"Strengthening Regional Support to National Forest Monitoring Systems for REDD+ in the Pacific"

Report on the National Forest Inventory Capacity Building Workshop for Vanuatu

7th-11th March, 2016.

UN-REDD PROGRAMME

Food and Agriculture Organization of the United Nations

UNDP

UNEP

Pacific Community

Communauté du Pacifique

Report By:

Jalesi Mateboto and Loraini B. Kasainaseva (SPC)
(with input from Adam Gerrand, FAO)

Sustainable Resource Management Programme

Land Resource Division (LRD), Pacific Community (SPC)

Narere, Fiji.

Photo Credit:

Cover Photo: Group photo of the participants to the 2016 Vanuatu Backstopping Workshop. Photo by Loraini B. Kasainaseva

Workshop Photos:

Figure 1: Participants at the summit plantation. Photo by Loraini B. Kasainaseva.

Figure 2: Group discussion. Photo by Loraini B. Kasainaseva

Figure 3: Beer-bottle top forest management exercise Part 1. Photo by Loraini B. Kasainaseva

Figure 4: Beer-bottle top forest management exercise Part 2. Photo by Adam Gerrand.

Abbreviations

FAO: Food and Agriculture Organization of the United Nations

FCPF: Forest Carbon Partnership Facility

GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit

NFMS: National Forest Monitoring System

NFI: National Forest Inventory

NFP: National Forest Policy

PICs: Pacific Island Countries

REDD+: Reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries

SPC: Pacific Community

UNDP: United Nations Development Programme

UNEP: United Nations Environment Programme

UN-REDD: United Nation Collaborative Programme on Reducing Emission from Deforestation and Forest Degradation

Table of Contents

1.0 Background

The project "Strengthening Regional Support to National Forest Monitoring Systems for REDD+ in the Pacific", funded by the UN-REDD and executed by the Food and Agriculture Organisation (FAO) through the Pacific Community (SPC) has been carrying out capacity building activities since its implementation in May 2014. Together, FAO and SPC have been assisting the countries in building a robust National Forest Monitoring System in the Pacific through its regional training workshops and national backstopping activities.

The Vanuatu backstopping workshop, which was held in Port Villa from the 7th-11th of March was attended by 20 participants from the Vanuatu Department of Forest (Annex 1) who were based in Port Vila and from the outer islands of Espirutu Santo, Malekula, Erromango, Vanua Lava and Tanna. This workshop, which was facilitated by UN-FAO and SPC looked at the current status of the Vanuatu monitoring system, specifically their NFI, its National Forest Policy (NFP) and its link to an NFI, the planning of an NFI and the drafting of a 'roadmap for a NFI proposal'.

Working from their National Forest Policy, the Vanuatu Department of Forests (DoF) has over the years carried out projects that promote and ensure the sustainable utilisation and management of their forest resources. As stipulated in their NFP, the DoF need to carry out forest assessments every ten years in order to properly manage their resource. Though works have been done in the field of National Forest Inventory (NFI) by International organisations such as the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the forestry department still feel the need to implement a suitable National Forest Monitoring System by planning a full NFI at national level by local stakeholders (specifically DoF) with the support of regional governing bodies, so as to ensure that local issues are considered.

2.0 Purpose of the Workshop

The main purpose of the workshop was to build capacity development toward the implementation of a full National Forest Inventory in 2017. Specific objectives of the activities were to:

1. Develop capacity on NFI;
2. Review previous NFI experiences in Vanuatu;
3. Clarify the main purpose of an NFI for Vanuatu;
4. Help with design building on the pilot testing done with GIZ support in 2014/15;
5. Develop an outline for a road map toward a full NFI proposal;
6. Identify the next steps toward NFI implementation.

3.0 Summary of Workshop Proceedings

3.1 Welcoming remarks

The workshop was officially opened by the Vanuatu Director of Forestry, Mr Tate Hannington with an opening prayer from Mr Samuel Bebe. In his opening remarks, Mr Hannington welcomed the facilitators, FAO and SPC, and the Vanuatu foresters that had travelled in from the outer islands with an overview of the current work that the Vanuatu DoF is carrying out in support of sustainable forest management. Mr Hannington also thanked the FAO and SPC team for their current support in assisting them in planning and implementing a full NFI and deliberated upon the need for further technical and financial support.
Mr Adam Gerrand, the resource personal from UN-FAO later provided an overview of the workshop objectives and agenda. He reflected on how FAO and SPC plan to assist Vanuatu in their NFI by building capacity and developing a roadmap towards a full NFI for 2017.
This was followed by a round of self-introduction from the participants.

