

A landscape mosaics approach for characterizing shifting cultivation from a REDD+ perspective

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Cornelia Hett, Andreas Heinimann, Kaspar Hurni

Swiss National Centre of Competence in Research (NCCR)
North-South and Center for Development and
Environment (CDE) University of Bern



Shifting cultivation landscapes

- 29% of the area of Laos
- 17% of the population *

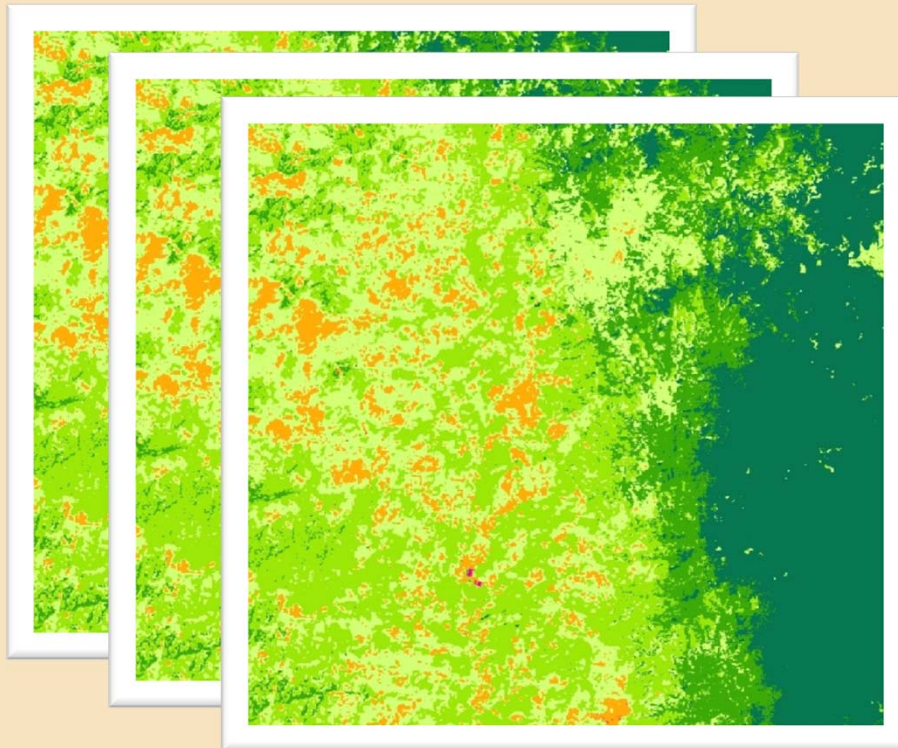
REDD+
reducing **e**missions from
deforestation and **d**egradation +
enhancing forest carbon stocks

* Messerli et al. 2009, Hum Ecol

Assessing deforestation and degradation for REDD+

GOFC-GOLD REDD Sourcebook

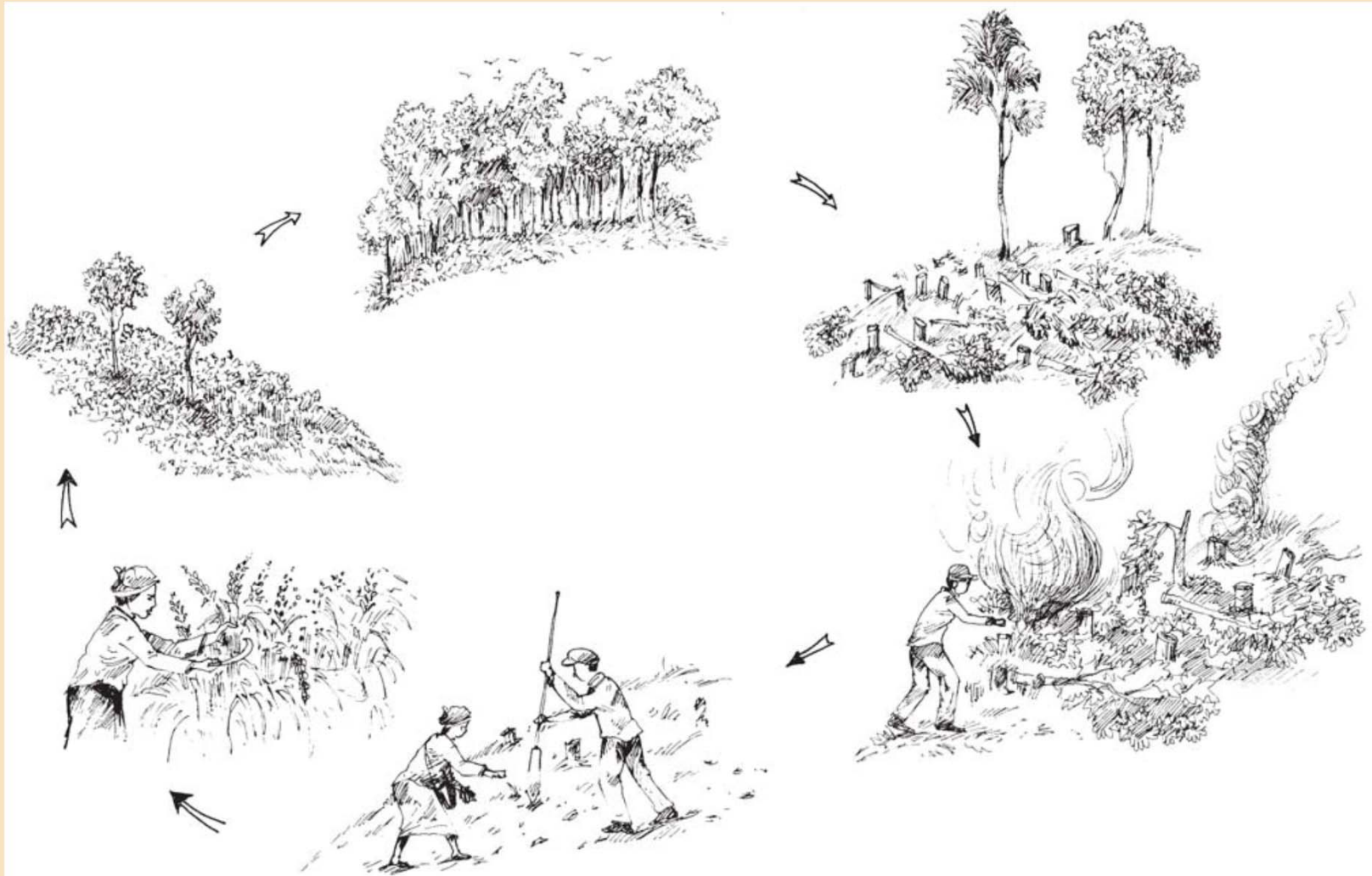
- Landsat-type imagery
- Years 1990, 2000, 2005



