R & D
Trend about MRV methods for REDD+
in
THAILAND

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Thailand

Overall Condition of REDD+ Initiatives in Department of National Parks, Wildlife and Plant Conservation

Overall condition

- Prime Minister of Thailand gave the statement at UNFCCC COP 15 in Copenhagen in December 2009 that

“ to increase our carbon sink, Thailand has set the ambitious target to increase the national forest cover from 30% in 2006 up to 40% by 2020.”

Overall condition

- Thailand got R-Pin approval from World Bank since March 2010 and waiting for funding to develop RPP.

- To date, Thailand does not have an official policy on how to implement REDD+.

Overall condition

- DNP mission commonly conform with REDD goal : forest protection, forest rehabilitation, forest fire prevention

- To prepare REDD+ : Task force set up and considering to conduct REDD+ in project based

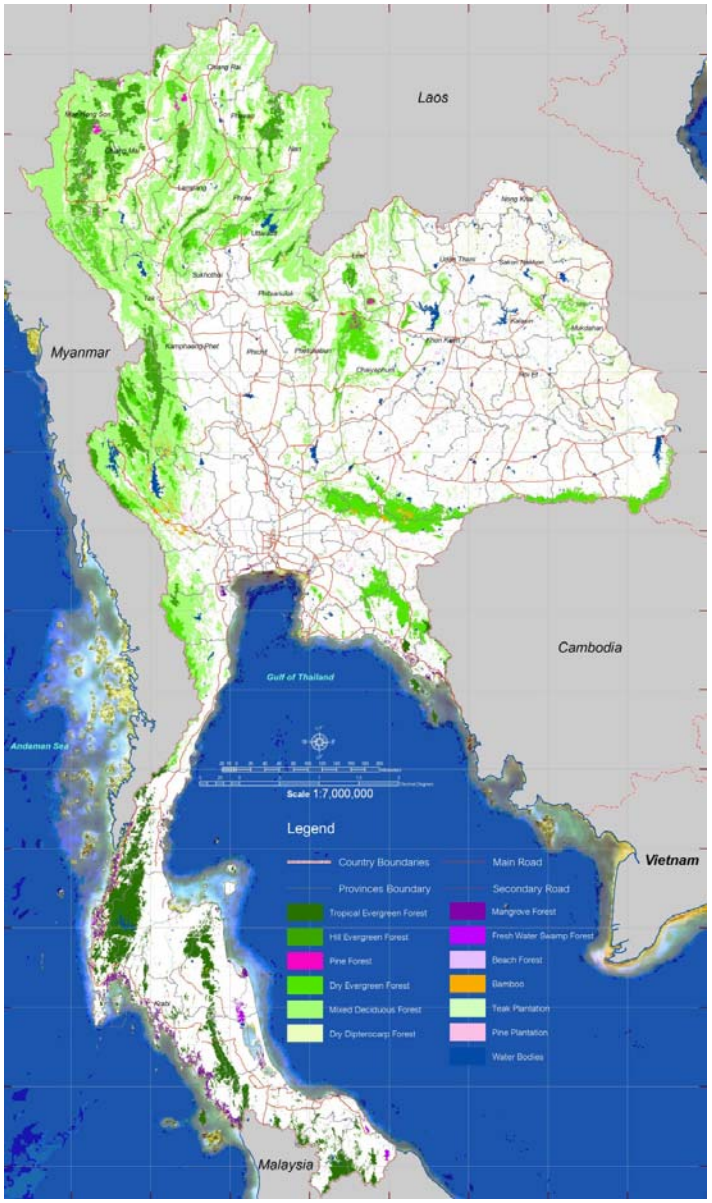
- Participated in MRV capacity building organized by international institution
  :Winrock International
  :Wood Hole Research Center (WHRC)

Overall condition

- **Insufficient of personnel working in RS area**

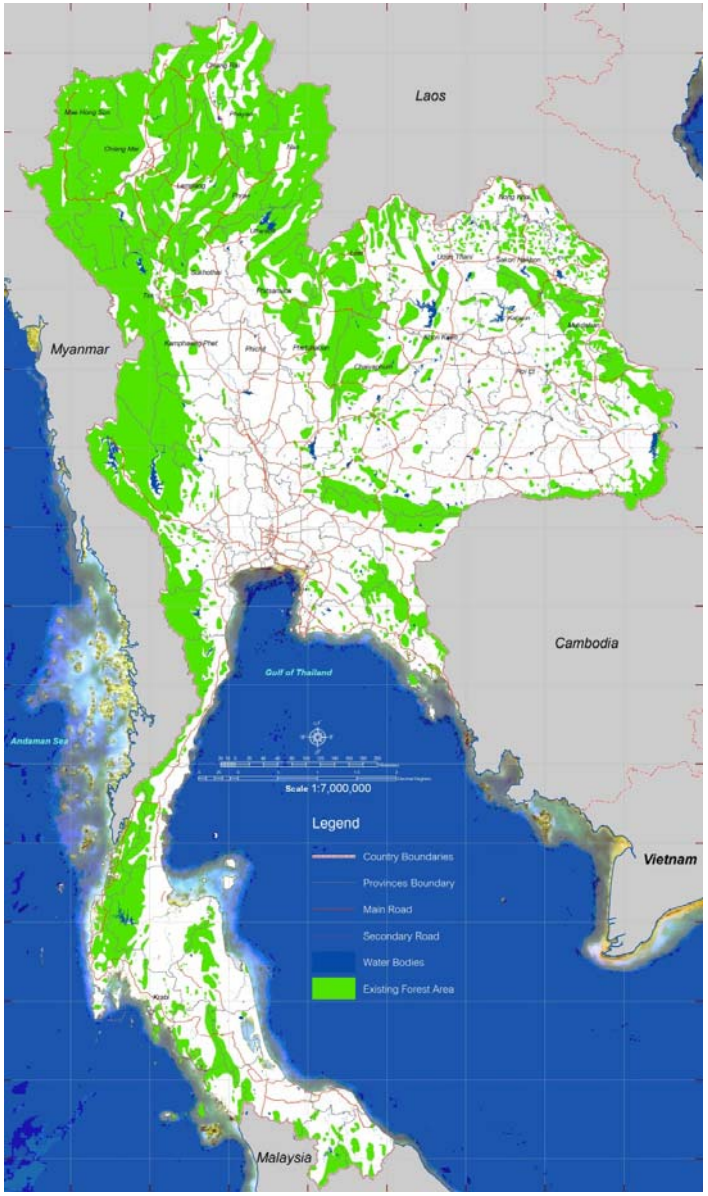
Forest Cover

Data on forest cover obtained from visual interpretation using Landsat data.



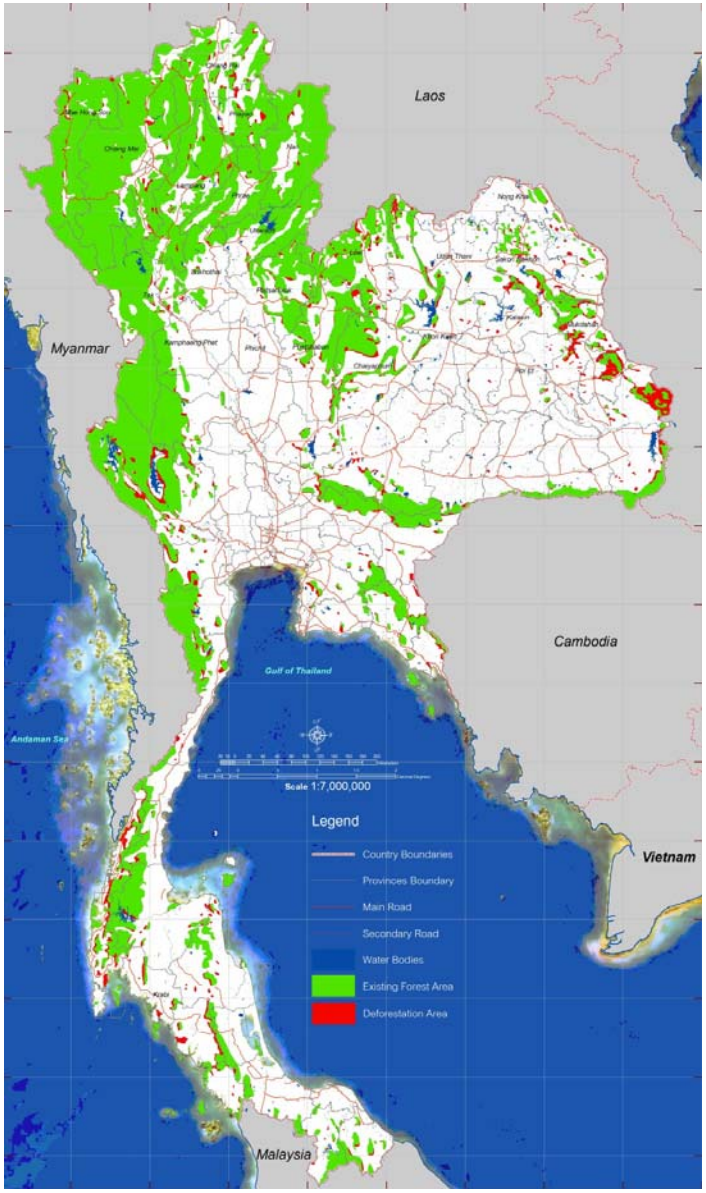
Existing Forest 1989-1990

Data on forest cover obtained from visual interpretation using Landsat data.



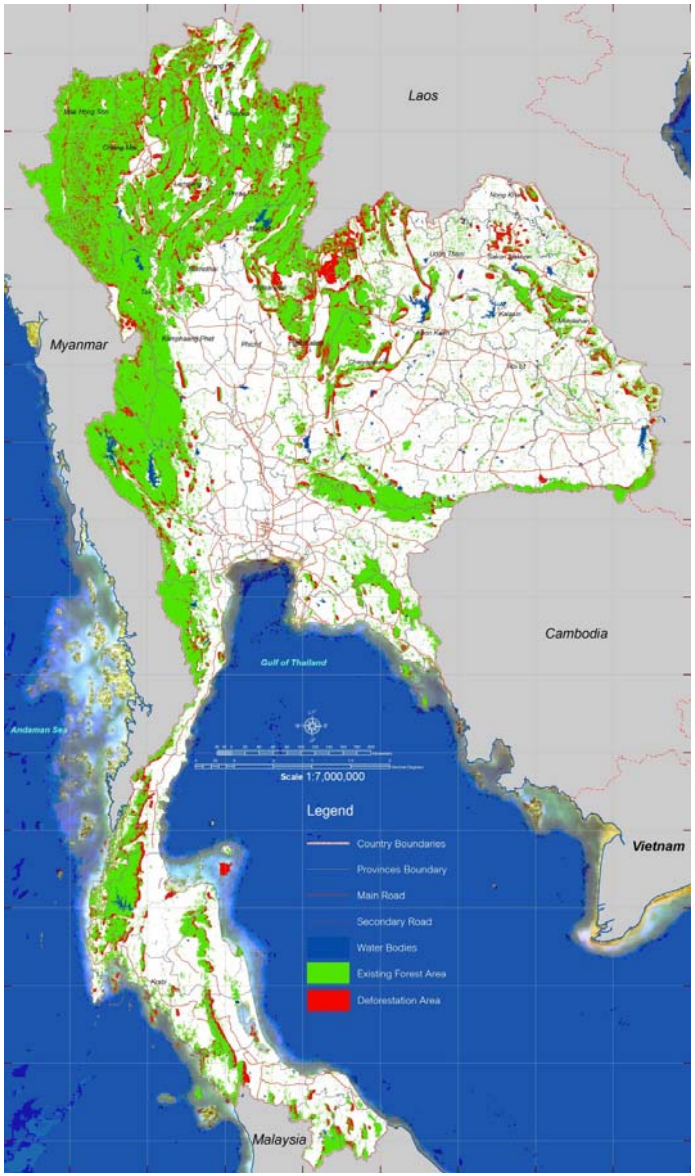
Existing Forest 1995

Data on forest cover obtained from visual interpretation using Landsat data.