3.2 SPC NFI Support Facility

The project "*Strengthening Regional Support to National Forest Monitoring Systems for REDD+ in the Pacific"* is a response to the lack of capacity in most Pacific Island countries to set up and maintain national forest monitoring systems. One of the aims is to support the establishment of a Regional forest inventory facility that will assist member countries with their National Forest Inventory. An overview was presented by Mr Jalesi Mateboto of SPC on the purpose of this project and the need for such a facility.
The Heads of Forestry Meeting in 2011 discussed and endorsed SPC to continue working on Sustainable Forest Management. The lack of reliable inventory data was however identified as a challenge in managing the forest resources sustainably. National Forest Inventories has become an important issue that needs attention. With funding assistance from the UNREDD , and technical support from UN-FAO, the Pacific Community has established a Regional Forest Inventory Support Facility that is housed within the Land Resource Division (LRD) of SPC. This facility will be able to mobilise resources (Human, Physical and financial) and assist countries with their National Forest Inventory.

3.3 FAO's Role in Supporting NFI

Elaborating on the role of the UN-FAO in promoting sustainable forest management, Mr Gerrand discussed on past and present activities of the organisation and their plans to have a broad integrated concept of National Forest Monitoring Systems in the future. The Food and Agriculture Organisation has been supporting countries in implementing projects that is aimed at improving forest data since the 1960's by providing technical expertise, reports and project funding's. Over the years, FAO has come up with mechanisms that assisted countries in measuring their resources. One of these mechanisms is the National Forest Monitoring and Assessments programme (NMFA) that came into place since the year 2000. This programme builds capacity by addressing country circumstances and international reporting requirements. It also promotes south-south collaboration through knowledge sharing and is solid and sustainable. Guidelines, such as the 'Voluntary Guidelines on National Forest Monitoring', which takes into account the requirements for REDD+ reporting is being developed by FAO to assist countries in their NFMS.

As part of the UN-REDD programme, FAO together with SPC has been working together to promote forest monitoring tools such as the National Forest Inventory and Satellite Land Monitoring System (SLMS) in the Pacific.

3.4 Past NFI Experience in Vanuatu

Based on their past experience, participants namely Mr Dick Tomker, Mr Jude Tabi, Mr Watson Lui, Mr Simon Naupa, Mr Rexon Moli and Mr Philomen Ala shared their experiences on previous NFI processes and the challenges that they faced.

Vanuatu's first NFI was carried out in 1989 with funding through the Australian AUSAID programme. This was carried out on all the islands. Vanuatu foresters during the time were only trained in carrying out data collection processes instead of the whole NFI process from the planning, implementation, data analysis and reporting phase. The field data were handed over to international consultants for analysis and reporting. As remote sensing and mapping programmes were not readily available, field teams would use stereoscopes and aerial photographs to locate sample points followed by plans to access these points. In the field, a compass and tape measure was used to locate these points. Rectangular plots of 30m*270m were established from the plot point.

In 2012, a NFI design was piloted on the island of Santo by DoF with the support of GIZ. IPCC Guidelines require the measurement and estimation of two variables to calculate total forest carbon: forest area change and carbon stock change estimation or emission factors

(carbon density). These should be based on a common methodology, such as use of remote sensing and ground-based methods. Reference levels and reference emission levels (RLs/RELs) need to be established and verified, taking national circumstances into account. MRV should be based on robust national forest inventories (existing or developed) and subject to periodic external review.

The SPC LRD in close collaboration with FAO, developed a manual on Monitoring, Assessment, and Reporting for Sustainable forest Management (MAR – SFM) in the Pacific Island Countries in 2010. The multi-stakeholder consultation workshop in Vila on 25th October 2011, found the MAR system feasible and agreed on its adoption for Forest inventory, Carbon Assessment and Forest Monitoring.

