



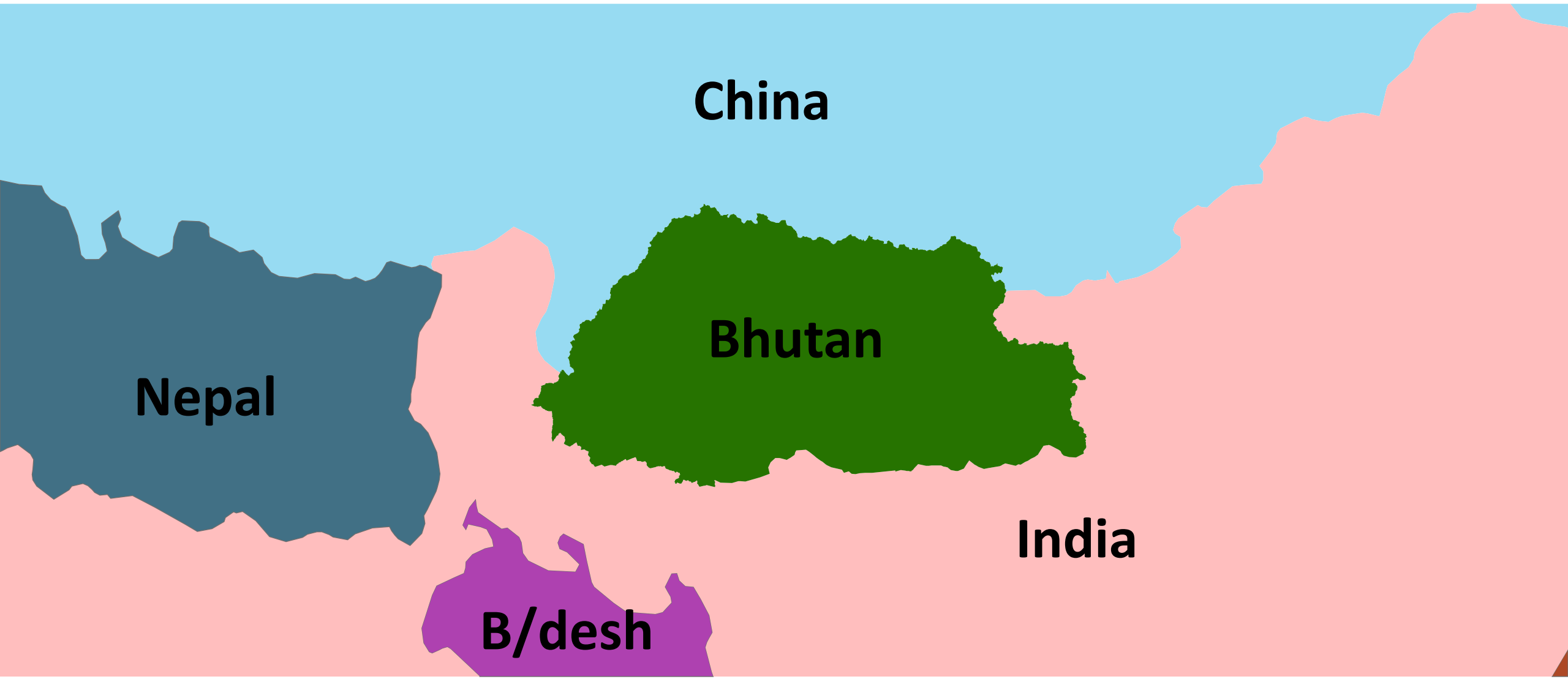
National Forest Monitoring System, Bhutan

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Department of Forests and Park Services



Country Profile





Country Profile

- Mountainous Country
 - Geographical Area: 38,394 Km²
 - Altitude : 100m – 7700m asl
 - Major economy: Hydropower

- Population: 750,970 (2014)