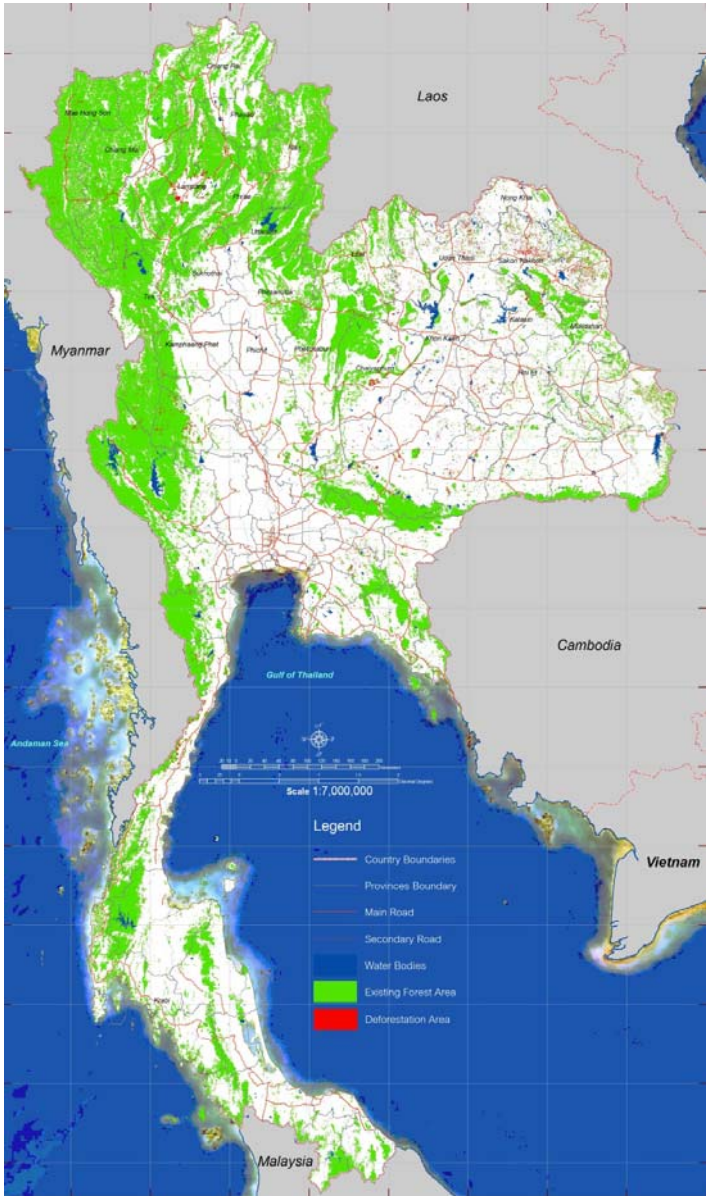
Existing Forest 2000

Data on forest cover obtained from visual interpretation using Landsat data.



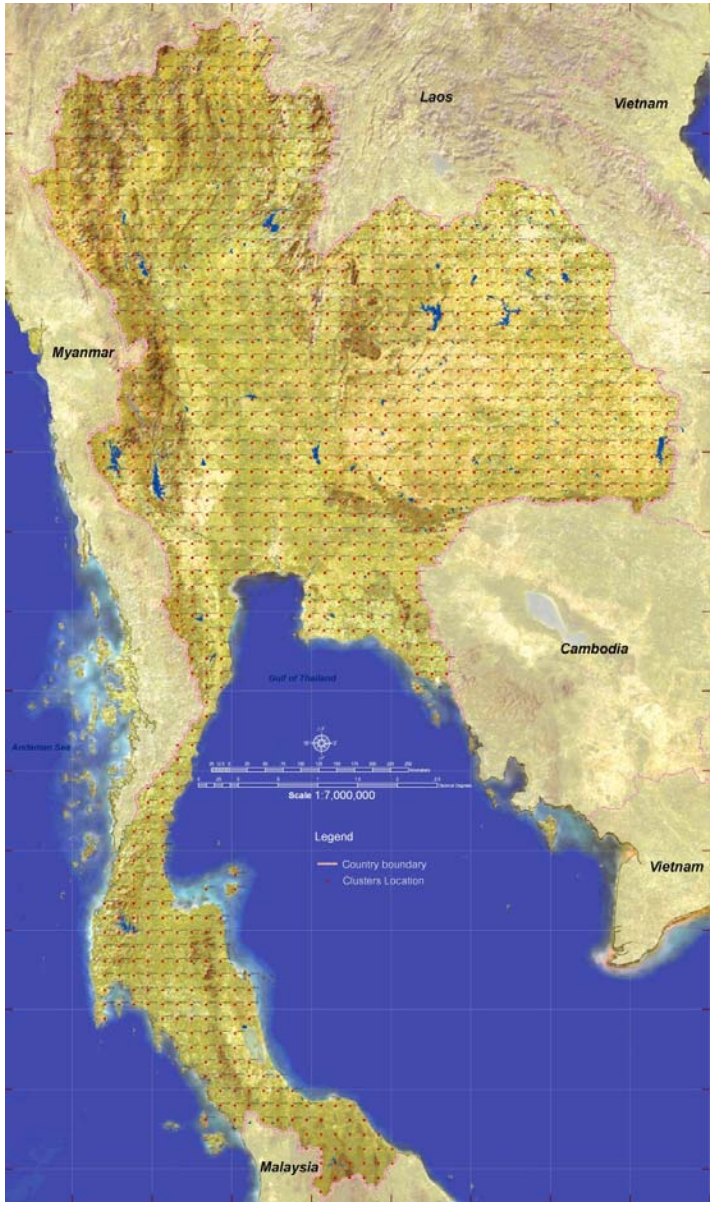
Existing Forest 2005

Data on forest cover obtained from visual interpretation using Landsat data.



Inventory Cluster Location

National Forest Inventory (ground survey) and Monitoring system completely established with the support of ITTO.



Knowledge obtained from past experience

- **The essential data for MRV are forest cover and biomass to estimate historical emission level.**
- **No standard in historical data on forest cover due to instability of methodology**
- **Lack of biomass data**

Technical challenges

Calculate C stock directly from RS data

Using mathematical model working with ground data & RS data for calculate carbon.

Technical Challenge

Long term using RS data

Normal technique such as visual interpretation, unsupervised classification and supervised classification didn’t give accuracy data enough for calculation C stock. And take a long time, use a lot of budget and human resources.

Technical Challenge

- **RS systems can be used to estimate forest carbon stocks by applying allometric relationships to measures of tree volume, crown diameter, or spectral indices, BUT…**
  - Operational systems still developing
  - Will require additional ground-based data for development and verification

Technical challenges

How to gain the right technical in

- Estimating historic emission levels
- Projecting future emission
- Monitoring emissions and removals
- Monitoring forest degradation
- Estimating Biomass (above & below ground live biomass, litter, dead wood, soil organic carbon)
- Establishing National REL/RL

Specific technical challenges (remote sensing): cloud cover, seasonality, topography, remote sensing data availability and access procedures

Technical Challenge

Stratification of forest C stocks

- **Efficient stratification of forest carbon stocks can help reduce the monitoring effort and increase the accuracy by grouping homogeneous C stocks and separating heterogeneous C stocks**

- **This will be dependent on the RS methods that are chosen and the resources available to acquire and process data**

Technical Challenge

Stratification of forest C stocks

Goal::

Increase the accuracy of C stocks estimates by mapping heterogeneous stratum, reduce the number of field plots, increasing accuracy and reducing level of effort .

Technical challenges

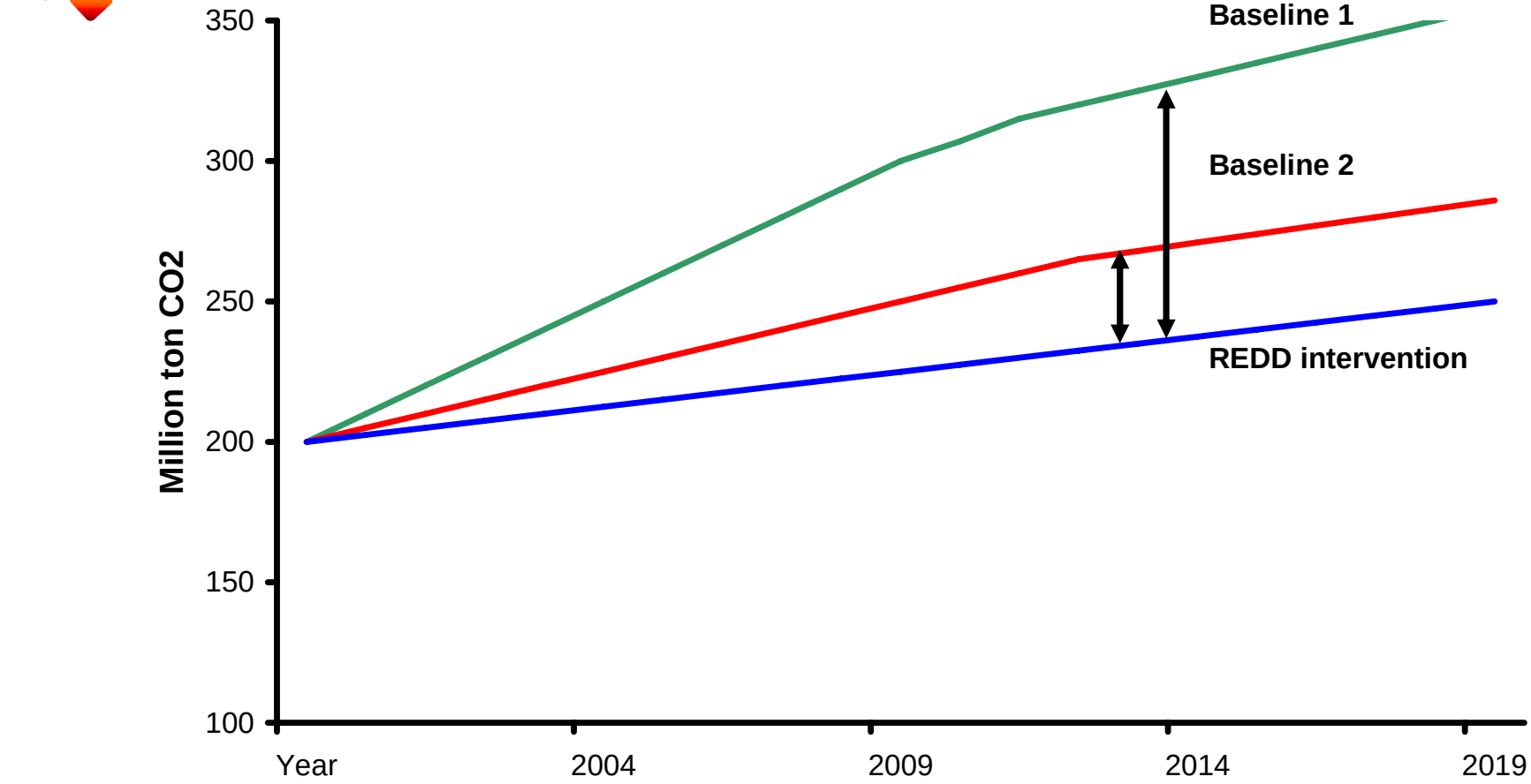
Accuracy in REL and MRV::

