FPCD-IGES Community-based Forest Monitoring Project

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Workshop on **Challenges and Opportunities for Papua New Guinea on Climate Change, REDD+, Land Use and Forest Resource Management**

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Sogiri, PNG

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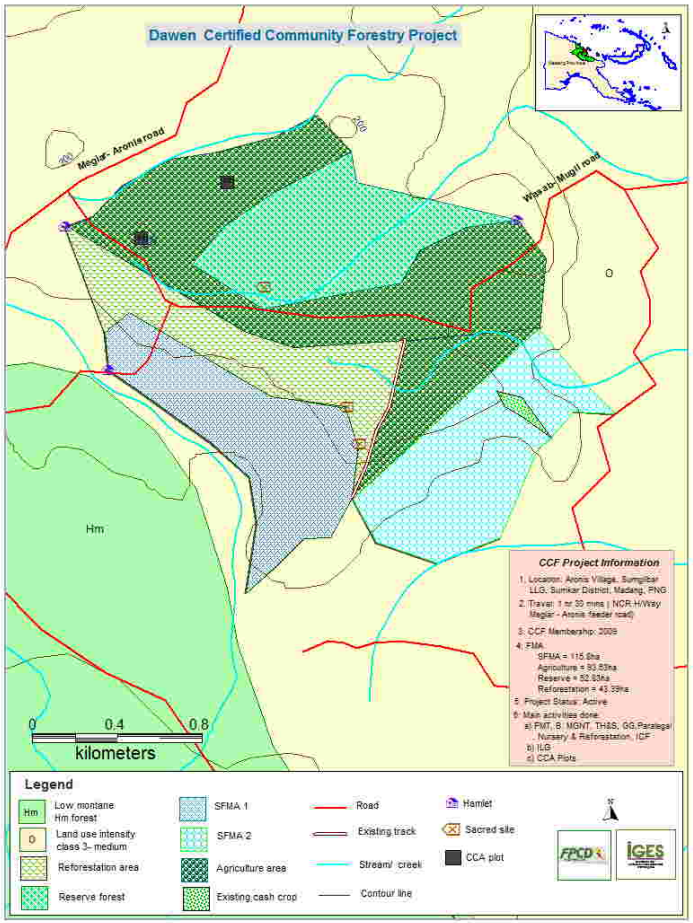
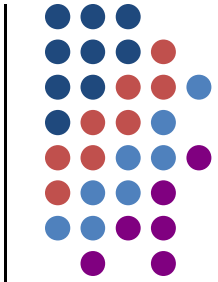
What type of REDD+ model for PNG?

- Should landowners just give permission and receive benefits from REDD+ in their forests, or should they be central actors in REDD+ design and implementation?
- Should REDD+ begin with a request to landowners to commit all their forests to REDD+, or with participatory land use planning that supports a variety of livelihood options?



How to do REDD+



- Estimate existing forest carbon stocks
- Estimate emissions from land uses and study historical emission trends
- Model future emissions from most likely without REDD+ scenario (REL)
- Model future emissions from most likely with REDD+ scenario
- Implement the REDD+ activity and monitor and report on it

What roles should the landowners play in all of this?

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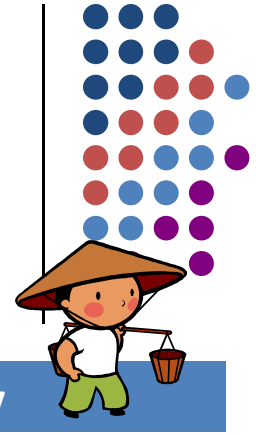
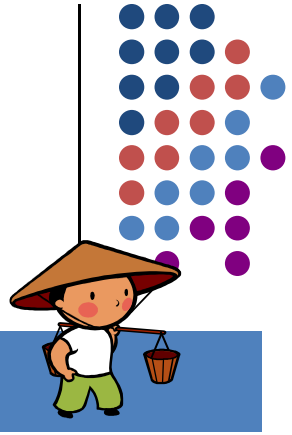
Ground-based measurement - Our approach: Identify roles of outside experts and communities at each stage



Step	Expert	Community
Boundary and strata mapping	Provides GIS expertise, Legal expertise, etc.	Key role in boundary mapping; Trad. knowledge can aid stratification
Forest measurement and recording	Select carbon pools; Develop monitoring system and build community capacity; Guidance of community-based monitoring teams; Key role in measurement of non-wood carbon pools; Studies to improve biomass estimates (e.g. development of allometric equations, diameter-height models, etc.)	Establish plots; Record site conditions; Measure trees; Record data
Data processing	Set up spreadsheets, etc.	Potential for data input

