

International Seminar on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD), 10-12 March, 2010, Tokyo, Japan

Session V: Updated Information on Remote Sensing Technology

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# A Case Study for the Country Capacity Building in Laos

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# 1. Scope of the Study

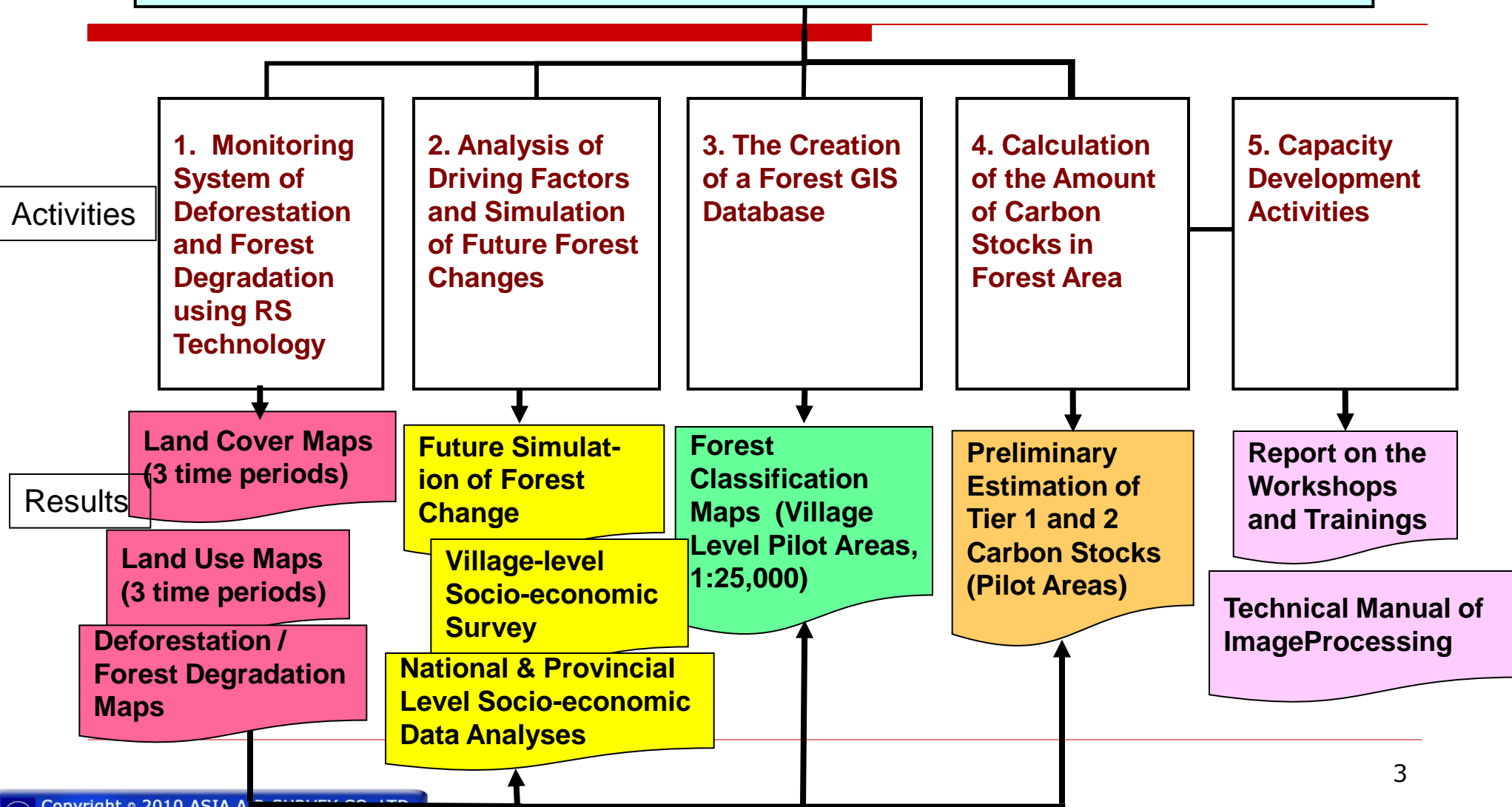
## (1) Study Project

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- **TITLE:** “The Study on the Strengthening of Methodological and Technological Approaches for Reducing Deforestation and Forest Degradation within the REDD Implementation Framework: Application in Lao P.D.R.”
- **Support:** Forest Agency, Ministry of Agriculture, Forestry and Fishery (MAFF), Japan
- **C/P Organization:** Forest Inventory and Planning Division (FIPD), Department of Forestry, Ministry of Agriculture and Forestry, Lao P.D.R.