Apply higher tier methods for key categories and significant pools

Reliable methods for measuring carbon stocks are needed

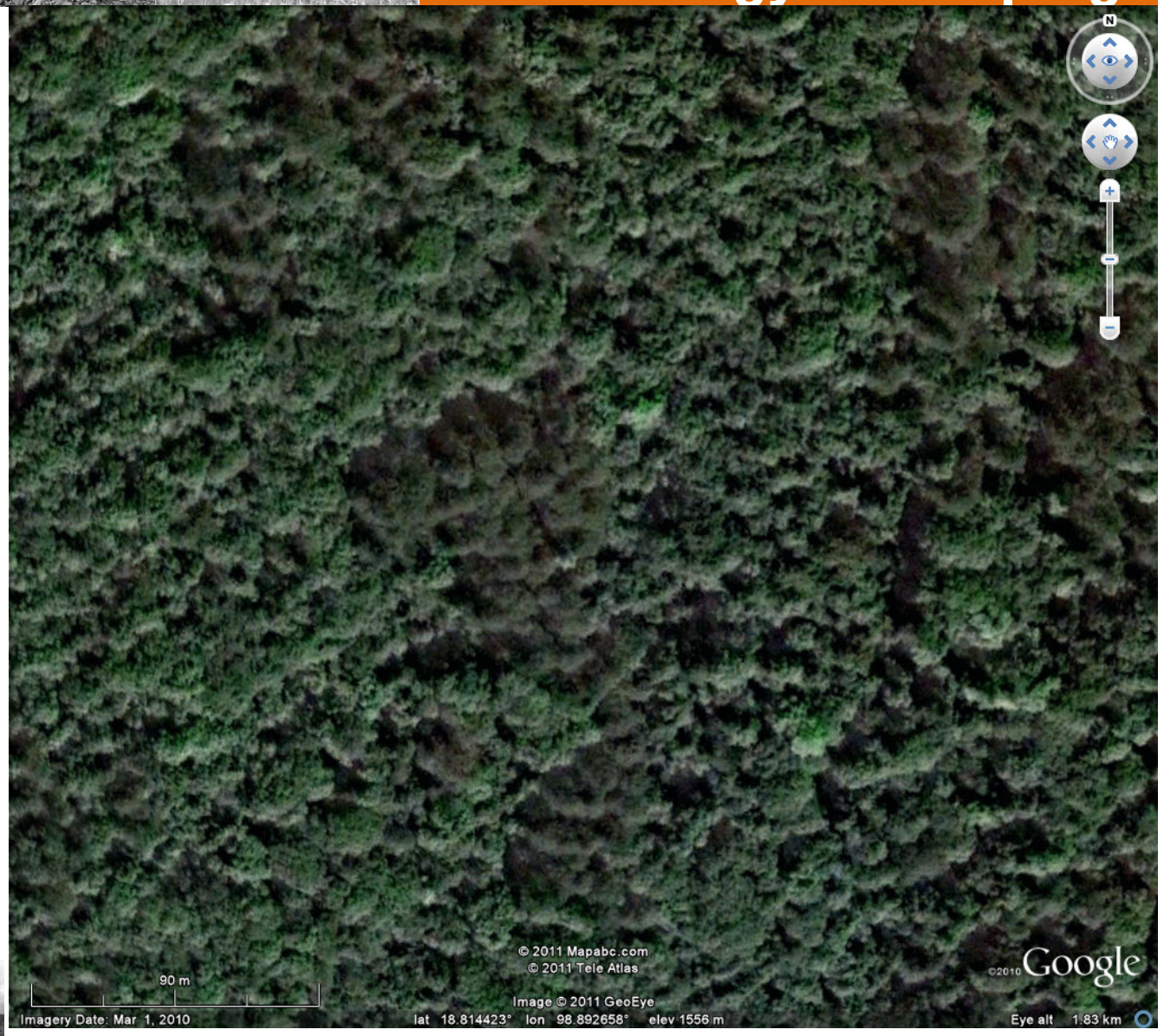
Appropriate methodologies should be used in accordance with the IPCC to promote accuracy in inventories and to quantify the uncertainties in order to improve future inventories

Knowledge obtained from the past experience



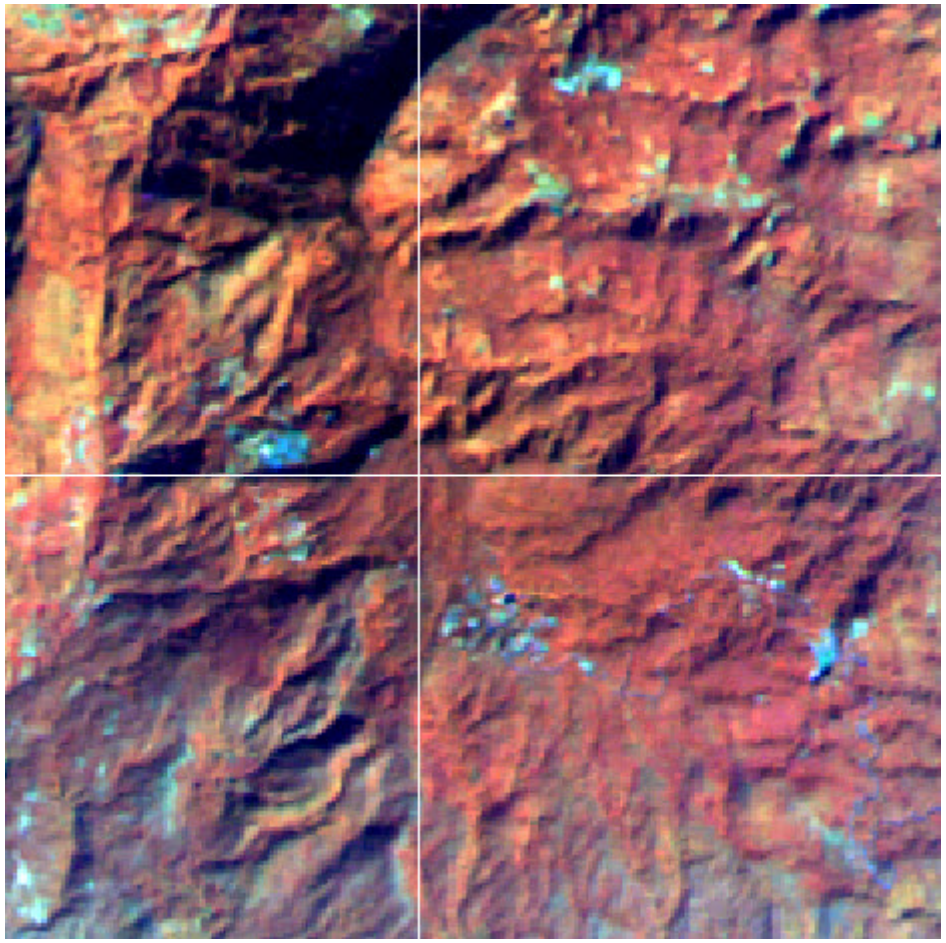
Initiative MRV Technology / Methodology developing

Evergreen Forest
@18.815,98.893



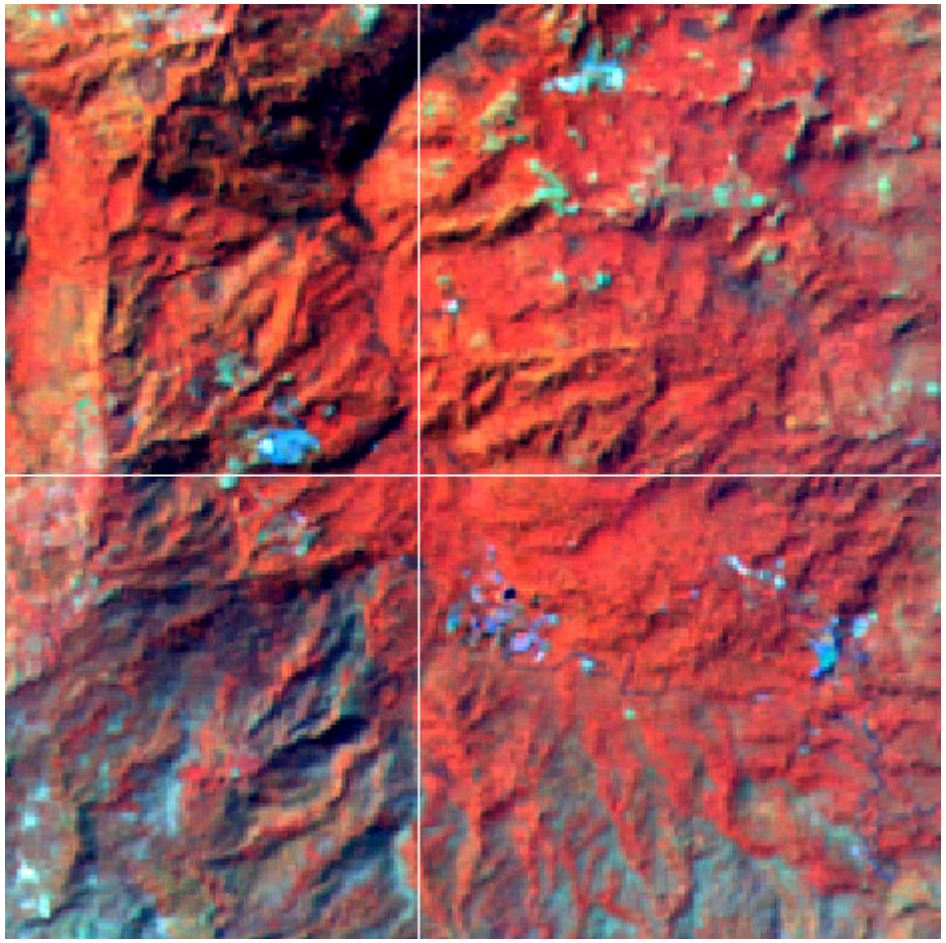
Initiative MRV Technology / Methodology developing

Evergreen Forest
@18.815,98.893
Landsat5-TM
2000-01-25



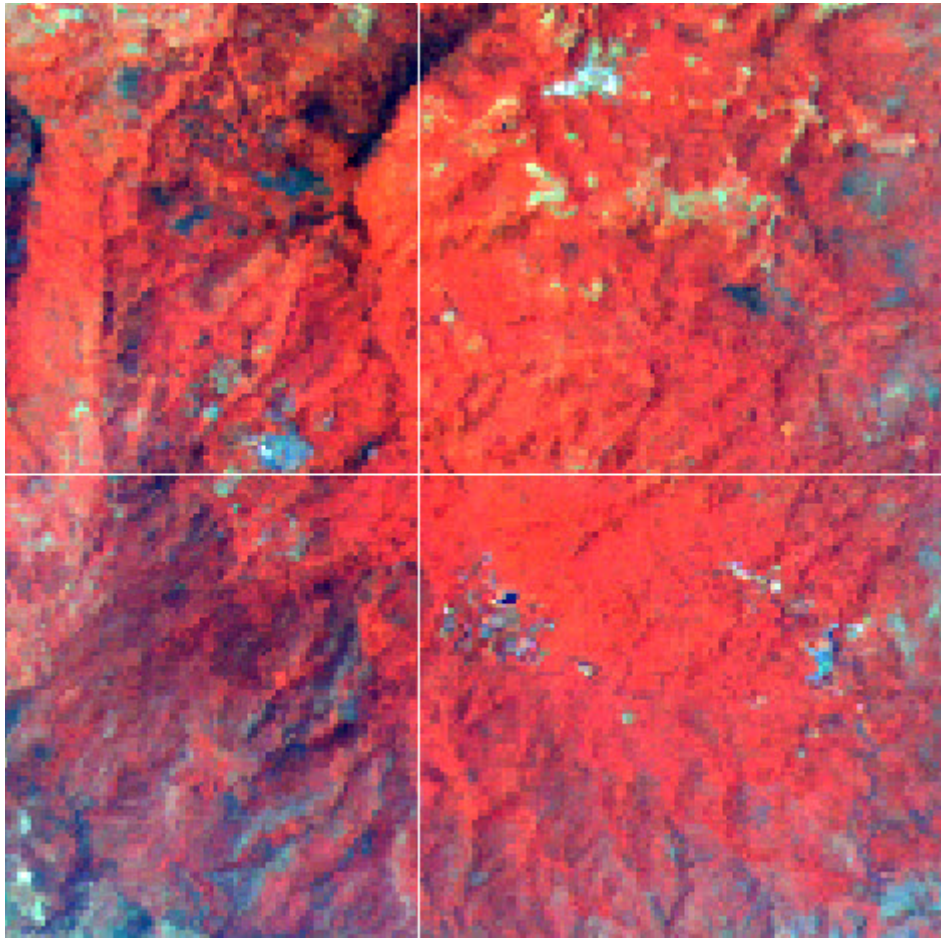
Initiative MRV Technology / Methodology developing

