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Task Force 01
FIGHTING INEQUALITIES, POVERTY, AND HUNGER

Inclusive Digitalization for Sustainable Agrifood System Transformation

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Abstract

Inclusive digitalization of agrifood systems can foster equitable and efficient accessibility to digital technologies and related solutions to large segments of the population in the developing world. The latest available ITU data (2023) indicates that rural areas lag in key digitalisation indicators. Various aspects of digitalisation also include interoperability and privacy issues. The innovations in digitalization are expanding fast, necessitating G20 actions and firm hand-holding for the lagging countries to facilitate food security, adequate nutrition, and livelihoods. Inclusive digitalization to overcome the digital divide requires a multifaceted approach, with access and affordability to facilitate sustainable production. Institutionally strengthened regulatory systems and wider coverage can ensure access to inputs, including finance and market information. Strengthening the human capacity of users, including women and youth, is a key to inclusive digitalization. G20 can support policies that enhance smooth access, affordability, and adoption of emerging technologies to build up open digital data platforms to lay digital public infrastructure (DPI) to use as digital public goods (DPGs).

Diagnosis of the Issue

1.1. Context and Relevance for G20

The G20 New Delhi Leaders' Declaration is committed to promoting responsible, sustainable, and inclusive use of digital technology by farmers and an ecosystem of Agri-Tech start-ups and MSMEs. It underlined the role of digital transformation, AI, data advances, and the need to address digital divides (G20 Summit, 2023). G20, due to its substantial share of the world's population and GDP, has a unique and influential role to play in shaping the global agenda, which is the need for a more equitable and sustainable future leading to address the multifaceted challenges (G20 Brasil, 2024). FAO, World Bank, and OECD recognise that 'digital technology is part of a set of solutions to the long-standing problem of food shortage (Lajoie, *et al.,*2020). Digital innovations can contribute to more sustainable and resilient agricultural systems and can enable increased productivity, reduced environmental footprints, and higher resilience of farms (Finger, 2023). Such interventions can improve capacities of the LICs (Low-income countries) and LMICs (Lower-middle-income countries) to overcome the structural barriers to leverage digital transformation opportunities and thus enhance sustainable growth in agriculture.

In this context, G20 needs to promote inclusive and sustainable digital public infrastructure (DPI) and Digital Public Goods (DPGs) to transform agrifood systems. These include endorsing emerging technologies and innovations and supporting countries that are in need of catching up with digitalization. The application of Digital Agriculture (DA) provides agrifood producers with accurate and real-time observations regarding different features influencing their productivity, such as plant health, soil quality, weather conditions, and pest and disease burden. Such interventions can increase yields, improve

efficiency, reduce costs, and help better manage resources (Abiri, 2023). Moreover, these interventions can lead to an increase in farm production, better supply chains and logistics management, optimised use of scarce natural resources (notably agricultural water), and also better adoption of digital agriculture leading to high-value agricultural production (Bahn, 2021).

1.2. Challenges

Challenges of climate change causing frequent extreme weather events, along with conflicts and supply chain disruptions, necessitate the transformation of agrifood systems to ensure global food security and nutrition for all. These include challenges to retain and generate sustainable livelihoods and income opportunities for all, including vulnerable groups such as small and marginal farmers, women, youth, and indigenous communities.

However, many developing countries, including Least Developed Countries (LDCs), are facing the severe challenge of lack of access to emerging technologies and innovations. Inadequate investments[1] in digital public infrastructure (DPI) and digital public goods (DPGs) are also restraining these countries from catching up with such improvements. FAO (2023) also underlines innovations in digital technologies risk increasing the digital divide across socioeconomic groups (e.g., income, gender, and age), geographies (e.g., rural and urban populations). In the literature, several studies related to

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[1] As per an UNCTAD study, achieving a digital transformation for the 48 developing economies is projected to cost \$5.6 trillion annually from 2023 to 2030, which is equal to 18% of their combined GDP. The current government spending trajectory leaves a yearly gap of \$469 billion for these economies. Bridging this gap would require a 9.1% increase in yearly spending on digitalisation (https://unctad.org/sdg-costing/digitalization).

