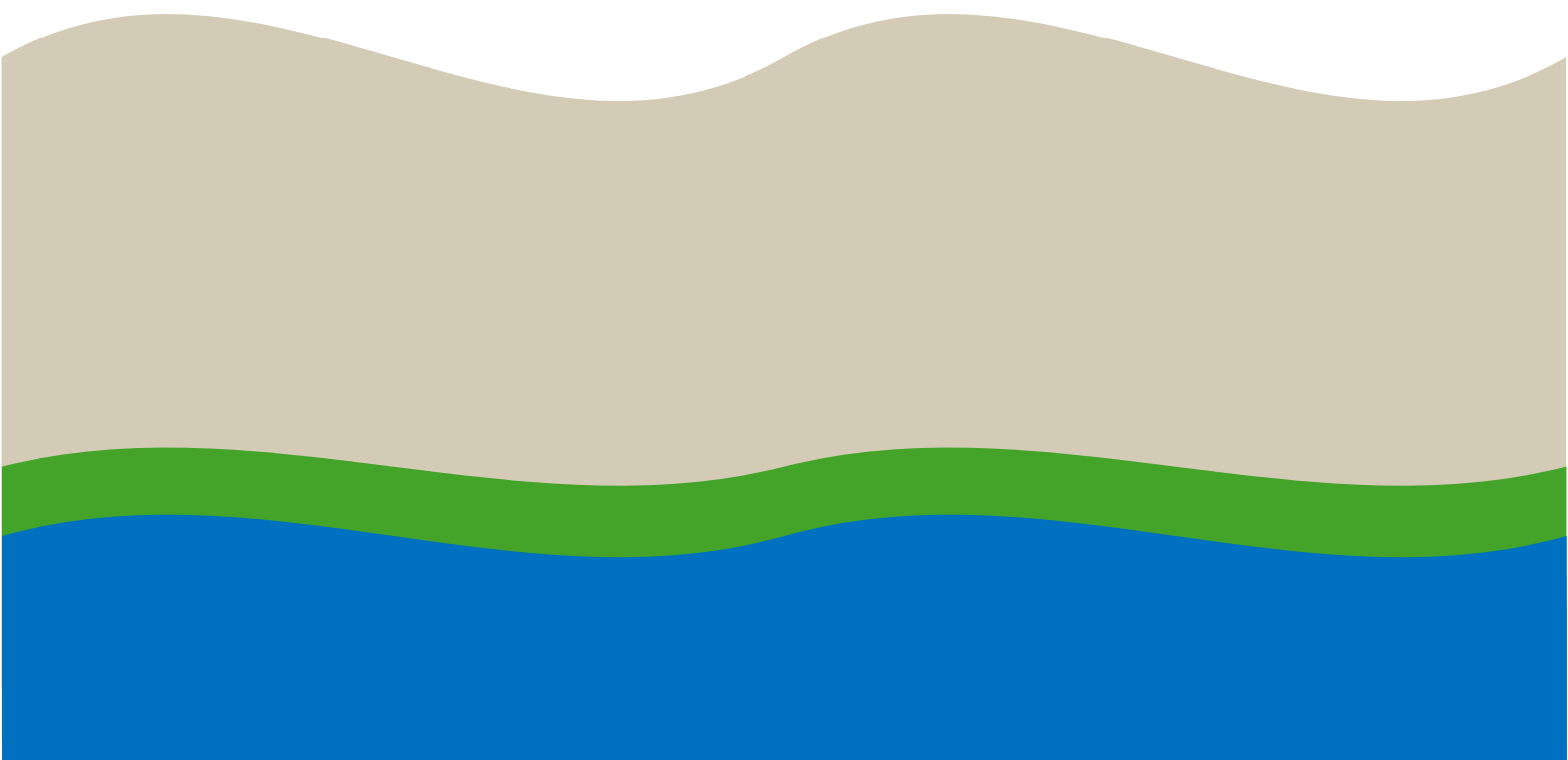




Food and Agriculture
Organization of the
United Nations

Part 6: Farmer Field School digital support

Climate-smart Farmer Field School curriculum



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Climate-smart Farmer Field School curriculum

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This training material Part-6: Farmer Field School digital support delves into the integration of digital tools within the CS-FFS model. Recognizing the vital role of digital support in modern agriculture, particularly in the face of climate change, this module equips both facilitators and farmers with the knowledge and skills to effectively utilize these technologies. It also aims to enhance field school implementation, align the CS-FFS methodology with climate-smart practices, and standardize implementation for uniformity and quality across diverse regions and sectors.

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Acronyms

AESA	agroecosystem analysis
AI	artificial intelligence
BRCCJ	Building resilience to cope with climate change in Jordan through improving water use efficiency in the agriculture sector
CBFS	climate business field school
CSA	climate-smart agriculture
CS-FFS	climate-smart Farmer Field School
ERA	entrepreneurs for rural access
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
GCF	Green Climate Fund
GPS	global positioning system
GSM	global system for mobile communication
ICTs	information and communication technologies
IEC	information, education and communication
IVR	interactive voice response
JMD	Jordan Metrological Department
MOA	Ministry of Agriculture, Jordan
NARC	National Agriculture Research Centre
ODK	open data kit
SMS	short message service
TOF	training of facilitators
TOT	training of trainers
WOS	women open school

Background

Digital support is vital for climate change adaptation in climate-smart Farmer Field School (CS-FFS). Sensors and precision agriculture technologies provide farmers with real-time monitoring of soil, temperature, and other critical factors. This data allows for optimal resource use and helps manage risks posed by unpredictable weather patterns, especially important in Jordan, a water-scarce country (World Bank, 2022). Identifying digital agriculture tools in result would benefit the agriculture community ensuring security of food for farmers around Jordan. Government, private sector, and development organizations must collaborate to fully realize the potential of digital support in CS-FFS. Investing in rural internet infrastructure, digital skill-building for farmers, and the development of user-friendly agricultural applications will create the necessary environment. Bridging this digital divide will pave the way for a tech-savvy, resilient, and ultimately more prosperous agricultural sector in Jordan.

Smartphones hold great potential for agricultural transformation by streamlining operations and integration with precision agriculture systems. Farmer Field Schools (FFS), known for addressing local challenges and adaptability, can greatly benefit from the integration of digital support. Digitizing processes like problem diagnosis, pest identification, soil health monitoring, and programme evaluation strengthens FFS programmes, helping farmers make informed, timely decisions for climate-smart agriculture (FAO, 2023).

Learning objectives

This training module empowers facilitators and farmers participating in CS-FFS to successfully integrate digital tools that support climate-smart agriculture in Jordan. CS-FFS facilitators and farmers will:

- Discover a range of digital tools that can enrich CS-FFS facilitation and enhance farmer learning.
- Assess the suitability of specific digital tools within the unique agricultural context of Jordan.
- Design clear action plans for implementing chosen digital tools to maximize their effectiveness within the CS-FFS model.
- Learn to establish a digital community for farmer-to-farmer knowledge sharing and leverage visual storytelling to enhance learning.
- Integrate digital tools with field activities and learn online community management.

Digital evolution of Farmer Field School

The Farmer Field School (FFS) approach, born from the need for sustainable and participatory agricultural development, has empowered farmers worldwide for decades. Traditionally, FFS programmes rely on hands-on learning, field experimentation, and collective problem-solving to enhance agricultural practices. In today's rapidly changing world, digital tools are transforming the FFS landscape, providing a powerful new toolkit to facilitators and farmers alike.

Digital technology offers vast potential to expand the reach and effectiveness of FFS programmes. Mobile apps, online platforms, and even simple short message service (SMS) systems streamline the flow of knowledge. Farmers who once relied on limited local expertise can now tap into a global network of agricultural information on topics like climate-smart techniques, pest management, and market trends. This access to timely, tailored advice empowers farmers to make more informed decisions, boosting crop yields and resilience in the face of climate change.

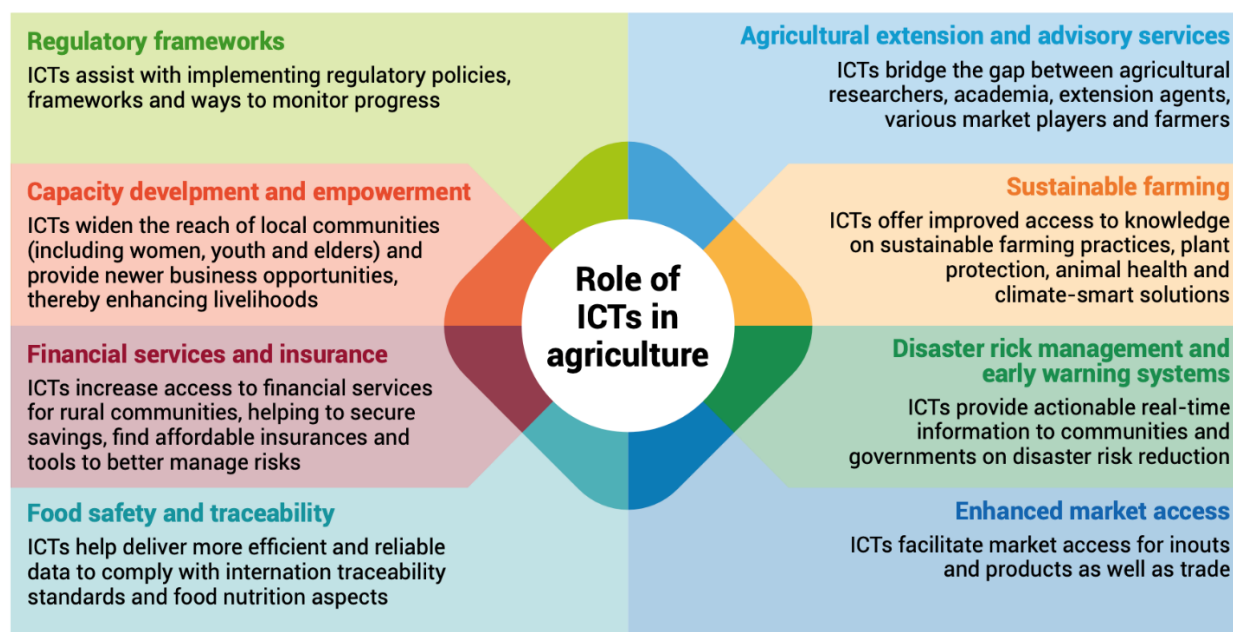
Communication and collaboration, cornerstones of the FFS approach, find new avenues through digital platforms. Facilitators can connect more easily with experts and other FFS groups, drawing on a broader knowledge base for addressing complex agricultural challenges. Farmers can share experiences, learn from their peers across geographic distances, and build a support network.

Precision agriculture tools, when integrated with FFS programmes, empower data-driven decision-making. Sensors monitoring soil moisture or crop health allow farmers to optimize resource use and respond quickly to emerging issues, which is particularly crucial in regions with water scarcity. Data collected through FFS activities can enhance research and extension services, ensuring they align with the real needs of farmers on the ground.

