



DIGITAL FINANCIAL SERVICES FOR EMPOWERING WOMEN IN AGRI-FOOD VALUE CHAINS IN THE NENA REGION:

Authors:

HSUAN CHIEN, University of Vienna, Leipzig University

MARINA CHUBRINA, University of Vienna

OLIVER HERRERA GONZÁLEZ, Universitat Politècnica de Catalunya

ALBA LEDUCHOWICZ-MUNICIO, Universitat Politècnica de Catalunya

Agency: THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED
NATIONS (FAO)

Mentors: HUDA ALSAHI & VALENTINA FRANCHI

Peer+: MARIO GHIOLDI

Abstract

As Near East and North Africa (NENA) region demonstrates one of the largest gender gaps in economic participation and opportunity, this research seeks to investigate the potential of digital financial services (DFS) and platforms to better serve the specific needs of rural women in agri-food value chains (AFVC) to advance their financial inclusion. Based on an extensive literature review, available evidences and a macro analysis of national-level statistical data, the research illustrates the nexus of gender, DFS and AFVC in the NENA region, as well as identifies challenges in fostering women's empowerment and opportunities to be leveraged by DFS initiatives. The research identifies women's limited access to financial, productive, and capacity-building resources and limited decision-making roles over AFVC as major challenges. More importantly, the research sheds light on four key areas of opportunities to be leveraged: the suitability of designing DFS initiatives through an ecosystem approach, with an emphasis on partnerships and cooperation with multi-level stakeholders, including women's cooperatives and associations; the significance of tailored training and effective communication channels to reach women through DFS initiatives; the relevance of accompanying DFS with the human touch and local presence through female agents; and the importance of collecting and analyzing sex-disaggregated data related to the triple nexus. Recommendations are then presented to guide institutions, financial services providers, international organizations and civil society to design and deliver more gender-responsive DFS in future initiatives.

Contents

- 1. Introduction..... 4
- 2. State-of-the-Art Review 5
 - 2.1 The women's role in AFVC in the NENA region..... 6**
 - 2.2 Digitalization of the AFVC and Development of DFS in the NENA region..... 8**
 - 2.3 Women's financial inclusion and access to DFS in the NENA region 10**
- 3. Methodology..... 11
- 4. Challenges in fostering women’s empowerment..... 12
 - 4.1 Women’s Limited Access to Financial Resources 13**
 - 4.2 Women’s Limited Access to Productive Resources..... 14**
 - 4.3 Women’s Limited Access to Capacity-Building Resources 14**
 - 4.4 Women’s Limited Decision-making and Roles over AFVC..... 15**
- 5. Opportunities to be leveraged by DFS initiatives 16
 - 5.1 The Ecosystem Approach: a comprehensive support to various accesses 16**
 - 5.2 Tailored training and effective communication channels 18**
 - 5.3 High Tech High Touch: technology with a focus on human touch 19**
 - 5.4 Sex-disaggregated data: collection, analysis, and further implementation 20**
- 6. Conclusions and recommendations 21
- References 23

DIGITAL FINANCIAL SERVICES FOR EMPOWERING WOMEN IN AGRI-FOOD VALUE CHAINS IN THE NENA REGION

Hsuan Chien, Marina Chubrina, Oliver Herrera González, Alba Leduchowicz-Municio

1. Introduction

The Near East and North Africa (NENA) region demonstrates the second-widest gender gap in Global Gender Gap Report 2022 (World Economic Forum, 2022)¹, particularly related to political empowerment² and to economic participation and opportunity³. Across the NENA region, agriculture remains a critical source of livelihood and employment, where women play multiple roles in agrifood value chains (AFVC) such as producers, processors and retailers. However, their contribution is often invisible, unpaid or informal. The unequal gender relations are echoed in persisting gender biases such as associating women with domestic and care responsibilities. Paradoxically, despite their contribution to ensuring food security and nutrition, women are up to 4% more vulnerable than men to food insecurity in the region (FAOSTAT, 2021) and in general more vulnerable to the impacts of the multiple shocks and crises affecting the region.

In this context, digital financial services (DFS) present considerable potential to enhance women's participation and role in AFVC. DFS comprise a broad range of financial services accessed and delivered through digital channels, including payments, credit, savings, remittances, insurance, and mobile financial services (AFP's DFS Working Group, 2023). Compared to traditional financial devices, DFS present multiple potentials: lower costs (e.g., digital transfers, e-wallet), time-saving, increased speed, security, greater efficiency, transparency, and mobility, as well as more tailored financial services that serve the poor at scale (Pazarbasioglu *et al.*, 2020). Recent evidence⁴ has shown some positive results: DFS enable digital crop procurement, e-commerce and smart farming, as well as remittances and Government-to-Person payments, and helps previously 'unbanked' small-scale farmers build up a credit history (Tricarico and Chassin, 2021). Nevertheless,

¹ The Global Gender Gap Report 2022 includes Israel within the Middle East and North African countries while Iraq, Palestine, Syria, Yemen, Libya, Mauritania, and Sudan are excluded.

² Political Empowerment subindex measures the gender gap in ministerial, parliamentary and government executive positions.

³ Economic Participation and Opportunity subindex contains three concepts: the participation gap, captured through labor-force participation rates, the remuneration gap—through ratio of estimated female-to-male earned income and wage equality for similar work, and the advancement gap—through ratio of women to men in technical and senior positions.

⁴ Mobile money is particularly prevalent in Sub-Saharan Africa, where 21% of the adult population have a mobile money account (World Bank, 2020).

DFS are certainly not a cure-it-all in every context but a double-edged sword. While microfinance/microloans can facilitate financial access for vulnerable and underserved communities, it also tends to expose them to the risk of debt in the long term. Therefore, prior to the employment of DFS in the local context, a thoughtful design and delivery should be considered to ensure that its potential is leveraged, and the common pitfalls are circumvented.

Understanding how DFS can be used to facilitate women's financial inclusion and, ultimately, their participation in AFVC in the NENA region is one of the key areas of interest for the FAO Regional Office for the Near East and North Africa (FAO RNE). This brief was commissioned to explore and discuss, based on a review of national and international reports, scientific literature, and the analysis of implemented initiatives, **how DFS and platforms can be better designed and delivered to serve the specific needs of rural women in AFVC, taking into consideration the diversity and specificities across the NENA region.**

This research places its focus on providing a comprehensive review of the nexus between gender, DFS, and AFVC in the NENA region. Countries of the NENA region are not homogeneous and have diverse profiles in relation to the weight of the agrifood sector in the economy, the penetration of DFS and gender equality. In order to identify this, a macro analysis of statistical data at the national level is performed. Then, the challenges faced to foster financial inclusion of women in AFVC through DFS are discussed, including limited access to financial, capacity-building and information resources and limited roles within the AFVC. The opportunities are then drawn, supported by examples of the most prominent initiatives identified. Concluding with critical analysis and synthesis of findings, this study is an attempt to generate new knowledge and provide concrete recommendations.

The remainder of the paper is organized as follows: Chapter 2 presents the state-of-the-art review considering a nexus approach; Chapter 3 summarizes the methodological considerations, Chapter 4 describes the main challenges, Chapter 5 exposes the opportunities to foster women's inclusion through DFS and Chapter 6 draws main conclusions and recommendations.

2. State-of-the-Art Review

This chapter presents the current state of the nexus dimensions under research, schematized in Figure 1. First, the relevance of the AFVC and women's roles in the NENA region are contextualized (section 2.1). Then, the opportunities of AFVC digitalization and the potential application of the DFS in AFVC in the NENA region are described (section 2.2). Finally, the current status of women's financial inclusion and access to DFS in the NENA region are presented (section 2.3). In line with FAO's definition, this region covers the following 19 countries and regions: Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen in the Near East region; Algeria, Egypt, Libya, Mauritania, Morocco, Sudan, and Tunisia in North Africa (FAO, 2023a).

