UN-REDD PROGRAMME
VIET NAM

Introduction to spatial analysis for REDD+ planning at the provincial level in Viet Nam

UN-REDD PROGRAMME

Joint Working Sessions Report

Working sessions convened as part of Viet Nam's National UN-REDD Programme, Phase II

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This working session was organized by the Forest Resources and Environment Center of the Forest Inventory and Planning Institute (FIPI) and the UN-REDD Viet Nam Phase II Programme as part of Viet Nam's National UN-REDD Programme.

The UN-REDD Programme is the United Nations Collaborative Initiative on Reducing Emissions from Deforestation and forest Degradation (REDD) in developing countries. The Programme was launched in 2008 and builds on the convening role and technical expertise of the Food and Agriculture Organisation of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). The UN-REDD Programme supports nationally-led REDD+ processes and promotes the informed and meaningful involvement of all stakeholders, including Indigenous Peoples and other forest-dependent communities, in national and international REDD+ implementation.

The UN-REDD Programme provided technical support for this workshop from the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC). UNEP-WCMC is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organization. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

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Acronyms and abbreviations

AG	Above ground
AHP	Analytical Hierarchy approach
BG	Below ground
CFIC	Center for Forest Information and Consultancy
FIPI	Forest Inventory and Planning Institute
FREC	Forest Resources and Environment Center
GIS	Geographic information systems
LUCIA	Land Use Change Impact Assessment tool
MCA	Multi-criteria analysis
NIAPP	National Institute of Agricultural Planning and Projection
NFI	National Forest Inventory
PA	Protected Area
PFES	Payments for Forest Ecosystem Services
PMU	Programme Management Unit
PRAP	Provincial REDD+ Action Plan
REDD	Reducing Emissions from Deforestation and Forest Degradation
SEDP	Socio-Economic Development Plan
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UTM	Universal Transverse Mercator
VAFS	Viet Nam Academy of Forest Sciences
VCF	Vegetation Continuous Fields
WCMC	World Conservation Monitoring Centre

Executive Summary

This report details the content and outcomes of two joint working sessions on spatial analysis to support provincial REDD+ planning, which took place in Ha Noi, Viet Nam, in June 2014. The purpose of the working sessions, with both national-level and provincial-level participants, was to introduce and launch collaboration on spatial analyses to support the development of provincial REDD+ action plans (PRAPs).

The working sessions were part of a wider collaboration between the UN-REDD Viet Nam Phase II Programme, the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), and the Forest Resources and Environment Center (FREC) of the Forest Inventory and Planning Institute (FIPI). These partners are working together to support the use of spatial analysis for REDD+ planning in the UN-REDD Programme pilot provinces: Bac Kan, Binh Thuan, Ca Mau, Ha Tinh, Lam Dong and Lao Cai. The aim of this work is to inform provincial REDD+ planning and implementation by presenting the benefits and trade-offs associated with REDD+ actions in particular locations, land-use designations and ecosystems.

The first week's working session, led by UNEP-WCMC, included 12 participants from national-level partner organizations, who will take a leading role in training and supporting the UN-REDD pilot provinces to develop PRAPs. The second week's session, led by FREC, was attended by 13 participants from the Forestry, Forest Protection and Natural Resources and Environment departments of the UN-REDD pilot provinces.

Although there were differences in the topics covered and software utilised between the two sessions, the main content included the following:

- Introduction to REDD+ and REDD+ implementation in Viet Nam, and the role of spatial analysis in REDD+ planning;
- Relevance of natural forests to REDD+ activities and mapping natural forest;
- Mapping of forest cover change and carbon stocks;
- Using international data and tools to map layers related to biodiversity and ecosystem services;
- Mapping layers related to pressures on forests and risks for REDD+ implementation;
- Multi-criteria analysis of REDD+ benefits and risks;
- Overlaying and combining map layers, e.g. species richness and carbon stocks.

The discussions, results and testing of tools during the two working sessions will inform planning for further support on spatial planning to the pilot provinces as they develop their PRAPs.

1. Introduction

Two joint working sessions on spatial analysis to support provincial REDD+ planning took place in Ha Noi, Viet Nam, during 17-20 June and 24-26 June 2014. These working sessions were aimed at introducing and launching collaboration on spatial analyses to support the development of provincial REDD+ action plans (PRAPs) under the UN-REDD Viet Nam Phase II Programme.

The UN-REDD Viet Nam Phase II Programme was approved in mid-2013 and will conclude at the end of 2015. The objective of the Phase II Programme is: to enhance Viet Nam's ability to benefit from future results-based payments for REDD+ and undertake transformational changes in the forestry sector. The Programme will deliver capacity building and provide technical assistance at the national and provincial levels, as well as promote initial activities in the country's six pilot provinces: Bac Kan, Binh Thuan, Ca Mau, Ha Tinh, Lam Dong and Lao Cai.

Box 1: What is REDD+?

REDD+ (Reducing Emissions from Deforestation and forest Degradation +*) is an initiative intended to combat climate change by providing incentives for changing the ways in which forests are used and managed, so that emissions of greenhouse gases from forests are reduced and carbon sequestration is increased. REDD+ may require many different actions, such as protecting forests from fire or illegal logging or rehabilitating degraded forest areas.

* The "+" indicates the inclusion of the following activities, i) conservation of forest carbon stocks, ii) sustainable management of forests and iii) enhancement of forest carbon stocks.

The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is partnering with the Forest Resources and Environment Center (FREC) of the Forest Inventory and Planning Institute (FIPI), to support the use of spatial analysis for REDD+ planning in the UN-REDD Programme pilot provinces. The aim of this work is to inform provincial REDD+ planning and implementation by presenting the benefits and trade-offs associated with REDD+ actions in particular locations, land-use designations and ecosystems. Analysis of the potential multiple benefits and risks from REDD+ can help to design a REDD+ strategy and inform interventions that address key policy concerns, such as ensuring the improvement of rural livelihoods, and maintaining or enhancing key ecosystem services.

The first week's working session, led by UNEP-WCMC and utilising mainly ArcGIS software, included 12 participants from national-level partner organizations in Viet Nam, who are expected to take a leading role in training and supporting the UN-REDD pilot provinces to develop PRAPs in the coming months. The second week's session, led by FREC and utilising MapInfo software, was attended by 13 participants from the Forestry, Forest Protection and Natural Resources and Environment departments of the UN-REDD pilot provinces (participants lists are provided in Annex 1).

2. Working session objectives

The purpose of the two joint working sessions with both national-level and provincial-level participants was to introduce and launch collaboration on spatial analyses to support the development of provincial REDD+ action plans (PRAPs). The specific objectives of the working sessions were:

- To build capacity among technical staff in spatial analyses to inform the development of PRAPs, and for provincial level maps showing potential zones for REDD+ actions;
- To develop approaches for support on spatial planning for REDD+ to selected UN-REDD programme pilot provinces in Viet Nam;

- To provide national partners with knowledge and tools to work with and train technical staff and stakeholders in the pilot provinces.

3. Summary of topics and outputs[1]

Week 1: National level

Introductory session

Dr Pham Manh Cuong, National Director of the UN-REDD Viet Nam Phase II Programme, welcomed the participants. After introductions among the participants, Nguyen Thanh Phuong (UNEP, UN-REDD Programme Management Unit, PMU) provided an overview of the objectives of the working session and the planned agenda.

Dr Cuong gave a presentation on REDD+ in Viet Nam, introducing REDD+ generally as a tool for promoting forest management, protection and sustainable use, and the status of REDD+ processes in Viet Nam. He also provided an overview of the PRAP process and the principles for PRAP development.

Charlotte Hicks (UNEP-WCMC) then presented on the role of spatial analyses in REDD+ planning, particularly how it may contribute to promoting multiple benefits, reducing risks and addressing safeguards. These introductory presentations were followed by two interactive exercises:

i) **Risks and benefits exercise**: This first exercise involved dividing the participants in small groups of 2-3 people, each of which selected a REDD+ action (also known as an intervention) and followed a flow chart to identify potential risks and benefits, as well as management interventions that could reduce risks and maximise benefits. The table below summarises the results of the exercise:

Table 1: Summary of outputs of the exercise 'Identifying possible risks and benefits from REDD+ actions'

REDD+ action		Potential risks/Potential benefits	Strategy
Extend the protected area (PA) network/establish new PA	RISKS	• Loss of land for cultivation • Loss of cattle grazing area • Displacement	• Benefits/compensation policies for local people • Develop agroforestry system
	BENEFITS	• Improved water (hydrological) control • Enhanced carbon stocks • Improved livelihoods for local people • Improved environmental quality	• Prioritise use of local species and mixed species planting methods • Develop forest/PA management plan • Monitoring of forest resources
Promote alternative livelihoods to minimise pressures on forests	RISKS	• Changes to methods of cultivation, but may lack funds, knowledge and experiences	• Policies to support access to credit • Technical training
	BENEFITS	• Diversified livelihoods/jobs for people • Diversified products • Biodiversity conservation	• Select occupations to suit local needs/conditions • Seek new markets for products

[1] Please see Annex 2 for the agenda of the working sessions.

