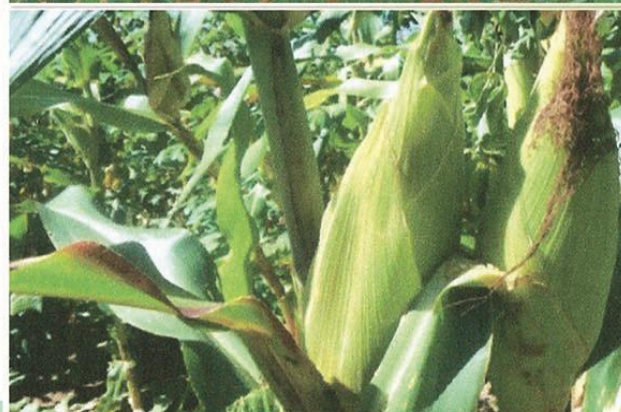República de Moçambique
Ministério da Agricultura

DIRECÇAO NACIONAL DE TERRAS E FLORESTAS

**Development of Sustainable National Forest Resource Information Platform for Monitoring REDD+ in Moçambique**

Miombo Network Workshop

Joaquim Macuacua
Maputo, July 24, 2013

Presentation Outline

- REDD+ activities;

- Policy Development of REDD + in Mozambique;

- Existing REDD+ initiatives activities and Prospects;

- Development of National Forest Resource Information Platform in Mozambique for REDD+;

- Support of the Government of Japan for REDD+ readiness preparation;

- DNTF-JICA Technical Cooperation Project
  - Establishment of Sustainable Forest Resource information Platform for Monitoring REDD+;
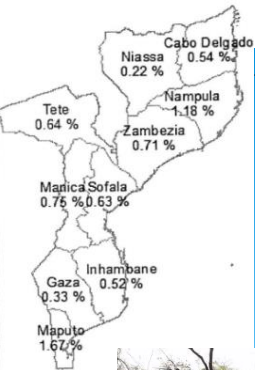
← Annual Forest loss

Benefits of REDD+ in Mozambique

REDD+ Action

Monitoring System

Japan Grant Aid and JICA Project

Carbon Credit

<Bi-products of REDD+>

* Protect water sources
* Maintain air, soil, and water quality
* Provide habitat of animals
* Secure ecosystem and biodiversity
* Thus, improve food security of large population

Forest Transition Curve

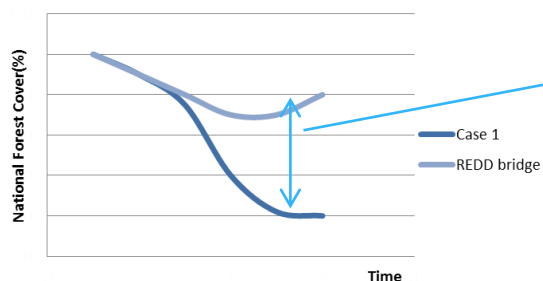National Forest Cover(%)

Time

Case 1
REDD bridge

<Bi-products of REDD+>

* Prevent erosion
* Protect people from flood & drought
* Share the benefit among people
* Thus, help people get out from poverty

UNFCCC "REDD+"

5 REDD+ activities (1/CP16. para 70)

a) Reducing emissions from deforestation;

b) Reducing emissions from forest degradation;

c) Conservation of forest carbon stocks;

d) Sustainable management of forests;

e) Enhancement of forest carbon stocks

(Note) Forest and Wildlife Law of Mozambique (Article 3 of Law No. 10/1999) is bases of these five activities;

Phased approach (para 73, 74)

READINESS → **Implementation** → **Full Implementation**

- **Development of strategy**
- **Capacity building**

- **Implementation of strategy**
- **Demonstration activities**

- **Result-based actions with MRV**

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* UNFCCC : *United Nation Framework Convetion on Climate Change*
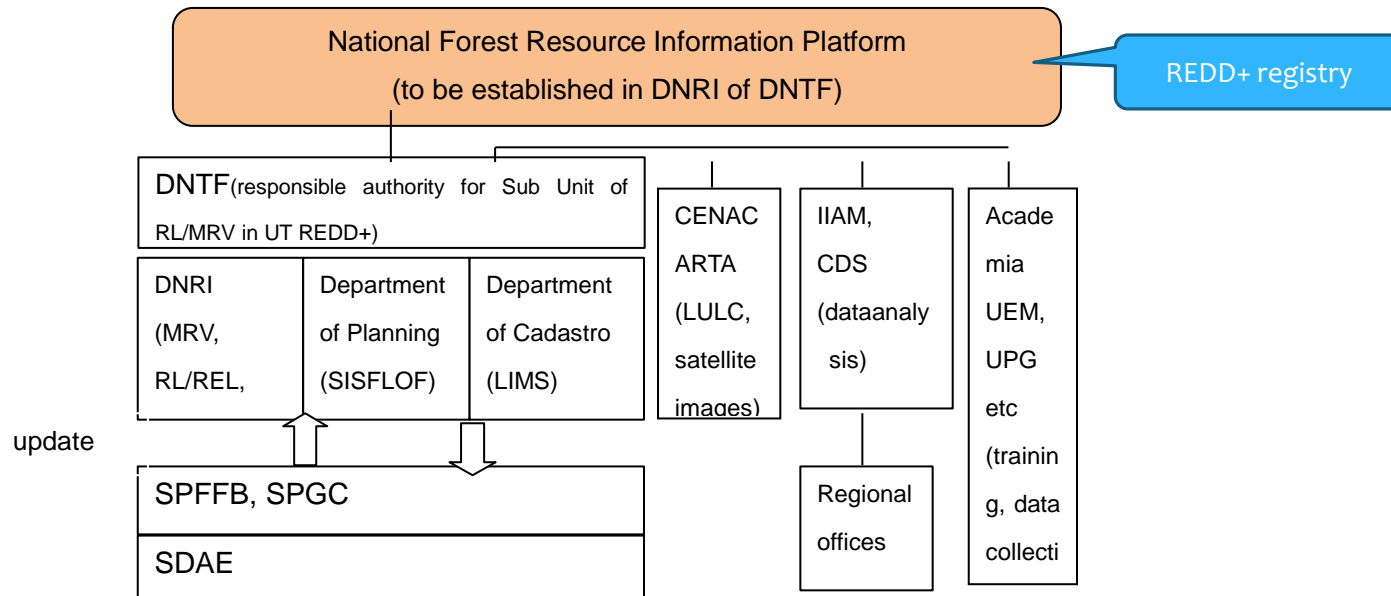
Policy Development of REDD + in Mozambique

