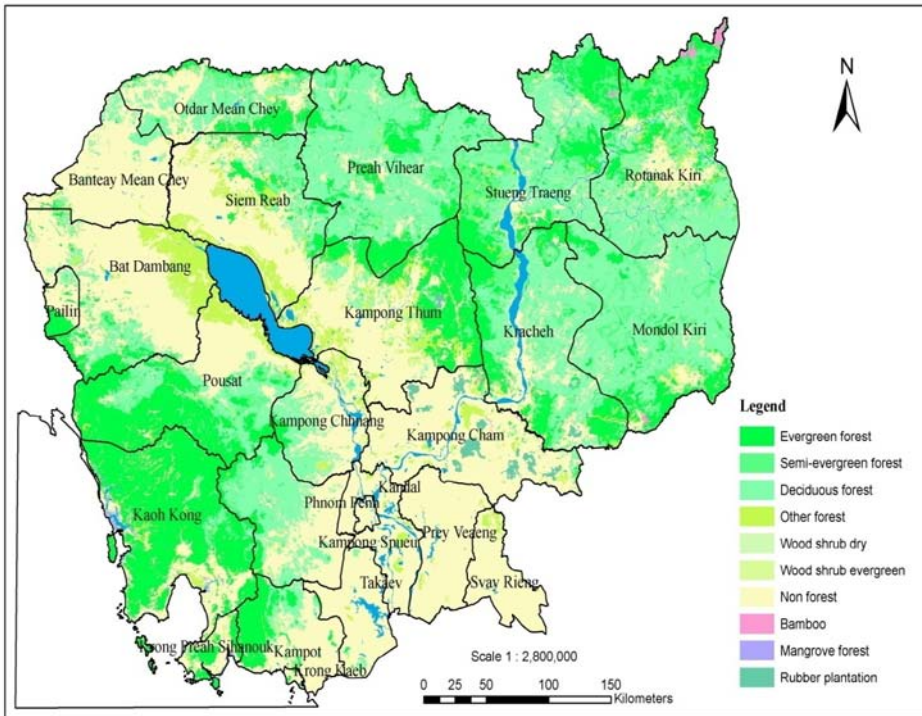
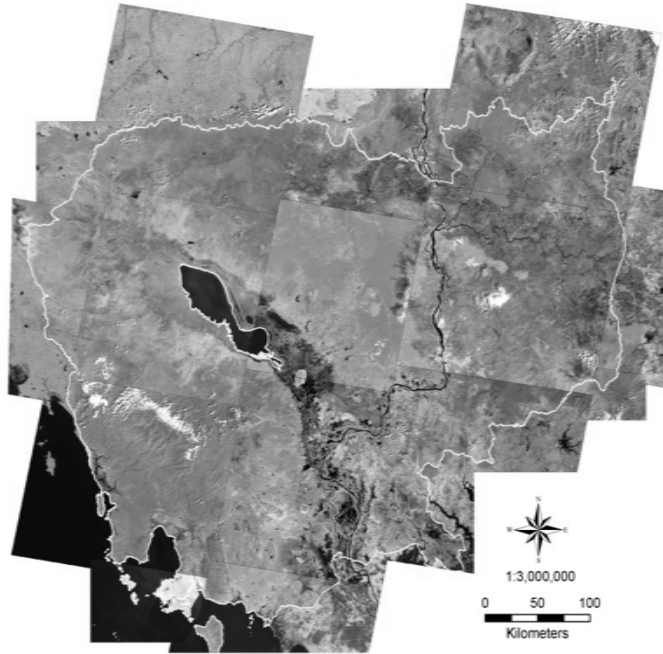


KINGDOM OF CAMBOIA

Forest Cover Monitoring Assessment In Cambodia



Presented by

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Forestry Administration, Cambodia

TWG F&E meeting 31 Mar 2011

Back ground

- ◆ The project was funded by DANIDA/ITTO in collaboration with FA
- ◆ The GIS and Remote Sensing lab of The Forestry Administration have conducted FC 2010 in early of mid July 2010 by selected precisely Landsat TM images.
- ◆ The image processing was done in August to mid November 2010 with 19 landsat scenes coverage entire of the country.
- ◆ In order to Verified the classification result GRAS, University of Copenhagen has been considered to assist accuracy assessment accomplished with FA staff in October and December 2010.