3.5 UNREDD Initiative in Vanuatu

The UN-REDD Programme is the United Nations Collaborative Initiative on Reducing Emissions from Deforestation and forest Degradation (REDD+) in developing countries. UN-REDD works under the collaborative role and technical expertise from the Food and Agriculture Organisation (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) and assists countries with their national REDD+ programmes. Briefly presented by Mr Ioan Vutilolo, the participants and facilitators were brought up to speed with the latest on REDD+ activities in Vanuatu. Vanuatu is one of the five countries in the Pacific that comes under the UN-REDD partner countries. The REDD+ readiness process in Vanuatu began in 2007 with the establishment of the Vanuatu *Carbon Credits Project*. This process has been ably supported by the SPC/GIZ regional project, *Climate Protection through Conservation in Pacific Island Countries* and the World Bank (WB) *Forest Carbon Partnership*. In support of Vanuatu's REDD+ initiative, the World Bank Forest Carbon Partnership Facility (FCPF) participant committee has recently accepted the country's REDD+ Readiness Preparation Proposal (R-PP) and approved funding of up to US$3.6 million to assist in the development of their national REDD+ programme (National REDD+ Scheme). This is still under development though works have already started on the ground under the *community-based REDD+ pilot project* (approved by government) that is being implemented by Live and Learn.

3.6 Vanuatu Forest Mapping Information System

Vanuatu's forestry mapping information system is looked after by the Planning division of the DoF. Presented by Ms Phyllis Kamasteia, the main discussion were on the use of software in improving forestry data presentation, planning and development. With the support of the Geo-science division (GSD) of SPC, the planning division has had a number of training opportunities on the use of mappings programmes such as Arc-Gis, Map-info, and incognito. SPC also trained two of their staff, Phyllis and James for a month on the use of the OpenFORIS Collect earth tool. This training was part of the Satellite Land Monitoring Systems component under the project '*Strengthening Regional Support to National Forest Monitoring Systems for REDD+ in the Pacific'*. On this point, Ms Kamasteia also raised that they have not completed the collection of their 10,000 sampling points as there has not been any further contacts with GSD. FAO/SPC will follow up to provide support to prepare the Collect Earth datasets for Vanuatu and see if we can arrange some refresher training.

3.7 Sustainable Forest Management Practical Exercise

This practical exercise was based on a scientific journal article titled '*Beer-Bottle tops: a simple forest management game*' written by J. Vanclay *et al*. in 2006[1]. With this exercise, the participants were divided up into groups of four made up of management, planning and field officers. This game provides an effective way of capturing forest planning and management concepts which is sometimes too complex. Each group were given butcher paper, topography maps (scale of 1:50000) and 160 coloured stickers (to replace the beer-bottle tops used in the original game) with different colours that represents the wood volume on 1,000 hectares. The stickers were spread out over the cubic grid of the maps and turned so that the colours are not visible. Two separate exercises were carried out on this activity, one was on 'area control' and the other on 'volume control'. With area control, participants were asked to harvest an equal area of forest each year for 20 years (each person was to take equal number of stickers from the map on their turn). Results were than recorded on the butcher paper (20 year period against the corresponding wood volume harvested). This allows participants to manage the land area being harvested though wood volume may be very high or low. The second exercise focused on 'volume control'. In this exercise participants were asked to first calculate the

[1] Vanclay, J., Keenan, R., Gerrand, A., Frakes, I. (2006). "Beer-bottle tops: a simple forest management game." International Forestry Review **8**(4): 432-438. http://epubs.scu.edu.au/cgi/viewcontent.cgi?article=1472&context=esm_pubs

total standing volume and allowable cut from an initial small inventory sample of 2, 4, 6 or 8 stickers. This allows them to manage the amount of trees that they should harvest each year by giving them a target value for 'allowable cut' (some groups had very high figure while the others had medium to low figures). Results from this exercise indicated that the teams that had overestimated the allowable cut had harvested all of their trees in 20 years while the teams that had lower allowable cut managed to sustainably harvest their trees for 40 years with a few left. This exercise allowed teams to smartly manage their harvest based on the calculated allowable cut.

Overall, different results and scenarios were achieved and discussed thoroughly among group members. Participants found this practical exercise to be very realistic and useful in terms of planning for sustainable forest management in Vanuatu.