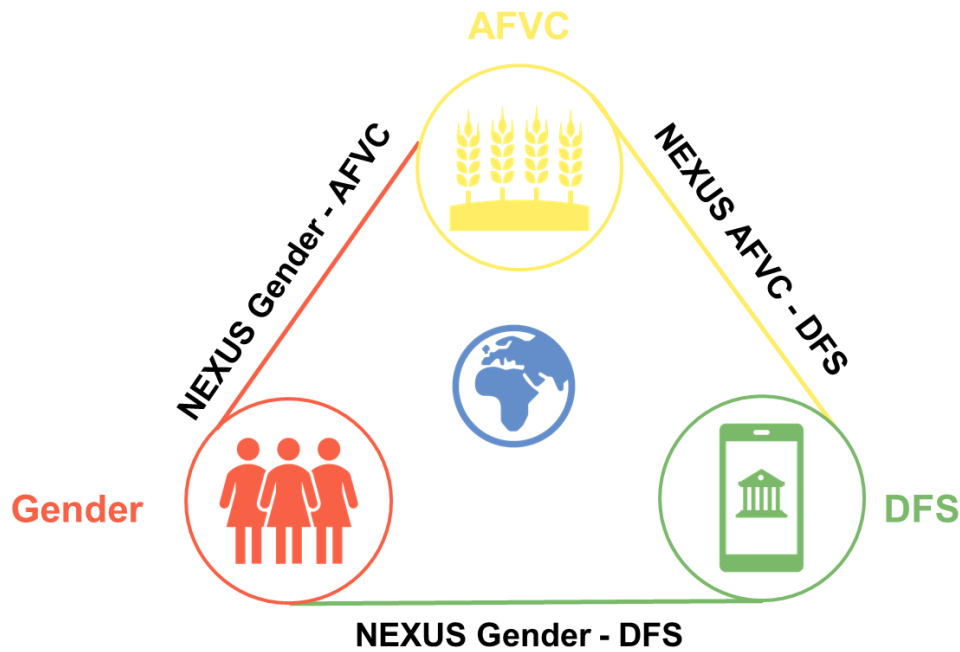


Figure 1: Scheme of the nexus framework: interlinkages between Gender, AFVC and DFS in the NENA region.

2.1 The women's role in AFVC in the NENA region

Agriculture remains a significant pillar for rural development in many countries of the NENA region (FAO, 2022a), where the rural population accounts for more than half of the total population, namely, in Sudan, Yemen, and Egypt, or more than $\frac{1}{4}$ in Algeria, Iraq, Mauritania, Morocco, Syrian Arab Republic, and Tunisia (World Bank, 2021b). At the same time, some countries such as Kuwait or Qatar have more than 99% of their population in urban areas, making rural communities of great importance to ensure food security to the expanding urbanization (World Bank, 2021b). Employment in agriculture varies significantly among countries, with close or more than $\frac{1}{3}$ of the population being employed in agriculture in Mauritania, Morocco, Sudan, and Yemen, and less than 2% in countries such as Bahrain and UAE (World Bank, 2019). This positions agriculture as an important source of income for the rural population. In Egypt, Lebanon, and Yemen, for example, smallholders account for more than 90% of cultivated agricultural land (Yahia and Smolak, 2014).

However, the geography, the climate, and the endowment of natural resources shape the agrifood activities of the region. Arid climate dominates more than $\frac{2}{3}$ of the cultivated land, presenting great challenges of productivity and limited and unpredictable rainfall and making it especially vulnerable to climate change effects (ESCWA, 2017). Besides the fragile food systems and water scarcity, the food import dependency from the NENA region countries is another factor that makes the region highly vulnerable to external shocks, including conflicts and protracted crises (FAO, IFAD, UNICEF, WFP, WHO and ESCWA, 2021). It is estimated that Egypt, Jordan, Lebanon, Morocco, and Tunisia alone accounted for 8.7% of global wheat imports, with Egypt representing 5.2% of total global wheat imports in 2021.

The increase in international food prices, coupled with the economic slowdown and supply chain disruption as a result of the pandemic (FAO, 2023b) has been further aggravated by the outbreak of the war in Ukraine, considering that international food prices hit a record high in March 2022 and FAO Food Price Index reached its highest average value in the history⁵ (Rauschendorfer and Krivonos, 2022). In fact, the war in Ukraine also exposed the vulnerability of food systems in the NENA region due to its high dependency on imported wheat, grain, and foodstuffs from Ukraine and the Russian Federation, particularly for Lebanon, Egypt, Libya, Oman, Saudi Arabia, Yemen, Tunisia, Jordan, and Morocco (FAO, 2022b; Rauschendorfer and Krivonos, 2022). The reliance of the NENA countries on grains originating from the Russian Federation and Ukraine is associated with low shipping costs thanks to these countries' physical proximity to the Black Sea basin. Therefore, the impact of any shipping disruption in this area is most directly felt by importers in the NENA region and makes already poor consumers extremely vulnerable to wheat, maize, and vegetable oil price shocks.

Similarly, mass migration caused by conflicts and conflicts per se hampers rural development in the NENA region⁶. Around 22.4 million people have been forcibly displaced by conflicts in countries such as Iraq, Yemen, and Syria (IFAD, 2023), with great consequences on the degradation of agricultural land and the collapse of food production in the areas left behind. Migrations to host countries such as Lebanon, Jordan, and Sudan (accounting for more than 5.3 million displaced people (Amnesty International, 2023)) increased pressure on their natural resources, food security, and agricultural production systems.

Across the region, women play multiple roles in AFVC⁷ as producers, processors, and retailers. In fact, almost a quarter of employed women in the NENA region work in the agrifood sector, although general women's participation in the labor force is low in the region, with less than 30% of women participating in the formal economy in most countries⁸. Albeit again with significant differences between countries: in particular, more than 40% of the women in the formal economy work in the agricultural sector in Sudan, Yemen, and Morocco (World Bank, 2019). In addition, women represent a majority of soft fruit workers in Morocco, and olive harvesting workers in Tunisia (Barakat, 2021). By contrast, less than 1% of women in the formal economy are involved in food and agriculture activities in Bahrain, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, and UAE.

⁵ Since the creation of the index in 1990.

⁶ IFAD's definition of the NENA region includes Djibouti, Somalia and Turkey, and does not include Bahrain and Mauritania.

⁷ Among other common approaches (e.g., food systems), agrifood value chain lenses were selected for this study as they allow to conduct an analysis of the nexus under research at a workable scale. Agrifood value chains refer to the entire agrifood production chain, beginning with agriculture production to the end of food consumption. It involves all stakeholders in the value chain, including farmers, food companies, retailers and consumers (FAO, 2023c). Food systems, in turn, encompass "the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded" (FAO, 2018).

⁸ Only Saudi Arabia, Libya, Bahrain, Kuwait, UAE and Qatar have better rates (World Bank, 2021a).

Despite women's increasing active presence in the AFVC in the NENA region, the gender gap is still very pronounced in terms of labor opportunities, and the work women do remains under-reported and under-estimated. Women are often not perceived as farmers and agricultural workers, but rather as 'helpers' and 'contributing housewives' (FAO, 2022c; Najjar *et al.*, 2023; Najjar and Badstue, 2020), and remain concentrated in informal, low-skilled, low-paid occupations or micro-enterprises (Seghirate, 2017). Their contribution is typically relegated to non-mechanized, labor-intensive, non-capital-intensive activities such as planting, cultivating, and harvesting (GSMA, 2022a), and have primary responsibility for the husbandry of small animals and ruminants (Lehel, 2023). In addition, women are under-represented in decision-making institutions, especially in rural institutions and organizations, having less than 1/3 seats in parliament across the region, except for the UAE (UNDP, 2023). This prevents women from designing and guiding policies, investments and strategies that better respond to their needs and interests.

2.2 Digitalization of the AFVC and Development of DFS in the NENA region

In the context of rural development, digitalization can offer various value propositions and have a positive impact on activities, processes, and stakeholders at different levels (FAO, 2021). According to the GSMA report (2022), the digitalization of AFVC in low- and middle-income countries is enabling access to markets, assets, and services for smallholder farmers and value chain actors. Digital solutions and DFS⁹, namely, digital payments and digital procurement, create efficiencies for both agribusinesses and farmers in the last mile¹⁰. GSMA (2022) identifies four main applications of digital solutions in the last mile of the agrifood value chain: digital profiles creation, track-and-trace and farm management systems, information services and DFS, including opportunities for mobile money-enabled transfers, payments and other financial services. For instance, digital procurement solutions provide a possibility to record farmer production data, allowing the creation of economic identifiers that, in turn, enable financial institutions to assess the credit risk of previously 'unbanked' farmers. This can also be combined with digital advisory services for farmers to receive vital information about up-to-date farming practices, weather forecasts and yields.

Peer-to-peer trading platforms are also gaining ground among farmers. For example, based on the layaway savings model, myAgro mobile platform for seeds and fertilizer trading in Mali, Senegal, and Tanzania have helped to overcome several challenges for smallholder farmers in Sub-Saharan Africa, such as the exclusion of the 'unbanked' farmers from traditional loan and credit schemes;

⁹ According to the World Bank, DFS are “financial products and services, including payments, transfers, savings, credit, insurance, securities, financial planning and account statements that are delivered via digital/electronic technology such as e-money (either online or on a mobile phone), payment cards and a regular bank account” (Pazarbasioglu *et al.*, 2020). Fueled by the explosive growth of mobile phones, DFS is expanding access to financial services by offering new forms of financial accounts that provide a secure way to store, transfer and save money.