While digital tools offer immense possibilities, it's crucial to recognize that they are not meant to replace the core philosophy of FFS. The hands-on learning experience in the field remains irreplaceable. Rather, digital tools should be integrated thoughtfully to complement on-the-ground activities, ensuring they are accessible, user-friendly, and tailored to local contexts. This combined approach will pave the way for the next generation of Farmer Field Schools - digitally-enhanced, resilient, and ready to meet the challenges of the 21st century.

Information and communication technologies (ICTs) offer a powerful tool to empower farmers under CS-FFS in Jordan. Simple images on smartphones or tablets greatly enhance the identification of pests, diseases, and deformities in plants and animals. Videos effectively demonstrate agricultural practices, share experiences from other farmers, or showcase success stories, motivating and inspiring CS-FFS participants. By building upon the existing use of ICTs by farmers and extension workers, e-empowerment drives wider adoption and impact at the community level.

Figure 1. Role of ICTs in agriculture



Source: FAO, 2018. International Telecommunication Union adapted from –E-Agriculture Strategy Guide (Piloted in Asia-Pacific Countries). www.fao.org/3/MW402EN/mw402en.pdf

Challenges and opportunities

The Jordanian government and organizations like FAO recognize the potential of mobile technology in agriculture. With targeted app development, strategic investment in digital skills, and a focus on addressing farmers' specific needs, the availability of internet all around the country and the spread of mobile phones around the country, Jordan can harness mobile apps to boost productivity, efficiency, and the overall sustainability of its agricultural sector.

- Many Jordanian farmers lack awareness about the existence of agricultural apps. To fully leverage this technology, initiatives that focus on spreading knowledge about these tools alongside app development are needed. Additionally, some farmers may need training to fully utilize these apps.
- Rural internet connectivity may pose challenges in some areas. This needs to be addressed for widespread adoption.
- The most impactful apps will likely be those developed through partnerships between tech specialists, research institutions like NARC, and organizations that understand farmers' needs on the ground.

Opportunities and limitations of ICTs in Jordanian Farmer Field Schools

Information and communication technologies (ICTs) offer tremendous promise for transforming agricultural practices in Jordan through Farmer Field Schools. However, specific challenges need to be addressed to maximize their potential.

Opportunities

- Enhanced knowledge transfer – ICT tools (videos, images, interactive platforms) surpass traditional text-based learning. This caters to diverse learning styles and boosts the adoption of improved farming techniques.
- Access to expertise and information – Farmers can connect with extension workers, researchers, and peers, bridging geographical divides. They gain timely advice on pest management, weather patterns, market prices, and more.
- Strengthened networks – ICTs foster communities of practice, allowing farmers to share successes, troubleshoot problems collectively, and access peer-to-peer support.
- Efficient Data Management – Digital record-keeping streamlines data on yields, inputs, and practices, informing decision-making and demonstrating the value of FFS interventions.

Table 1. Challenges and mitigation actions

Challenge	Mitigation actions
Digital inequality – Digital literacy gaps, gender disparities, and cost can exclude farmers, making the benefits of ICT unevenly distributed.	Conduct needs assessments to understand the digital landscape. Offer tailored training (including women-focused sessions) to build ICT literacy. Advocate for policies that support digital access for all.
Limited infrastructure – Some areas in Jordan lack strong internet connectivity hindering the use of ICTs within FFS programmes.	Explore offline ICT tools (e.g. pre-loaded digital libraries) alongside online resources. Seek partnerships with telecom companies and government to improve connectivity in some areas. Investigate solar or alternative energy solutions.
Misinformation – Online platforms might contain unreliable or inaccurate information, potentially leading to poor farming decisions.	Emphasize information literacy skills. Train farmers in source evaluation and cross-referencing. Partner with trusted agricultural institutions for verified content.
High costs – The purchase of devices (smartphones, tablets) and data plans can strain budgets for individual farmers and FFS organizations.	Negotiate bulk purchases or subsidies on devices and data. Explore equipment-sharing models or rental schemes within communities. Advocate for government support on ICT costs for FFS initiatives.

Source: Authors' own elaboration.

Box 1. ICTs and Farmer Field School

Opportunities	Risks	Possible mitigation
<ul style="list-style-type: none"> ■ Improved access to new information, farmer education on digital literacy, sharing experiences from wider sources within/outside the FFS community by farmers and facilitators ■ Contribute to and facilitate community-wide ecological awareness and problem-solving through alert, diagnostic and monitoring systems e.g. fall army worm (FAW), natural resource management tools, geographical information system mapping, fish stocks assessment tools ■ ICTs can improve communication by reaching out more democratically (e.g. to women, youth) and thus providing tools and larger data sets to empower the facilitator in analysing the information ■ Improved access of facilitators to advisory support systems and multiple data sets for technical information based on needs (weather, soils, vet services, markets, global positioning system GPS)/site mapping ■ Facilitate networking among facilitators and FFS for peer learning and mentoring ■ Facilitate collective activities (market information, bulk buying, bulk selling) and finance ■ Timely monitoring of results for quicker problem-solving 	<p>Cost & economic exclusion</p> <ul style="list-style-type: none"> ■ Inaccessibility of ICTs to farmers due to cost of devices, internet access, and poor connectivity in rural areas ■ High cost of data collection, management, and storage 	<ul style="list-style-type: none"> ■ Start simple, tailor solutions to context (e.g. offline apps) ■ Use common basic, accessible tools like community radio, basic phone ■ Contextualize new content to resonate with local realities and examples
	<p>Digital literacy & learning process</p> <ul style="list-style-type: none"> ■ Lack of knowledge of ICT use ■ Mistrust of ICT tools by farmers & preference to learn from peers ■ Loss of touch with human interaction ■ High risk of exclusion of certain individuals and groups because of connectivity arising out of low literacy levels, therefore disempowerment ■ Content may not be relevant, and the language used online may be a barrier 	<ul style="list-style-type: none"> ■ Bridge the gender digital gap by engaging women and youth in rural areas to provide services to disadvantaged groups/FFS/communities ■ Identify/prioritize farmer's needs, simplify and tailor content, translate into local languages ■ Provide capacity building on ICT to farmers and facilitators ■ Capitalize on experience, find synergies
	<p>Quality</p> <ul style="list-style-type: none"> ■ Simplistic view of agro ecosystems dynamics leading to wrong decisions ■ Potential reduction in quality of joint experimentation and learning dilute the impact of FFS ■ Reintroduction of top-down approach to extension delivery ■ Biased, non-contextualized, non-actionable online information 	<ul style="list-style-type: none"> ■ Make ICTs complementary rather than replacing field discovery learning approaches in FFS ■ Prioritize the collection of relevant/meaningful data for decision-making/research into use ■ Establish feedback loops – two-way interaction between farmers and facilitators ■ Verify and filter online information before use

Source: FAO, 2023. E-empowerment tips for facilitators – Information and communication technologies for Farmer Field Schools. <https://doi.org/10.4060/cc6730en>

Digital support in climate-smart Farmer Field School

To maximize the potential of digital tools in CS-FFS, careful attention should be paid to bridging the digital divide, leveraging existing infrastructure, and emphasizing quality content. It's essential to assess technological gaps within the farming communities, provide tailored training, and advocate for policies that improve rural connectivity. Partnering with non-government organizations (NGOs), telecoms, and government agencies can increase the reach and impact of ICTs within FFS programmes. A focus on developing reliable, curated content and fostering a network of experts and farmers is crucial for building trust in digital tools and creating a sustainable model for information sharing.

Integrating ICTs into Jordanian Farmer Field Schools

ICTs offer the potential to reshape Farmer Field Schools in Jordan, making them more responsive, knowledge-rich, and empowering for farmers. Here's how to make this vision a reality:

1. Bridging the digital divide

- Conduct thorough needs assessments across FFS participants to understand differences in access, digital literacy, and preferences regarding ICT tools.
- Design inclusive training programmes not just on how to use technology, but also on how to evaluate online information critically. Prioritize programmes for women and other potentially marginalized groups.
- FFS facilitators and organizations should become advocates for better rural connectivity, affordable devices, and policies that promote digital skills across agricultural communities.

2. Leveraging existing infrastructure and resources

- Combine online resources with low-tech alternatives like SMS, radio programmes, and pre-loaded digital libraries on shared devices. This offers flexibility and resilience.
- Collaborate with NGOs, telecom companies, and government agencies to pool resources, share expertise, and build sustainable ICTs solutions for FFS.
- Seek grants, subsidies, or partnerships to address the costs of devices, data plans, and training programmes necessary for ICTs integration.

3. Emphasizing quality content and networks

- FFS facilitators can partner with agricultural extension services or research institutions to identify reliable sources and develop curated content libraries for farmers.

- Facilitate online and offline communities of practice where farmers, experts, and FFS facilitators can discuss challenges, share best practices, and build trust in digital information sources.
- Encourage farmers to become active contributors to knowledge sharing through simple data collection tools and feedback mechanisms, making ICTs a two-way street.

4. Policy and institutional support

- FFS programmes should develop plans for ICTs integration with clear goals, budgets, and monitoring mechanisms.
- Advocate for policies that recognize the role of ICTs in agricultural development and support their integration into extension services and FFS-like programmes.
- Government incentives or subsidies for ICT adoption by FFS and farmers can be a significant driver of change.

Box 2. Assess your context for ICT integration in CS-FFS

List down several ICTs that are common and known to you and the farmers

Action	Parameters
1. Use an appropriate tool to assess them against these parameters to select relevant ones for FFS	<ul style="list-style-type: none"> ■ Awareness of ICTs – do they know it and its use, have they used it? ■ Availability/accessibility- do the farmer or their family members use ICTs? ■ Affordability – what is the cost, and what strategies can be used? ■ Appropriateness – in what ways can farmers use ICTs? ■ Adaptability – is it flexible enough to address more than one need?
2. Evaluate the barriers to access and use of the selected ICTs and together with farmers, and discuss how to overcome them	<ul style="list-style-type: none"> ■ Connectivity – availability of internet services ■ Cost – how much, can farmers afford, how can they to pay for the service? ■ Content – what is relevant to the farmer, for what do they need the ICTs? ■ Capacity – what is available in terms skills, resources, etc... what is the gap? ■ Confidence – to navigate a particular ICT
3. Assess the requirements for the access and use of the ICTs selected	<ul style="list-style-type: none"> ■ Process – e.g. is it easy to acquire a sim card for a mobile phone? What do they require? how long does it take? ■ People-centred – can the ICTs enable reach out to more farmers in the community? ■ Practices – can the ICTs facilitate learning of new practices? ■ Participation – does the ICTs enable the participation of farmers, does it allow for two-way communication, does it allow discussion, etc.?
4. Assess opportunities within reach that you and the farmers can harness	<ul style="list-style-type: none"> ■ Infrastructure – is there communication infrastructure that allows for connectivity? ■ Investment – are there institutions that have invested in providing communication services within the community? Are there service providers that have invested in farmer-centric products e.g. digital financial services, digital information services for agriculture, market information services etc.? ■ Innovation – what innovations can you suggest or implement to make ICTs work? ■ Inclusiveness -- are these services pro-farmer/pro-poor, are there specific products suited for the farmer?
5 Finally, for the selected options discuss how to ensure:	<ul style="list-style-type: none"> ■ Simplicity ■ Scalability ■ Sustainability

Source: FAO. 2023. E-empowerment tips for facilitators – Information and communication technologies for Farmer Field Schools. <https://doi.org/10.4060/cc6730en>

Digital support for e-empowerment under the CS-FFS approach envisions the use of technology to boost the effectiveness and reach of this hands-on learning methodology. FFS programmes traditionally focus on experiential learning, where farmers experiment, observe, and analyse agricultural practices directly in the field. Digital support aims to enhance this process in several keyways:

Table 2. Keyways to enhance FFS programme

Knowledge sharing	Mobile apps, online platforms, and even simple SMS services can deliver essential information on climate-smart agriculture, pest and disease management, market trends, and weather forecasts. Farmers can access this knowledge on-demand, overcoming barriers of distance or limited access to traditional extension services.
Communication and collaboration	Digital tools facilitate communication between farmers, FFS facilitators, and experts. This creates a network of knowledge exchange, enabling farmers to ask questions, share their experiences, and learn from one another on a wider scale.
Data-driven decision making	Sensor-based technologies and precision agriculture tools enable farmers to gather real-time data on soil moisture, temperature, and other factors impacting their fields. This data empowers them to make informed decisions about irrigation, fertilization, and crop management, especially crucial in the context of climate change adaptation.
Market access	E-commerce platforms help farmers overcome geographical limitations and connect directly with buyers. These platforms offer the potential for better prices, expanded customer bases, and reduced reliance on intermediaries. Digital traceability systems can enhance the value of their products by assuring consumers of their origin and quality.
Enhanced learning experience	Digital tools like videos, simulations, and interactive tutorials can supplement hands-on FFS activities, providing visual demonstrations of complex techniques or illustrating concepts that are difficult to observe in a single growing season.

