TREES-3 Case study :
Papua New Guinea

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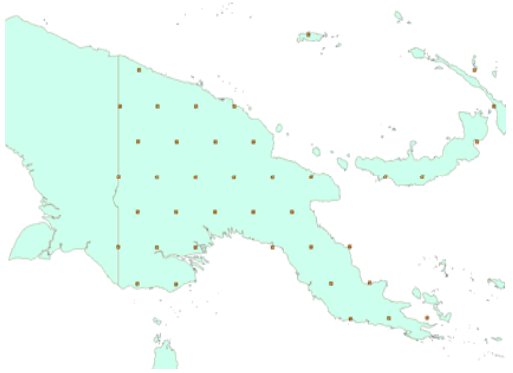
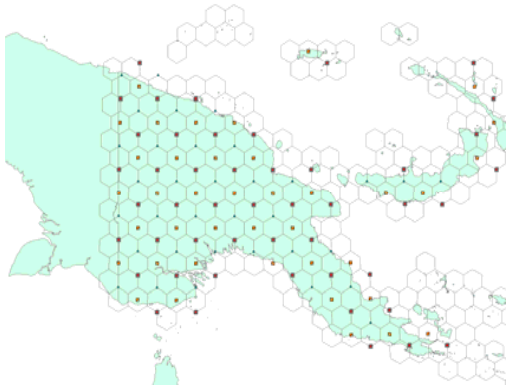
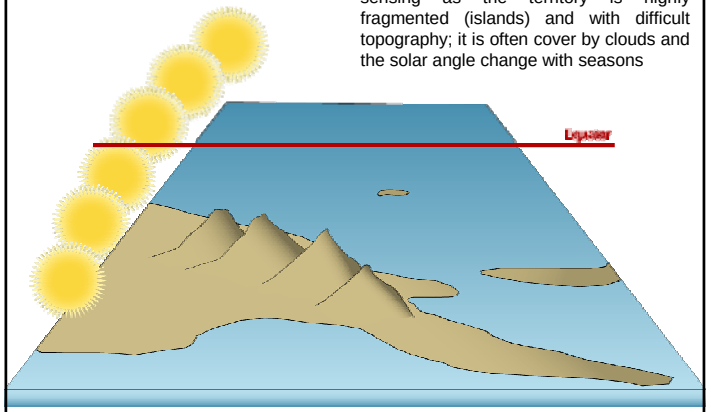
Systematic sampling – global level
based on Hexagonal Tesselation



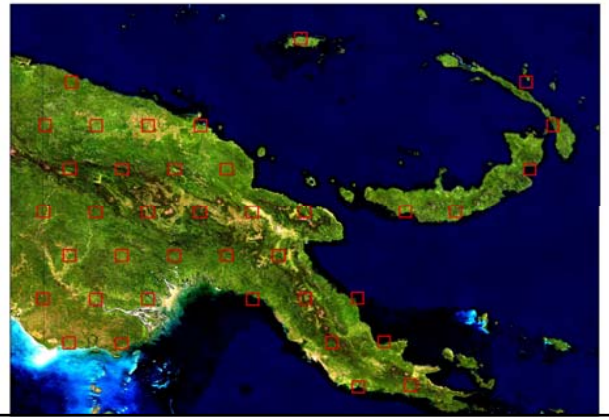
Systematic sampling – country level
based on Hexagonal Tesselation



PNG has been selected as case study because it is a difficult test for remote sensing as the territory is highly fragmented (islands) and with difficult topography; it is often cover by clouds and the solar angle change with seasons



Due to time limitation (study started in May) for the PNG case study we used the global sampling scheme but we increased the sampling plot size: ***from 100 km^2 to 900 Km^2 (approx. 9% of country land)***



For PNG case study we were using data from the Maryland University Global Land Cover Facility archive glcf.umiacs.umd.edu which is freely available, but does not hold all the available data

date	GLCF	USGS+	
1990	99	376	Landsat TM
2000	170	2679	Landsat ETM+

Number of satellite images present in archive on PNG

Of the 37 sample units we were able to evaluate forest area change on 65% of the total sampling area (5.8% of the land)

Cloud cover was more than 50% on only three sample units

Other possible limitations on satellite imagery (e.g. topography, solar angle) did not prevent change detection analysis

The detectable minimum mapping unit for forest area changes was < 1ha

- **Forest change detection examples on three deforestation cases with different driving forces:**

1. **Unsustainable land use**
2. **Indigenous forest use**
3. **Logging**

Unsustainable land use

3D view of Quick Bird very high-resolution satellite image

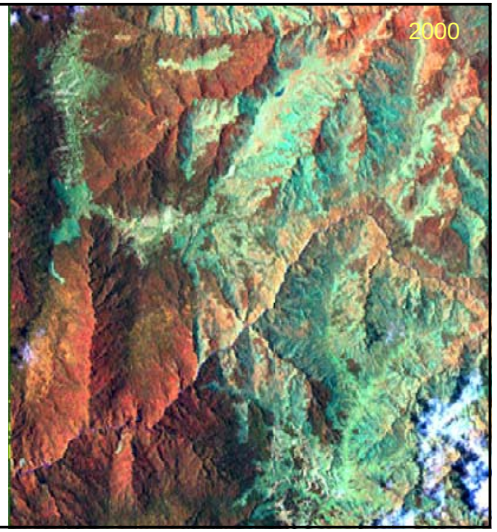
Unsustainable land use

Field picture October 2006

Unsustainable land use

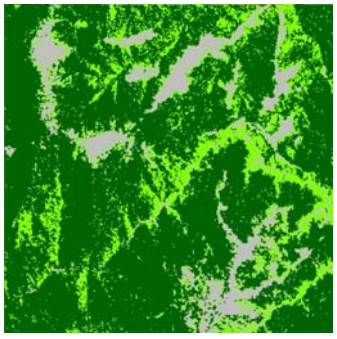
In this case there are large detectable changes

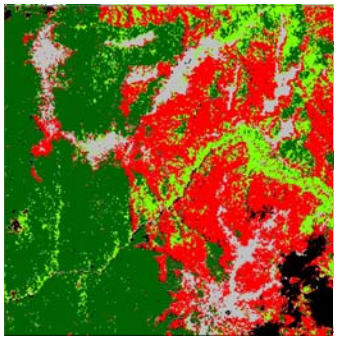
deforestation > 30%.



