K&C Phase 3 – Brief project essentials
Forest Resources Mapping and Monitoring in Kenya

SUZUKI KEI
*JAFTA (**Ja**pan **F**orest **T**echnology **A**ssociation)*

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1. Requirement of REDD mechanism

①. Reduction of emissions from deforestation.

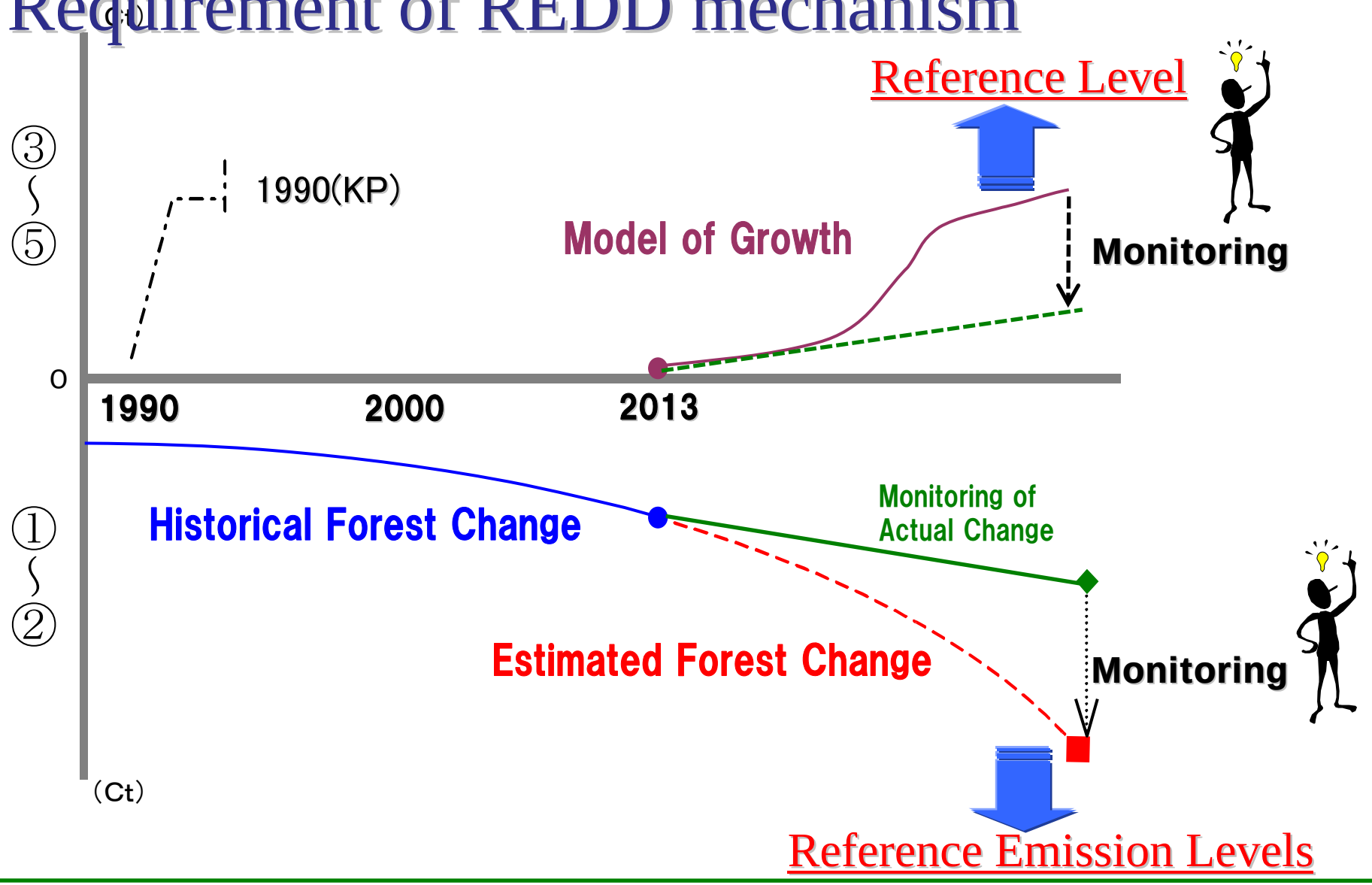
②. Reduction of emissions from forest degradation.

③. Carbon stock enhancements.

④. Conservation of forests.

⑤. Sustainable management of forests.