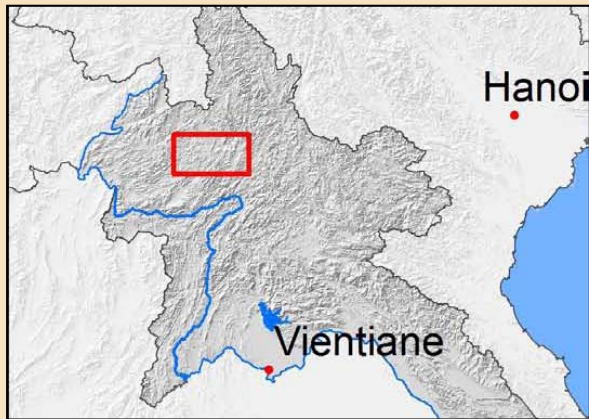
Land cover 2009



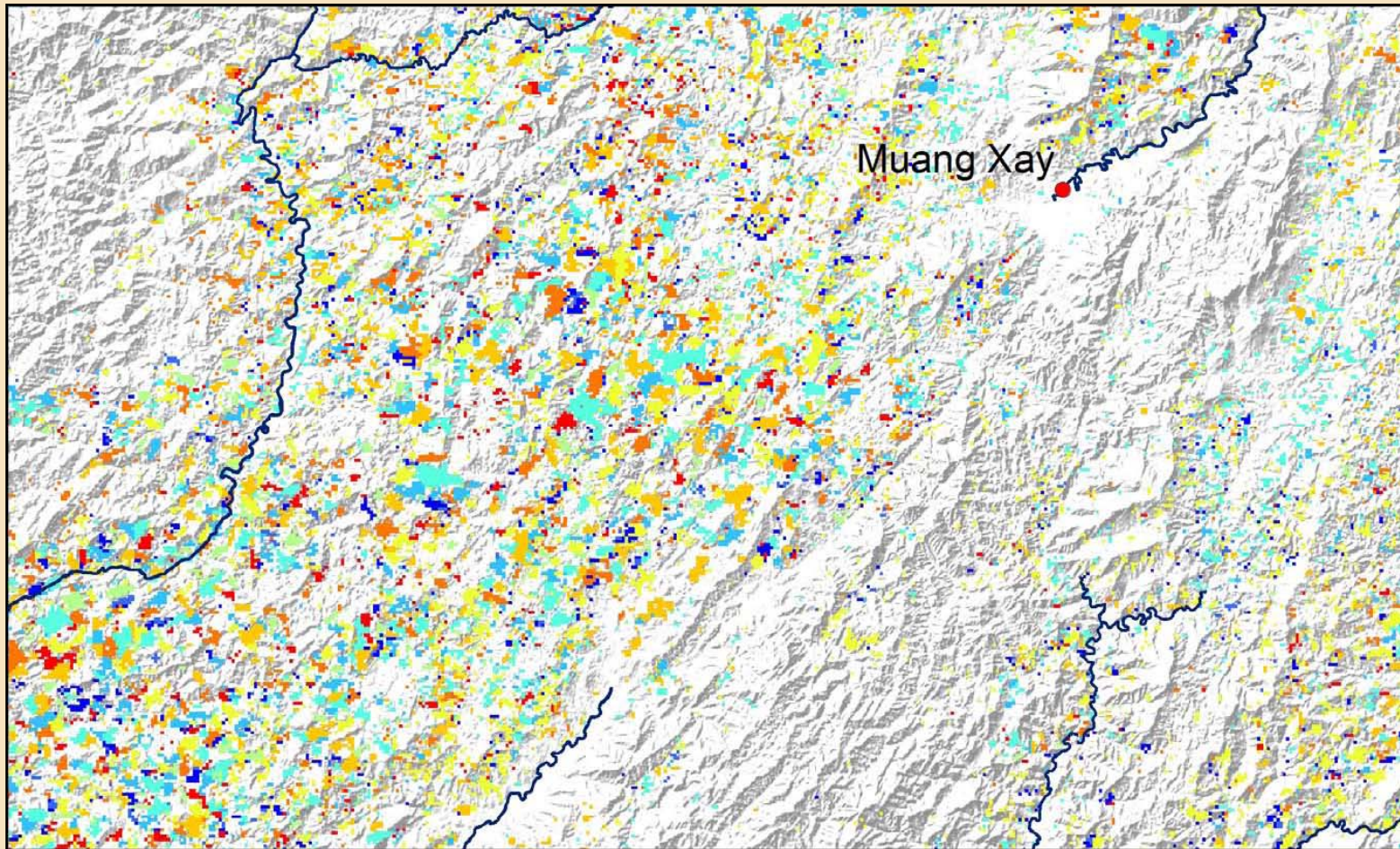
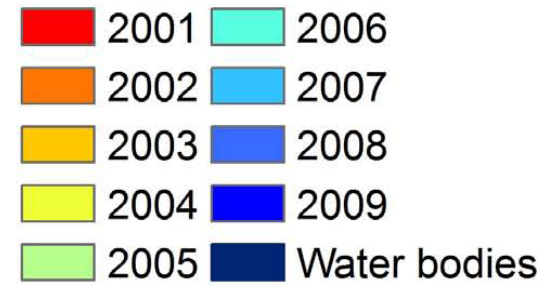
Shifting cultivation: temporal pattern