## (2) Contents of the Study (2009)

### A Practical Approach towards REDD Implementation Mechanism (Phase 1)

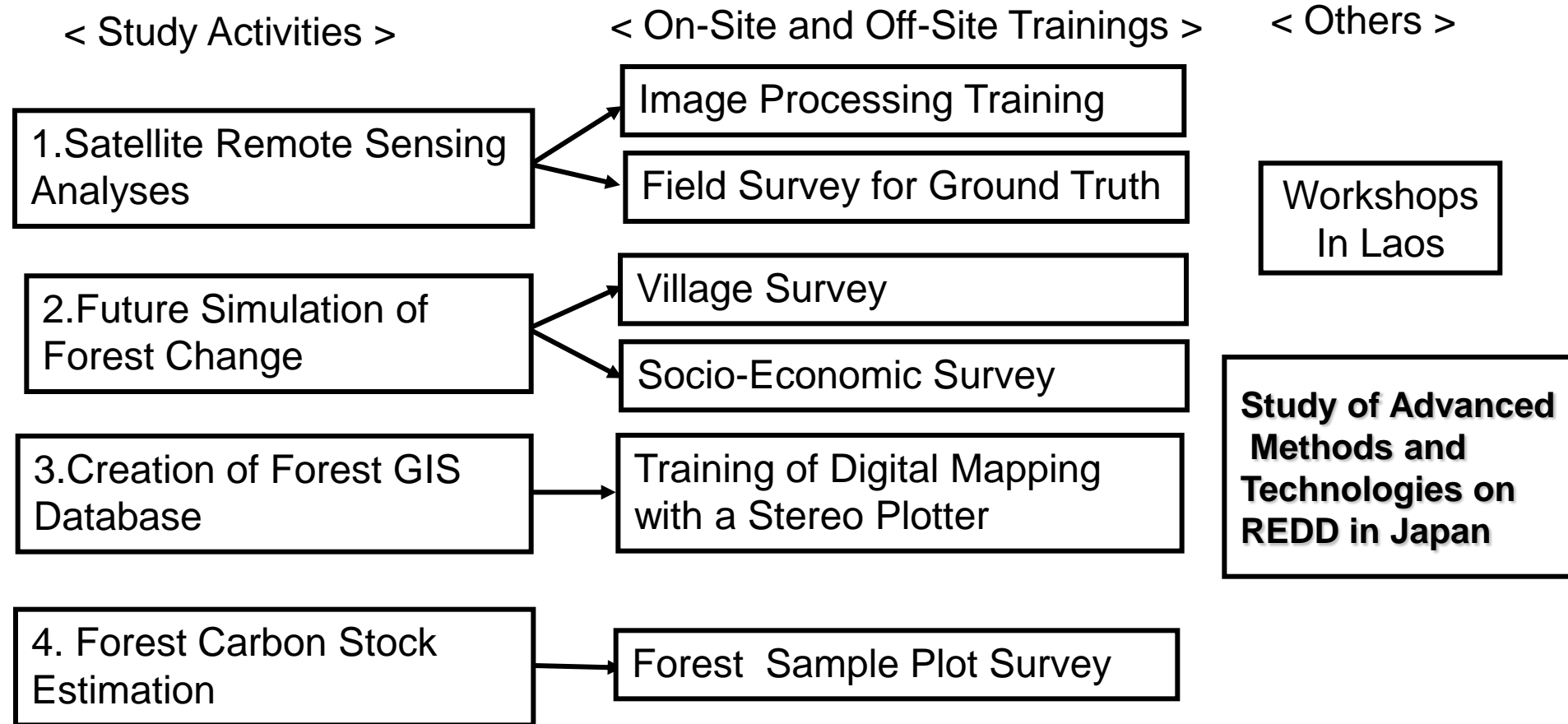


## (3) Technical Background of FIPD

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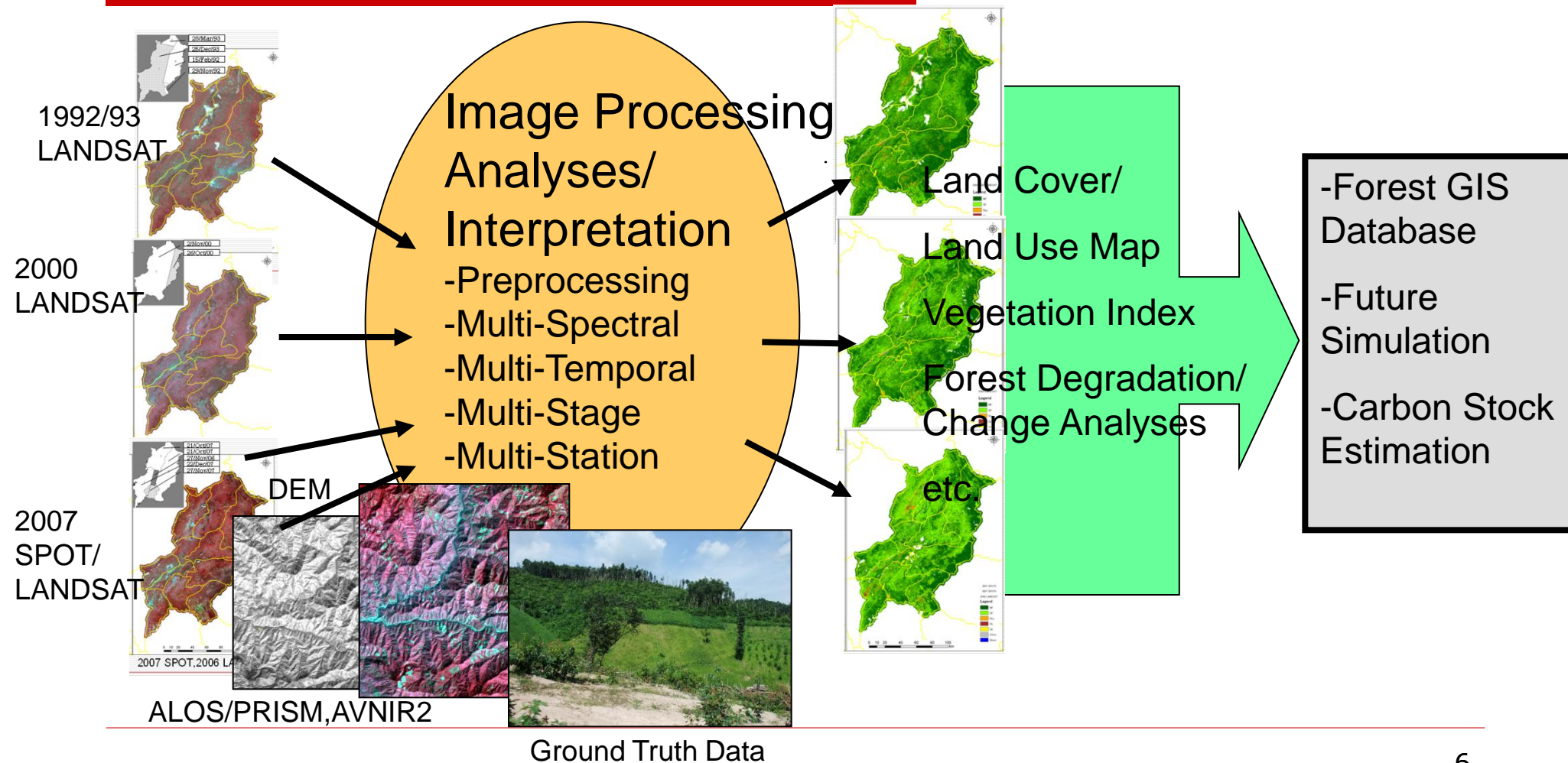
- Experience in forest cover and land use change assessment (1992-2002) using aerial photos, satellite image interpretation and field verification
  - Some experiences in satellite image processing and forest GIS database development (13 RS/GIS specialists)
  - No experience in forest cover mapping using stereo photogrammetric plotter
  - No practical experience in socio-economic survey and future simulation of forest cover changes
