Energy Harvesting, Storage and Management for Automated Environment Monitoring in the East African Region

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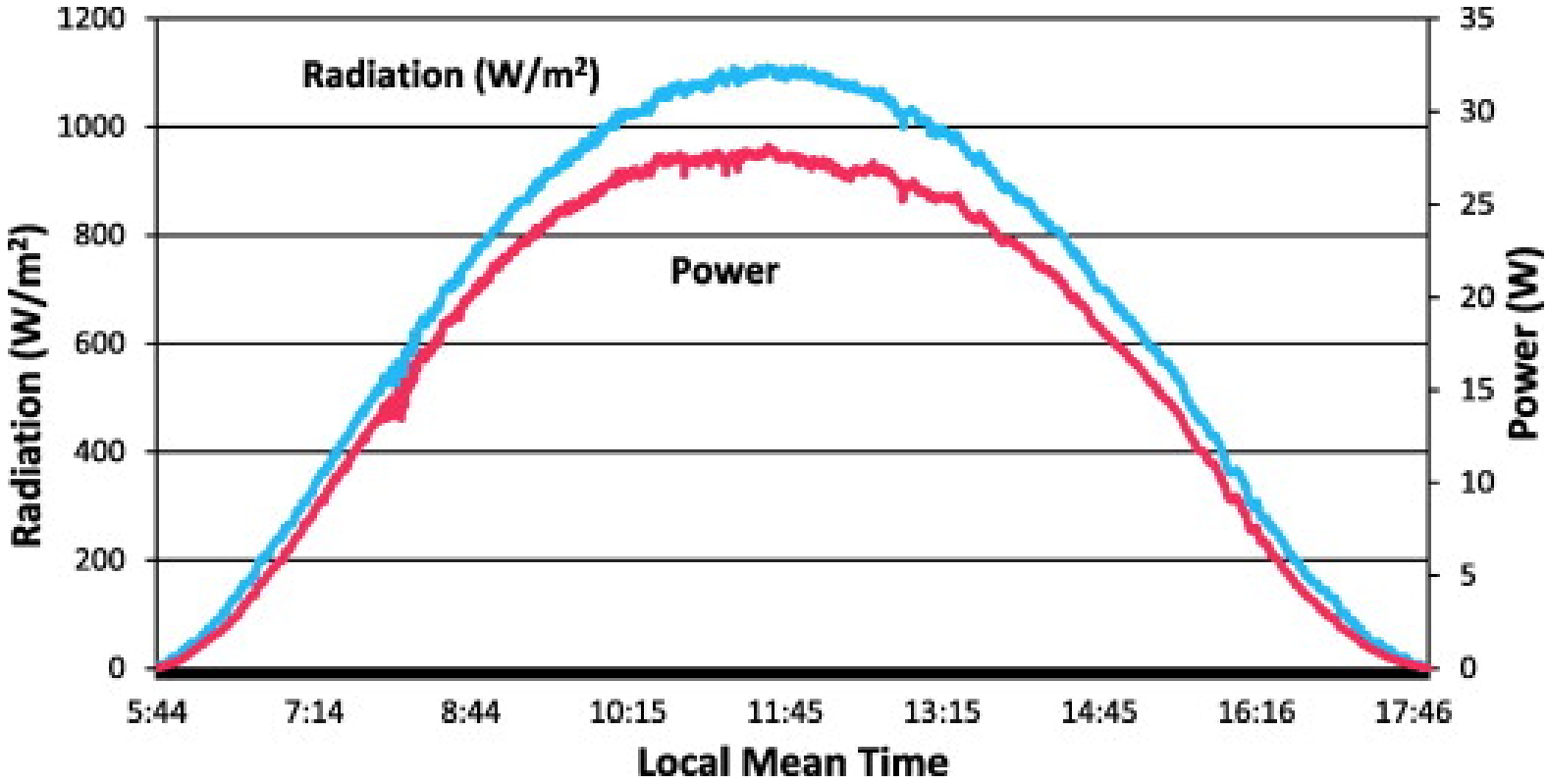
June Progress Report