Evergreen Forest
@18.815,98.893
Landsat5-TM
2006-02-26



Initiative MRV Technology / Methodology developing

Evergreen Forest
@18.815,98.893
Landsat5-TM
2010-04-10



Initiative MRV Technology / Methodology developing

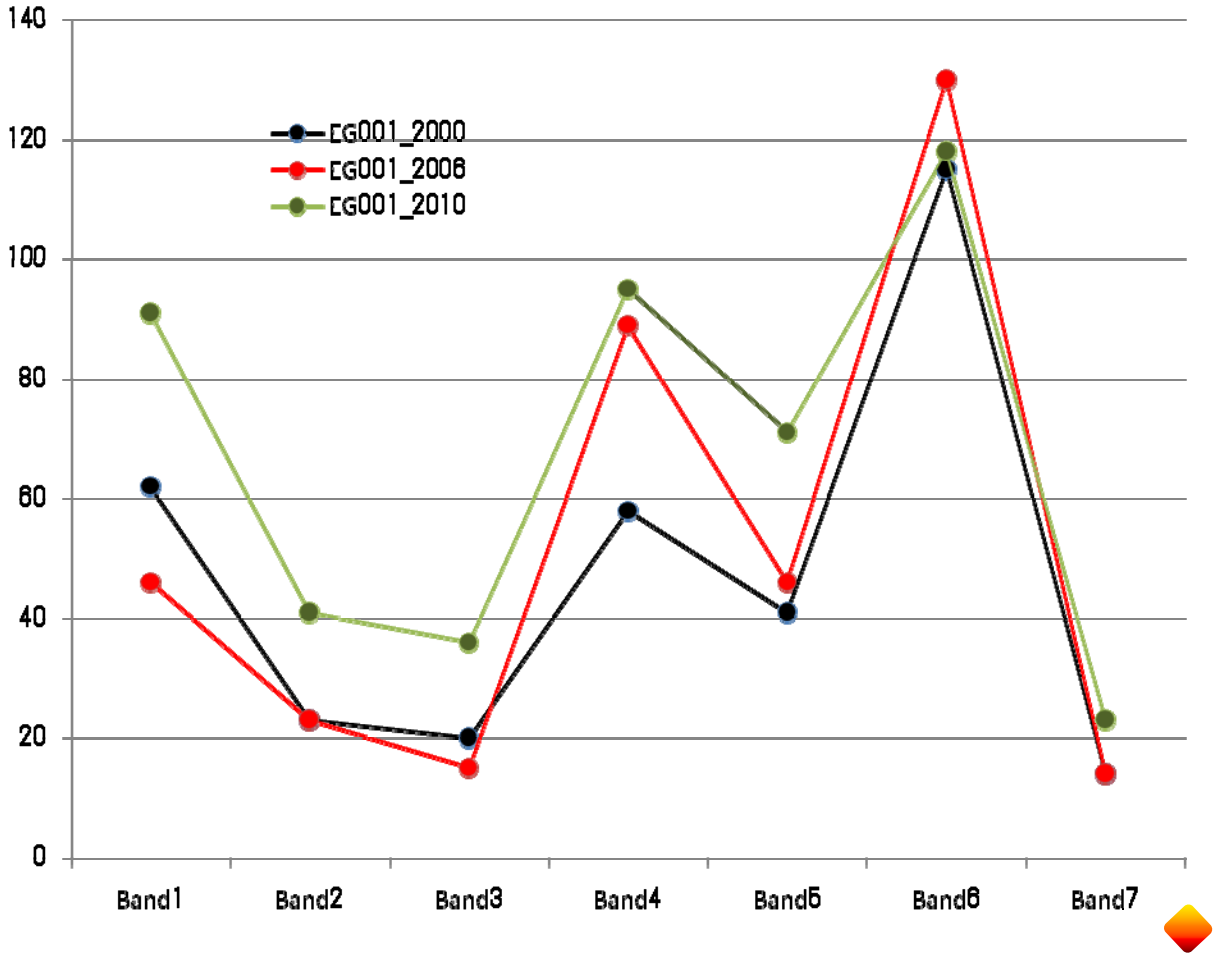
Evergreen Forest @18.815,98.893

ForestType_YYYY	Band1	Band2	Band3	Band4	Band5	Band6	Band7
EG001_2000	63	23	21	55	40	113	13
EG001_2006	48	23	17	93	51	129	14
EG001_2010	89	40	36	86	67	118	23

Initiative MRV Technology / Methodology developing

Evergreen Forest @18.815,98.893

NDVI2000 = 0.447
NDVI2006 = 0.690
NDVI2000 = 0.409



Initiative MRV Technology / Methodology developing

Evergreen Forest
@18.810,98.894

Initiative MRV Technology / Methodology developing

Evergreen Forest @18.810,98.894

ForestType_YYYY	Band1	Band2	Band3	Band4	Band5	Band6	Band7
EG001_2000	62	23	20	58	41	115	14
EG001_2006	46	23	15	89	46	130	14
EG001_2010	91	41	36	95	71	118	23

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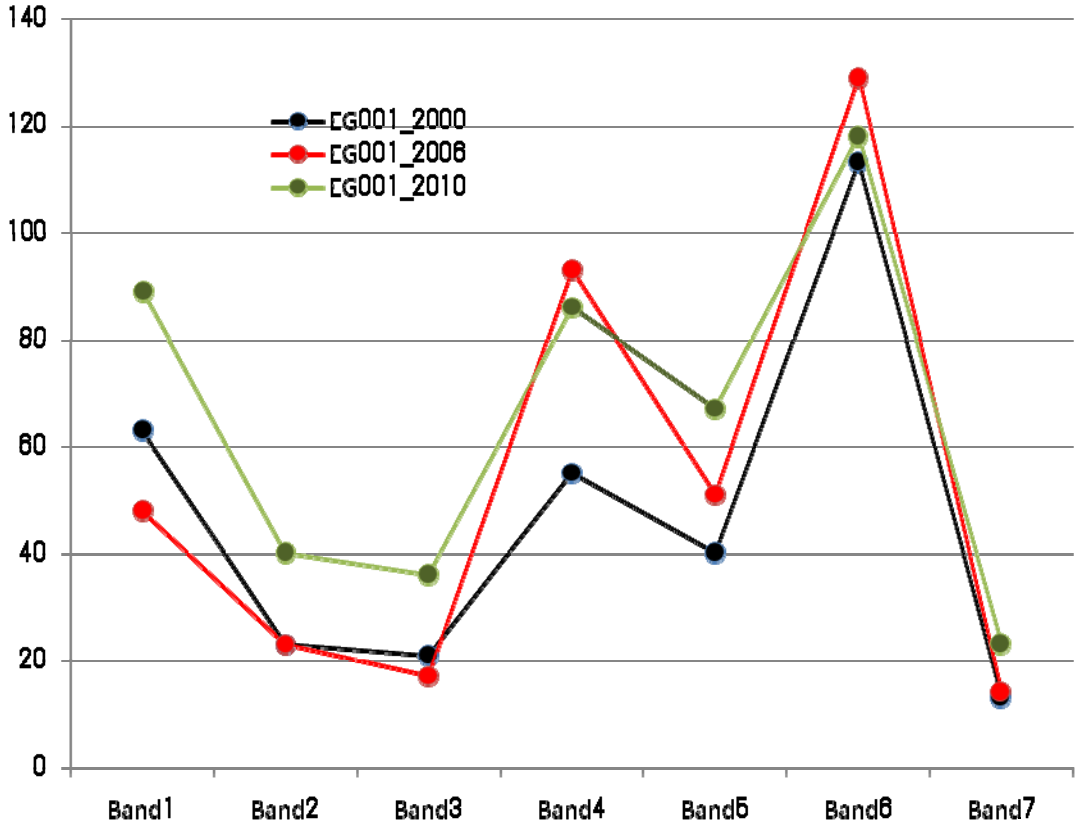
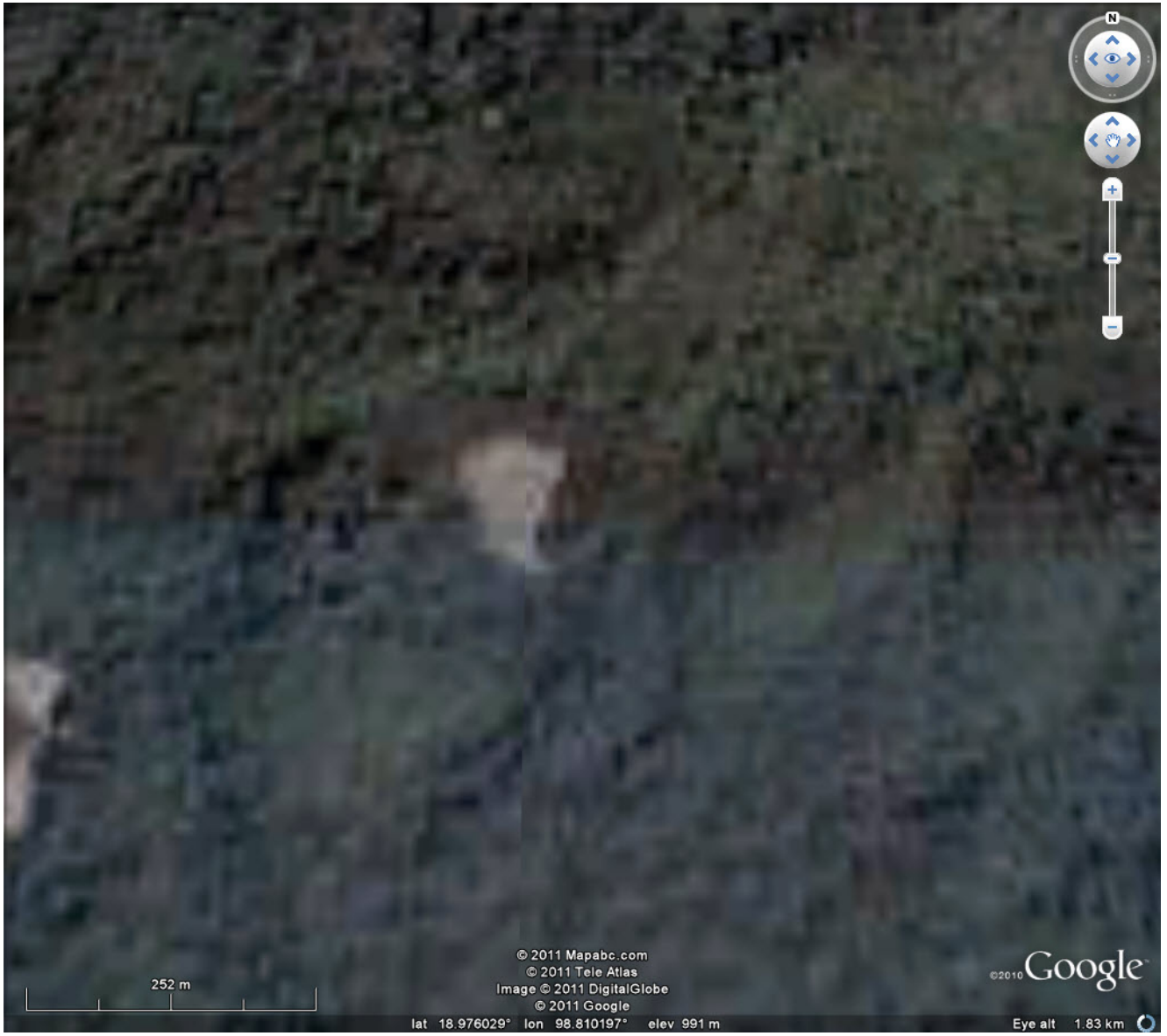
Evergreen Forest @18.810,98.894

NDVI2000 = 0.487
NDVI2006 = 0.711
NDVI2000 = 0.450



Initiative MRV Technology / Methodology developing

LU Changed @18.979,98.811



Initiative MRV Technology / Methodology developing

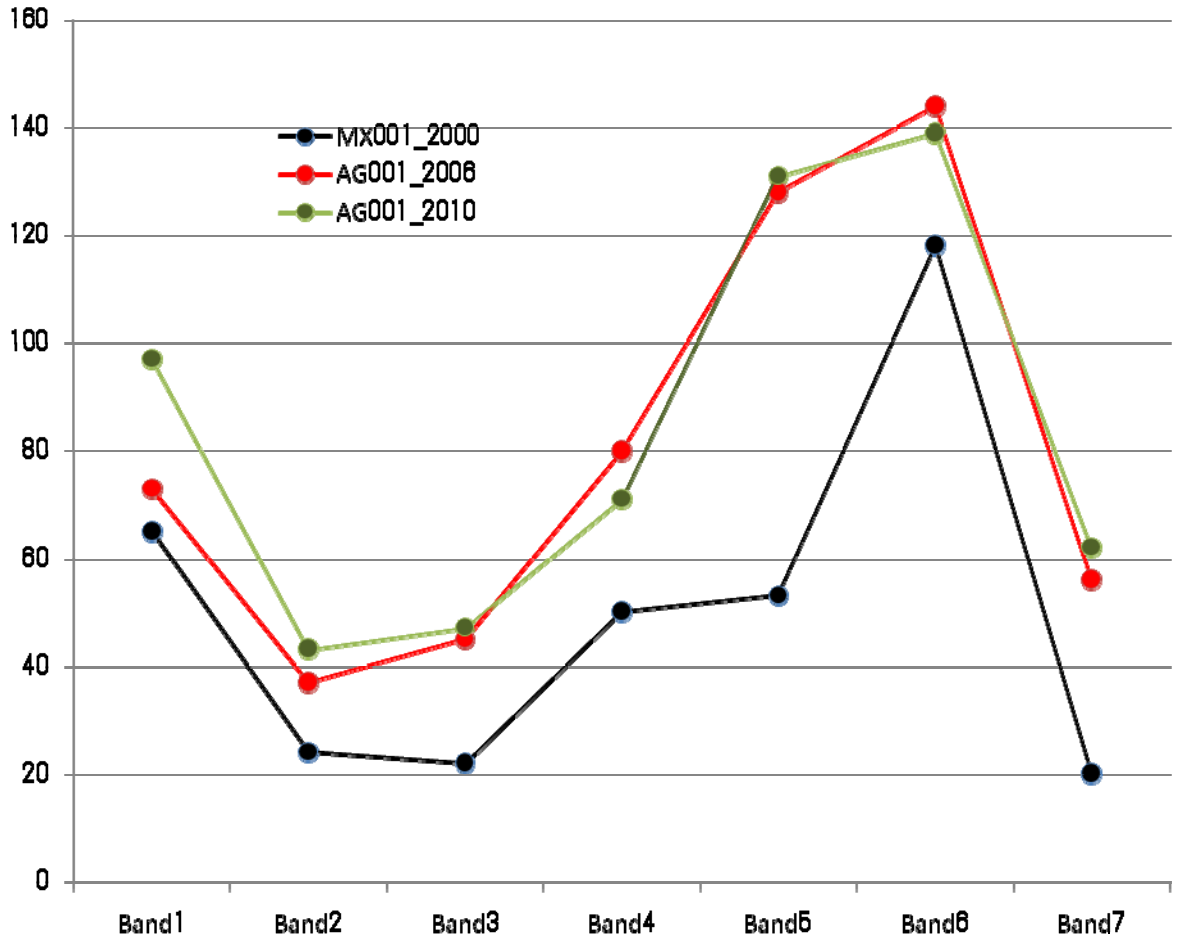
Changed from Mixed Deciduous Forest to Agriculture Area @18.979,98.811