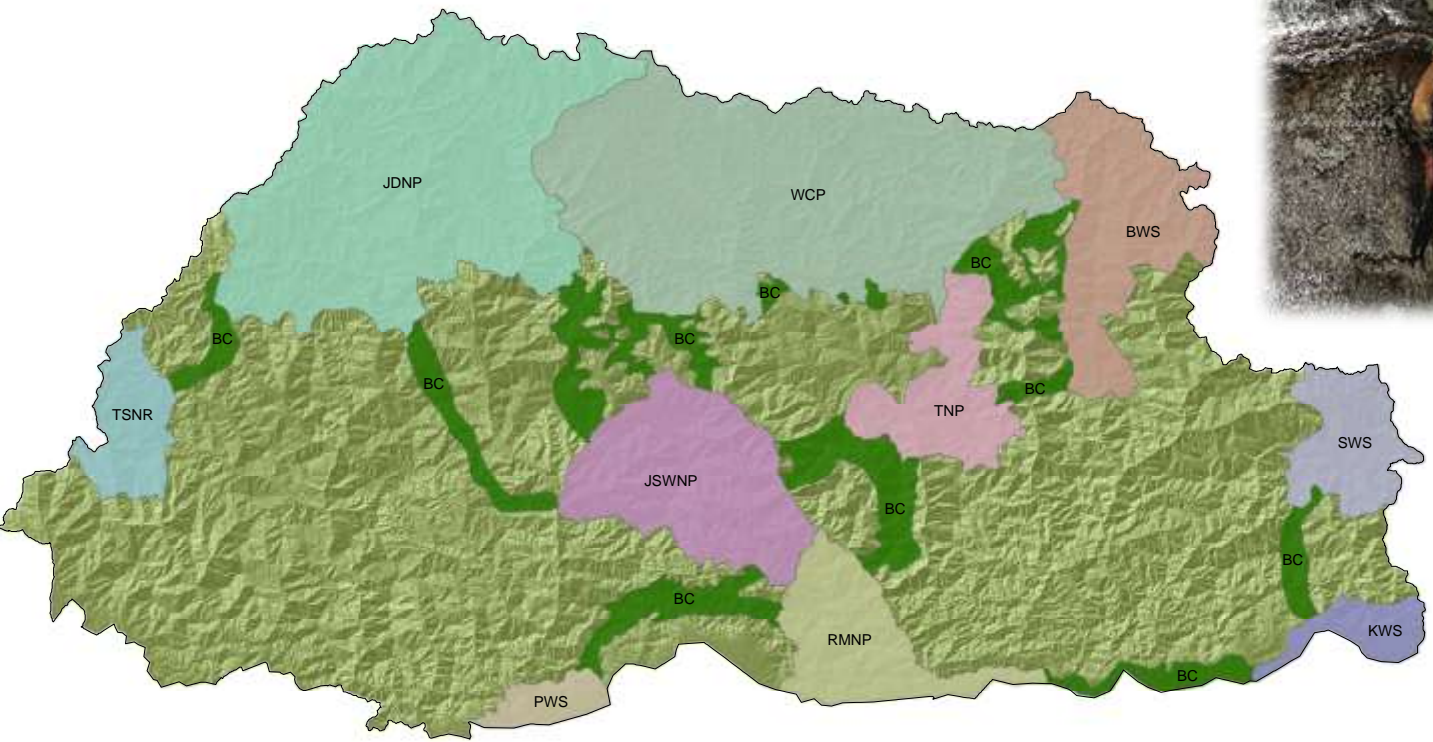




Country Profile

Protected Area :(51.44%)