Forest Cover Assessment 2010

The main objective is aims to assess the forest cover in year 2010 and monitor change between 2005/06-2010, 2002 base map- 2010 by following.

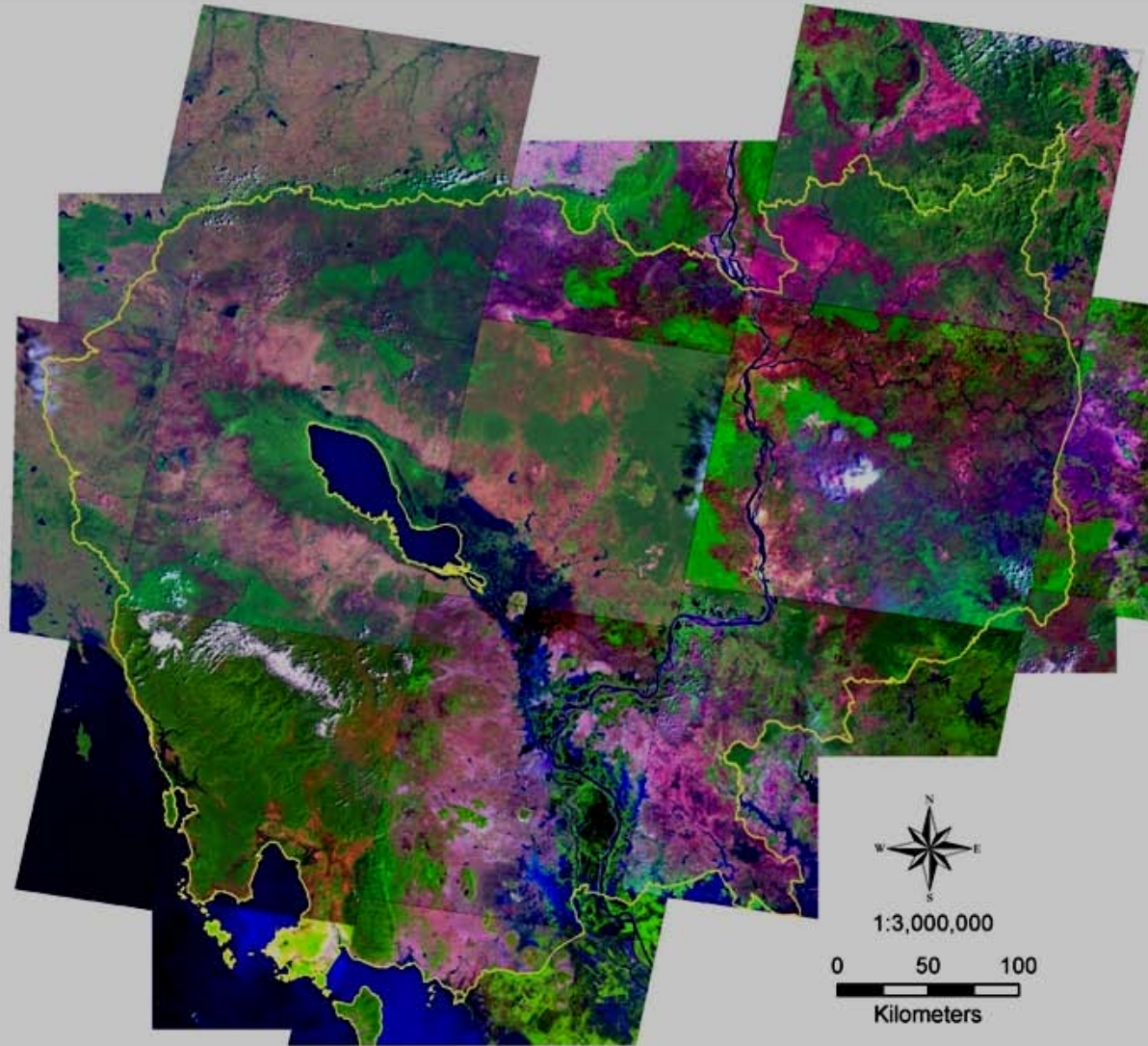
- Classified forest type according to NFP definition
- Mapping FC 2010 in context of REDD+
- Generate FCC between 2005/06-2010, 2002-2010 and mapped