Allocation of forestland to local people/ community forest management	RISKS	• Loss of land for agriculture and grazing • Lack of knowledge	• Promote agroforestry • Increase crop growing area • Training for local people on benefits of forest protection
	BENEFITS	• Existing forests are better protected • Enhanced quality of forests • Reduction of soil erosion • Enhanced carbon stocks • Reduced impacts of climate change	• Link to payments for forest ecosystem services (PFES) • Assess/calculate ecosystem services value • Promote sustainable forest management certificates

ii) **Transparent maps exercise**: For the second exercise, the participants worked in two groups to discuss the goals they would like to achieve for a particular REDD+ action, and then used transparent map overlays to choose location/s for the action. The overlays included layers showing basic planning information (e.g. forest types, carbon stocks, land use/land cover), potential multiple benefits (e.g. areas of importance for biodiversity), and pressures (e.g. areas of high human influence, road network). The groups filled out worksheets detailing their goals for the REDD+ action and the layers they selected:

Table 2: Summary of results of the transparent maps exercise

Group 1	**Group 2**
The REDD+ action being considered: Alternative livelihoods to reduce pressures on existing forests	
The REDD+ goals: ▪ Reduce dependence on forest ▪ Improve local people's quality of life ▪ Reduce forest degradation and deforestation ▪ Protect habitats of animal and plants, gene conservation ▪ Reduce illegal hunting, logging and trade of forest products	The REDD+ goals: ▪ Conservation of biodiversity ▪ Local economic development ▪ Poverty alleviation ▪ Improve capacity to protect soil and water ▪ Ecotourism development
The maps chosen and why: **Base map**: Land use/land cover: To know about distribution of forest and forest land. **Overlays:** ▪ Three forest use categories: Because policies on each kind of forest are different. ▪ Map of KBAs: To know the area to focus on conservation biodiversity. ▪ Population/human influence map: To know area that local people need to use for socio-economic development, where to reduce dependence on forest. ▪ Road network map: As basic for implementing measures for local people's socio-economic development.	The maps chosen and why: **Base map**: Land use/land cover: Provides lots of information. **Overlays:** ▪ Roads: Convenience of transportation for socio-economic development and eco-tourism. ▪ Human influence: To show potential threats to forest. ▪ Production forest: To identify areas for local people's socio-economic development. ▪ KBAs: To identify areas for biodiversity conservation.
Data unavailable that would have been useful: ▪ Map of land-use plan ▪ Soil map	Data unavailable that would have been useful: ▪ Map of land-use plan ▪ Socio-economic development plan ▪ Hydropower plan

Mapping natural forest

The first technical topic covered in the working session was mapping natural forest. Pham Duc Cuong (FREC) began by leading a discussion on Viet Nam's national forest definition and how this relates to natural forest and carbon pools. Using 2010 national forest inventory (NFI) data showing forest/land cover for Lao Cai Province, the participants categorised the province's forest types as natural, planted and non-forest, and prepared a map showing these three categories (Figure 1 below). There was also some discussion regarding why natural forest is of interest in REDD+ planning, highlighting for example its importance for addressing the Cancun Safeguards.

It was agreed by the participants that the following categories from the table below represented natural forest: 1, 2, 3, 4, 6, 7, 8, 9, 10 and 11 - although there was some discussion about the bamboo and mangrove classes, which might contain a mixture of plantation and natural forest (although mangrove was not present in this example for Lai Cai).

Type	Land use	Categories	TYPE
1	Rừng LRTX và nửa rụng lá giàu	Evergreen broadleaf - rich	Natural forest
2	Rừng LRTX và nửa rụng lá trung bình	Evergreen broadleaf - medium	Natural forest
3	Rừng LRTX và nửa rụng lá nghèo	Evergreen broadleaf – poor	Natural forest
4	Rừng LRTX và nửa rụng lá phục hồi	Evergreen broadleaf – regrowth	Natural forest
5	Rừng rụng lá	Deciduous forest	Natural forest
6	Rừng tre nứa	Bamboo forest	Natural forest
7	Rừng hỗn giao gỗ, tre nứa	Mixed bamboo and wood forest	Natural forest
8	Rừng lá kim	Conifer forest	Natural forest
9	Rừng hỗn giao lá rộng, lá kim	Mixed conifer and deciduous forest	Natural forest
10	Rừng ngập mặn	Mangrove forest	Natural forest
11	Rừng núi đá	Limestone forest	Natural forest
12	Rừng trồng	Plantation forest	Plantation forest
13	Núi đá không rừng	Limestone without forest	Non-forest land
14	Đất trống	Bare land	Non-forest land
15	Mặt nước	Water body	Non-forest land

Type	Land use	Categories	TYPE
16	Dân cư	Resident	Non-forest land
17	Đất khác	Other land	Non-forest land

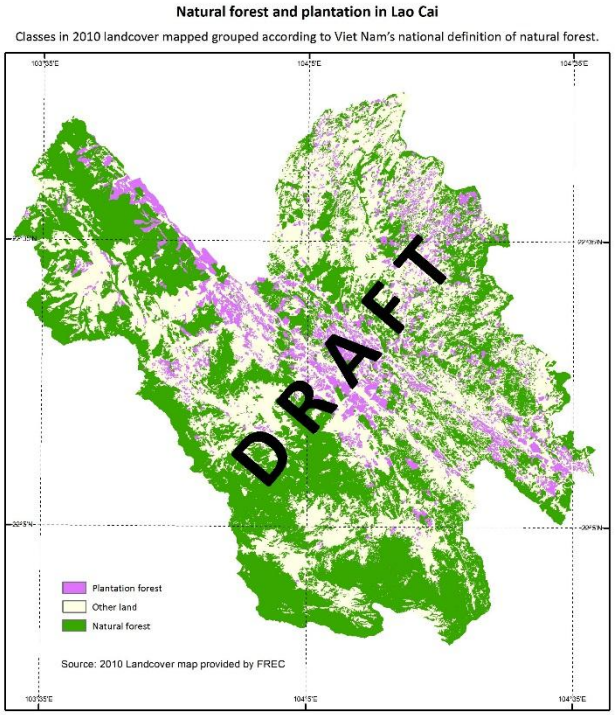


Figure 1: Draft map showing natural forest and planted forest

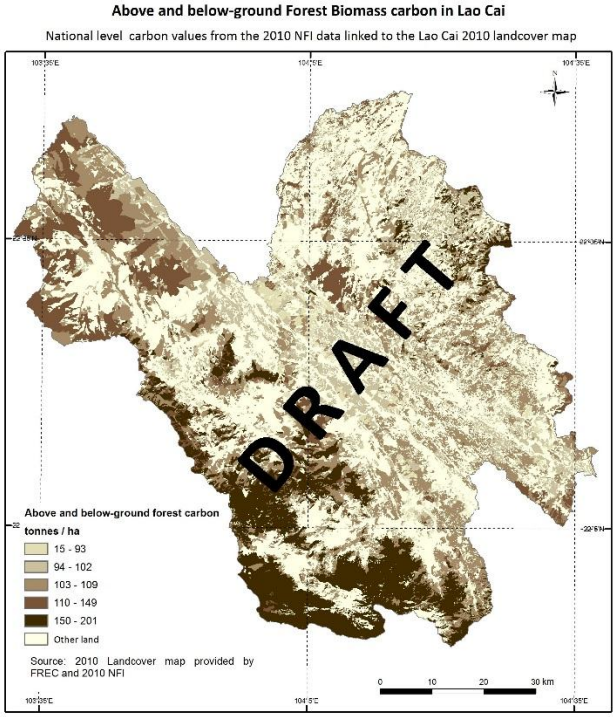


Figure 2: Draft map of forest carbon stocks in Lao Cai Province

Carbon mapping

The next topic was the preparation of a carbon map for Lao Cai Province. Corinna Ravilious (UNEP-WCMC) gave a short presentation on how the carbon values used in the exercise were developed (using national level carbon values). The participants then used these carbon values and the Lao Cai forest/land cover types (from the 2010 NFI data) to create a carbon map (including above (AG) and below-ground (BG) carbon) for the 2010 land cover map of Lao Cai (Figure 2 above), as well as overlays with natural forest (Figure 3 below).

Type	Forest Type	AGBCAR	BGBCAR	AG_BGCAR
1	Rich evergreen broadleaved forest	157.42	43.29	200.71
2	Medium evergreen broadleaved forest	117.19	32.23	149.42
3	Poor evergreen broadleaved forest	85.79	23.59	109.39
4	Regrowth evergreen broadleaved forest	80.33	22.09	102.42
5	Deciduous forest	100.54	27.65	128.18
6	Bamboo forest	11.88	3.27	15.15
7	Mixed wood-Bamboo forest	54.29	14.93	69.21
8	Coniferous forest	53.96	14.84	68.79
9	Mixed broadleaved and coniferous forest	105.12	28.91	134.03
10	Mangrove forest	52.72	14.5	67.22
11	Forest on rocky mountain	59.14	16.26	75.4
12	Plantation forest	73.15	20.12	93.27