  - No practical experience in forest carbon estimation
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# 2. Study Activities and Associative Capacity Developments in 2009



# (1) Monitoring System of Deforestation and Forest Degradation Using RS Technology

## 1) Digital Satellite Image Analyses



## 2) Technical Training at FIPD on Satellite Image Processing and Interpretation

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### ● Image Processing Training Programs

#### [First training]

- Principle of Remote Sensing (0.5 day, 23 persons)
- Preprocessing of Images (4 days, 23 persons)
- Multi-Band Image Processing (7 days, 23 persons)

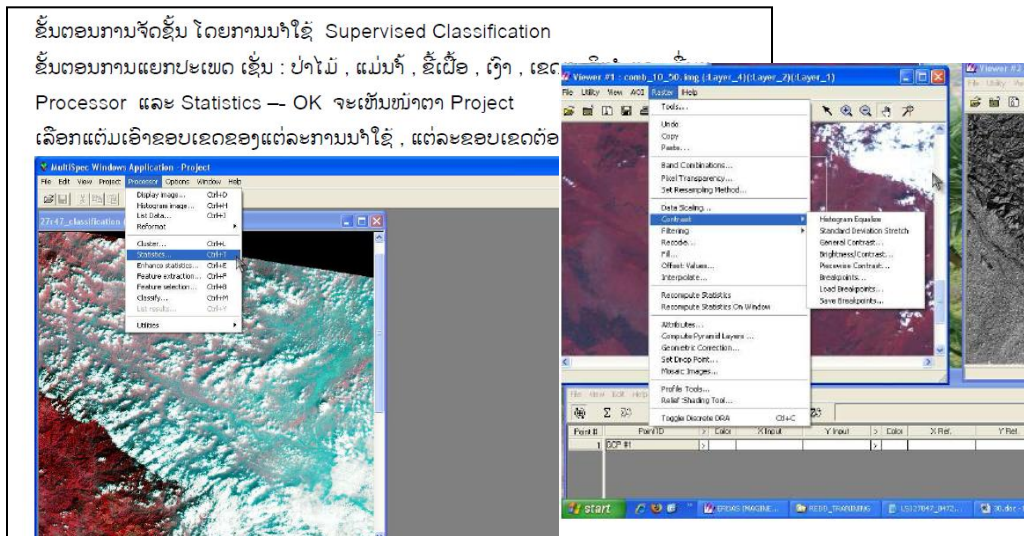
#### [Second training]

- Image Classifications (5 days, 10 persons)