¹⁰ The last mile is defined as “a web of relationships and transactions between buyers of crops, such as agribusinesses, cooperatives and intermediaries, and the farmers who produce and sell the crops” (GSMA, 2022).

lack of funds for large packages of seeds offered by a market that targets large households; and service unavailability in the village centers or small towns (ICRW, 2019).

However, the DFS ecosystems remain nascent and highly fragmented in the NENA region, with limited mass-scale adoption. Moreover, limited internet connectivity and comparatively high cost of internet access (e.g., Lebanon) pose stumbling blocks for further DFS development. In fact, in countries such as Mauritania, Sudan, and Yemen, the availability of high-performance mobile internet network coverage is very little developed. The low infrastructure and number of servers make internet connection a very expensive service. Most countries in the region have, on average, higher prices for mobile data than many European countries. An extreme case is Yemen, among the poorest of the region, where the average price for 1 GB is more than 16 USD (2022), while the average price in Switzerland is about 7.4 USD.

The NENA region also presents contrasting country profiles in terms of financial and mobile money account ownership. In fact, a high percentage of the population living in the NENA region are unbanked, but with very different situations across the region, ranging from 14% in the UAE to 81% of the population lacking a financial account in Iraq¹¹. Furthermore, in Jordan and Morocco only 11% and 6% of the population, respectively, have mobile money accounts, despite the fact that it is estimated that the entire population over the age of 15 owns a mobile phone. Similarly, enrollment in a DFS account is not enough as many accounts stay inactive, i.e., users may have a financial account but never use it due to poor understanding, avoidance of transaction fees, or other reasons. The use of digital payments is relatively low in most of the NENA region, ranging from 14% in Lebanon or Iraq to 36% in Jordan in 2021. It is worth mentioning that DFS penetration is even lower in rural areas¹². By contrast, 73% of the population in Saudi Arabia and 77% in the UAE made or received digital payments during the same period.

According to Pazarbasioglu et al. (2020), the NENA region presents different levels of maturity in terms of DFS adoption and applications. For example, Morocco, Egypt, and Algeria are classified within the first stage of DFS development, highlighting the long road toward universal digitization. Several regulatory constraints common to the NENA region also limit DFS adoption. For instance, e-signature functionalities are still limited in many countries of the region, while hard-copy contracts (e.g., Egypt) and face-to-face interaction (e.g., applying for governmental loans in the UAE) are still mandatory in many contexts. In this regard, some governments in the NENA region have recognized the benefits digitalization brings about, and set out to develop a digital transformation strategy, that is, a strategy not only to introduce new digital solutions but also to re-design existing technologies in an innovative way. Such examples include Egypt's Vision 2030 and Jordan's The National Digital Transformation Strategy & Implementation Plan (2021-2025). In addition, the Digital Financial Services Working Group (DFS WG) was created by the Alliance for

¹¹ 'Unbanked' people (% of population ages 15+), calculated on the basis of: Account ownership at a financial institution or with a mobile-money-service provider (% of population ages 15+) (World Bank, 2021c)

¹² Based on the indicators: Made or received a digital payment and Mobile money account (rural (% age 15+) and urban (% age 15+)) (World Bank, 2021c). Data is only available for Egypt, Iraq, Palestine, and Tunisia.

Financial Inclusion (AFI) with the purpose of creating a platform for policymakers to foster a DFS regulatory ecosystem (including mobile financial services, branchless banking, e-money, and digital payment solutions). The group includes banking institutions from Morocco, Mauritania, Tunisia, Egypt, Jordan, and Palestine. Good practices, knowledge sharing, and financial inclusion are also being promoted at a regional level by some financial regulators, including the Arab Monetary Fund (AMF) (Attia and Benson, 2018).

The digitalization of AFVC is also emerging in the NENA region. The collaborative work carried out between the World Bank and the Faculty of Agricultural and Food Services (AUB) from Beirut (World Bank, 2021d) identified various DFS applicable to AFVC in Lebanon, Iraq, and Jordan. Among them, the distribution of subsidies through the e-government service, the digital dissemination of information to promote rural producers' access to new markets, the use of digital marketplaces and e-platforms for direct interaction between producers and consumers, or the utilization of mobile money, digital credit scoring and remote sensing to facilitate trade and farmers' access to insurance and savings. Despite its current embryonic state, increasing adoption of DFS is expected thanks to the ongoing digital development agenda and improved ICT infrastructure. However, the report highlights the importance of some considerations in order not to deepen existing inequalities, with special emphasis on accessibility problems, the concentration of power of some e-commerce platforms or social networks, the lack of information and skills in rural areas, and the risks associated with data privacy and cybersecurity.

2.3 Women's financial inclusion and access to DFS in the NENA region

According to the Global Findex Database 2021, the NENA region presents the lowest proportion of adult female account holders in the world. In fact, women are less likely to have a financial account than men, with the largest gender gap in Algeria (26 percentage points), Jordan (25 percentage points), and Morocco (23 percentage points)¹³. To foster women's financial inclusion, some conditional cash transfer programs have been implemented in the NENA region (Simon, 2019) and presented different achievements regarding women's empowerment. A cash-based intervention combined with capacity-building activities was applied for Syrian refugees from Lebanon and presented positive effects on gender outcomes (Simon, 2019). By contrast, a women-focused cash transfer program was implemented in Egypt, but instead of contributing to women's empowerment, the program exacerbated the gender gap by reducing women's control over decision-making and reducing women's employment (El-Enbaby *et al.*, 2019).

Despite progress, the gender gap in relation to phone ownership, and use of the internet (including mobile internet) remains significant. In that sense, 25 million fewer women than men own a mobile phone across the NENA region¹⁴ (USAID, 2020). On average, women are also less likely to use

¹³ Gender Gap calculated on the basis of Account ownership at a financial institution or with a mobile-money-service provider, male (% of population ages 15+) and Account ownership at a financial institution or with a mobile-money-service provider, female (% of population ages 15+) (World Bank, 2021c)

¹⁴ The study considers 11 countries: Algeria, Egypt, Iraq, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia, West Bank and Gaza, and Yemen

mobile internet, which is the main source for accessing the web (USAID, 2020). Lower levels of phone ownership, in turn, can compound gender inequalities, limiting economic opportunities and financial inclusion¹⁵ of women.

Several DFS projects have already been implemented in the NENA region. From 2015 to 2018, the World Bank piloted the Virtual Marketplace project to help small and medium enterprise (SMEs) in NENA increase their exports through e-commerce platforms. The project was moderately successful in Jordan and Morocco, but showed promising results in Tunisia, where participation accounted for 42% of women-led SMEs (Robinson, 2019). The e-commerce for women-led SMEs from the Women Entrepreneurs and Finances Initiative (We-Fi), which is ongoing since 2019, targets women-led SMEs from Algeria, Djibouti, Egypt, Jordan, Lebanon, Morocco, and Tunisia (Women Entrepreneurs Finance Initiative, 2023). The Affirmative Finance Action for Women in Africa (AFAWA) is another We-Fi programme implemented in Mauritania, and the Business Resilience Assistance for Value-Adding Enterprises for Women (BRAVE) has been applied in Yemen (Robinson, 2019). A collaboration of women's business associations, such as Business Women of Egypt 21 (BWE21), Savoir et Vouloir Entreprendre (SEVE) from Algeria, the Lebanese League for Women in Business (LLWB), and Chambre Nationale des Femmes Chefs d'Entreprises (CNFCE) from Tunisia, have created the Digital Women in Business (WiB)—a digital transformation accelerator for women-led SMEs in the NENA (Women in Business, 2023).

The benefits of the DFS are also being perceived by the women entrepreneurs in the AFVC. For instance, the WiB accelerator report presents success stories from the agrifood sector in Algeria (Women in Business, 2023) and Egypt (Women in Business, 2023), both focusing on olive oil export. Similarly, the Digital4Her hackathon in Lebanon focused on promoting digital solutions to improve productive agriculture (World Bank Blogs, 2023), enabling the development of three women-led businesses in AFVC. From 2019-2022, 140 young women from the Mediterranean countries, including Palestine and Tunisia, benefited from the social innovation in the agrifood sector projects (Mediterranean Sea Basin Programme, 2023). This region has also received training projects focusing on rural women (CIHEAM, 2021).

