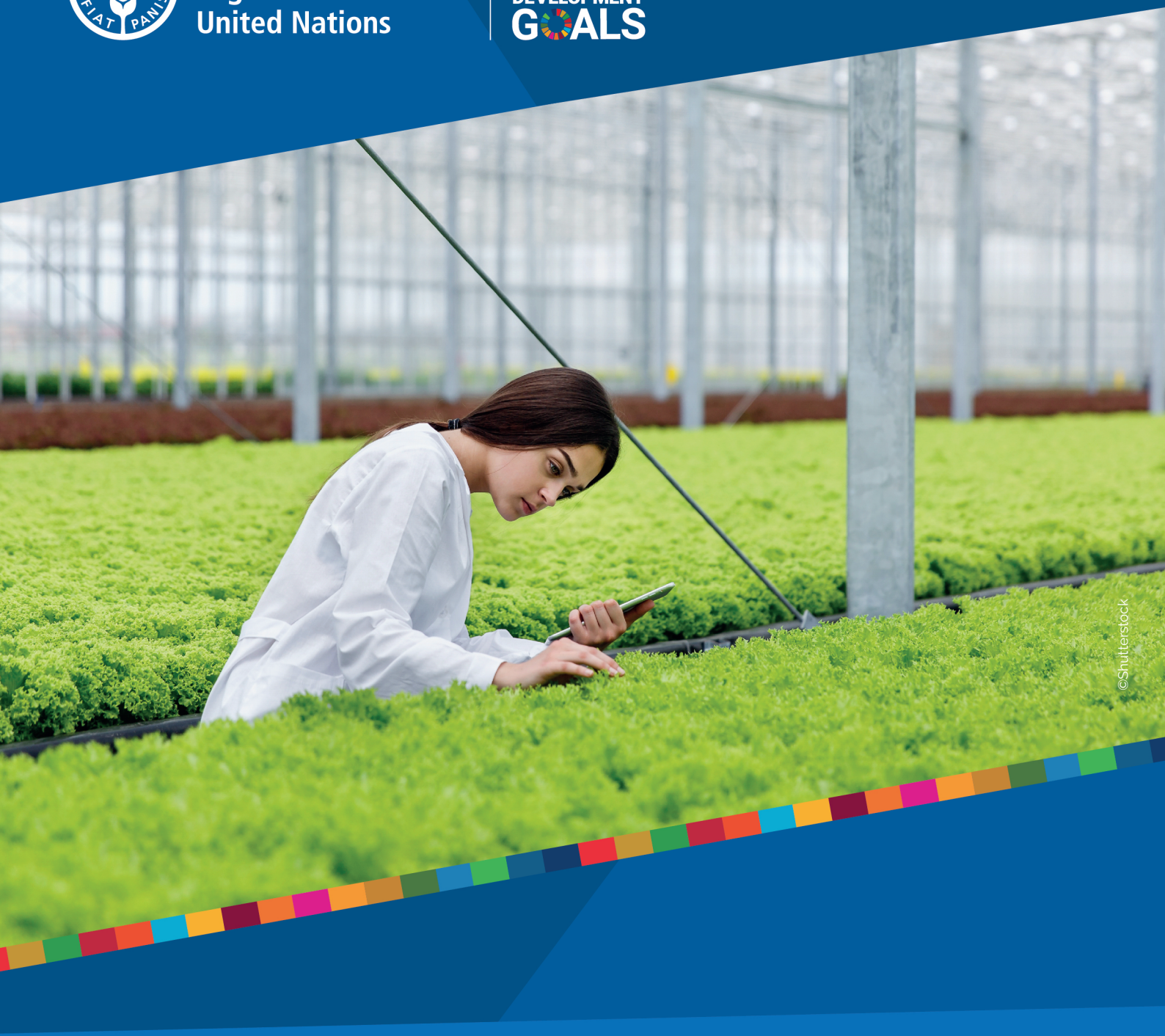
Food and Agriculture Organization of the United Nations

SUSTAINABLE DEVELOPMENT GOALS



©Shutterstock

DIGITAL INNOVATION FOR

PROMOTING DECENT RURAL EMPLOYMENT IN AGRICULTURE FOR YOUTH AND WOMEN IN THE NEAR EAST AND NORTH AFRICA

DIGITAL INNOVATION FOR

PROMOTING DECENT RURAL EMPLOYMENT IN AGRICULTURE FOR YOUTH AND WOMEN IN THE NEAR EAST AND NORTH AFRICA

Food and Agriculture Organization of the United Nations
Cairo, 2023

Required citation:
FAO. 2023. Digital innovation for promoting decent rural employment in agriculture for youth and women in the Near East and North Africa. Cairo. https://doi.org/10.4060/cc6312en

Cover photograph: ©Shutterstock

Contents

Acknowledgements

This paper was written by Dalia Abulfotuh and Rima Al-Azar for FAO's Regional Office for the Near East and North Africa under the Regional Priority on Rural Transformation and Inclusive Value Chains.

The authors wish to thank the following FAO staff for their feedback and comments: Anna Befus, Clara Park, Francesa Borgia, Francesca Dalla Valle, Huda Alsahi and Valentina Franchi.