- In 2009, FCPF R-PIN was submitted by DNTF-MINAG and MICOA and was approved to prepare RPP. Norway funded US$1million to IIED (UK research institution) to develop National REDD+ Strategy and RPP.

- In March 2012, the draft of RPP was finalized and submitted to FCPF by the Government of Mozambique represented by MINAG-DNTF and MICOA (with a support of JICA & DANIDA) and was approved a granting of $ 3.8 million with a condition of inclusion of some points such as institutional arrangement, budget and others. http://www.forestcarbonpartnership.org/

- In January 2013 the last version of RPP was submitted and Grant Aid Agreement was signed in June.

- R-PP provides the a clear guidance of the activities that will be performed in the process of REDD+ readiness preparation in Mozambique. With the fund of FCPF, National REDD+ Strategy, legal and institutional framework law and relevant guidelines including nationally appropriate safeguards will be developed within three years.

Existing REDD+ initiatives activities and Prospects

- Tree planting using indiginus species (Presidential initiative: One child one tree, one forest one community leader);

- Readiness preparation (FCPF);

- Establishment of National Sustainable Forest Resource Information Platform for Monitoring REDD+ (JICA);

- SADC-GIZ for MRV, for Mozambique in Mopane ecosystem in 26000 km^2 (SADC-GIZ);

- Some voluntary carbon projects by private sector;

- Assessment on the Mangrove for carbon estimation in Zambezi river Delta (USAID);

- Some studies on-going by research institutions;

Development of National Forest Resource Information Platform in Mozambique for REDD+

* **Institutional Arrangement** –National Forest Resource Information Platform, MRV and RL/REL: responsibility of DNTF-MINAG
* **REDD+ Registry** - one of the functions to be established in National Forest Resource Information Platform (inc. National Accounting System / NAMA reporting function)

National Forest Resource Information Platform (to be established in DNRI of DNTF)					

REDD+ registry

DNTF (responsible authority for Sub Unit of RL/MRV in UT REDD+)			CENAC ARTA (LULC, satellite images)	IIAM, CDS (dataanalysis)	Academia UEM, UPG etc (training, data collecti
DNRI (MRV, RL/REL,	Department of Planning (SISFLOF)	Department of Cadastro (LIMS)			

update

SPFFB, SPGC
SDAE

Regional offices

Support of the Government of Japan for REDD+ readiness preparation

Grant Aid: US $ 7 million (2009 ~ 2013)

By Ministry of Foreign Affairs of Japan

DNTF & JICA Advisor:
National REDD+ policy planning support (UNFCCC negotiation, FCPF –RPP, laws & strategy formulation, etc)

DNTF-JICA Technical Cooperation Project (2013 ~ 2018)
Establishment of Sustainable Forest Resource Information Platform for Monitoring REDD+

DNTF-JAXA KC3 Project (2013-2014)

- Reception of ALOS-PALSAR in exchange of forest inventory
- Science meetings

DNTF National Director

JICA Advisor (2010~)

Chief of Natural Resource Inventory

Staff, Field Staff
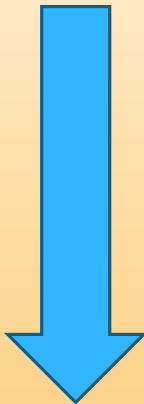
- Purchase satellite images, equipment, vehicles (including installing & user training & maintenance services)

JICA training (2011~)
on MRV, forest fires, inventory etc. 8~10/year (in Japan, Brazil, Thailand)

- Capacity development
1) Forest info platform
2) MRV system
3) RL/REL
4) Biomass estimation
(JICA experts: Remote sensing, GIS/Db, Forest inventory and REDD+)

DNTF-JICA Technical Cooperation Project: Establishment of Sustainable Forest Resource Information Platform for Monitoring REDD+

Executing Agency: Mozambique DNTF-MINAG

1. Database System functioning as the Forest Resource Information Platform (including REDD+ Registry) is established.

2. Basis of National MRV for the Forest Resource Information Platform is developed.
(MRV: Monitoring, Reporting and Verification)

3. National RELs/RLs for the Forest Resource Information Platform are created.
(REL: Reference Emission Level)

4. Data set of biomass and carbon estimate is prepared.

Japan Grant Aid
- Satellite Imagery
- GIS facility
- Survey equipment

In the future

Develop to a nation-wide system by DNTF for REDD+

1. Establish a database system functioning as the Forest Resource Information Platform (including REDD+ Registry)

1-1 Create a database in DNTF HQ GIS facility with a nationwide satellite image map product and all available forest and geographic information.