Source: Authors' own elaboration.

Table 3. Digital tools for CS-FFS

Tool type	Facilitators	Farmers	Examples for Jordan
Communication and collaboration	<ul style="list-style-type: none"> - WhatsApp - Zoom - Google Meet - Facebook groups 	<ul style="list-style-type: none"> - WhatsApp - Facebook groups 	Consider forums dedicated to Jordanian agriculture to foster knowledge exchange.
Data collection and analysis	<ul style="list-style-type: none"> - BRCCJ's custom application - Excel - Google Sheets - ODK Collect - Kobo toolbox - Other mobile applications 	<ul style="list-style-type: none"> - Simplified customised data entry applications - Plantix application for crop problem identification 	Look into survey tools that have Arabic language interfaces.
Weather info and forecasting	<ul style="list-style-type: none"> - Jordan meteorological department (JMD) application and website - Specialized agriculture weather platforms 	<ul style="list-style-type: none"> - JMD application - SMS weather alerts 	Include resources addressing Jordan's water scarcity issues.
Knowledge Sharing Platforms	Online resources on CSA, databases, forums (international and regional)	<ul style="list-style-type: none"> - Arabic language CSA resources, videos or tutorials on water-saving techniques - Use of handy multimedia for local level display of video material 	FAO resources, Jordanian university websites (check if they have extension services).
SMS and voice-based systems	<ul style="list-style-type: none"> - Weather alerts 	<ul style="list-style-type: none"> - Weather alerts - Market info 	Partner with mobile network providers or

Tool type	Facilitators	Farmers	Examples for Jordan
	- Market info, CSA tips/messages etc.	- CSA tips/ messages etc.	ag organizations that offer these services.
Mobile Apps	Applications for crop management, pest/disease identification (e.g. Plantix), CSA techniques	Plantix, other crop-specific or CSA-focused mobile applications in Arabic	Ma Almuzare (if available), investigate other Jordanian agriculture apps.
Interactive learning	Videos, tutorials, simulations on CSA practices	Videos, tutorials, simulations on CSA practices	Focus on techniques relevant to Jordan's climate and crops.

Source: Authors' own elaboration.

Selecting digital tools for FFS in Jordan

Selecting digital tools for CS-FFS implemented by Jordan's Ministry of Agriculture (MOA) requires a multi-faceted approach to ensure adoption, effectiveness, and alignment with national agricultural goals. Firstly, assess existing MOA infrastructure and any recommended tools by the ministry to ensure compatibility and potential integration. Prioritize platforms with robust Arabic support that cater to Jordanian agricultural practices. Consider organizing training workshops for MOA staff, focusing not just on the tools, but their integration within FFS methodology – emphasizing data-driven field observations and farmer-centric problem-solving. Partner with telecom providers (if required) for potential data packages that make tool access affordable for farmers. Finally, establish feedback channels between MOA staff and farmers. This ensures the chosen tools truly support on-the-ground challenges and allows for adjustments over time, maximizing the benefits of this digital-enhanced FFS approach.

FFS facilitators

FFS Facilitators, as the main drivers of programme implementation, require robust digital tools for planning, organization, and communication. Key considerations include reliable internet connectivity in the Ministry offices or areas where they plan, a balance between features and user-friendliness (especially if tech literacy is varied), and the ability to handle data collection and potentially light data analysis. Platforms like WhatsApp, Zoom, ODK, or Kobo could be suitable starting points, provided their Arabic translation is functional for data input. Careful piloting with facilitators, along with training, is crucial before wider rollout.

FFS farmers

For FFS farmers, the primary focus should be on tools that bridge information gaps and enhance their decision-making. Limited internet connectivity in rural areas favours solutions like SMS-based (WhatsApp or GSM mobile) systems for sharing vital alerts (A pest outbreak has been detected in your region, recommended treatment is...). Apps like Plantix for image-based diagnosis require some smartphone access but can be powerful if supported by a network of facilitators for assistance. Ensuring tools are available in local Arabic dialects and designed with simple interfaces, even using visuals or audio, is essential for inclusivity.

Table 4. Key consideration for FFS farmers

<p>Literacy levels of facilitators and farmers</p>	<p>Consider the varying levels of digital literacy. Tools with visual interfaces, step-by-step tutorials, or even voice-based features may be helpful. Platforms with (Arabic language) are crucial for bridging any language barriers.</p> <p>Example: A diagnostic app like Plantix, primarily image-based, may be easier to adopt than one requiring extensive text input.</p>
<p>Internet connectivity and infrastructure</p>	<p>Assess internet reliability in rural areas where FFS activities take place. Prioritize tools with offline capabilities for data collection or consider SMS-based systems for essential communication.</p> <p>Example: For areas with weak connectivity, prioritize apps allowing offline data entry that sync to a central database when internet connection is available.</p>
<p>Costs of technologies</p>	<p>Explore both free and paid options, ensuring the value proposition of paid tools justifies the expense. Look for subsidies or partnerships with organizations that might offset costs for farmers.</p> <p>Example: Weather information might be accessible via a free government-run SMS service, while more sophisticated analysis tools might come at a cost.</p>
<p>User-friendliness and language availability</p>	<p>Choose tools with intuitive interfaces and navigation, minimizing the need for extensive training. The existence of a quality Arabic interface is essential for maximizing adoption and usefulness.</p> <p>Example: A platform with visual drag-and-drop features might be easier to understand than one requiring knowledge of complex project management jargon.</p>
<p>Alignment with CSA goals and local farming practices</p>	<p>Identify tools directly applicable to climate-smart agriculture challenges faced by Jordanian farmers. Prioritize those that promote water conservation techniques, pest and disease management tailored to local conditions, and weather forecasting that aids crop planning.</p> <p>Example: An app offering localized drought management strategies and crop recommendations is more valuable than a generic agricultural forum.</p>

Source: Authors' own elaboration.

Implementing digital tools in CS-FFS Programme

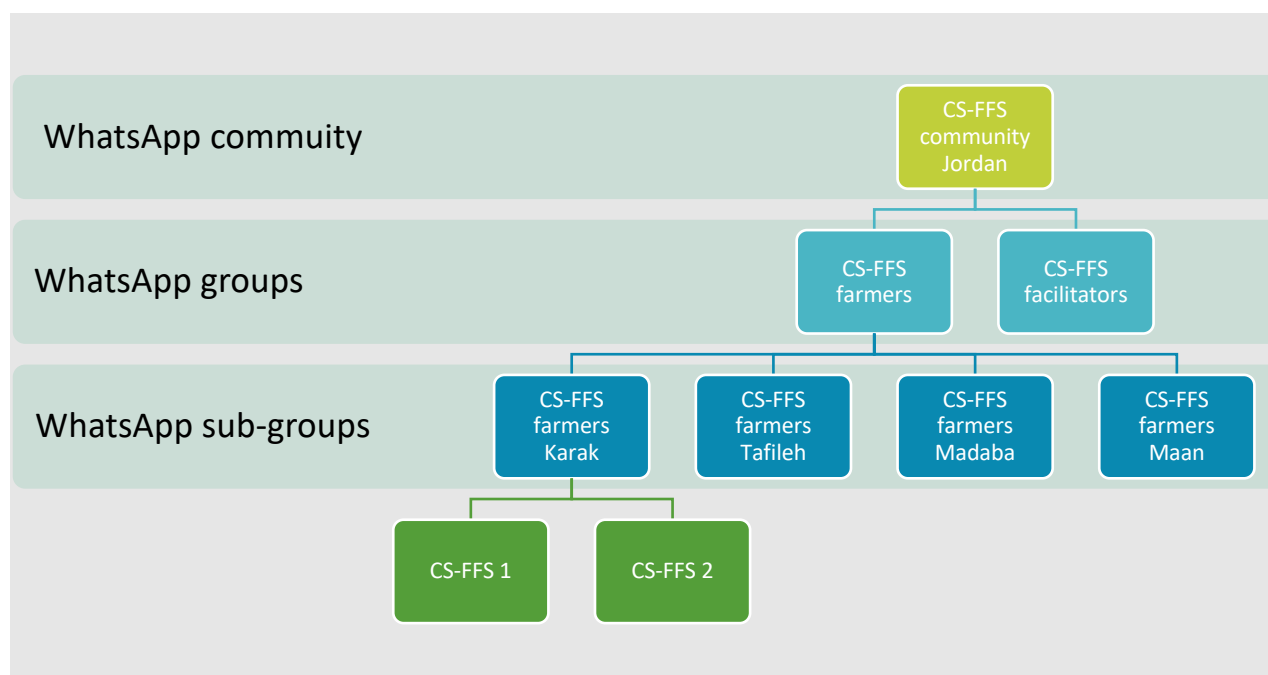
Digital tools for farmers

Within the Jordanian context, a careful approach to digital tool selection is essential for ensuring cultural relevance and successful adoption. This approach streamlines adoption by both facilitators and farmers. Here are ways to use common tools to enrich key FFS activities, ensuring their cultural relevance within the Jordanian context:

Social media networking

Private Facebook or WhatsApp groups dedicated to CS-FFS programmes foster ongoing communication beyond field sessions. For example, in WhatsApp, the team can introduce a WhatsApp Community connected with following groups and sub-groups of Facilitators and farmers from all four governorates.

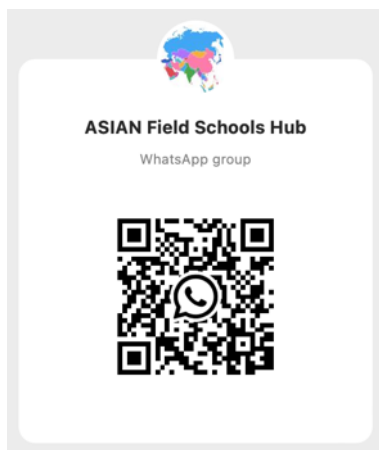
Figure 2. Social media networking



Source: Authors' own elaboration.