3. Methodology

The literature highlights a limited existence of initiatives aiming to leverage the potential of utilization of DFS to contribute to the empowerment of women in AFVC in the NENA region, and several research gaps are identified. These include the tendency to analyze the NENA region in a generic way and treat it as a homogeneous body. However, the countries present different levels of development of DFS-related infrastructure and regulations, as well as nuances among their degree of progress towards gender equality. While some literature provides a relatively clear

¹⁵ Financial inclusion refers to “individuals and businesses who have access to useful and affordable financial products and services that meet their [specific] needs—transactions, payments, savings, credit and insurance—delivered in a responsible and sustainable way” (World Bank, 2023).

picture of rural women's challenges in the NENA region, only few studies offer concrete solutions to tackle these challenges or identify applicable evidence-based opportunities. Furthermore, when recommendations are developed, they often demonstrate multiple shortcomings, failing to address the nuances among the different groups of women and treating them as homogeneous.

To fill these gaps, a macro analysis of statistical data is carried out at the national level, considering indicators related to gender equality, financial inclusion, DFS penetration and development of AFVC. This statistical analysis by country provide evidence on potential challenges to be faced across the countries and to demonstrate, at the same time, the heterogeneity of the territory and thus avoid generalization. 3 dimensions are characterized: gender, DFS and AFVC. The NENA region represents a crosscutting dimension. A nexus approach is then applied, analyzing the interlinkages of these dimensions: women's role in the AFVC (section 2.1), DFS application to the AFVC (section 2.2) and DFS access and state of women's financial inclusion (section 2.3).

Through an extensive literature review, including international and national reports from public and private institutions, conferences and scientific literature, evidences are collected related to the challenges and opportunities of DFS for women's empowerment in the AFVC in the NENA region. Key enablers and common pitfalls are identified and analyzed. Due to limited data availability, the most relevant works outside the region are also discussed. A particular attention is paid to nuances existing among women from diverse socioeconomic conditions (different ages, women-led households, women migrant) in order to draw an exhaustive analysis and include all existing realities. The results have been verified through a peer consultation among FAO experts and validated during the webinar: *Innovation and Digitalization for Gender Equality: experiences from the agrifood sector in the NENA*¹⁶. Finally, 4 recommendations are drawn for DFS providers, NGOs and governments on opportunities to be leveraged to empower rural women. The recommendations aim to promote interventions based on DFS applied to the AFVC that are more gender-responsible, guiding them to counteract the challenges presented and to effectively reach and address women's specific needs.

4. Challenges in fostering women's empowerment

Women in the AFVC in the NENA region face several challenges to be addressed by DFS interventions. These challenges are grouped and schematized in **Figure 2** and then described in detail: limited access to financial resources (section 4.1), limited access to productive resources (4.2), limited access to capacity-building resources (4.3) and limited decision-making and roles over the AFVC (4.4).

¹⁶ FAO and ITU webinar organized for the International women's day (March 9, 2023).
<http://www.fao.org/neareast/events/women2023>

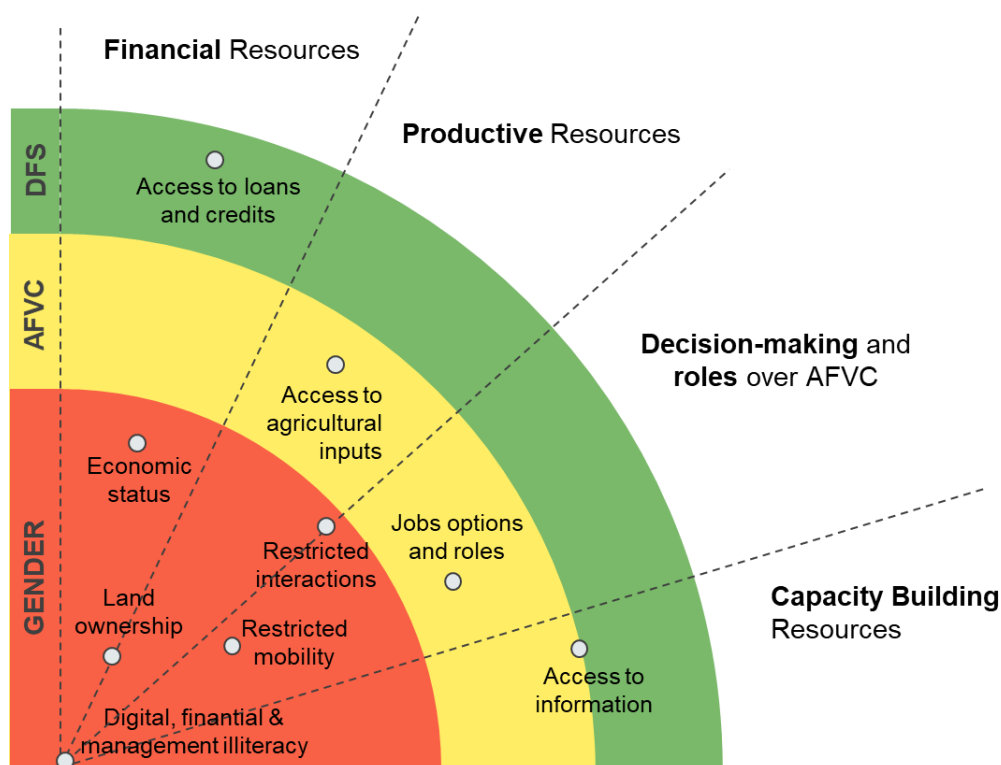


Figure 2: Main challenges to foster women’s empowerment in AFVC in NENA region: lack of financial resources, lack of productive resources, lack of decision-making and roles over the AFVC and lack of capacity building resources.

4.1 Women’s Limited Access to Financial Resources

Financial resources are particularly relevant in AFVC, as financial capacities to invest in equipment and technologies as well as projects and businesses can contribute to increasing productivity and mitigating risks. However, women are often kept away from making investments due to their disadvantaged economic status. Several factors contribute to this, including prevalent lower wages compared to their male counterparts despite the same work¹⁷, which is aggravated for female migrants and refugees. Moreover, women’s work is often unrecognized or unpaid. Women also face time poverty from the burdens of domestic responsibilities, further limiting their capacity to work for extra income. On average, women spend 5.1 times more hours than men on unpaid care work (OECD, 2019). The difficulties to attain loans and credits¹⁸ (including small credits), is another barrier to women’s access to financial resources. This is partly due to a lack of collateral as well as a lack of business development support services, which are significant when applying for loans. The inaccessibility of loans for many women prompts them to resort to alternative sources of funding, which places women at a higher risk of perpetual debt.

¹⁷ For instance, women are often paid at a daily rate instead of hourly rate.

¹⁸ In general, small-scale farmers do not have easy access to formal loans regardless of gender.

4.2 Women's Limited Access to Productive Resources

Limitations to productive resources are another barrier that undermines women's productivity. Women commonly face limited access to agricultural input resources such as tools, equipment, vehicles, machinery, irrigation sources, and agricultural technologies. The considerable mobile gender gap in the NENA region is another potential barrier for women to access productive opportunities enabled by DFS such as e-commerce. In fact, not only are women less likely than men to own and use a mobile phone, but also often have their mobile phones registered under their husbands' names. The largest gender gaps in mobile ownership are found in Oman, Sudan, and Yemen (GSMA, 2022b). Limited land ownership is another important factor. Even though it is legal for women to inherit or own land in many countries in the NENA region, the land is still predominantly owned by men, highlighting the social-cultural factors behind it and pointing out that what is enshrined in the regulations does not necessarily translate into practice. In this sense, in the few countries where data is available (Algeria, Egypt, Lebanon, Morocco, Saudi Arabia, and Tunisia), the share of female agricultural landholders does not exceed 7.1% (FAO, 2023d). These elements increase the vulnerability of female-headed households, including migrant and forcibly displaced women, often under the responsibility of a male family member. For instance, when purchasing agricultural inputs such as seedlings¹⁹, it is common for women to record a male family member's name. Similarly, in few cases where women own inherited lands, women rarely cultivate the land themselves, but rather rent it out or partner with male farmers for cultivation. Not only insecurity of land tenure demotivates women from investing, but lack of land ownership and the inability to rent keep women from accessing credit, undertaking independent activities, or being self-employed. Therefore, limitations to land ownership can lead to far-reaching impacts, including limiting women's productivity as well as undermining women's economic empowerment and agency.