1-2 Produce forest cover and land use maps for 2 provinces (Gaza and Cabo Delgado) by remote sensing using optical satellite images (ALOS-AVNIR2) and ground truth.

Mining and agriculture area data

Past remote sensing data and images, historical changes

Land use data

Agro-ecological zoning

Forest inventory data

Protected area data

A product of pan-sharpened, mosaicked, colour coded, geo-coded nationwide satellite image raster map

Pan-sharpened image of ALOS-PRISM and AVNIR2

Plantation area data

Concession area data

RS and GIS Database Expert
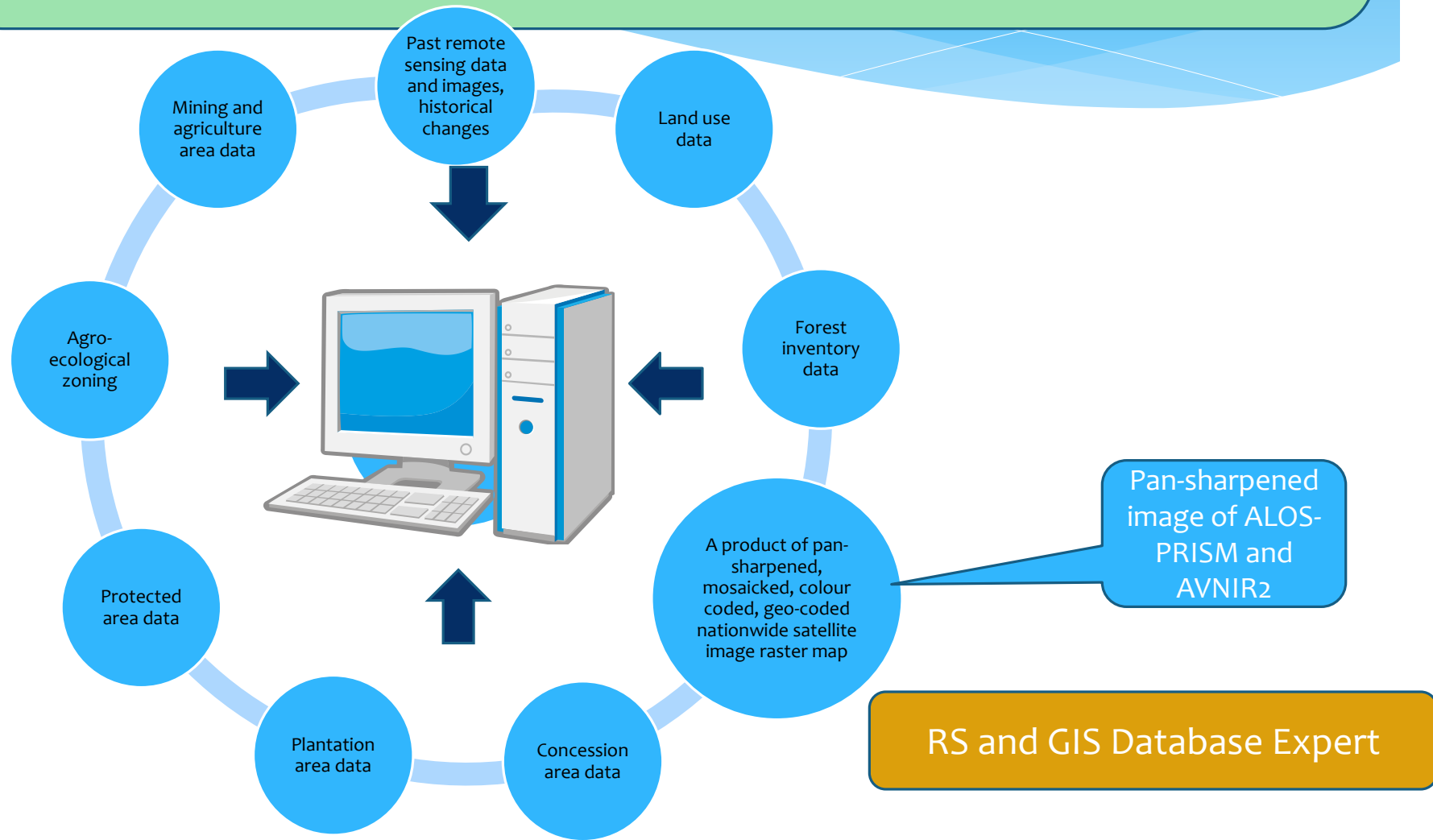
2. Basis of national MRV for the Forest Resource Information Platform is developed

2.1 Develop a technical capacity of remote sensing to detect forest cover change using SAR (ALOS-PALSAR) in 2 provinces (Gaza and Cabo Delgado) <in combination with JAXA KC3 Project>;

2.2 Establish ground monitoring system
- Establishment of Forest Inventory System through trial in entire 2 provinces (Gaza and Cabo Delgado) and 2 districts for remaining 8 provinces
- Establishment of Forest Monitoring System in 2 districts for 10 provinces

Component 2-1

Monitoring REDD+ using SAR (PALSAR) images

PALSAR (Phased Array type L-Band Synthetic Aperture Rader) : An active type microwave sensor which can carry out observations day and night regardless of weather conditions.

