# Design of
a Land Monitoring System
for REDD+ in Vietnam

Proposed by the members participated in
the TerraAmazon training course

Functions of the LMS

- Generating activity data (AD) for calculation of GHG emissions/removals from forest-related activities

- Providing information for monitoring/ implementing policies and measures (PaMs)

- Providing information on Safeguards

TerraAmazon LMS
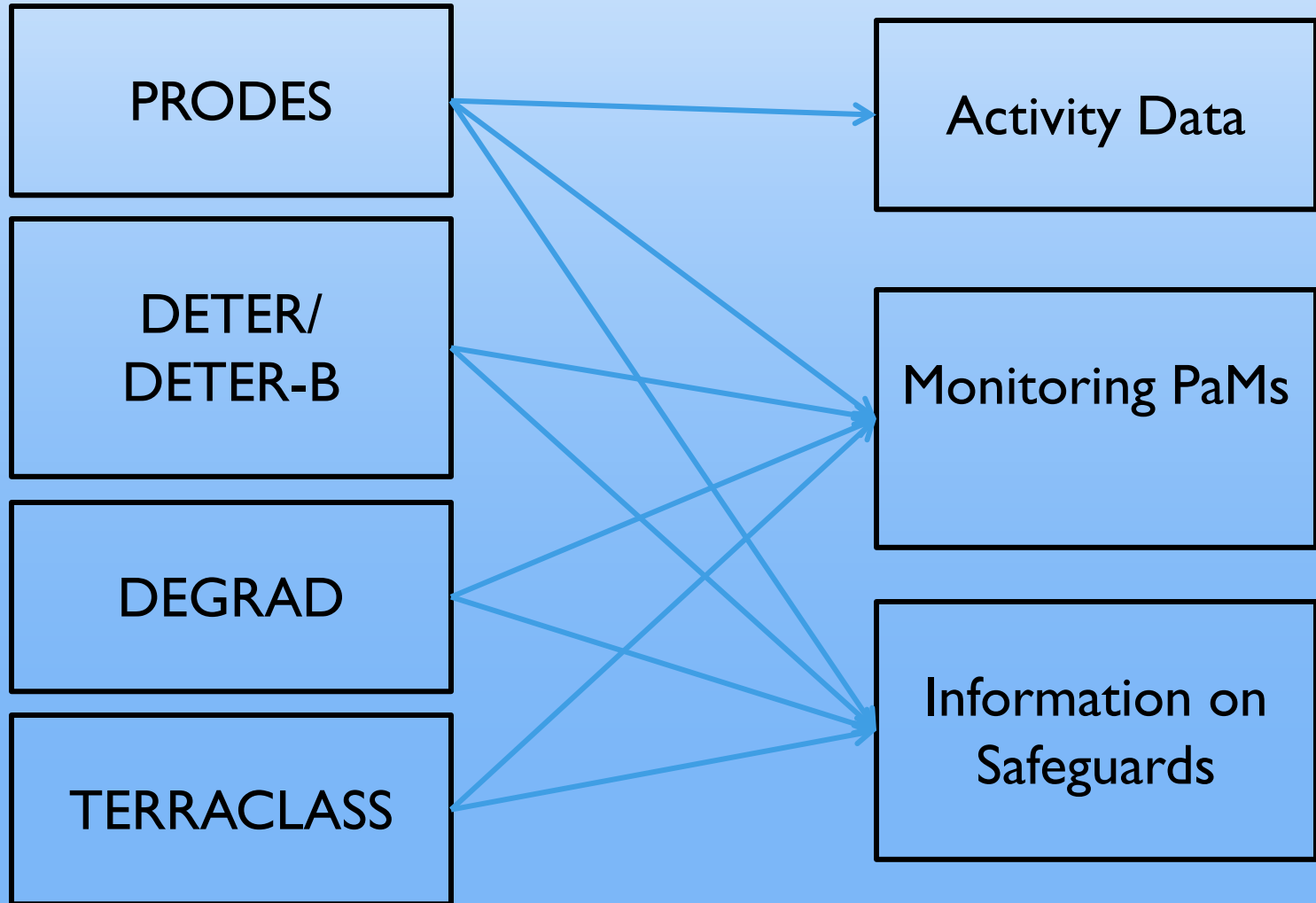
Amazon vs. Vietnam Forest