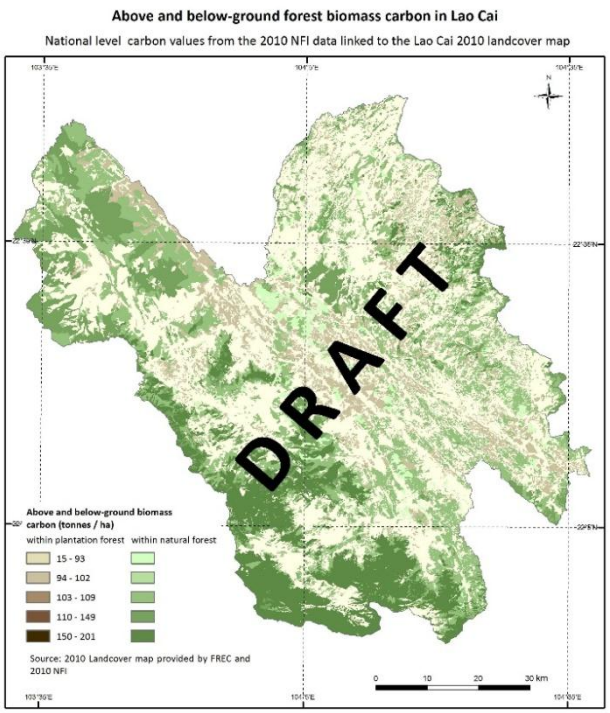


Figure 3: Draft map showing carbon stocks, natural forest and planted forest

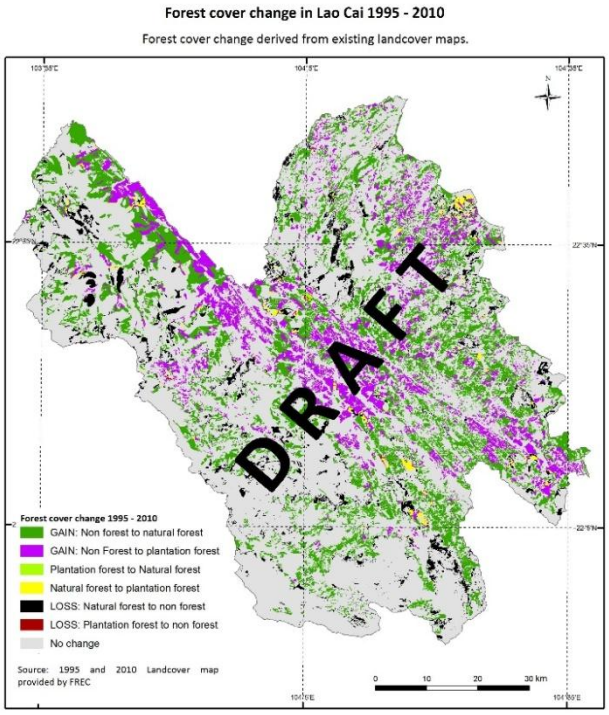


Figure 4: Draft map showing forest cover change, 1995-2010

Forest cover change mapping

This activity involved using the existing Lao Cai forest/land cover datasets for 2000 and 2010 (from NFI) to determine areas of change (deforestation, degradation and forest gain). After discussing the approach, the participants practiced preparing a forest cover change map (see Figure 4 above) and one participant demonstrated his results. There was considerable discussion regarding data accuracy issues; many participants felt that the forest inventory data used to create these datasets is flawed and thus requires on the ground checks or comparisons with satellite images to improve accuracy. One of the issues was that different datasets from the different years were created at different resolutions and perhaps using different methodologies. This issue results in sliver polygons showing areas of change that were likely just a result of differences in digitisation of the same boundary of a particular land cover type rather than actual change. Other issues relate to an old VN2000 projection being used by some departments rather than the standard UTM, causing some incorrect positioning of the data when overlaying with data in UTM with the WGS84 datum. One participant showed the group this problem and demonstrated a process to help clean up differences boundaries and eliminate sliver polygons (i.e. correcting the two maps in relation to each other where polygon boundaries between the two maps were almost identical). He also demonstrated how to add a satellite imagery background to a map session in MapInfo.

Biodiversity related layers

After a discussion on the availability of biodiversity related data in Viet Nam, the participants were shown two useful international datasets for understanding biodiversity in the landscape: the Key Biodiversity Areas (KBAs) data (from Birdlife International) (Figure 5 below) and species richness data (based on species' ranges of occurrence from the IUCN Redlist). After discussing how the data is generated and a demonstration of how to access the data, the participants were also shown a method for creating a species richness map (Figure 6 below), using data on critically endangered, endangered and vulnerable species in Viet Nam, clipped to Lao Cai Province.

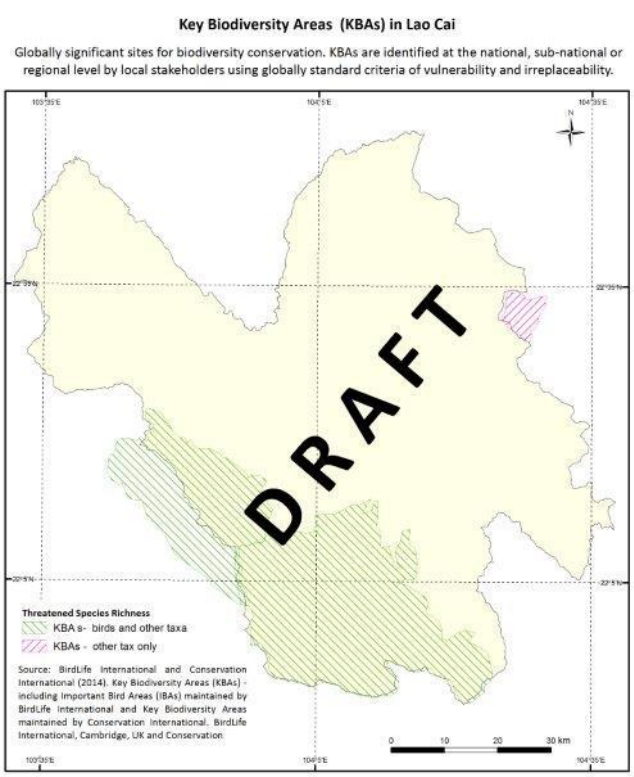


Figure 5: Draft map of KBAs

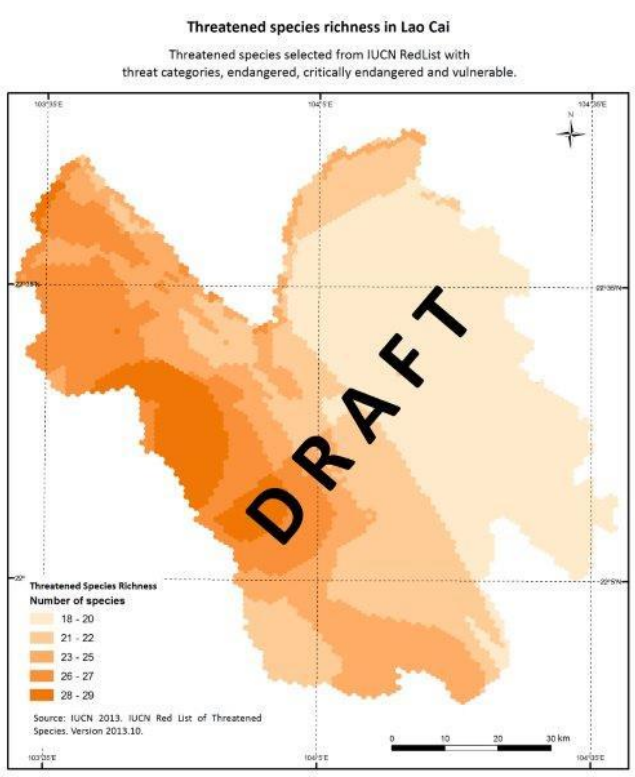


Figure 6: Draft map of threatened species richness

Ecosystem services related layers

Spatial datasets related to ecosystem services in Viet Nam are also relatively limited. In this activity, we focused on hydrological services and explored running the online tool, WaterWorld (http://www.policysupport.org /waterworld), for Lao Cai Province.

The tool is designed to help users explore hydrological and water related resources and processes with the ability to run scenarios for land use, land management and climate change.

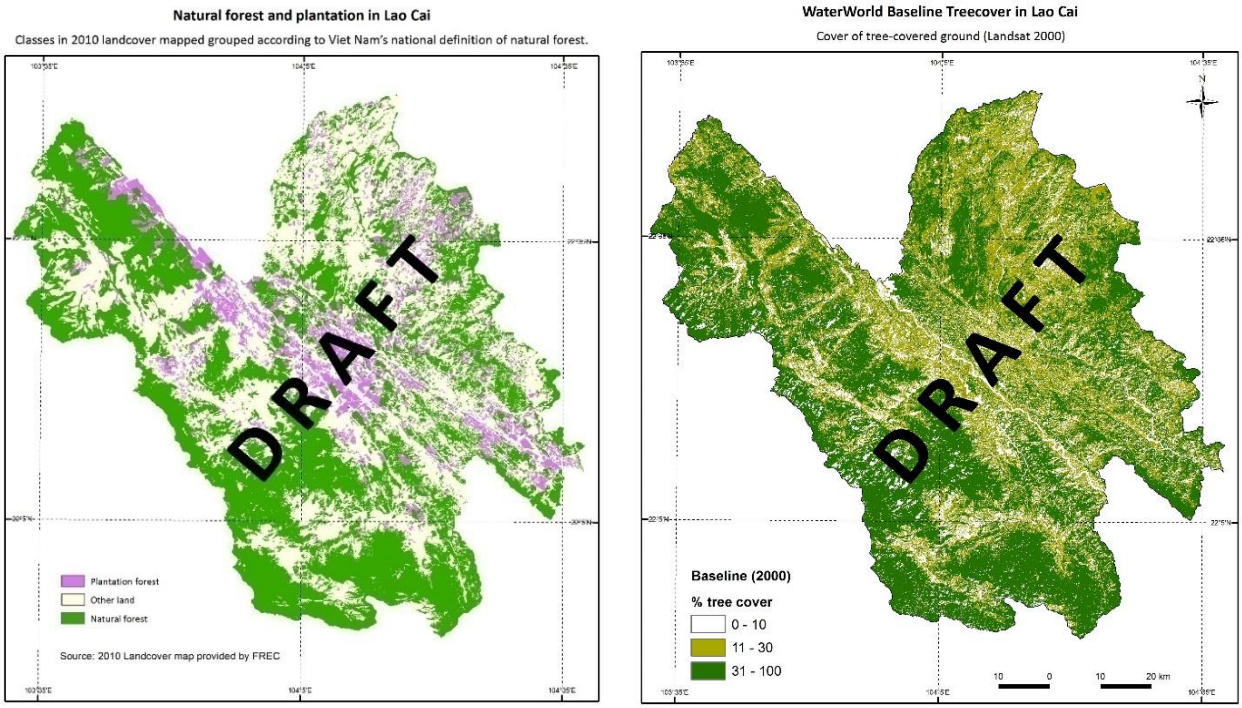
Key outputs that can be explored in WaterWorld (from the free non-subscription model) are presented in Figure 7 (right).

The great advantage of the tool is that it is not 'data hungry', as it incorporates detailed spatial datasets at 1-square kilometer and 1 hectare resolutions for the entire world. A full list of its data sources can be found on the website. WaterWorld is free for non-commercial use but there is a subscription model for additional features and support. One of these additional features allows users to upload their own data. Figure 8 below shows a comparison of Lao Cai's forest cover data with the baseline data used by WaterWorld.

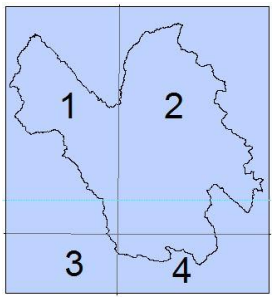
Name	Explanation	Change from baseline
Change in rainfall	Change in total annual (wind-driven) rainfall (mm/yr)	
Change in water balance	Change in local water balance (mm/yr) (rainfall minus actual evapotranspiration (AET). Where water balance is negative local AET is supported by upstream sources of water and/or groundwater	
Change in runoff	Change in total annual runoff (m^3/yr). Calculated as water balance cumulated downstream. Negative water balance (AET>precipitation) in a cell consumes runoff from upstream.	
Change in hillslope net erosion	Change in hillslope net erosion (mm/yr). Net erosion (erosion minus deposition) on hillslopes	
Change in total net erosion	Change in total net erosion (mm/yr). Net erosion (erosion minus deposition) from hillslopes and channels (streams/rivers)	
Change in human footprint on water quality	Change in mean percentage of water that may be polluted (human footprint index, %)	

Figure 7: Key WaterWorld outputs

Figure 8: Visual comparison of the Lao Cai forest cover (2010; on left) compared to baseline Vegetation Continuous Fields (VCF) forest (2000; on right) from WaterWorld. The VCF data have been grouped to show forest as > 10% canopy cover, although a definition of > 30% seems to match better with the provincial data:



After some technical difficulties in getting participants registered and running the simulations, results for the four tiles covering Lao Cai Province were generated. The first step involved generating a baseline scenario. This was followed by setting up a scenario to try to show what would happen if the province exceeds its forest cover target (65%). We did not manage to successfully get the forest cover scenario to work in the session. After the session, Corinna and Charlotte followed this up and found it was necessary to modify the scenario to look at an example where the user defines areas where forest cover could potentially be increased. For example, by increasing forest cover on high slopes or in protected areas; this could then also be followed by some calculations outside of WaterWorld to see how close the results of the scenario were to reaching the forest target.