- National Parks
- Biological Corridors



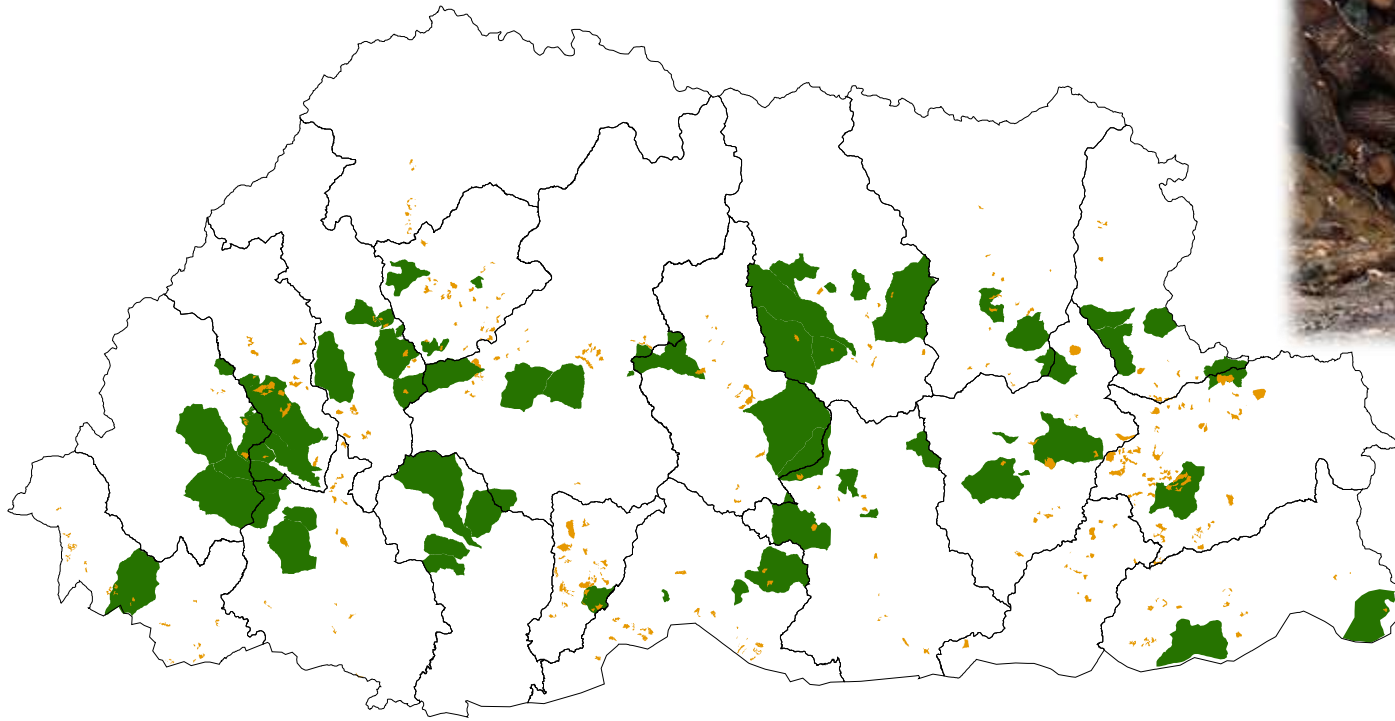


Country Profile

Sustainable Forest Management

Forest Management Units : 5.4 %

Community Forest: 2.3%





REDD+ Status of Bhutan

- R-PP was accepted in January 2014
- Coordinated by WMD, DoFPS

Goals

- Prepare Bhutan to engage in and benefit from the potentially emerging performance-based system from REDD+
- Strengthen the existing forest policy and management systems, information and data, participatory methods and other human and institutional capacity of direct use in management and development of forests in Bhutan



REDD+ Status of Bhutan

Three components

1. REDD+ Leadership Development
2. REDD+ Information Infrastructure
3. REDD+ Management

Three Technical Working Group

1. NFMS and REL
2. Safeguards and Governance
3. Strategy Options



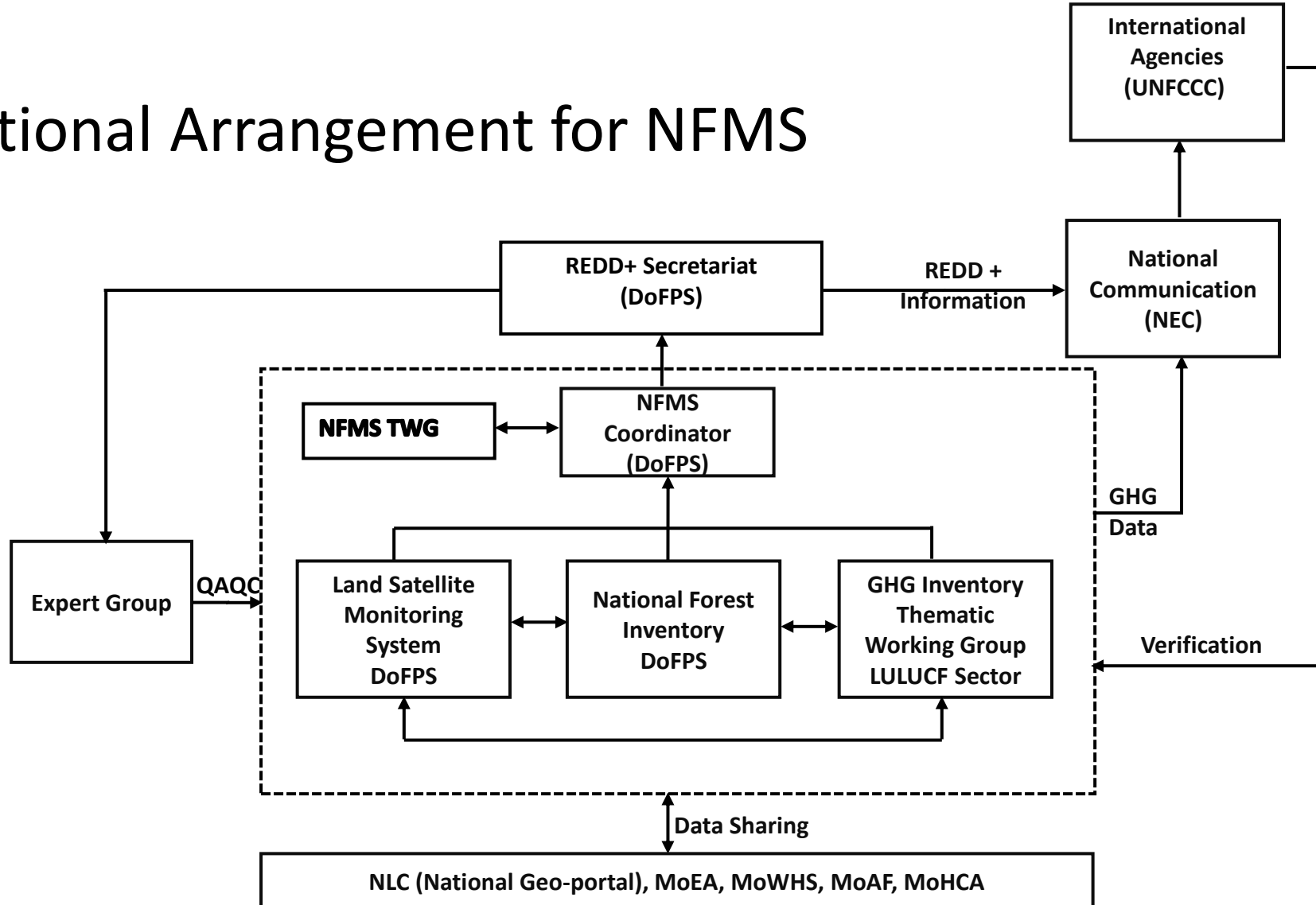
REDD+ Status of Bhutan

- Operation Manual developed
- Participation Agreement signed
- REDD+ Readiness grant ready for signing
- Action Plan for National Forest Monitoring system-ongoing (UN REDD)
- Risk assessment for REDD+ in Bhutan-ongoing (UN REDD)