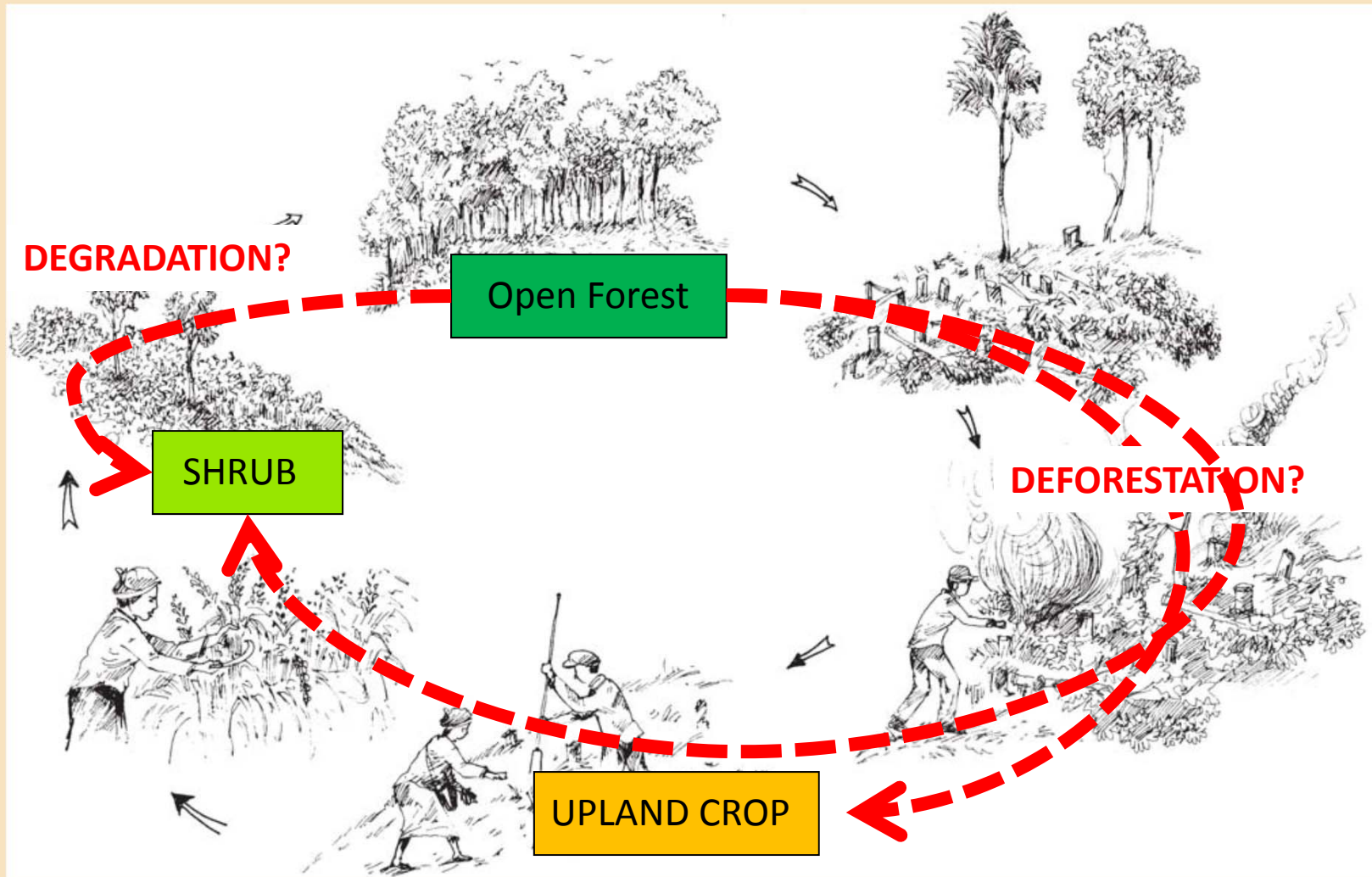
NAFRI. (2006). Improving Livelihoods in the Uplands of the Lao PDR. National Agriculture and Forestry Research Institute (NAFRI), Laos.