Remote sensing - Our approach: Identify roles of outside experts and communities at each stage



Step	Expert	Community
Selection of satellite data and processing methodology	Done be outside experts	-
Data processing to produce initial land cover map	Done be outside experts	Assists with identifying geographical features on satellite images
Land cover mapping validation	Identify sample points and decide data to be gathered; Provide training and guidance to community forest monitoring teams	Together with outside expert, conducts sampling to validate (assess accuracy) of processed map

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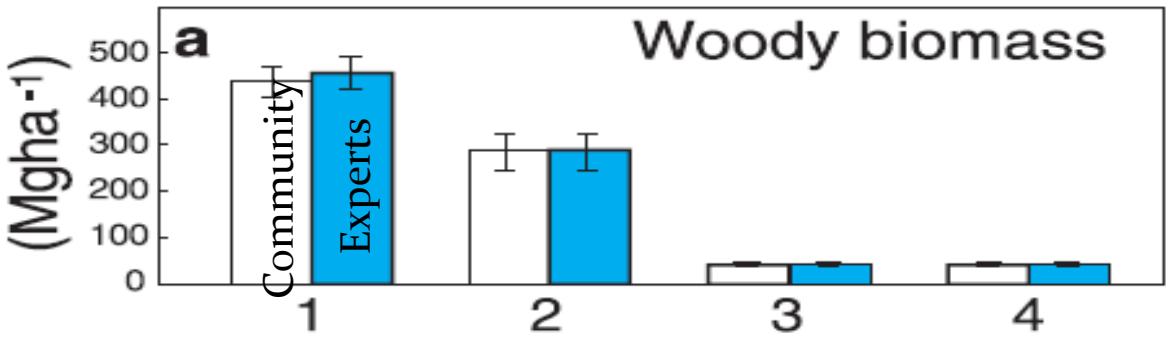
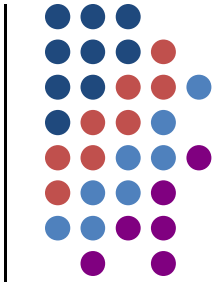
Community measurement is reliable

	Community	Expert
Cambodia **Deciduous forest**	72.2 ± 23 tC/ha	73.8 ± 8.6 tC/ha (Vathana 2010)
Yogyakarta & **Central Java Provinces,** **Indonesia**	34.2 ± 20.6 tC/ha	35.3 ± 21.2 tC/ha - *Lampung province (Roshetko et al. 2002)*



(Danielsen et al. 2011)

IGES-FPCD Community-based Forest Monitoring Project (CFMP) aim



- Develop, test and implement approaches to engage local communities in monitoring their forests, including changes in carbon stocks
- With the communities, use the information generated to:
  - further improve forest management and
  - assess the feasibility of alternative forest management options

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Part of a regional project

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THE CENTER FOR PEOPLE AND FORESTS

dewan kehutanan nasional

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Timeline

REFOFTC-IGES National REDD+ W/S (included training needs assessment) – Cambodia, Vietnam, Indonesia

