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| **Spatial analysis to support provincial REDD+ action planning in Viet Nam****Joint working session for the UN- REDD Viet Nam Phase II Programme** |
| UN-REDD PROGRAMME  |
| **Working Session Report***xx- xx November, Institute for Forest Ecology and Environment, Viet Nam Forestry University, Xuan Mai* |

The joint working session covered in this report was organized by the Institute of Forest Ecology and Environment (IFEE) and the UN-REDD Viet Nam Phase II 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 Organization 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 from the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) for this workshop. UNEP-WCMC is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world’s foremost intergovernmental environmental organisation. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

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| Acronyms and abbreviations |
| CIPDEM | Co-Implementing PartnerDigital Elevation Model |
| FIPI | Forest Inventory and Planning Institute |
| FREC | Forest Resources and Environment Center |
| EIA | Environmental impact assessment |
| ES | Ecosystem services |
| GISGIZ | Geographic Information SystemDeutsche Gesellschaft f**ür Internationale Zusammenarbeit** |
| GPSIFEEIMHEN | Global Positioning SystemInstitute for Forest Ecology and EnvironmentInstitute for Meteorology, Hydrology and Environment |
| IUCN | International Union for Conservation of Nature |
| KBAMONRE | Key Biodiversity AreaMinistry of Natural Resources and Environment |
| MoU | Memorandum of Understanding |
| NGO | Non-government organization |
| NP | National Park |
| NTFPsPFESPRAPs | Non-timber forest productsPayment for ecosystem servicesProvincial REDD+ Action Plans |
| REDD+ | Reducing Emissions from Deforestation and Forest Degradation; ‘plus’ Conservation of forest carbon stocks, sustainable management of forests; and enhancement of forest carbon stocks |
| RF modelSRTMSub-FIPI HCMSub-FIPI NW UNEP | Random Forest modelShuttle Radar Topography MissionSub Forest Inventory and Planning Institute for Ho Chi Minh CitySub Forest Inventory and Planning Institute for the North-West RegionUnited Nations Environment Programme  |
| UNEP-WCMCUSGSVFUWDPA | United Nations Environment Programme World Conservation Monitoring CentreUnisted States Geological SurveyViet Nam Forestry UniversityWorld Database on Protected Areas |

# Executive Summary

# 1. Introduction

## 1.1 Overview

Following on from the working session that took place in late September Charlotte and Corinna spent four days working with each of the CIPs to both get an update on how far along in the Provincial REDD+ Action Plan development process they were and provide additional support on the development of workflows for the additional spatial analysis that would complement and help to validate the participatory results. The CIPs each provided an update on how the workshop on drivers/barriers and the workshop on solutions/ interventions went.

…... For the bulk of this follow-up working session, we discussed specific technical issues and the development of spatial workflows with each CIP individually. We spent one day with each partner. Following the individual partner sessions, we held a joint working session bringing together the CIPs and PMU staff in order to share experiences and approaches for the mapping of areas suitable for interventions.

## 1.2 Objectives

The working session had three main objectives:

1. To facilitate the exchange of knowledge and experiences between the CIPs involved in spatial analysis for PRAP development.
2. To provide technical support to CIPs in the preparation and use of spatial layers for the development of PRAPs.
3. To build the capacity of CIPs to take forward the spatial analysis work, with a focus on mapping potential zones for REDD+ intervention packages and final outputs.

# 2. Partner-to-partner sessions

During each partner session, we started with an update on the status of the work in the province/s concerned and clarified the methods used so far to check/validate the participatory results from the workshops. Although all CIPs had finished the second workshop on solutions, few had completed field checks or benefits & risks analysis. Methods for validating participatory results from the drivers/barriers workshop varied, with some using on statistical analysis in Excel as well as spatial analysis. For each session, we worked together to develop a spatial analysis workflow to validate participant selected locations for either a driver/barrier or an intervention. We also covered some specific questions and issues, such as ongoing challenges accessing coastal erosion and aquaculture data, and lack of information on specific drivers in Ca Mau, and how benefits and risks could be incorporated into spatial analysis (e.g. including biodiversity information to highlight either a potential benefit or risk). The partners asked for further clarification on the risks and benefits analysis in the PRAP process, so this was added to the agenda for the joint workshop. Each CIP was also asked to prepare the following for the joint workshop with their colleagues: a draft workflow (and map) to share; and the list of intervention packages for their province/s.