PALSAR 10m Global Forest/Non-Forest Map 2009

©JAXA, METI Analyzed by JAXA

●:Forest :Non-Forest ●:Water

Component 2-2

Ground Survey

SDAE*(District)

GPS Training

SPFFB** (Province)

MODIS Info

DNTF Headquarter

Map & Data Sharing
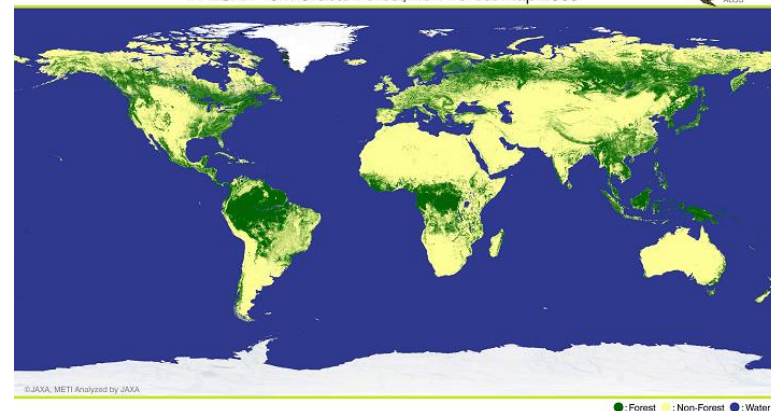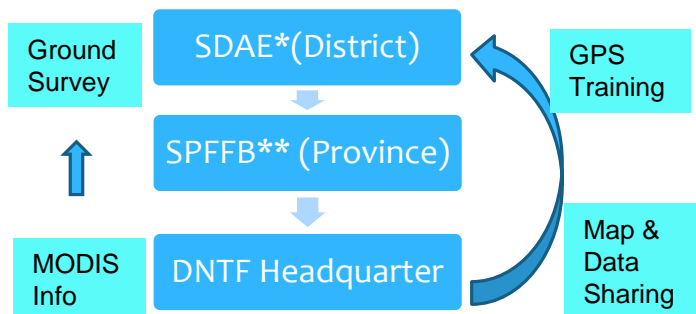
20 Pilot Districts

Province	District 1	District 2
Maputo	Matutuine	Magude
Gaza	Bilene	Mabalane
Inhambane	Mabote	Vilanculo
Manica	Gondola	Macossa
Zambezia	Murrumbala	Gile
Tete	Moatize	Tsangano
Sofala	Golongoza	Cheringoma
Nampula	Mecuburi	Mossuril
Niassa	Nuembe	Majune
Cabo Delgado	Ancuabe	Montepuez

<Note>
*SDAE: District Administration Office for Economic Activity (Agriculture, Forestry etc)
**SPFFB: Provincial Office for Forest and Wildlife
***HQ: Department of Natural Resource Inventory, DNTF Headquarter

Framework of the Cooperation with JAXA KC-3 Project

DNTF-JICA The Project for Establishment of Sustainable Forest Resource Information Platform for Monitoring REDD+ (2013~2018)

Capacity building

Monitoring Pilot

Monitoring Implementation

DNTF-JICA Project Component 2-1

From 2012 to 2013 Capacity building of interpretation of PALSAR archives data from 2006 to 2011 of Gaza and Cabo Delgado Provinces, Platform data base, Monitoring and RL/REL

From 2014 to 2018

Pilot monitoring in Gaza and Cabo Delgado Provinces using new images

From 2018

Monitoring in whole country (step by step)

Under the KC3 cooperation, we can use PALSAR (Radar) imagery as below:
- 50 scenes PALSAR image per year through AUIG
- PALSAR mosaic image whole Mozambique
- Forest/Non forest map from PALSAR

JAXA K&C Phase 3

Archives (Level 1.1 FBD, base line length between the positions of each satellite taking in the same area to be less than 1km)

Annual data of Gaza and Cabo Delgado taken in May (Keep Archive of whole country data)

Annual data taken in May of entire country

DNTF-JICA Project Component 2-2

Ground truth and inventory survey in Gaza and Cabo Delgado Provinces

Inventory and monitoring in 20 Districts

Inventory and Monitoring in whole country (step by step)

What's ALOS?

✓ **Period:**
   Jan. 24, 2006 by JAXA, JAPAN
   Apr. 27, 2011

✓ **Objectives:**
   ■ Cartography (1/25,000 scale)
   ■ Regional environmental monitoring
   ■ Disaster monitoring, *etc.*

✓ **Three mission instruments:**
   ■ PRISM, AVNIR-2, PALSAR
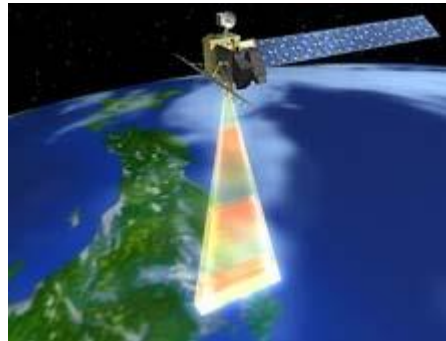
PRISM