Furthermore, the paper benefitted from inputs from Fatma Yassin Aglan, Agricultural Specialist, and Jean-Louis Racine, Senior Private Sector Specialist, Finance, Competitiveness & Innovation, both with the World Bank.

Finally, the authors would like to thank Jean Marc Faures, Regional Programme Leader, and Faten Adada, Agriculture and Rural Development expert, both at FAO's Regional Office for the Near East and North Africa, and Angham Abdelmageed, FAORNE Senior Graphic Designer.

Abbreviations and acronyms

CGIAR	Consultative Group for International Agricultural Research
CIHEAM	Centre international de hautes études agronomiques méditerranéennes
CSAYN	Climate Smart Agriculture Youth Network
ESCWA	United Nations Economic and Social Commission for West Asia
EU	European Union
EYE	Employment for Youth in Egypt
FAO	Food and Agriculture Organization
GCC	Gulf Cooperation Council
GDP	gross domestic product
GIZ	Gesellschaft für Internationale Zusammenarbeit
GPS	global positioning system
GSMA	Global System for Mobile Communications Association
HR	human resources
ICARDA	International Centre for Agricultural Research in Dry Areas
ICT	information communication technology
IFC	International Finance Corporation
IFI	International Financial Institution
ILO	International Labour Organisation
IoT	internet of things
ITU	International Telecommunication Union
LARI	Lebanese Agricultural Research Institute
Mbps	megabyte per second
MHz	megaherz
MIP	Mediterranean Innovation Partnership

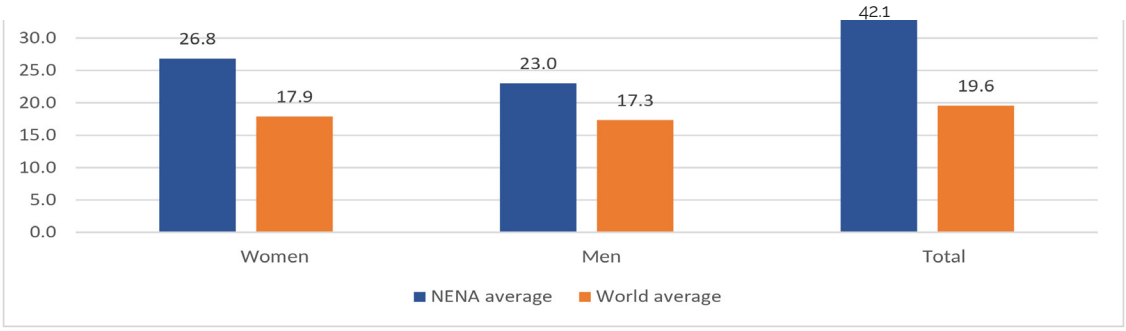
MoU	Memorandum of Understanding
MM	Mobile money
MOCCAE	UAE Ministry of Climate Change and Environment
MOOC	Massive open online courses
MVP	Minimum viable product
NENA	Near East and North Africa
NGO	Non-governmental organisation
NRI	Networked Readiness Index
OECD	Organisation for Economic Cooperation and Development
OPIC	Overseas Private Investment Corporation
R&D	Research and development
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SDG	Sustainable Development Goal
STEM	Science, technology, engineering and mathematics
TIEC	Technology Innovation and Entrepreneurship Center
ToT	Training of trainers
UAE	United Arab Emirates
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
USD	United States dollar
WEF	World Economic Forum
WIPO	World Intellectual Property Organisation
YPARD	Young Professionals for Agricultural and Rural Development


©Shutterstock

I. Introduction

Youth unemployment rates in the Near East and North Africa (NENA) region have been the highest in the world for over 25 years (Kabbani, 2019). All but four NENA countries have higher youth unemployment than the world average of 17.9 percent. The highest rates are in countries as diverse as Libya (50.5 percent), Jordan (40.5 percent), Palestine (39.6 percent) and Tunisia (38.3 percent) (World Development Indicators, 2021). Only in Bahrain, Oman, Qatar and the United Arab Emirates are rates lower than the world average, due to their capacity to absorb young nationals into public sector jobs. Even more alarming are the unemployment rates among young women. The region's average unemployment rate among female youth was an estimated 42 percent in 2021, (nearly double the male youth unemployment rate) while their labour market participation rate was just 14.7 percent, almost one third the participation rate among young men.

Figure 1: Youth unemployment in the NENA, 2021 (ages 15—24)



Source: World Bank, World Development Indicators Database. Accessed 1/12/2022

An important element not captured by national unemployment rates is the quality of jobs. In countries like Egypt, Morocco, Palestine and Yemen rural youth are more likely to be employed but in low wage, informal jobs characterized by unsafe or unhealthy work conditions (IFAD, 2019a). A major consequence of the poor quality of jobs in rural areas is that youth, and specifically young men, are increasingly fleeing in search of work opportunities in urban centers or abroad. Young women, on the other hand, are much less likely to migrate due to social and cultural norms affecting their mobility (Wenger and Abulfotuh, 2019).