digitalisation indicate barriers like weak technological infrastructure, high costs of technology (up-front investment and recurring maintenance expenses), low levels of e-literacy and digital skills, especially among women, youth, and rural populations, weak regulatory framework, and limited access to services, technological risks and high operator skill requirements, etc (Trendov, 2019., Griffin, 2022 & Hassoun, 2022). Data ownership and management, privacy, and cybersecurity are some other challenges impeding the adoption of digital technologies (FAO, 2023). Therefore, these countries not only need to acquire digital technologies but ensure that adoption of these technologies does not lead to digital divides.

Recommendations

2.1. Inclusive Digitalization for Agrifood Systems Transformation

It has been empirically argued in several studies that the better adoption of technologies and ICT solutions has a significant impact on the transformation of agrifood systems. These can help to address climate change and emerging challenges faced that could otherwise impede production and thus stress food security. Therefore, the promotion of inclusive digitalisation and technological innovations is essential for the transition to ensure higher farm productivity and sustainable livelihoods. Such favourable interventions can thus help attain SDG2 on zero hunger and achieve other SDGs.

It is a fact that the high degree of digital divide in agriculture is manifested by inadequate access and lack of affordability to basic mobile phones and internet connectivity. It is compounded by inaccessivity to emerging technologies due to lack of diffusion, lack of affordability, and complexity of adoption by various stakeholders, in particular, vulnerable groups, including smallholder farmers, women, youth, and indigenous communities. A study by the World Bank (2021) showed that the digital divide in agriculture across the countries is substantial as measured by the digitalisation index comprising parameters like availability, affordability, and enabling environment. Such a high-degree of digital divide across the regions in the world and between rural and urban areas within regions is clearly visible, indicating inadequate access and lack of affordability compounded by lower-quality internet connectivity. The latest data by the International Telecommunication Union (2023) depicts (Figures 1 and 2) internet users by income groups as well as by regions.
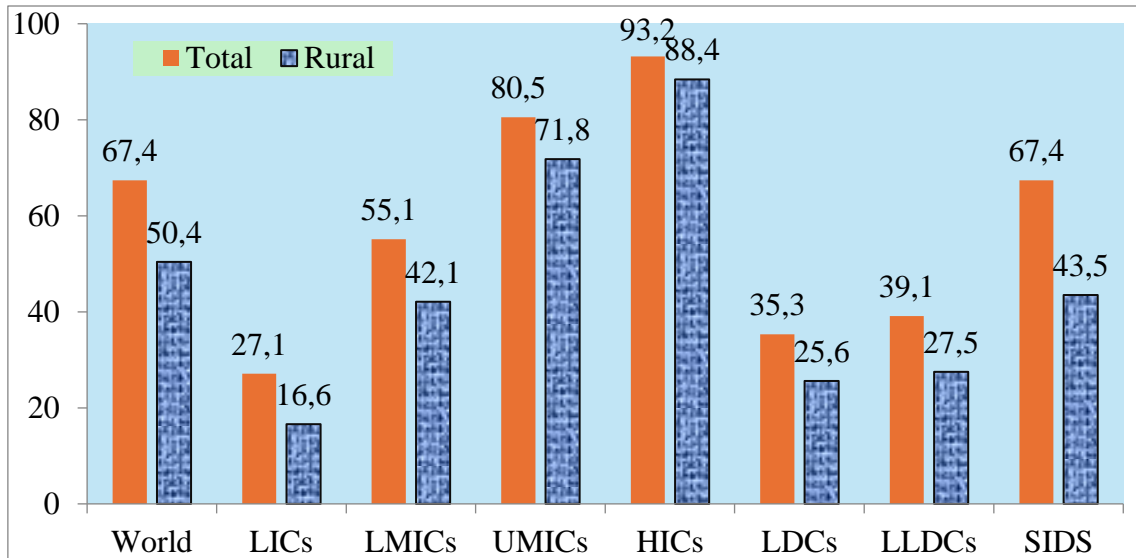
FIGURE 01. Individuals Using Internet across Income Groups, 2023 (in %)

Notes: LICs (Low-income), LMICs (Lower-middle-income), UMIC (Upper-middle-income), HIC (High-income countries), LDCs (Least developed countries), LLDCs (Land Locked Developing countries) SIDS (Small Island Developing States).

