoon, 2021). Therefore, public-private partnerships become more relevant for the development of this type of technology.
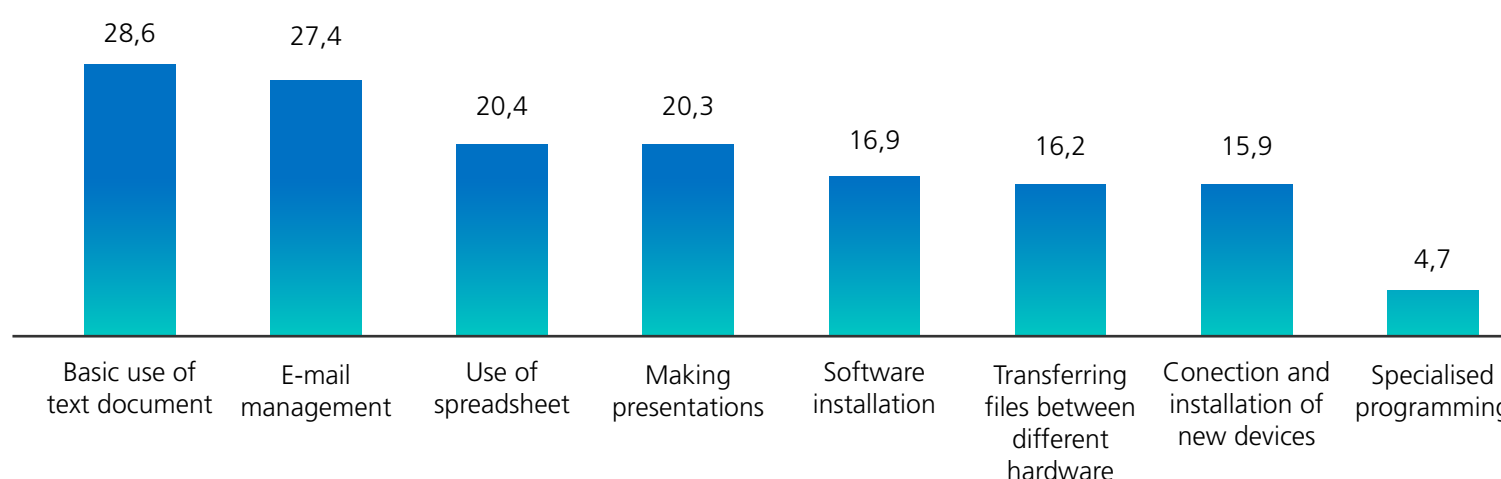
3.2. Digital literacy and training

The use of digital technologies requires basic literacy and numeracy, as well as special technical knowledge and skills (FAO, 2019), which need to be regularly updated in response to the rapid evolution of new technologies (ITU, 2018).

From a cognitive point of view, the digital user must know what to do, what can be used and for what purpose. In simple terms, in the analysis of digital literacy, it is not enough to quantify the number of people who can operate a smartphone and connect to the internet, but it is also necessary to take advantage of these technologies to solve public or private problems (Cruz and Aedo, 2021).

Literacy takes on a particularly relevant role in Latin America and the Caribbean, considering that since 2008, digitalisation has increased much faster than the supply of human capital trained in the use of digital technologies (Development Bank of Latin America (CAF), *et al.*, 2020).

Figure 2. People with ICT skills, by type of skills (%), 2019*.

*The latest available data for Jamaica and Peru are from 2017.
Source: FAO, based on ITU, 2021.

As the difficulty in using basic technologies increases, the number of people with these skills decreases (see Figure 2). In fact, just over half of people (56 percent) only know the basic functions of text document and email.

From the above, it is urgent to make progress in the availability of trained and qualified professionals to design specific software for the rural environment. To do this, it is possible to train and promote strategies that bring digitalisation closer to the countryside, especially among the new generations (OECD, 2021).