### ● Collection of Ground Truth Data ( 10 days for 2 persons)



### 3) Some Results of the Image Processing Trainings



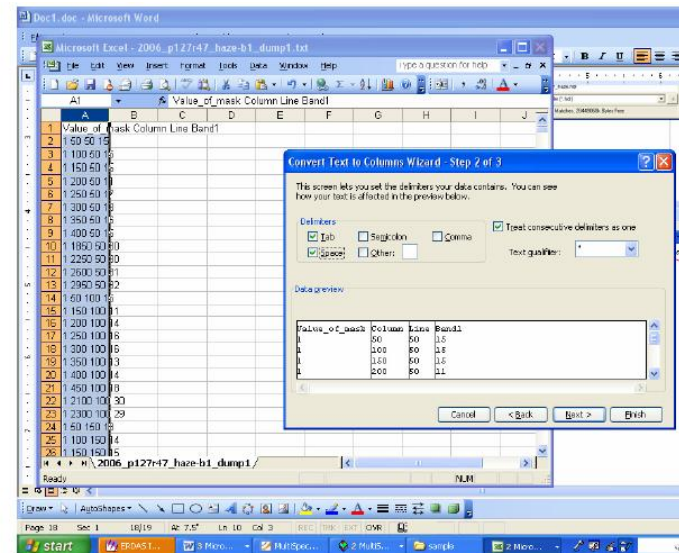
ການຕັດພາຍ

Open view1

ເອົັນຟາຍ ທີ່ຮ່ວມກັນແລ້ວ 4 ພາຍ (mosaic\_4dem.img)

Open view2

ເອົັນຟາຍ ທີ່ຮ່ວມກັນແລ້ວ 4 ພາຍ (mosaic utm shaded.img)



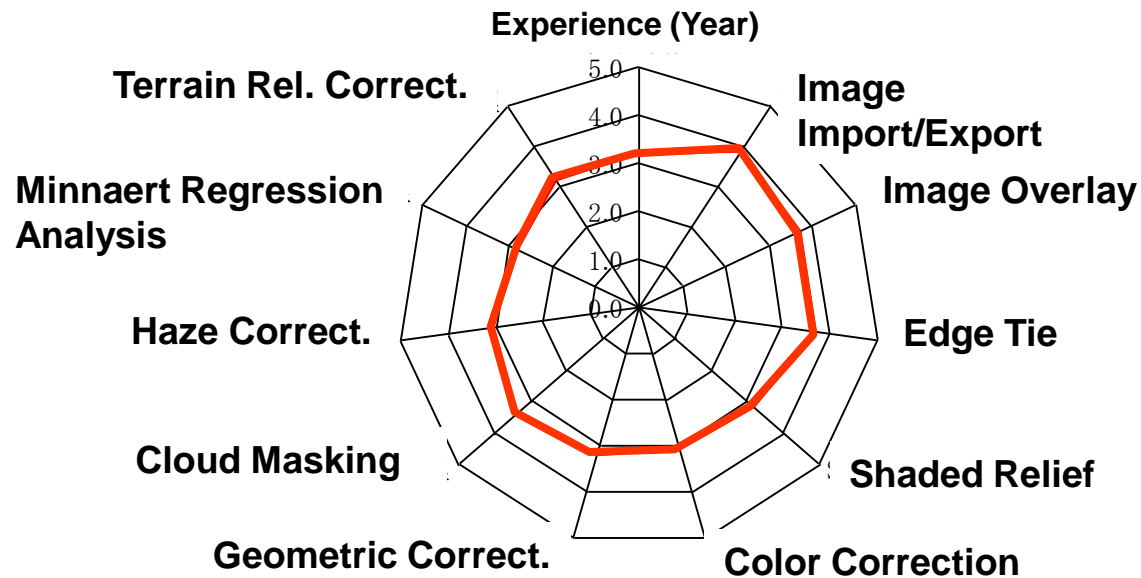
- ກົດ b1ຫຼື15
- ກົດ shift + end+ລູກສອນເລືອນລົງ
- Copy ໃສ່ຕາຕະລາງ b1 ຫຼື 15

● Trainees were asked to arrange their own operation manuals of an image processing system in Lao language.