Source: ITU World Telecommunication/ICT Indicators database, *for Facts and Figures 2023 (version November 2023).*
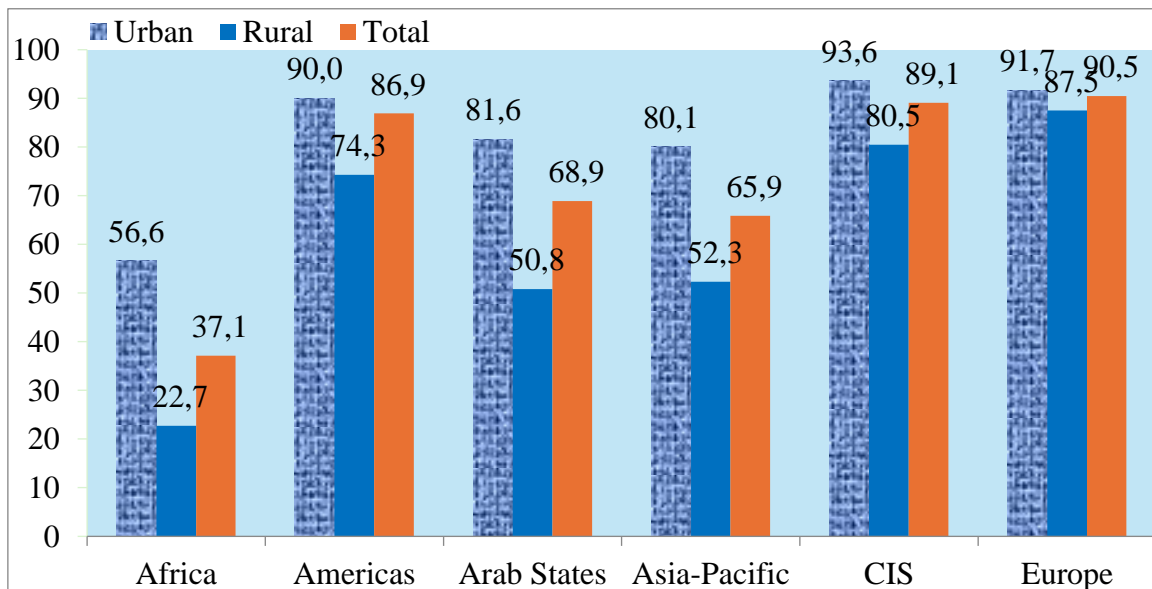

FIGURE 2. Region-wise percentage of individuals using the Internet in 2023

Source: ITU World Telecommunication/ICT Indicators database, *for Facts and Figures 2023 (version November 2023).*

It is further found that (Table 1) internet users are considerably lower for LDCs and LLDCs. Furthermore, the population covered by at least a 3G mobile network (%) in rural areas for these regions, including Small Island Developing States (SIDS), is also lower than the related rural global average (88.8%). From this data, it is evident that the digital divide across the regions of the world is sharp due to inadequate spatial and population coverage by mobile and internet connectivity. The divergence between rural and urban areas within the regions, including high-income and upper-middle-income regions, is also visible and reflects a high digital divide. In this context, the promotion of digitalization in agrifood systems inclusively and sustainably, which extends across access to basic mobile connectivity to emerging technologies like robots, can help in the transformation of agrifood systems.