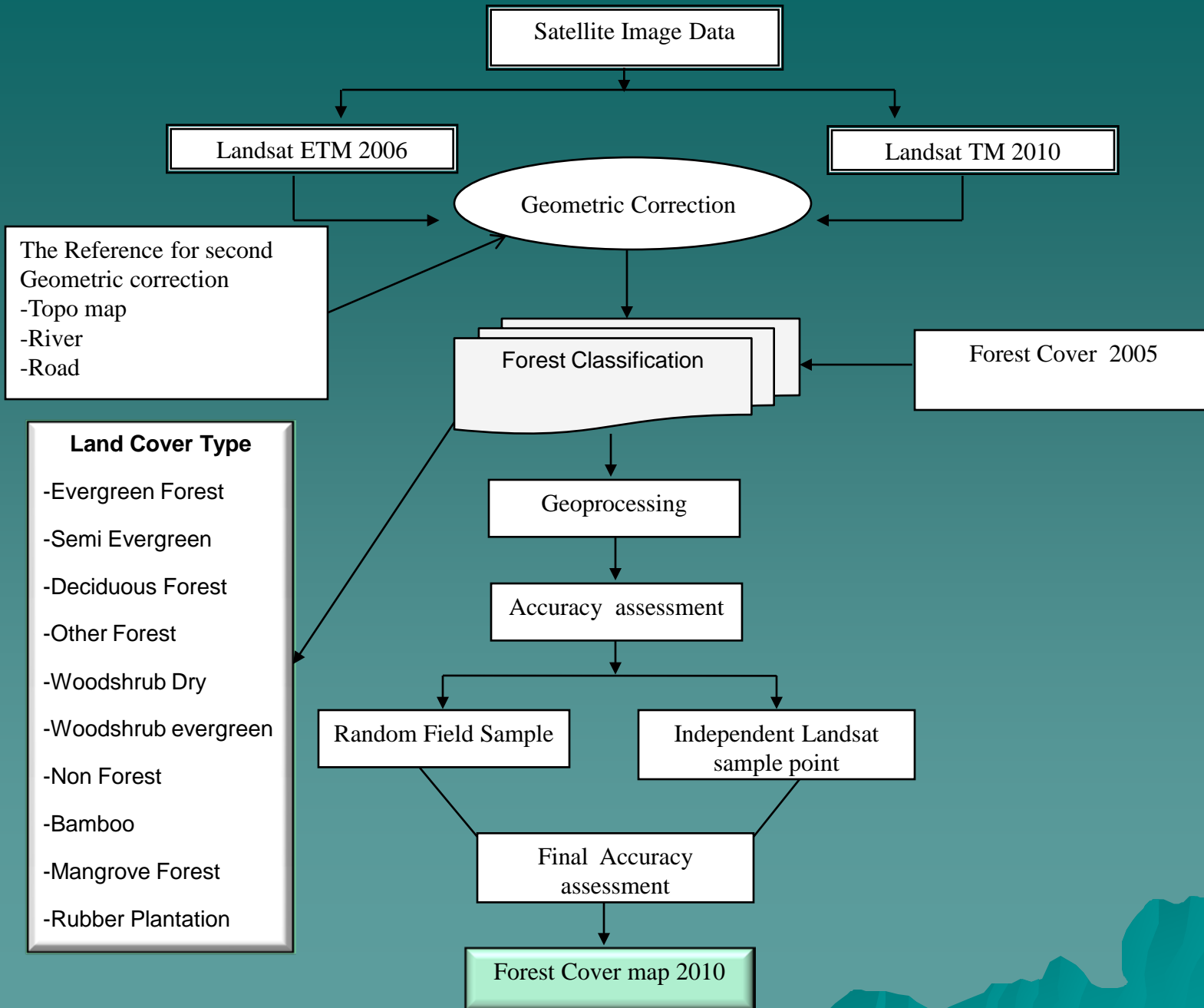
Used Data

Primary Data	Sources	Date Acquired
Landsat TM 19 Scenes	FA	Nov 2009-27 Feb 2010
Road	FA	Generate from landsat scene in October 2009