4.3 Women's Limited Access to Capacity-Building Resources

Limited access to capacity-building resources and opportunities poses another challenge for women's empowerment in the NENA region. To begin with, many women in the NENA region are placed in an unfavorable position in exploring various professional opportunities due to illiteracy, lower educational levels, as well as limited digital literacy. For example, the share of women with at least some secondary education is lower than that of men in most countries in the region, with gender gaps above 10% in Algeria, Iraq, and Yemen (UNDP, 2023). Education not only plays a role in productivity, but also has an impact on individuals' roles in AFVC. For instance, illiteracy is often a constraint in taking up sales activities as it requires dealing with invoices and accounting. Furthermore, less educated individuals are often confined to lower-skilled and non-managerial roles in value chains, which can lead to being perceived as less capable of quality work. Further aggravating the matter is women's limited access to information²⁰ on agricultural practices and techniques, marketing and trading, DFS, as well as a holistic view of the agricultural value chains. Moreover, women often face limited access to training and capacity-building interventions and initiatives; meanwhile, services and events that focus on digitalization and DFS, entrepreneurship and advisory services often face challenges to reach women. More concretely,

¹⁹ Although this type of activity is still rare among women

²⁰ Women in the NENA region often rely on second-hand information from male family members.

lower levels of literacy, digital literacy and financial literacy, as well as the need to establish trust and relationships before adopting new services²¹ has demonstrated to increase the cost to deliver DFS to women and the risk faced by DFS providers, which limits their service provision. Together, women could miss out on exploring the potential DFS brings along due to a lack of trust and knowledge in DFS, while limited access to information, training and capacity-building programs can negatively impact women's ability to increase productivity, mitigate risks, respond to shocks or adapt to changes.

4.4 Women's Limited Decision-making and Roles over AFVC

Another major challenge commonly faced by women in the NENA region is limited decision-making power and little control over a range of matters alongside the AFVC despite their considerable contribution. Women's frequent absence in decision-making processes, unequal representation and leadership particularly in rural regions pose challenges to shaping gender-responsive policies, strategies, and investments.

Women only have limited job options, determined by restricted mobility and restricted interaction with the public, particularly male-female interactions outside of the home. Likewise, marital status also comes into play: restricted mobility constraints particularly for married women, while those with children are left with further limited job options. Gender norms attribute to women the main responsibility for housework and childcare, which prevent them leaving their immediate environment and thus challenging their participation in formal AFVC. For example, 89% of Jordan's population consider that children will suffer if mothers are working outside home for a pay and 49% of Yemen's population considers that it is not acceptable for a woman in their family to have paid work outside the home (OECD, 2019). In addition, only jobs that are deemed safe, suitable, or prestigious enough for women are socially acceptable. For instance, it is not socially acceptable for women to access markets or transport products to markets in some NENA countries such as Lebanon. Cultural and social traditions behind nationality also play a role in women's various positions. For instance, while female Syrian agricultural workers are common due to traditional divisions of labor, the general perception of Lebanese society regards Lebanese married women's position to be full-time housewives.

Such restrictions have a significant impact on AFVC: women are excluded from certain roles, such as marketing and trading, as they require interaction with a range of stakeholders, predominantly male. Meanwhile, male stakeholders themselves often prefer a man to be present upon signature of an invoice or contract, because women's signatures are generally not recognized as trustable guarantees. Women's high level of dependency on male family members highlights the exclusion of women and the dominance of men in the agricultural sector. Furthermore, women's lack of control can reduce their incentives to work. Coupled with their exclusion from certain roles on the AFVC, it undermines the potential to expand production, which further impacts income and food security.

²¹ CoAmana, a growing Nigerian digital platform, observed that it cost them 4 times more to serve a woman farmer over 50 compared with their male counterparts, largely due to lower levels of digital literacy and the need of establishing trust and relationship before adopting new services.

5. Opportunities to be leveraged by DFS initiatives

DFS provide several advantages that can effectively address a number of challenges faced by women in the AFVC in the NENA region, such as the lack of financial services in rural areas and the need for mobility. Since women often suffer from time poverty, limited mobility and economic disadvantage due to being excluded from the formal economy, DFS have the potential to not only counteract the aforementioned challenges but also accelerate women's financial inclusion and empowerment. Several strategic focus areas are presented: an ecosystem approach built through multi-sector partnerships enables to synergistically address multiple challenges. In particular, women's networks, structured in associations and cooperatives, strengthen communities, facilitate capacity building activities and the introduction of innovative solutions to accelerate women's economic empowerment (section 5.1). In addition, tailored training and the appropriate communication channel, such as audio communication, are significant to overcome gender gaps in access to information (section 5.2). In line with the concept "high tech high touch", strong human touch with a focus on employment of local female agents and networks as well as physical local presence, is also indispensable to effectively reaching rural women (section 5.3).

5.1 The Ecosystem Approach: a comprehensive support to various accesses

In recent years, the ecosystem approach has been gaining traction across agricultural finance, as it provides comprehensive support covering various customers' needs. In the context of DFS and AFVC, the ecosystem approach often presents itself as a platform serving as a one-stop shop, not only providing access to finance but also access to key inputs, know-how, and market. Therefore, employing an ecosystem approach allows to overcome several challenges faced by rural women in the NENA region and presents the immense potential to be leveraged upon.

For DFS providers, lack of data as well as land ownership, combined with high risk and high cost to serve, pose significant challenges that prevent lending to agriculture, especially women. In this regard, the use of alternative data and regulatory quick, can respond to these challenges from an ecosystem approach. For example, the lack of property titles represents a significant barrier for women to access financial resources, not only in the NENA region but in most rural areas of Africa, Asia, and Latin America. As mentioned above, access to finance is one of the most common challenges women in the NENA region are facing when seeking to strengthen their participation in agrifood value chains. In India, the digital platform Samunnati, solved this problem by encouraging the agrifood producer organizations they work with to change membership criteria from requiring to possess an active land title to having land in the family name to facilitate female farmers' membership application. In Ghana, "FinTech Innovation Office" was recently established on a national level to oversee DFS providers. It provides special regulatory flexibility that greatly reduces entry barriers for DFS providers and encourages participation, particularly for more innovative business models.

Box 1: Samunnati—India

A leading digital platform in India, Samunnati engages with over 2,500 farmer producer organizations (FPOs) and reaches over 4 million farmers. The initiative considers a gender lens in its workforce, with 25% of their employees being women. Samunnati seeks to improve Indian female farmers' access to resources by recognizing their needs have been historically underserved despite significant contribution. It recently launched an initiative to support establishing 100 women-led FPOs, expecting to reach 10,000 female farmers and enable them to gain access to opportunities that would otherwise be out of their reach through collective action. Each women-led FPO is designated with a Samunnati relationship manager, and receives support in advisory, digitization and technical assistance, and financial literacy training. Samunnati also supports female farmers and farming activists by raising awareness through featuring their success stories.

Partnerships and cooperation can provide multiple services and ensure the comprehensiveness of the ecosystem. Multi-level and multi-sector partnerships are of particular importance, as they can create synergies across the entire DFS ecosystem. According to Reham Gharbiye, former AWEF Jordan's Country Director, the ecosystem approach is key in the path toward gender equality through innovation and digitalization in NENA. On her part, Jeanne Schmitt, ILO's Chief Technical Advisor, highlights the role of cooperatives and associations to effectively introduce innovations and reach women in communities²². In this regard, partnership and cooperation with women's cooperatives and associations presents abundant opportunities to catalyze DFS adoption. In this way, cooperatives are playing an important role in individual and collective women's empowerment across the NENA²³ and particularly in Morocco (Ibourk and Raoui, 2022), accounting for 14.5% of the total number of cooperatives in the country in 2014 (Aimane and Wannous, 2018). In this regard, online marketplaces are already used by some women-led organizations to reach larger markets with smaller gender gaps. For instance, the Morocco argan oil women cooperatives group Targanine uses e-commerce platforms to sell nationally and internationally (Targanine, 2021).

Box 2: GIE Targanine - Morocco

The Targanine cooperative project was born in 1996 with the support of the Mohammed V University of Rabat with the double objective of protecting the Argan tree through the economic valorization of its fruits, and of helping to improve the social status of women, increasing their income and giving them access to literacy programmes. Currently, the group brings together 6 cooperatives (with more than 600 women) that produce argan oil, used in food and cosmetics. In 2003, the GIE Targanine was created with the aim of helping cooperatives in the commercialization, promotion and valorization of the product at a national and international level.

²² *Innovation and Digitalization for Gender Equality: experiences from the agrifood sector in the NENA*. FAO and ITU webinar organized for the International women's day (March 9, 2023). <http://www.fao.org/neareast/events/women2023>

²³ Leveraging on the power of collective action, women's cooperatives and associations enable to improve the quality of products, expand production and activities through division of tasks and collective work. They also bring women the opportunity to interact with various stakeholders and participate in various positions within the AFVC, including decision-making and leadership roles and thus help women build management and leadership skills. Since formal groups are generally more recognizable in the NENA region, women's cooperatives and associations contribute to increasing recognition of women's role among AFVC stakeholders and their communities. Collective action also helps exercising higher bargaining power and accessing new markets (SME Finance Forum, 2023).

5.2 Tailored training and effective communication channels

Rural women from the NENA region have generally reduced experiences in certain roles on AFVC and limited access to capacity building resources, such as information and technology, which greatly prevent them from exploring new professional options (e.g. starting new business). In this regard and as an indispensable part of the ecosystem approach, tailored training and effective communication facilitate better access to key inputs and know-how.