Year of clearance of shifting cultivation areas

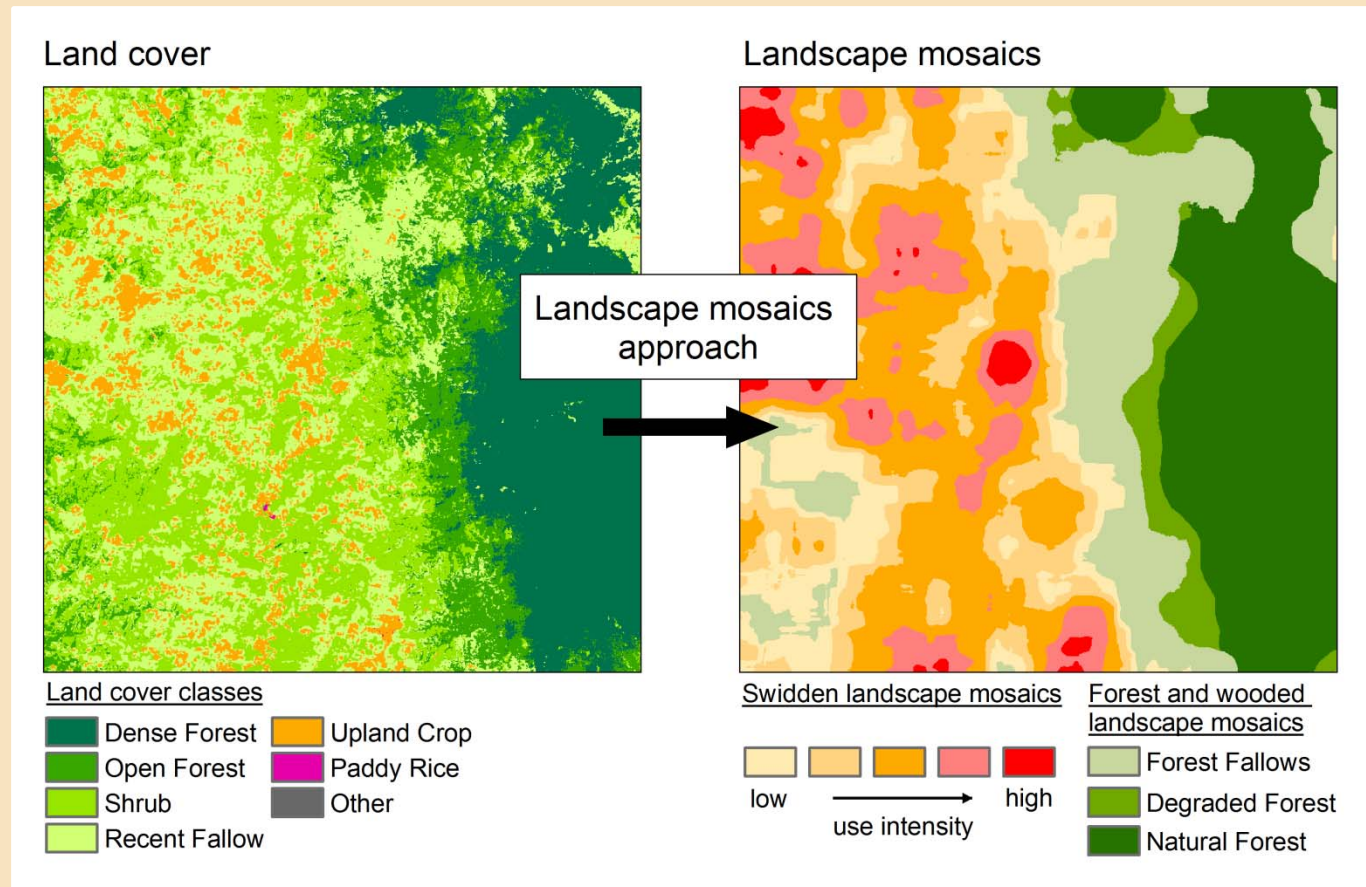


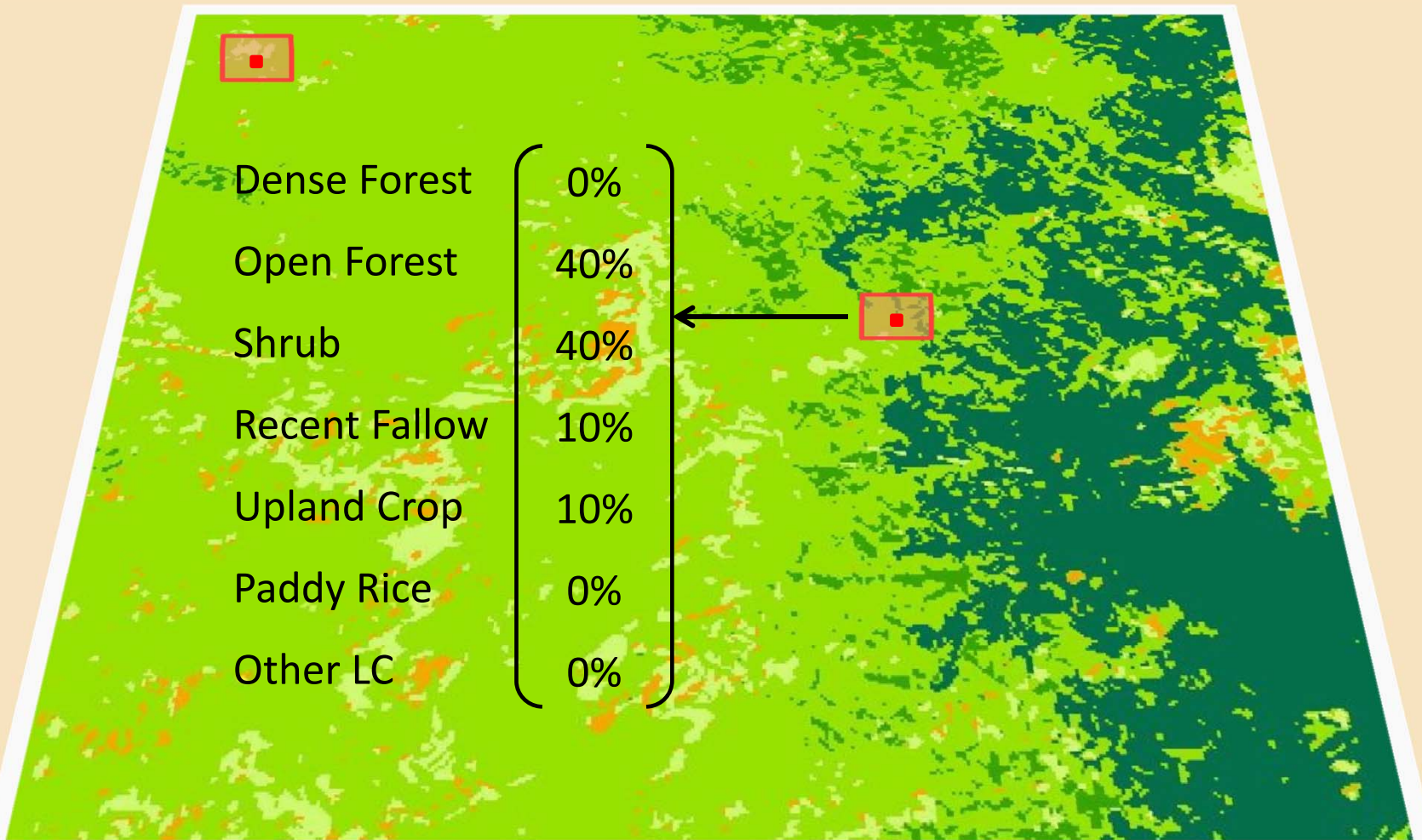
Monitoring LC change: Challenge for swidden systems



