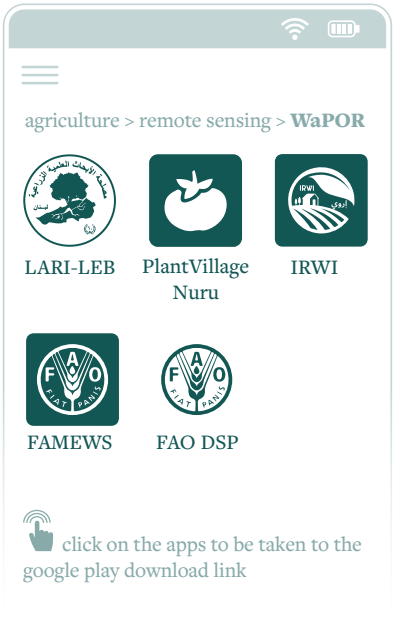
Food and Agriculture Organization of the United Nations

WaPOR and ICT



Phase 2 of WaPOR will stress co-design of agricultural solutions to ensure that outputs such as applications can be as accessible and inclusive as possible, meeting the needs os the target users.

Agricultural extension and advisory services (EAS) play a crucial and unique role in bridging the gap between farmers and the growing body of scientific knowledge and technological advances that are produced in the field of agriculture. EAS promote increased land and water productivity, food security and consequently better livelihoods for rural folks. Yet, there are still far too many farmers, often smallholder farmers in poorer countries, who do not have access to them, partly due to a shortage of skilled service workers.

How can the positive impact of extension services in different facets of agriculture be scaled up to reach more farmers? Information and communication technologies (ICT) are a workable way to achieve a broader reach. The applications presented on this document all use WaPOR data to assist smallholder farmers in different capacities: from the tracking of crop health to irrigation scheduling. They take advantage of the popularisation of access to smartphones to reach a broad base of farmers. Further, even in the instance that not all farmers in an area own a cellphone, the ones who do can extend the network of beneficiaries by sharing their access to the tools and by acting as local experts. There is, therefore, a massive amount of potential, provided that these apps are actively co-designed with beneficiaries so that they can truly respond to their needs and the realities on the ground. IRWI, LARI-LEB and some functionalities of PlantVillage Nuru are currently actively being tested with farmers in the fields to ensure the relevance of the information, its accuracy, its accessibility and readability to the farmers.

With climate change, the need for such tailored advice, becomes more pressing as farmers are increasingly challenged to adapt to a climate that operates in extremes, in ways they are not accustomed to having to cope with. Water scarcity too is a growing threat, and with competing uses for the limited water resources, ICT-based EAS can help reduce water use in agriculture while striving to produce enough to ensure food security.

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Data sources:

WaPOR

By providing near real-time pixel information from remote-sensing data, WaPOR opens the door for service-providers to assist farmers in making the right decisions for better land and water productivity, consequently improving their livelihoods.

Legend:

WaPOR data used by the apps.

Other data used by the apps.

Farmer-provided data

Through user-friendly interfaces available in several languages, the farmers are able to input information that is specific about their farms and fields. Thus, they receive tailored and relevant advice.

RET: reference evapotranspiration
P: precipitation
AETI: actual evapotranspiration
NPP: net primary production
GBWP: gross biomass water productivity

Data inputs to the apps:

Services that are provided to farmers using WaPOR data:

Further descriptions of the apps and the context in which they operate:

IRWI

P RET
current fuel price · planting date · irrigation method · crop type · field size · water pump discharge · last irrigation date · soil salinity · soil category · metereological data · local crop coefficients

In conjunction with the data provided by the farmers, IRWI uses WaPOR data to deliver an estimate of the water requirement (in irrigation hours and frequency) allowing the farmers to know when and for how long to water their fields as well as how much it will cost them.

IRrigation Water Information

Egypt is an arid to semi-arid country where most of life and consequently agriculture is located on the delta and valley of the Nile River, on which the country is highly dependent. Almost all of agriculture is irrigated. Yet, as the third most populous country in Africa, the availability of water per person will continue to decrease. Egypt is already under critical water stress. That is among the reasons why it is turning to water productivity and water savings initiatives in its management decisions. IRWI contributes directly towards that goal by promoting water savings at the field level.