One important aspect of tailored training for women is ensuring a women-friendly environment, with female facilitators and in female-only sessions. As many women from the NENA region feel more comfortable around women (Startup Scene, 2023), large potential can be leveraged if woman-only space can be ensured to let women interact freely and create communities where to connect, exchange, and share knowledge with each other. In addition, childcare provision and scheduling training during convenient times for women (e.g. Saturdays) can be helpful to alleviate women's domestic burden. Training conducted in local languages and in community-based venues has also shown better results in reaching the female audience. In this regard, the regular participation of women in the weekly sessions of the Gender Saving Groups (Central Bank of Egypt and Alliance for Financial Inclusion, 2021) in Egypt has been considered of particular importance for the success of the model, which is largely facilitated by the women facilitators who conduct the sessions in rural communities.

Box 3: Gender Savings Groups – Egypt

Initiative developed by the Central Bank of Egypt, in cooperation with several partners, aims to formalize Savings Groups in rural areas by using mobile wallets and builds a formal credit history to increase women's financial inclusion. The program has reached 18,000 beneficiaries from which 92% are female. 6,138 loans have been taken out, 4,357 of which were used for income-generating projects.

Another aspect is a strong focus on the content of the tailored training. Providing know-how related to marketing, selling, and technology can treat the challenge associated with the lack of trading and digital literacy. Complementary to capacity building, gender awareness raising is another issue. Although most of the tailored training is aimed at women, it is particularly useful to open these activities to both genders, including men, to facilitate the incorporation of gender equality concepts within the NENA region society. These activities can address the recognition of women's contribution within the AFVC, the division of domestic responsibilities, and reduce gender-based violence. For example, the Entreprenelle initiative engages men in their activities in order to mitigate gender-based violence.

Finally, ensuring effective communication is another component to improving women's access to inputs and know-how. Audio-based training particularly demonstrates immense potential, as it effectively treats illiteracy, as well as limited technological infrastructure. In fact, radio is still one of the most popular media outlets in rural areas in the NENA region, as it requires little electricity and connectivity infrastructure. Therefore, the design of women-targeted messages through radio channels, along with devising audio-based training and support content, can help to reach and communicate with rural women more effectively. On the other hand, YouTube is gaining ground among women as a known digital channel. In addition, social media and WhatsApp also demonstrates the considerable potential for reaching younger women and connecting rural and

urban populations²⁴. Instagram is one of the most popular social networks, followed by Facebook, accompanied by a diverse landscape of other social networks within the region. Popularity of social media has been leveraged by the Entreprenelle Hub platform, dedicated to helping women become entrepreneurs by providing them with training, awareness, resources and support through its Facebook page (Entreprenelle Hub, 2023). Moreover, blending different channels, both physical, traditional or more modern and digital, often gives better results. In fact, the technological requirements should be complementary and not exclusive, to guarantee that participation in the training is not limited by technological restrictions.

Box 4: Entreprenelle – Egypt

Founded in 2015 in Egypt, Entreprenelle is a social enterprise aiming to empower women in the MENA region economically and integrate them in the entrepreneurship ecosystem by connecting women to all the resources needed. Adopting an ecosystem approach, Entreprenelle establishes extensive partnerships with over 100 partners ranging from governments and enterprises to financial institutions and educational institutes. Entreprenelle facilitates access to resources including know-how, market, and finance through its one-stop digital hub, providing support such as consulting (e.g., branding), training (localized content in hybrid format, with a particular focus on sales, marketing and awareness raising), promoting and match-making potential projects. Entreprenelle leverages both online channels and offline events to reach women, where successful women entrepreneurs stories are shared. Social media such as Facebook and Instagram have enabled Entreprenelle to capture an 1 million online outreach with 300 thousand followers, in addition to a vibrant online community Entreprenelle Hub with over 60 thousand members. It has facilitated over 30 events and 200 workshops in Egypt, and is now expanding into the UAE.

5.3 High Tech High Touch: technology with a focus on human touch

Despite the great benefits offered, the technology does not ultimately replace human touch, but technology opens doors to different, higher value-added applications of that human touch. Accordingly, it is necessary that the employment of DFS in the AFVC is accompanied by a strong focus on human touch, with an emphasis on local physical presence.

Leveraging on a local existing network has been proved as an effective and efficient way to establish human touch on a local level, as well as ensuring better access to several resources. For instance, some DFS providers, such as Apollo Agriculture in Kenya (SME Finance Forum, 2023), effectively leverage an informal local distribution network to gain better access to the market. Others rely on local field agents to interface with farmers, from delivering goods and services to customers, to onboard customers and providing technical support. Working with local field agents helps to take advantage of the synergy with the local referral system, reach rural populations and also tackle the issue of high costs to serve. The Central Bank of Egypt, for example, capitalizing on the success of the informal Village Savings Group scheme introduced in Egypt in 2009, developed the Gender-Savings Group initiative, which aims to formalize those groups through the use of mobile wallets (Central Bank of Egypt and Alliance for Financial Inclusion, 2021) (see box 3).

²⁴ *Innovation and Digitalization for Gender Equality: experiences from the agrifood sector in the NENA*. FAO and ITU webinar organized for the International women's day (March 9, 2023). <http://www.fao.org/neareast/events/women2023>

Box 5: Apollo Agriculture- Kenya

Apollo Agriculture is a DFS provider in Kenya, aiming to help small-scale farmers maximize their profits. Employing an ecosystem and high tech high touch approach, Apollo Agriculture provides farmers access to finance, key inputs, know-how (advisory services and audio-based training), and marketplace through its one-stop-shop digital platform and its “Checkout” App, while managing risk in combination with the use of alternative data. Apollo works extensively with local agents, particularly leveraging female agents and a referral system to effectively reach female farmers. Apollo has reached 200k farmers—nearly half of which are female farmers—and doubled the farmers’ profit by significantly increasing their yields by 2.5 times compared to national average. As a result, 75% of Apollo farmers reported increased productivity, while 84% reported improved quality of life.

Lastly, leveraging the existing mechanism can also facilitate effective communication to address the lack of trust towards new services or technology among the female audience. On the one hand, given the importance of male acceptance in the NENA region, presenting DFS benefits to men first has been identified as an effective strategy to indirectly improve women's confidence (Maftai *et al.*, 2022). On the other hand, a proven approach to tap into women’s networks is by employing female agents. Women agents are reported to be more successful in reaching female farmers (SME Finance Forum, 2023). The Female Agent Project, from Dinarak company, trained 30 women small business owners to act as agents, which resulted in encouraging women to interact directly with agents, improving their ability to use DFS, conduct transactions and access financial information (Dinarak, 2019). In a similar vein, establishing female call centers to have female agents answering women’s questions benefits the introduction of DFS services (e.g. CoAmana). Furthermore, female agents are also local microentrepreneurs, not only presenting other career possibilities but can also serve as role models for other rural women.

Box 6: Dinarak - Jordan

Dinarak, a payment service provider licensed by the Central Bank of Jordan, offers several DFS such as mobile money through the e-Wallet and the online bill payment service eFAWATEER.com. In 2018, The Female Agent Project was launched in partnership with the Arab Women's Enterprise Fund (AWEF), which consisted of a network of 30 women entrepreneurs trained during a one-year program to be agents, who support women customers. In addition, proper marketing has been implemented through social media networks addressed to and designed for women. As a result of these activities, Dinarak has registered an additional 12,309 female e-wallet users against a target of 3,000 female clients during the year of the partnership.

5.4 Sex-disaggregated data: collection, analysis, and further implementation

One common challenge regarding DFS is the lack of gender lenses, largely because many of these services tend to focus on early adopters, which often tend to be male farmers (Maftai *et al.*, 2022). Moreover, although some DFS providers come up with some gender initiatives, they are often lacking a holistic approach which builds the gender lenses into their service (Maftai *et al.*, 2022). The lack of women-tailored services is also largely due to a lack of knowledge of local rural women’s needs²⁵. While some DFS do collect sex-disaggregated data on the basic information, they often do

²⁵ The lack of collecting women’s feedback, as well as sex-disaggregated data collection and analysis result in missing out important insights (Maftai *et al.*, 2022).

not cover every aspect nor analyzed; other DFS providers face the difficulty of making their gender intention and action aligned (Maftai *et al.*, 2022). In this sense, a relevant component to design women-tailored services is to collect women's feedback and sex-disaggregated data. Analysis of this information can provide important insights of rural women's needs and shape more gender-targeted actions. DFS providers can also use these data to establish goals and targets, and facilitate better decision-making. In this regard, the Nigerian digital platform CoAmana demonstrated the usefulness to collect and analyze sex-disaggregated data on customers. For instance, CoAmana implemented a support center entirely staffed by women to provide women—especially the elderly—with additional support, as its data revealed that it took CoAmana 4 times the cost and effort to onboard women aged over 50 compared to their male counterparts, largely due to prevalent digital illiteracy as well as restrictive social constraints.