ForestType_YYYY	Band1	Band2	Band3	Band4	Band5	Band6	Band7
MX001_2000	65	24	22	50	53	118	20
AG001_2006	73	37	45	80	128	144	56
AG001_2010	97	43	47	71	131	139	62

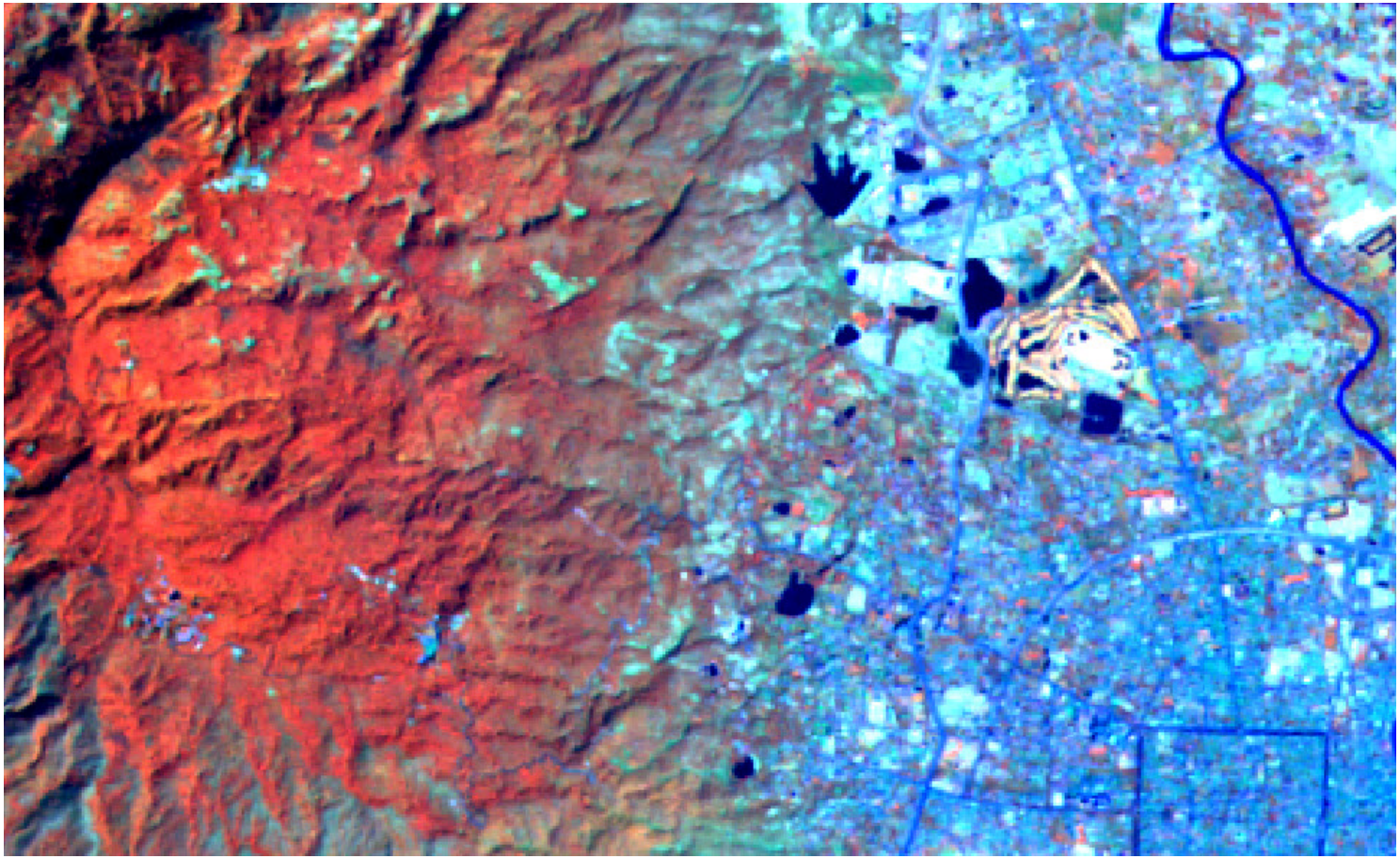
Initiative MRV Technology / Methodology developing

Changed F-NF
@18.979,98.811

NDVI2000 = 0.389
NDVI2006 = 0.280
NDVI2000 = 0.203



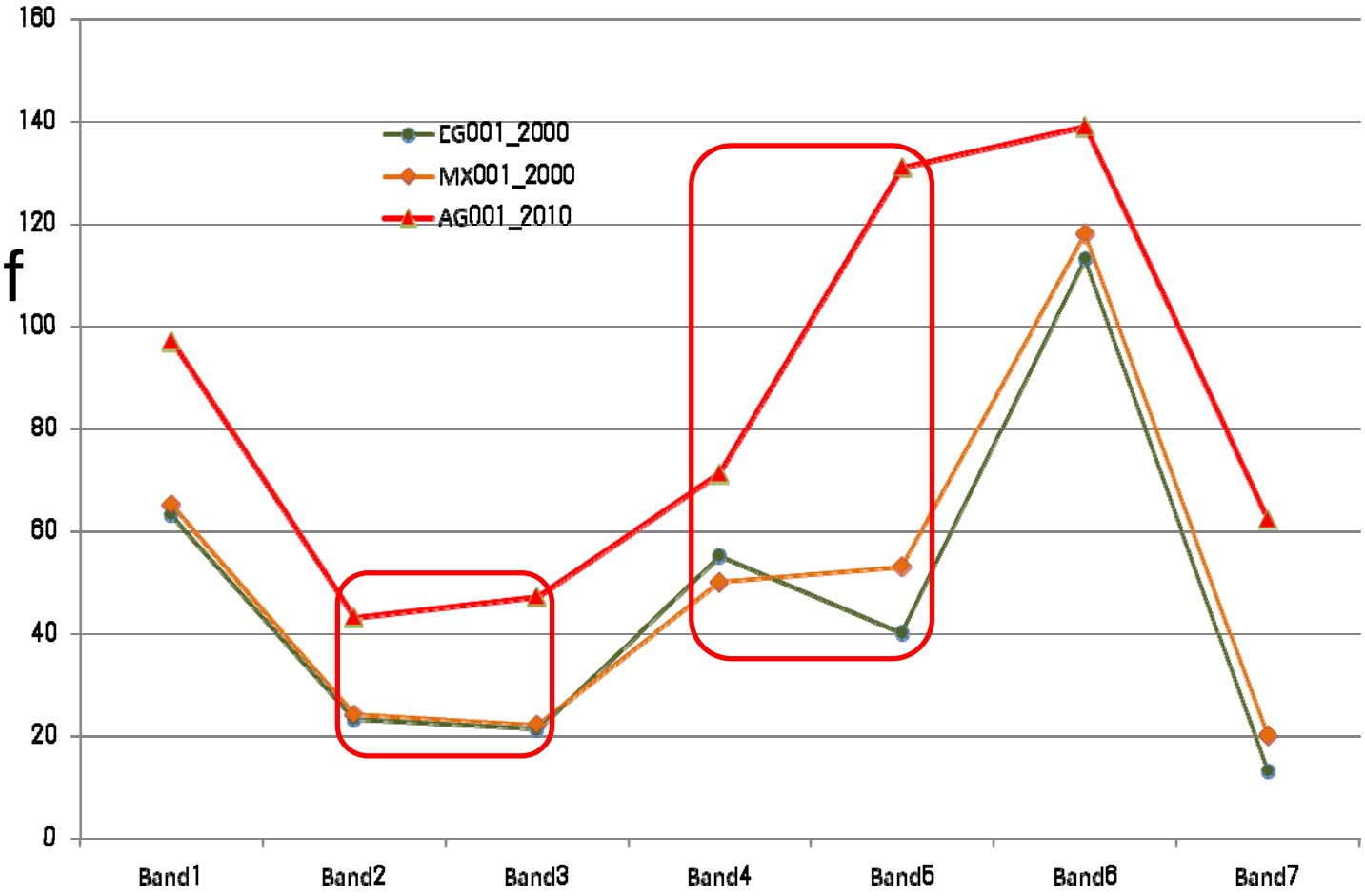
Initiative MRV Technology / Methodology developing



RS Data 2006

Initiative MRV Technology / Methodology developing

Stratified by Pattern of DN Value



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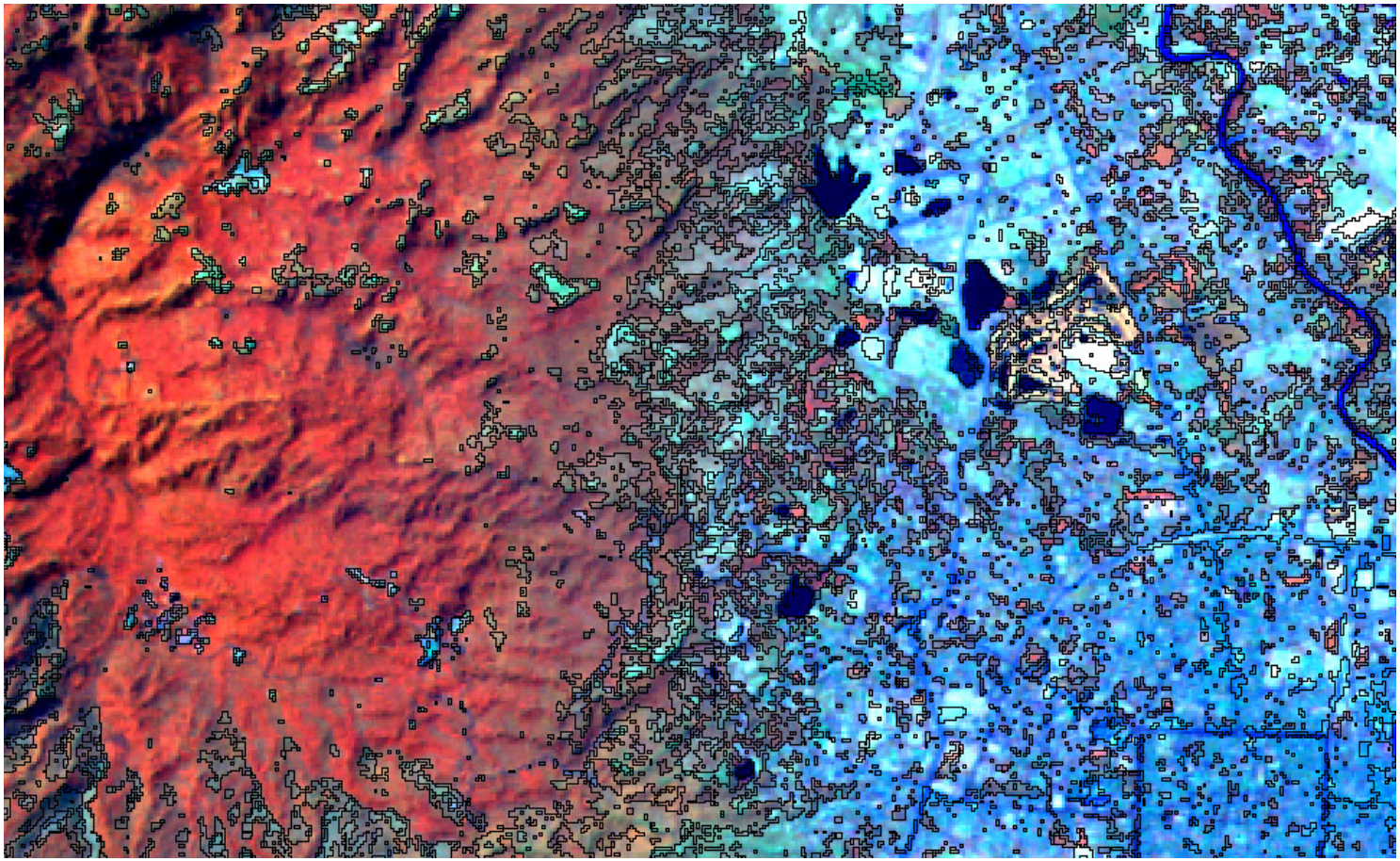
Stratified
by DN Value