An additional scenario of 'removing all forest' was run by Corinna and Charlotte to demonstrate another application of the tool linked closely to REDD+, i.e. showing the importance of forest for soil erosion control.

Presented below are the preliminary outputs generated (Figures 9 and 10). At this stage it is necessary to label them as draft as they only illustrate the functionality that WaterWorld can provide. In particular, in the second example showing the scenario for increasing forest cover, the criteria were selected by Charlotte and Corinna solely for the purposes of demonstrating how the tool can target areas for increasing forest, dependent on user-defined criteria.

Preliminary outputs from WaterWorld:

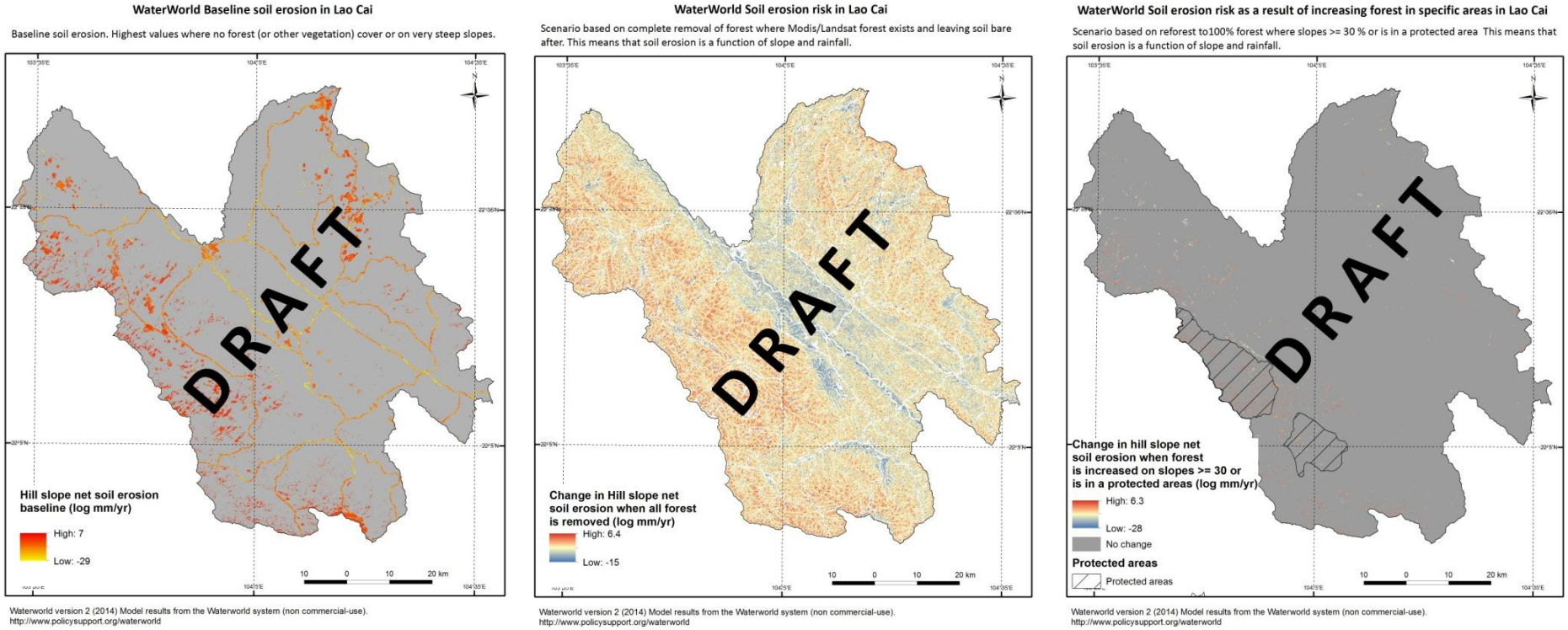


Figure 9: Map on the left shows the baseline, net hill-slope erosion for Lao Cai Province. It thus represents the current situation. It shows the highest values where there is no forest (or other vegetation) or on very steep slopes. The middle map shows a scenario based on the complete removal of forest (i.e. removing tree cover where Modis/Landsat shows it exists and leaving soil bare after). This means that soil erosion is estimated as a function of slope and rainfall. There will be hardly any change in areas where there is no forest initially. Therefore, the highest values in this map represent areas where change in forest cover would result in higher soil erosion risk. The map on the right shows the change in hill slope net soil erosion as a result of reforesting on steep slopes and in protected areas; there is a potential clear benefit under the reforestation scenario with an overall decrease of 0.033mm of erosion, which adds up to a reduction of over 200 tons of sediment.

Preliminary outputs from WaterWorld, cont:

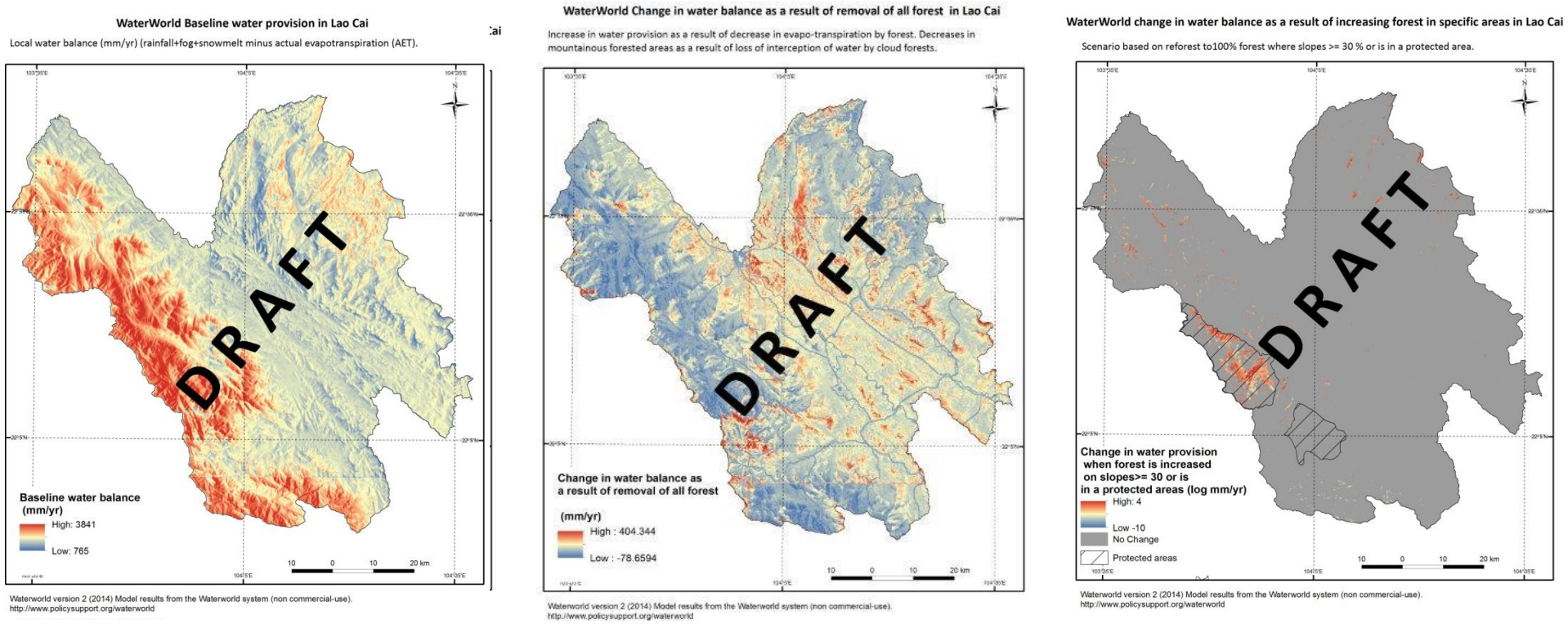


Figure 10: The map on the left shows the baseline water balance in the province, i.e. representing the current situation. In the middle map showing the potential effects of a scenario where all forest has been removed, there is greater change in water balance in the lowland areas, compared to low levels of change in the water balance in higher elevation areas. At higher elevation, temperatures are lower resulting in lower evapo-transpiration rates and thus lower water use by forests compared to the lowlands. Forest loss at lower elevations therefore leads to greater increases in the water balance. The map on the right shows the change in water balance when forest is increased on slopes greater than 30 degrees and in protected areas. Grey areas show no change, while orange-red areas show high change, indicating higher levels of change in water provision within the protected areas and the northern part of the state.

Unfortunately, there was not enough time to fully explore the results from WaterWorld in the working session. However, the participants can re-run the tool on their own to explore the data further. UNEP-WCMC will also follow-up on WaterWorld applications and the relevance of its outputs for REDD+ planning before the next working session, if there is interest to explore the tool further.

The participants pointed out that it would be useful to have more information on the input layers/data to WaterWorld in order to compare it to provincial level data. Since the session, UNEP-WCMC has explored this and discovered it is possible to download some of the input layers in the tool (e.g. baseline forest cover, Fig. 8). There were additional questions relating to cost if the free version did not meet requirements. There was some concern that although the license fee was minimal, this could be quite costly if multiple purchases were required. There were also questions related to the units of mm/year in the WaterWorld outputs, which participants felt were not intuitive or appropriate for decision makers.