## 3.4 Institute of Forest Ecology and Environment (IFEE)

On day 1 of the partner-to-partner sessions we met with the IFEE team at their Office at the Viet Nam Forestry University, about an hour from central Hanoi. IFEE were furthest along in the process with the Ha Tinh province solutions workshop having happened in late October. Their outputs included a solution tree and intervention packages for each driver and ranked communes map for each solution tree. Specific areas were also identified but not marked on the map. IFEE had done some additional spatial analysis to validate the participatory maps on drivers and district level maps had been prepared using these results to use in the next step of field verification.

The Field verification had already started and was ¾ the way through. In the verification process they were checking whether the drivers/barriers were correct, whether the selection of the priority communes for each driver/barrier were correct and to check the proposed solutions/intervention packages. They first grouped the solutions by district and produced three maps for each district 1) reduction of deforestation and forest degradation 2) planned activity for increasing plantations 3) potential for enhancement of natural forest. They met at the district level to verify the packages of solutions i.e. intervention packages. In addition to the maps they produced a consultation template for the prioritised districts to work with district divisions together with commune leaders to consult on drivers of deforestation and degradation and barriers to the enhancement of natural forests areas and quality. They visited key communes to meet with communities and developed another short questionnaire to verify solutions and areas more clearly. In the field checks as part of the questionnaire they also included some questions on risks and benefits and feasibility to ask stakeholders. IFEE highlighted a few risks that were mentioned 1) Planting in the wrong season impacting survival rate of seedlings 2) Pressures from Livestock and 3) risk of soil erosion. The one they had thought about the most and included in their draft workflow was soil erosion risk. They did not go into detail about how they were going to do that but they did indicate that they already have an existing methodology that they plan to use to create this layer which included using a DEM and rainfall data. They plan to do more risks and benefits analysis. IFEE highlighted the challenges they were facing because of the tight deadline of end of December for submitting the draft PRAPs and also that the PRAP guideline does not have any information on spatial analysis.

IFEE did not feel they needed any additional technical support on the GIS side and wanted to share their experience of combining the participatory map and validated map. They had already started giving some thought to the workflows for validation and identification of potential intervention areas. We spent the time outlining the workflow for the Intervention package: Enrichment planting in Natural Production Forest Areas to identify areas where there is potential to overcome barriers and implement enhancement activities.

IFEE outlined the criteria they planned to use for identifying potential areas for enrichment planting and together with Charlotte and Corinna drew out the planned technical workflow. IFEE decided to use MapInfo to develop the workflow. The final draft workflow presented at the join 2 day session is presented below. The comments in red are where some further clarity is still needed. Corinna and Charlotte highlighted that at this stage we are not doing site level planning but broad areas where enhancement activities could potentially take place and excluding areas where enhancement activities would be inappropriate. They suggested that it might be worth also exploring other areas where the timber volume > 30m3/ha but poor quality forest, with the rest of the criteria remaining the same. A final map could for example show priority communes according to the participatory map and field checks and on top of that areas of Natural Production Forest with potential for enrichment planting where there is high erosion risk (i.e. both within and outside of priority communes). Those areas with timber volume <= 30m3/ha could be further highlighted. This may also be present a series of simpler maps in an annex of the PRAP document to transparently show the stages of the final map development and criteria used.

Figure X: DRAFT Workflow presented by IFEE for areas for Enrichment planting in Natural Production Forest

Erosion = f(slope, rainfall, porosity, forest cover)

Soil porosity

Forest cover

Rainfall

(Use program Visual Foxpro)

Overlay (MapInfo)

Output vector: Area of Natural Production Forest with potential for enrichment planting where there is high erosion risk (within and outside of priority communes)

Ranked map of priority communes for enhancement activities as a result of Workshop 2 + Field check

Output vector: Soil erosion risk map

**Input: (Forest Status 2014)**

*Select Natural Forest categories only, where the function is production forest, the forest owners are households and where the forest reserves with timber volume < = 30m3/ha.*

*To do this they planned to use the Query command (MapInfo)* Maldlr=any(17,37) and malr3=3 and mgo<=30 and Machur<9000

(Maldlr is forest type, mgo is volume, mair3 is forest category, and Machur is forest owner)

Output vector: Natural Production Forest (Volume: <=30 m3)

Owner: CPCs, HHs

Output vector: Area of NPF with potential for enrichment planting inside and outside of priority communes

Overlay (MapInfo)

**Input: topographic maps –** are these raster layers e.g. DEM or vector?

Slope

## 3.2 Sub-FIPI Northwest (NW)

The second day we met with the Sub-FIPI NW team at their Offices in central Hanoi. Their outputs from workshop 2 included 4 solution trees and 16 intervention packages for each driver and ranked communes map for each solution tree. They highlighted a lot of overlap between the problem trees. Their next steps were processing the stakeholder information and developing plans for undertaking the field checks. They were interested in learning from the experience of IFEE for what to find out during field checks.