Action research launched in Cambodia

Action research launched in Laos

Action research launched in Vietnam

Feb-March 2010

July 2010

Nov 2010

March 2011

April - May 2011

Jan 2012

July 2012

Jan 2013

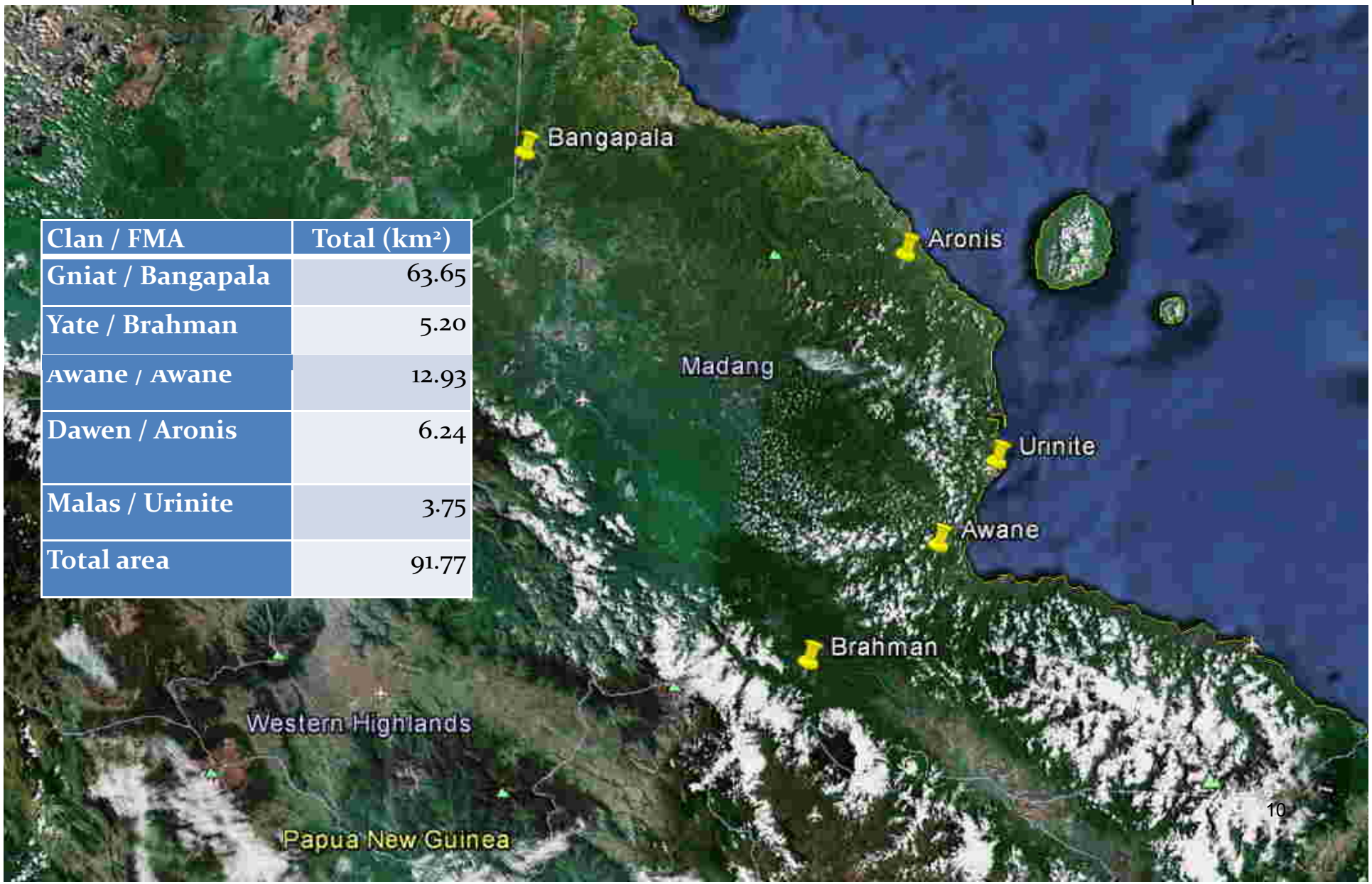
Action research launched in Indonesia and PNG

Yogyakarta Reflection Workshop

Mondol Kiri Reflection Workshop

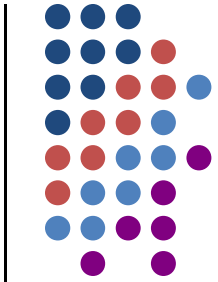
Hayama Reflection Workshop

Project sites in PNG



Clan / FMA	Total (km²)
Gniat / Bangapala	63.65
Yate / Brahman	5.20
Awane / Awane	12.93
Dawen / Aronis	6.24
Malas / Urinite	3.75
Total area	91.77

Activities and progress with communities in Madang Province



	Activity
Forest measurement	Development of community-based forest monitoring (field manual) and community training methods
	Teams in 5 communities trained on forest measurement
	PSPs established and measured in 5 forests
	First round of data processing completed
Mapping	All clan boundaries demarcated using GPS/GIS
	All participatory land use maps created using GIS and being shared with clans
	Assessing costs/benefits of available RS options for land cover (carbon density) mapping