AVNIR-2

PALSAR
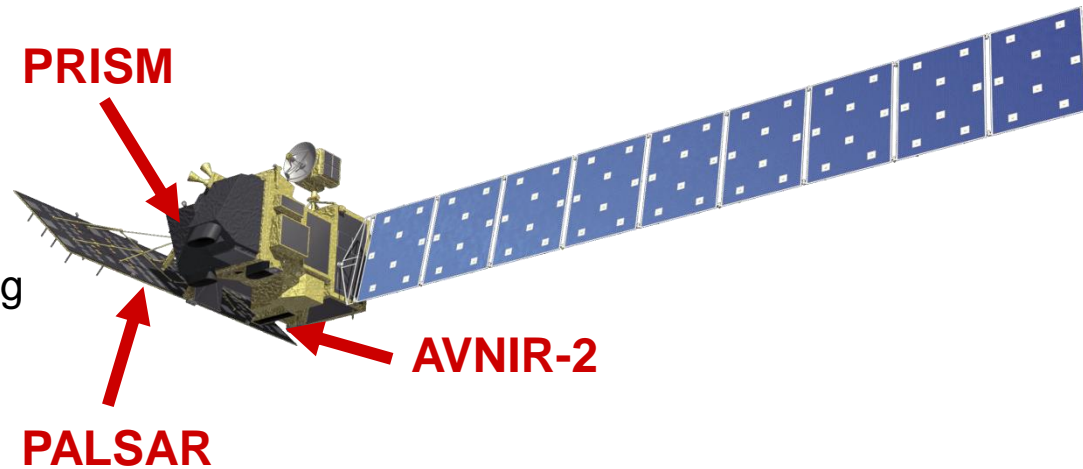
PRISM
Panchromatic Remote sensing
Instrument for Stereo Mapping
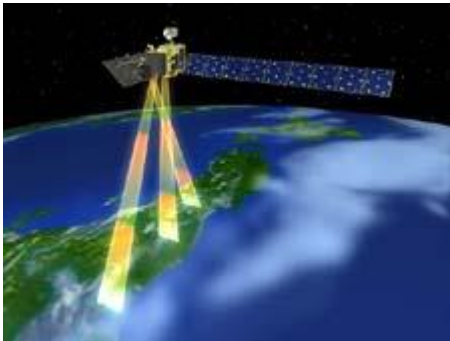
PRISM can acquire triplet
stereo imageries by nadir-,
forward, and backward-
radiometers with 2.5m spatial
resolution in 35km wide swath.

AVNIR-2
Advanced Visible and Near-Infrared
Radiometer type 2

AVNIR-2 can observe with 10m
resolution in 70km swath, and it
can be changed the observation
area by pointing capability within
+/-44 degrees in across track.

PALSAR
Phased Array type L-band
Synthetic Aperture Radar
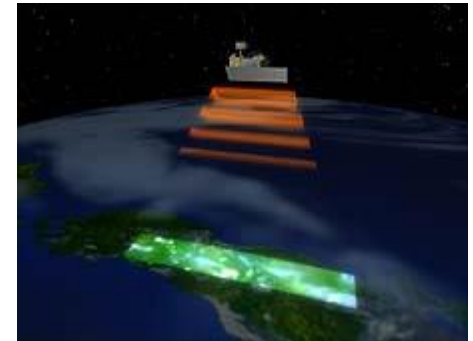
PALSAR can acquire the data
in not only daytime but also
nighttime as well as cloudy
and rainy whether conditions.

Ref. JAXA Web

AVNIR-2

Advanced Visible and Near Infrared Radiometer type 2

4 band (Blue, Green, Red, NIR)
10m spatial resolution (at nadir)
70km swath width (at nadir)
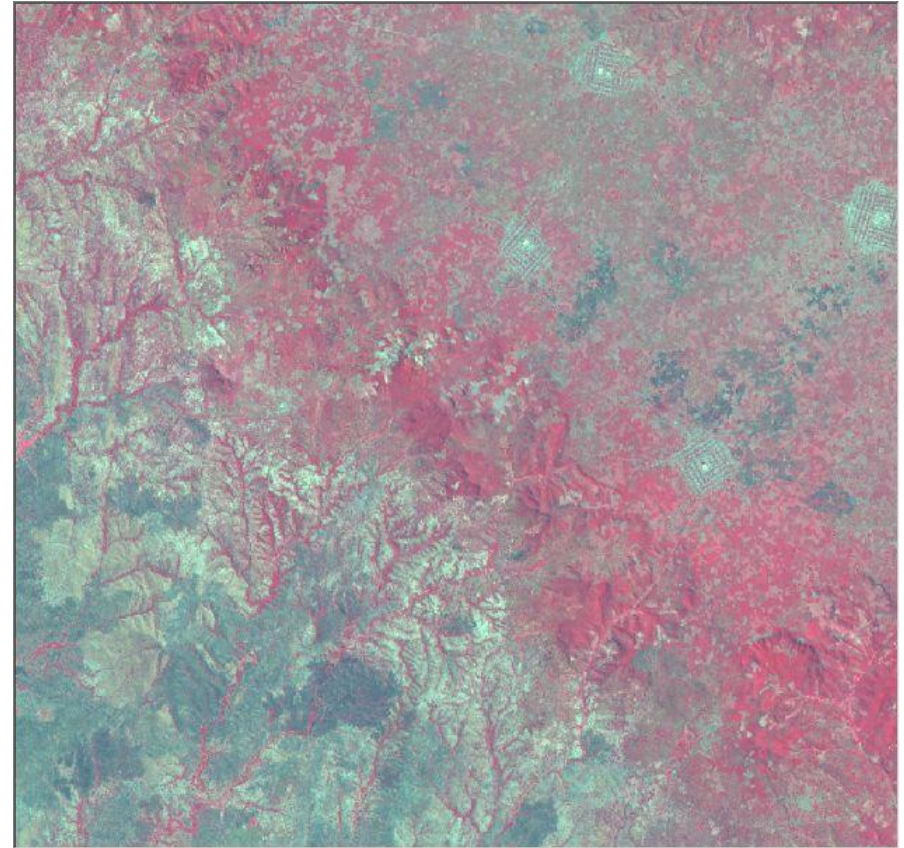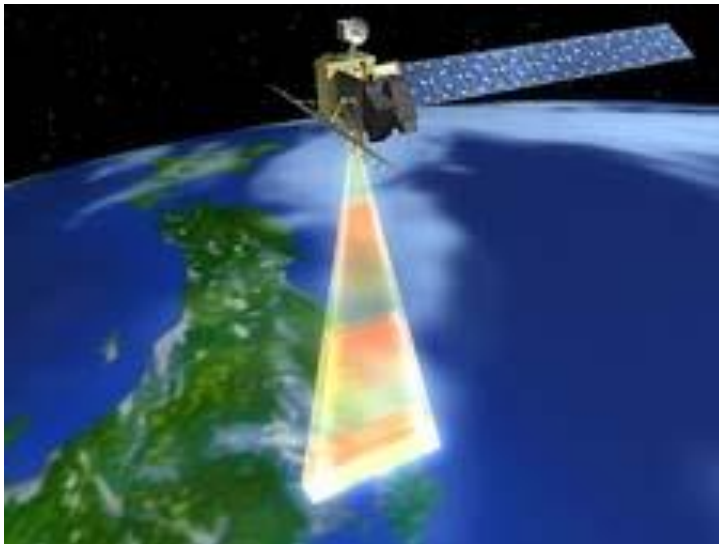
Sample image of AVNIR-2