1. Requirement of REDD mechanism



1. Requirement of REDD mechanism

4/CP.15

(d) To establish, according to national circumstances and capabilities, robust and transparent national forest1 monitoring systems and, if appropriate, sub-national systems as part of national monitoring systems that:

(i) Use a combination of remote sensing and ground-based forest carbon inventory approaches for estimating, as appropriate, anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes;

(ii) Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities and capacities;

(iii) Are transparent and their results are available and suitable for review as agreed by the Conference of the Parties;

2. REDD+ mechanism and Japan's contribution

- Sep. 2009
- Former PM Hatoyama
- 25% reduction of emission

- Dec. 2009 in COP15
- Minister Ozawa
- 1,750 billion US$ (from 2009 to 2012)

- Forest Agency
  - FFPRI Project
- Ministry of Foreign Affair
  - Grant Aid Project → JICA Project

2010-2013 → 2012-***

ALOS

K&C Initiative
An international science collaboration led by JAXA

Grant Aid Project → JICA Project

2010-2013 →

2012-*** →

Provide equipment
- 4WD Vehicles
- GPS/Digital camera
- Forest Measurement equipment

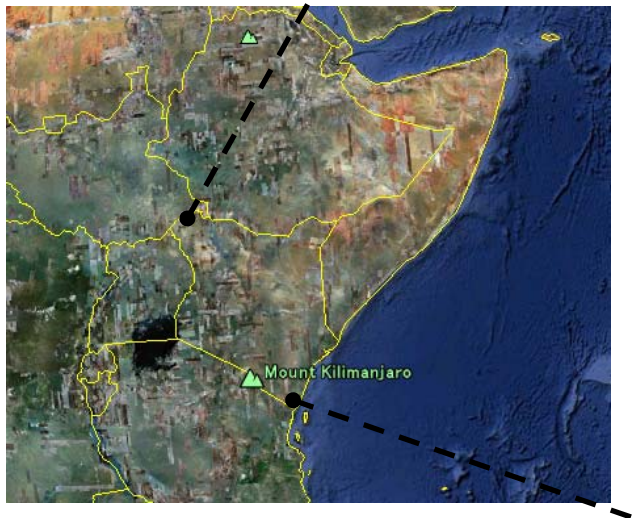
Capacity building and implementation
- Design on NFI
- Collection data on the field
- Satellite analysis and developing forest map

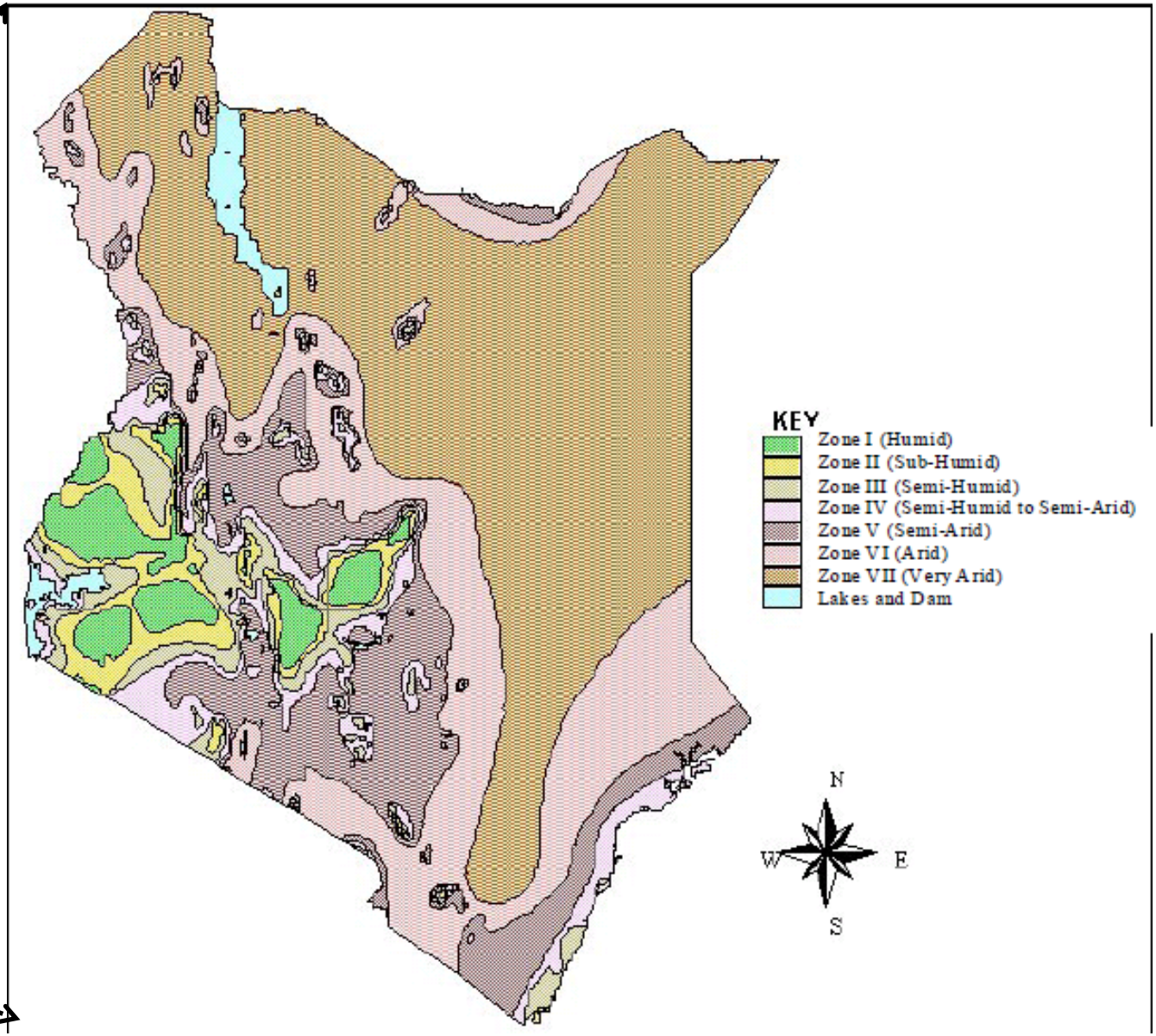
- Ghana
- Cameroun
- Gabon
- DRC
- Mozambique
- Kenya
- Peru
- Paraguay
- Laos
- Cambodia
- PNG
- East Timor