Box 1. Definitions of youth

The definitions of youth change with context, especially in different demographic, financial, economic and sociocultural settings. Youth is best understood as a period of transition from the dependence of childhood to the independence of adulthood. The United Nations (UN) General Assembly first defined youth in 1985, for the International Youth Year, as persons between 15 and 24 years of age, without prejudice to other definitions by Member States. However, several UN entities have different definitions of youth which are recognized by the UN Secretariat. The African Union defines youth as referring to all persons between the ages of 15 and 35.

Source: International Fund for Agricultural Development (IFAD). 2019b. 2019 Rural development report. Creating opportunities for rural youth. Rome.

When it comes to women's participation in the labour force, NENA countries have the lowest rate of any region: just 26.6 percent compared to a global average rate of 46.3 percent in 2021 (World Development Indicators, 2021). The region whitnessed a period of "feminization" during the 1980s, when the share of women in agriculture increased significantly (FAO, 2011). In North Africa, the share of women in agriculture increased from about 30 percent in 1980 to 43 percent in 2010, and in the Near East, from 35 to 48 percent. In the Syrian Arab Republic the phenomenon was especially marked as the share of women in agriculture employment rose from about 30 percent in 1980 to more than 60 percent in 2010. However, in the last decade this trend has reversed. Across non -Gulf Cooperation Council (GCC) NENA countries, the share of employed women working in agriculture was 19.7 percent in 2019 compared to 26 percent in 2010 (World Development Indicators, 2010 and 2019). The percentage of women in agriculture has dropped significantly in countries like Palestine, the Syrian Arab Republic and Tunisia.

The previous period of feminization was, according to the World Bank, a result various drivers including more men shifting away from family farming to non-agriculture jobs as a result of structural transformation and increasing rural out migration of men (World Bank, 2016b). The reasons behind the reversal of this phenomenon are less clear. One thing that hasn't changed is the tendency for women's work to be informal or unpaid as family farmers. Women in agriculture continue to have less access to critical productive assets especially land, services like extension and financial services and decision making fora – while also facing the triple burden of work, discrimination in pay, restrictions on mobility and other well document gender based constraints that hinder decent employment in agrifood value chains (World Bank, 2016b).

A compounding force, the emergence of COVID-19 in 2020 was highly detrimental to the goal of decent employment for women and youth. Women producers and small-business owners, were more likely than men to experience loss of income or employment during the pandemic (Alayli, 2020; CARE, 2020). They also reported facing greater exposure to domestic violence and an increase in domestic responsibilities. Meanwhile, young people suffered from disruptions in education as well as even longer school-to-work transitions than before. The restrictions on mobility curtailed migration as an important livelihood strategy for rural youth (particularly young men) and the economic downturn resulted in a resurgence of negative coping mechanisms in rural households, such as child labour and early marriage (UNESCWA, 2020).

Ironically, the pandemic also led to the accelerated adoption and use of information and communication technology (ICT) which wield enormous potential in increasing access to decent employment among women and youth. However, a glaring gender and spatial digital divide diluted this potential significantly.

This paper examines how ICT technologies can contribute to decent employment of youth and women in the agrifood sector. In other regions, the widespread adoption and integration of ICTs has reduced information and transaction costs, improved service delivery, created new jobs, generated new revenue streams and saved resources. The analysis explores the current status of ICT uptake and certain age and gender specific barriers before highlighting existing efforts to leverage digital technologies to create and facilitate access to decent employment for youth and women in agrifood systems. The paper aims to identify key entry points to ensure digital technologies are better leveraged in NENA agrifood systems to foster decent employment in a way that is gender and age responsive.

©FAO/Fahad Al Dhuhli

II. ICT use by youth and women in the NENA

Digital technology infrastructure has increased substantially across the region over the last two decades, and in particular over the last two years. One type – mobile phones – has expanded rapidly in the region. International Telecommunication Union (ITU) data from 2021 show that mobile phone subscriptions in most NENA countries have surpassed 100 percent, on par with the global average (ITU, 2022). The lowest cell phone penetration is in Libya (42.5 percent), Yemen (50.9 percent) and Lebanon (62.8 percent) (World Development Indicators 2021). Fixed broadband subscriptions, necessary for high-speed internet access have also grown but not to the same extent. With around 9 subscriptions per 100 people the region lags behind the world average of about 16 subscriptions per 100 people (ITU, 2022).

One significant factor affecting internet connectivity and infrastructure in the NENA region is the number of conflicts and protracted crises. Conflict has a major impact on the ability to access, utilize and afford ICTs. Power disruptions and infrastructure damage directly affect availability and cost of internet while the impacts of conflict on poverty levels and education systems have a clear bearing on internet affordability and digital literacy.