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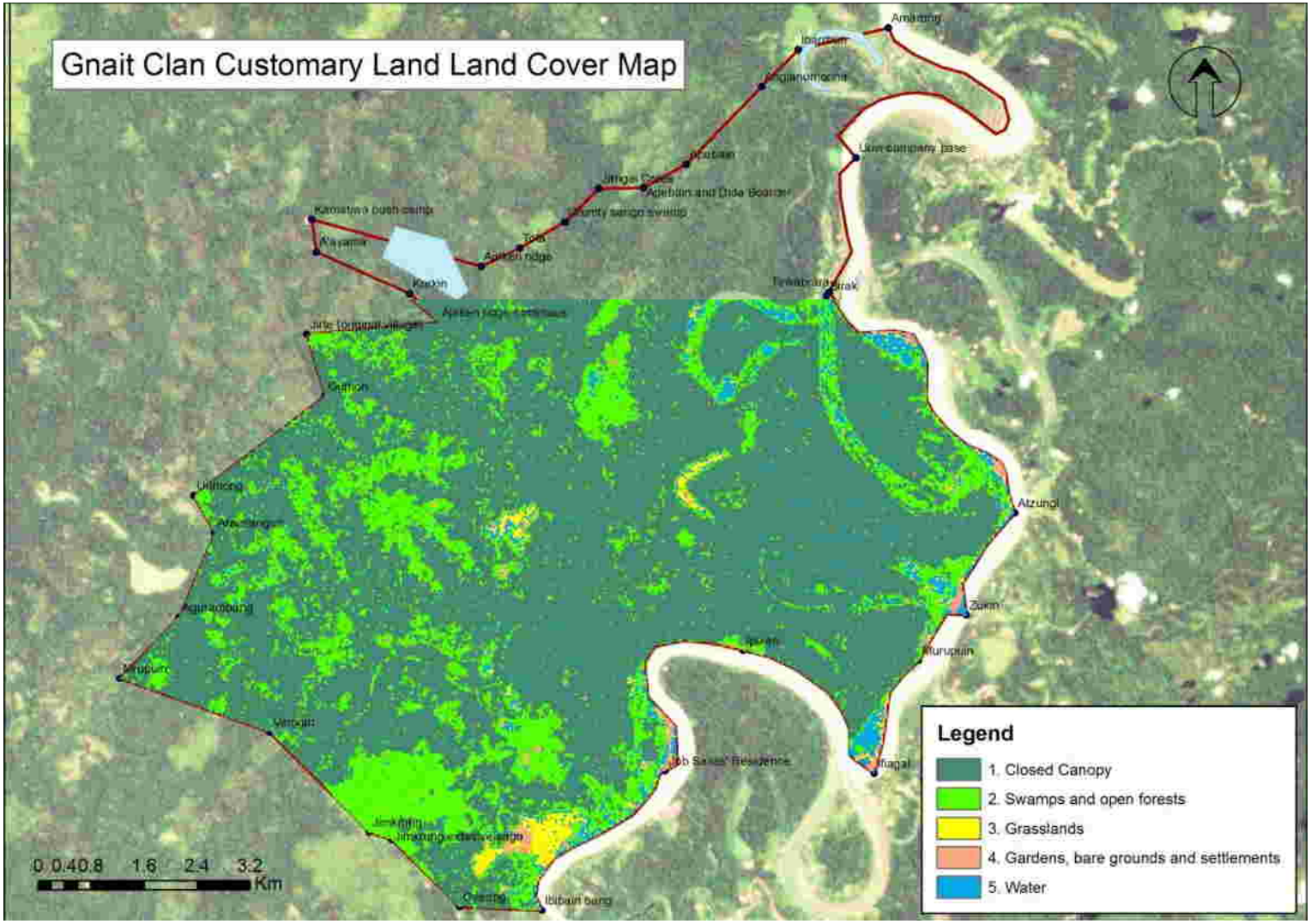
Satellite image options: What is best for community-scale?