National Forest Monitoring System

- Institutional Arrangement for NFMS





Satellite Land Monitoring System

- National Land Commission
 - Any land related mater
- Ministry of Agriculture and Forests
 - Department of Forests and Park Services
 - Forest Monitoring



Satellite Land Monitoring System

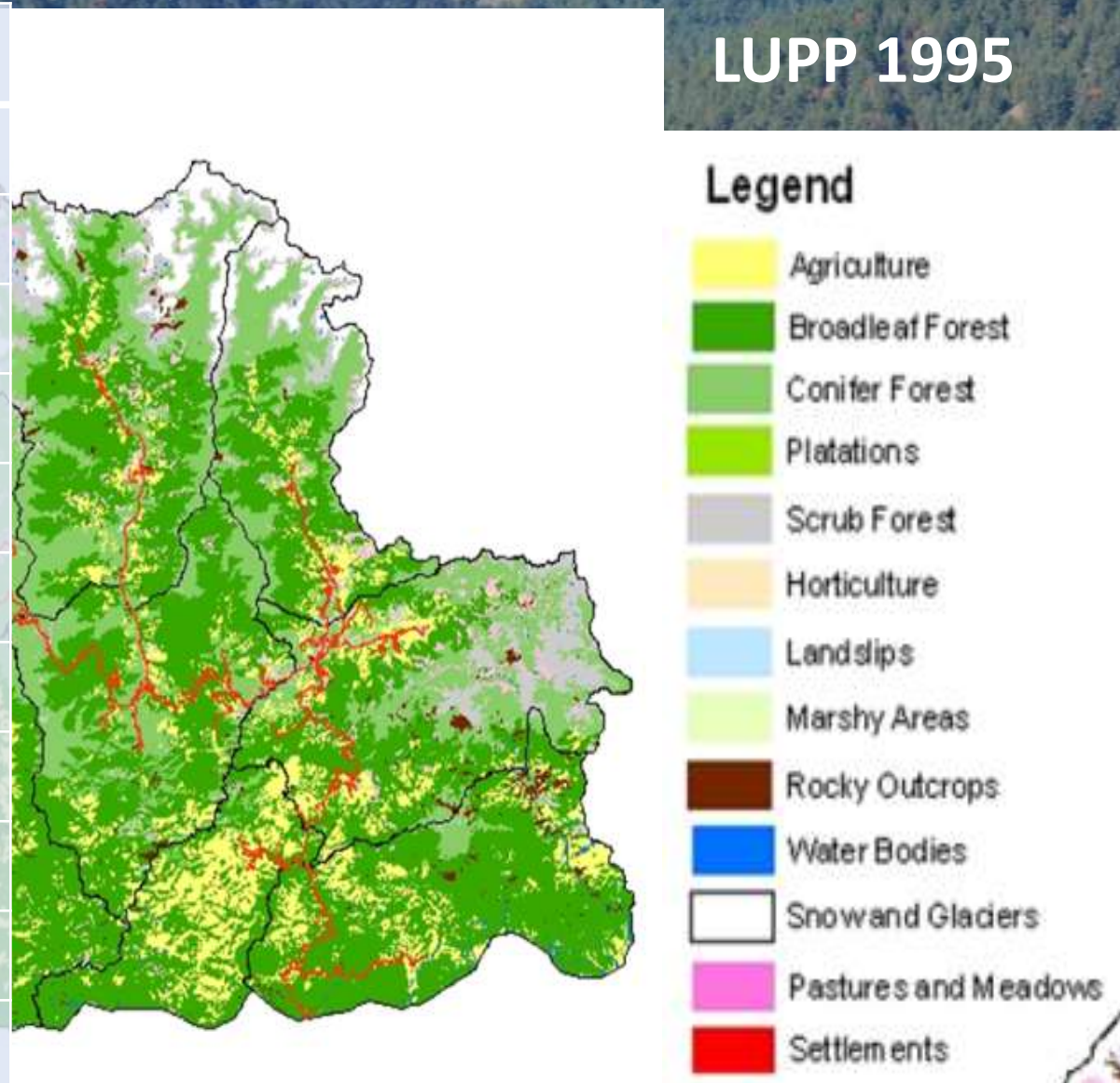
- Land use and Land Cover Mapping
 - 1st Land Use and Land Cover Mapping in 1960-1970s
 - Carried out by Ministry of Agriculture and Forests
 - Aerial Photo and Pre investment Survey
 - 2nd Land Use and Land Cover Mapping in 1994-1995
 - Carried out by Ministry of Agriculture and Forests under Project Titled: Land Use Planning Project
 - SPOT imageries (Panchromatic), Aerial Photo
 - Visual Interpretation and manual digitization



Satellite Land Monitoring System

LUPP 1995

Land Use	Percentage
Forest	64.36
Shrubs	8.13
Meadows	3.9
Cultivated Agriculture Land	7.85
Built Up	.08
Snow Cover	7.46
Bare Soil	5.01
Water Bodies	.76
Marshy Land	.09
Degraded Land	2.38
Total	100