Unsustainable land use

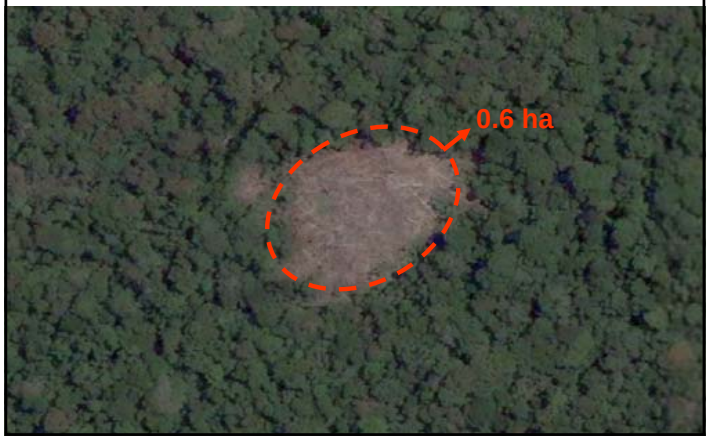
In PNG case study change detection have been performed on a pixel based supervised classification.
In this case there are two forest classes (pixels with trees, green color). The red area represents the conversion from forest (both classes) to non forest (deforestation). The black area is the cloud mask.





Indigenous forest use

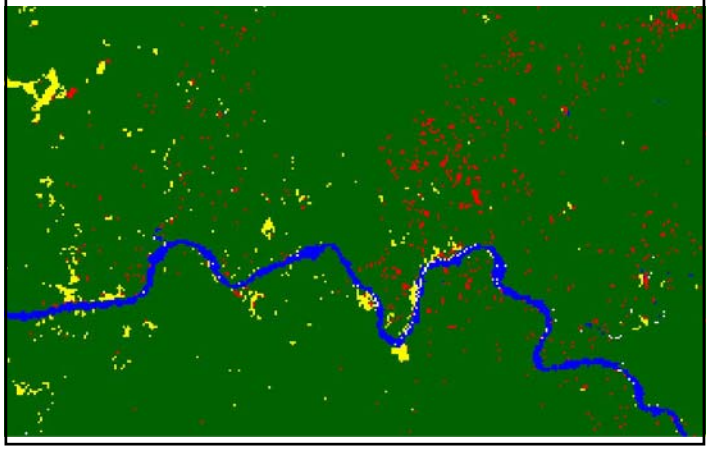
Quick Bird very high-resolution satellite image



Indigenous forest use

Deforestation < 1%

Change from 1990 to 2000



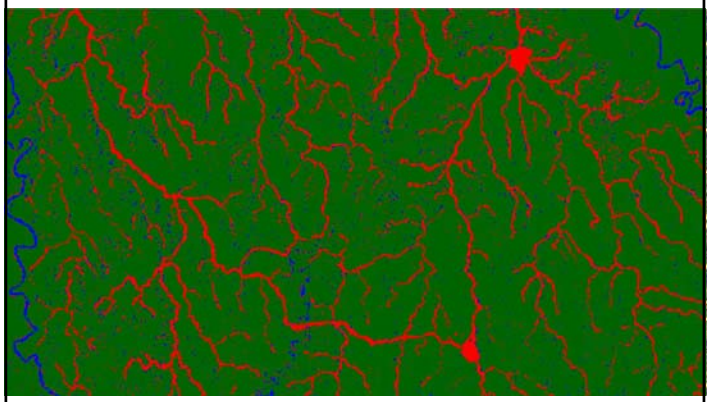
Logging

Field picture October 2006

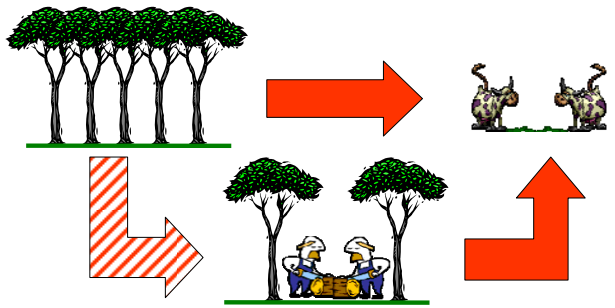
Logging

Deforestation > 2%

Change from 1990 to 2002



In PNG case study only area changes in existing forest have been considered (**gross deforestation**)



Lessons learned from the

Case studies on monitoring area change from space:

Lessons from Congo Basin study

Sampling schemes exist for providing valid area change estimates (with acceptable sampling error) at regional levels

Access to other data sources / techniques for compensating for missing data need to be established for some regions

Lessons learned from Costa Rica and PNG studies

At national scale, sampling schemes needs to be intensified up to full coverage (small countries)

The techniques are available to monitor land cover changes, in whatever form they take – clear cutting, fire, shifting cultivation

The minimum mapping unit can vary from 5 ha at the global level to less than 1 ha where suitable ground information and imagery are available