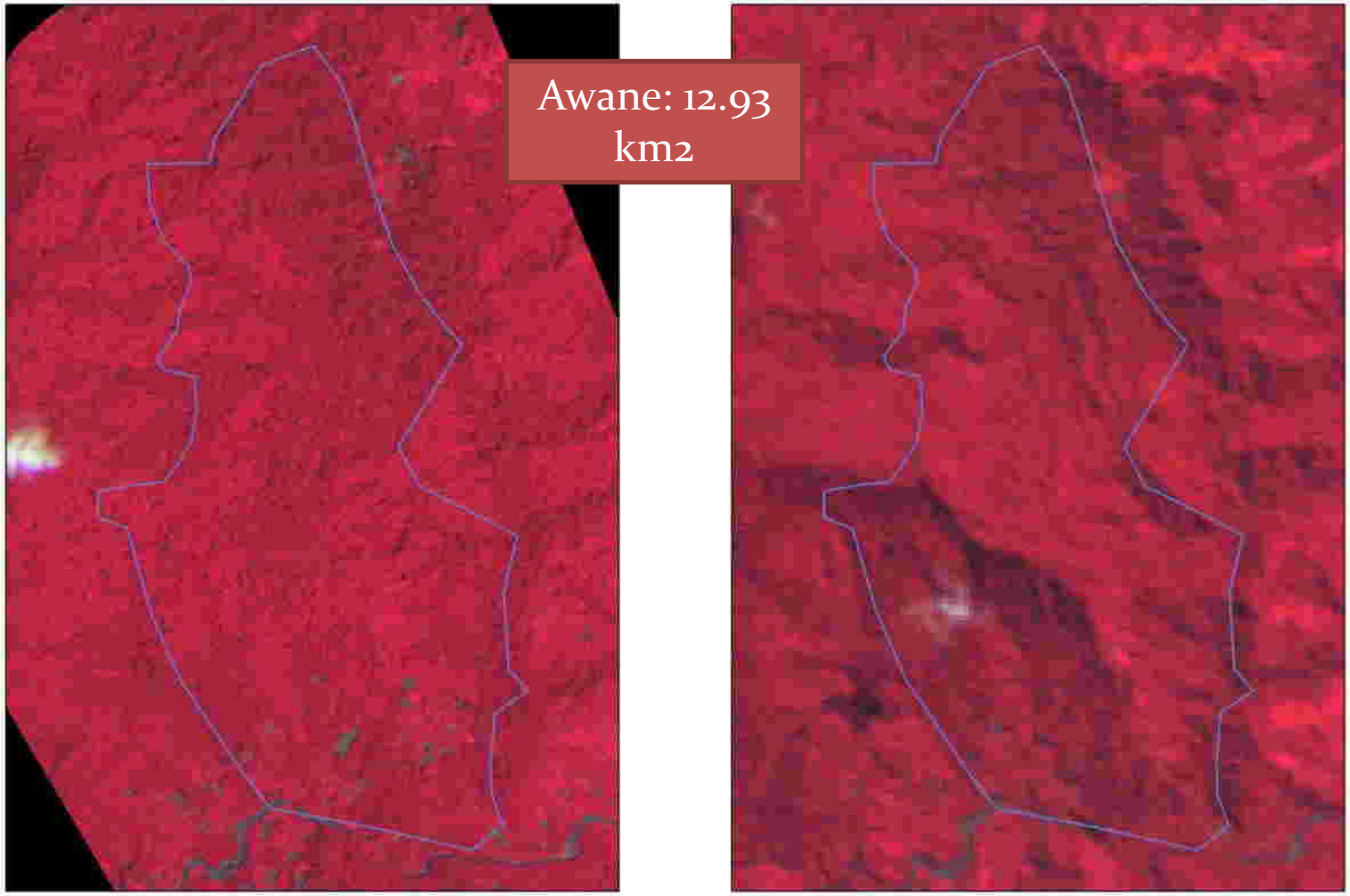
Satellite	Sensor	Type	Res [m]	Launch Date	Distrib	Price
RapidEye	REIS: 5 bands VNIR	MS	6.5	2008	Panaxx GeoServe	144,375 JPY/tile EUR 0.95
Landsat 7	ETM + STC = ON: 7 VNIR + P	MS	15/30/60	1999	USGS	free
Landsat 4-5	TM (Thematic Mapper)	MS	30 / 120	1982, 1984	USGS	free
Terra / EOS AM-1	ASTER : 8 VNIR; 5 TIR;	MS	15 / 30 / 90	1999	ERSDAC / JAPAN (?)	L1A: 20 580 JPY/tile
ALOS	AVNIR-2: 4 VNIR	MS	10	2006	RESTEC	26 250 JPY
ALOS	PRISM: P	MS	2.5	2006	RESTEC	26,250 JPY
SPOT-5	HRG: 4VNIR + P	MS	(2.5) 5 / 10 / 20	2002	GeoServe Astrium	n/a EUR 1200/scene
IKONOS	VNIR, P	MS	1 / 4	1999	GeoServe	USD 10; S: USD 35
EROS-A	PAN	PAN	1.8	2000	GeoServe	EUR 300 / 600
QuickBird	VNIR, P	MS	P: 0.6m M: 2.5m	2001	GeoServe	VNIR: USD 14; VNIR-P: USD 17; S-PAN: USD 28; S-MS: USD 32
GeoEye 1	VNIR, P, Stereo	MS	0.5 / 2	2008	GeoServe	USD 12.5
WorldView 1, 2	P, Stereo-P; VNIR, P	MS	0.5 / 2	2007; 2009	GeoServe	P:USD14; S-P: USD28; WV2: VNIR: USD 14; VNIR-P: USD 17; 8-Band: USD 32
EO-1	Hyperion:220 Spectral Bands	HS	30	2000	USGS	0.4 – 2.5 µm : free; (out: 2011)
ALOS	PALSAR: L-Band 23.6 cm	R	10 ~ 100	2006	RESTEC GeoServe	26,250 JPY n/a
RADARSAT-1	C-Band 5.6 cm	R	8	1995	GeoServe	n/a
JERS-1	L-Band 23.5 cm	R	18	1992	GeoServe	n/a