In terms of individuals using the internet, regional averages exceeded the world average of 63 percent in 2021 (ITU 2022). However, not all population groups enjoy the same degree of access. ITU data from 2021 shows that 66 percent of individuals in the Arab region were using the internet, with usage reaching 70 percent of men and 60 percent of women. Internet use among youth aged 15 to 24 was 73.2 percent compared to 60 percent of those 25 and above (ITU, 2022). Internet access is also higher in urban areas. In 2020, an estimated 75.9 percent of the urban residents in Arab countries had access to the Internet compared to 42.1 percent among rural residents. There is also a difference in the speed and quality of Internet access. Regionally, both 3G and mobile-cellular network coverage stands at 100 per cent in urban areas. However, mobile-cellular network coverage is 10 percent lower in rural areas while 3G coverage in rural areas is 18 percent lower in rural areas than in urban (ITU, 2022).

In sum, while young people overall are in a slightly better position to leverage digital tools, there remain clear rural-urban and gender divides in access to internet. Even among women and youth that can access the internet, what remains unclear is the extent to which they are actually able to use ICTs to improve their livelihoods as opposed to other functions like social interaction and gaming, especially key in rural areas where the need for more decent employment opportunities is high.

Box 2. FarmBeats – how to address the problem of connectivity in remote and rural areas

A common problem in remote and rural areas is poor internet connectivity and bandwidth that is too low for cloud use or for internet of things (IoT) to function. Developed by Microsoft, FarmBeats works by leveraging a technology called TV White Spaces, using the concept of data transmission on empty TV channels. Because there are fewer TV towers in rural areas, it is possible to use the empty spectrum around farms. Often reaching more than 200 MHz, this is enough to transmit data not only from sensors but from cameras, tractors and drones at 100 Mbps. FarmBeats capitalises on this spectrum to install a TV white space antenna to enhance internet connectivity.

Source: Narain, Ananya. 2017. Internet of Things (IoT) system for data-driven agriculture. *Geospatial World*. www.geospatialworld.net/blogs/internet-of-things-system-for-agriculture/


©FAO/Mazen Haffar

III. Challenges faced by women and youth using ICTs in the agriculture sector

This section summarizes some of the main challenges faced by women and youth in accessing ICT and leveraging these technologies in the agrifood sector to improve their livlihoods and employment prospects. Here six main barriers are identified and explained.

Cost and affordability. The two most important factors determining online access for youth and women are cost and affordability. Even as broadband prices fall, they are still high relative to income in developing countries. The Broadband Commission's target of entry-level broadband access at less than 2 per cent of GNI per capita has only been achieved by a handful of countries in the region (GCC countries plus Algeria, Egypt and Tunisia) (ITU, 2021). Cost is also the most important overall barrier to owning and using a mobile phone, particularly for women, who often have less financial independence. The relatively high price of smart phones relative to income is another limiting factor, especially in a region with very high unemployment among youth who can ill-afford expensive handsets.

Access to knowledge and skills. Education and literacy rates are generally lower in NENA rural areas, especially for women and mobiles tend to be used mainly for communication and social media. Introducing digital agriculture apps requiring greater digital skills is therefore a challenge. However, despite the low digital literacy in rural areas, there are growing opportunities to integrate ICT into education and training curricula and to involve rural women and youth in the development of these technologies. For one, the region has one of the highest proportion of female graduates in science, technology, engineering and mathematics (STEM) in the world (World Bank, 2019). Cultivating this impressive skill base to improve the livelihoods and employment prospects of young women in rural areas holds significant untapped potential.

Social norms. Gender barriers to access can be particularly strong in the case of the internet. This is especially true in poor and remote localities where internet access is mainly outside the home and safety or norms affecting mobility can be a further obstacle. Strict norms surrounding socialization with members of the opposite sex persist in many communities. In Egypt, for example, 12 percent of women stated that they did not access the internet more often because they thought it was inappropriate and more than 8 percent said family or friends would disapprove (World Bank, 2016c). Gender barriers range from internalized gender norms to outright prohibition in the most extreme cases.

Box 3. Cultural barriers to using a mobile phone among Berber communities in Morocco

In rural Berber areas, communication between unrelated women and men is highly restricted due to conservative traditions and religious norms. Restrictions apply to face-to-face communication as well as phone to phone and text to text contact. According to an anthropological study conducted in 2013, male authority figures in these communities were concerned about women's mobile use. Berber men feared female relatives would be tempted to use mobiles to interact with men outside the family, possibly in inappropriate ways. This sentiment came not only from males but pervaded the community. The research showed that "men and women, fathers and mothers, brothers and sisters all contributed to an atmosphere of suspicion and surveillance of women's phone use."

Source: Dodson, L., Sterling, R. & Bennett, J.K. 2013. *Minding the gaps: cultural, technical and gender-based barriers to mobile use in oral-language Berber communities in Morocco*. ICTD 7-10 December, Cape Town.

Perceived relevance of digital tools and information. According to GSMA's Mobile Gender Gap Report 2022, globally women tend to be less aware of possible mobile internet benefits than men, significantly limiting their uptake, preventing them from tapping into its full potential (GSMA 2022). The perceived relevance of mobile internet is an important barrier in several countries and is a much greater obstacle to mobile internet use than mobile ownership. It is often the case that both women and youth with internet access are unaware of its potential beyond being a gateway to familiar sites such as Facebook and YouTube. Interestingly, in Egypt, the only NENA country included in the GSMA study, only slightly more men (21 percent) than women (20 percent) found the internet to be of low relevance to them.