June in brief

- Fully registered PhD Candidate who has completed his third year!
- Paper on objective 2 sent to PLOS ONE

Obj3 Progress

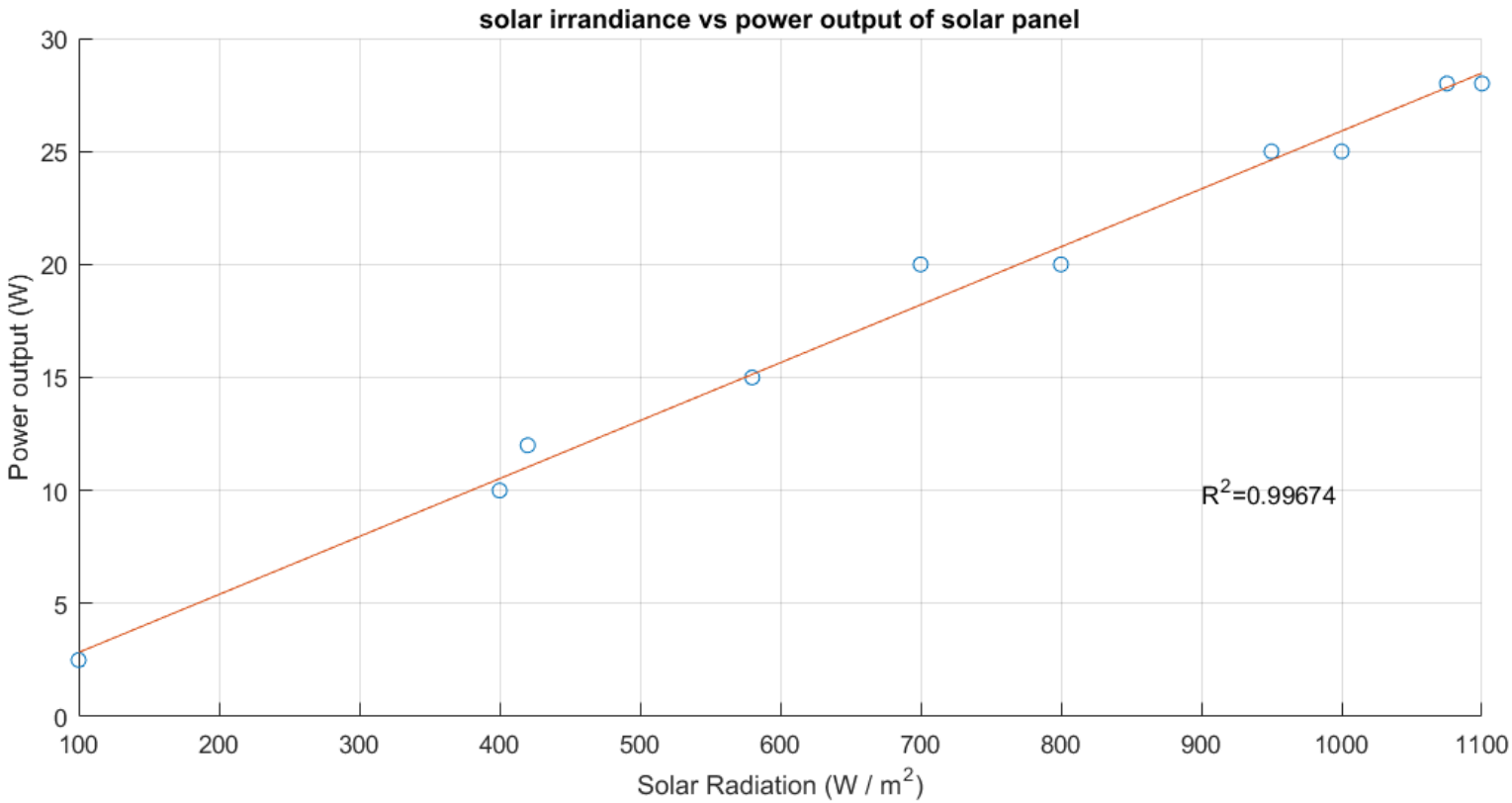
- Linear Models have come out quite well. Explanation.