Secondary Data	Sources	Date Acquired
Administrative	Dep. Of Geographic	
Topographic map	Dep. Of Geographic	Scale 1:50 000
Road	JICA 2000	

LANDSAT SATELLITE IMAGERIES OF 2010





-**Methodology:** Visual analysis digitization on screen using ArcView software, ArcGIS9.3, ERDAS 9.1. Minimum mapping unit 20ha. Satellite Band 4 3 2.

Advantages

- Consistency with 2005 classification
- Provide more advantages to forest demarcation
- Faster than Auto Classification
- Time limitation
- More Accurate

- Forest classification 2002 and 2005 classified in 8 classes.

.Evergreen forest

.Semi-evergreen forest

.Deciduous forest

.Others forest

.Woodshrub dry

.Woodshrub evergreen

.Bamboo

.Non-forest

- 2010 add two more classes on the classification. those are:

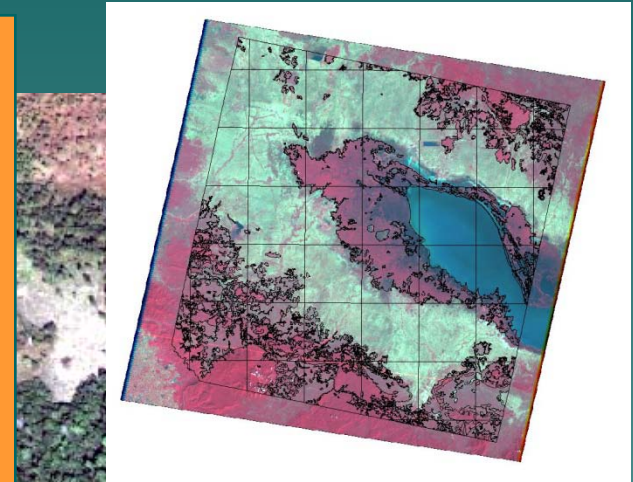
. Mangrove Forest

. Rubber Plantation

Accuracy Assurance

I. Procedure of Accuracy Assessment 2010

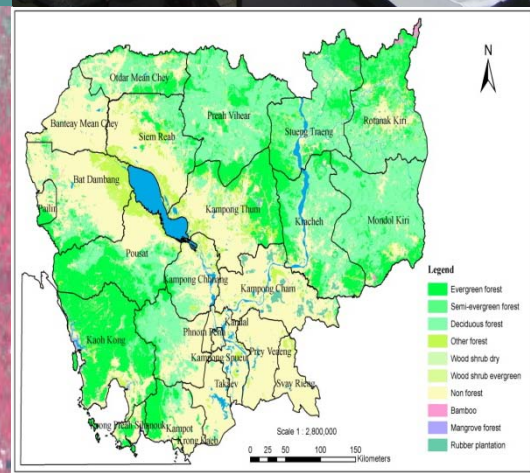
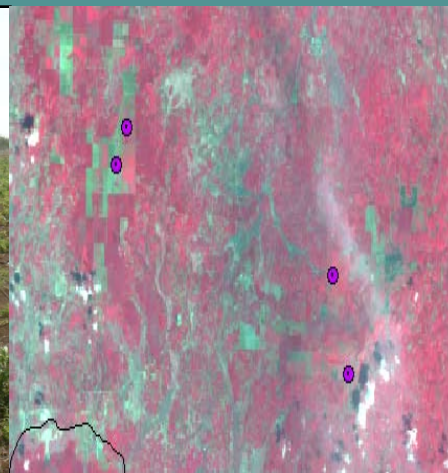
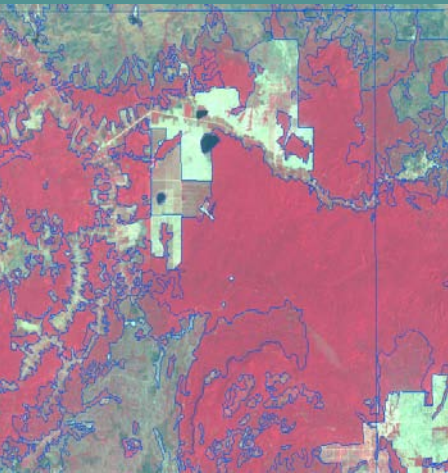
- Send two team to the field with field equipment
- Total of 108 points covers whole of the country
- Timing is one week or ten days according to access road
- Landsat images had been used to verified where point located in very remote area