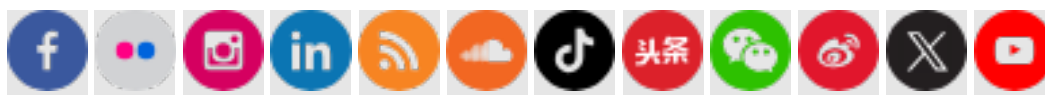
Facilitators can share timely updates, reminders, or links to relevant articles. Farmers can post photos of their field activities, photos to seek quick advice on potential pest or disease issues, ask questions, and support each other with solutions based on their field observations. This creates a continuous learning environment and strengthens the FFS community.

The Jordan FFS community can join Asian Field Schools hub WhatsApp community at <https://chat.whatsapp.com/d5gl5fl1i7k1yhlpnumjm> or



Other social media channels like Facebook, YouTube, TikTok, LinkedIn etc. Can be explored and experimented.

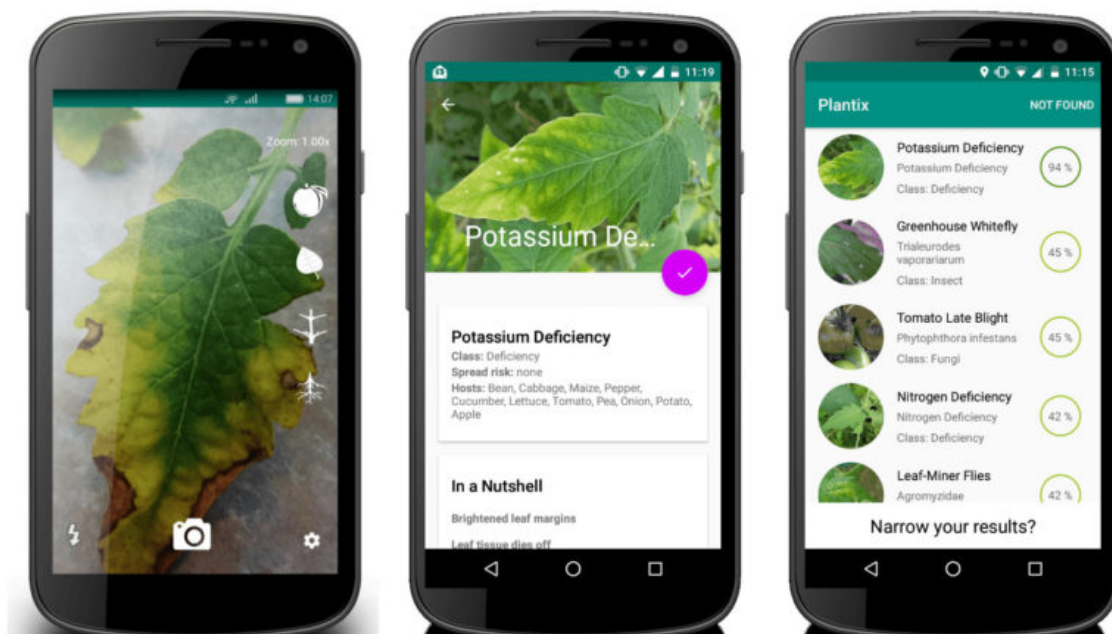
FAO social media accounts can be further explored and networked with the relevant account.



Source: <https://www.fao.org/home/en/>

Diagnostic applications

Figure 3. Plantix plant diagnostic application



Source: <https://plantix.net/en/>

Mobile application like Plantix can be invaluable during FFS field sessions. Farmers can take photos of problem areas in their crops, and the app uses artificial intelligence (AI) to suggest diagnoses. This immediate visual aid reinforces FFS

training on pest and disease identification. The app can also provide treatment recommendations, empowering farmers with options. Facilitators can then guide discussions around the suggested solutions, exploring their suitability, potential organic alternatives, and integration into the overall crop management plan.

Weather forecasts

Access to reliable weather forecasts through apps or websites is critical for climate-smart decision-making. During FFS sessions, facilitators can use forecasts to discuss optimal planting windows, irrigation scheduling, and potential risks like extreme heat or heavy rainfall events. Farmers can learn to analyse how forecast data informs field-level choices. Integrating weather forecasts encourages proactive planning and helps farmers understand the role of climate information in agriculture.

Jordan weather application

The Jordan weather application is a powerful tool designed to empower farmers with accurate and timely weather information. By integrating this app into their daily operations, farmers gain access to hyperlocal forecasts, seasonal outlooks, and critical alerts, enabling them to make informed decisions regarding planting, irrigation, fertilization, and pest control. This valuable resource helps optimize agricultural practices, improve crop yields, and enhance resilience to the impacts of climate change.

Figure 4. Jordan weather application

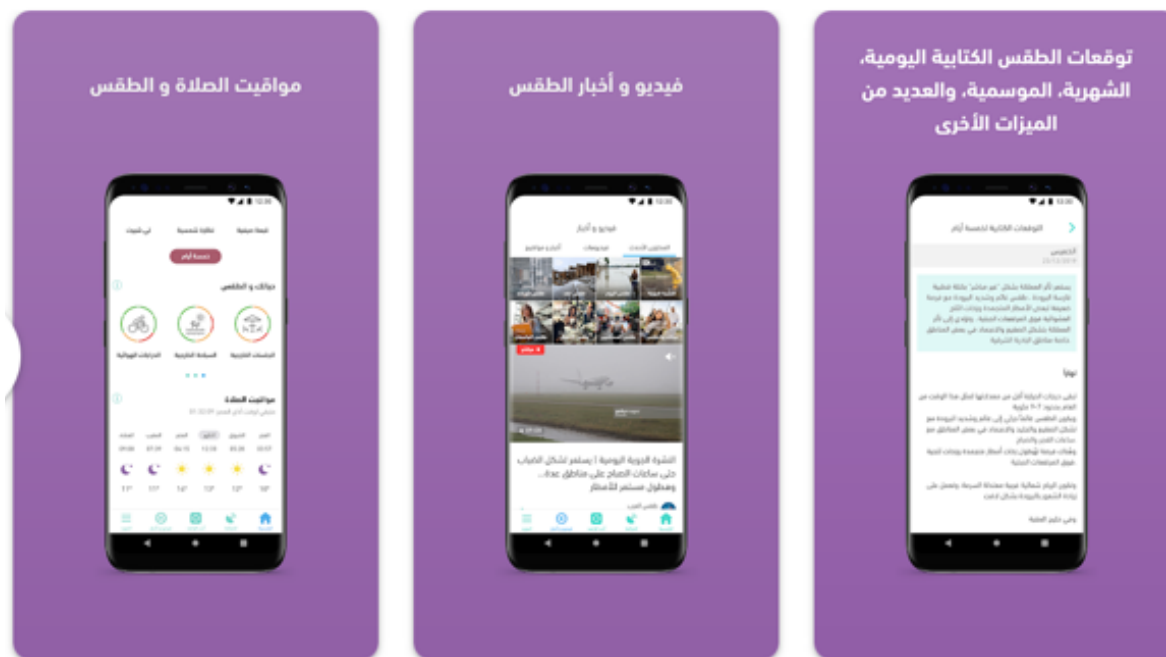


Source: <https://play.google.com/store/apps/details?id=com.mobilesoft.meteojordaniearabic&hl=ar>

Arabia weather application

Arabia weather is a leading weather forecasting application tailored for the middle east region including Jordan. This app provides farmers with several key advantages: hyper-local weather forecasts ensure accurate predictions for specific farms, crucial for planting and harvesting decisions. Its timely alerts on frost, extreme heat, or storms allow farmers to take protective measures, minimizing crop damage. Rainfall tracking and drought predictions aid in irrigation planning, optimizing water usage.

Figure 5. Arabia weather application, Jordan



Sources: <https://www.arabiaweather.com/> and https://play.google.com/store/search?q=طقس%20العرب&c=apps&hl=en_AU

Important considerations

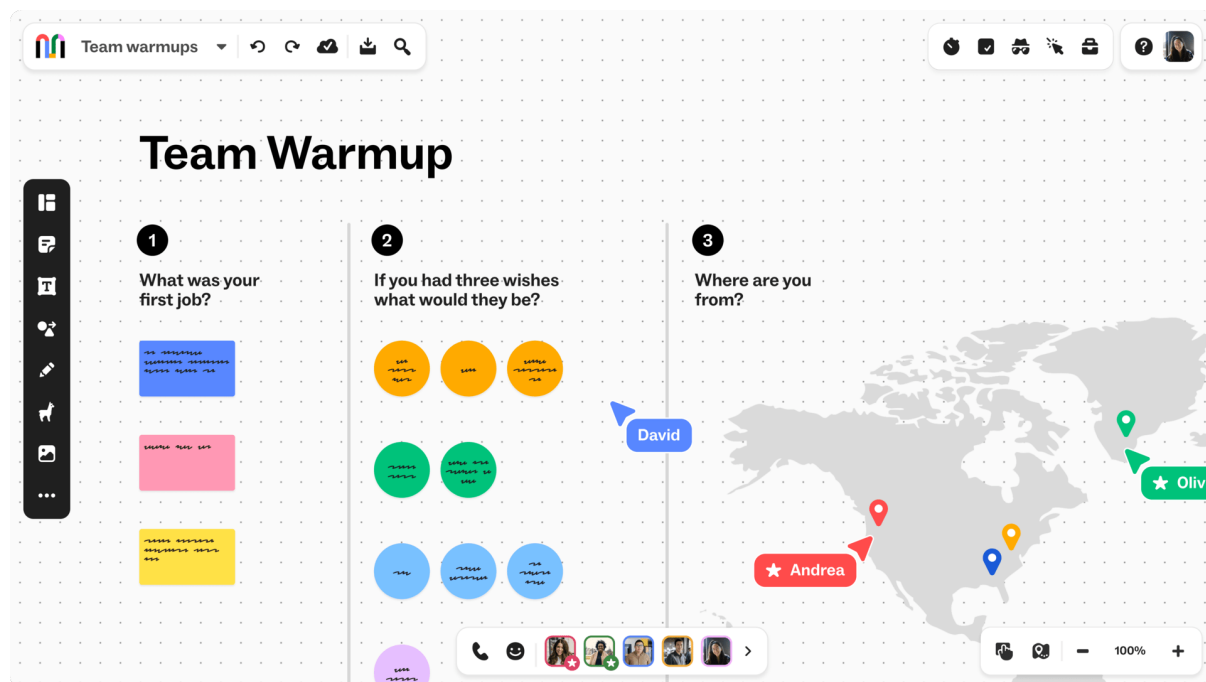
- Before introducing any digital tool, comprehensive training for both facilitators and farmers is crucial. Consider a train-the-trainer model to cascade knowledge and skills effectively (FAO, 2023).
- Phasing in the introduction of digital tools is recommended. Start with small groups and a select few well-suited tools aligned with FFS activities.
- The trust between farmers and FFS facilitators is paramount. Establish clear policies on data ownership, privacy, and how any collected farmer data will be used (World Bank, 2018).
- Integration with traditional FFS methods – Digital tools should complement, not replace, the hands-on learning focus of FFS. Field-based experiential learning, observation, and group problem-solving remain the foundation.