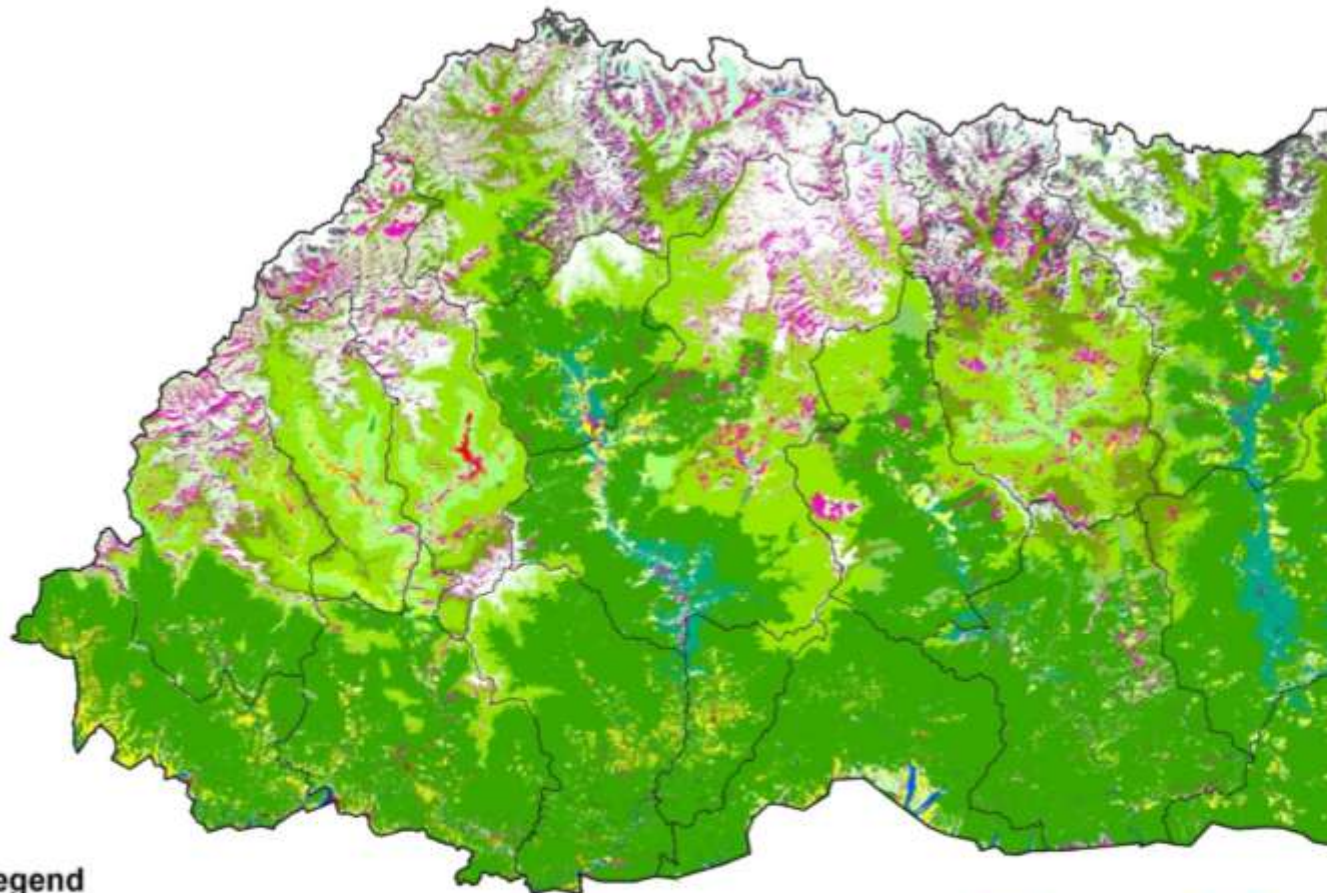


Satellite Land Monitoring System

- 3rd Land Use and Land Cover Mapping in 2010
 - Carried out by Ministry of Agriculture and Forests
 - ALOS Imageries
 - Un supervised classification



Satellite Land Monitoring System



Legend

National Boundary	Landuse	Broadleaf Forest	Fir Forest	Meadow
Dzongkhag Boundary	Agriculture	Broadleaf mixed with Conifer Forest	Horticulture	Mixed Conifer Forest
	Bare Soil	Builtup Areas	Landslides	Moraine
	Blue Pine Forest	Chir Pine Forest	Marshy Areas	Non-Equatorial Forest