II. Procedure of Forest cover Accuracy 2010

The accuracy assessment was supported technical and monitor by international expert from GRAS. The sample side on the map for checking the accuracy assessment were generated through the following three fundamental steps:

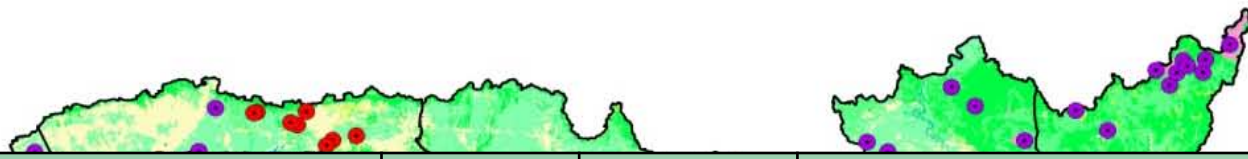
- ◆ Development of a sampling strategy
- ◆ Collecting data for each sample
- ◆ Analyzing the results



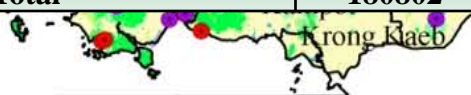
-Ground truthing : 108 points was checked



combined field sample and Landsat image interpretation



Class	Area	Percent (%)	Number of Samples		
			Field	Landsat	Total
Evergreen	34996	19.4	15	45	60
Semi-evergreen	12759	7.1	8	22	30
Deciduous	44837	24.8	17	56	73
Other forest	9250	5.1	11	18	29
Wood and shrub-land dry	352	0.2	7	8	15
Woodand shrub-land evergreen	927	0.5	10	9	19
Non-forest	76117	42.1	10	16	26
Bamboo	350	0.2	11	8	19
Mangrove forest	323	0.2	9	8	17
Rubber plantation	891	0.5	10	9	19
Total	180802	100	108	200	308