## 4) Evaluations of the Image Processing Trainings (First Training)

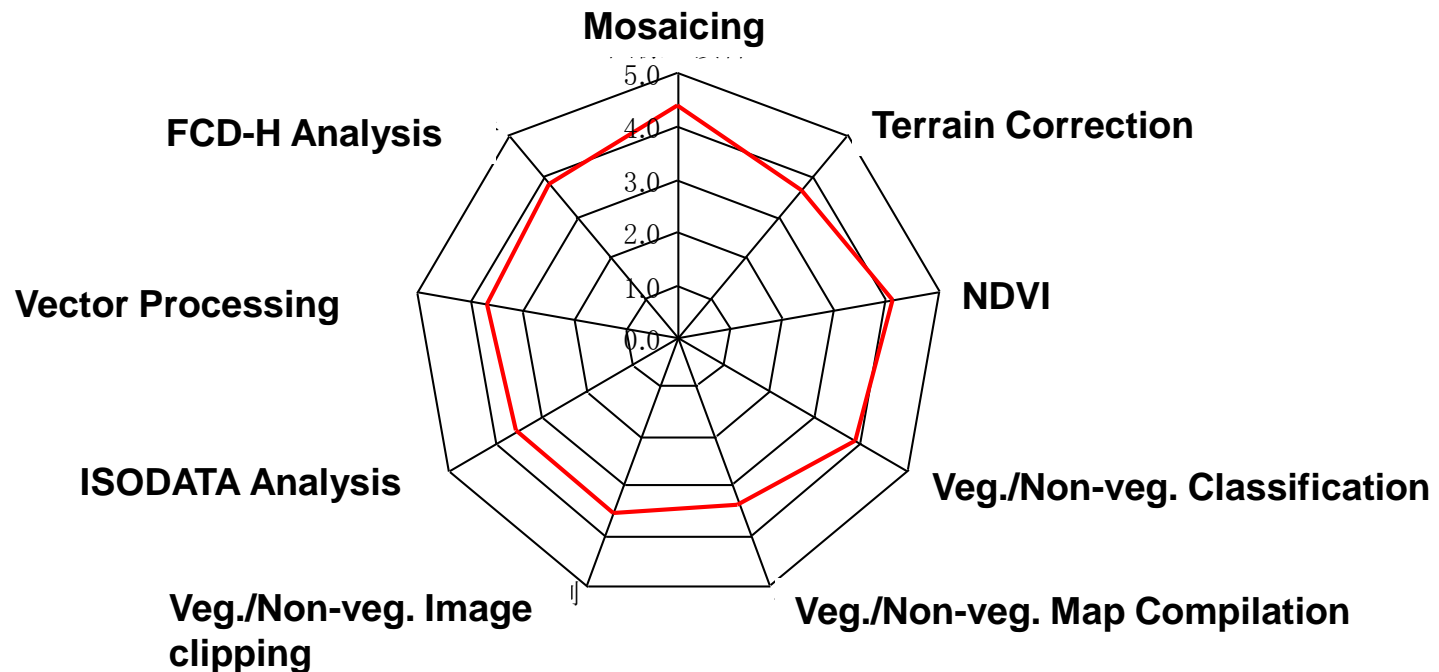
- Level of understanding of training items were evaluated by 23 trainees.
- Average grade points are relatively lower for advanced items because many trainees were beginners of remote sensing.



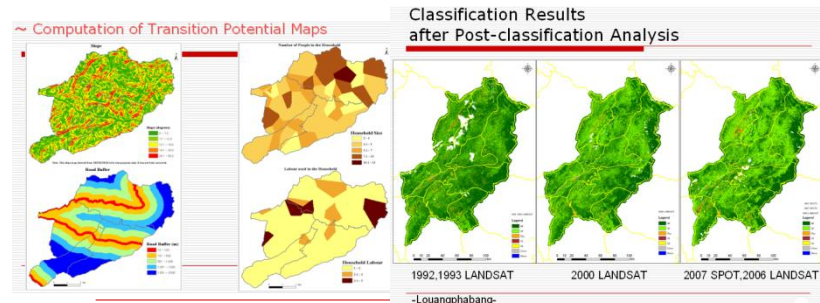
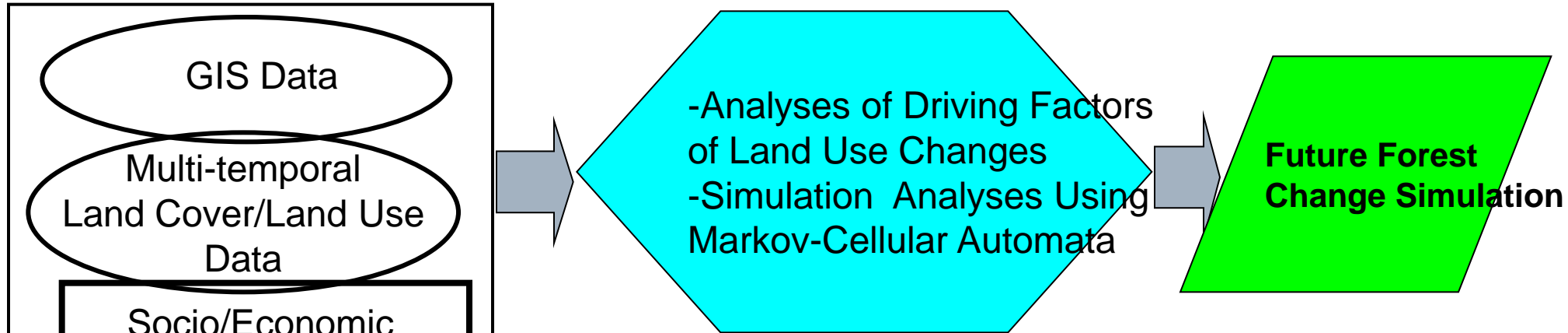
Grade point	Level of Understanding
5.0	Very well
4.0	Well
3.0	Good
2.0	Not enough
1.0	Poor

# Evaluations of the Image Processing Training (Second Training)

- The second training were carried out for 10 FIPD staffs only.
- Average grade points were higher than that of the first training.