It's important to note that these digital tools should seamlessly integrate into existing activities, making them a natural extension of the knowledge-sharing and problem-solving process. Successful implementation also relies on ongoing engagement with farmers and facilitators for feedback and continuous improvement of digital tool usage.

Digital tools for FFS master facilitators and facilitators

In today's digitally connected world, master facilitators and facilitators within CS-FFS programmes have a wealth of tools at their disposal to elevate their work. Platforms designed specifically for communication and collaboration offer powerful capabilities for enhancing training delivery, streamlining team management, and fostering an ongoing sense of community.

Figure 6. Online team building and collaboration platform



Source: <https://www.mural.co/use-case/team-building-and-ice-breakers>

There are many software available for effective online participatory team building, collaborative workshops and group work facility. Google Jamboard, Google Meet, Microsoft Team, Zoom, etc.

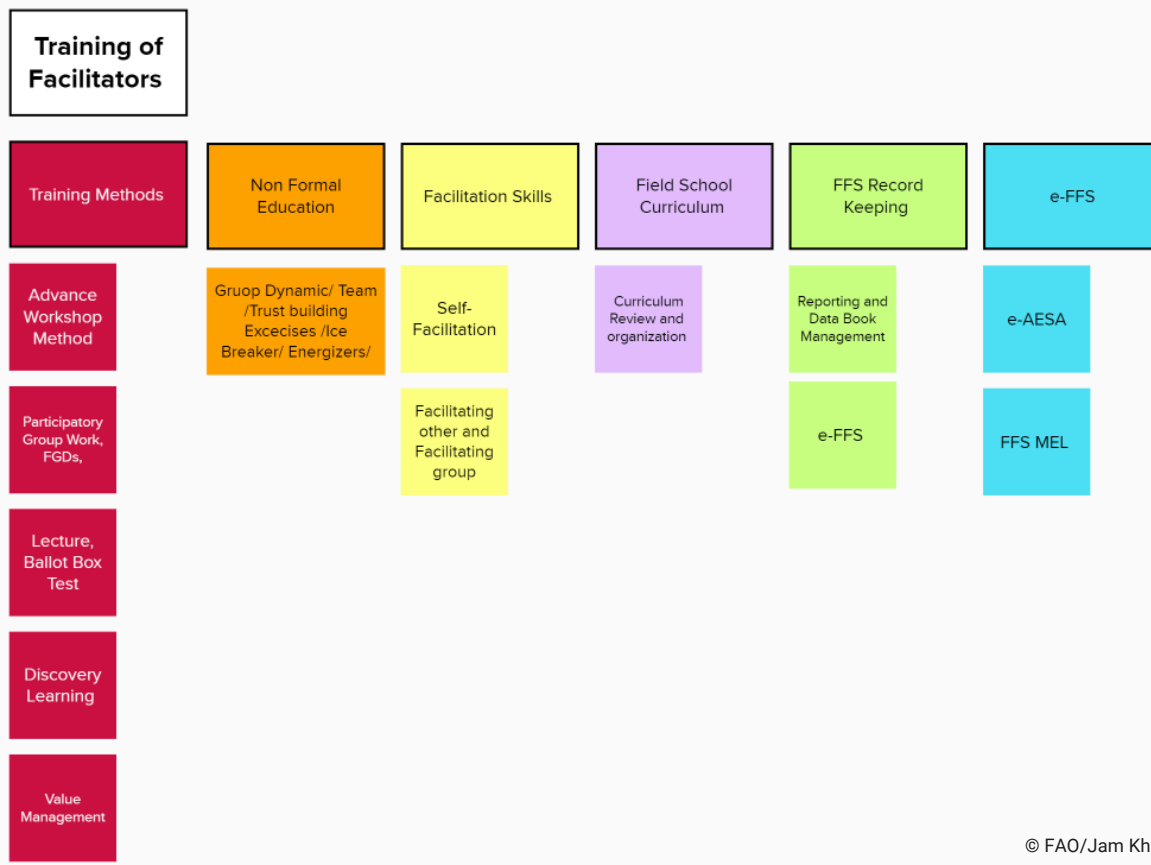
Key features that enhance facilitation

Communication and collaboration platforms excel by providing a range of features valuable to facilitators. Video conferencing facilitates dynamic online workshops, while text-based chat, discussion threads, and file-sharing allow for quick problem-solving and resource exchange. Task management tools boost organization, and polls/surveys gather valuable feedback. Screen-sharing, virtual whiteboards, and integration with other productivity suites make these platforms ideal for collaborative training development and interactive sessions.

Box 3. FAO Pakistan's Farmer Field School team experiences with online participatory team building and collaborative work software

Some of these tools have proven highly successful in contexts like the GCF funded project Transforming the Indus Basin with climate resilient agriculture and water management in Pakistan. The Pakistani FFS master facilitators and facilitators team has successfully used Mural for collaborative work during the time COVID-19 to develop one-curriculum for both climate business field school (CBFS) and women open school (WOS).

	FARMERS ORGANIZATION/ COMMUNITY DEVELOPMENT	AGRI-BUSINESS & ENTERPRISE DEVELOPMENT	SOIL Health	CRA & WFI	SEED AND SEEDLING	GENDER MAINSTREAMING	AESA & JACO	ONS & HANDLING CHEMICALS	CROP Nutrition	VALUE CHAIN DEVELOPMENT	CROP Water	IPM Season 1	FIELD DAY	HARVEST/ POST HARVEST	MARKET & MARKETING	AGRI-BUSINESS AND PLAN DEVELOPMENT	EXCHANGE VISIT	CRA & NUTRITION Season 2	SEED AND SEEDLING	AESA & JACO	IPM Season 2	HARVEST/ POST HARVEST	Graduation Ceremony	FARMER LED ORG. (SPECIALIZED) COMMUNITY DEVELOPMENT
VALUE CHAIN			☹	☹	☹				☹	☹	☹	☹		☹	☹	☹		☹	☹		☹	☹		☹
AESA							☹		☹	☹	☹			☹				☹		☹	☹	☹		☹
Experiments			☹	☹	☹		☹		☹	☹	☹							☹	☹	☹	☹	☹		☹
GENDER	☹	☹				☹		☹	☹	☹	☹	☹		☹	☹	☹	☹			☹	☹	☹		☹
FARMER FACILITATION AND FOLLOWUP	☹		☹	☹			☹	☹		☹	☹	☹			☹			☹		☹	☹	☹		☹
SKILLS SET	25	22	7	1	3		2	20	12	29	16	11	9	22	24	24	24	12	3	2	16	22	25	1
	26	4	25	4	5		10	21		33	20	18		22		24	9	22	5	11	16	23		26
				9	2		16	21		5		19						2	15		15			26
				24	23		15	23		25								22	23	17	17			
					28		17	28		22									28	17	18			

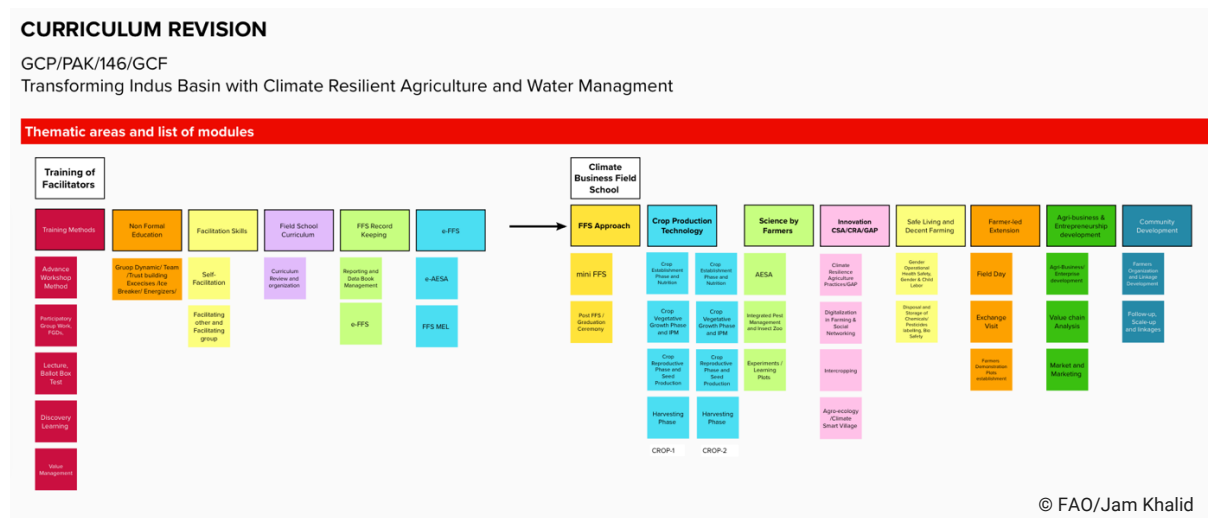


Source: Khalid J.M. 2022. Climate Business Field School one-curriculum. Multan. FAO.

Mural

Mural is a digital workspace designed to enhance visual collaboration and brainstorming for remote teams. It functions as a vast online whiteboard where users can add sticky notes for ideas, embed images and documents, draw and sketch, create diagrams, and even run agile workflows for project management. Key features include a wide range of templates to suit various activities, intuitive drag-and-drop functionality, real-time collaboration, and commenting tools for feedback and discussion. Mural fosters engagement in online training, workshops, and design thinking sessions, enabling creative problem-solving and idea generation in a shared visual space. For more details, <https://www.mural.co>