Box 7: CoAmana - Nigeria

CoAmana is a growing Nigerian digital platform integrating products and services marketplace. It adopts a proactive and diverse approach for sex-disaggregated data collection at every stage, from registration to women's feedback from calls coming into the support call center, followed by a systematic analysis to gain insights into gendered consumer patterns of usage and behavior and make data-informed decisions, which enable CoAmana to develop women-tailored product design and initiatives, as well as marketing strategies targeting women customers. Some of these strategies include leveraging radio for diffusion and going out to communities to reach women customers, as well as phased launch for new technology introduction. Another example is the establishment of an all-women support call center to provide additional support for rural women. As a result, CoAmana's gender focus has enabled them to effectively reach female farmers, composing more than $\frac{3}{4}$ of the farmers using the digital platform.

6. Conclusions and recommendations

Despite women's pronounced role in AFVC in the NENA region, they are, paradoxically, more vulnerable to food insecurity and malnutrition as well as to the impacts of the multiple shocks and crises affecting the region. DFS and the digitization of AFVC may bring a range of benefits, such as accelerating transactions or reducing costs, as well as the appearance of new markets and players. Their penetration is still embryonic and fragmented in the NENA region, constrained mainly by the lack of adequate regulation, the limited infrastructure and connectivity, and the consequent unaffordability of the service, particularly in rural areas. DFS adoption is also deeply gendered in the NENA region (e.g., women's limited financial account or mobile phone ownership). Despite some successful cases of women entrepreneurs in the AFVC, the representation of women is far from being balanced with that of their male counterparts. Furthermore, while some initiatives show positive gender results, others have reduced the role of women in decision-making roles, highlighting that when services are not designed or tailored to women's needs, these initiatives can deepen gender inequalities.

In this context, the main challenges faced by women to access and use DFS for their professional development within the AFVC have been identified and analyzed. Gender gaps in wages, insufficient recognition of women's agricultural labor and time poverty due to excessive household

burdens place women in a disadvantageous economic situation. This situation is exacerbated by limited access to land ownership or productive resources such as agricultural inputs. Gender gaps in literacy and education impact productivity and limit the presence of women in different roles within the AFVC. Current interventions and advisory services related to digital empowerment, DFS and entrepreneurship often face challenges in reaching women. In addition, cultural traditions and social norms, such as reduced mobility, restricted public interaction or the existence of socially non - acceptable jobs for women, leave women with limited employment options within the AFVC and perpetuate women's lack of representation in decision-making processes and leadership.

Thus, through a review of the literature and the analysis of promising cases, several opportunities have been identified to tackle gender inequalities by designing and disseminating DFS that can reach women and meet their specific needs. From this, general recommendations include:

- Document case studies from DFS applications in gender-responsible initiatives related to the AFVC in the NENA region. Analysis of the success factors and failure patterns of already implemented initiatives can provide lessons learned and meaningful insights to improve future interventions in the region.
- Collect and analyze sex-disaggregated data related to the nexus DFS-AFVC-GENDER in the NENA, improve gender mainstreaming measures and promote further actions based on this data to meet women's specific needs.
- Build DFS initiatives through an ecosystem approach with multi-sector partnerships, including women-led cooperatives and associations. The ecosystem approach enables addressing multiple challenges at once and creating consistent initiative.
- Design tailored training on digitalization and DFS usage and leverage on effective communication channels such as social media, WhatsApp and YouTube, to better reach women and improve their access to information and capacity-building resources.
- Accompany DFS provision with local human touch. Leveraging local trustable networks and female agents is an effective way of reaching rural women.

References

- AFI's DFS Working Group.** 2023. Alliance for Financial Inclusion - Digital Financial Services (DFS). In: *Alliance for Financial Inclusion - Digital Financial Services (DFS)*. Cited 8 January 2023. <https://www.afi-global.org/working-groups/dfs/>
- Aimane, H. & Wannous, M.** 2018. *Utilizing an e-commerce platform for cooperatives: A marketing strategy to enhance sales through internet case study of Morocco work in progress*. In: *2018 IEEE International Conference on Applied System Invention (ICASI)*. 2018 IEEE International Conference on Applied System Invention (ICASI), April 2018. <https://doi.org/10.1109/ICASI.2018.8394378>
- Amnesty International.** 2023. The World's Refugees in Numbers. In: *Amnesty International*. Cited 8 January 2023. <https://www.amnesty.org/en/what-we-do/refugees-asylum-seekers-and-migrants/global-refugee-crisis-statistics-and-facts/>
- Attia, H. & Benson, C.C.** 2018. *Digital Financial Services: Payment Aspects for Financial Inclusion in the Arab Region*. Arab Monetary Fund. <https://www.amf.org.ae/sites/default/files/publications/2022-01/dfs-payment-aspects-for-financial-inclusion-in-the-arab-region.pdf>
- Barakat, H.N.** 2021. Right to Food and Food Sovereignty from a Gender Perspective
- Central Bank of Egypt & Alliance for Financial Inclusion.** 2021. *Gender Savings Groups: Formalizing Village Savings Groups with a Gender Lens - Egypt Case Study*. https://issuu.com/afi-global/docs/egypt_casestudy_sg_web_final_v4/1
- CIHEAM.** 2021. DIGITAL INNOVATIONS AND OPPORTUNITIES FOR WOMEN ENTREPRENEURS IN RURAL AREAS. In: *CIHEAM*. Cited 8 January 2023. <https://www.ciheam.org/agendas/digital-innovations-and-opportunities-for-women-entrepreneurs-in-rural-areas/>
- Dinarak.** 2019. ENABLING FINANCIAL INCLUSION THROUGH DINARAK FEMALE AGENT NETWORK. In: *Dinarak*. Cited 9 January 2023. <http://dinarak.com/news/enabling-financial-inclusion-through-dinarak-female-agent-network/>
- El-Enbaby, H., Gilligan, D., Karachiwalla, N., Kassim, Y. & Kurdi, S.** 2019. *Cash transfers and women's control over decision-making and labor supply in Egypt*. Washington, DC, International Food Policy Research Institute. <https://doi.org/10.2499/p15738coll2.133538>
- Entreprenelle Hub.** 2023. Entreprenelle Hub | Facebook. Cited 9 January 2023. <https://www.facebook.com/groups/entreprenellehub/about/>
- ESCWA.** 2017. *Agriculture and natural resources*. <https://archive.unescwa.org/sites/www.unescwa.org/files/uploads/background-paper-1.pdf>
- FAO.** 2018. *Sustainable food systems: Concept and framework*. <https://www.fao.org/3/ca2079en/CA2079EN.pdf>
- FAO.** 2021. Gender-responsive digitalization. A critical component of the COVID-19 response in Africa. <https://www.fao.org/3/cb5055en/cb5055en.pdf>
- FAO.** 2022a. *The State of Land and Water Resources for Food and Agriculture in the Near East and North Africa region*. Cairo, FAO. <https://doi.org/10.4060/cc0265en>
- FAO.** 2022b. The importance of Ukraine and the Russian Federation for global agricultural markets and the risks associated with the war in Ukraine
- FAO.** 2022c. *Gender, water and agriculture*. FAO. <https://doi.org/10.4060/cc0452en>
- FAO.** 2023a. FAO Regional Office for Near East and North Africa | Food and Agriculture Organization of the United Nations. Cited 8 January 2023a. <https://www.fao.org/neareast/regional-office/en/>

