Satellite based ICT for improved crop production in Gezira Scheme

Younis A. Gismalla

24 October 2017
Background

- One year project/ winter 2014/2015,
- Funded by CTA /ICT4Ag
- Piloted in Gezira Scheme (880,000 ha)
- Implemented by eLEAF – Netherlands & HRC -Sudan

Objectives:

To set up an advisory service for the Gezira Irrigation Scheme that conveys satellite based information on crops and irrigation to selected farmers via mobile phone text-messages.
ICT project setup:
- Innovative project
- Uses Satellite images to measure 9 parameters (growth, moisture, minerals)
- ICT technology
  - mobile SMS & web portal
  - Irrigation planner software

Fieldlook GUI Home
Satellite images
(Landsat8, DMC, MODIS, MSG)

SEBAL measures 9 parameters

Crop growth
- Biomass production BP,
- Leaf area index LAI, and
- Vegetation index NDVI

Moisture
- Actual evapotranspiration,
- Evaporation deficit,
- Crop factor, and
- Biomass water use efficiency

Minerals
- Nitrogen in upper leaf, and
- Total plant nitrogen.

A summary is sent to farmers via SMS.
Project Activities:
✓ Selection of farmers
✓ User Needs Assessment (UNA)
✓ Fix farms locations with GPS/link with mobile number
✓ Develop service tools
✓ Weekly info. SMS
✓ Follow up and Training
  o Daily telephone calls
  o Weekly field visits
  o 3 training workshops
  o Stakeholders meetings
Project Output:

Water Use:

- Shorter irrigation interval (8-17) days compared to (15-20) days
- Irrigated more frequently (7-9) irrigations per season compared to (5-7)
- Used less water per irrigation
- Increased Water Use Efficiency
Crop Yield:

- Crop yield increased in all pilot farms
- Increase in wheat yield 3% to 270%
- Average increase in wheat 67%.

![Graph showing crop yield comparison](image-url)
Improved field Management:

- Frequent irrigation advice via SMS messages regardless of farmers’ location
- Confirmed accuracy of received info.
- Can retrieve farmers information any time
- Neighbor farmers applying same SMS irrigation advice resulted in:

1. an increase in wheat yield in Numbers with pilot farmers;
2. no variations in irrigation in Numbers with pilot farmers;
Other benefits:

- A database of Information collected for the first time
- Research institutions/universities can use database.
- Study irrigation efficiency-field level
- Early estimation of crop production (DSS)
- Can benefit Insurance companies

![Graph showing the relationship between Harvest Index (HI) and Yield (t/ha) for wheat in Gezira. The equation is given as $y = 12.804x^{0.9409}$ with $R^2 = 0.9305$.](image-url)
The way forward

- Replicate in 1 Block (GS 22 B)
  (i) Water supply /distribution
  (ii) Water consumption ICT
  (iii) Institutional aspects (policies, institutions, resources)
  (iv) Capacity building
- Conducted a workshop in ElMeilig Block on 6 Nov 2017 based on farmers’ initiative
- Scaling up to cover the whole scheme
THANK YOU