One participant also expressed concern that WaterWorld did not allow national level inputs, particularly on forest cover. Corinna and Charlotte have since determined that in WaterWorld, users who have paid for a subscription are able to upload their own data. However, this is not always straightforward, as the data needs to be in a format that WaterWorld can use (i.e. as a % tree cover, % herb cover and % bare land). The version of WaterWorld used in the session utilises baseline tree cover for the year 2000. However, the model can also be run with a 2010 tree cover baseline. The advantage of the data being expressed as % tree cover in the tool is that users can more easily define thresholds according to national definitions of forest.

A similar, alternative tool was suggested called the Land Use Change Impact Assessment tool (LUCIA) (https://lucia.uni-hohenheim.de/) produced by the University of Hohenheim, which has had some national level testing in Viet Nam. This tool may also be useful to explore further, especially as it is open-source.

In Viet Nam, forest function mapping is also undertaken to determine forest-use categories. This is another potential source of spatial data related to ecosystem services, particularly soil erosion risk and hydrological regulation. A group discussion on forest function mapping processes highlighted the following:

- The input layers for Vietnam forest function mapping are:
  - Topography (elevation, slope, aspect)
  - Water bodies (but not dams/hydropower)
  - Soil (chemical properties, depth)
  - Current vegetation
  - Precipitation
  - Population (distribution)

- For identifying soil erosion risk/protection forest, the key layers are:
  - Topographic map
  - Soil map
  - Precipitation
- Coefficient factors are applied to determine degree of importance (very critical, critical, less critical).
- Layers are combined to produce the final map showing areas for the different forest categories.
- Intermediate layers are not provided with the final product; the consultant/assisting organization may keep these layers but it is difficult to see the process, or access intermediate layers.

Discussion on prioritising layers

A group activity was then held to discuss the possible layers that could be used for REDD+ planning for a particular intervention (maintaining existing forests) based on three basic categories: basic planning information; multiple benefits; and pressures. In two groups, the participants listed the datasets that could be used in each category and then prioritised among these possible layers. This discussion then informed the types of layers utilised for the remaining part of the joint working session.

The prioritised layers were:

- **Base layers**: forest/land cover; forest categories; protected areas/zones; topographic map; current land use/situation; Socio-Economic Development Plan (SEDP)/planning zones
- **Pressures**: population distribution; land management units; infrastructure; timber extraction; forest fires
- **Benefits**: erosion risk/land degradation; landslide and flood risk; biodiversity conservation; PFES; hydrological regulation.

Multi-criteria analysis

Corinna led a session on multi-criteria analysis (MCA), beginning with a presentation on MCA approaches and including a discussion on participants' experiences with MCA. The presentation introduced MCA and highlighted how spatial-decision problems typically combine multiple attributes of differing importance/relevance to the decision maker, as well a range of MCA approaches that can be used. The discussion focused on thinking about workflows to help identify areas which meet a set of criteria using overlay approaches and the GIS techniques that can be used to string together the geo-processing processes. The presentation and discussion also highlighted how different approaches have different levels of subjectivity, and that the biggest challenge is to create appropriate workflows that meet the defined objectives with transparency to ensure that the approach is clearly understood by all. Factors that affect the quality of the analysis were discussed. It was not decided what type of MCA analysis should be undertaken in the context of spatial analyses to support PRAPs, but if a weighted approach should be undertaken, the participants indicated that they would like more information on methodologies for setting weights for the different criteria.

The main methodologies presented/discussed were:

- **Boolean approach** (often referred to as constraint mapping, where criteria are in either an 'AND' or 'OR' process or a combination of AND and OR processes).

  AND: The output is classified as true (suitable) IF all criterion layers are true (suitable) in the same location.

  OR: The output is classified as true (suitable) IF any criterion is classified as true (suitable) at the same location.

Some advantages/disadvantages of the Boolean approach discussed:

Pros	*Cons*
• Easy to implement (in ArcGIS) • Easy to understand outputs when presented with input maps • Varying thresholds can be used to investigate criterion and their relationships • No normalisation required	• Defining thresholds complex – requires justification (and consultation with stakeholders) • Output influenced by threshold • Too simplistic – no gradation of outputs • Uncertainty not explicit

- **Fuzzy (Linear) approach** (a cumulative approach where values are normalised to a range from 0 - 1 and summed to produce a summary or composite index).

Some advantages/disadvantages of the fuzzy approaches discussed:

Pros	*Cons*
• Easy to implement (in ArcGIS) • Easy to understand output when presented with input maps • Gradation of outputs • No need to pre-define thresholds	• No consideration of the interaction of criterion • Influenced by method of normalisation (i.e. linear or other)

- **Weighted approaches** This was not covered in detail but discussion focused on how to determine weights. Two methods were highlighted in the presentation were: 1) Ranking approach (simple ranking of criteria in order of importance); and 2) Analytical Hierarchy approach (AHP) (pairwise comparison of each of the variables against each other and used to calculating a mean weight for each criteria).

Some advantages/disadvantages of weighting approach discussed:

Pros	*Cons*
• Easy to implement if using simple ranking of criteria in order of importance • If using AHP there is consideration of the interaction of the criterion • Simple to explain so easy to involve wide range of stakeholders • Easy to understand outputs	• Subjectivity of weight selection • If using ranking approach no consideration of the interaction of criterion • Difficult to explain the values chosen for the weights for the ranking when using AHP • Some weighted approaches require subjective scaling of data prior to analysis • Difficulty getting consensus on weights from different stakeholders

Group work

Participants were then split into four groups of 3-4 people each, the participants spent approximately one day processing and finalising the layers that could be used for MCA and overlays to inform REDD+ planning, using the draft maps and datasets for Lao Cai Province. The four groups covered:

Group 1 - Base layers and quality control: natural forest, FCC, carbon stocks

Group 2 - Biodiversity benefits: species richness and KBAs

Group 3 - Ecosystem services: evaluate WaterWorld results/soil erosion risk, provisioning ES

Group 4 - Pressures: roads, poverty, population, fire

Each group ensured the relevant layers were finalised and if necessary prepared with thresholds/classifications and buffers. For example, Group 1 ensured that the correct forest categories had been used for their layers. Group 4 used buffers to show pressures related to the distance from roads and fire intensity points. One member from each group then reported back to everyone about what they did and the layers produced.

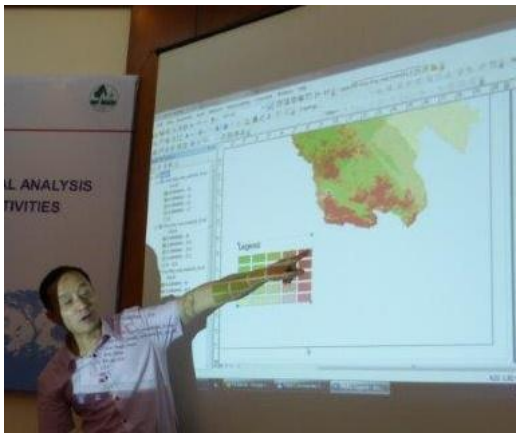
Demonstration in MapInfo

As MapInfo is the main software package used for spatial planning in the provinces of Viet Nam, the working session also explored how to carry out similar processes using this software. On the last day of the working session, Tran Thi Thu Hang (FREC) gave a demonstration of using MapInfo to prepare the natural forest and forest cover change layers.

MapInfo lacks the same analytical power as ArcGIS. However, it was determined that quite a few layers used in REDD+ planning spatial analyses could be prepared in MapInfo, including matrix style legend maps. In addition, the 'vertical mapper' extension for MapInfo may also offer some solutions and is worth exploring further.

Matrix style legend exercise

The final technical activity for the working session involved developing a matrix style legend map of carbon and species richness for Lao Cai Province. This demonstrated how two wall-to-wall datasets can be displayed on the same map. The example utilised the carbon and species richness layers already prepared for the province. After Corinna demonstrated the method, the participants then used a tutorial to create their own versions, with one participant giving a demonstration of his approach.



The matrix legend in the tutorial was implemented as a Raster analysis, but following this Corinna described how it could just as easily be implemented using two vector layers.

Wrap-up session

This started with a discussion about how the various layers we had been working with could be combined and MCA used to help identify potential areas for a particular REDD+ action. The group also discussed what approaches from the working session could be useful for REDD+ planning work in the provinces, highlighting:

- The usefulness of MCA
- The value of having visual material/evidence to use in discussions with provincial stakeholders
- The need to use specific data, such as statistics, as well as spatial information

The group also discussed some key issues and how approaches could potentially be modified/improved for use in Viet Nam. Two main questions raised by the participants were: How to combine ArcGIS and the analysis needed for REDD+ planning with MapInfo? How to overcome challenges associated with accessing data and data quality/accuracy?

With regards to what areas/questions should be followed-up on after the session:

- Circulate WaterWorld results and check how/when it is possible to upload own data to WaterWorld
- Check what forest layer is used in WaterWorld
- Explore utility of a map combining carbon stocks with elevation, slope and contour lines

Additional feedback from the participants' feedback forms is summarised in Annex 3.

Feedback on the session

In order to gather feedback from the participants about the utility of the working session and suggestions for the future, a feedback questionnaire was distributed. Eleven responses were received in total, with the results summarised below.

Regarding how useful the working session was in **developing capacity to support provincial planning** for REDD+ that incorporates multiple benefits and safeguards, all respondents participants reported that the session was very useful (six responses) or useful (five responses). Specific comments included:

- *"Developed planning method based on ArcGIS"*
- *"Understood method for provincial REDD+ planning...introduced to some new tools"*
- *"Positive, learned more about the rewarding experience of multi-criteria analysis, accessing and downloading from some websites, planning REDD+ activities"*

Most respondents answered that the session was very useful (five responses) or useful (five responses) in developing their **capacity to use spatial analysis tools**. Participants mainly highlighted the session increased their knowledge of GIS software and learning new tools and applications. One respondent mentioned that information sharing was also useful, and another stated networking opportunities. One respondent commented that they already knew many of the skills being shared.

Regarding the **most useful topics** covered in the session, four participants highlighted REDD+ knowledge, while ArcGIS knowledge, MCA, planning, and REDD+ benefits and risks topics were highlighted by two respondents each. Other useful topics mentioned were scenario development, matrix legend map, information exchange, and REDD+ implementation. When asked what were **the least useful topics**, participants considered that some of the specific GIS tools presented in the session were least useful (three respondents). Other topics stated here by respondents related to forest cover change, biodiversity, matrix legend map, and Vietnamese forest types/classification.