Plenty number of in-situ data could be collect

Forest Resources Mapping and Monitoring in Kenya

3-1 Project Area





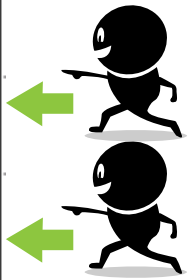
3-2 Project Objectives

The Kenya Forest Service (KFS) appreciates the effort of JAXA in support to Kyoto and Carbon Initiative. The FPP(Forest Preservation Program) project is related to the K&C initiative owing to both are international collaborative project initiative supporting international climate change initiatives.

Of particular importance is the JAXA Forest theme goal on products development namely refinement of **m**ethodology and adaptation of regional forest types and definitions, **g**eneration of annual and bi-annual maps on forest cover change, **g**eneration of global/regional maps of above ground biomass, and **d**evelopment of methodology standards for generation of forest information products from PALSAR.

3-3 Project Schedule

Project activity	Target	Period			
		2011	2012	2013	2014
Review of requirements and gap analysis in support of forest mapping and REDD+	Images and additional data required identified				
Development of mapping standards	Documented mapping standards				
Identification of sources, initiate requests and delivery of existing data	Images for yr 1990, 2000, 2005 and 2010 availed				
wall to wall mapping of forest resources at national level	Maps developed for all forests				
Forest resource change analysis	Change analysis maps for yr 1990, 2000, 2005 and 2010, 2014				
Detailed mapping of Mau Ecosystem (800,000 ha) using high resolution images	Production of 1:25,000 land use maps				
Capacity building on forest data capture, retrieval, analysis and reporting	Skills developed among KFS staff				



PALSAR

PALSAR

3-3 Project Collaborators

- Kenya Forestry Research Institute (KEFRI)
- Survey of Kenya (SoK)
- Department of Resource Survey and Remote Sensing (DRSRS)
- Regional Centre for Mapping of Resources for Development (RCMRD)
- Department of Geomatic Engineering and Geospatial Information Systems (GEGIS), Jomo Kenyatta University of Agriculture and Technology (JKUAT)
- National Museum of Kenya (NMK)
- Moi University

3-3 Support to JAXA's global forest mapping effort

Improvement and validation of the PALSAR global forest products

The Kenya Forest Service is the national agency responsible for forest resources management in Kenya. The Service has a national network of offices in all regions within the country and forest inventory department with regional units for forest data collection. The KFS will support JAXA phase 3 activities as follows

- Support the provision of ground truth forest data of unique ecosystems in Kenya
- Support the improvement of classification/algorithm development of K&C forest product on dry forest and coastal mangroves in Kenya
- Support with validation of K&C forest product on dry forest and coastal mangroves in Kenya
- Provide additional information photographs etc that could be useful.