RS Data 2006



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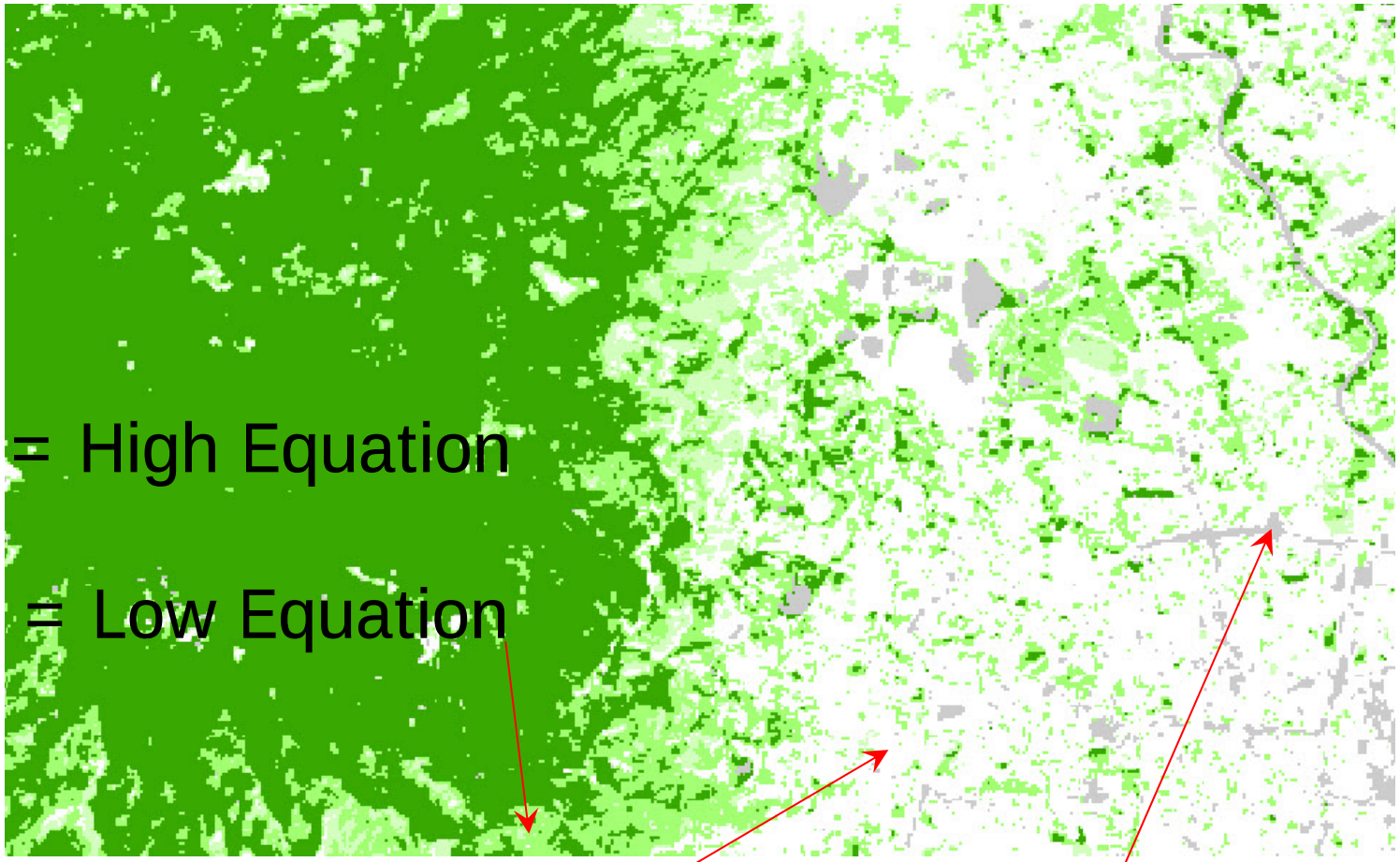
Stratified
4 Class

Class3::C = High Equation

Class2::C = Low Equation



Class1::C = Very Low Equation Class0::C = 0

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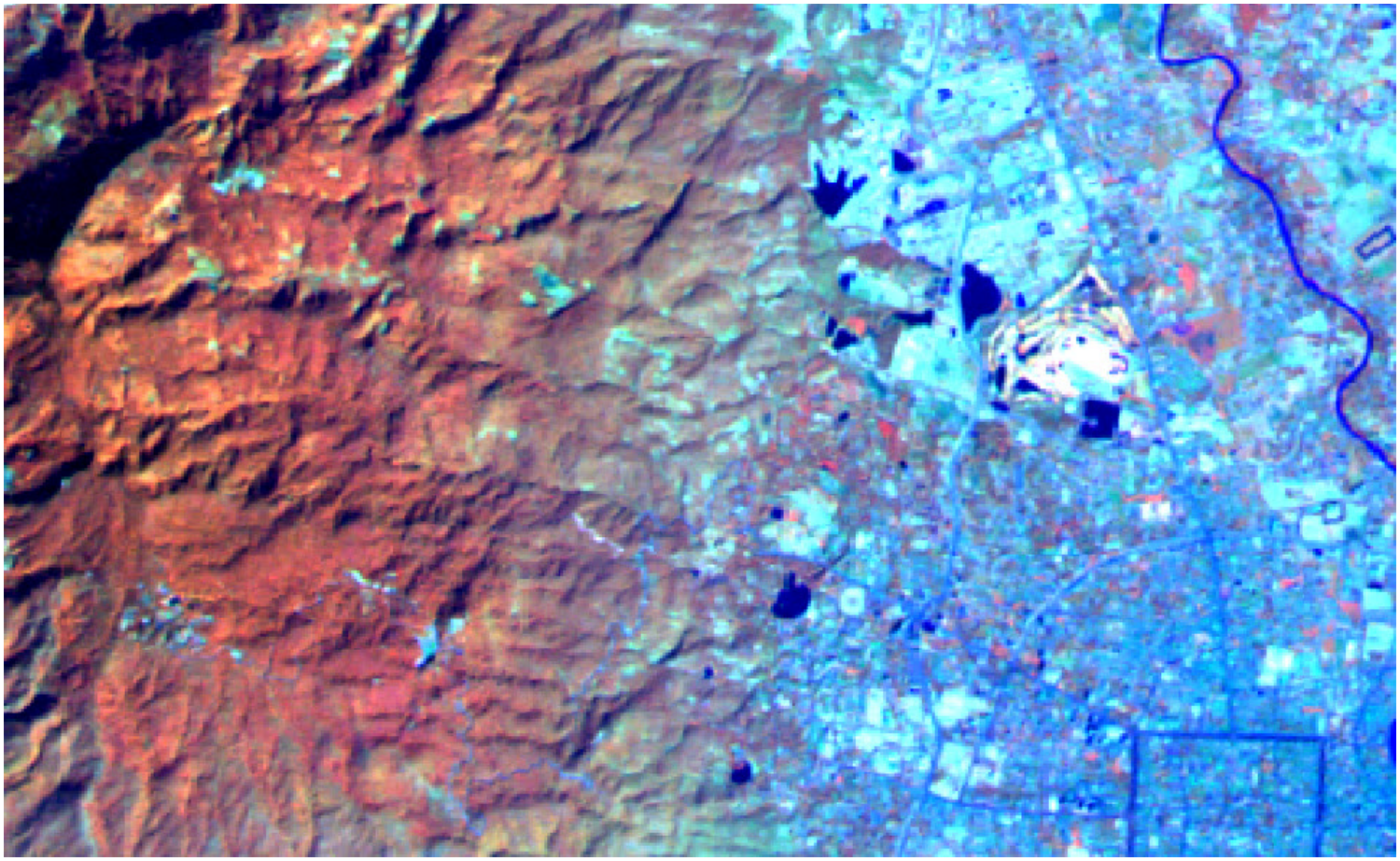
Landsat
2000
2000-01-25