Freely available Landsat might be sufficient for larger land parcels

Bangapala: 63.65 km2



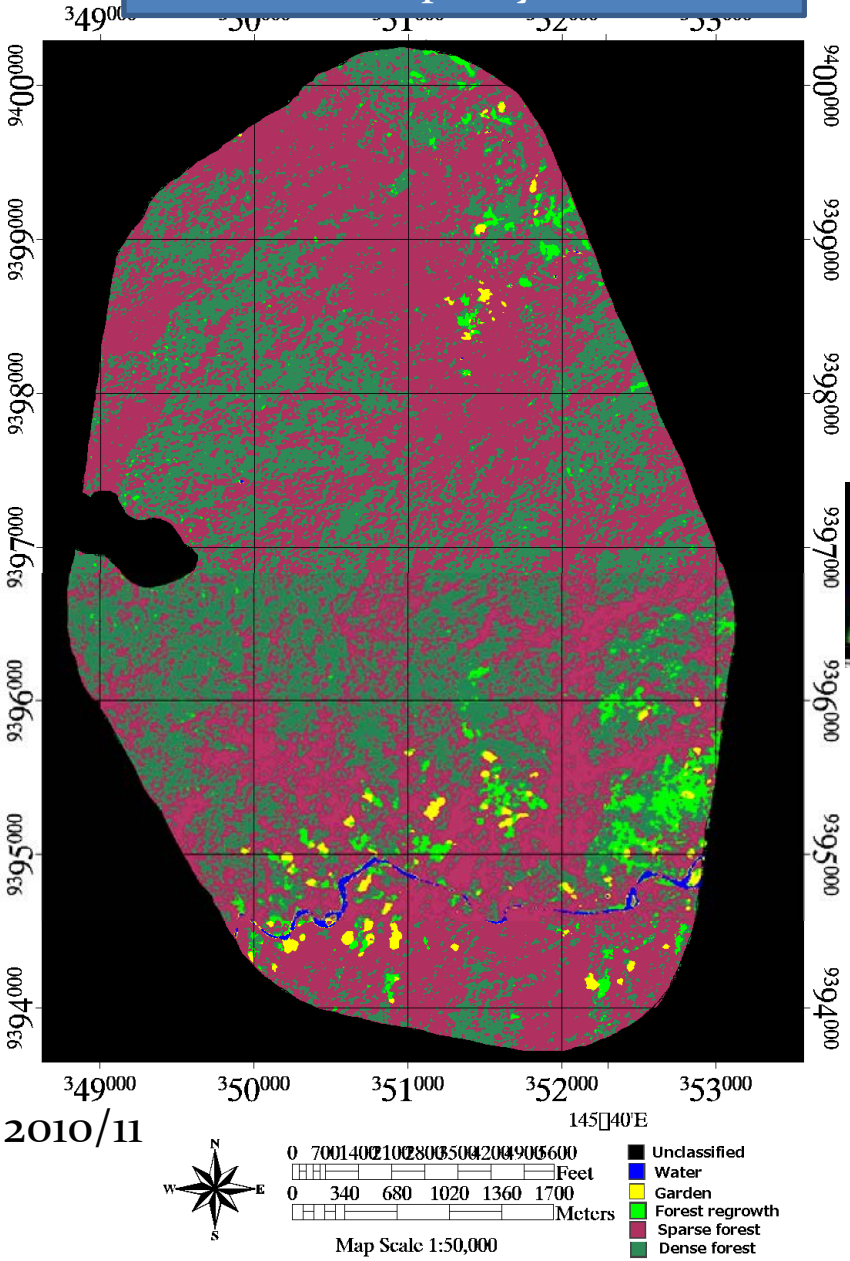
Landsat is not suitable for small land parcels



