

MURANG'A (KENYA)

JECAM/GEOGLAM Science Meeting
Ottawa, Canada
21 – 23 July 2014



Camille LELONG (CIRAD-TETIS)

Philippe VAAST (CIRAD/ICRAF)

Philippe PEDELAHORE (CIRAD/ICRAF)

Fabrice PINARD (CIRAD/ICIPE)

Régis BABIN (CIRAD/ICIPE)

JECAM

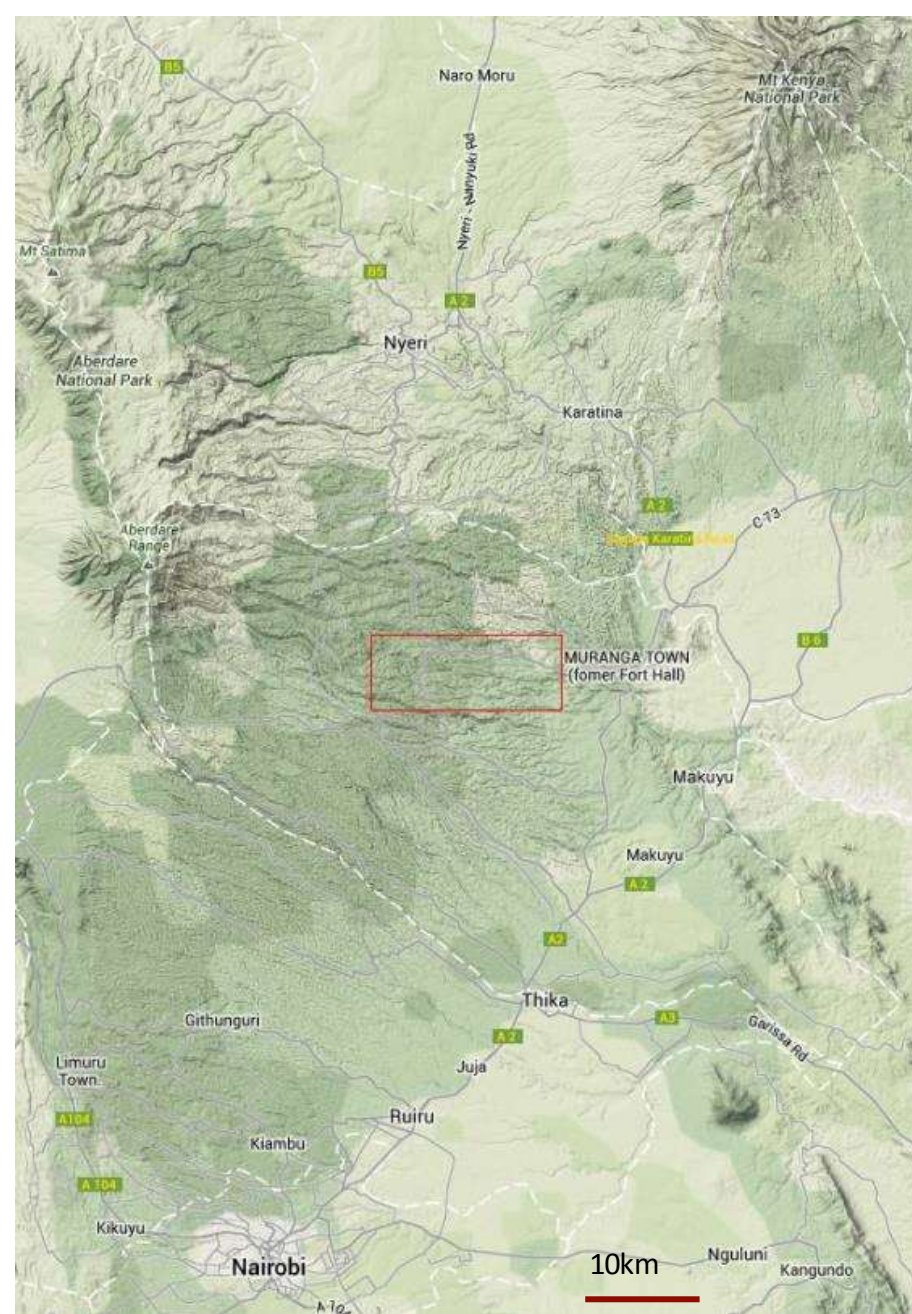
Joint Experiment for Crop Assessment and Monitoring



GROUP ON
EARTH OBSERVATIONS

Site Description

Central Province of Kenya (North of Nairobi), surrounded by Mt Kenya at North, Aberdares at West, Machakos Hills at South, Muranga town at East.