3.8 Field Trip to 'The Summit' sandalwood plantation

The Vanuatu DoF organised a half day trip on the second last day of the workshop to a 240ha sandalwood plantation called 'The Summit' owned by Mr and Mrs Jim and Lesley Batty. In 1994, the owners of the summit established its first sandalwood plantation on land that had been previously used for cattle rearing, coconut plantation and timber logging, the shift to a sandalwood plantation came about due to the decreasing number of sandalwood trees in the country and most importantly as a need for strengthening the sandalwood industry in Vanuatu. The owners also saw this as a good opportunity to contribute to the already depleting endemic species. The dominant variety grown is the local species of sandalwood, *Santalum austrocaledonicum*. The company have their own nursery and also carry out experiments on techniques that would enhance its growth rate and produce high timber volume. This promotes knowledge sharing between the DoF and the company to improve locally owned sandalwood plantations in Vanuatu. Apart from its timber production, the company also uses unused materials for their sandalwood perfumes and scented oils. Today, the company has about 150,000 sandalwood trees and have contracted farmers from the outer islands of Tanna and Erromango to establish sandalwood plantations in a joint venture to improve the sandalwood supply and production of end products flowing to overseas markets. After a tour around their gardens (company also promotes eco-tourism), sandalwood nursery and plantation and perfume/oil production facility, the participants were provided refreshments by the owner. Later on, the director of DOF, Mr Hannington Tate, officially thanked the company for their cooperation and assistance in making the trip a successful one.

3.9 Vanuatu's Roadmap to an NFI proposal

The main aim of the Vanuatu backstopping workshop was to continue with capacity development towards the implementation of a full NFI in 2017. Capacity building activities carried out during the training covered areas of NFI, linkages between national forest assessments and national policy and sustainable forest management. This would allow the participants to write up a draft roadmap for Vanuatu's NFI at the end of the workshop. Resource personal, Mr Gerrand reiterated the need of how the document should capture national needs and circumstances and raised the question *'what does Vanuatu need to do to prepare for an NFI?'* Vanuatu is planning to have a full NFI implemented by 2017 but will need resources (financial and human) in order to make this happen. To do so they will need to produce a proposal for funding and a roadmap.

Participants were divided up into four groups lead by the management team of DoF and were assigned different topics from the article 'How to do an NFI in 20 steps' by Chip Scott from USFS and Carla Ramirez from FAO. The four main topics were:

A. Planning component;
B. Remote sensing component;
C. Inventory design and data collection component; and
D. Processing, reporting and dissemination component.

The main idea was to bring together at the end, four documents that would be used to write up a document like a 'table of contents' for the roadmap which will be filled later on.

4.0 Discussion and Recommendations

The Vanuatu backstopping workshop was overall a success as the main objectives were met. During the training exercises, the facilitators were able to build capacity on NFI and sustainable forest management. Vanuatu DoF was also able to present on their past experience on NFI and their current status. Forest inventory in Vanuatu has not always been an easy task for the forestry department as they do not have the capacity and resource to carry out a full NFI across the islands. In addition to this, work with international organisations

have not always worked out well in terms of delivering of NFI reports or the lack of coordination between national and international key personals.

A few recommendations were put forward by the facilitators to assist Vanuatu in their proposed 2017 NFI. These were:

1. Set up a working group for the proposed NFI. This will be made up of selected staff of Vanuatu DoF and representatives from the SPC NFI facility.
2. Working group to write up a schedule on the drafting of the NFI roadmap and a Concept Note as a proposal for funding.
3. FAO will prepare a dataset for the Department to undertake a study across the country using the FAO "Open-FORIS Collect Earth" tool which will help get an updated set of statistics on forest cover as well as be useful for helping the plot design and stratification for the proposed NFI. FAO will also investigate the possibility of providing some refresher training on Collect Earth to VDoF staff if the funding for travel can be arranged, hopefully with the support of SPC.