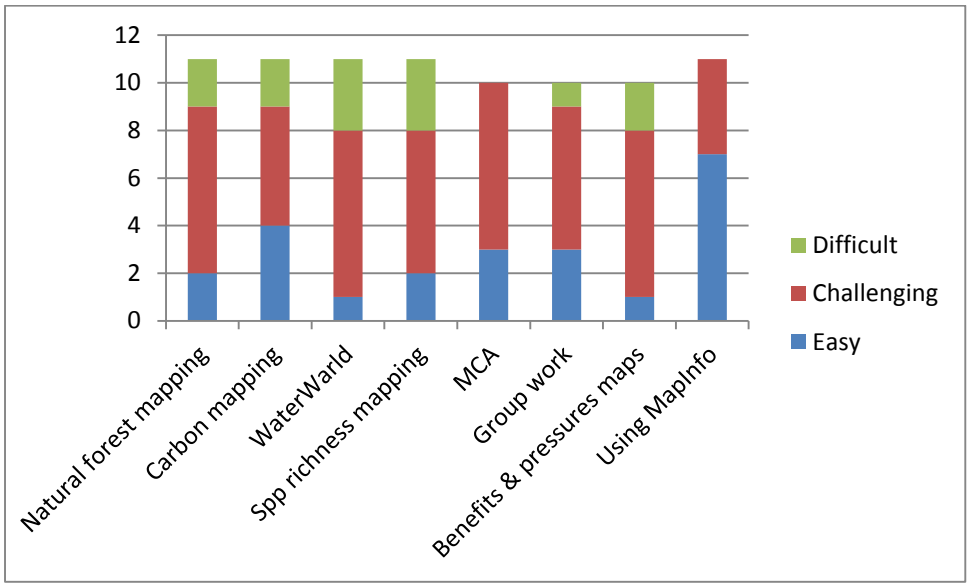
Participants were then asked **whether any subjects were covered too quickly or too slowly**, though there were limited responses. GIS application, MCA, and learning of new tools were felt to have been covered too fast by one respondent each. WaterWorld and the discussion on Vietnamese forest types were felt to have been covered too slowly by three respondents and one respondent respectively.

When asked about the **suitability of the workshop organization,** seven respondents considered it suitable, while one participant considered it very suitable, and another considered it not suitable, citing the large amount of technical information but the short time available. Another comment was that documentation for the session should have been better prepared.

Five participants stated that the **knowledge presented** during the participatory REDD+ activities was known to them before the workshop, and four participants said they **gained knowledge** through these activities. One participant said they had little knowledge before the sessions but did not comment on whether this changed as a result of the sessions.

Participants were also asked to **what extent they found different sessions easy, challenging or difficult** (see chart below for results). For example, the easiest session appeared to be Mapinfo, for which seven

respondents answered 'easy', and four respondents answered 'challenging', while the most challenging session appeared to be WaterWorld with three 'difficult', seven 'challenging' and one 'easy' response.



Participants were asked **whether, in order for them to become trainers at the provincial level, they would need more support**. In general, most responded that they would require more support, rather than finding the tools easy to use. Ten respondents replied that they would need more support for ecosystem services and MCA. The majority also answered that they would need more support to create combined maps and biodiversity layers. Six participants answered they would need more support to use participatory activities for training at the provincial level, compared to four participants answering 'easy to use'. MapInfo and carbon layers were perceived as relatively easy, with only four respondents replying they needed more support.

Regarding **potential applications of WaterWorld,** three respondents stated that it was useful for reference, while two others mentioned the richness of the data, but appreciated that an assessment of the accuracy should be undertaken. Other potential applications listed were for identification of priority areas for soil erosion control, MCA, and as a source where data was otherwise lacking.

In terms of **additional training to help to support the provinces** with spatial planning for their PRAPs**,** the development of scenarios and extra time for analysis and evaluation of results were stated twice. More specific suggestions included:

- *"How to identify weighting in pressures maps"*
- *"Advanced analysis methods"*
- *"Database should be more complete and need more time to the analysis and evaluation of the results"*
- *" Issues related to forestry and policies"*

When respondents were asked **what additional GIS technical support** would be helpful in their work to support PRAPs, they mentioned greater support on Arc GIS (two responses), as well as MCA, the multiple benefits toolbox, and combined pressures. One specific suggestion was on:

- *" Overlaying layers, correcting mistakes to create map on changes in forest/ information"*

When asked for other comments and suggestions, one respondent stated *"In general the training is an organised and serious study; it can be maintained and apply for the next course".* There were no other responses to this question.

Week 2: Provincial level

Overview

The participants in the second working session were 13 technical staff working in the forestry and other relevant sectors of the UN-REDD Viet Nam Phase II Programme pilot provinces. The facilitators for this session were officers of FREC, including Pham Duc Cuong, Bui Thi Kim Chi and Pham Ngoc Bay. Annex 2 provides the agenda for both working sessions. Similar in content to the first session, the second session focused on the following topics:

- Introduction about REDD+ and REDD+ implementation in Viet Nam, and the role of spatial analysis in REDD+ planning;
- Relevance of natural forests to REDD+ activities and mapping natural forest;
- Assessment of forest cover change;
- Development of forest carbon maps;
- Accessing and using data from international organizations, e.g. on biodiversity, species richness and ecosystem services;
- Identification of benefits and risks associated with REDD+ activities;
- Multi-criteria analysis of benefits and risks;
- Development of matrix legend map of species richness and carbon stocks

The working session provided training in theory along with practice in applying techniques and developing specific map outputs, this time using MapInfo software, which is more commonly used in Viet Nam's provinces. As MapInfo has more limited functionality than some other software packages (e.g. Arc and Quantum GIS), particularly for certain types of analysis, this limited the types of topics that could be covered in this session. (For example, MCA was not fully covered).

The participants often worked in groups so that they could discuss their work and provide their comments, which would then be shared with everyone for further discussion. The methods and examples used were associated as far as possible with circumstances and activities underway in the pilot provinces in order to help the participants better understand the issues.

Introductory session

Based on the materials and results of the first week's session, Pham Duc Cuong (FREC) gave a presentation on the role of spatial analysis in REDD+ planning, especially measures to enhance benefits and reduce risks in order to protect and develop forest resources.

- **Exercise I**: Exercises were then conducted on identifying benefits and risks, as well as measures to reduce risks and maximise benefits from REDD+ actions. Exercises were carried out in each group (3-4 people in a group), participants acted as representatives of agencies/departments of the province to discuss and determine the benefits and risks from REDD+ activities, which had been determined (e.g. scenario: expanding protected area). The table below shows the results of the discussion:

REDD+ Action		Potential risks/Potential benefits	Strategy
Extend the protected area (PA) network/establish new PA	RISKS	• Loss of land for cultivation • Loss of cattle grazing area • Change in land use planning	• Benefits/compensation policies for local people • Develop agroforestry models • Land/forestland for local people
	BENEFITS	• Improved water/ hydrological control • Improved livelihoods for local people • Improved environmental quality and biodiversity	• Prioritise use of local species • Develop forest/PA management plan • Monitoring of forest resources
Promote alternative livelihoods to minimise pressures on forests	RISKS	• Changes to methods of cultivation, but may lack funds, knowledge and experiences • Changes in local social economic planning	• Policies to support access to credit • Technical training • Building up pilots model for social economic development
	BENEFITS	• Diversified livelihoods/jobs for people • Diversified products • Biodiversity conservation	• Select occupations to suit local needs/conditions • Seek new markets for products
Allocation of forestland to local people/ community forest management	RISKS	• Loss of land for agriculture and grazing	• Promote agroforestry • Increase crop growing area • Training for local people on benefits of forest protection • Raising awareness about forest protection, biodiversity conservation
	BENEFITS	• Existing forests are better protected • Enhanced quality of forests • Improved environment	• Payments for forest ecosystem services (PFES) • Promote sustainable forest management

- **Exercise II:** In this component, trainees also split into groups (south and north) to carry out an exercise on using transparent maps to identify priority areas for REDD+ actions. After setting goals for an action, e.g. contribute to biodiversity protection, each group was required to select the most important/useful base map (with clear explanation about why they were selected). Then they discussed and overlaid other maps on the base map to choose priority areas for the action, based on multiple benefits, pressures, etc. After discussion, each group assigned a representative to present about on discussion results including:
    - Why they selected certain thematic maps (overlaying on the original map)
    - Why they selected such areas (delineating the maps)
    - The maps missing or necessary
    - How to collect and create such missing maps.

Mapping natural forest

The facilitators began this exercise by introducing the definition of forest and natural forest, as well as the current forest classification system in Viet Nam. The importance of natural forests to ecological protection, and the relationship between natural forests and REDD+, were discussed. The participants developed a forest cover map of Lao Cai Province and a forest classification system table involving three categories: natural forest, plantation and non-forest land. The table below shows how the categories were assigned:

Type	Land use	Categories	TYPE
1	G	Evergreen broadleaf - rich	Natural forest
2	TB	Evergreen broadleaf - medium	Natural forest
3	NG	Evergreen broadleaf – poor	Natural forest
4	PH	Evergreen broadleaf – regrowth	Natural forest
5	RL	Deciduous forest	Natural forest
6	TN	Bamboo forest	Natural forest
7	HG	Mixed bamboo and wood forest	Natural forest
8	LK	Conifer forest	Natural forest
9	RLRLK	Mixed conifer and deciduous forest	Natural forest
10	RNM	Mangrove forest	Natural forest
11	RND	Limestone forest	Natural forest
12	RT	Plantation forest	Plantation forest

Type	Land use	Categories	TYPE
13	ND	Limestone without forest	Non-forest land
14	DT	Bare land	Non-forest land
15	MN	Water body	Non-forest land
16	DC	Resident	Non-forest land
17	DK	Other land	Non-forest land

After discussion, the participants practiced grouping objects and the steps to create a natural forest map, and one participant presented the achieved results.