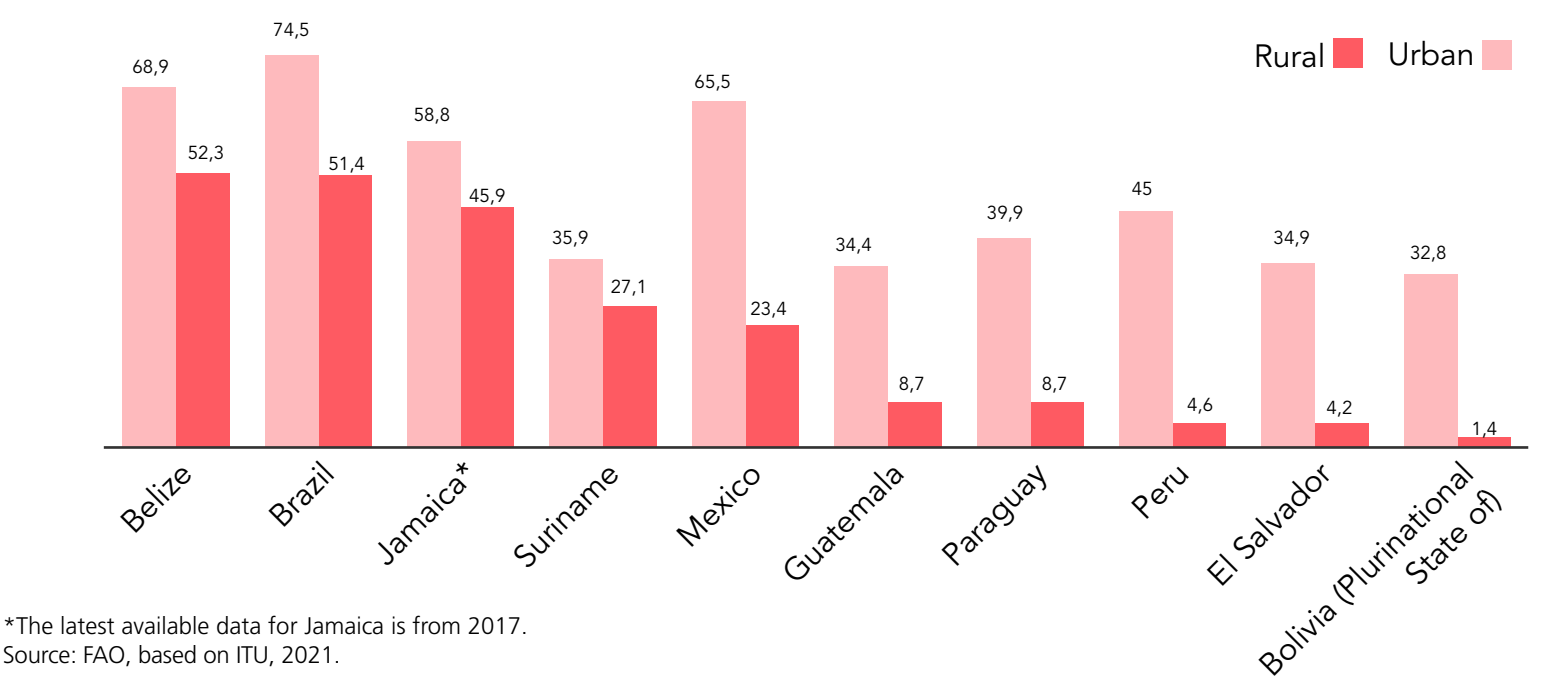## 3.3. Infrastructure expansion and coverage of digital services

The expansion of telecommunications infrastructure allows for increased use of digital technologies among people living in the most disadvantaged or hard-to-reach areas. This is not plausible without private investment and the development and improvement of policy and regulatory frameworks (IDB, 2017).

In addition to infrastructure expansion, good signal and bandwidth continuity is needed, with efficient speeds for relatively complex content and operations, and with possibilities to transfer information, images and voice messages that are suitable for advanced business management (ECLAC, 2012).