Mass adoption of digital tools and services by citizens, businesses and governments is a key driver of economic growth and job creation. In order to achieve this in a way that does not exacerbate spatial and gender divides, instead promoting the economic inclusion and empowerment of youth and women there is a need to address these deep and entrenched barriers to ICT access. Moreover, not only do women and youth in rural areas need additional support to access digital tools, there is also a specific need to support their use in the agrifood sector and in the creation of more and better livelihood opportunities.

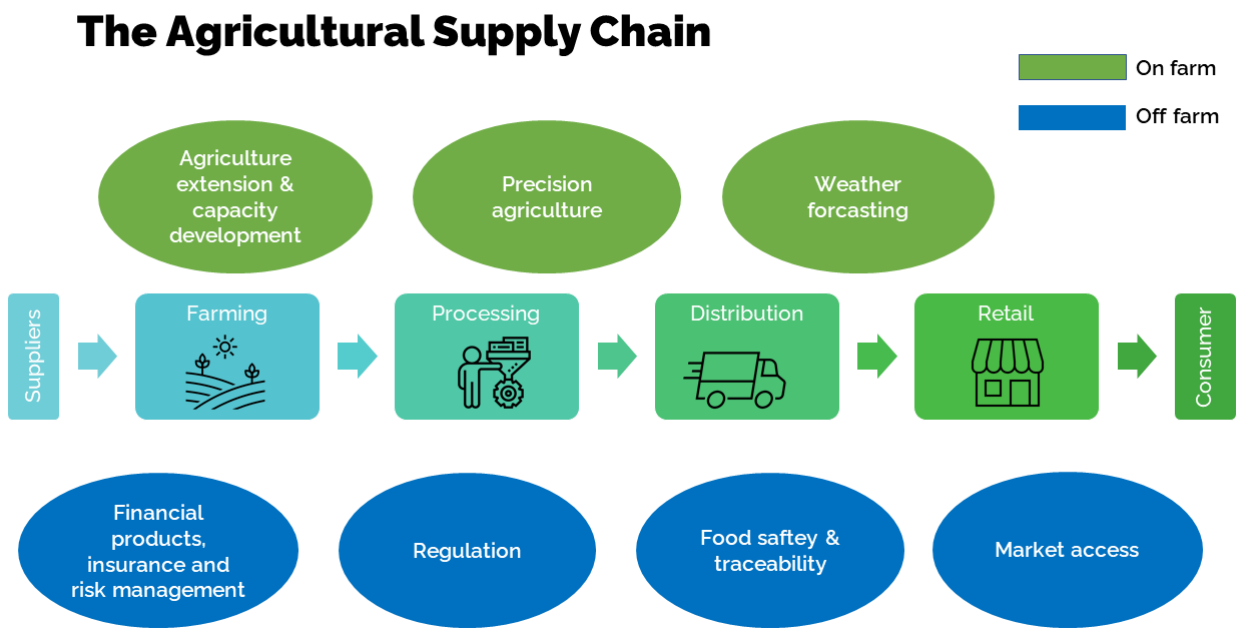
©Shutterstock

IV. Mapping and assessment of current initiatives supporting rural women and youth via digital technologies

In the NENA region there are a limited but growing number of initiatives and digital platforms that support rural women and youth in the agrifood sector. This section highlights a number existing initiatives that have been created and offer important opportunities for learning and scaling. It also demonstrates the diversity of ways that ICTs can be used to help women and youth overcome key barriers to their effective engagement and employment in agrifood value chains.

Digital technologies apply to both on-farm and off-farm activities. Figure 2 provides a representation of where along the agriculture supply chain they may be relevant to small- and medium-scale agriculture in developing countries. They range from well established ones, such as the internet, mobiles, big data and satellites, to the more innovative such as the IoT, sensors, drones and blockchain.

Figure 2: Main roles of digital agriculture



Source: Authors' own elaboration.

On-farm digital initiatives include agriculture extension, weather forecasting and precision agriculture. The following presents a few examples of digital tools and services emerging in the NENA region.

- ***ICT for agriculture extension and capacity building.*** In Tunisia PLANTIX, an application implemented by GIZ, offers extension services using digital technology. It offers crop advisory services for farmers, extension workers and gardeners, to diagnose plant diseases, pests and nutrient deficiencies affecting crops. It can: (i) identify plant diseases and pests in less than a second based on a picture taken from a smartphone; (ii) provide real time surveillance of the geographical spread of plant diseases and pests (geo-localised data); (iii) work off line, free of charge with no sponsors or advertisements. This initiative was set up through a public-private partnership between GIZ and two start-ups, PEAT from Germany and Royal Green Technologies (RGT) from Tunisia. There is a PlantMed network of young male and female plant doctors, women plant doctors are well represented on the steering committee. The application has already been adapted to make it more user friendly and there is an exchange forum in Arabic to reach more farmers with over 8000 downloads to date (GIZ, 2017).