Figure 7. Mural platform used by FFS team of Pakistan for developing curriculum

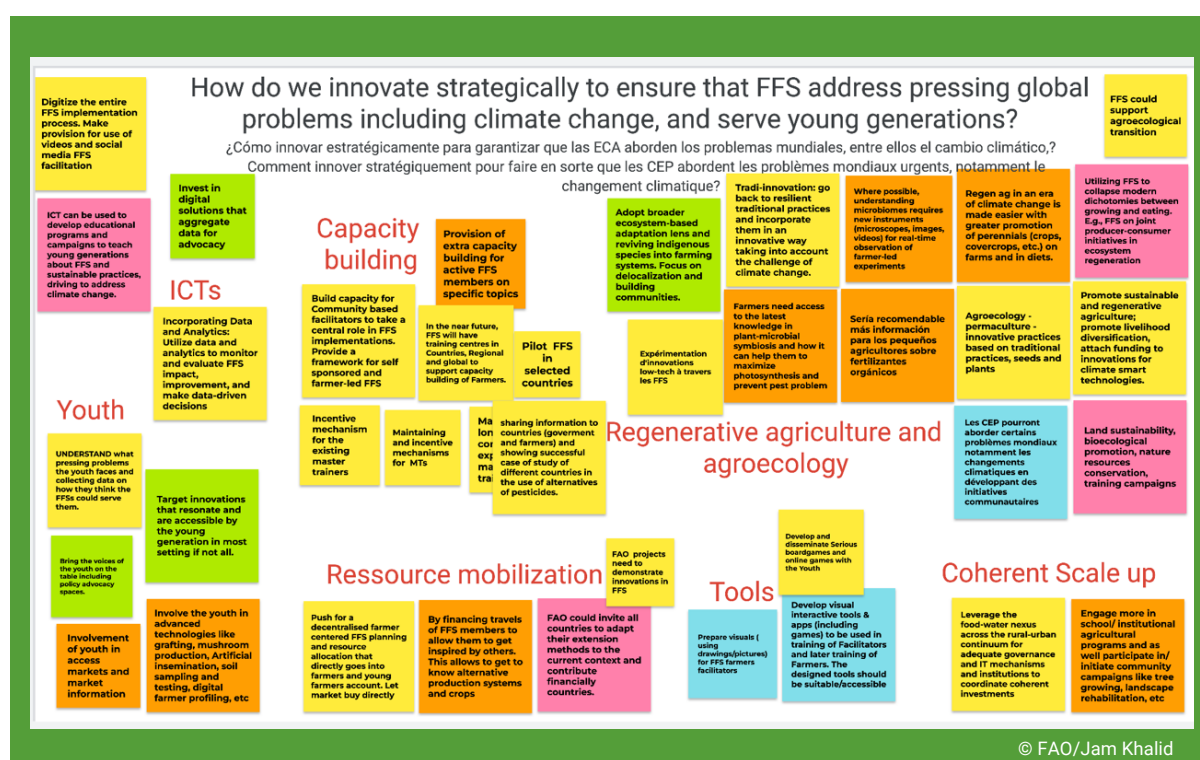


Source: One-curriculum outlines developed for training of facilitators (TOFs) and climate business field school (CBFS) online on Mural with participation of FFS facilitators from 8 districts of the project, GCF funded TIBCRAW Project 2023 - Pakistan

Google jamboard

Google Jamboard is a cloud-based digital whiteboard that offers a collaborative and interactive workspace for teams and training sessions. Its key features include drawing and sketching tools with handwriting recognition for brainstorming and visual notetaking, sticky notes for adding ideas and feedback, the ability to import images and web content for visual learning, real-time collaboration allowing multiple users to work simultaneously, and integration with other Google Workspace apps (e.g. pulling in content from Docs, Sheets, and Slides). Jamboard can be accessed through a web browser or a dedicated Jamboard hardware device, which offers a large touchscreen display for even more immersive collaboration.

Figure 8. Google Jamboard – Online workshop on FFS and innovations, organized by FFS global platform, FAO.



Source: <https://jamboard.google.com>

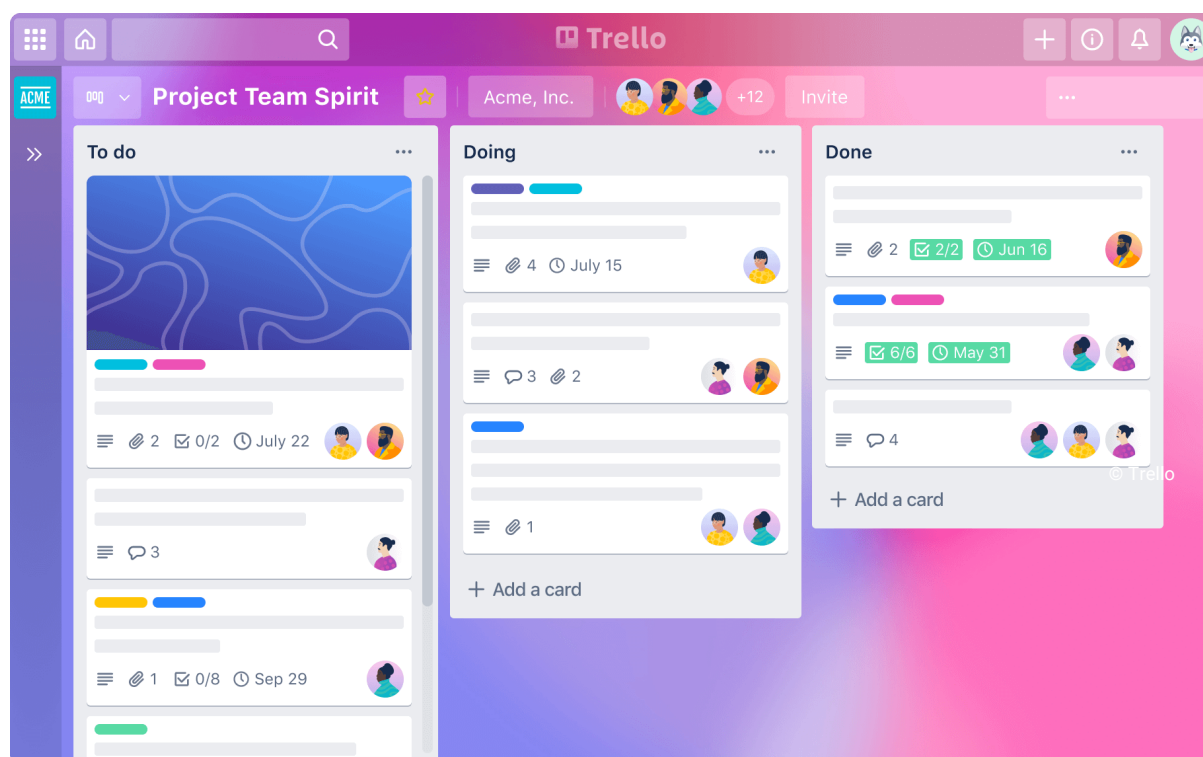
Project management platforms

Project management platforms provide a powerful tool for FFS facilitators and supervisors, revolutionizing the management and implementation of Farmer Field Schools. These platforms offer a centralized digital space for organizing projects, streamlining communication, and fostering collaboration. Facilitators can use them to manage field schedules, track farmer progress, share educational resources, and gather feedback for continuous improvement. Supervisors benefit from easy access to real-time data on FFS implementation, enabling them to provide timely guidance, identify challenges, and allocate resources more effectively. By integrating project management platforms into their workflow, facilitators and supervisors can enhance the efficiency, organization, and impact of Farmer Field Schools while promoting a culture of data-driven decision-making and accountability.

Trello

Trello uses a card-based Kanban system to organize tasks and projects visually. Each card represents a task and can be moved through columns representing different stages of progress. It's known for its simplicity, flexibility, and ease of use. Trello offers a generous free plan and includes basic Arabic language support.

Figure 9. Trello application

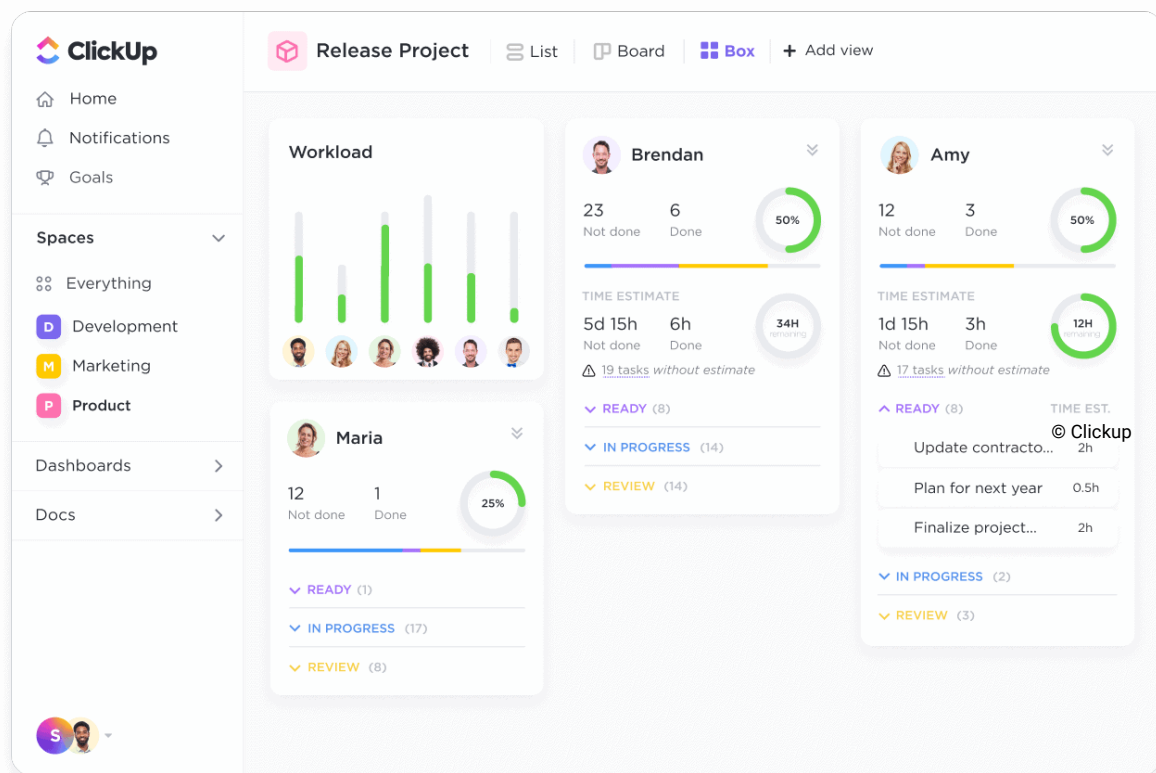


Source: Trello official website. www.trello.com

Clickup

Clickup aims to be an all-in-one productivity platform, with extensive features for project management, communication, and collaboration. It offers customizable views (lists, boards, calendars), task hierarchies, time tracking, docs, goal setting, and more. Clickup boasts a comprehensive free plan and claims to have Arabic language support.

Figure 10. Clickup application

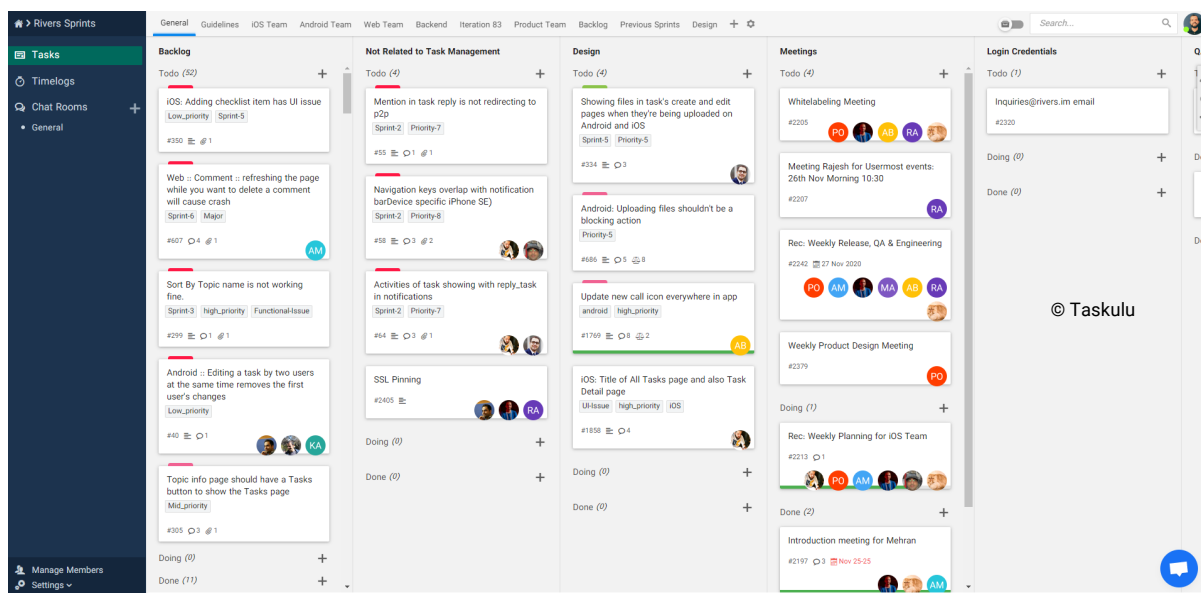


Source: Clickup official website. www.clickup.com

Taskulu

Taskulu is another platform tailored to the Arabic-speaking market. It emphasizes task management, likely including features like project breakdowns, task assignment, file sharing, and some team communication tools. Similar to Projectry, detailed feature lists may be harder to find.