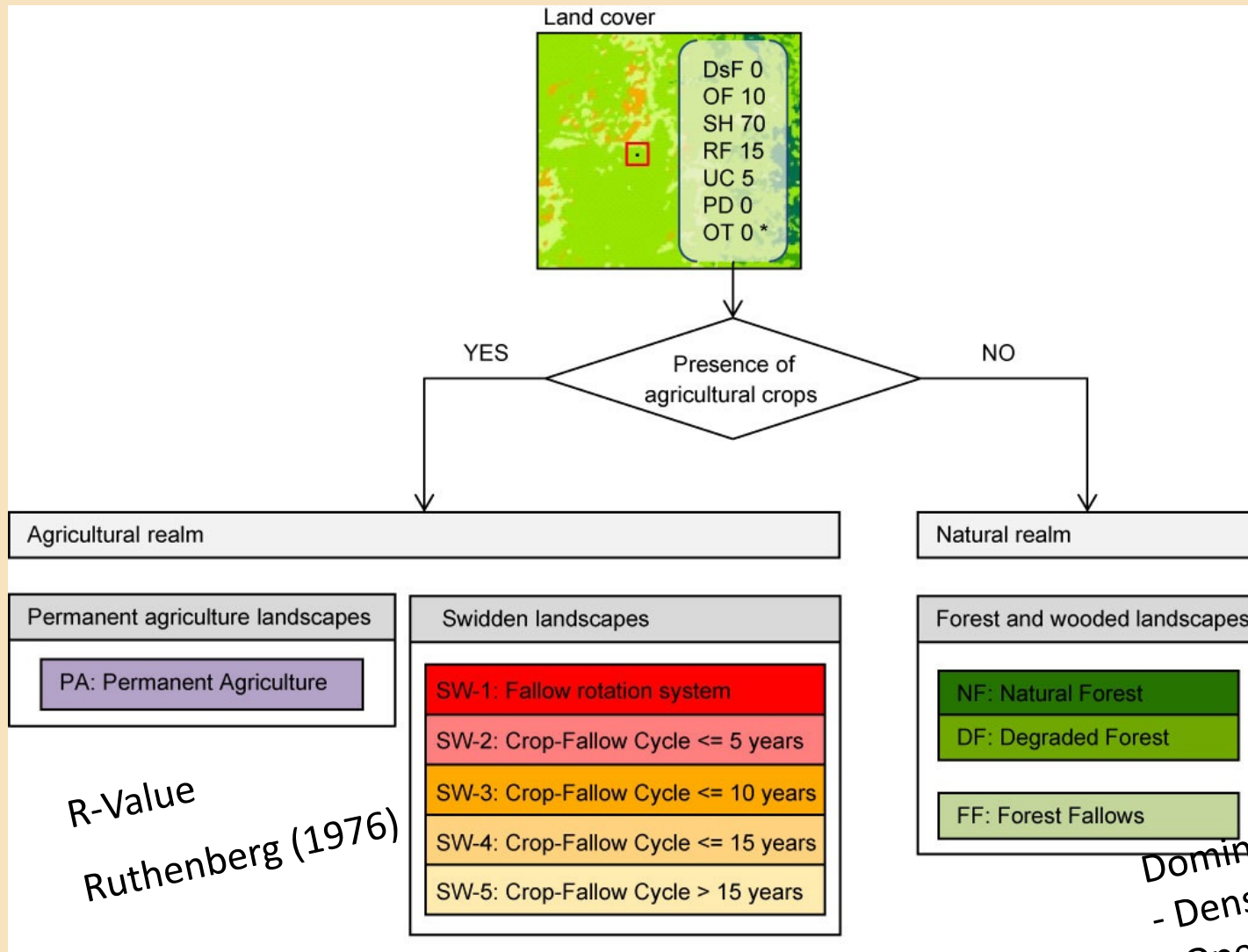
New approach to LU and LU change for shifting cultivation areas

Step 1: Delineate swidden areas and their different use intensities using landscape mosaics





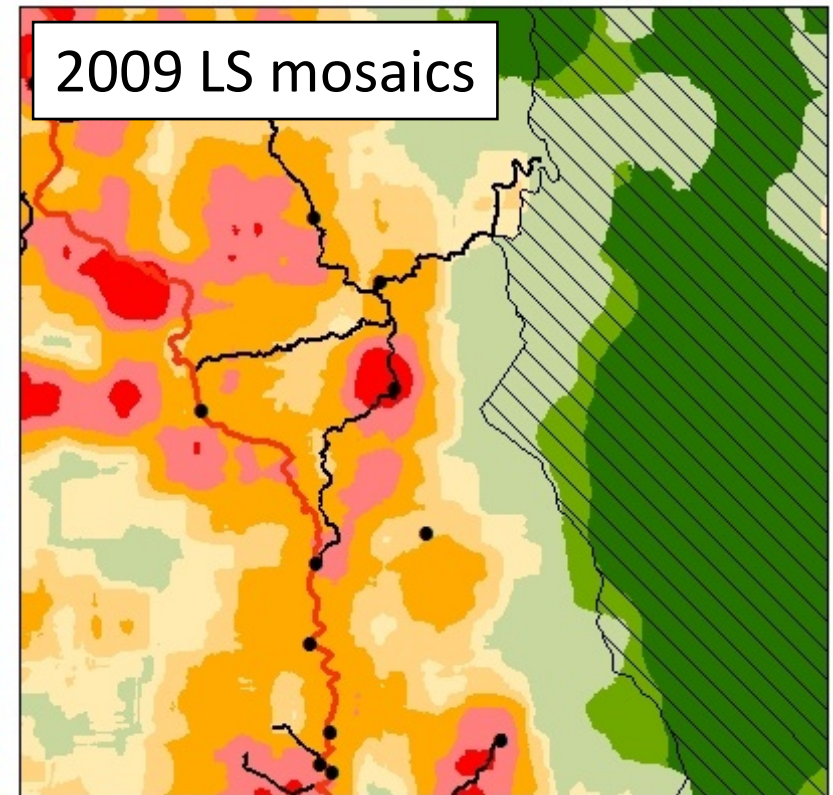
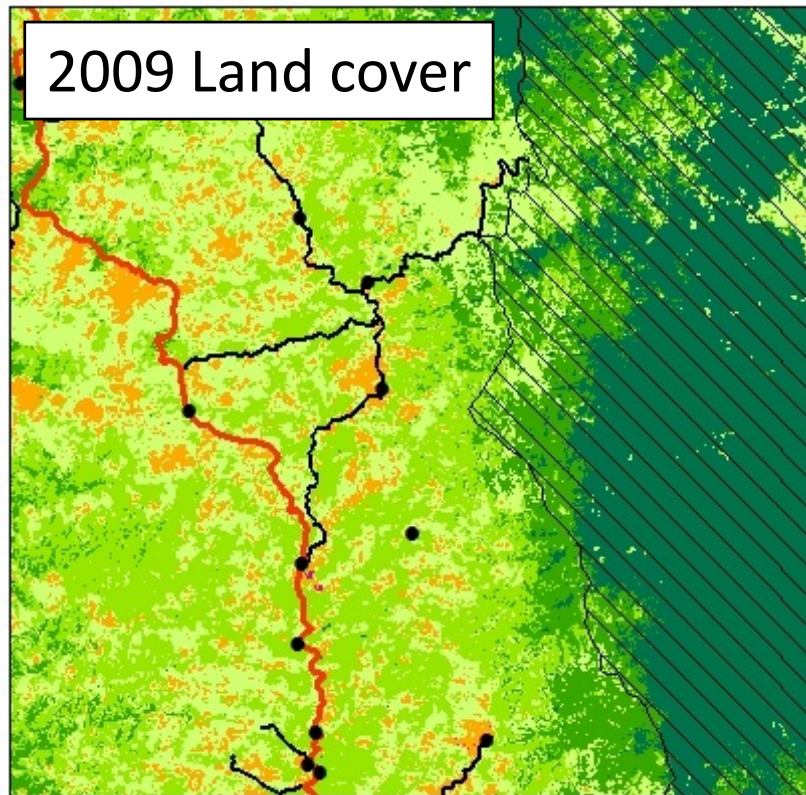
Definition of landscape mosaics