# (3) Analyses of Driving Factors and Simulation of Future Forest Changes

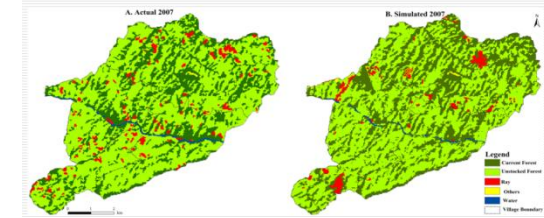


~ Land Use/Cover Transition Probabilities (2000 - 2007)

		2007				
2000	CF	UF	R	O	W	
CF	<b>0.71</b>	0.26	0.03	0.00	0.01	
UF	0.07	<b>0.88</b>	0.05	0.00	0.00	
R	0.00	0.84	<b>0.15</b>	0.01	0.00	
O	0.21	0.32	0.07	<b>0.40</b>	0.00	
W	0.01	0.04	0.06	0.00	<b>0.78</b>	

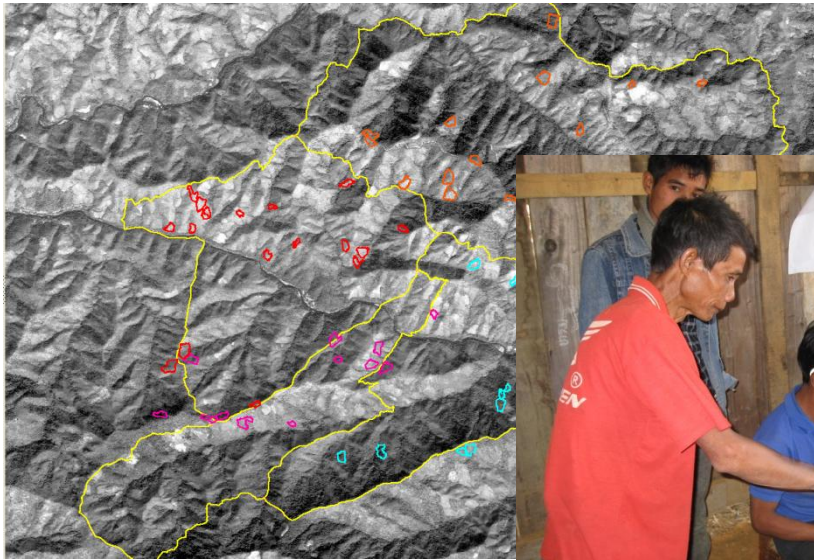
Note: CF - Current forest; UF - Unstocked forest; R-Ray;  
O - Others; and W - Water

~ Actual versus Simulated Land Use/Cover Maps for 2007



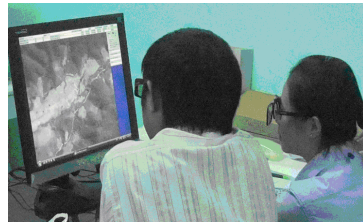
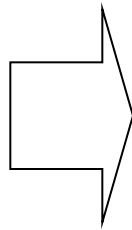
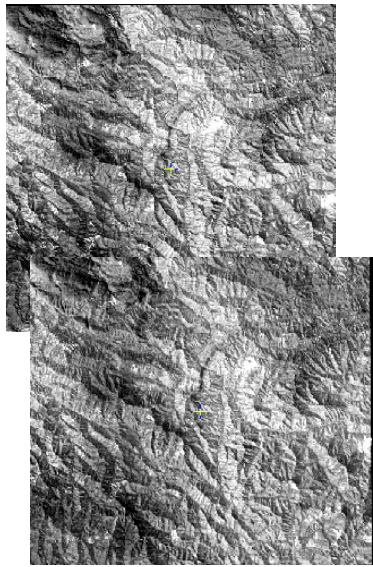
# 1) On-Site Training of Village Surveys

- Boundary Surveys of the Villages and Swidden Cultivated Areas using GPS(OJT, 15 days, 3 p.)
- Socio/Economic Survey at Villages (OJT, 18 days, 3 persons )

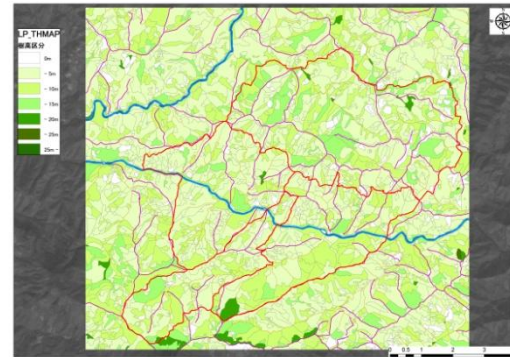
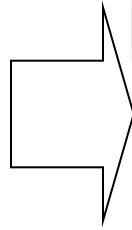