Figure 11. Taskulu application



Source: Taskulu official website. www.taskulu.com

Table 5. A comparison between some platforms

Platform	Safe Use	Free Plan	Arabic Language Suitability for Jordan	How to Investigate Further
Trello	Widely considered secure.	Yes, robust free plan.	Basic Arabic translation. May be enough for simple projects.	Read reviews from Jordanian users, try the free version yourself.
Clickup	Security seems well-regarded.	Yes, extensive free plan.	Claims Arabic support.	Search for reviews specifically mentioning Arabic use in Jordan.
Taskulu	Security info less readily available.	Unknown, likely paid plans.	Tailored to the Arabic market.	Same as Projectry: seek Jordanian reviews, inquire for trial options.

Source: Authors' own elaboration.

Key Considerations

1. Try free versions first since they are the most accessible.
2. Even if Arabic is imperfect, see if those platforms meet your core needs.
3. Demos or trials can reveal their true suitability.

Participatory online training

FAO e-learning academy

The e-learning academy, hosted by the Food and Agriculture Organization of the United Nations, is a comprehensive online platform dedicated to enhancing the knowledge and skills of those working in food security, social and economic development, and sustainable natural resource management. FAO e-learning academy has a rich offer of free multilingual certified e-learning courses. It offers a diverse range of learning resources, including self-paced courses, blended learning programmes, webinars, and even university-level degrees. All this knowledge is freely accessible, aiming to empower professionals and build capacities worldwide to address pressing global challenges and contribute to the Sustainable Development Goals.

The FAO e-learning Academy also offers a range of valuable courses focused on the Farmer Field School (FFS) approach. These courses provide in-depth insights into the principles, history, and practical implementation of FFS programmes. Some notable offerings include "Introduction to the Farmer Field School Approach", which explores the fundamentals of FFS, and "Implementation of Farmer Field School Programmes", which addresses FFS planning, execution, and evaluation. These courses are invaluable for development practitioners, government officials, FFS facilitators, and researchers seeking to enhance their understanding and application of this participatory agricultural education model.

Table 6. Participatory FFS online training courses

Course	Available at	You will learn about	Time duration	Repeat
Introduction to Farmer Field School approach	https://elearning.fao.org/course/view.php?id=724	<ul style="list-style-type: none"> Basics of the FFS approach. The principles of non-formal education. The objectives and benefits of FFS. The origin and expansion of FFS in terms of locations, topics and modalities. The key elements of FFS sessions: the agroecosystem analysis (AESA), field studies, group dynamics, special topics, recap, and evaluation. The FFS basic learning cycle. 	1 hour	6 months
Implementation of	https://elearning.fao.org/co	<ul style="list-style-type: none"> The process to plan and initiate an FFS programme. 	3 hours	6 months

Course	Available at	You will learn about	Time duration	Repeat
Farmer Field School	urse/view.php?id=776	<ul style="list-style-type: none"> • The roles in an FFS programme, and different responsibilities and training needs. • The strategies available to develop human capacities needed. • The process to define FFS curricula – as a co-creation with communities. • The activities required to deliver effective FFS throughout the season. • All programme management activities, including budgeting, Monitoring and Evaluation, impact assessment, reporting. 		

Source: Authors' own elaboration.

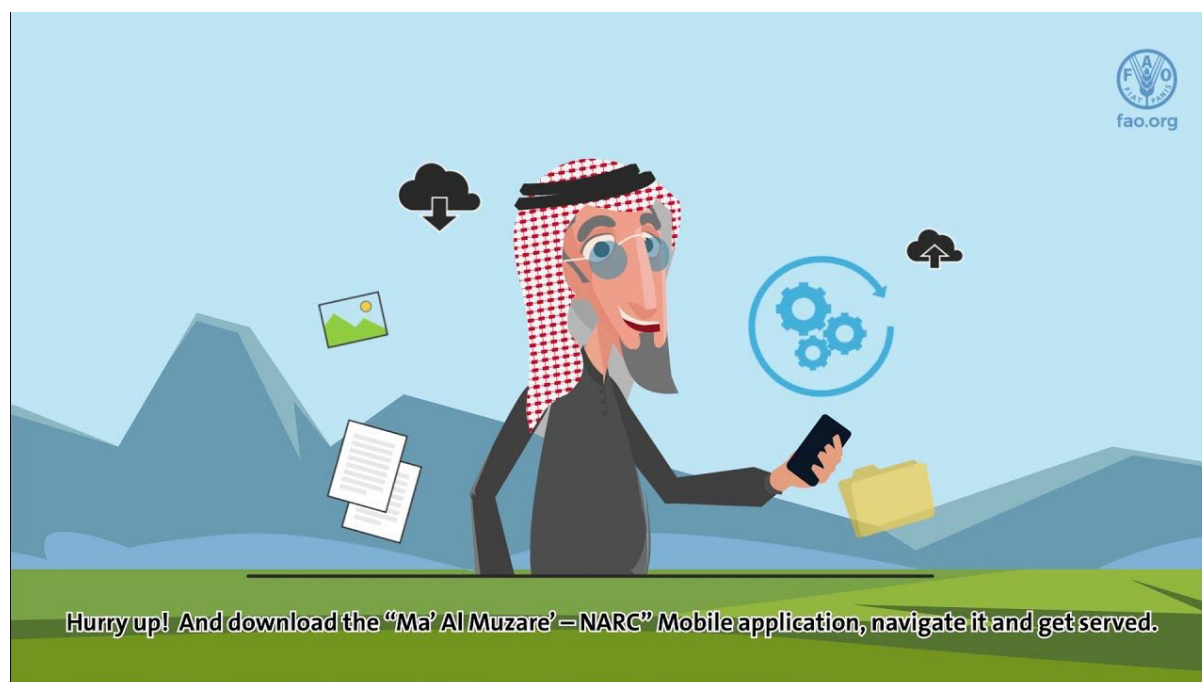
Case studies and best practices

Existing mobile applications for Jordan's Farmers

Ma' Almuzare – NARC mobile application

Ma' Almuzare mobile application, developed by the FAO and NARC in Jordan, aims to revolutionize agricultural practices in the country. It provides a digital platform for farmers to access essential agricultural information, connect with experts, and share knowledge with peers. The app is organized into themes like Animal Husbandry, Weather and Crop Calendar, Harvest and Postharvest, and Agri Market place, offering resources and data to guide farmers throughout the production cycle. A crucial feature is the Expert to Farmer Forum, where farmers can directly seek advice from NARC specialists and learn from fellow farmers. Crucially, Ma Almuzare's content is tailored to Jordan's agricultural landscape, making it highly relevant. By providing easy access to knowledge, expert advice, and community support, Ma' Almuzare aims to empower Jordanian farmers, boosting productivity and fostering sustainable practices.

Figure 12. Ma' Almuzare – mobile application for farmers

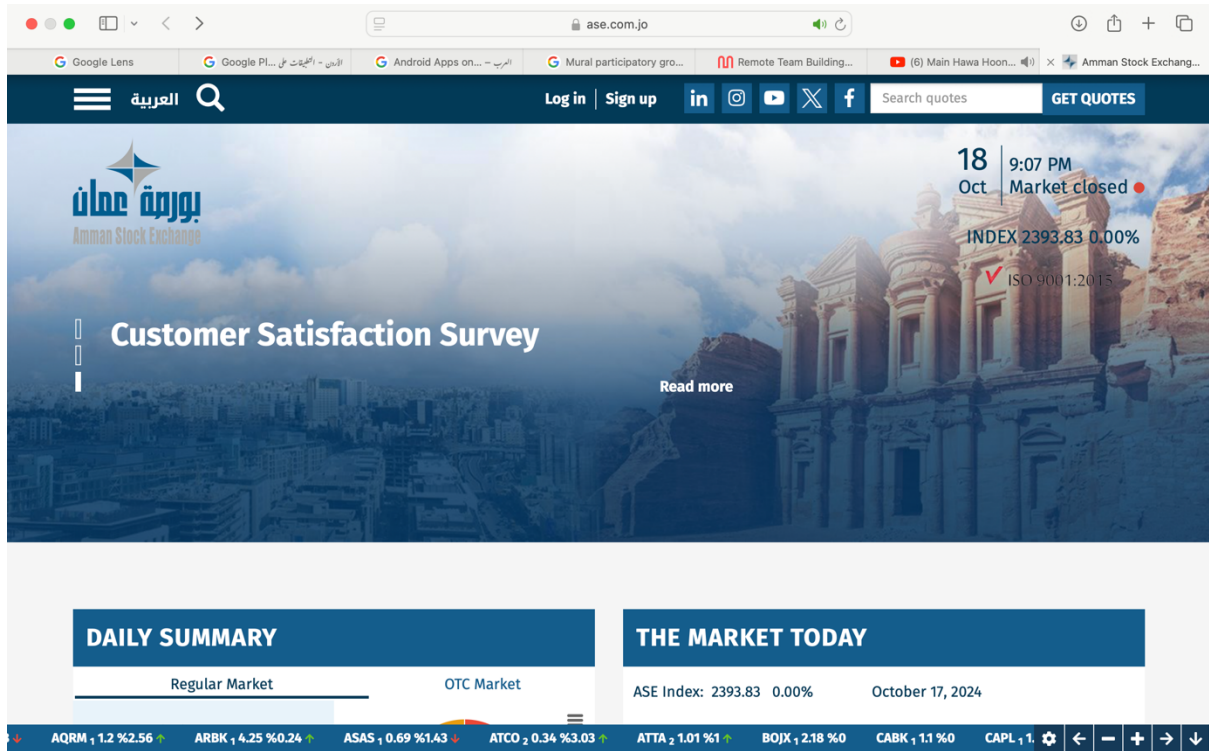


Source: <https://www.youtube.com/watch?App=desktop&v=55af9edesbw>

Market watch live

An offering from the Amman stock exchange, allowing investors (which include farmers) to track securities and market data in real-time. This focus on market knowledge empowers farmers to make informed decisions.