5.0 Annex

5.1 Annex 1: Participant List

	Name	Organization	Location	Email
1	Ioan Vutilolo	Forestry Department	Vila	Vutilolo3@gmail.com / iviji@vanuatu.gov.vu
2	Watson Lui	Forestry Department	Vila	Watson_lui@yahoo.com/ wlui@vanuatu.gov.vu
3	Jude Tabi	Forestry Department	Vila	tjude@vanuatu.gov.vu/ ajubula@gmail.com
4	Godfrey Bome	Forestry Department	Vila	gbome@vanuatu.gov.vu
5	Hanington Tate	Forestry Department	Vila	htate@vanuatu.gov.vu
6	Phyllis Kamasteia	Forestry Department	Vila	pkamasteia@vanuatu.gov.vu
7	James Samuel	Forestry Department	Vila	Jsamuel925@gmail.com
8	Anne Marie	Forestry Department	Vila	Anne_Sarisets@yahoo.com
9	Sam Chanel/ Philemon Ala	Forestry Department	Vila	philemon_ala@yahoo.com.au
10	Ray Kerry	Forestry Department	Vila	raykerry8@gmail.com
11	Dick Tomker	Forestry Department	Santo	dick.tomker@gmail.com / dtomker@gov.vu
12	Rexon Moli	Forestry Department	Santo	virarexon012@gmail.com
13	Sero Isaiah	Forestry Department	Santo	isaiahsero163@gmail.com
14	Frank Joeli	Forestry Department	Santo	fjoel66@gmail.com
15	Samuel Bebe	Forestry Department	Ambae	bebesamuel16@gmail.com
16	Toufao Kalsakau	Forestry Department	Malakula	tkalsakau@vanuatu.gov.vu
17	Russell Johnny	Forestry Department	Erromango	rnuvilau15@gmail.com
18	Simon Naupa	Forestry Department	Tanna	snaupa@gmail.com
19	Kesen Alick	Forestry Department	Vanua Lava	akasen@vanuatu.gov.vu
20	Presley Dovo	Forestry Department	Port Vila	dovopres@gmail.com
21	Dhan.B Dhital	Consultant to Forestry Dept.	Port Vila	dhan_dhital@yahoo.com
22	Joseph Tungon	Forestry Department	Port Vila	jotungon@yahoo.com
23	Michael Tabi	Forestry Department	Port Vila	michael_tabi2001@yahoo.com
24	Samson Lulu	Forestry Department	Port Vila	

5.2 Annex 2: Agenda

Day One: 14th (Monday) March 2016			
Time	**Event**	**Organization**	**Speaker**
8:30-9:00	**Arrival and registration**		
9:00-9:15	Opening remarks Introduction of participants	Vanuatu FD	Vanuatu FD
9:15-10:00	Welcoming remarks, objectives of the workshop, introduction to FAO and SPC's role in assisting Pacific countries with NFI	UN-REDD / SPC	Adam Gerrand / SPC
10:00-11:00	Previous NFI experiences in Vanuatu	Vanuatu FD	Vanuatu FD
11:00-13:00	NFI capacity building presentation	UN-REDD	Adam Gerrand / SPC
13:00-14:00	**Lunch**		
14:00-17:00	NFI capacity building presentations (cont')	UN-REDD	Adam Gerrand / SPC
17:00-17:30	**General discussion and review of day 1**		
Day Two: 15th (Tuesday) March 2016			
Time	**Event**	**Organization**	**Speaker**
8:30-9:00	**Arrival and registration**		
9:00-9:15	Recap of discussions from first day and introduction to second day	UN-REDD	Adam Gerrand / SPC
9:15-17:00 (incl. lunch and breaks)	Development of a draft NFI methodology for Vanuatu – plot and sampling design	All	All

Day Three: 16th (Wednesday) March 2016			
Time	**Event**	**Organization**	**Speaker**
8:30-9:00	**Arrival and registration**		
9:00-13:00	Field test of the proposed NFI design	All	All
13:00-14:00	**Lunch**		
14:00-17:00	Field test of the proposed NFI design	All	All
Day Four: 17th (Thursday) March 2016			
Time	**Event**	**Organization**	**Speaker**
8:30-9:00	**Arrival and registration**		
9:00-13:00	Refinement of NFI methodology	All	All

13:00-14:00	**Lunch**		
14:00-17:00	Commence drafting of a NFI proposal, and develop a roadmap for drafting of a full proposal	UN-REDD	Adam Gerrand
Day Five: 18th (Friday) March 2016			
Time	**Event**	**Organization**	**Speaker**
8:30-9:00	**Arrival and registration**		
9:00-12:00	Review of progress made during the week and identification of next steps building toward NFI implementation in 2017	UN-REDD	Adam Gerrand / SPC
12:00-13:00	**Closing remarks**	**Vanuatu FD**	
13:00-14:00	**Lunch followed by departure**		

5.3 Annex 3: Pictures

Figure 1: Participants at The Summit sandalwood plantation.

Figure 2: Group discussion.

