

Satellite Based ICT for Improved Crop Production in the Gezira Irrigation Scheme in Sudan



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INTRODUCTION:

The Satellite based ICT for improved crop production in the Gezira irrigation scheme is a one year project funded by the Technical Centre for Agricultural and Rural Cooperation CTA, The Netherlands and implemented by eLEAF and the Center, HRC-Sudan. The aims is to set up an advisory service for the Gezira Irrigation Scheme that conveys satellite based information on crops and irrigation to selected farmers and managers via mobile phone text-messages.



A Figure (1): farmer receiving an sms for irrigation date

GOAL:

The service is envisaged to contribute to a better irrigation water management that increases water use efficiency in order to maximize food production.

STUDY AREA:

The project was piloted in the Gezira irrigation scheme. Gezira is the largest irrigated scheme an area of 2.1 million Feddan. 44 farmers from five agricultural Blocks representing Gezira scheme geographically viz. north, middle, south and west, were selected for the pilot testing. The pilot testing period covered 2014/2015 winter season crops namely; wheat, chickpea and onions.

METHODOLOGY:

The ICT project comprises a web portal and SMS service. The web service facilitates the dissemination of spatial information. Extension officers, irrigation engineers, management board and other stakeholders can access farmers' information in the web portal at www.fieldlook.com.sd.

Satellite images from DMC and Landsat8 supplemented by NPP VIIRS surface temperature were analyzed using the SEBAL algorithm to measure 9 parameters. These cover **crop growth** (biomass production, leaf area index, and vegetation index), **crop moisture** (actual evapotranspiration, evaporation deficit, crop factor and biomass water use efficiency) and **minerals** (nitrogen in upper leaf and total plant nitrogen). The SMS service summarizes the spatial information into a simple meaningful short message in Arabic language sent to farmers.

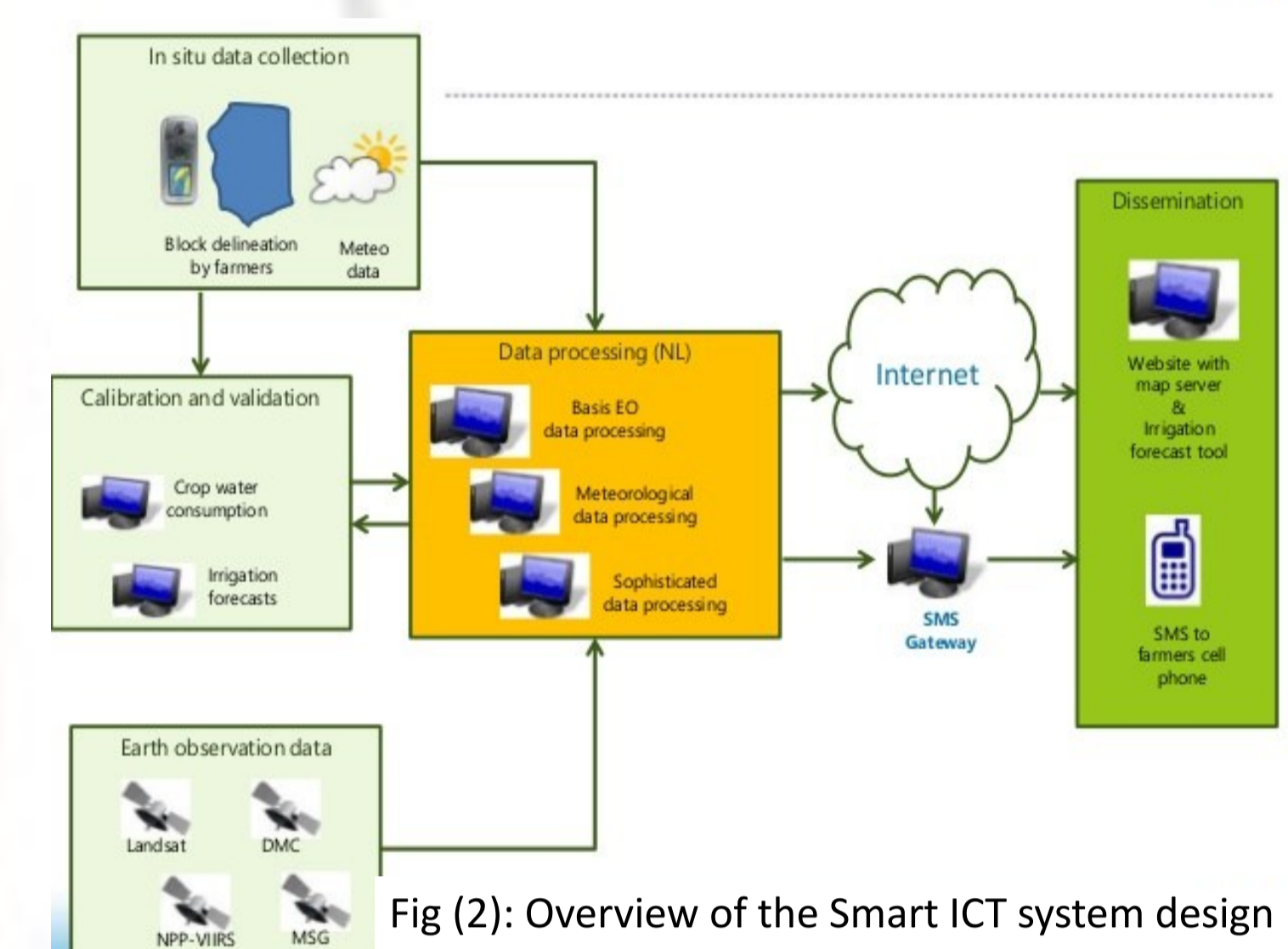


Fig (2): Overview of the Smart ICT system design



Fig (3): A Farmer getting advice from the project's leader

PROJECT ACTIVITIES:

The project's activities included:

1. Conduction of User Needs Assessments (UNA)
2. Data collection (end-user information, field data, crop data and climatic data)
3. Development of ICT tools (portal and SMS)
4. Send weekly SMS to farmers
5. Provide day-to-day support to farmers
6. Training of farmers, extension officers, and researchers
7. Monitoring and evaluation
8. Reporting on different activities



PROJECT OUTPUTS:

The main conclusions are :

- Average increase in wheat production is 67%.
- Farmers irrigated more frequently while using less water per irrigation. Shorter period of irrigation advice through SMS (8-11 days) compared to two weeks in the past.
- Early estimation of production, which contributes in fulfilling food security.
- The irrigation advice and other information can represent a database for further benefits.
- Farmers accepted the new technology because it is easy and accurate.
- Clear differences in crop production between attended and un-attended irrigation.
- Neighboring farmers applying the same irrigation advice received by the pilot farmers had increase in yield
- Research institutions and universities can highly benefit from the database.
- Facilitates management of consumed irrigation water and project management as a whole.

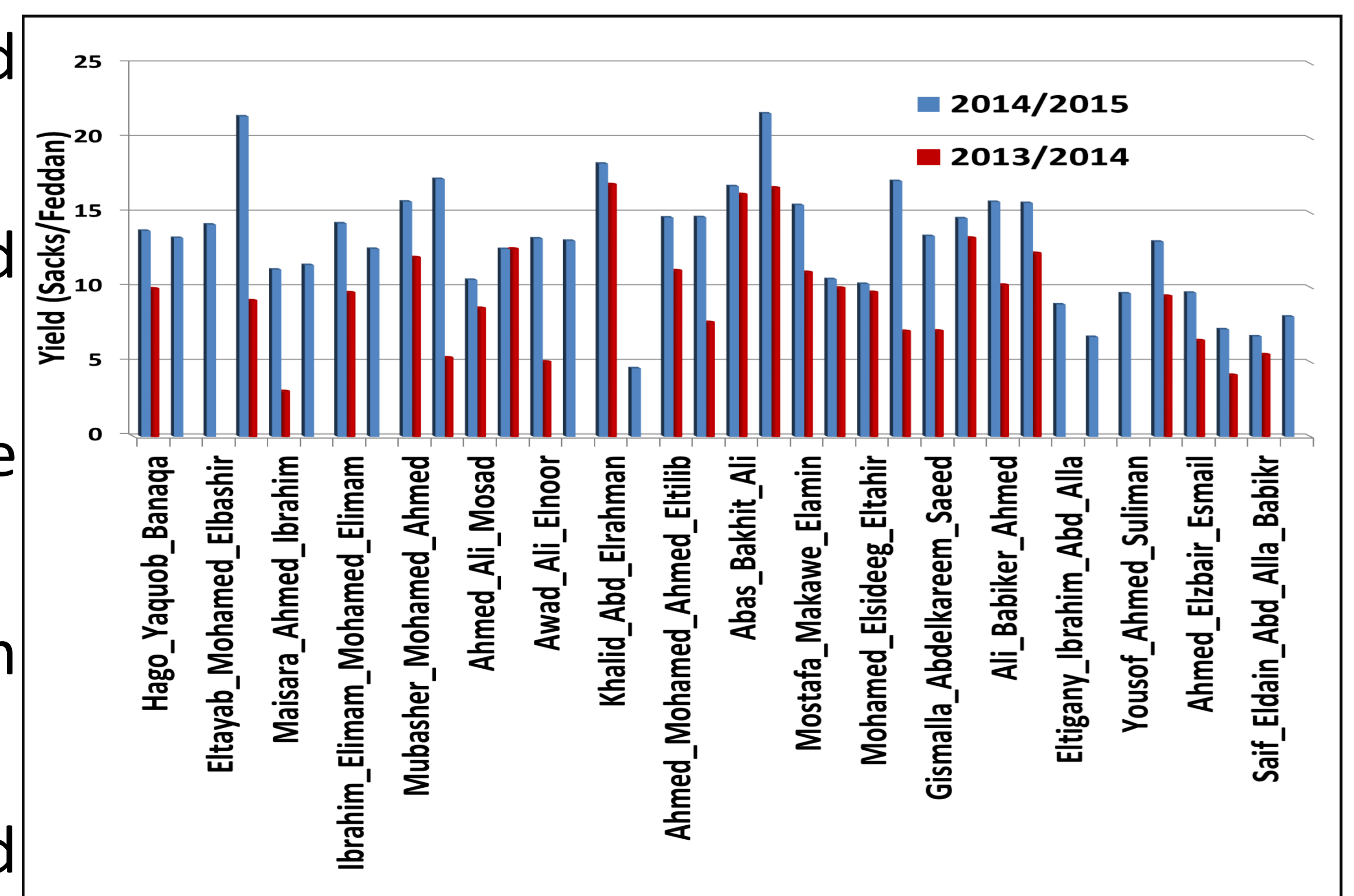


Fig (4): Farmers' wheat productivity during pilot year and the year before

WAY FORWARD

The Gezira Scheme management, the MWRIE and the farmers look forward to applying this technology in the near future in the whole Gezira scheme. Based on initiative from farmers of El Mieleg Block, a workshop was held on 6th November 2017 at El Mieleg. The workshop discussed the possibilities and challenges in implementing the ICT technology in Gezira. The farmers are willing to pay for the service supported by their associations, government officials and insurance companies.

Sponsor: _____

Duration: 2014 – 2015

Amount: _____ Euro