Smart Information and Communications Technology (ICT) for Weather and Water Information and Advice to Smallholders in Africa

Grant factsheet

Programme goals and objectives

Information revolution has transformed farming in many parts of the developed world. Poor farmers in Africa, Asia and elsewhere, often struggle to get even basic information about water, weather and other factors that might affect their crops. Meanwhile, water resources are becoming increasingly scarce and optimal use is hampered by insufficient knowledge. The challenge is to increase agricultural production while reducing water consumption ("more crop per drop") for those farmers who live in remote and isolated areas and receive little information about new technologies and processes.

To address these issues, the Smart ICT project goal was to empower smallholder farmers in Africa to make informed decisions to better manage their land and water resources.

The primary objective of the project was to promote innovative approaches and ICT-based technologies for timely transfer of weather, water-and crop related information and advice to relevant end users in Africa for informed decision-making and enhanced negotiation capacity with water and farm-related service providers.

Specific objectives of the project were to:

1. Develop, test and pilot innovative approaches and technologies to provide relevant information and affordable advice in a timely manner to end users;

2. Develop capacity of different stakeholders to make use of the information and advice for better decision making, negotiation and accountability;

3. Define priorities for information provision and identify early successes in timely and affordable transfer of information and advice;

4. Develop interest of agri-industry and other service providers in supporting further expansion and continued services.

Map of countries where the grant operated

At a glance (GRIPS ID 10000003888)

Grant Implementing Agency: International Water Management Institute (IWMI), New Delhi/ Colombo (http://www.iwmi.cgiar.org/2013/09/who-can-you-call/)

Themes: Information and Communication Technology, Water Management and Knowledge Management

Benefitting Countries: Ethiopia, Egypt, Sudan

Total Programme Cost: USD 3,000,000

IFAD Contribution: USD 1,800,000

Co-financing (other donors): USD 1,200,000

Partners: ELeaf, DLV plant (http://www.eleaf.com and http://www.dlvplant.nl)

Effectiveness and duration: three-years (2011-2014)

Target group/beneficiaries

The Project's target groups were individual smallholder farmers (about 60 at each site in Sudan, Egypt and Ethiopia), contract farm managers (only in Egypt), water user' associations/ farmer co-operatives, irrigation/ flood control agency, public and private agricultural extension service providers, input suppliers and mobile services operators, federal and state/regional departments of agriculture and/or irrigation and regional agricultural and water resources research stations in the participating countries of Egypt, Sudan and Ethiopia.

Major results

An interactive SMS service was implemented to provide field specific information and advice in the local languages. In addition, online data portals enabled local extension advisors to monitor the status of all individual registered fields with weekly maps of nine different crop water parameters for each field. The main source of data feeding both the web and SMS information service was high-resolution satellite imagery, with one new image acquired every week.Such innovations also hold the potential to retain the rural youth in modern farming and empower the poor and women. Some of the major achievements –of the Project included:

i.   First-ever cell-phone and web-based information systems for water management developed and tested in pilot areas in Ethiopia, Egypt and Sudan.

ii.   Knowledge and capacity of different stakeholders / end users was significantly improved to understand and make use of the mobile and web-based information for better decision making, negotiation and accountability.

iii.   Viable business models developed for agri-industry, government departments, donor agencies and other service providers interested in supporting expansion and continued services.

iv.   Stakeholder analysis and institutional mapping completed; and communication material, outcome and impact stories and scientific papers published and presented at large international platforms.

v.   In the Gash delta region of Sudan, the occurrence and extent of flash floods was mapped for the first time which helped in significant improvement of the spate irrigation operations and management in the region.

vi.   The service generated immense interest of high level officials such as Chief of the Gezira Irrigation Scheme, (~880,000 ha), the Ethiopian Ministries of Agriculture and Minor Irrigation, and large commercial irrigated farms in Egypt.