R-Value
Ruthenberg (1976)

Dominance
- Dense Forest
- Open Forest
- Shrub

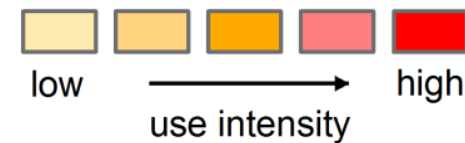
From land cover to landscape mosaics



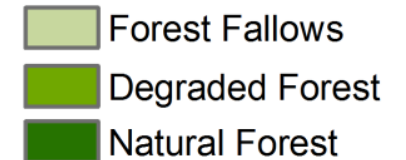
Land cover classes



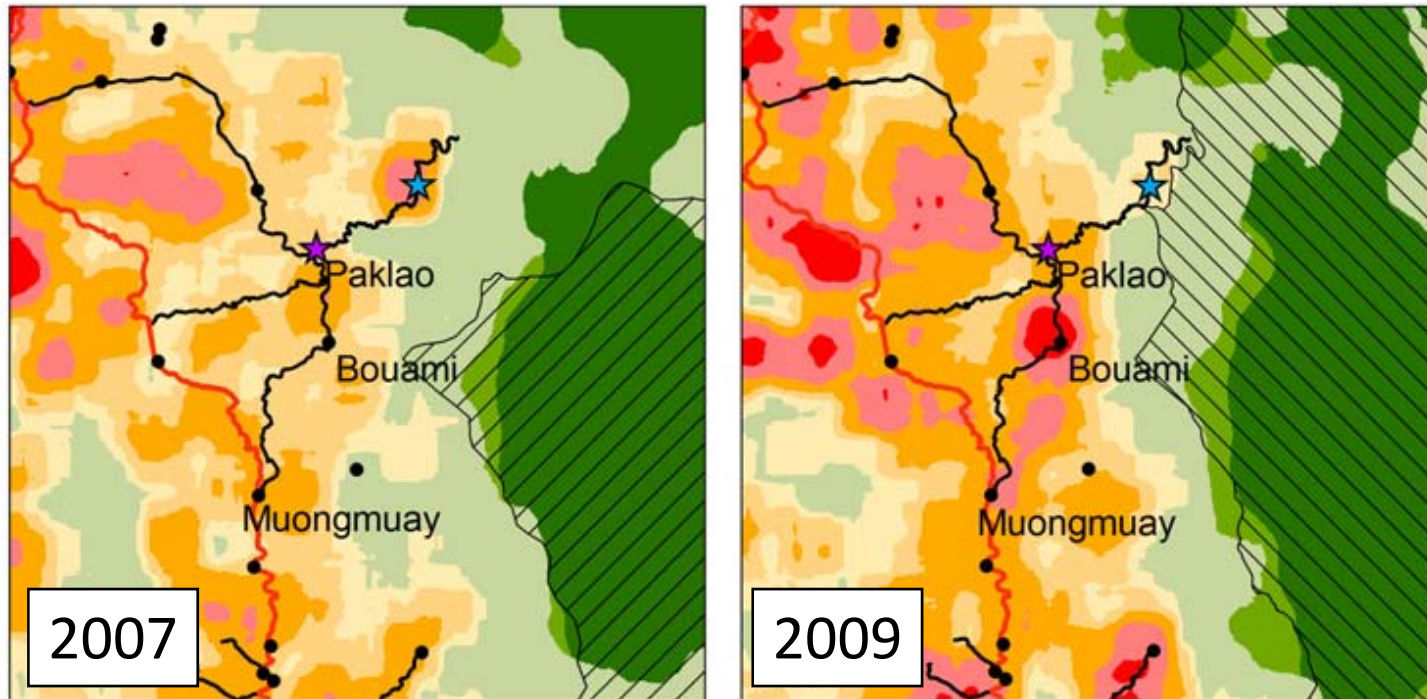
Swidden landscape mosaics



Forest and wooded landscape mosaics





Example landscape mosaics changes



Legend

Landscape mosaics

- | | |
|--|--|
|  Natural Forest (NF) |  SW-1 |
|  Degraded Forest (DF) |  SW-2 |
|  Forest Fallows (FF) |  SW-3 |
| |  SW-4 |
| |  SW-5 |