GPS Survey

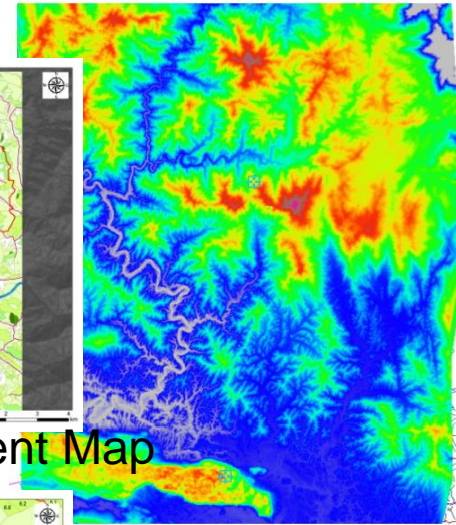
# (4) The Creation of Forest GIS Data



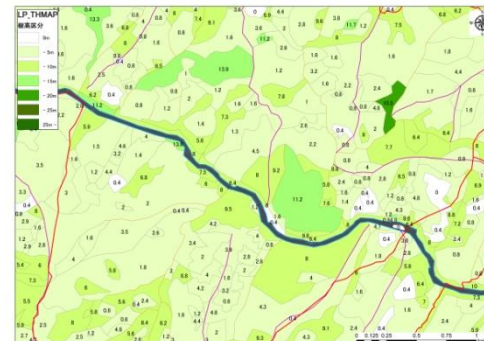
Digital Stereo Plotting



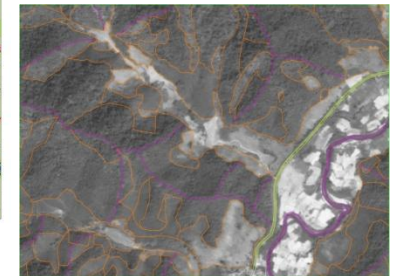
Forest Compartment Map



Topography



Tree Height Map



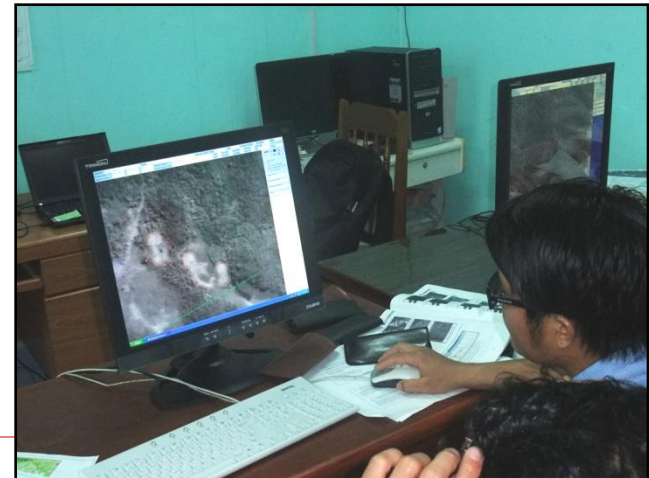
Orthoimage

ALOS/PRISM  
Stereo Images

# 1) Training for Forest GIS Data Mapping

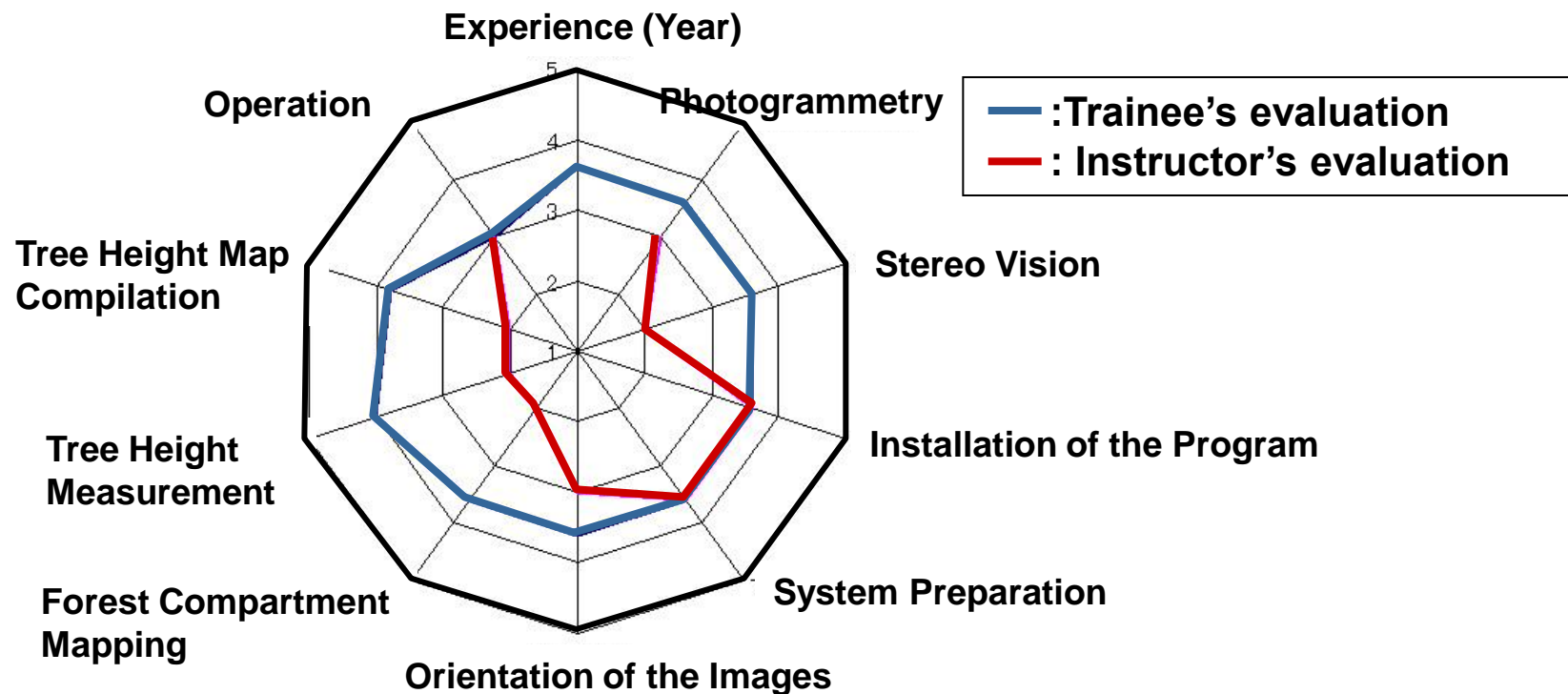
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- Four days training for 8 persons on photogrammetric mapping of GIS data using ALOS/PRISM images and a Digital Stereo Plotter
- Training Program
  - Lecture on forest stand mapping and carbon stock estimation,
  - Orientation of ALOS/PRISM stereo satellite images,
  - Mapping of topographic feature, forest compartment, tree height, etc.
  - Preparation of GIS data.