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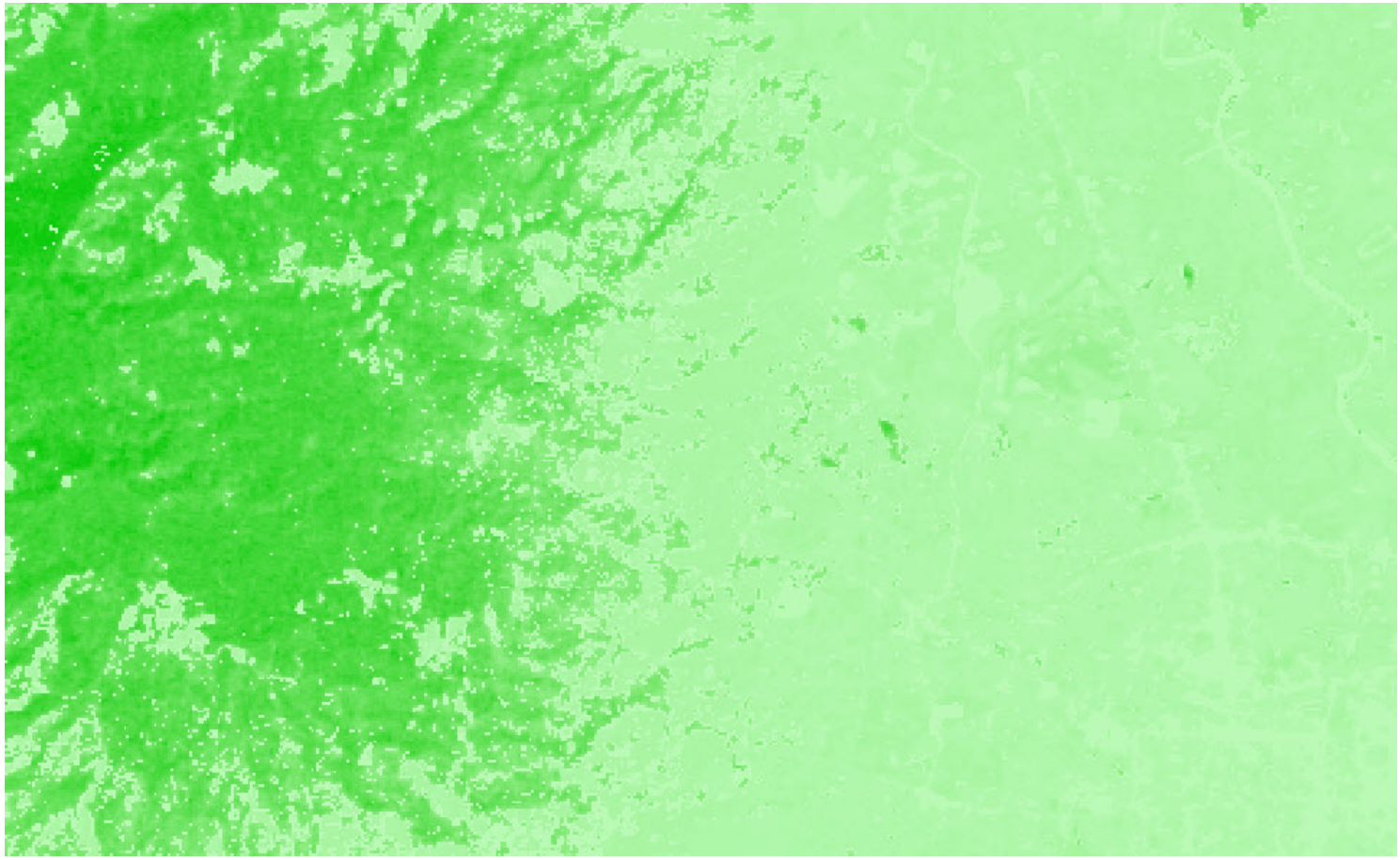
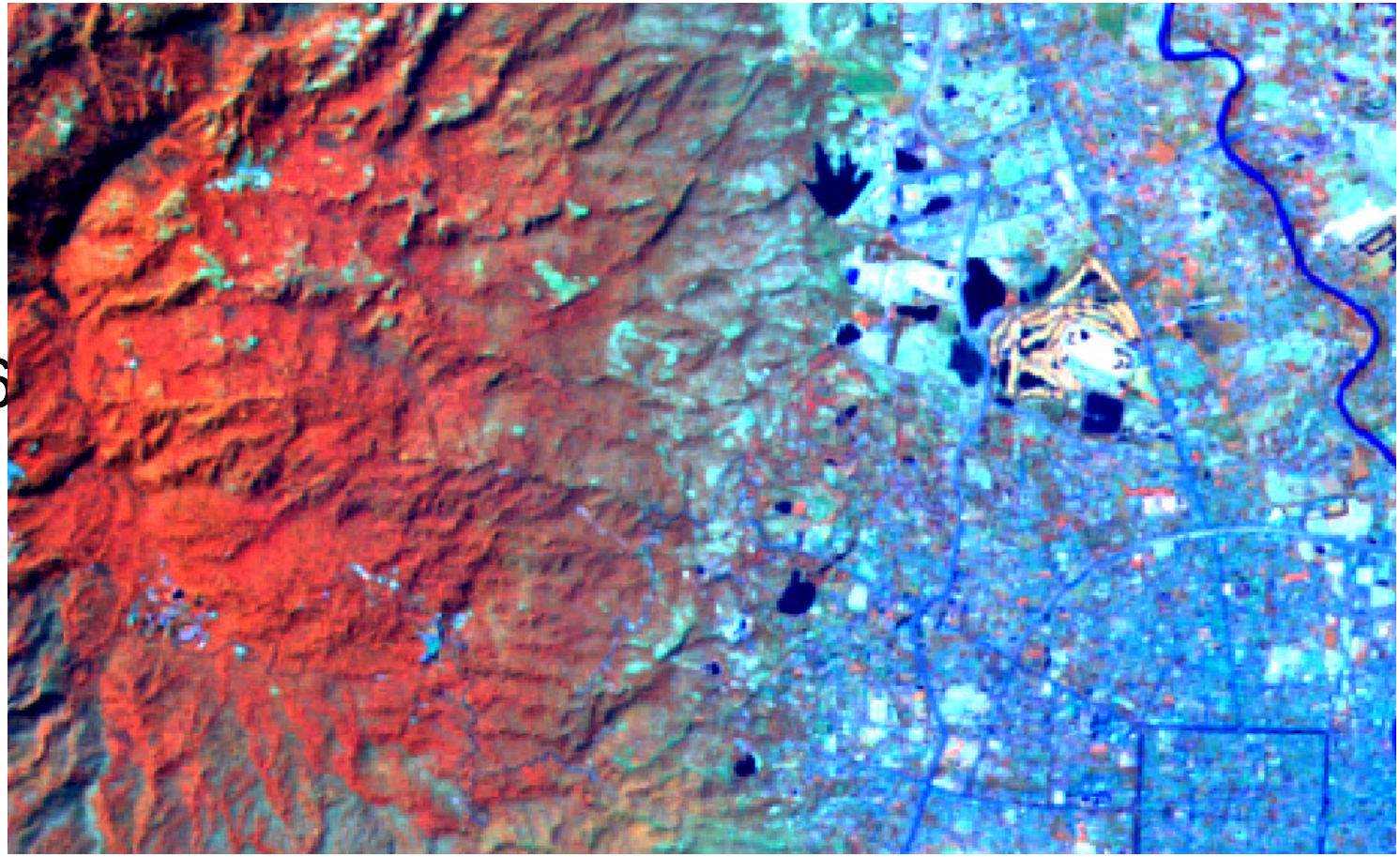
Carbon Mapping 2000



Initiative MRV Technology / Methodology developing

Landsat
2006
2006-02-26



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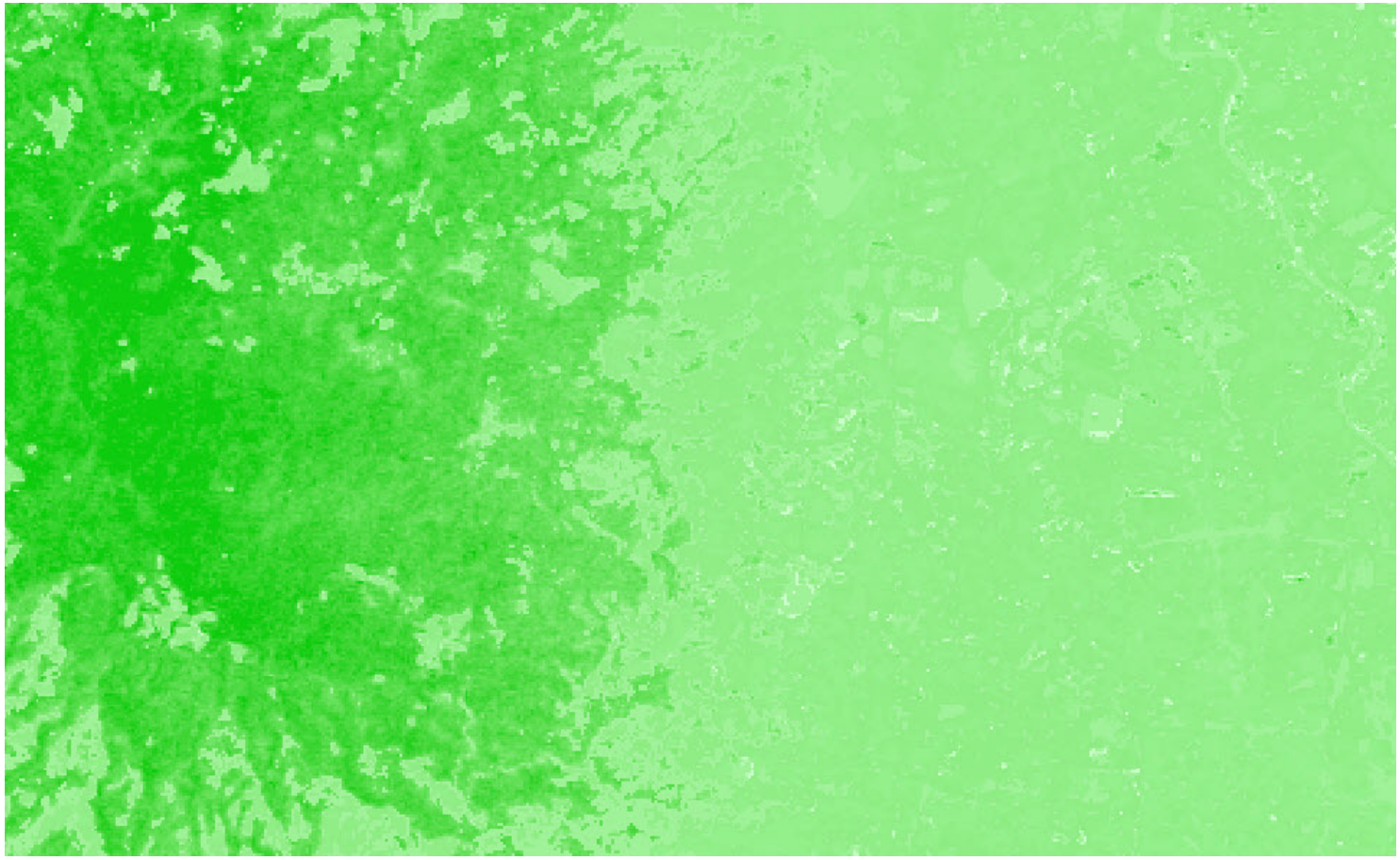
Carbon Mapping 2006



Value
High : 303.092712
Low : 0.000000

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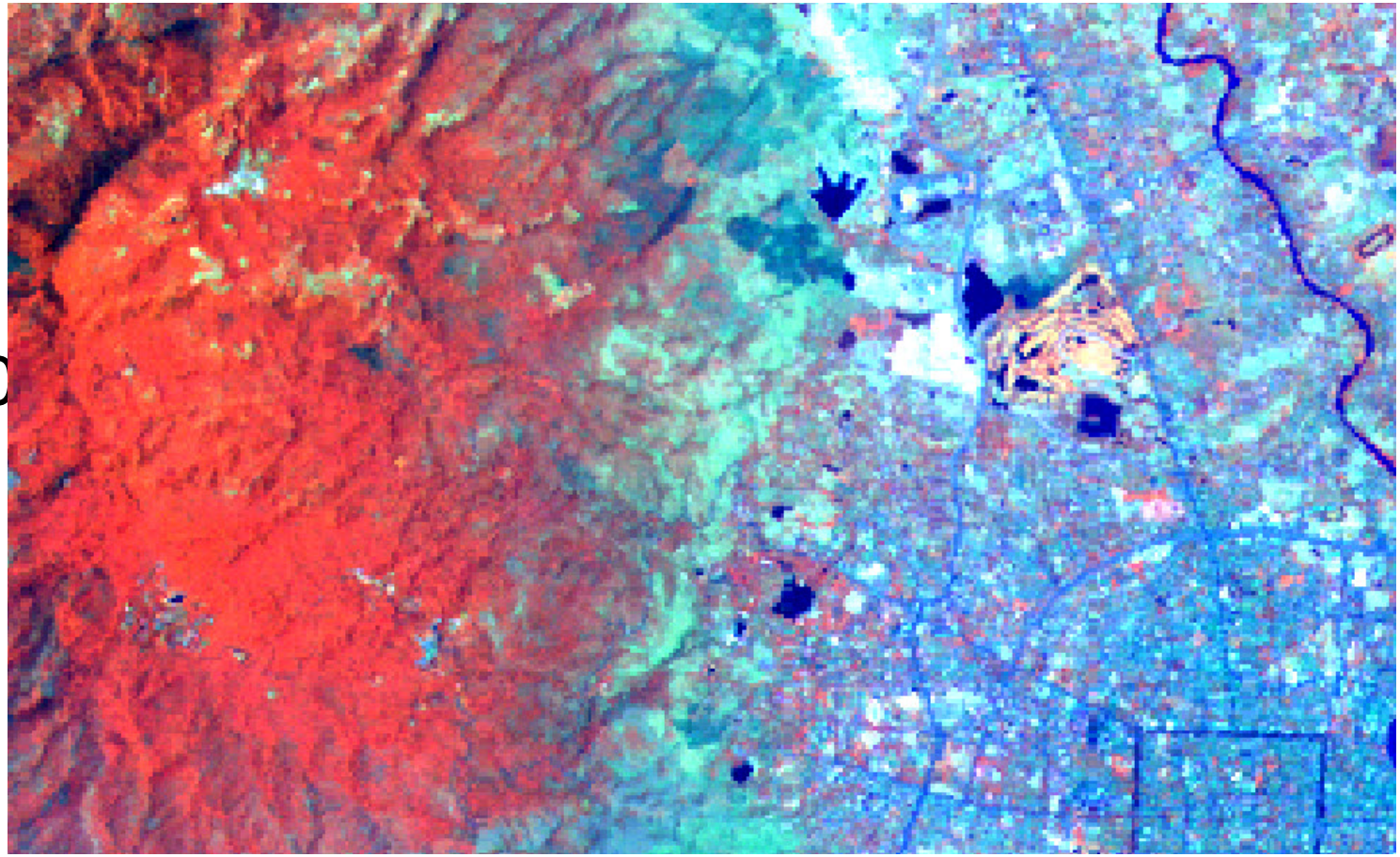
Landsat
2010
2010-04-10