Knowledge generated

i.   Project specific website (http://www.smartict-africa.com) and country specific web-portals for Sudan (http://fieldlook.com.et/),Ethiopia(http://fieldlook.co.et/)and Egypt (http://fieldlook.com.eg/) for having access to real-time field status of all the participants and the advisories

ii.   Training manuals on understanding and use of Smart-ICT services in agriculture and water resources management (irrigation, floods)

iii.   Communication material in print media (brochures, country profiles, instruction sheets, newspaper stories etc.), virtual media (blogs, Slideshare) and TV interviews.

Lessons learned

The Smart-ICT was a timely project as it addressed some key concerns of expected water shortage, variability and uncertainties in Africa. Smart ICT project demonstrated the potential of high end technology and science (High resolution RS-GIS image analysis and modelling) at the backend coupled with wide-reach communication platforms (mobile phones- push and pull service, interactive web portals) in

empowering smallholder farmers. During the course of project implementation, each of the three regions faced its own set of challenges due to capacity, culture and institutional differences; but some general lessons are applicable to all regions.

Using SMS had its own set of pros and cons, while it clearly advised farmers on the actions to be performed, the spatial variations of remote sensing information was lost in the simplification. Therefore, intensive support from extension staff based on the spatial maps and hand-holding of illiterate farmers remains very important. It was also found that cooperation with the local Water User Association and Irrigation Boards and Flood Management Units leads to a more meaningful irrigation advice. User feedback studies indicated advice, rather than only information, is more likely to lead to behavioural changes and should therefore be the focus in any follow-up Smart ICT tools. The communication between farmers and water institutions improved when web-based information became available in conjunction with instruction messages.

Way forward

The use of Smart-ICT services for information and advice to smallholder farmers in Africa is a major innovation with great potential for replication and scaling-up. Until now such services were available only to large commercial farmers in Europe, South Africa and parts of North America. This project has successfully demonstrated and evoked sufficient interest among the farmers and the relevant agencies that such services are actually useful for smallholders in Africa where agricultural extension systems are weak and specific advisories unavailable.

Developments in satellite sensors and image interpretation are now a proven data source for precision agriculture systems in the developed world. Free and low-cost high-resolution satellite imagery is becoming increasingly available, including NASA's Landsat 8 satellite (2013) and ESA's Sentinel-2 (2014), making scaling up to emerging markets more plausible.

The Project has also demonstrated that integration of hydrological modelling with this service can help in real time flood forecasting and effective management. During the project period, it has seen some good evidence of its adoption in some large irrigation schemes like Gezira and flood forecasting and flood-recession agriculture in Nigeria.

The project has developed detailed Business models, with components on marketing and communication strategy and risk analysis, for scaling-up of the services under African conditions. Involvement of food processing and allied stakeholders, telecommunication companies and threshold coverage of about 15,000-20,000 ha in country holds the key for scaling up of the financially viable service with a payback period of about 3 years.

There are significant financial opportunities for the project regions in Egypt and Ethiopia. To obtain project knowledge and experience with the food industry as a partner, Egypt is the most interesting region where the implementation of Smart-ICT using high cost DMC images is profitable within 3 years. Availability of freely downloadable high resolution images in the near future shall substantially reduce the costs and make it more affordable for small farmers in the developing countries.

Grant linkages to IFAD investment projects:

- Egypt: West Nubaria Rural Development Project (2003-2014)

- Ethiopia: Participatory Small-Scale Irrigation Development Program (PaSIDP) 2008-2015)

- Sudan: Gash Sustainable Livelihoods Regeneration Project (2004-2012)

Links to grant documentation

- Grant Design Document: http://tinyurl.com/p2cdqw8 (internal use)

- President Report: http://www.ifad.org/gbdocs/lot/2010/e/EB-2010-LOT-G-3.pdf

- Project Completion Report: http://tinyurl.com/o2bllg7 (internal use)

- Project website: http://www.smartict-africa.com

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