Reference : http://www.eorc.jaxa.jp/ALOS/en/about/avnir2.htm

PALSAR

Phased **A**rray type **L**-band **S**ynthetic **A**perture **R**adar

HH and HV polarization
(FBS : HH, FBD : HH+HV,
 POL : HH+HV+VH+VV)
6.25m spatial resolution (at FBS)
12.5m spatial resolution (at FBD)
25m spatial resolution (at PLR)
70km swath width

Sample image of PALSAR

Reference : http://www.eorc.jaxa.jp/ALOS/en/about/palsar.htm
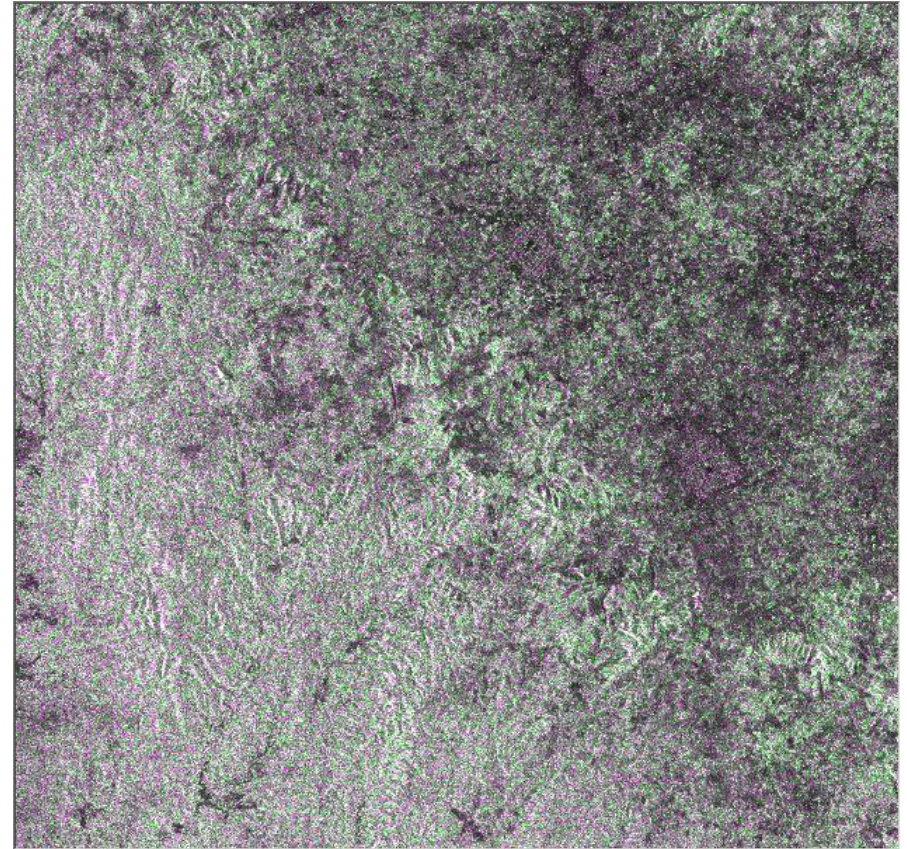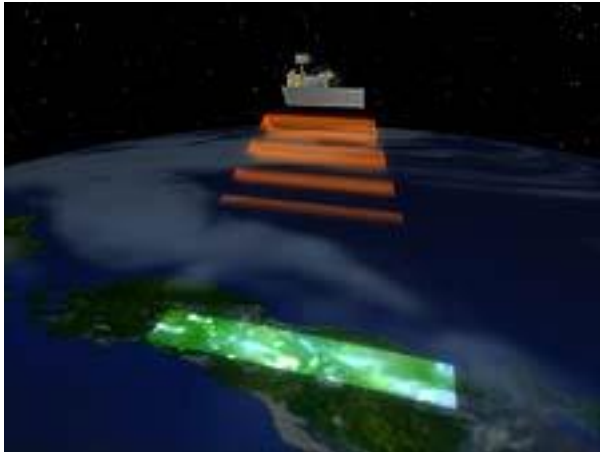
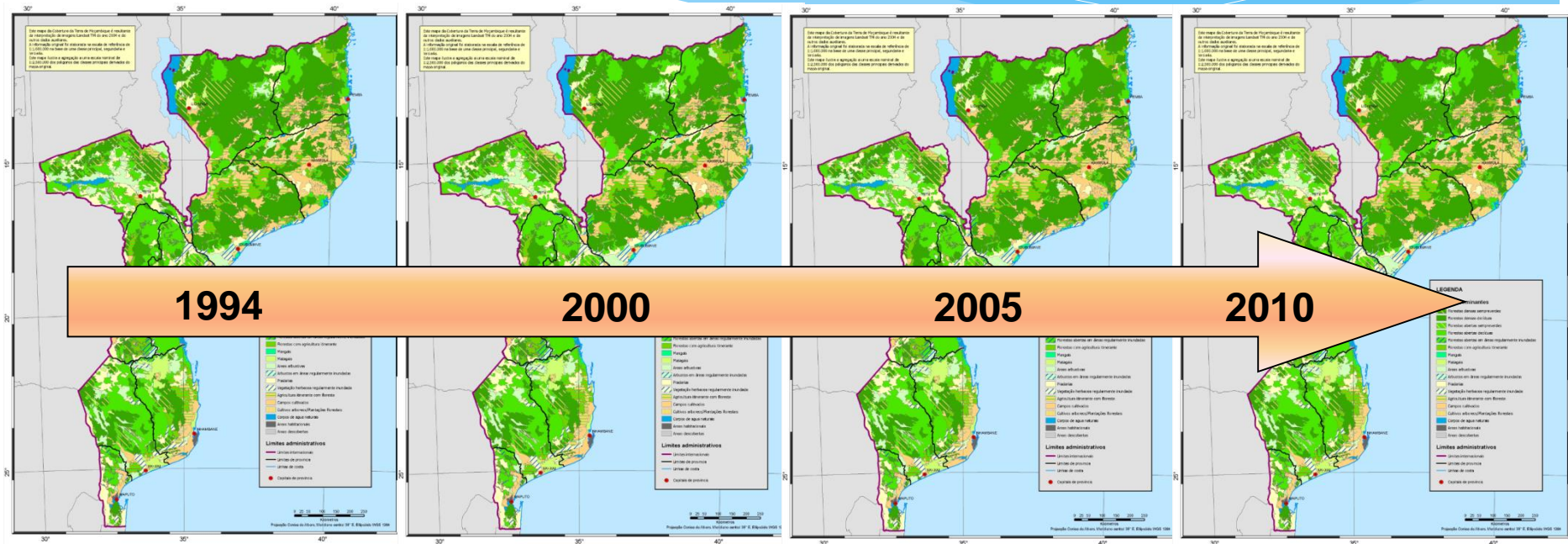# Example of change detection from PALSAR
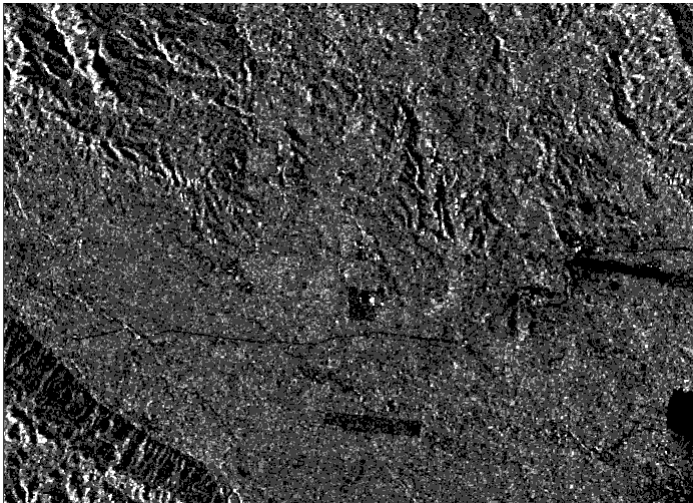
PALSAR 2007
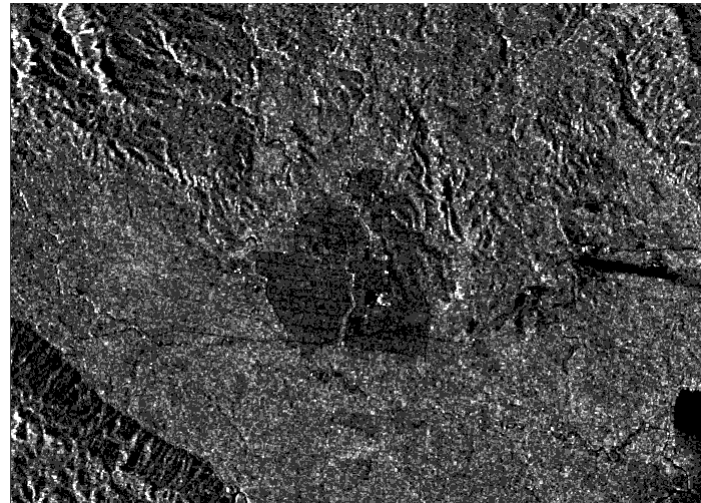
PALSAR 2010