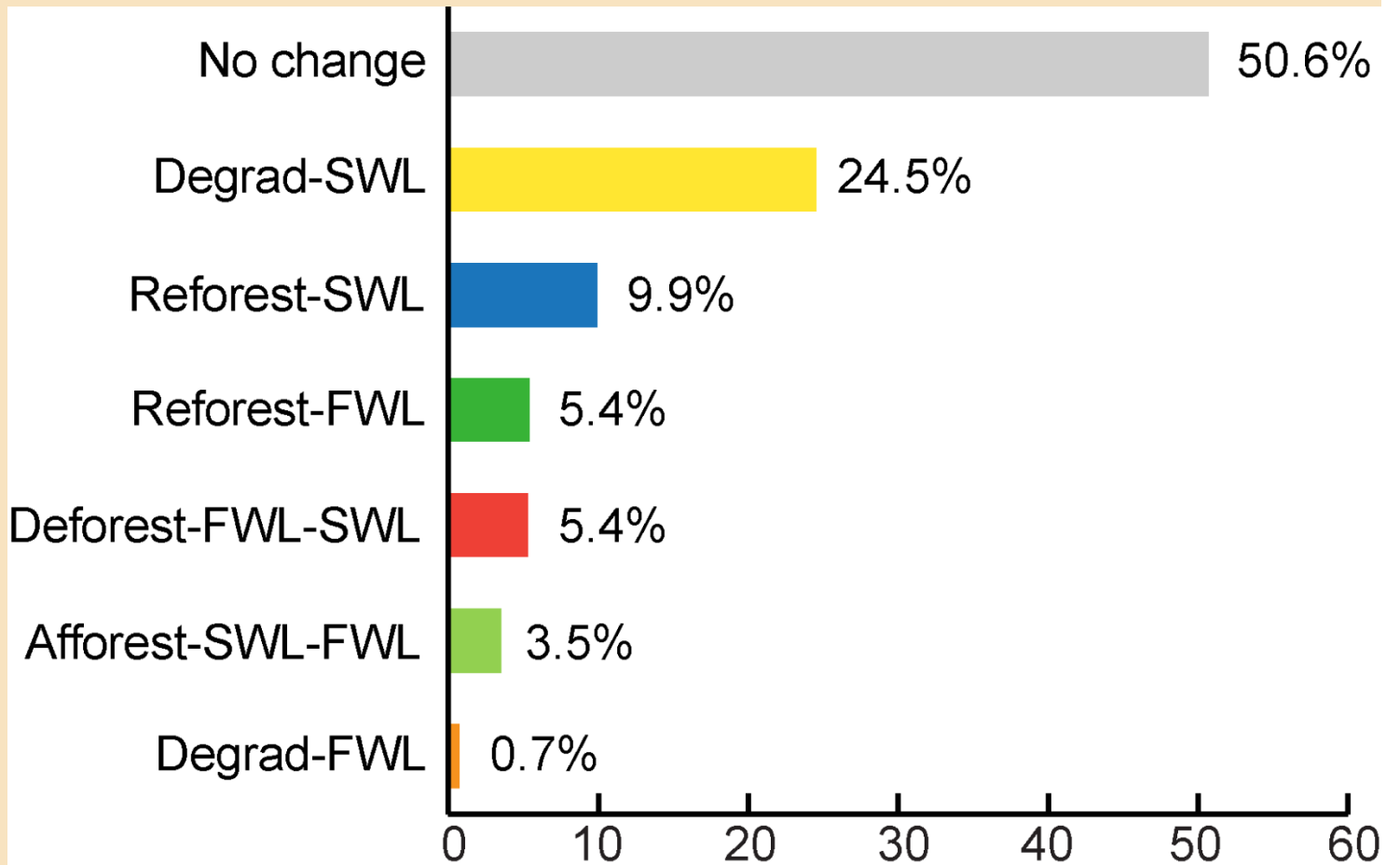
- | |
|---|
|  Main road |
|  Secondary roads |

New approach to LU and LU change for shifting cultivation areas






Step 2: Identifying landscape changes with the landscape mosaics

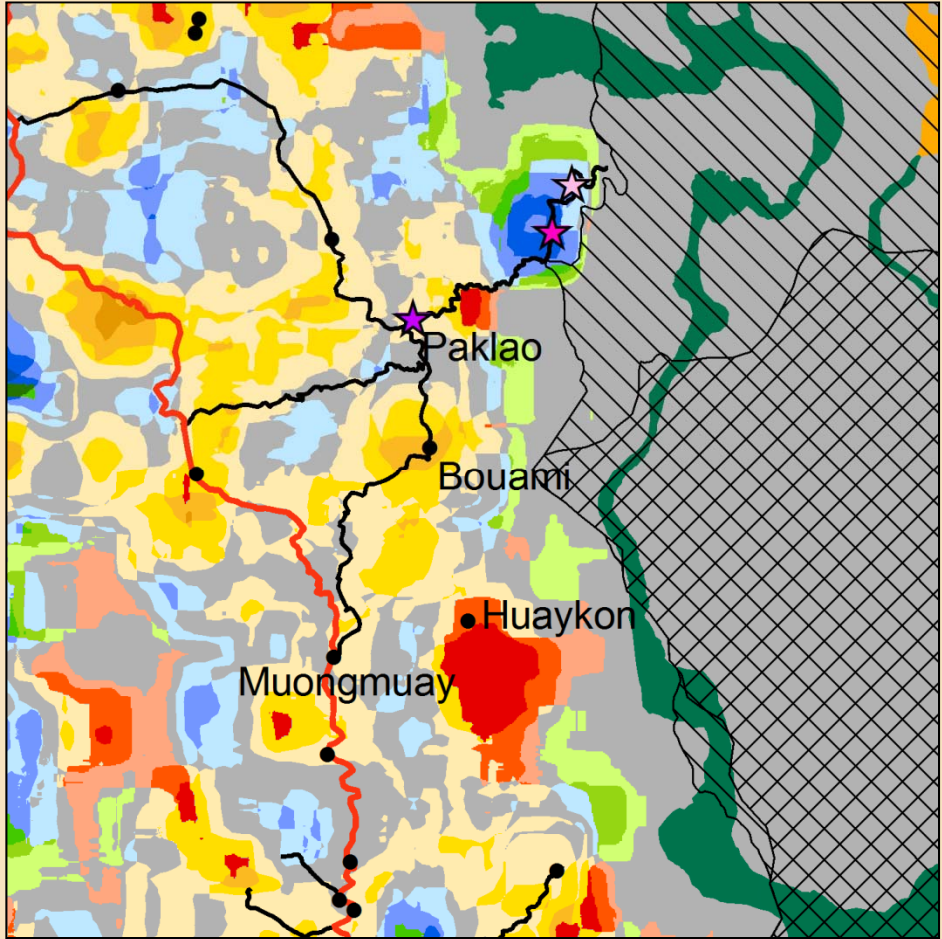
Change matrix			Landscape mosaics at t(1)										
			Forest and wooded landscapes FWL			Swidden landscapes SWL							
			NF	DF	FF	SW-5	SW-4	SW-3	SW-2	SW-1			
Landscape mosaics at t(0)	Forest and wooded landscapes	NF		Degrad-FWL		Deforest FWL-SWL Type-1**							
		DF											
		FF	Reforest-FWL										
	Swidden landscapes	SW-5	Afforest-SWL-FWL				Degrad-SWL						
		SW-4											
		SW-3											
		SW-2				Reforest-SWL							
		SW-1											