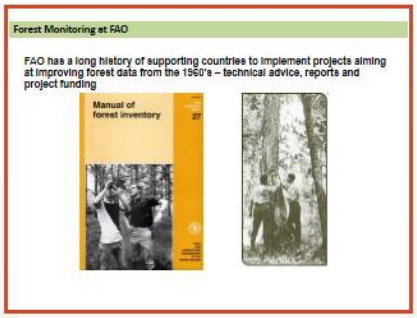
Figure 3: Beer-bottle top forest management exercise part 1: harvesting equal areas each year (the stickers) showing the variation in volumes harvested (bar-chart).

Figure 4: Beer-bottle top forest management exercise part 2: aiming to harvest consistent volume each year (bar-chart) showing the variation in areas harvested (the stickers).

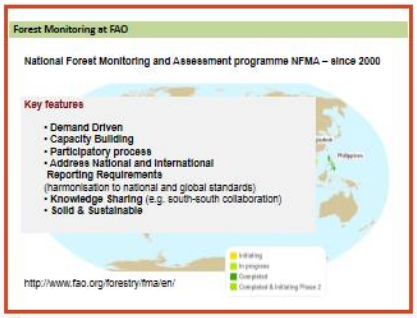
5.4 Annex 4: Presentations

5.4.1 FAO's role in supporting NFI's

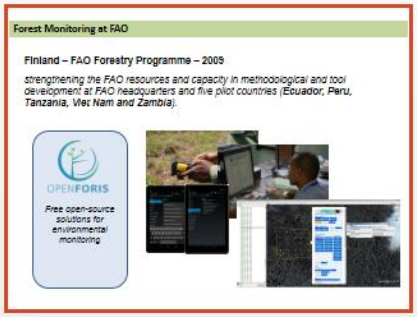
1



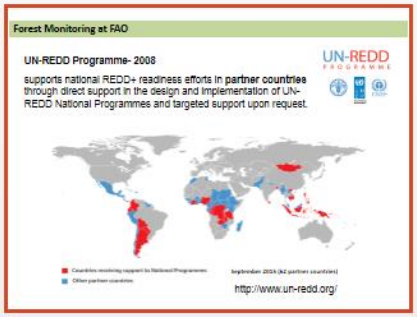
2



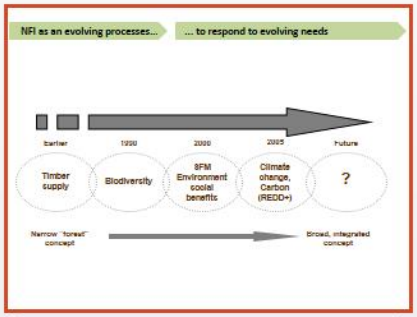
3



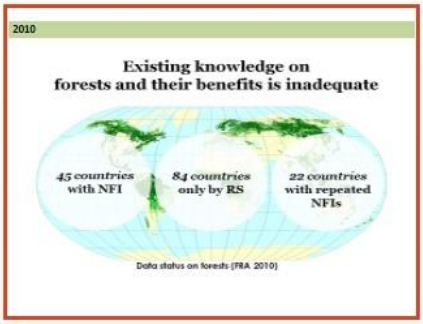
4