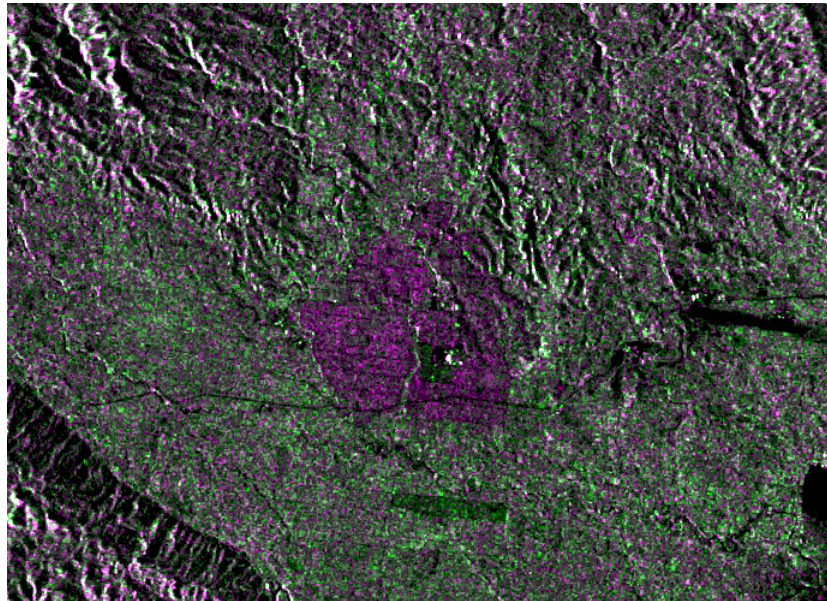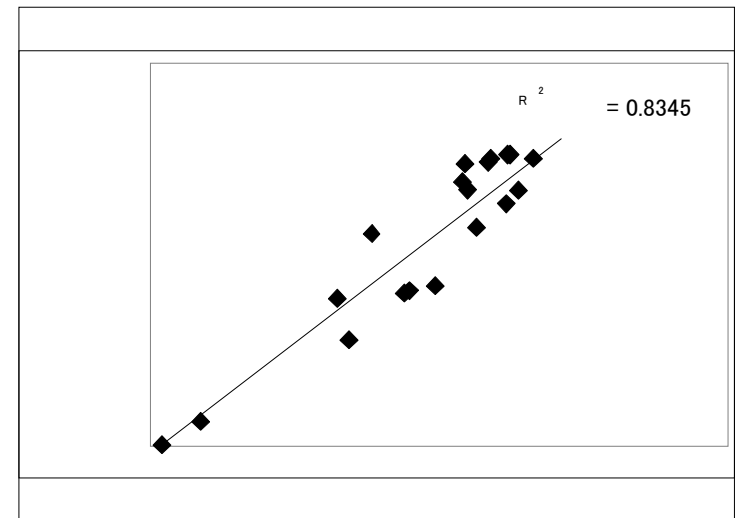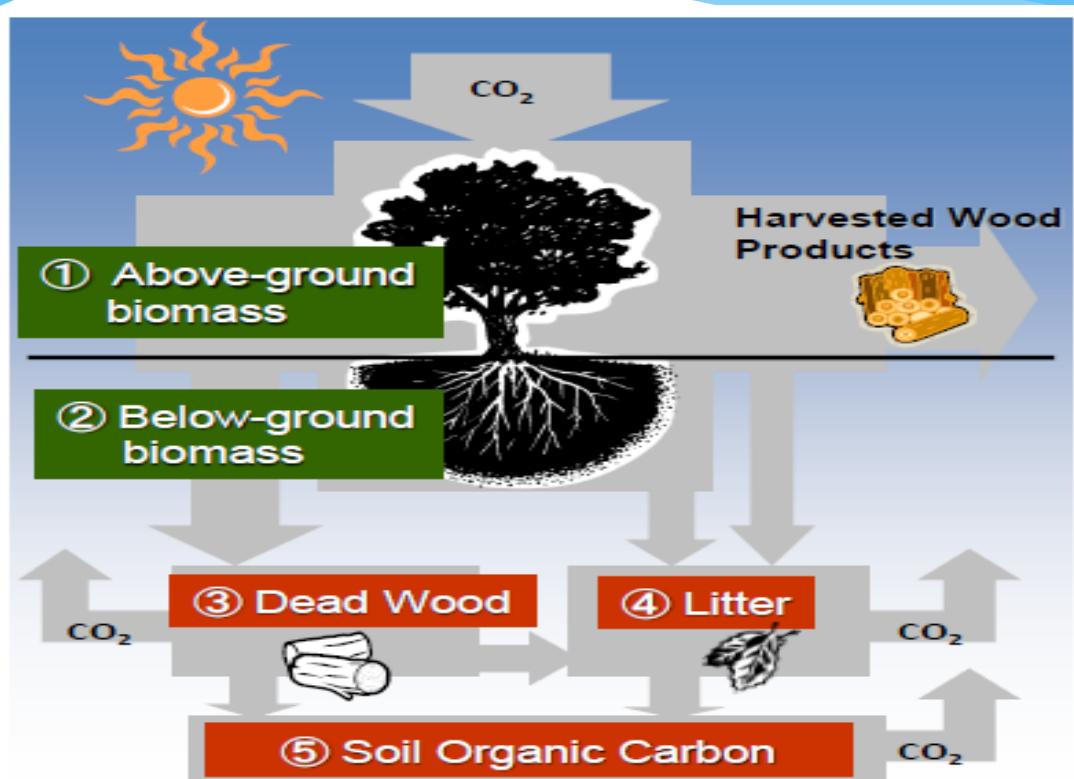

Magenta : Decrease
Green : Increase

3. Create national RELs/RLs for the Forest Resource Information Platform (using Landsat and past inventory data and SPOT 4)

1994   2000   2005   2010
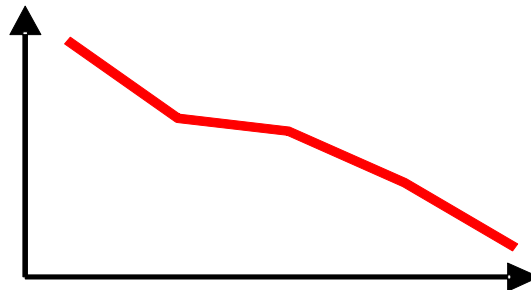
4. Prepare data set of biomass and carbon estimate

Muito Obrigado