Field trials are presently being carried with smallholder farmers in three governorates Kafer-ElShiekh, Dakahlia and Beheira. Five key crops are targeted for the moment: rice, cotton, soybean, maize and potatoes.
Find out more about the IRWI app here, and access the introductory video (in Arabic) here: ▶

LARI-LEB

P AETI
field size · location · soil category · crop type · irrigation method · avg. flow of the irrigation method · distance between emitters · distance between rows of emitters · metereological data

WaPOR data is used to provide the farmers with a net irrigation requirement (mm/day) map from which further information is required from the farmer to calculate the gross irrigation requirement (m^3/day/dunum) or even the irrigation duration (hr/day/dunum), which are more practical information to work with.

* unit of measurement of land area, = 1000 m^2

While Lebanon does not suffer from water scarcity nearly to the extent of Egypt and receives a substantial amount of rainfall, the country's storage capacity is quite low, and therefore, during the seven dry months (April to October) making water scarcity seasonal. To that are added difficulties linked the fact that the water delivery systems and networks are lacking, though there is ongoing work to improve them.

The Bekaa Valley is one of the two main agricultural areas in the country. The LARI-LEB app is actively being tested there for wheat, potato and table grapes. The initial iteration of the app came to replace the SMS system that provided farmers with a weather forecast and pest warnings. This new version is more complete and provides the same information with the addition of irrigation advice. Soon a crop health module using WaPOR NPP * data will be added.

* Net Primary Production

PlantVillage Nuru

NPP
photos from the field · location

Biomass production data, in the areas that are covered by WaPOR data, allows the app to give the farmer information on the health of their crops.

PlantVillage operates all around the world, by providing the users with an extensive database of crop diseases and an AI-powered image identification feature that empowers farmers to be able to find out whether their plants are suffering from pests or diseases simply by taking photos of the plants. Users can also find out what actions they should take when the issue is identified.

FAMEWS

NPP
location
metereological data

Biomass production data helps with keeping track of crop health and is an important aspect of understanding the impact that pests have on crops, and might have on yields.

Fall Army Worm Monitoring and Early Warning System

FAMEWS works in conjunction with PlantVillage to create a platform that assists farmers in dealing with the fall armyworm (FAW) pest. It is meant to be used to assist in the scouting of fields and in checking traps. The app gives access to a wealth of information on the pest and on coping strategies. In addition to that, usage of the app contributes to a database that allows to further understand FAW's evolution and to know its geographic spread.

FAO DSP

P AETI GBWP
location
metereological data

Knowing water productivity and water consumption help farmers keep track of how plants are doing and make adjustments such as with irrigation.

FAO Digital Services Portfolio

The DSP provides farmers with information and advisory services that will facilitate them to boost their production, access market and nutrition information. The application consists of different services that change depending on the GPS location detected by the user's device and offer a wide range of information: weather and crop calendars, real-time information and advice on livestock, market prices, nutritional information and plant pests. Access here.

The outlook is positive and promising, yet ICTs are not a panacea. Though these apps seek to provide tailored information, they cannot realistically replace EAS in their capacity to look at agriculture as a rich system with a vast number of interconnected variables, from the biophysical to the socio-political. Though these apps seek to expand their service offerings, *in situ* EAS will always be needed to help farmers with their specific sets of needs. Traditional in-person EAS should ideally work in tandem with ICT-based EAS. They have more capacity to look at farmers as a part of communities where change might need to happen not just at the individual level, with better decisions needing to be taken in the farm, but at the communal level as well or even higher, at the systemic level, where needs might have to be translated into changes in management practices. For instance, it is of little help to have an application that tells the farmer when to irrigate their field, based on the crop and the location, if there is a centralised and inflexible irrigation regimen in the scheme.

Despite these caveats, ICT solutions to agricultural problems make an undeniable contribution to the democratisation of knowledge and information. Knowing their limitations should simply serve the goal of ensuring their better use.

Because WaPOR data is open access and is available through a fully developped API, it is remarkably fit to be integrated into ICT solutions. Additionally, new data is made available in near real time and adds on to more than 10 years of historical data (since 2009). This allows for trend analysis and the comparison of the present conditions with past ones and averages.

Find out more about **WaPOR data** by exploring the WaPOR portal and the WaPOR data catalogue.

Take a look at the WaPOR applications catalogue to learn of the different ways WaPOR data is used.

The apps presented here provide **advisory services to farmers**. In addition to that, WaPOR data is also used to monitor water productivity, the water consumption of crops as well as to assess the impacts of drought, amongst others.

The breadth of applications of the data keeps expanding as projects like WaterPIP (Water Productivity in Practice) and hackathons serve as a platform for the conception and development of innovative ideas. Head here to learn about the winning ideas of the latest hackathon organised by WaterPIP.