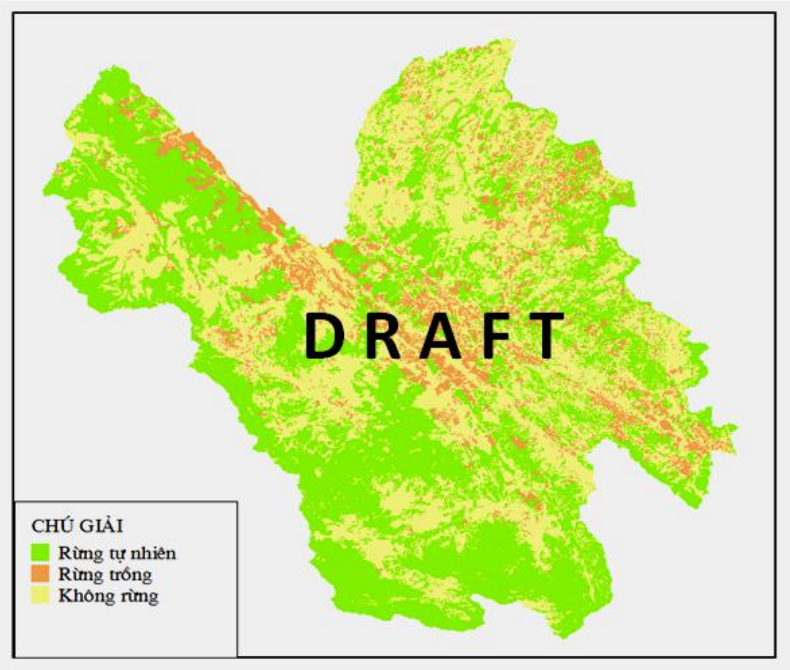


Figure 11: Map of natural and planted forest in Lao Cai Province, created using MapInfo

Mapping forest cover change

To create a forest cover change map, the participants prepared forest cover maps for at least in two periods. This activity and issues associated with it were also discussed actively, including:

- Input data for provincial forest status maps: there are various coordinate reference system, various implementation methods and various classification systems in use.
- Measures to improve quality of maps by periods: use of satellite images, field work, software training, etc.
- Drivers of forest cover change: deforestation, conversion to different purposes, infrastructures, etc.

This discussion was meaningful in determining methods and assessing the database condition, in order to improve quality of the databases in the future, which is a big issue of concern for most pilot provinces in preparation of their PRAPs in the near future. Based on maps of Lao Cai Province in 2005 and 2010, the participants were instructed in a map overlay method to create forest cover change maps. Due to some software functions and computer configuration, this overlaying is time-consuming in MapInfo. Therefore, we focused only on a small area of the province. The results were used to identify areas with deforestation, forest degradation and forest enrichment, etc., and to create a forest cover change map (see Figure 12).

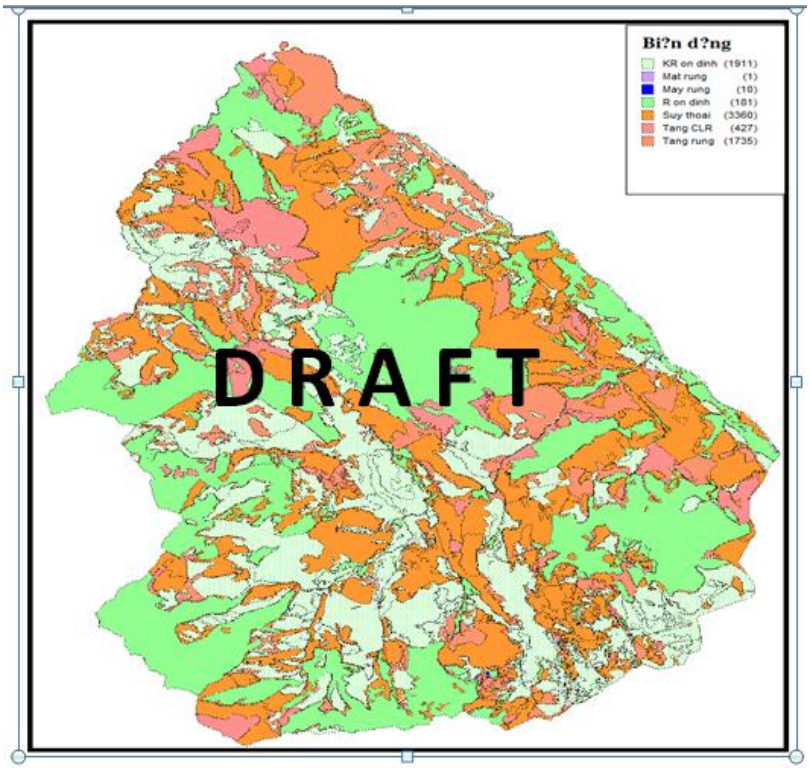


Figure 12: Forest cover change map for selected area of Lao Cai Province

The participants also learnt about methods to generate statistics on the status of forest resources by periods and a change matrix showing shifts between forest enrichment, deforestation, forest degradation, forest enhancement, stable forest land and stable non-forest land, as follows:

2005	2010									Total
	1	2	3	4	12	14	15	16	17	
1	102,1	12,4	842,5	18,6	2,6	39,1	0		0,1	**1017,4**
2		20,4	1297,1	582,4	12,5	50,3		4,6	17,7	**1985**
3		0	25746,5	2222,5	218,6	1078,1	0,7	41,9	135	**29443,3**
4	15,7	3,7	2122,5	15546,4	719,4	2192,8	1,2	64,6	368,8	**21035,1**
12		0,7	10,1	312,7	3276,3	191,2	20,4	14,8	141,3	**3967,5**
14	2,7	3,9	402,8	8905,3	2760,9	11119	5,3	278,9	4191,3	**27670,1**
15			0,6	0,5	6,6	0,3	432,6	0,2	4,9	**445,7**
16			0,3	1,7	0,8	2,1		157,1	2,9	**164,9**
17		5,2	381,9	783,2	217,6	3150,7	3,1	78,9	6717,4	**11338**
Total	**120,5**	**46,3**	**30806,1**	**28373,3**	**7215,3**	**17823,6**	**463,3**	**641**	**11579,5**	**97068,9**

Where:

- Red numbers: code of forest categories
- Pink: forest degradation
- Red: forest enhancement
- Blue: afforestation
- Gray: deforestation
- Green: bareland

Creating a forest carbon map

The next activity was creation of a forest carbon map for Lao Cai Province. The participants were provided with information about carbon and estimates of average carbon stock for various forest types (based on national average carbon values). They then used the 2010 forest cover map for Lao Cai Province and these values to create an above-ground carbon map, below-ground carbon map, and total carbon stock map (Figure 13). The land cover/forest cover types and values used were as follows:

Type	Forest Type	AGBCAR	BGBCAR	AG_BGCAR
1	Evergreen broadleaf - rich	157,42	43,29	200,71
2	Evergreen broadleaf - medium	117,19	32,23	149,42
3	Evergreen broadleaf – poor	85,79	23,59	109,39
4	Evergreen broadleaf - regrowth	80,33	22,09	102,42
6	Bamboo forest	11,88	3,27	15,15
7	Mixed bamboo and wood forest	54,29	14,93	69,21
11	Limestone forest	59,14	16,26	75,4
12	Plantation forest	73,15	20,12	93,27

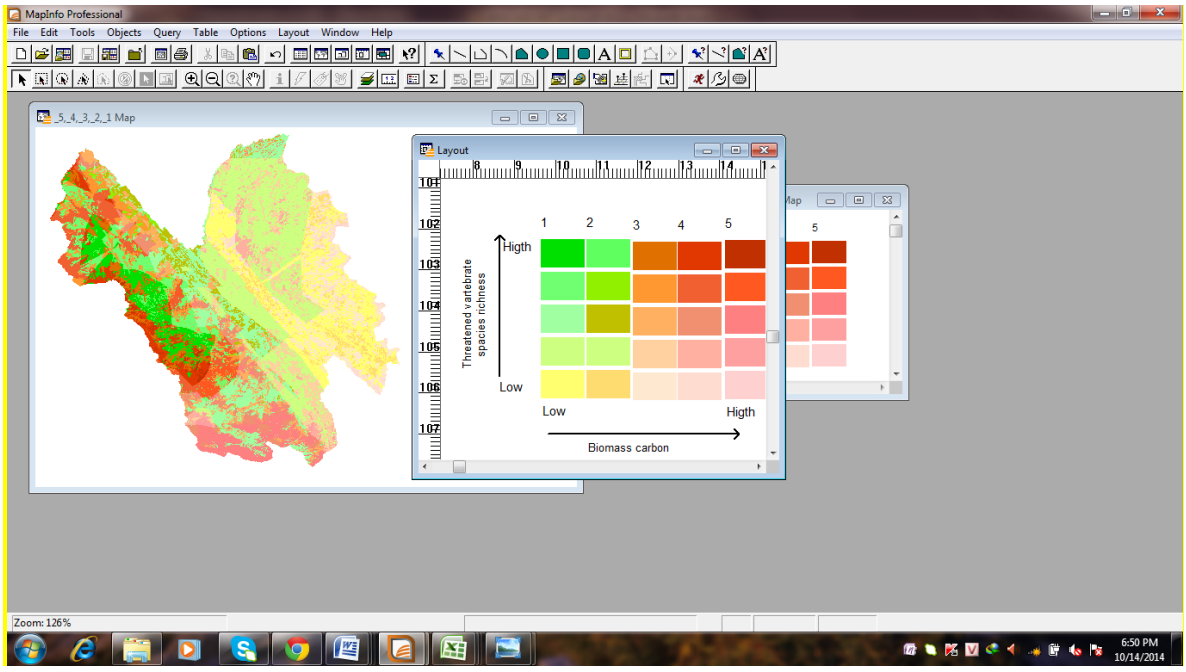
Figure 13: Map of forest carbon stocks in Lao Cai Province, 2010, ranging from high (green) to low (orange)

Biodiversity and species richness

Corinna Ravilious (UNEP-WCMC) gave a brief presentation about identifying and accessing international biodiversity data from Birdlife International and IUCN. These data are available on the respective websites and you must be registered and adhere to the terms and conditions specified. For the Birdlife data permission this requires awaiting an email granting permission to use the data. For the purposes of the session, data was collected on threatened species in Viet Nam, which could be shown for Lao Cai Province. The participants used such data to create a biodiversity map.