- A. E. Githas (2012), Studying the effect of spectral variations intensity of the incident solar radiation on the Si solar cells performance, NRIAG Journal of Astronomy and Geophysics, vol.1, issue 2, pp165-171

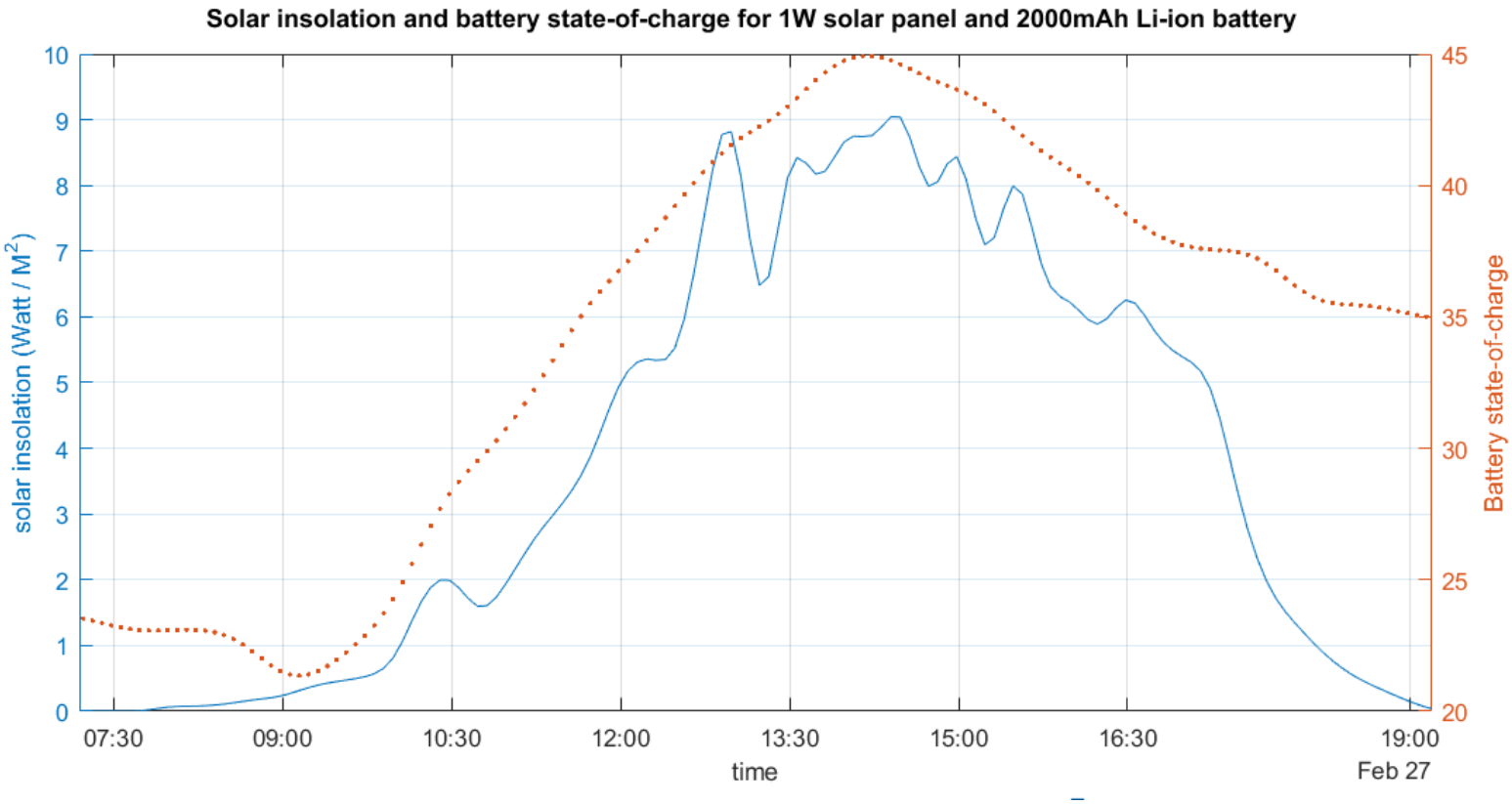
Obj3 Progress

- Linear relationship between irradiance and power output