- ***Digital technologies for weather forecasting.*** With funding from the United States Agency for International Development (USAID), Souktel, a Palestinian technology company in Morocco developed an algorithm to harness the huge amount of weather data collated by the government. Souktel has automated the process and packaged the information for farmers by creating an algorithm triangulating weather, crop and farmers' input data and sending a daily message to female and male farmers (SoukTel, 2013). Another example is in Lebanon where the Lebanese Agriculture Research Institute (LARI) developed a smart phone application to communicate with farmers (LARI, 2015). It replaces a short message system LARI used to send early warnings to farmers. The LARI-LEB application works on both android and Apple systems to reach a greater number of young farmers (IWMI, 2020).

- ***Precision agriculture.*** The major objective of precision agriculture is to improve decision-making regarding farm management and to optimize resources. According to a recent market study, the precision agriculture market in the Middle East and Africa regions was worth USD 0.9 billion in 2021, and is estimated to grow by 11.7 percent, to reach USD 1 billion by 2026 (Market Data Forcast, 2022). Solarise and Tomatiki are two Egyptian initiatives developing innovative precision agriculture, selected for incubation by the World Bank. Through farmer-friendly mobile applications linked to sensors, producers are able to receive accurate real-time information and guidance to optimize the use of critical inputs such as water and nutrients (DigitalAg4Egypt, 2018).

Beyond agriculture production, a number of off-farm digital initiatives have proliferated recently targeting downstream segments of the agrifood value chain. Important examples of this are enumerated below. These do not including the important but non-sector specific digital tools and services such as mobile money or e-banking which work in tandem accelerate digital transitions in the sector.

- ***ICT for improving supply chain efficiencies.*** In Tunisia, IFAD in partnership with Silatech and Making Cents International, supported ProInvest to pilot MobiPOS, a mobile application to address supply chain, inventory and transaction bottlenecks. Young rural shop owners and retailers use a basic mobile phone to automate and record their business transactions manually. This created a formal transaction and credit history to access trade finance from suppliers and improve business performance through efficiency gains. More than 50 percent of retailers who subscribed by the end of the programme were under 35 years of age (Making Cents International, 2016). In Egypt, the 'Mozar3' (Farmer) application is revolutionizing the sector by digitally linking small producers to buyers, sources of credit, and extension and sellers of agriculture inputs – facilitating linkages across the value chain and leveraging digital tools for each of its services.

- ***Digital marketing.*** E-commerce has the potential to reduce gender gaps by making work more flexible, connecting women to work and generating new opportunities for online work It also increases inclusion in new and existing markets. For example, Anou enables rural artisans in Morocco to export their products online, cutting out traditional intermediaries. Similar platforms in Tunisia include Bio Fresh which aims to produce and export certified organic products and Bio Farm Trading which specializes

in handcrafted olive wood and ceramic products. In Egypt, a number of e-commerce platforms for agriculture produce have emerged including businesses like Ouffa, ElMazra3a and Sara's Organic Food (from farm to consumer directly) with a focus on local markets. There has also been a rapid proliferation in the use of social media like Instagram and Facebook to market and sell all types of goods including produce, food and handmade products sourced locally from rural regions.

- ***Food waste.*** In the United Arab Emirates three women created the BonApp to reduce food waste by selling excess food at discounted prices through the app. BonApp works with 150 food providers who regularly sell their excess food to consumers looking for high-quality discounted food. The app provides real time information to users on the available food, with a discount ranging from 30 to 50 percent. Transactions go through the app and meals are enjoyed as either dine-in or take-away. So far, BonApp operates in Dubai and Abu Dhabi and has helped to sell 10 000 meals or three tonnes of food that would otherwise endup in landfills (Kamel, 2018). Using a similar approach, TeKeya was founded by a young female entrepreneur in Egypt to enable food retailers to give away excess food or sell it at discounted prices. In 2020, Tekeya saved over 3,000 meals from being wasted (StartupScene 2020).

- ***Decency of work.*** A critical issue faced by women and youth in agrifood value chains is the prevalence of informality and decent work deficits leading to unfair wages, absence of social protection, hazardous and unsafe working conditions, unstable or insufficient employment, discrimination and other violations of international labor standards. ICTs have a lot to contribute in this area. One good example is Tunisian youth-led startup Ahmini. Launched in 2019, Ahmini facilitates rural womens' access to social and health insurance using a secure mobile application. The service helps women, the majority of which are informal agriculture workers, to enroll in social security programmes and pay regular contributions online using a simple interface which they can access anywhere (The Arab Weekly, 2019). Another example, is REEFI a mobile game developed by FAO in Lebanon which helps to address the issue of child labour (FAO, 2022). The game targets rural adolescents and children to help them learn about and avoid the hazards of child labour. It's modules covers different production systems where child labour is common including greenhouses, field crops and orchards.

Thanks to intensifying efforts to incentivize digital solutions the number of tools and services is rising exponentially – well beyond those captured here. Business ideation, incubation and acceleration programmes combined with financial support from government agencies, development partners and even private sector actors are creating a steady stream of digital solutions targeting NENA markets. The bigger bottleneck will be ensuring the use and uptake of ICT by the most marginalized small producers, women and youth in order to create more decent jobs, on and off the farm, in rural areas and for those who need it most.