Matrix legend map

The last exercise in the session was creation of a matrix legend using the carbon and species richness maps developed for Lao Cai Province. The two layers are combined together on the one map, showing gradients of where they overlap. After an introduction to the technique, the participants practiced creating this type of map. Due to limited time and the constraints in MapInfo, it was difficult for the participants to complete the exercise. More practice and experience, as well as experimentation with the symbology available in MapInfo, is needed to create this detailed map.



Feedback on the session

At the end of the session, feedback questionnaires were distributed among the participants, with all filled out and returned. The key results are discussed below:

(i) All participants evaluated it as **useful**, with 15% categorising it as 'useful', 61% as 'relatively useful', and 23% as 'very useful', for main reasons as follows:

- Better understanding about REDD+
- More awareness of steps in spatial analysis to develop PRAP
- Enhancement of software skills
- Developed spatial analysis skills and methods

(ii) The **most useful** topics/content according to the participants were:

- Overlaying to make a forest change map
- Selection of maps/information necessary for spatial analysis
- Assessment, consideration of potential benefits/risks in PRAP planning
- Spatial data identification, overlaying methods
- Analyzing capacity, software applications for REDD+ activities

(iii) On their **understanding/capacity for specific activities**, the participants reported:

- Creation of forest maps: 15% of trainees evaluated this as relatively easy; 85% as fair;
- Overlaying for forest cover change assessment: 23% of trainees evaluated this as easy, 46% as fair, 31% as difficult;

- Creation of carbon map: 15% evaluated this as easy, 62% as fair, and 23% as difficult;
- MCA, and selection of benefits and pressures maps: 8% evaluated this as easy, 69% as fair, and 23% as difficult;
- Matrix style legend map: 15% evaluated as this easy, 46% as fair, 38% as difficult.

(iv) On the **organization of the working session**, 69% of the participants considered it to be 'suitable' or 'relatively suitable', 15% considered it 'very suitable', and another 16% did not comment.

Some **additional feedback** from the participants included that: (i) the training period was too short; (ii) and that training materials should have been delivered prior to the commencement of the training course.

In terms of additional training needs, the participants identified the following:

- 8/13 trainees hope for further training on ArcGIS software;
- 2/13 trainees hope for refresher training on REDD+ related issues
- 1/13 trainees wish for more intensive training on all issues;
- 1/13 trainees expected training on map overlaying, remote sensing image processing
- 1/13 trainees would like training/experience sharing during actual implementation.

Annex 1: Participants lists

Week 1

Name	Organization
Pham Duc Cuong	FREC – FIPI
Tran Thi Thu Hang	FREC – FIPI
Bui Kim Chi	FREC – FIPI
Pham Ngoc Bay	FREC – FIPI
Nguyen Thi Thuy Ha	FREC – FIPI
Pham Tran Hung	Sub FIPI- North West
Tran Huy Manh	Sub FIPI- South
Tran Thi Thanh Huong	Sub FIPI- South
Nguyen Van Luc	Sub FIPI-Hue
Vu Xuan Quy	FIPI
Bui Van Hung	NIAPP
Do Minh Phuong	NIAPP
Nguyen Huy Hoang	VAFS
Pham Tien Dung	VASF
Dr Pham Manh Cuong	VNForest/UN-REDD PMU
Nguyen Thanh Phuong	UNEP
Charlotte Hicks	UNEP-WCMC
Corinna Ravilious	UNEP-WCMC
Nguyen Thanh Tung	Translator/interpreter

Week 2

Name	Organization	Province
Nguyen Van Kien	Forest Protection Department	Bac Can
Ly Thi Thu	UN-RED PPMU	Bac Can
Nguyen Duy Nam	Forestry Department	Lao Cai
Nguyen Huu Tuan	Forest Protection Department	Lao Cai
Hoang Thi Kim Oanh	DONRE	Lao Cai
Nguyen Quang Giang	Forestry Department	Lam Dong
Hoang Cong Hoai Nam	Forest Protection Department	Lam Dong
Nguyen Nhu Do	Forestry Department	Ca Mau
Nguyen Van Hiep	Forestry Department	Ca Mau
Pham Duc Huy Hong	Forestry Department	Binh Thuan
Nguyen Tan Trong	Forestry Department	Binh Thuan
Nguyen Xuan Linh	Forest Protection Department	Ha Tinh
Nguyen Van Thang	Forestry Department	Ha Tinh

Pham Duc Cuong	FREC – FIPI	
Pham Ngoc Bay	FREC – FIPI	
Bui Kim Chi	FREC – FIPI	
Nguyen Thanh Phuong	UNEP	
Charlotte Hicks	UNEP-WCMC	
Corinna Ravilious	UNEP-WCMC	
Nguyen Thanh Tung	Translator/interpreter	

Annex 2: Working sessions final agenda

Date/time	*Content*	*Who*
Session 1: FREC/sub-FIPI/UNEP-WCMC joint session (17-20 June, 2014)		
Tues 17 June	**Welcome and introductions** **Overview of the working session objectives, activities and agenda** ***PART 1: Understanding the role of spatial planning in Viet Nam's PRAP process*** **1A: Introduction to REDD+ and the PRAP processes in Viet Nam** **Questions on agenda, process, etc** **1B: The role of spatial analyses in REDD+ planning: enhancing benefits and minimising risks** **1B: Interactive exercise**: Identify possible risks and benefits of REDD+ action (reducing emissions from deforestation) **1B, cont: Interactive exercise**: Transparencies as a tool for communicating REDD+ risks and benefits (using national Viet Nam maps) ***PART 2: Identifying potential zones for a REDD+ action - Maintaining existing forests*** **Review registrations & requests, share datasets, install multiple benefits toolbox** **2A: Definition of Forest & Natural Forest in Viet Nam; can natural forest be mapped?** - Presentation: Viet Nam's national definition of forest/natural forest (FREC) - Discuss and produce a map of natural forest compared to other forest according to the national definition *Wrap –up – Questions and answers relating to the day's activities.*	Dr. Cuong, UN-REDD PMU FREC Dr Cuong, UN-REDD PMU Charlotte, UNEP-WCMC Corinna & Charlotte, UNEP-WCMC
Weds 18 June	***PART 2: Identifying potential zones for a REDD+ action, cont.*** **2B: Map of carbon stocks** - Intro to forest carbon stocks/pools and importance/implications - Has a map of current carbon stocks been produced? - Produce maps of above and below-ground carbon stocks (not incl. soil carbon) - Overlay the carbon stocks map with natural forest to create data layer of carbon stocks within natural forest **2C: Forest cover change layer** - Map forest loss and gain, using Lao Cai data **2C, cont: Identify datasets which show other benefits from the action** - Discussion on forest function mapping currently done in Viet Nam *Wrap –up – Questions and answers relating to the day's activities.*	Corinna & Charlotte, UNEP-WCMC

Thurs 19 June	***PART 2: Identifying potential zones for a REDD+ action, cont.*** **2C, cont: multiple benefits** - Importance for biodiversity, including KBAs and species richness - Importance for ecosystem services, e.g. soil erosion control, water, NTFPs, including simulation using WaterWorld. **2D: Discussion on identifying and prioritising spatial layers for analyses: base layers, pressures layers, multiple benefits layers** 2D, cont: Group work to prepare layers - Natural forest, FCC and quality control - Biodiversity benefits - Ecosystem services benefits - Pressures *Wrap – up: Questions and answers relating to the day's activities.*	Corinna, & Charlotte UNEP-WCMC
Fri 20 June	***Part 4: Demonstration of using overlays in MapInfo*** - Preparing natural forest and FCC layers in MapInfo **2E: Multi-criteria analyses and overlays of carbon stocks in natural forests, other benefits and pressures** - Presentation on MCA - Discussion on multi-criteria analyses and weightings approaches in the Viet Nam REDD+ planning context **2E, cont: Matrix style legend map of carbon and species richness** *Wrap – up: Feedback session on the approach and methods for spatial analyses for REDD+ planning*	Mrs Hang (FREC) Corinna & Charlotte, UNEP-WCMC
Date/time	***Content***	***Who?***
Session 2: FREC/sub-FIPI/provincial joint session (24-26 June, 2014)		
Tues 24 June	**Welcome and introductions** **Overview of the working session objectives, activities and agenda** ***PART 1: Understanding the role of spatial planning in Viet Nam's PRAP process*** **1A: Introduction to REDD+ and the PRAP processes in Viet Nam** **1B: Presentation and discussion: the role of spatial planning in supporting REDD+ planning and the aims of this work** - Interactive exercise: Identify possible risks and benefits of REDD+ action (conservation of forest carbon stocks) - Interactive exercise: Transparencies as a tool for communicating REDD+ risks and benefits (using national Viet Nam maps) ***PART 2: Identifying potential zones for a REDD+ action - Maintaining existing forests*** **2A: Definition of Forest & Natural Forest in Viet Nam; can natural forest be mapped?**	FREC FREC Nguyen Thanh Phuong/PMU FREC/with support from UNEP-WCMC

	- Produce a map of natural forest compared to other forest according to the national definition *Wrap – up: Questions and answers relating to the day's activities.*	
Weds 25 June	***PART 2: Identifying potential zones for a REDD+ action - Maintaining existing forests, CONT.*** **2B: Forest cover change layer** - Map forest loss and gain, using Lao Cai data **2C: Map of carbon stocks** - Has a map of current carbon stocks been produced? - Produce maps of above and below-ground carbon stocks (not incl. Soil carbon) - Overlay the carbon stocks map with natural forest to create data layer of carbon stocks within natural forest **2D:Discuss and identify datasets which show multiple benefits from the action** - Importance for biodiversity: species richness map - Importance for ecosystem services, e.g. soil erosion control, water, NTFPs *Wrap – up: Questions and answers relating to the day's activities.*	FREC/with support from UNEP-WCMC
Thurs 26 June	**2E: Identify existing pressures and future pressures** - Datasets useful for mapping existing pressures, e.g. forest degradation/deforestation, roads, fire, mining, forest concessions, population density, poverty - Datasets useful for mapping future pressures, e.g. future land-use plans, future infrastructure/concessions, agriculture suitability **2E: Matrix style legend map of carbon and species richness** *Wrap – up: Feedback session on the approach and methods for spatial analyses for REDD+ planning*	FREC/with support from UNEP-WCMC