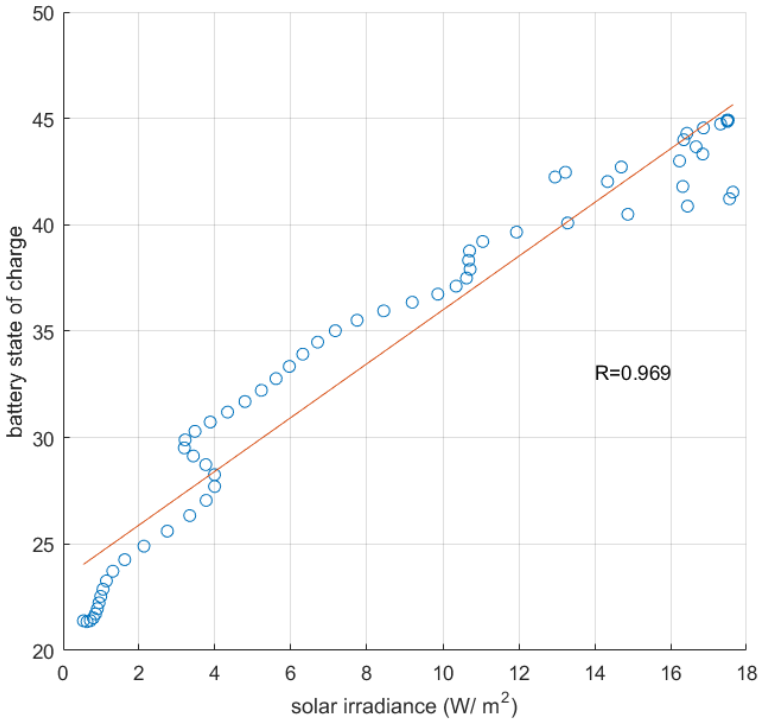
Obj3 Progress

- The Insolation SOC relationship has a similar trend

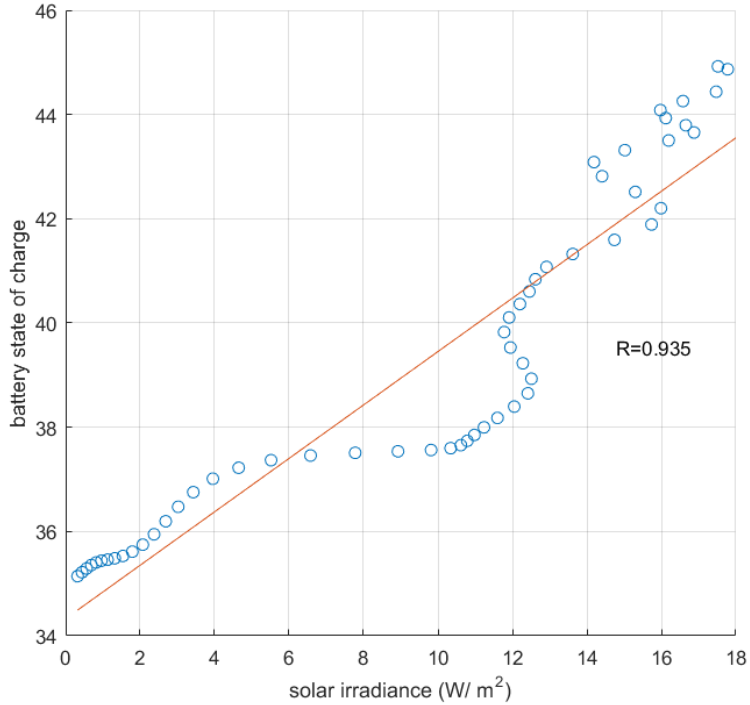


Obj3 Progress

- The Linear relationship during the charge and discharge phases means we are justified to use a linear model