© FAO/Marwan Tahtah

V. Conclusions and recommendations

Across the NENA region this enabling environment for ICT is developing rapidly, albeit much more slowly in low income and conflict affected countries. COVID-19 restrictions on mobility were pivotal in accelerating demand for digital technologies, platforms and services across all sectors and prompted governments to prioritize ICT in policies and programmes including those related to agriculture and food. But pre-existing socio-economic inequalities have played a large role in shaping the outcomes of digital transformation.

Closing spatial divides in access to and use of digital technologies in agrifood systems requires significant investments in electricity, cellular and broadband coverage in rural areas to make these technologies not just available but also affordable. Ensuring their uptake and use across different groups, especially women and youth, further requires demand-side interventions linked to high-quality livelihood and employment opportunities.

Promoting digital literacy, advanced ICT skills and more progressive gender norms in the context of agrifood value chains is the only way to ensure that the ongoing processes of rural transformation happening in NENA countries economically empowers rural women and youth. The region is already seeing budding examples of digital tools and services being leveraged to create more formal, downstream opportunities, as evidenced in section 4 of this paper. However, much more needs to be done to accelerate and scale up this progress. Here a wide range of actors play a role, from governments to private sector companies, academia to community based organizations and of course, development partners.

Four broad entry points are identified to foster more decent rural employment for women and youth by leveraging digital innovation i) enhancing digital skills, literacy and education linked to agrifood value chains ii) investing in rural infrastructure iii) changing perceptions and attitudes and iv) creating supportive policy and institutional frameworks.

Digital skills and literacy – with a focus on agrifood

Digital literacy courses and guidance material is available in abundance, however is mainly accessible to those in urban settings particularly if they already have enough online access to reach these resources online. Making these resources and opportunities available in rural communities requires more effort. Closer collaboration with local schools, training institutions and even agriculture extension centers in necessary to make digital skills curricula or programmes available and accessible. While youth will naturally be among the primary beneficiaries of these efforts – these programmes are useful for all ages. What is critical is to ensure that women are equally able to benefit from them. This entails making sure digital literacy programmes specifically target women and are availed in places, times and formats conducive for female participation.

Digital skills or literacy programmes must have an explicit focus on how ICT can be used in the agrifood sector to access information, inputs, services, finance and markets. For women, this can be hugely important in overcome gender based constraints such as mobility restrictions. Unless rural women and youth are empowered to use digital technologies to improve their livelihoods and pursue economic opportunities, the fundamental challenge of their economic marginalization will persist. Conversely, with enough knowledge and skills they will be able not just to benefit from the existing digital tools and services, but also develop new solutions that better respond to their needs and the needs of their communities.

Infrastructure investment

One fundamental cause of rural urban gaps in development is unequal investment in infrastructure and public services, favoring urban areas because of the higher population density. If the goals of food security and poverty elimination are to be achieved greater investments will need to be made in rural areas, including electricity

and affordable internet and broadband coverage. Although governments shoulder much of the responsibility in this regard, new paths for connecting rural communities are emerging (see Box 2 above). With adequate incentives and policy support rural connectivity can be accelerated by working with the private sector to prioritize rural service accessibility. For example, in the United States HughesNet, a satellite internet provider, recently released a service known as Gen4 which provides customers in rural areas with fourth generation high speed broadband Internet access. Similarly in South Africa, private sector providers have stepped to provide high speed broadband for farmers and households in remote rural areas.

Perceptions and attitudes

One of the reasons for women's lower utilization of digital technologies in the NENA region is the persistence of restrictive gender norms. Gender responsive or transformative approaches to ICT programmes targeting rural communities can increase women's use of digital platforms, helping them to access economic opportunities at different nodes of the value chain. Digital services like mobile money, e-commerce platforms can also help women overcome other gender based constrains such as reduced mobility and time poverty.

In addition, attitudes among ICT proponents including development partners and governments also need to shift. While digitalization can have very positive effects on employment, employment and economic inclusion this is not automatic nor guaranteed. It is not sufficient to focus on creating or incentivizing the development of new digital tools and services. We must also be mindful of how these technologies can perpetuate spatial and gender divides and ensure that enough of these solutions are inclusive. One important way to achieve this is by engaging or rural communities including women and youth in the design and development of new digital solutions, or at a minimum consulting them.

Creating supportive policy and institutional frameworks

Supportive policy and institutional frameworks are essential to create a strong enabling environment for digital innovation to flourish. For example, countries with a more transparent and competitive telecommunications market are more likely to have lower priced cellular and broadband networks and wider network coverage, including in remote and rural areas. Similarly, creating agrifood entrepreneurship and innovation ecosystems that help agri-preneurs to start their businesses and gain access to funding, market information and business development services can be a huge catalyst for digital transformation. Entrepreneurship Support Organizations (ESOs) such as agribusiness incubators and accelerators play a vital role in this space and have helped create hundreds of digitally-enabled youth and women-led agrifood startups across the region.