3-3 Support to JAXA's global forest mapping effort

Table A2-1 Summary of forest definitions used/proposed in Kenya

UNFCC, Forest definition for CDM A/R, reported by DNA – NEMA		
A single minimum tree crown cover value 10 - 30 %	A single minimum land area value 0.05 - 1 ha	A single minimum tree height value 2 - 5 m
Thresholds for Kenya defined by DNA (NEMA)		
30 %	0.1 ha	2 m
Thresholds proposed by Kenya R-PP, October 2010		
15%	0.5 ha	2 m
FAO FRA forest definition		
Canopy cover of more than 10 %	Land spanning more than 0.5 ha	Trees higher than 5 m
Forest cover reported by KFS (2010): 6.0%		
CBD Kenya reporting by MEMR		
Canopy cover more than 40 %		
Forest cover reported by MEMR (2009): 2.4%		

3-3 Support to JAXA's global forest mapping effort

Sharing of Ground truth data

The following ground truth data will be availed on request all conditions applying and governed by prevailing regulations in Kenya,

- Data on forest types
- Geo-referenced data
- Specific site photographs with descriptions of vegetation types and species
- Any other relevant data

3-3 Support to JAXA's global forest mapping effort

Table 3-4 Description of Measurement

Level	Items	Description
Tree Level	Running number	For each trees
	Species	Code of tree species
	DBH	Diameter at breast height (1.3m) in cm
	Height	Height of the tree in m (sample trees only)
	Canopy coverage (Crown density)	Percentage, %.
Plot level	Sample Plot ID	ID according to the sampling
		Initials of the measurer
	Date	Date of the measuring
	Plot coordinates	Latitude and Longitude, in degrees or meters
	Slope	In degrees
	Damage	None, Fire, Insects, Biotic (e.g. wildlife browsing) agents, Abiotic (e.g. storm) agents.
	Human activities	e.g. firewood collecting

3-3 Support to JAXA's global forest mapping effort

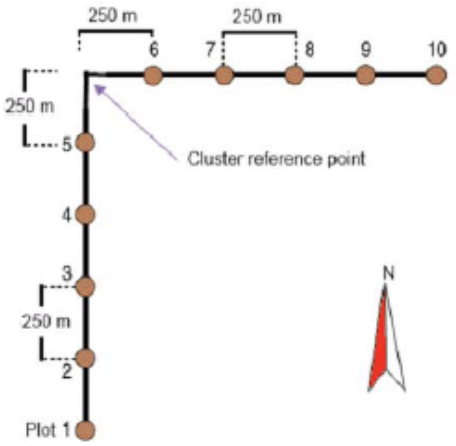


Figure 3-2 L-shaped cluster design. Source: FAO Tanzania NAFORMA

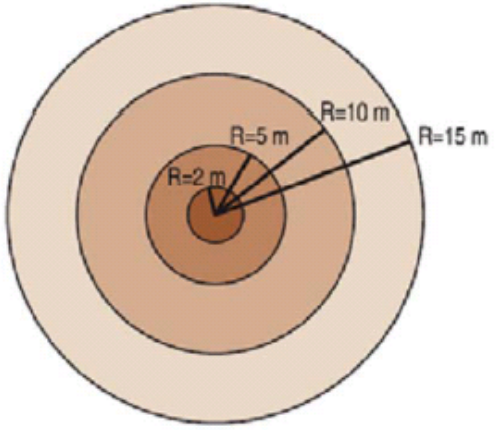


Figure 3-3 Concentric Sample Plot *(Source: FAO Tanzania NAFORMA)*

Sampling Design

The sampling design is a stratified systematic cluster sampling – a design that feature equal probability samples within strata. The numbers of plots in a cluster varies from 5 to 10 (average 7 plots per cluster).

- **I**n total approximately 175 plots arranged in 25 clusters will be measured.
- **A**n L-shape cluster is proposed.
- **T**he distance of the plots within a cluster may be 250m, for example.
- **T**he distance between clusters may vary by the stratum.
- **T**he sampling unit is a circular sample plot (for example, 15m radius) or a concentric plot (for example 15m, 10m and 5m radius, as used in the Tanzania National Forest Monitoring and Assessment, NAFORMA).

3-4 Deliverables

- Review of requirements and gap analysis in support of forest mapping and REDD+
- Standards for mapping and resource classification
- Identification of sources, initiate requests and delivery of existing data wall to wall mapping of forest resources at national level
- Baseline forest resource maps for 1990,2000 and 2010 at national level using agreed classification/ stratification for forest inventory
- Forest resource change analysis
- Detailed map of Mau Forest Ecosystem based on high resolution satellite image data