Content	Amazon Forest	Vietnam Forest
Forest characteristics	Homogeneguous	Many types of forest
Main REDD+ activities	Deforestation	Forest degradation, Conservation of C stock
Deforestation characteristics	Large scale	Small scale

- ❑ PRODES is not suitable for calculating GHG emissions/removals for REDD+ in Vietnam (need to use more detailed classification system)
- ❑ It is difficult to use only medium resolution imagery to classify forest into detailed types
- ❑ DETER-B is more appropriate (compared to DETER) for quick detection of clear-cut deforestation areas in Vietnam

Technicalities (Generating AD)

- ◘ Using a classification system which is detailed enough for estimating GHG emissions/removals at Tier-3

- ◘ Using high resolution RS imagery (e.g. SPOT 5) to generate land cover maps every 5 years

- ◘ Using medium resolution RS imagery (LANDSAT, CBERS, DMC, LISS-3, ASTER) together with ground surveys to update land cover maps annually (or biennially).

- ◘ Software for RS image processing still need to be examined (between commercial software like eCognition, ERDAS, ENVI and open source software like TerraAmazon)

Proposed classification system

- Evergreen & semi-evergreen broad-leaved forest
- Limestone forest
- Deciduous forest
- Coniferous forest
- Bamboo forest
- Mixed woody & bamboo forest
- Mixed woody & coniferous forest
- Mangrove-forest
- Plantations
- Coffee
- Rubber
- Tea
- Rice field
- …

Comparison of RS sensors

Type	Owner	Spatial res. (m)	Temporal res. (day)	Cost	Note
LANDSAT TM	USA	30.0	16	X	Difficult to get full coverage?
CBERS CCD	Brazil-China	20.0	26		N.a. now
DMC SLIM6	Anglo-Algeria	32.0	14	XX	
IRS-P6 LISS-3	India	23.5	24	XXX	
TERRA ASTER	Japan	15.0	??	XXXX	

It is necessary to do a cost-benefit analysis of the utilization of different sources of RS data

Technicalities (Monitoring PaMs)

- Using AWiFS imagery (56m resolution) for quick detection of clear-cut deforestation areas > 3ha, reporting monthly or quarterly depending on availability of RS data (DETER-B)

- Using TerraAmazon system (using the LSMM tool to generate raster soil maps and then using the Segmentation tool for mapping)

Technicalities (database management)

- Using distributed database management system (one database for forestry land and one for non-forestry land)

- Using an information portal to ensure unified access to information on land cover maps on both forestry and non-forestry land

Institutional Responsibilities

- Generating land cover maps every 5 years using high resolution imagery: FIPI (forestry), GDLA (non-forestry)

- Updating land cover maps annually using medium resolution: FIPI and FPD (forestry), GDLA (non-forestry)

- Quick detection of clear-cut deforestation areas (monthly or quarterly): FPD

Institutional responsibilities (cont.)

- System maintenance & development: Consider the following options:
  - Space Technology Institute
  - Remote Sensing Centre (MONRE)
  - FREC+CFIC (FIPI)
  - Forming a join working group including members of the above agencies

Issues to be addressed

- Development of a classification system that meets the requirements for REDD+

- Development of a standardized RS interpretation protocol

- Determination of the technical issues (type of imagery, interpretation software, information platform etc.)

- Testing the potential of applying TerraAmazon in Vietnam context

Proposed plan for the next 9 months (focus on generating AD)

- Development of a classification system suitable for REDD+ (1 month)
- Development of a standardized RS imagery interpretation protocol (2 months)
- Cost-benefit analysis of utilization of different sources of RS data (1 month)
- Testing the TerraAmazon system for 1 province using images at two time points which are 2 years different (4 months)
- Writing report and proposal for the next step (1 month)

Thank you very much!