The COVID-19 pandemic has highlighted the importance of digital technologies and connectivity. The
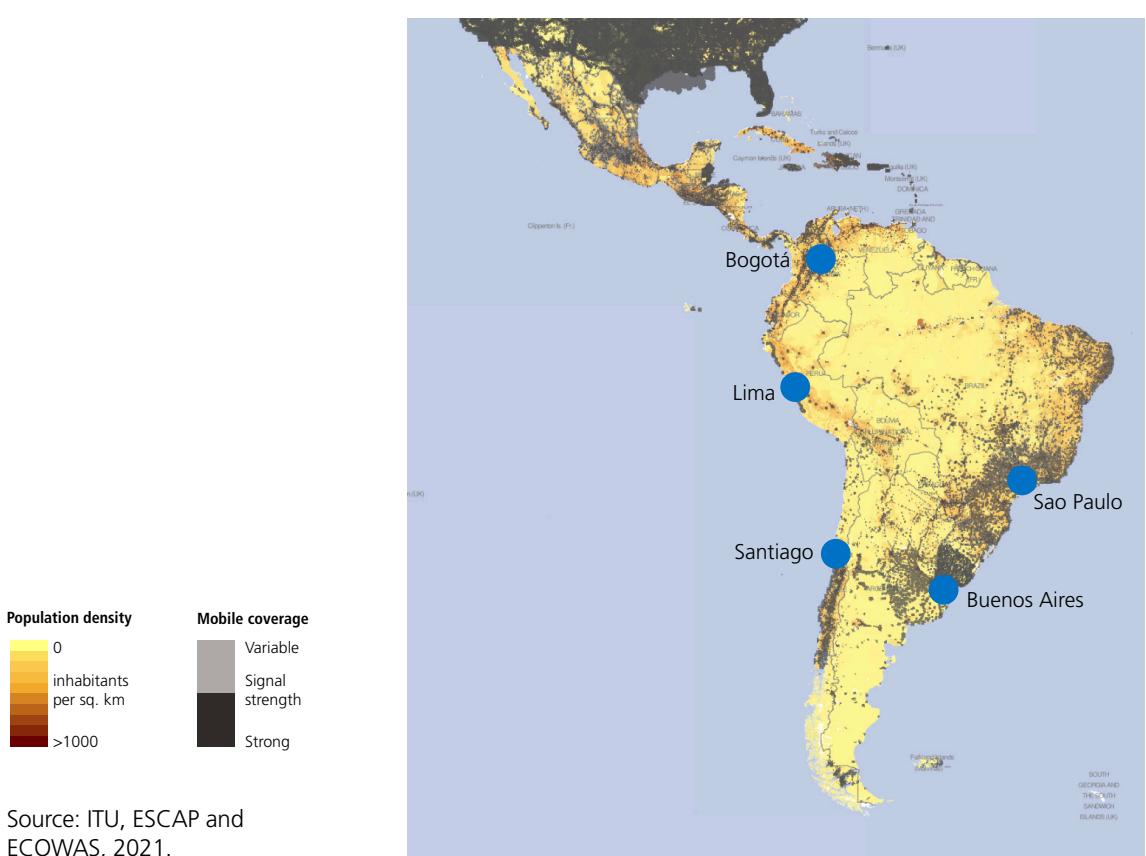
mobile industry in Latin America has seen unprecedented growth in data traffic. On average, operators reported a 25 percent increase in mobile data traffic during confinement. By the end of 2020, nearly 360 million people in the region – representing 57 percent of the population – were expected to be connected to the mobile internet. However, nearly 300 million people in the region are still unable to have access to mobile internet (GSMA, 2020).

Figure 3. Households with internet, selected countries (%), 2019.

*The latest available data for Jamaica is from 2017.
Source: FAO, based on ITU, 2021.

As shown in Figure 3, household internet availability is much lower in rural areas than in urban areas (34 percent vs. 65 percent as a weighted average), which may be due to the fact that infrastructure and coverage in rural areas is scarce (see Figure 4). However, if mobile penetration in the region is analysed, it is close to 80 percent for all countries in the sample, both in rural and urban areas (ITU, 2020).