Site Description

Mean topography= 1300m, toposequence trend raising from 1000m to 2800m following a E-W line, very hilly with deep slopes.

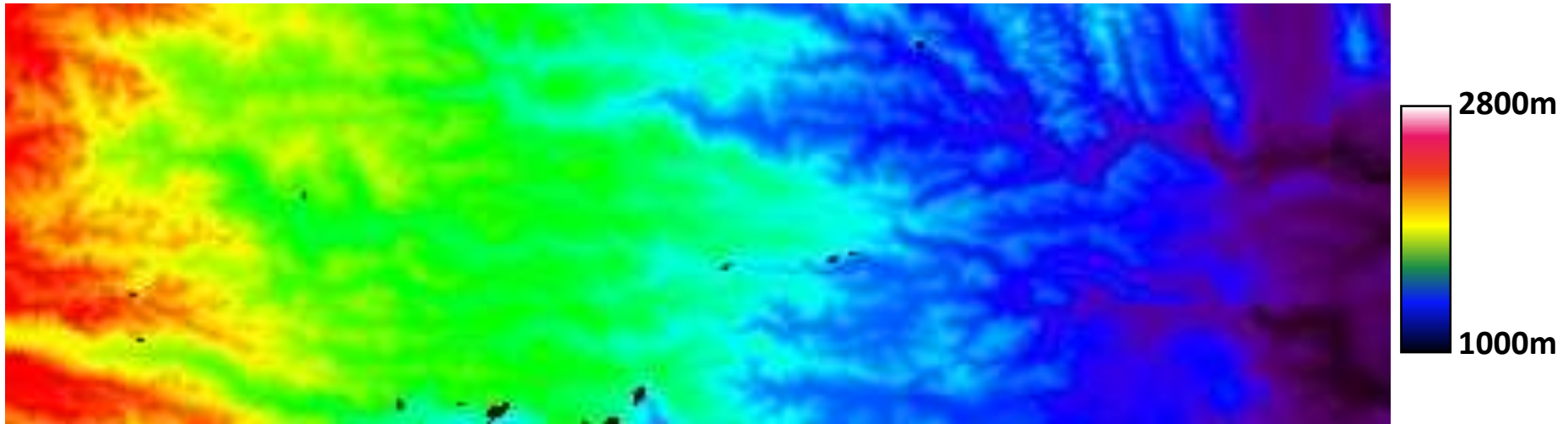


Figure 1 : SRTM DTM over the WorldView2 frame of acquisition.



Site Description

- Field size : 400m² à 5000m² with edges.
- Inherent climate : wet tropical/temperate (20°C (10°-32°C), 1200-1600mm, 2 rainy seasons)
- Soil = rich volcanic loam
- Natural Drainage, semi-organic practices
- Tropical crops, essentially perennial (banana, fruits, coffee, tea + woodlots), in association with local livelihood food-crops (maize & beans).








Site Description

- 🇰🇪 Tropical crops, essentially perennial (banana, fruits, coffee, tea + woodlots), in association with local livelihood food-crops (maize & beans)
- 🇰🇪 Field size < 1 ha
- 🇰🇪 **Agroforestry** and other crops in association





Project Objectives

-  Crop identification and Crop Area Estimation : OBIA approach + texture, Fourier...
-  Cropping systems characterization : spatial analysis
-  Dynamics and evolution monitoring

Earth Observation (EO) Data Received/Used

DigitalGlobe - WorldView2 - 8bands – VIS/NIR

- 1 scene (150 km²) : May 2013 (CIRAD funding)
- Need for very high spatial resolution
- **Need for stereo imagery** (not yet acquired)
- Clouds!