One area that needs more attention is create incentives not just for profitable ICT businesses but also social enterprises that cater to the needs of rural communities, small producers and vulnerable or marginalized groups groups. Applications that promote social inclusion and improve the decency of work in agrifood systems need special backing and support to balance the scales between high-profit innovations serving large commercial customers and those oriented toward social and environmental goals.

To date no NENA countries have adopted a national strategy for digital agriculture. As these types of polices develop, their ability to accelerate digital transformation while leaving no one behind will hinge upon being able to create incentives for the development and uptake of ICT while also addressing issues related to social inclusion, equality of access and the distribution of benefits.

References

Albarracín, Javier. 2017. *The digital economy: the silent revolution that will change the region.* Watch Letter n°38. CIHEAM-Bari. Bari.

Arezki, Rabah; Mottaghi, Lilli; Barone, Andrea; Yuting, Fan; Rachel, Abou Harb; Amani, Karasapan; Omer, M.; Matsunaga, Hideki; Nguyen, Ha & de Soyres, Francois. 2018. A new economy in Middle East and North Africa. *Middle East and North Africa Economic Monitor.* October, The World Bank. Washington DC.

Aseel Alayli. 2020. *COVID-19 Magnifies Pre-Existing Gender Inequalities in MENA*. Arab Barometer. Cairo.

Kabbani, Nader. 2019. *Youth employment in the Middle East and North Africa: revisiting and reframing the challenge*. The Brookings Institute. Washington DC.

CARE. 2020. *Rapid Gender Analysis – COVID-19 Middle East and North Africa Region*. Cairo.

DigitalAg4Egypt. 2018. *DigitalAG Award Ceremony.* Accessed 24/03/2022.

Dodson, L., Sterling, R. & Bennett, J.K. 2013. Minding the gaps: cultural, technical and gender-based barriers to mobile use in oral-language Berber communities in Morocco. ICTD 7-10 December, Cape Town.

FAO. 2011. *The State of Food and Agriculture 2010-11. Women in agriculture: closing the gender gap for developmen*t. Rome.

FAO. 2015. *Success stories on information and communication technologies for agriculture and rural developmen*t. Rome.

FAO. 2022. *FAO launches "REEFI", a digital game on child labour and occupational safety and health in agriculture for rural children and youth.* Accessed 24/03/2022.

Geospatial World. 2017. *Internet of Things (IoT) system for data-driven agriculture*. Accessed 06/07/2017.

GIZ. 2017. *Digital Solutions Competition*. Accessed 24/03/2022.

Global System for Mobile Communications Association (GSMA). 2022. *The Mobile Gender Gap Report.* London.

Göll, Edgar & Zwiers, Jakob. 2018. *Technological trends in the MENA Region: the cases of digitalization and information and communications technology.* Working Papers No. 23, MENARA.

International Fund for Agricultural Development (IFAD). 2019a. Aker, Jenny. *Information and communication technologies and rural youth.* 2019 Rural development report background papers.

International Fund for Agricultural Development (IFAD). 2019c. Kabbani, Nader. *Investing in rural youth in the Near East, North Africa, Europe and Central Asia.* 2019 Rural Development Report Background Papers .

International Water Management Institute (IWMI). 2020. *Phone app gives opportunity to improve water productivity in Lebanon*. Accessed 19/05/22.

Kamel, Deena. 2018. *Generation Start-up: A restaurant's excess food is now a UAE resident's bargain dinner with BonApp.* The National.

Market Data Forecast. *2022 Middle East and Africa Precision Agriculture Market.* Accessed 19/05/22.

Making Cents International. 2016. *Youth-inclusive value chain finance in Tunisia.* Learning Report #4. IFAD Rural Youth Economic Empowerment Program (RYEEP).

SoukTel 2013. *Souktel and USAID Launch SMS Crop Price and Irrigation Info Services, Empowering Moroccan Farmers*. Accessed 19/05/22.

StartupScene. 2020. Tekeya is Egypt's First Tech Startup Tackling Food Waste.

The Arab Weekly. 2019. *Ahmini, an application to protect Tunisian women farm workers*. Accessed 19/05/22.

United Nations Economic and Social Commission for West Asia (UN-ESCWA). 2020. *Impact of COVID-19 on young people in the Arab region*. Beirut.

World Bank. 2016b. *Feminization of agriculture in the context of rural transformations: what is the evidence?* Report No: ACS20815. Washington DC.

World Bank. 2016c. *World Development Report 2016: digital dividends*. Washington DC: World Bank.

World Bank. 2019. *The Little Data Book on Gender*. Washington DC.

DIGITAL INNOVATION FOR

PROMOTING DECENT RURAL EMPLOYMENT IN AGRICULTURE FOR YOUTH AND WOMEN IN THE NEAR EAST AND NORTH AFRICA

FAO Regional Office for the Near East and North Africa
11 Al-Eslah Al-Zerai Street, Dokki, P.O. BOX 2223, Cairo, Egypt.
Phone: (202) 3331 6000 to 3331 6007
Fax: (202) 3749 5981, (202) 3337 3419
E-mail: FAO-RNE@fao.org

Food and Agriculture Organization of the United Nations
Cairo, Egypt

CC6312EN/1/08.23