Figure 13. Official website of the Amman stock exchange



Source: <https://www.ase.com.jo/en>

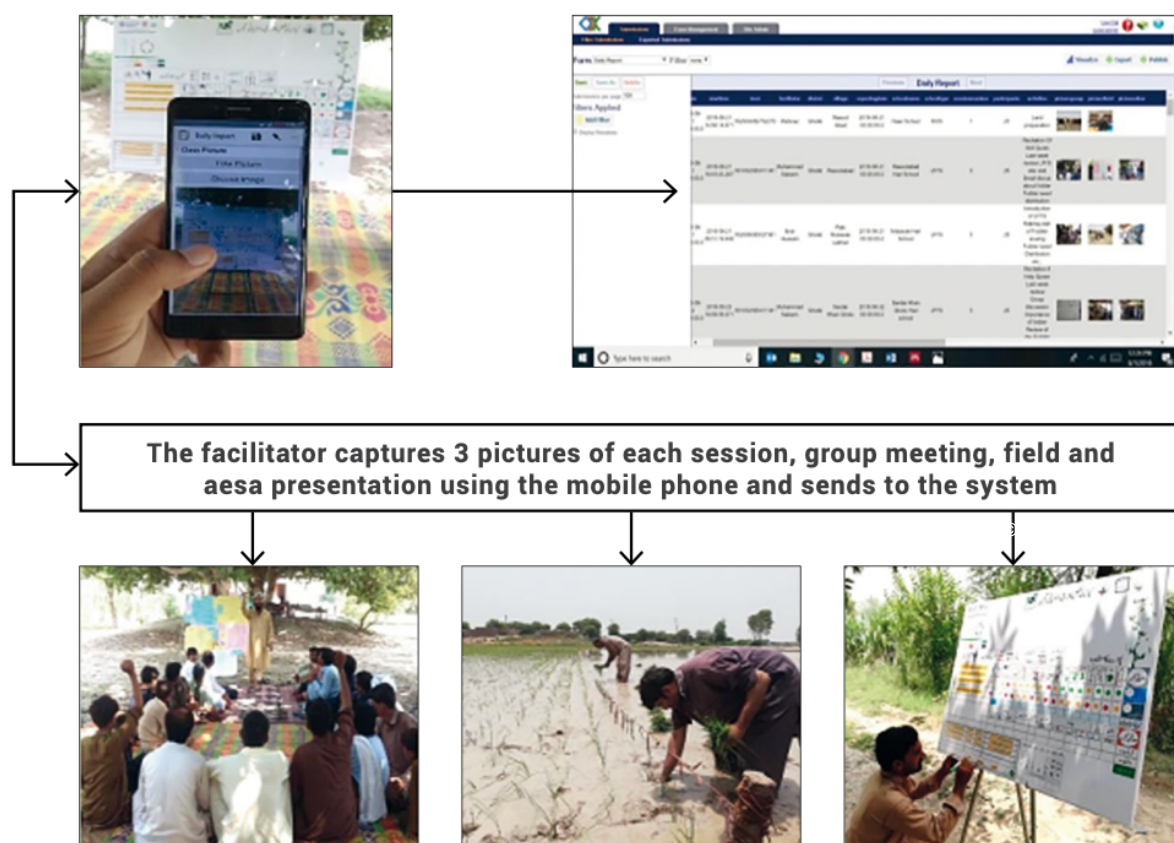
FFS monitoring, evaluation, and learning support (Pakistan)

E-FFS application

FAO Pakistan is embracing the opportunities presented by open-source data tools to improve its FFS monitoring and evaluation. Using the open data kit (ODK) to complement its monitoring and evaluation framework, FAO Pakistan can monitor the facilitation of FFS sessions in remote locations among widely spread out FFS. Using standardized online activity report formats, facilitators use mobile phones to collect information during field visits and upload to the system.

For every session, facilitators take three pictures including a group session, field session and agroecosystem analysis presentation which is sent to the system in real time as evidence of their presence in the field. Supervisors and managers remotely monitor the facilitators work in the field through activity reporting formats on: FFS formation report.

Figure 14. e- FFS application to improve the FFS monitoring and evaluation, Pakistan



Source: e-FFS application developed by FAO Pakistan.

Currently the same package is being implemented on the Kobo tools as well and the team also developing an e-FFS android application, which in near future will be available for global use as well.

Figure 15. E-FFS application prototype developed by FAO Pakistan



Source: e-FFS application prototype developed by FAO Pakistan.

Farm advisory, precision farming and data-driven decisions

Mobile applications are revolutionizing precision farming, empowering farmers to collect and analyse detailed crop data right from their smartphones. Equipped with sensors, GPS connectivity, and tailored messaging (like IVR), these apps monitor soil moisture, nutrient levels, and crop health in real-time. This critical data enables farmers to make highly targeted interventions, such as applying fertilizers or pesticides only where and when needed. The result? Reduced input costs minimized environmental impact, and optimized crop yields.

IVR service by mobile GSM technology (Pakistan)

Telenor Pakistan's Khushal Zamindar is an IVR service that provides Pakistani farmers with localized agricultural information through automated calls and SMS messages. By dialling 7272, farmers can access weather forecasts, crop-specific advice, and livestock management guidance in Urdu, Sindhi, or Punjabi. This free service aims to empower farmers with the knowledge they need to improve their yields and livelihoods.

Figure 16. 16 Khushal Zamindar IVR Service for farmers in Pakistan by Mobile GSM technology, Telenor



Source: <https://www.telenor.com.pk/digital-product/khushaal-watan/khushaal-zamindar/>

Plantix (global)

Plantix application utilizes image recognition to diagnose crop diseases and pests. Farmers take photos of affected plants, and the app uses AI to identify the issue and provide treatment recommendations. This reduces the need for costly consultations and helps manage infestations early on.

The Plantix app is a valuable tool for Jordanian farmers. It uses AI to help farmers quickly diagnose plant diseases and pests simply by taking a photo, providing tailored treatment solutions, often with organic options. The app's knowledge community offers further support and information sharing. Importantly, Plantix's Arabic language interface makes it easily accessible to Jordanian farmers, giving them a powerful and user-friendly tool to protect crops, improve yields, and make informed decisions.

Figure 17. Plantix a diagnostic application



Source: <https://bit.ly/plantixappda>

Market access and price transparency

Mobile apps connect farmers directly to buyers, shortening supply chains and improving price discovery. Farmers can list their produce on online marketplaces, eliminating intermediaries and ensuring fairer prices. Apps can also provide real-time commodity prices across different markets, helping farmers negotiate deals effectively.

Agri marketplace (India)

This platform connects farmers to buyers – wholesalers, retailers, and even consumers. It facilitates transactions, logistics, and offers price comparison tools for farmers to secure the best deal for their produce.

Figure 18. Agri marketplace platform in India



Source: <https://agrimp.com>

Pula (Africa)

In many developing countries, farmers lack access to traditional banking services. Mobile apps fill this gap, offering microloans, crop insurance, and digital payment solutions. Farmers can apply for loans, manage finances, and securely pay for inputs – all through their smartphones.

Pula company partners with mobile apps to provide farmers with area-yield insurance that protects them against weather-related losses. Farmers pay premiums via their phones, and payouts are triggered automatically using satellite data, eliminating lengthy claim processes. However, the Pula don't have mobile application, but Pula partners with existing organizations that already have digital platforms or mobile services for farmers. They integrate their insurance products into these established apps.

Figure 19. Pula digital platform for farmers



Global Insurtech

Pula is an agricultural insurance and technology company that designs and delivers innovative agricultural insurance and digital products to help smallholder farmers endure yield risks, improve their farming practices, and bolster their Pula incomes over time.

[LEARN MORE >](#)

Source: <https://www.pula-advisors.com>

Knowledge sharing and skill-building

Mobile apps serve as virtual classrooms. Farmers have access to an entire library of resources, including tutorials on best farming practices, pest management, and crop diversification. Many apps also feature discussion forums where farmers can ask questions, get advice, and learn from experts and other farmers around the world.

Access agriculture /ecoagtube

Access agriculture is a trailblazing international non-profit organization dedicated to empowering farmers in the global south with vital agricultural knowledge. Their core mission is to bridge the information gap by providing high-quality, farmer-to-farmer training videos translated into local languages.

These videos encompass a vast array of sustainable agricultural practices, including organic farming and agroecological principles. Access Agriculture operates with a multifaceted approach, working extensively with partners around the globe to ensure the widest possible reach. They utilize innovative delivery methods, such as offline video screenings through solar-powered projectors, reaching even the most remote communities lacking electricity or internet connectivity. Furthermore, the 'entrepreneurs for rural access' (ERA) model fosters youth and women's engagement in agriculture. This model provides business training, mentorship, and equipment like the 'Digisoft' smart projector, empowering young entrepreneurs to disseminate essential agricultural knowledge within their communities, transforming farming into a viable and profitable enterprise.

Figure 20. Access Agriculture - trailblazing international non-profit organization

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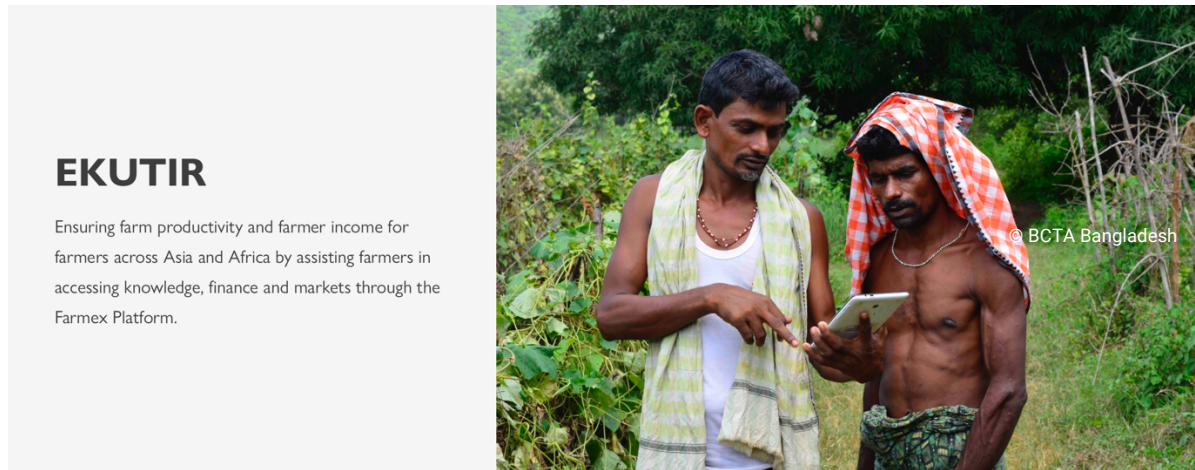
90,000,000 viewers 240 entrepreneurs in 17 countries 4,135 agroecology videos 105 languages available

Source: <https://www.accessagriculture.org>

Ekutir (Asia and Africa)

This multifaceted app provides farmers with everything from weather updates and crop advisories to market prices and access to e-commerce platforms. It emphasizes farmer-to-farmer knowledge sharing through its community features.

Figure 21. Ekutir application



Source: <https://www.businesscalltoaction.org/member/ekutir>

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Project

Building resilience to cope with climate change in Jordan through improving water use efficiency in the agriculture sector

Partners

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