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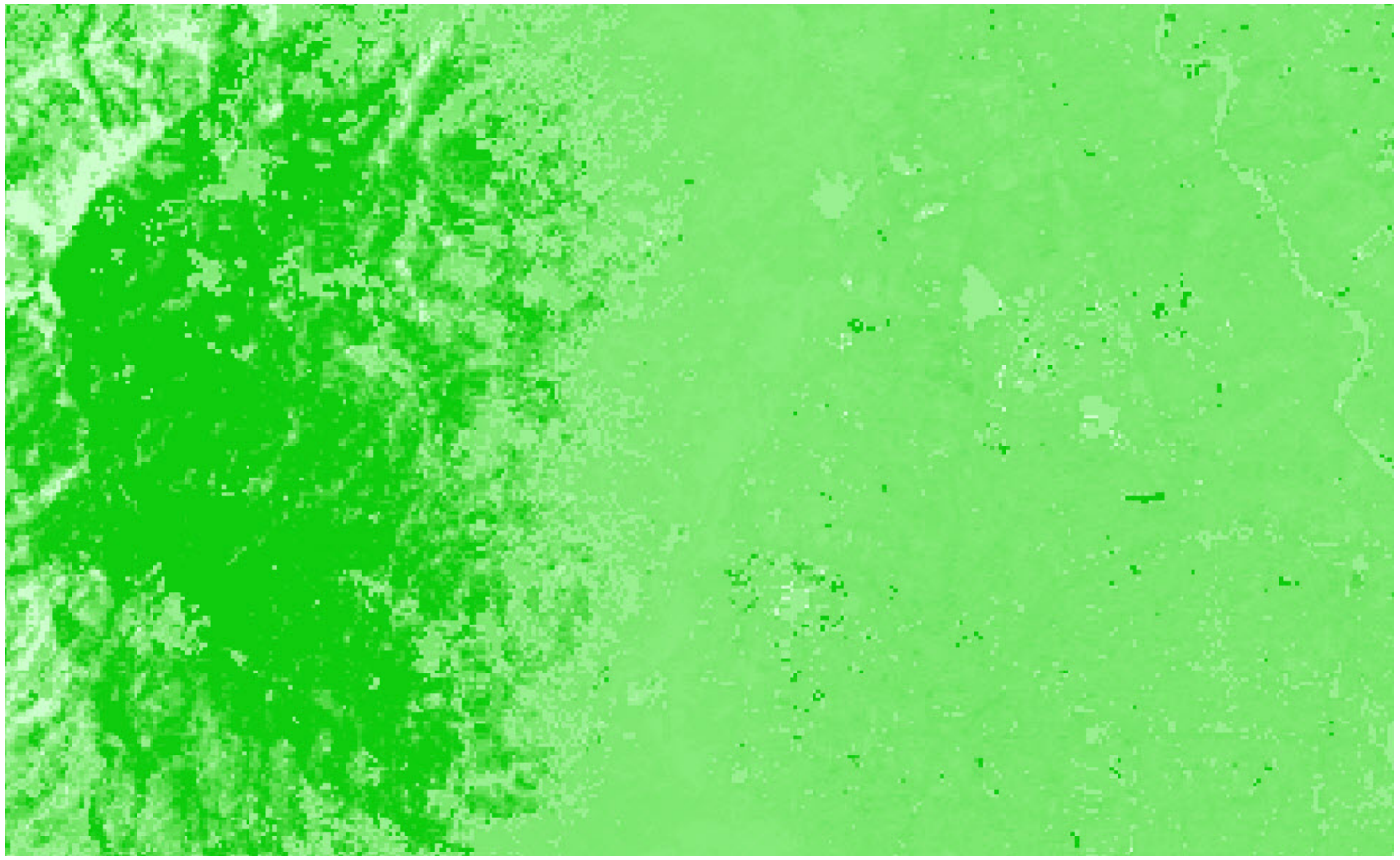
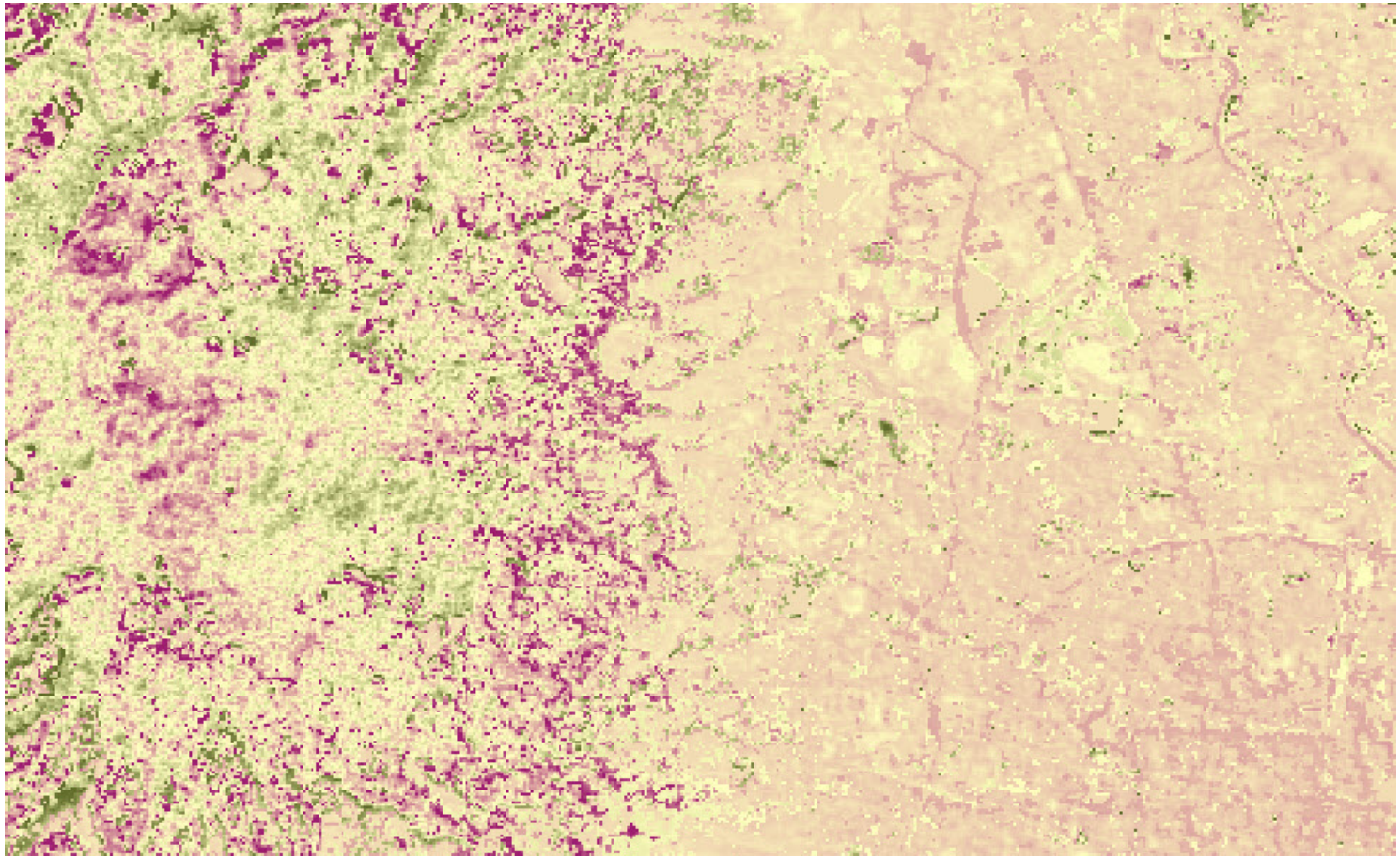
Carbon Mapping 2010



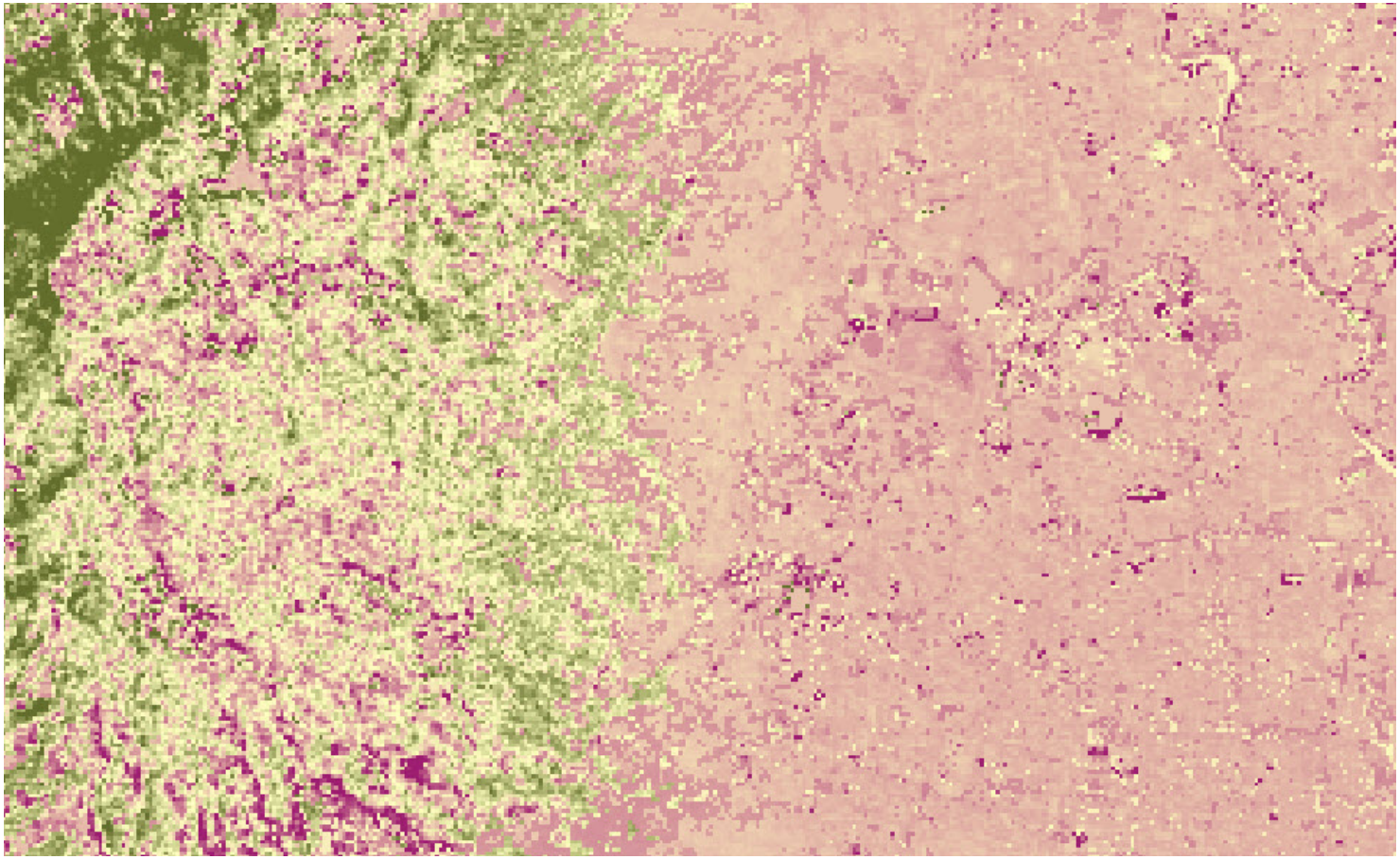
Initiative MRV Technology / Methodology developing

Carbon Changed 2000-2006



Initiative MRV Technology / Methodology developing

Carbon Changed 2006-2010



Issues to be addressed to promote REDD+ initiatives

Develop, prove, technology transfer, capacity building.

- Requirements for national MRV system:
- International: principles and procedures specified by the IPCC Good Practice Guidelines and UNFCCC guidance.
- National: needs and priorities of the national REDD policy and implementation strategy.
- Bridging the capacity gap.
- Assessment: of existing national forest monitoring technical capabilities versus the requirements for the MRV system.
- Develop and implement a roadmap: to build sustained in-country capacities for MRV

Suggestion for promotion of REDD+

Collaboration

- Data Sharing, RS data
- National REL/RL establishment
  - Forest definition
  - Stratification
  - Drivers of deforestation
  - Sampling design, where and what to measure
- MRV
  - Calculating emission removals
  - Verification of land cover change

Suggestion for promotion of REDD+

Collaboration

A major effort concerning capacity building is also required and identified as a priority by participants.

Enhancing current collaboration will benefit both the implementation of REDD+ strategies and exchange of experiences.

Monitoring carbon stock enhancements

- **GIS data for plantations**
- **RS data for regrowth and degradation via change in canopy cover combined with ground plots**
- **Permanent or temporary sample plots for enhancement and degradation**

Coordination between GIS/RS and forest carbon inventory teams

- **Benchmark map creation**
- **Stratification by type of signal DN value**
- **Field measurement plan sampling design**

Thank You

Anuchit Ratanasuwan
Thailand.