5

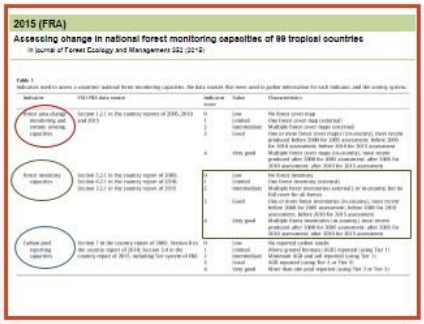


6

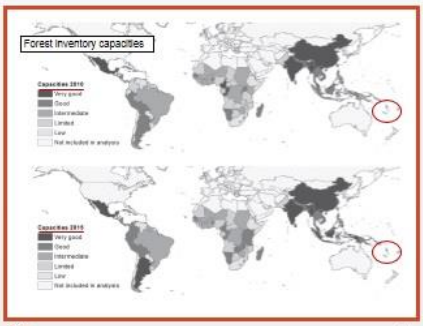


7

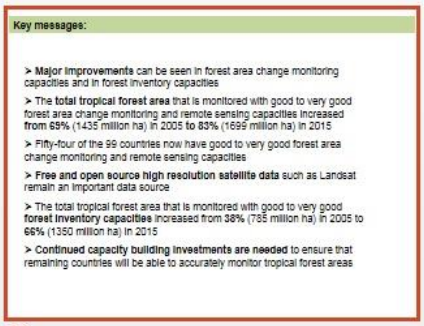
8



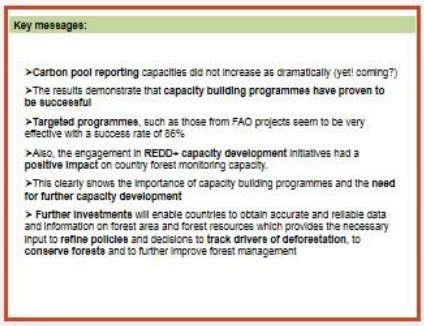
9



10

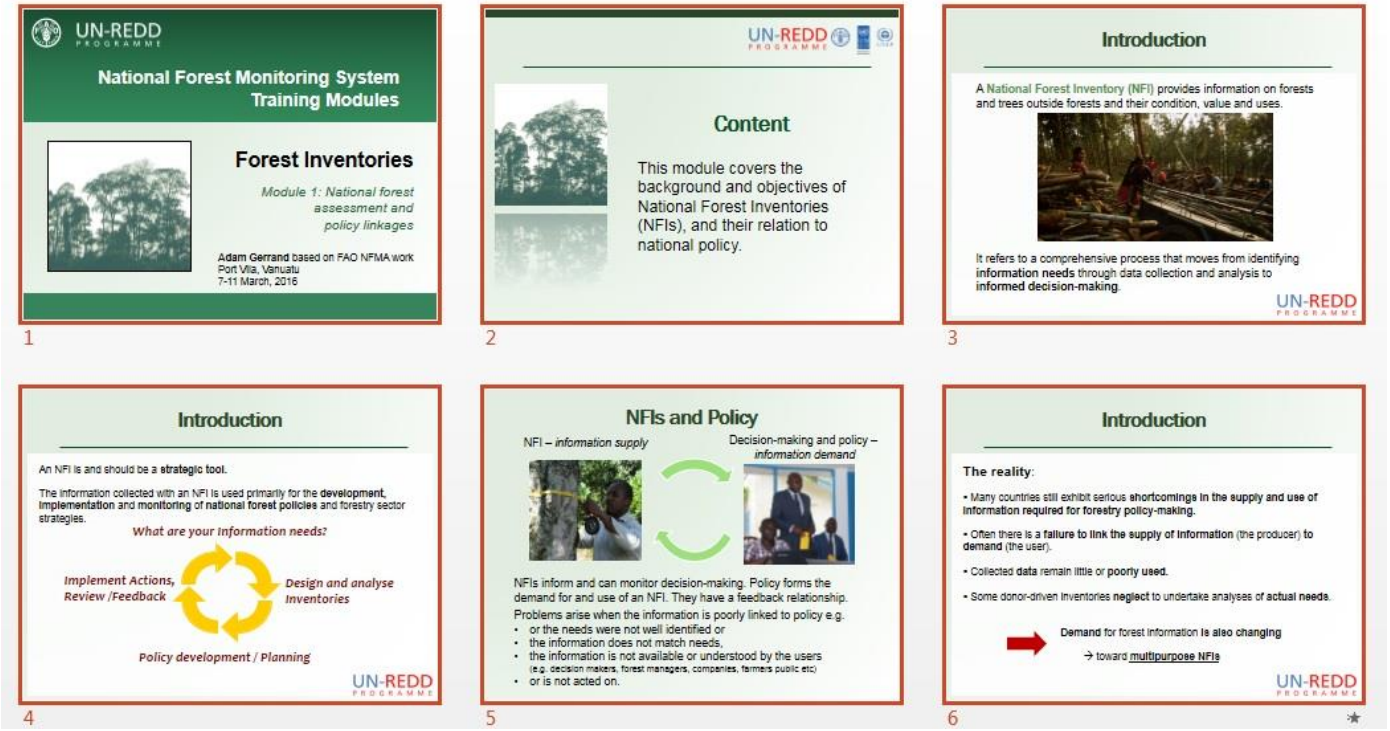


11



12

5.4.2 NFI Policy linkages



Introduction

The gap between supply and demand of information cannot be solved by improving the supply side alone (e.g. by introducing or improving national forest inventories);

it is also the result of issues on the demand (users) side.

It is important to **improve policy process**, including **administrative environments that affect the production, flow and communication of information**.