In terms of the participatory results from the drivers/barriers workshop they had not yet combined with any additional spatial analysis but planned to do so. During this one day Corinna and Charlotte were asked to provide some support to the development of workflows, provide some advice for the field checks and some clarity on risks and benefits analysis. Charlotte explained that the UNREDD Programme were aware of the lack of clarity on the risks and benefits analysis in the PRAP guidelines and that this topic was added this as an agenda item to the combined 2 day session. She also indicated that IFEE had started collecting some risks and benefits information as part of a questionnaire during field checks.

Huong, Quyen and Chinh presented some example input and output maps from workshop 1, including the 2005-2014 forest cover change map and the participatory map for the driver illegal logging. The question asked they asked the participants was “where does illegal logging happen high frequency and where may there be future illegal logging?” The illegal logging they were referring to was high value timber leading to degradation rather than deforestation. They indicated that there was some impact from fuel wood but this was not significant and in the future areas at risk are likely to be communes with hardwood and valuable species, rich forests with high volume which have these kinds of species and strictly protected forests may also be at risk. They highlighted that although there are laws for conservation and protection measures illegal logging ignores this. In the Solutions workshop for Bac Kan province they had nominated communes and locations for particular intervention packages but hardly mapped them out. Quite a few of the intervention packages could not be mapped e.g. Awareness raising and communication. It was also highlighted that some intervention package locations may change as validated with additional spatial analysis and field checks and later on costing.

Sub-FIPI NW decided to prepare a workflow for validating one of the results from WS 1 - the ranked communes map for illegal logging to identify whether based on spatial analysis do the areas that were prioritized match the areas identified in the participatory drivers map and also to exclude areas where the driver cannot be occurring i.e. it has to be in a natural forest area. Some of the criteria they identified to consider based on information collected in workshops 1 and 2 included: natural forest of rich and medium forest quality, highlighting inside and outside of protection forests, area of Natural forest with potential for enhanced protection, geophysical characteristics and high biodiversity areas.

Corinna highlighted that the documenting of the workflow and thinking about the spatial logic is the most important part and being as specific as possible so that another CIP can understand what and how you intended to do a piece of analysis and how they could improve or modify it for use in their own province. She also provided a guidance document with tips on using ArcGIS model builder and undertaking Raster analysis in ArcGIS.

Workflow for validating illegal forest areas:-

Workflow generated for Areas of forest with potential for protection enhancement to address the driver illegal logging:-

**Forest 3km from the village across the unprotected**

**Natural forest**

**(Rich forest, forest TB)**

**Results verified seminar II
(Area REDD + interventions will need to strengthen forest protection station)**

**Raster Calculator**

**Boolean and**

**The area outside the scope of protection**

**Is Null**

**Raster Calculator**

**Raster Calculator**

**TN forest area within 3 km from the village**

**The distance from residential areas**

**Euclidean Distance**

**Residential areas**

**Distance from the guard station**

**Euclidean Distance**

**Existing forest protection station**

**Natural forests raster format**

**Polygon to Raster**

## 3.1 Sub-FIPI Ho Chi Minh (HCM) Office

## 3.3 Forest Resources and Environment Center (FREC)

# 2. Joint session

Following the individual partner sessions, we held a joint working session bringing together the CIPs and PMU staff in order to share experiences and approaches for the mapping of areas suitable for interventions. The agenda for this joint session is provided at Annex 2. The session was opened by Madame Thuy, Deputy Director of the UN-REDD Viet Nam Phase II Programme. In the first part of the session, we examined the lists of intervention packages for each province and asked the CIPs to nominate which of these packages they planned to prepare maps for, and which they were uncertain about. This highlighted questions around which level of an intervention package should be mapped (e.g. individual actions or the whole package), and what the final maps in the PRAPs should look like (e.g. to be the most use to decision-makers)? Each CIP then presented the draft workflows and in some cases maps that they had developed that week. There was substantial discussion amongst the group regarding how complex a workflow should be, and at which stage of the process should additional spatial analysis be carried out. The draft workflows were also shared among all the partners, and each CIP was asked to adapt another CIP’s workflow to their province. The final part of the session focused on two issues where the CIPs were seeking extra guidance form the UN-REDD Programme: what to prepare and how to carry out the field checks; and how to carry out analysis of benefits and risks of the intervention packages? Mr Nguyen Trung Thong and Mr Shyam Paudel attended this last section to provide some information on these topics. IFEE and Sub-FIPI South also shared their experiences with conducting field checks. At the close of the session, the CIPs were encouraged to share any workflows in a dropox folder, and to submit any products for review or questions they may have on the spatial component to UNEP-WCMC.