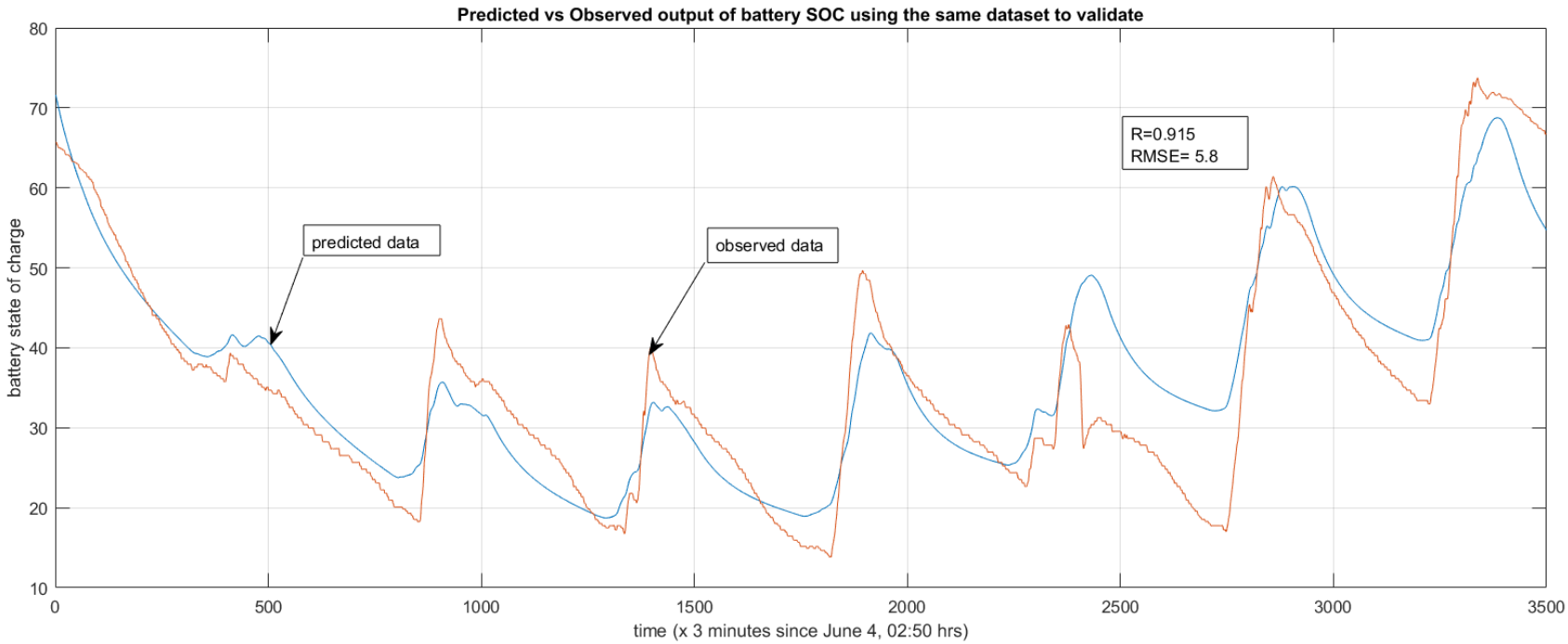
(a) charging



(b) discharging

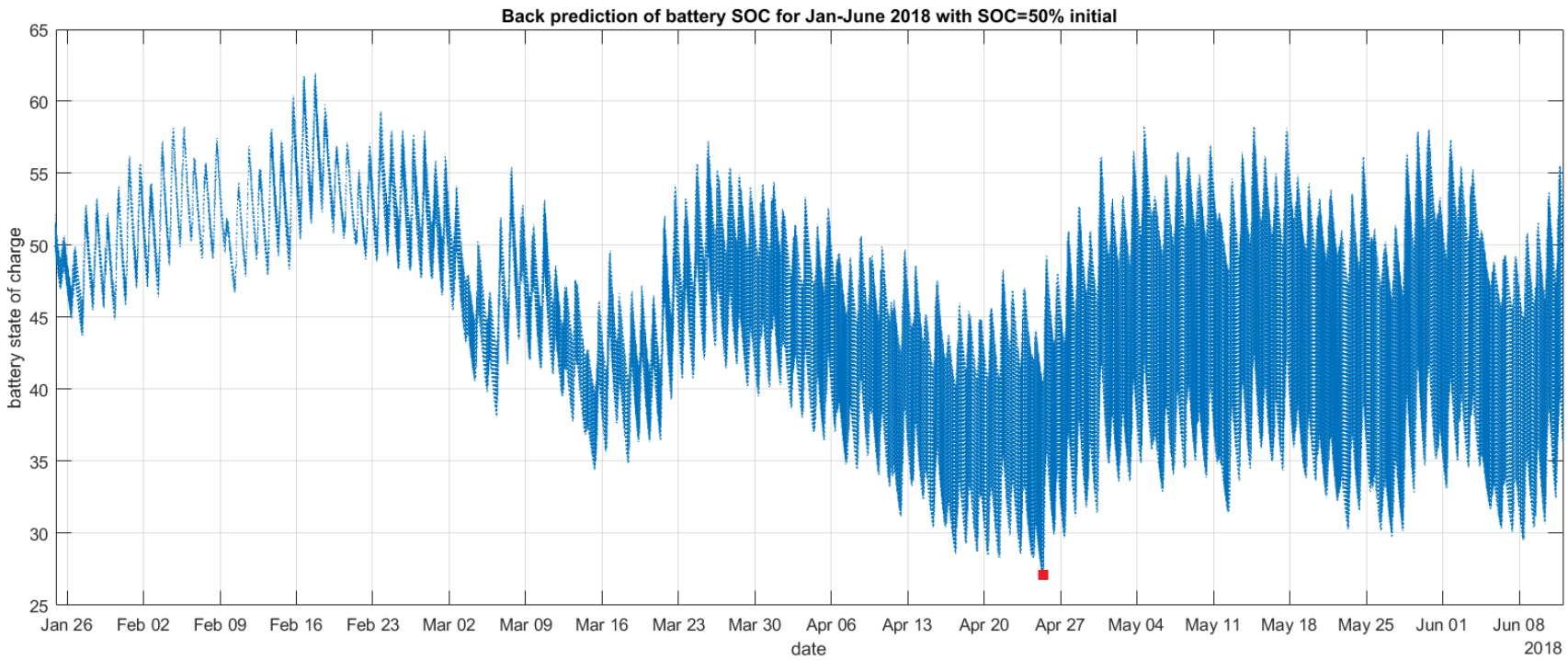
Using 2W solar panel - better results

- There was less interference in this experiment. Predicted SOC and actual SOC have smaller error margins and high correlation



Prediction run using Jan-June data 2018

- What the battery state of charge would have looked like if 2W panel had been deployed in Jan. 27% minima on April 26th



June Plans

- Proceed with Nonlinear or discrete calculus? Explanation.
- Paper 4 is already in the works 60% done: **"Solar Panel Sizing Models for Environment Monitoring Wireless Sensor Networks"** New Target: MDPI Sensors Journal (much faster response times. Issue each month. 5 year impact factor 3.0)
- Draft Thesis

Other news

- Accepted for postdoctoral position at University of Oxford in the Energy and Power Group. Starts April 2019? 24 months
- DC nanogrids. Task: Develop an energy management algorithm that distributes energy between the nano hub and loads in order to maximise PV yield, balance power availability and manage the lifetime of the energy storage elements
- A lot of work in Energy harvesting, storage and remote monitoring: Similar to WIMEA in a number of ways. Pilot projects in Kenya and Arua
- 2 presentations