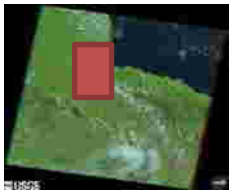
RapidEye False Colour Composite

Landsat False Colour Composite

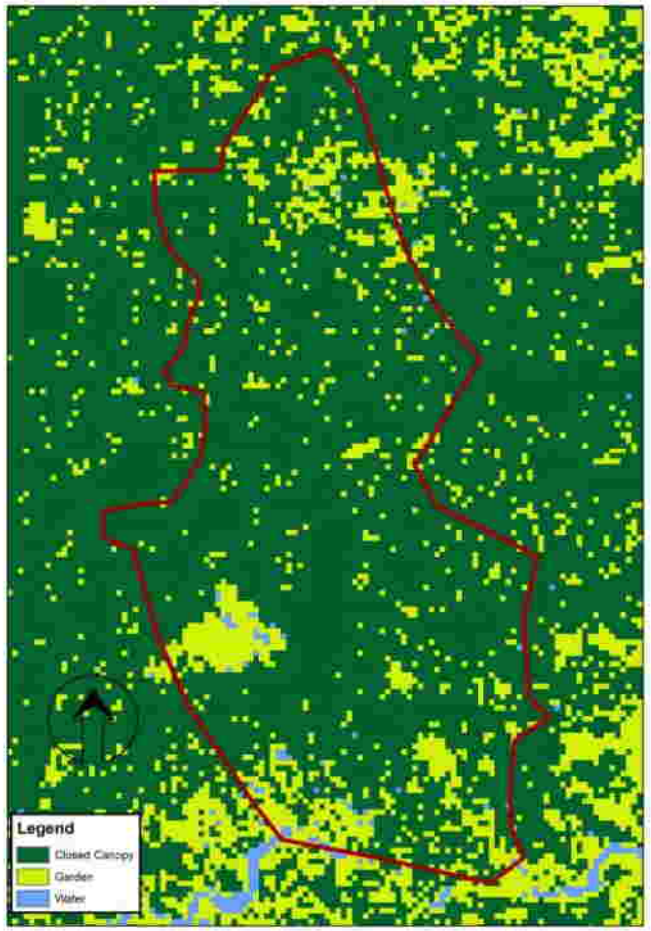
Initial land cover map using RapidEye



2010/11



Initial land cover map using Landsat



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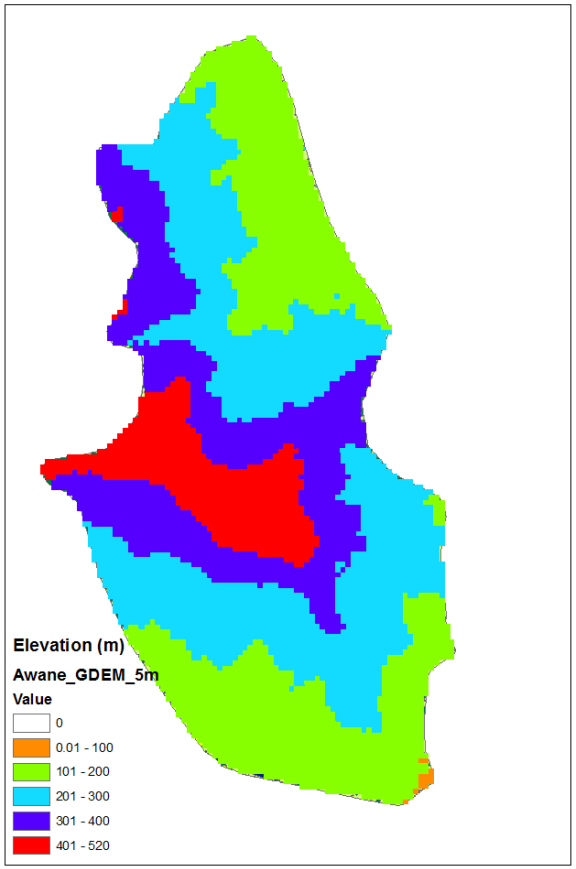
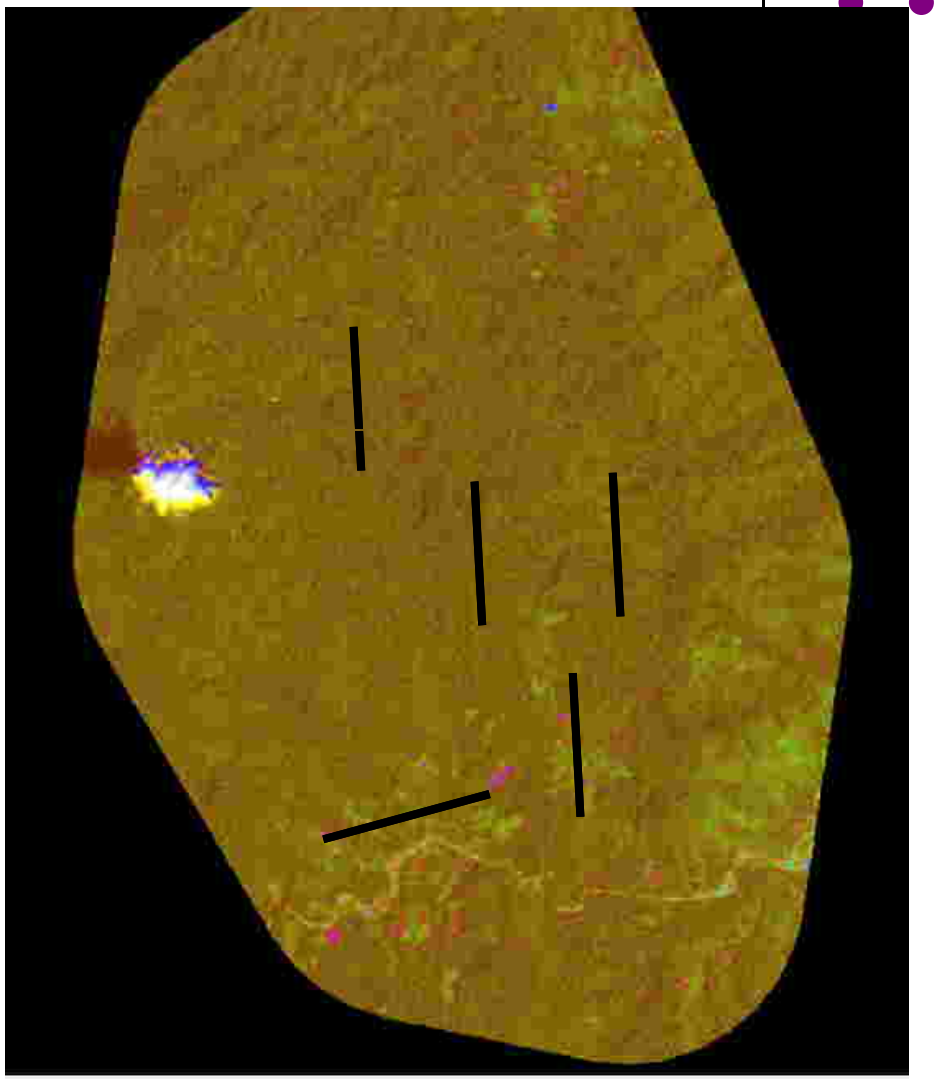
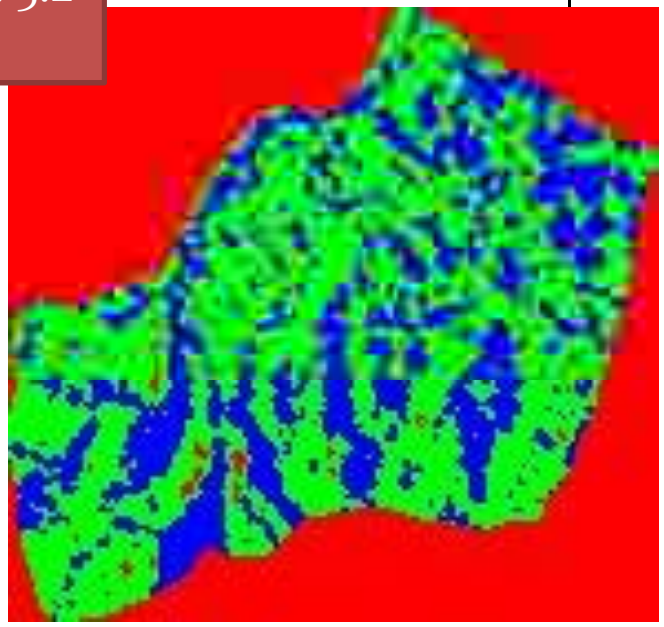
Classification accuracy





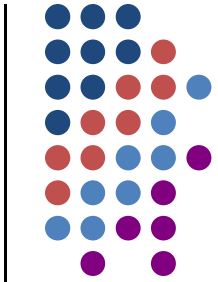
Brahman Land Cover Mapping: PALSAR

Brahman: 5.2 km2



- Small area -> Insufficient resolution
- Differences in elevations caused distortions

Concluding thought



- Always important to consider how to make every activity associated with REDD+ fully relevant to local communities
  - E.g. When doing the measurement, the older men can pass on their knowledge on species identification to the younger men/boys

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Thank you for your attention

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