Figure 4. Population density and mobile coverage in Latin America and the Caribbean, 2021.

Source: ITU, ESCAP and
ECOWAS, 2021.

It is the responsibility of the public sector to encourage investments that aim to bridge the gaps between rural and urban areas, especially in the most isolated places. Investment should be in terms of infrastructure (roads, highways) and internet access and speed (in rural areas). In conclusion, countries in the region must make significant efforts to lower the costs of digital distribution and logistics (OECD, 2021).

3.4. Generation of IT platforms and applications

Computer platforms are defined as integrated computer systems that run certain hardware and software modules; applications, on the other hand, refer to software developed for digital devices, usually but not exclusively those running on mobile phones (Cruz and Aedo, 2021).

Many of these platforms and applications are considered club goods, because efficiency conditions may justify charging a fee for the good. The term comes from the fact that, in most clubs, members share their benefits and non-members can be excluded (FAO, 2002).

While the supply of IT platforms and applications has grown over the last decade, they are often not designed to operate at small-scale farmers' level, which is a barrier to their use (FAO, 2019).

Paradoxically, in the context of the pandemic, digitalisation has become a key driver for rural transformation, creating new opportunities for farmers by increasing the use of different platforms and applications (FAO and ECLAC, 2020).

Within agrifood systems, the links that have benefited most from the acceleration of digitalisation during the pandemic are producers and intermediaries who market their products through e-commerce platforms. A study conducted in Brazil (Embrapa, 2020) showed an increase in direct purchases from producers, through product delivery, drive-thru or take-away. This alternative has emerged as one of the new forms of sales. The use of digital media via mobile phones has undoubtedly been a great ally of short marketing circuits for fruit and vegetables, even more so than online purchases, which have also increased.

Thus, promoting the development of different applications and platforms for the transformation of agrifood systems is recommended in the following areas:
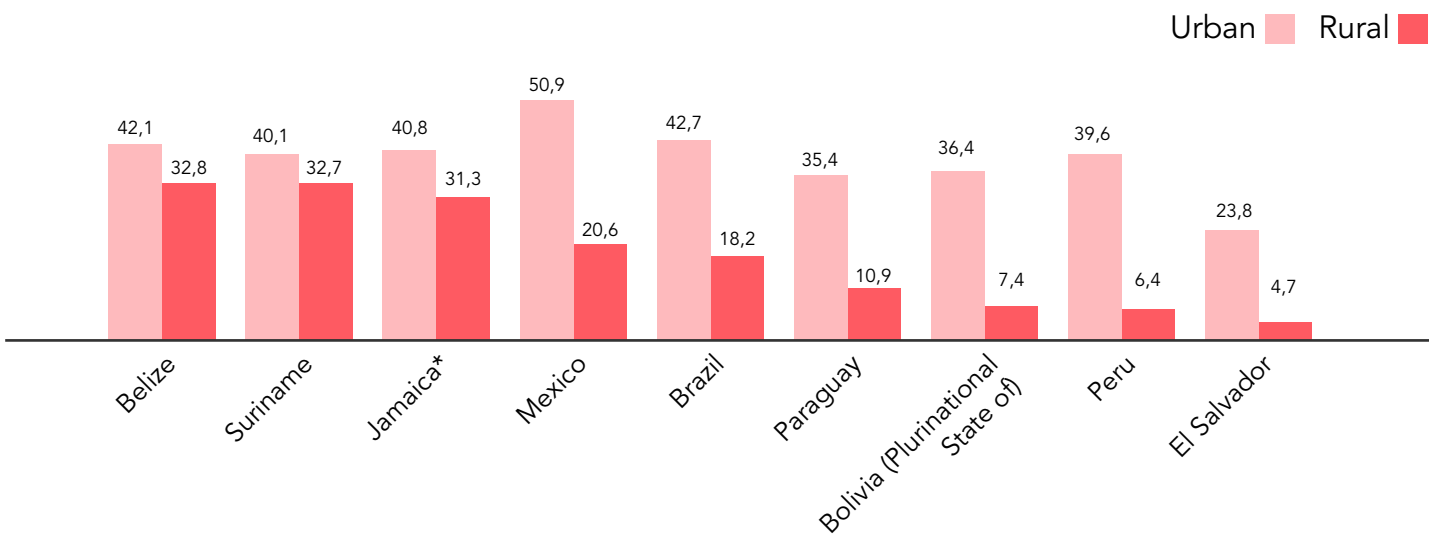
- On-farm monitoring and advisory services: There are four distinct technologies that can transform crop health monitoring and provide a range of additional field data to improve agriculture remotely and in near real-time: (a) internet of things sensors (remote sensing); (b) near-surface imagery (mobile imagery); (c) multispectral imagery (drones); and (d) satellite remote sensing.