1:1,250,000

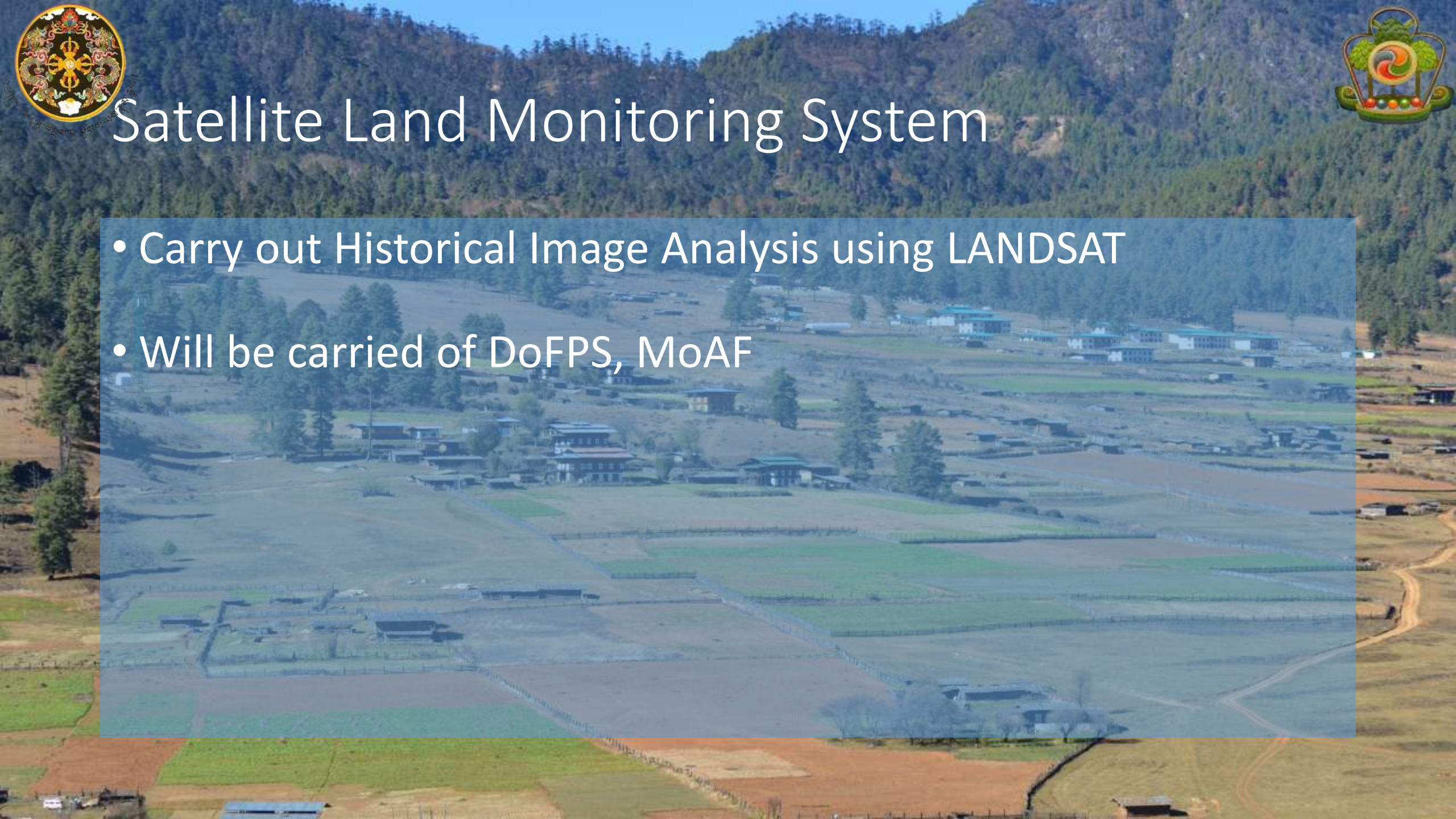
0 25 50 100 km

Land Use	Percentage
Forest	70.46
Shrubs	10.43
Meadows	4.1
Cultivated Agriculture Land	2.93
Built Up	0.16
Snow Cover	7.44
Bare Soil	3.2
Water Bodies	.61
Marshy Land	.01
Degraded Land	.53
Total	100