TABLE 1: Individuals Using the Internet, By Urban/Rural Area

Sl. No.	Regions/ Countries	Individuals Using the Internet (%)						Population covered by at least a 3G mobile network (%)			
		Total		Urban		Rural		Total		Rural	
		2020	2023	2020	2023	2020	2023	2020	2023	2020	2023
	World	*59.3*	*67.4*	*74.3*	*81.2*	*42.6*	*50.4*	*93.0*	*95.0*	*84.7*	*88.8*
1.	High-income	90.7	93.2	92.5	94.9	86.2	88.4	99.6	99.7	97.9	98.1
2.	Upper-middle-income	71.0	80.5	77.3	84.8	62.8	71.8	97.1	98.6	91.6	95.5
3.	Low-income	18.8	27.1	35.7	47.0	10.2	16.6	70.2	77.8	55.4	66.2
4.	Lower-middle-income	45.2	55.1	63.7	73.3	32.6	42.1	91.8	94.2	86.6	90.4
5.	Least Developed Countries (LDCs)	26.9	35.3	44.8	54.8	18.2	25.6	76.2	82.0	67.5	72.1
6.	Land Locked Developing Countries (LLDCs)	29.9	39.1	53.7	64.3	19.5	27.5	74.1	81.6	64.4	73.1
7.	Small Island Developing States (SIDS)	61.3	67.4	77.4	83.5	37.9	43.5	80.6	85.3	53.0	61.6

Source**:** ITU World Telecommunication/ICT Indicators database, *for Facts and Figures 2023 (version November 2023).*

1. G20 collaboration to promote inclusive digitalization to bridge and sustain the digital divide across countries for enhancing food security, adequate nutrition, and livelihoods

Inadequate digital public infrastructure (DPI) and digital public goods (DPGs), slower diffusion of innovations and technologies with a high degree of digital divide, etc., contribute toward food insecurity and undernutrition. In this context, G20 needs to promote initiatives to address the digital divide to ensure the transformation of agrifood systems. It also necessitates enhancing both public and private sector investments, including by multilateral organizations, such as Multilateral Development Banks (MDBs)

that need to expand their funding mechanism and budgetary allocations to improve digital coverage in low-income, Least Developed Countries (LDCs) and Land Locked Developing Countries (LLDCs). These are the countries that lag behind in access to basic mobile and internet connectivity. Further, the adoption and participation of vulnerable groups need to be enhanced by providing capacity-building and advisory services. These are critical for the use of technologies for improved risk mitigation strategies to have a substantial impact on agrifood systems transformation.

2. G20 to evolve a roadmap for institutional transformation and regulatory mechanisms to facilitate inclusive digitalization of agrifood systems in developing countries

The failure to use adaptable tools, lack of affordability, lack of digital literacy, and low participation of women and smallholder farmers due to their low income and education status are the main barriers to digitalization in agriculture (Kudama, 2021). Improved digital ecosystems require an enabling environment such as policies, rational regulatory mechanisms, and adequate budgetary allocations. Such interventions can improve accessibility to technologies, and better adoption can help bridge digital-divide[2] and empower farmers through the active participation of all stakeholders. In particular, the

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[2] Worldwide, 2.7 billion people do not have access to the Internet, and fixed or mobile broadband services are too expensive for the average consumer in most low-income countries. Moreover, in LMICs, women are 16 percent less likely to utilize mobile Internet compared to men, while adults residing in rural areas are 33 percent less likely to use mobile Internet than their urban counterparts (Source from citation No.8, from FAO 2023).

participation toward enhancing access to technologies and its adoption can increase potential impact on various aspects of agrifood systems. Such an inclusive approach can not only unlock the potential of scalability of digital technologies but also allow for spatial flexibility in real-time dissemination of information, thereby bringing benefits across the stakeholders including vulnerable groups.

In this background, G20 needs to develop a framework to improve the regulatory mechanism and to enhance investments in financial and other resources to increase accessibility and affordability of digital technologies, leading to better adoption by the countries and across all stakeholders. This will have a substantial impact on the agrifood systems, including an increase in farm production and protection of livelihoods, besides ensuring food and nutritional security, etc. On these aspects, sharing of the best practices through G20 initiatives, like the establishment of an e-platform, can also have a significant impact on such countries to improve their capabilities for the adoption of technologies and promoting innovation in agrifood systems, etc.