- Digital extension services: The wide reach of mobile phones and other devices allows the delivery of highly targeted technical advice to farmers at lower cost, targeting their technical and cultural capacities and enabling two-way communication, between farmer and extensionist, and among peers.

- Access to agricultural insurance: Low-cost remote sensing improves data capture and analysis; it also makes the delivery of compensation to affected people easier.

- Digital savings, credit and transfers: "mobile money" and other peer-to-peer electronic payment mechanisms have given rise to a range of financial products targeted at unbanked and low-income customers. These mechanisms are very useful for disaster management and allow active participation in financial systems without the need for costly infrastructure and banking operations.

- Innovative sharing economy models: A broad digital ecosystem enables the emergence of decentralised or peer-to-peer platforms for rural services, such as sharing the use of agricultural machinery.

In this case, just like content development, it is necessary to implement appropriate policies to strengthen public-private partnerships in order to develop this type of technology.

3.5. Access to technological devices

The costs related to infrastructure and acquisition of digital technologies are a significant challenge in rural areas, where poverty rates are generally higher than in urban areas. Therefore, it could be assumed that smallholders are at a disadvantage in accessing certain technological devices (see Figure 5).
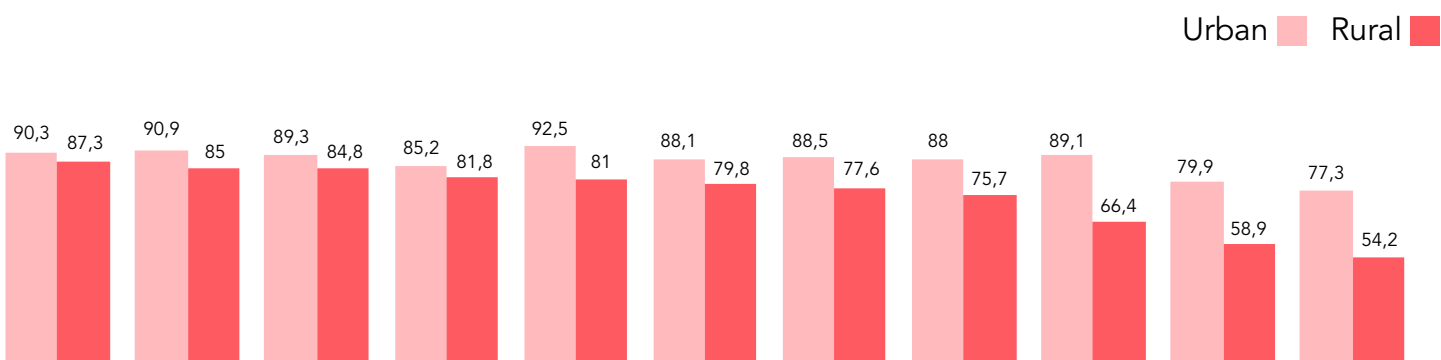
Figure 5. Rural and urban households with computers (%), 2019.

*The latest available data for Jamaica is from 2017.
Source: FAO, based on ITU, 2021.

However, when analysing the proportion of people using mobile phones in rural areas, this gap decreases considerably, possibly due to their usefulness and cost, compared to other digital devices. Phone penetration in the region is close to 80 percent.

Figure 6. Mobile phone users in rural and urban areas (%).