Figure 1 : WorldView 2 satellite image cover, acquired in two separate frames indicated in yellow.

In situ Data

- Land cover and land use survey in june 2013 (600 GPS points)



	ID	OS	assoc	comments
1	539 plot	coffee	rare banana	port haut, manque d'azote
2	540 plot	nappier	other grasses	
3	542 plot	wattle	cyprus	
4	545 tree	avocado		4-5 trees
5	546 plot	coffee	few banana	sunlight - photo
6	546b plot	coffee	banana grevillea	
7	545c plot	grass		weeds
8	541 tree	avocado		neffier coll NE, bananier au S, puis au
9	560 tree	croton mukindori		
10	560b tree	erythrina		
11	561 tree	erythrina		
12	562 tree	erythrina		
13	552 plot	coffee	grevillea	
14	557 plot	nappier/maize		
15	544a tree	erythrina		
16	544b tree	erythrina		
17	544c tree	erythrina		
18	545b tree	cordia africana		fleuri
19	543 tree	cyprus		3 trees in the axis N-S
20	547 tree	mango		

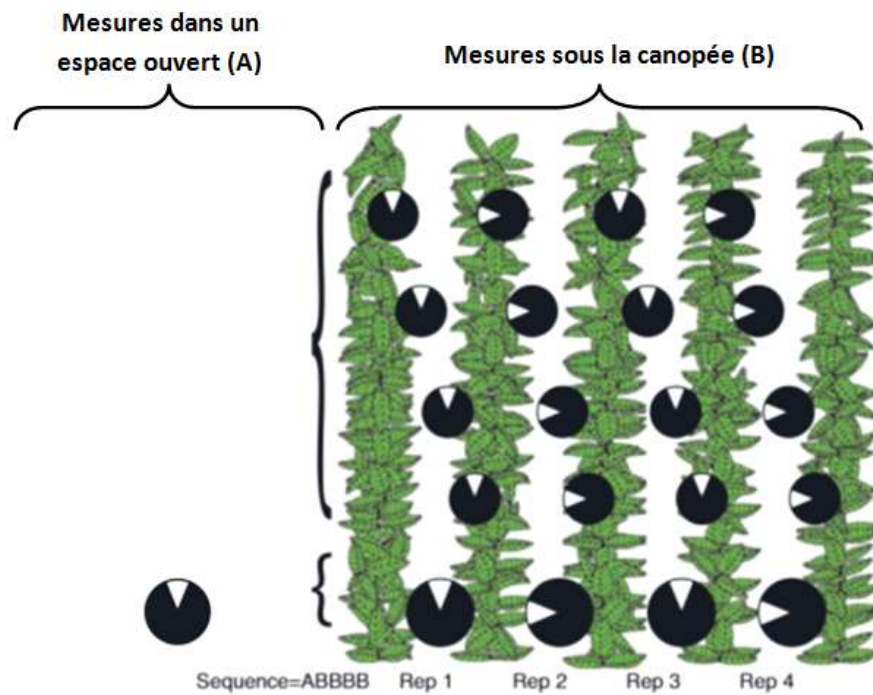
In situ Data

- Cropping systems survey in June 2014



In situ Data

- LAI (mean and variability) measurements of 20 plots of coffee in association with Grevillea, Macadamia



In situ Data

- Tree-crown size, and tree exact location in the 20 plots



JECAM

Joint Experiment for Crop Assessment and Monitoring

In situ Data

- Great challenges due to the complexity of the canopy, and the great diversity of vegetal types



Results

- First basic map of land cover, not yet validated
- Typology to refine, land-use and cropping systems to be identified



Results

- Intra-plot classification of measured trees to be done
- Comparison and validation of this intraplot map with the field data



Results

- LAI/structure to be analyzed

Research Plans for Next Growing Season

- Analysis to be continued
- Further information to be acquired
- Better satellite data to be acquired too:

WISH to have a WV2 / 8bands / stereo image
or a Pléiades-HR / 4 bands / Tristéréo