Change matrix		Landscape mosaics at t(1)								
		Forest and wooded landscapes FWL			Swidden landscapes SWL					
		NF	DF	FF	SW-5	SW-4	SW-3	SW-2	SW-1	
Landscape mosaics at t(0)	Forest and wooded landscapes	NF	Grey	Degrad-FWL	Deforest FWL-SWL					
		DF	Green	Grey	Orange	Type-1**				
		FF	Green	Grey	Orange	Type-2**				
Swidden landscapes	SW-5	Afforest-SWL-FWL			Grey	Degrad-SWL				
	SW-4	Afforest-SWL-FWL			Blue	Grey	Degrad-SWL			
	SW-3	Afforest-SWL-FWL			Blue	Grey	Degrad-SWL		Grey	
	SW-2	Afforest-SWL-FWL			Blue	Grey	Grey	Grey	Grey	
	SW-1	Afforest-SWL-FWL			Blue	Blue	Grey	Grey	Grey	



Change matrix		Landscape mosaics at t(1)							
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Landscape mosaics at t(0)	Swidden landscapes	SW-5	Afforest-SWL-FWL					Degrad-SWL	
		SW-4							
		SW-3	Reforest-SWL						
		SW-2							
		SW-1							

 NEPL-NPA after 2009
 NEPL-NPA before 2009
 Phountao (pre 2005)
 Phountao (2005-2008)
 Phountao moved to and merged with Paklao 2008



Conclusions and outlook

Landscape mosaics approach

- Delineation of swidden areas and their use intensities
 - Meaningful definition of landscape change processes with regard to REDD+
 - Promising approach for planning of REDD actions on the sub-regional level
 - Hett, C., Castella, J.-C., Heinimann, A., Messerli, P., & Pfund, J. L. (2012). *Journal of Applied Geography*, 32 (2), 608-618.
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- What's next?
 - Testing of approach in other regions
 - Carbon accounting, other ES?

... Thank you

Contact:

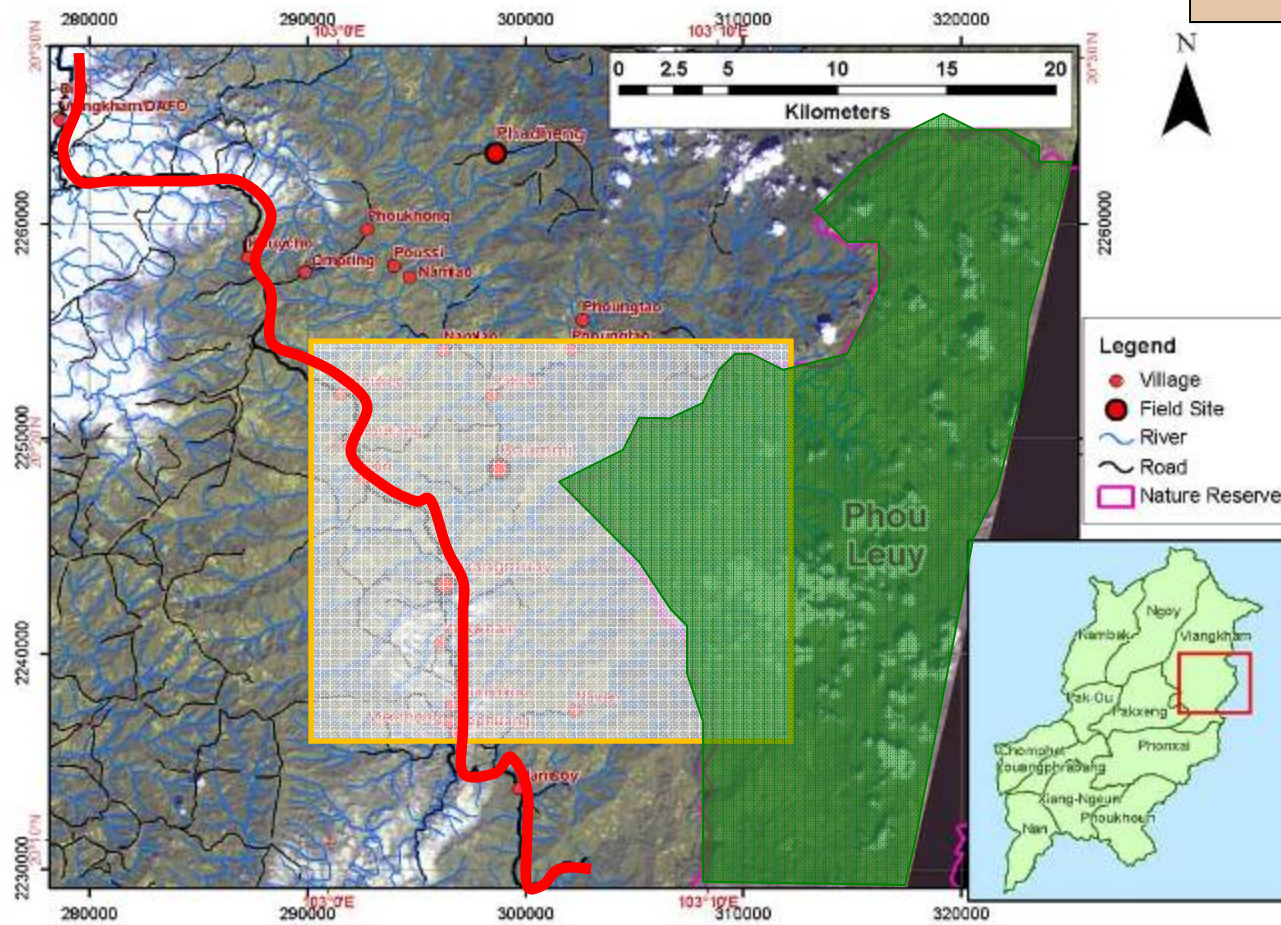
Cornelia Hett

National Centre of Competence in Research (NCCR) North-South
c/o Ministry of Natural Resources and Environment (MoNRE)
Prime Minister's Office, Lanexang Avenue, Vientiane, Lao PDR

Mail to: cornelia.hett@cde.unibe.ch



The case study area



The case study area