Satellite Land Monitoring System

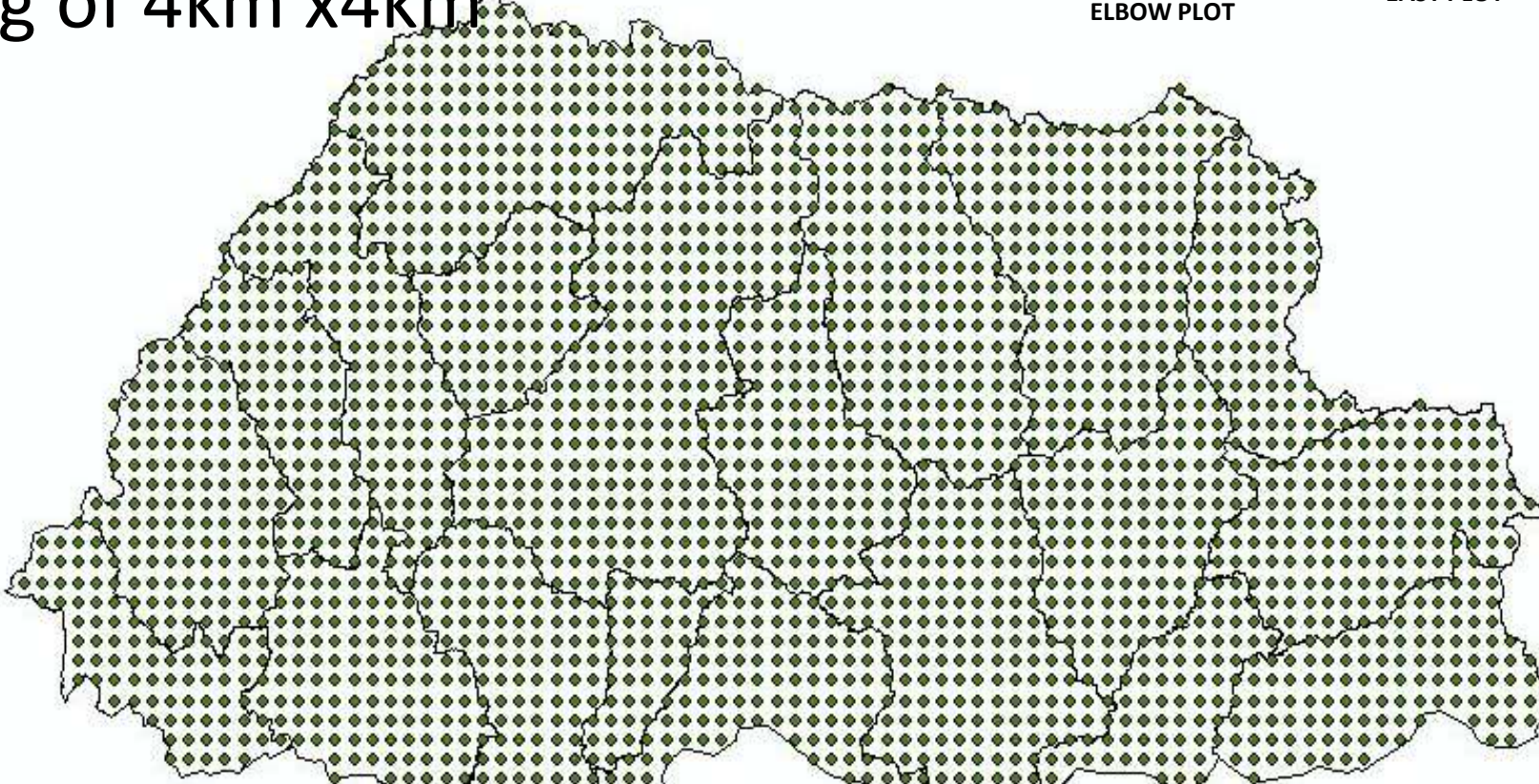
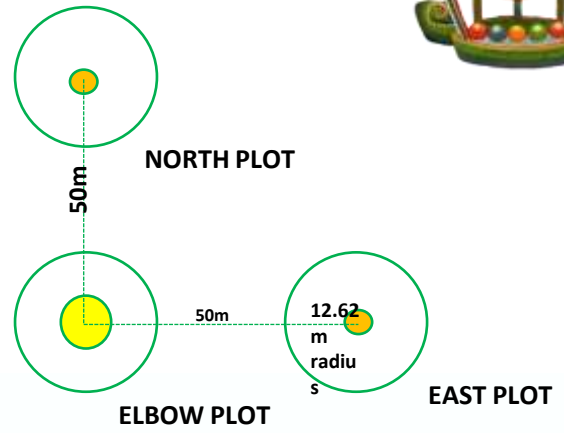
- Carry out Historical Image Analysis using LANDSAT
- Will be carried of DoFPS, MoAF