3. G20 initiative to set up a digital platform on agrifood systems for promoting open access to digital public goods and digital public infrastructure, facilitating informed decisions

The G20 India presidency in the New Delhi Leaders' Declaration recognized that safe, secure, trusted, accountable, and inclusive digital public infrastructure, respectful of human rights, personal data, privacy, and intellectual property rights, can foster resilience and enable service delivery and innovation (para 56). It welcomed the G20 Framework for Systems of DPI and India's plan to build and maintain a Global Digital Public Infrastructure Repository (GDPIR), as well as the Indian Presidency's proposal of the One Future Alliance (OFA), a voluntary initiative aimed to build capacity and provide

technical assistance and adequate funding support for implementing DPI in LMICs. The G20 leadership also emphasized the establishment of a digital economy that is enabling, inclusive, open, fair, and non-discriminatory for all countries and stakeholders while also adhering to relevant legal frameworks (para 57).

Earlier in June 2023, the G20 Deccan High Level Principles on Food Security and Nutrition, endorsed by the G20 Agricultural Ministers, had also emphasised on accelerating innovation and the use of digital technology and scaling up responsible public and private investments in agriculture.

In fact, technology as a macro determinant of growth beacons a path for agrifood systems, especially as the land supply is becoming inelastic, except in some Sub-Saharan countries, and the rising demand for non-human consumption of food grains for livestock as well as ethanol being equally critical; also needs to be met. In the short-term, adequacy of global food grain supply to Low Income Food Deficit Countries (LIFDCs) can be focused, but in the long-term spurred on digitalisation, these agrifood systems in these countries need to be strengthened to overcome recurrent food shortages. Towards it, a menu approach of viable and potential emerging technologies needs to be made available to these countries so that they can select options in order to meet the specific felt needs.

Scenarios of Outcomes

Scenario 1: Pessimistic

Inadequate access and lack of affordability may aggravate the digital divide, which would be deeper in rural areas due to inadequate DPI. In this scenario, LDCs, due to low investment in digital infrastructure, capacity building, and training, may have an even lower percentage of users than at present due to rising population, lack of affordability, etc. Moreover, the lack of digital technologies in agrifood systems may lead to low access to information, markets (both for inputs and outputs), and financial tools available in the present context, impeding the livelihoods of farmers, especially the vulnerable groups. In this scenario, access to the Internet may even decrease from the current levels, and graduation from 3G services may remain insignificant. It will lead to the widening of the digital divide, thus reversing progress made since the commencement of the SDG era.

Scenario 2: Business-As-Usual (BAU)

Under this scenario, the growth trends since the start of the SDG era till the pandemic may be achieved again. Accordingly, the percentage of internet users may increase from 67.4 percent in 2023 to 75 percent in 2025, indicating a little faster growth compared to the 2020-2023 period. Similarly, coverage of population by at least 3G networks may increase from 95 percent to 97 percent. It is further expected that out of it, at least 95 percent would be under 4G or a speedier network.

Scenario 3: Optimistic

Under this scenario, it is expected that the G20 push given by digitalisation would be able to take this endeavour to a higher digitalization trajectory. Accordingly, the

percentage of internet users may increase to over 75 percent in 2025. Similarly, coverage of population by at least 3G networks may increase to over 97 percent, of which over 95 percent would be under 4G or a speedier network. Notably, in this scenario, the G20 big push to digitalisation in agrifood systems is expected to be holistic and not limited to the two preceding parameters. For this, all-around investments in resources, including financial, human capacities, and technological innovations, are expected to fructify. This would also necessitate awareness campaigns for better coverage in the spirit of SDG10 for the countries that are lagging behind, as well as such regions within countries across the globe.

To sum up, the commitment and support of G20 to the preceding digital interventions across the entire supply chains and regions would improve efficiency in both production and distribution networks, leading to increased access to inputs, with better use of resources leading to a reduction of costs in cultivation besides improved access to food items. Better dissemination of market information can help farmers to get remunerative prices for their agricultural produce. In totality, inclusive digitalisation can help to avert existential threats and thus lead to better well-being of people across the globe.

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