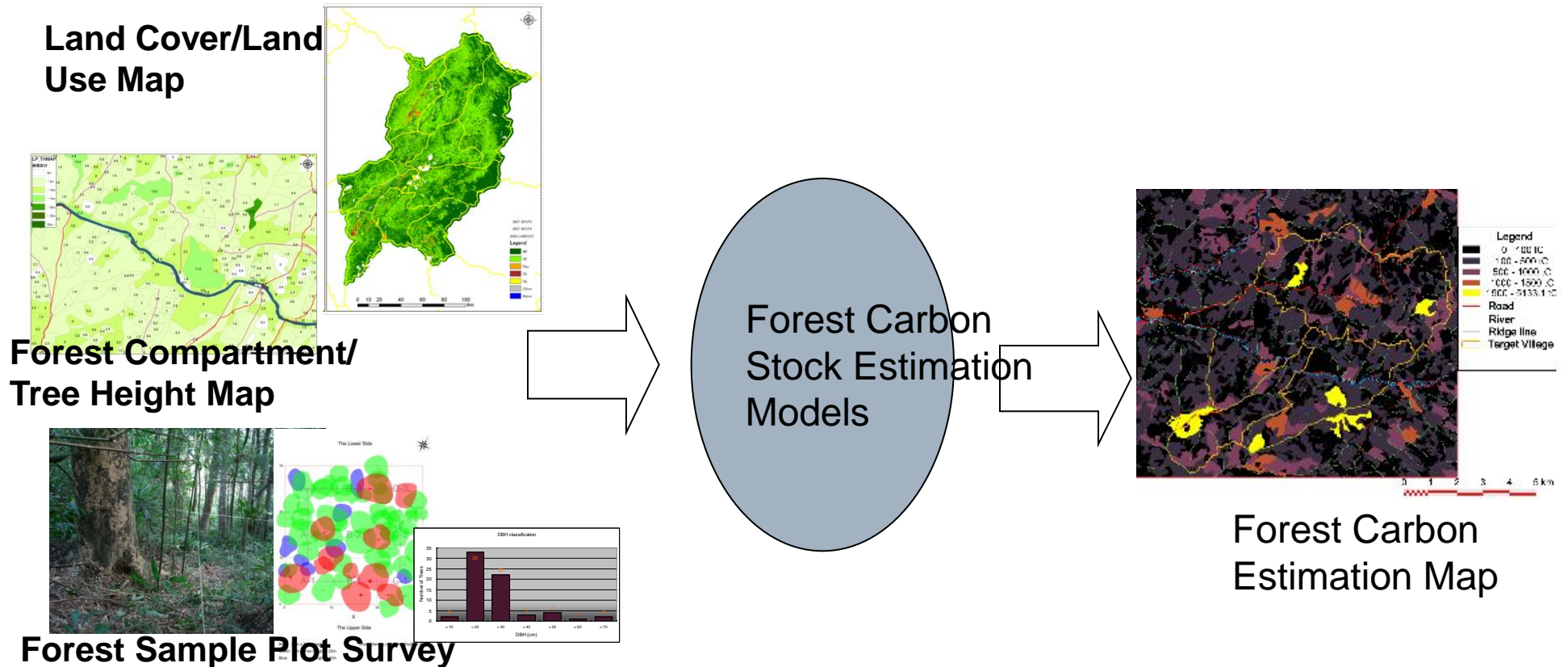
## 2) Evaluation of the Training (GIS Data Mapping)

- More training is needed for stereo vision



# (5) Estimation of Forest Carbon Stock

- On-site training of forest sample plot survey (16 days, 4 persons)





# 3. Summary

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- On-site and off-site capacity building activities have been carried out in various technological disciplines on REDD. Trainees actively participated in the program with enthusiasm.
- While many achievements have been made, progress was constrained by time.
- Therefore, continuous capacity building programs, including establishment of digital image processing/GIS facilities, advanced image and spatial data analyses, and basic model for carbon stock estimation in natural forest, are needed to further strengthen the REDD implementation framework in Lao P.D.R.