National Forest Inventory

- Initiated in 2009
- Systematic sampling of 4km x4km
- 2424 Cluster Plots



2424 Cluster plots



National Forest Inventory

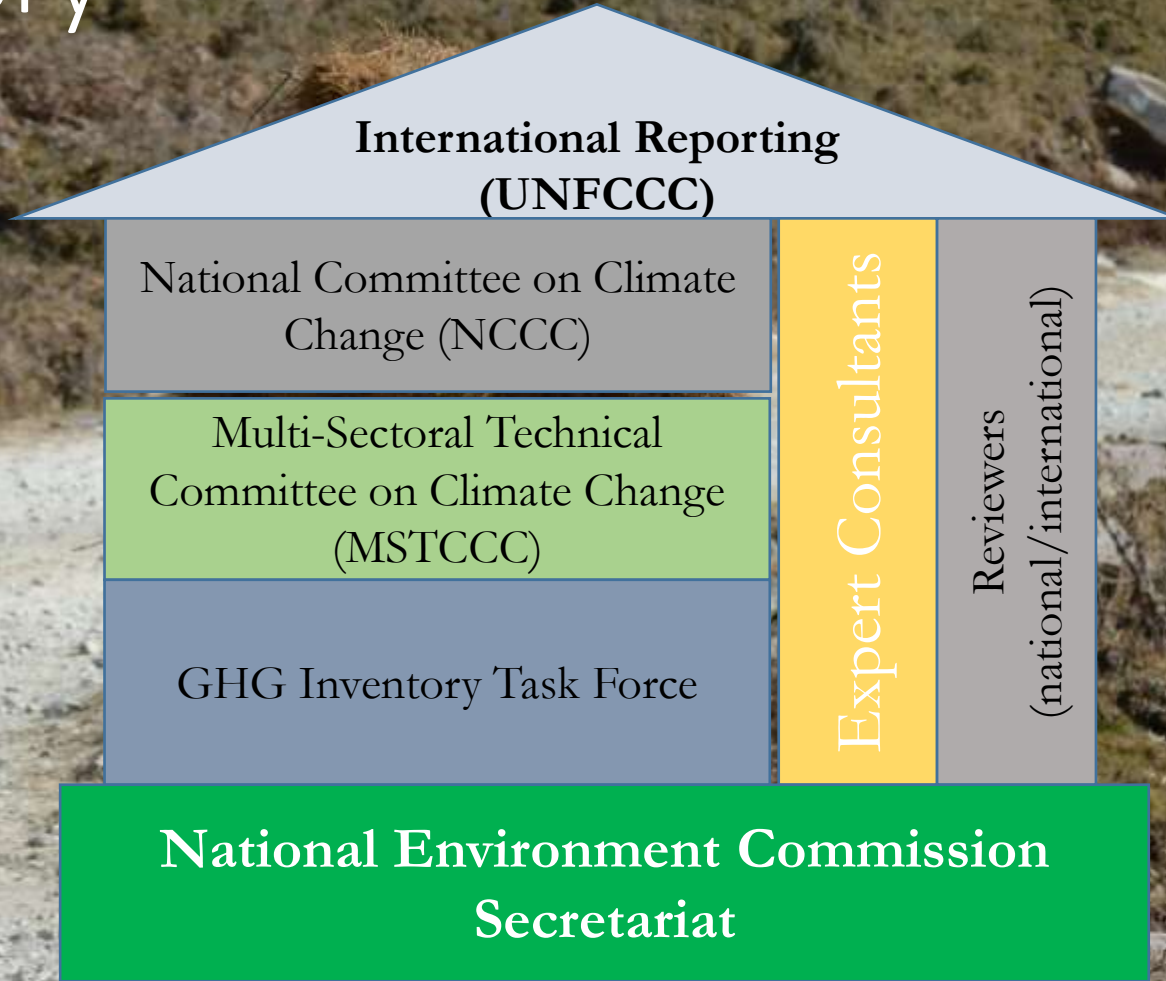
- Approximately 36 % field work





Green House Gas Inventory

- Arrangement for National communication





Green House Gas Inventory

- Bhutan signed UNFCCC -1992
- UNFCCC was ratified by 73rd session of NA of Bhutan in 1995
- Submitted INC in 2000
- Submitted NAPA in 2006
- Submitted SNC in 2012





Green House Gas Inventory

- National Environment Commission Secretariat-Nodal agency for CC
 - Represents Bhutan –climate negotiations
 - Coordinates and submits NC
- But Watershed Management Division of Dept. of Forests and Park Services is the Focal Point for CC related activities, thus coordinates REDD+ activities





Green House Gas Inventory

- Emission Factor from ongoing NFI
- Activity Data: Collect Earth and Wall to Wall Historical Image Analysis





Center for GIS Coordination

- Many Agencies using GIS and RS
 - Lack of Data Standard and Consistency
 - Data Duplication
 - Conflict of Mandates
 - Lack of Data sharing policy and Mechanism
 - Lack of Metadata



Center for GIS Coordination

- All GIS and RS Agency came together to form Center for GIS Coordination (CGISC) with following objectives:
 - Coordination of GIS activities
 - Promote efficient dissemination and use of geospatial information
 - Provide and mobilize technical backstopping to the GIS users
 - Initiate and coordinate workshops, seminar and conferences
 - Establish institutional linkages and partnership



Center for GIS Coordination

- National Geo Portal
- Lunched in 13th October, 2014
- www.geo.gov.bt

www.geo.gov.bt

Bhutan GeoSpatial Portal

Home Data Apps About

Enter text to search data

Featured Dataset

- MODIS Active Fire Data of Bhutan**
This dataset is created using Moderate Resolution Imaging Spectro-radiometer (MODIS) data. The data shows the locations of fires in the period between 2000 to 2013 along with the confidence level information of such incidents.
[View details](#)
- Glaciers of Bhutan 2010**
Digital polygon data of Glaciers of Bhutan in 2010. This dataset is created using Landsat TM and ETM+ images of 2010. The glacier boundary data was extracted using the Object-based Image Analysis (OBIA) method separately for clean ice and debris cover and further editing and validation was done carefully by draping over the high resolution images from Google Earth.
[View details](#)
- Dzongkhag Boundary of Bhutan**
The Dzongkhag boundaries of 20 districts are delineated from Topographic maps mostly using the natural features for boundary identification.
[View details](#)
- Protected Areas and Biological Corridors in Bhutan**
It Shows National Parks, Nature reserves, and Biological corridor networks of Bhutan.
[View details](#)
- Location of Hydropower Plants in Bhutan**
The dataset shows the location of hydropower plants that are existing/planned and under construction.
[View details](#)

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• Thank you