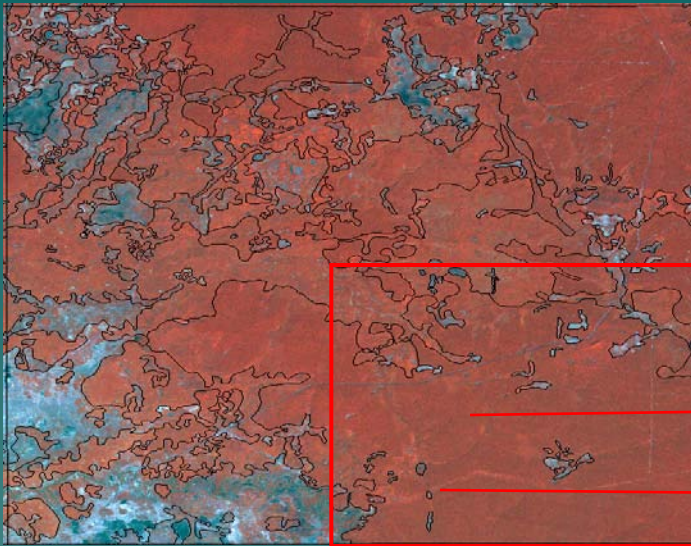
Scale 1 : 2,800,000



- Mangrove forest
- Rubber plantation

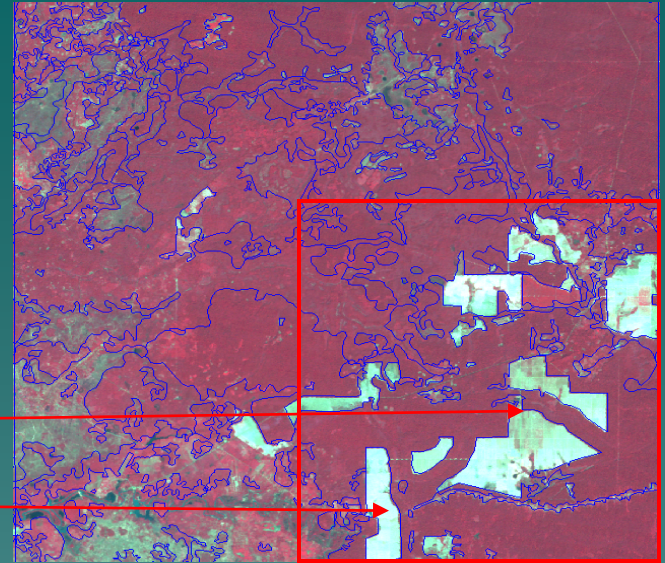
The data quality assessment of the classified land use/cover image for year 2010 by combined field sample and Landsat image interpretation

ID	LU/LC Category	E-F	S-F	D-F	O-F	W-D	W-E	N-F	B-B	M-F	R-P	Total	User Acc.
1	E-F	50	2									52	96%
2	S-F	2	25	2				2				31	81%
3	D-F		5	64			1	1				71	90%
4	O-F	1			26			3				30	87%
5	W-D			4	2	7		1				14	50%
6	W-E			3	1		15					19	79%
7	N-F	3		3	1			26		2		35	74%
8	B-B		1					1	17			19	89%
9	M-F				1			1		13		15	87%
10	R-P				1			2			15	18	83%
Total		56	33	76	32	7	16	37	17	15	15	304	
Prod. Acc.		89%	76%	84%	81%	100%	94%	70%	100%	87%	100%		
Overall accuracy =85%													