- FAO.** 2023b. Sustainable and Inclusive Agrifood Value Chains | FAO Regional Office for Near East and North Africa. Cited 8 January 2023b. <https://www.fao.org/near/east/action-areas/agrifoodvaluechains/ru/>
- FAO.** 2023c. Agrifood chains. Cited 8 January 2023c. <https://www.fao.org/energy/agrifood-chains/en/>
- FAO.** 2023d. Statistics. Gender and Land Rights Database. FAO. Cited 8 January 2023d. https://www.fao.org/gender-landrights-database/data-map/statistics/en/?sta_id=982
- FAO, IFAD, UNICEF, WFP, WHO and ESCWA.** 2021. *Near East and North Africa Regional Overview of Food Security and Nutrition 2020*. FAO. <https://doi.org/10.4060/cb4902en>
- FAOSTAT.** 2021. Prevalence of moderate and severe food insecurity in the population (percent) (annual value). Data for Western Asia and Northern Africa. Cited 8 January 2023. <https://www.fao.org/faostat/en/#data/FS/visualize>
- GSMA.** 2022a. *Reaching and Empowering Women with Digital Solutions in the Agricultural Last Mile*
- GSMA.** 2022b. GSMA Mobile Connectivity Index 2022. In: *2022 – GSMA Mobile Connectivity Index*. Cited 8 January 2023. <https://www.mobileconnectivityindex.com/>
- Ibourk, A. & Raoui, S.** 2022. Impact des coopératives féminines sur l'autonomisation des femmes au Maroc -Analyse spatiale-. pdf
- ICRW.** 2019. *Gender-smart investing: Agriculture case study*. https://www.icrw.org/wp-content/uploads/2019/09/ICRW_MyAgro_CaseStudy-rev.pdf
- IFAD.** 2023. Near East, North Africa, Europe and Central Asia. In: *IFAD*. Cited 8 January 2023. <https://www.ifad.org/en/web/operations/regions/nen>
- ILO.** 2021. Labor force participation rate, female (% of female population ages 15+) (modeled ILO estimate) - Tunisia, Egypt, Arab Rep., Morocco, Jordan, Kuwait, Bahrain, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, | Data. Cited 7 January 2023. <https://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS?locations=TN-EG-MA-JO-KW-BH-LB-OM-QA-SA-SY-A>
- ILO.** 2022. Female share of employment in senior and middle management (%). Cited 7 January 2023. https://data.worldbank.org/indicator/SL.EMP.SMGT.FE.ZS?end=2021&name_desc=false&start=1992&view=chart
- Lehel, S.** 2023. FAO's commitment to empowering rural women in the Near East and North Africa region. Cited 8 January 2023. https://www.ciheam.org/uploads/attachments/919/WL40_3FAO_s_commitment.pdf
- Maftai, A., Devermann, S., Shakhovskoy, M. & Naeve, K.** 2022. *Making Digital Platforms Work for Women in Rural Agricultural Livelihoods*. <https://www.findevgateway.org/slide-deck/2022/12/making-digital-platforms-work-women-rural-agricultural-livelihoods>
- Mediterranean Sea Basin Programme.** 2023. InnovAgroWoMed. In: *ENI CBC Med*. Cited 8 January 2023. <https://www.enicbcmmed.eu/projects/innovagrowomed>
- Najjar, D. & Badstue, L.** 2020. Four ways of strengthening gender equality in the agricultural sector in the MENA region. In: *CIMMYT*. Cited 8 January 2023. <https://www.cimmyt.org/news/four-ways-of-strengthening-gender-equality-in-the-agricultural-sector-in-the-mena-region/>
- Najjar, D., Percic, M., Baruah, B., Aw-Hassan, A. & Stloukal, L.** 2023. Women, Decent Work and Empowerment in Rural Egypt
- OECD.** 2019. Gender, Institutions and Development Database 2019. Cited 8 January 2023. <https://stats.oecd.org/viewhtml.aspx?datasetcode=GIDDB2019&lang=en>
- Pazarbasioglu, C., Mora, A.G., Uttamchandani, M., Natarajan, H., Feyen, E. & Saal, M.** 2020. *Digital Financial Services*. World Bank.
- Rauschendorfer, J. & Krivonos, E.** 2022. *Implications of the war in Ukraine for agrifood trade and food security in the Southern and Eastern Mediterranean: Egypt, Jordan, Lebanon, Morocco and Tunisia*.

- FAO. <https://doi.org/10.4060/cc0955en>
- Robinson, D.S.** 2019. The Virtual Market Place. (3).
<https://www.s4ye.org/sites/default/files/2020-01/S4YE%20Digital%20Jobs%20Knowledge%20Brief%203%20-%20E-commerce%20and%20Women-led%20SMEs%20in%20MENA.pdf>
- Seghirate, Y.** 2017. Mediterranean Women in Rural and Agricultural Communities: Double Jeopardy, Multiple Opportunities. Cited 8 January 2023.
<https://www.iemed.org/publication/mediterranean-women-in-rural-and-agricultural-communities-double-jeopardy-multiple-opportunities/>
- Simon, C.A.** 2019. *The Effect of Cash-based Interventions on Gender Outcomes in Development and Humanitarian Settings*. UN Women Discussion Papers. UN.
<https://doi.org/10.18356/94dbe778-en>
- SME Finance Forum.** 2023. AgriFinance Community of Practice (CoP) - Partnerships with AgTech platform: exploring win-win models. In: *SME Finance Forum*. Cited 9 January 2023. <https://www.smefinanceforum.org/post/agrifinance-community-of-practice-cop-bank-fintech-partnership>
- Startup Scene.** 2023. Meet the 8 Migrant Entrepreneurs Who Rocked at Cairo's "Women On The Move". In: *Startupscene*. Cited 9 January 2023.
<http://thestartupscene.me/MenaEcosystems/Meet-8-Migrant-Entrepreneurs-Who-Rocked-Women-On-The-Mov>
- Targanine.** 2021. Gie Targanine. Cited 9 January 2023. <https://targanine.com/en/>
- Tricarico, D. & Chassin, L.** 2021. *Agri DFS: Emerging business models to support the financial inclusion of smallholder farmers*. GSMA.
- UNDP.** 2023. *Gender Inequality Index*. United Nations. Cited 9 January 2023.
<https://hdr.undp.org/data-center/thematic-composite-indices/gender-inequality-index>
- USAID.** 2020. Digital Financial Services in the MENA Region. Cited 9 January 2023.
<https://shopsplusproject.org/sites/default/files/resources/Digital%20Financial%20Services%20in%20the%20MENA%20Region.pdf>
- Women Entrepreneurs Finance Initiative.** 2023. Where We Work | Women Entrepreneurs Finance Initiative. Cited 8 January 2023. <https://we-fi.org/where-we-work/>
- Women in Business.** 2023. Women in Business. In: *Women in Business*. Cited 8 January 2023a.
<https://womeninbusiness-mena.com/digital-wib>
- Women in Business.** 2023. Ouanani Nânaa. In: *Women in Business*. Cited 8 January 2023b.
<https://womeninbusiness-mena.com/success-stories/ouanani-nanaa>
- Women in Business.** 2023. Yomna el Sheridy. In: *Women in Business*. Cited 8 January 2023c.
<https://womeninbusiness-mena.com/success-stories/yomna-el-sheridy>
- World Bank.** 2019. Employment in agriculture (% of total employment) (modeled ILO estimate) - Mauritania, Sudan, Morocco, Yemen, Rep., Bahrain, United Arab Emirates | Data. Cited 8 January 2023.
<https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=MR-SD-MA-YE-BH-AE>
- World Bank.** 2021a. Ratio of female to male labor force participation rate (%) (modeled ILO estimate) - Tunisia, Egypt, Arab Rep., Morocco, Jordan, Kuwait, Bahrain, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, Yemen, Rep., Algeria, Libya, Mauritania, Sudan | Data. Cited 8 January 2023.
<https://data.worldbank.org/indicator/SL.TLF.CACT.FM.ZS?end=2021&locations='TN-EG-MA-JO-KW-BH-LB-OM-QA-SA-SY-AE-YE-DZ-LY-MR-SD&start=1990&view=chart>
- World Bank.** 2021b. Rural population (% of total population) - Middle East & North Africa | Data. Cited 8 January 2023.

- <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=ZQ>
- World Bank.** 2021c. The Global Findex Database. In: *World Bank*. Cited 8 January 2023.
<https://www.worldbank.org/en/publication/globalfindex/Data>
- World Bank.** 2021d. *Digital Revitalization of the Agri-food Sector in Mashreq. Focus on Iraq, Jordan, and Lebanon*.
<https://documents1.worldbank.org/curated/en/810711621219470465/pdf/Digital-Revitalization-of-the-Agri-food-Sector-in-Mashreq-Focus-on-Iraq-Jordan-and-Lebanon.pdf>
- World Bank.** 2023. Financial Inclusion. In: *World Bank*. Cited 8 January 2023.
<https://www.worldbank.org/en/topic/financialinclusion/overview>
- World Bank Blogs.** 2023. “DigitalAg4Her” in Lebanon: Finding solutions by & for women for more productive agriculture. Cited 8 January 2023.
<https://blogs.worldbank.org/arabvoices/digitalag4her-lebanon-finding-solutions-women-more-productive-agriculture>
- World Economic Forum.** 2022. *Global Gender Gap Report 2022*.
<https://www.weforum.org/reports/global-gender-gap-report-2022/in-full/1-benchmarking-gender-gaps-2022/>
- Yahia, E. & Smolak, J.** 2014. *Developing the Cold Chain for Agriculture in the Near East and North Africa (NENA). Policy Brief*