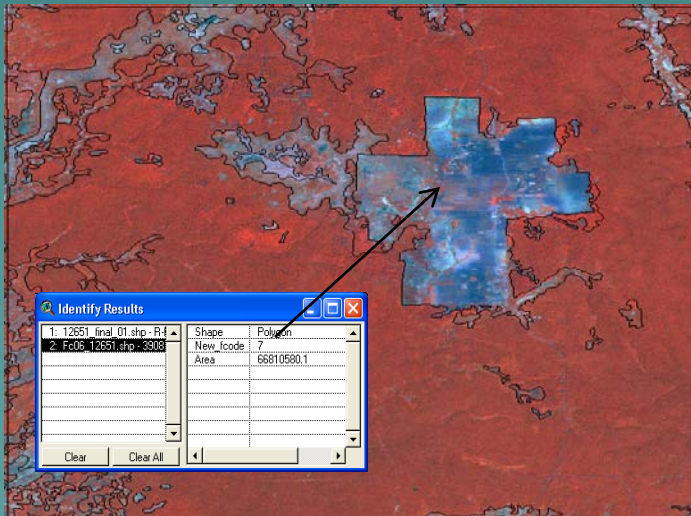


Forest Cover 2005

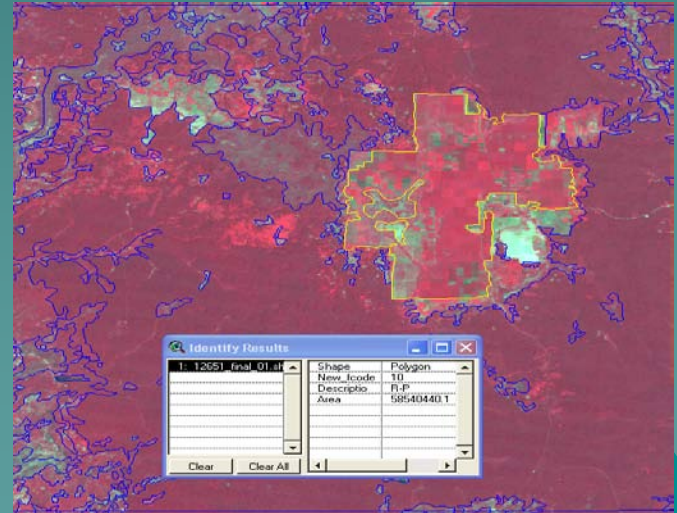
Forest to Non forest



Existing Non forest class in Forest Cover 2010



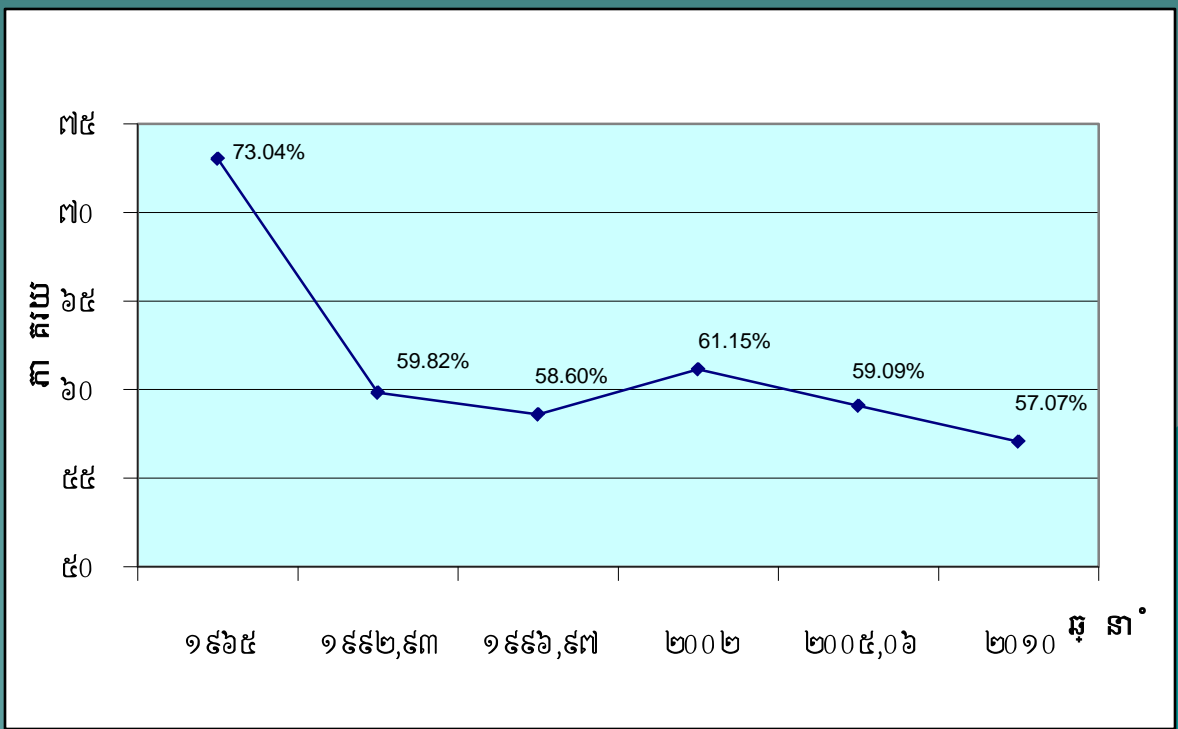
Non Forest Class in Forest Cover 2005



Rubber Plantation Class in Forest Cover 2010

No	Forest Types	Ha	%
1	Evergreen Forest	3,499,185	19.27
2	Semi-Evergreen Forest	1,274,789	7.02
3	Deciduous Forest	4,481,214	24.68
4	Others Forest	1,108,600	6.1
5	Total Forest Areas	10,363,789	57.07
6	Non-Forest Areas	7,796,885	42.93
7	Grand Total	18,160,674	100

FC 2010 Results



Needs

- ◆ In collaboration with ITTO project in order to publishing FCC 2002-2010, 2005/06-2010 booklets
- ◆ Develop FC 2010 Poster for public distribution and extension

Thanks for kind listening

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