Stakeholder involvement at all levels:

Involving **producers and users** of data in this process is crucial.

UN-REDD PROGRAMME

7

Introduction

In this Module:

Why is knowledge about forest resources still poor?

Why are inventories needed?

What kind of information is needed?

How can the links between information provision and policy-making be improved.

UN-REDD PROGRAMME

8

2. Why is the knowledge about forest resources still poor?

- Mechanisms to formulate policy-relevant questions are often poor
- The information presented is supply-driven (by foresters), without proper analysis of the questions that users need answering.
  → provides answers to irrelevant questions.
- Inventories are carried out under pressure from donors
  → tend to be one-time undertakings, with no real connection with what the country wants and needs to know
- Lack of national commitment and clarity on what is needed
- Information is kept secret or in closed government files
  → Hide real figures to avoid criticism (e.g. high deforestation).
  Or to hide failures,
  or to protect personal or small group's interests.

UN-REDD PROGRAMME

9

2. Why is the knowledge about forest resources still poor?

- Information may be present but fails to answer key questions
- Information exists but is spread across many institutions
  - (e.g. coast, land boundaries in Lands Dept., forest types/areas in forestry Dept)
- Collected information has been lost or become inaccessible due to lack of staff continuity / knowledge or good storage
  - *where is the information from the past NFI?*
- Planners and policy-makers have difficulties in finding and understanding available information

UN-REDD PROGRAMME

10

Why is information needed?

The need for information is mainly to develop forest-related policies and strategies, implement and monitor them.

Additionally, NFI data can enable the fulfilment of **international commitments**, such as reporting to the United Nations Framework Convention on Climate Change (UNFCCC) or the Convention on Biodiversity (CBD).

UN-REDD PROGRAMME

11

Why is information needed?

The need for information is mainly to develop forest-related policies and strategies, implement and monitor them.

Additionally, NFI data can enable the fulfilment of **international commitments**, such as reporting to the United Nations Framework Convention on Climate Change (UNFCCC)
or the Convention on Biodiversity (CBD).

An NFI is required for reporting greenhouse gas emissions for the Land Use, Land Use Change and Forestry sector to the UNFCCC. Indeed for UNFCCC's emissions reduction mechanism REDD+ (Reducing Emissions from Deforestation and Degradation), NFI is an essential component.

UN-REDD PROGRAMME

12

Why is information needed?

The need for information is mainly to develop forest-related policies and strategies, implement and monitor them.

Additionally, NFI data can enable the fulfilment of **international commitments**, such as reporting to the United Nations Framework Convention on Climate Change (UNFCCC) or the Convention on Biodiversity (CBD).

↓

NFI is required for reporting greenhouse gas emissions for the Land Use, Land Use Change and Forestry sector to the UNFCCC. Indeed for UNFCCC's emissions reduction mechanism REDD+ (Reducing Emissions from Deforestation and Degradation), NFI is an essential component.

↓

The NFI allows a country to estimate anthropogenic GHG emissions and removals associated with forests because it includes field measurements that allow the estimation of forest carbon stocks and changes

UN-REDD PROGRAMME

13

NFI & the policy process

Information should inform national policy.
Information is most meaningful if a functioning policy process operates
Forest policies must be integrated with national objectives and policies

UN-REDD PROGRAMME

14

The policy process

The policy process should precede information acquisition and should included the following steps:

- Public debate
- Identify problems and potentials
- Design options for action
- Analyze the consequences of action
- Decision-making (select the option)
- Implementation
- Monitoring

UN-REDD PROGRAMME

15

What information is needed?

Data collection should be **demand driven**
Should result from a political commitment and connected to a policy

- Public debate
- Identify problems and potentials

NFI decisions should be guided by what the information is **required for**; e.g. achieving national objectives or reporting to international conventions, often relevant beyond the forestry sector too.

UN-REDD PROGRAMME

16

Types of information commonly needed

Land use – possible conflict: wood vs. agricultural production.

Forest use - quantities, patterns and trends in the production and consumption of forest products. (including non-wood commodities and services derived from forests).

The present state of the forests - basic information: areas, topography, ownership, accessibility, volumes and growth.

Change - only repeated or "continuous" inventories can provide such information.

Plantations - purpose, planted area by year, ownership and tenure arrangements, etc.

Trees outside of forests – in many countries the majority of forest products originate from this resource.

17

Types of information commonly needed

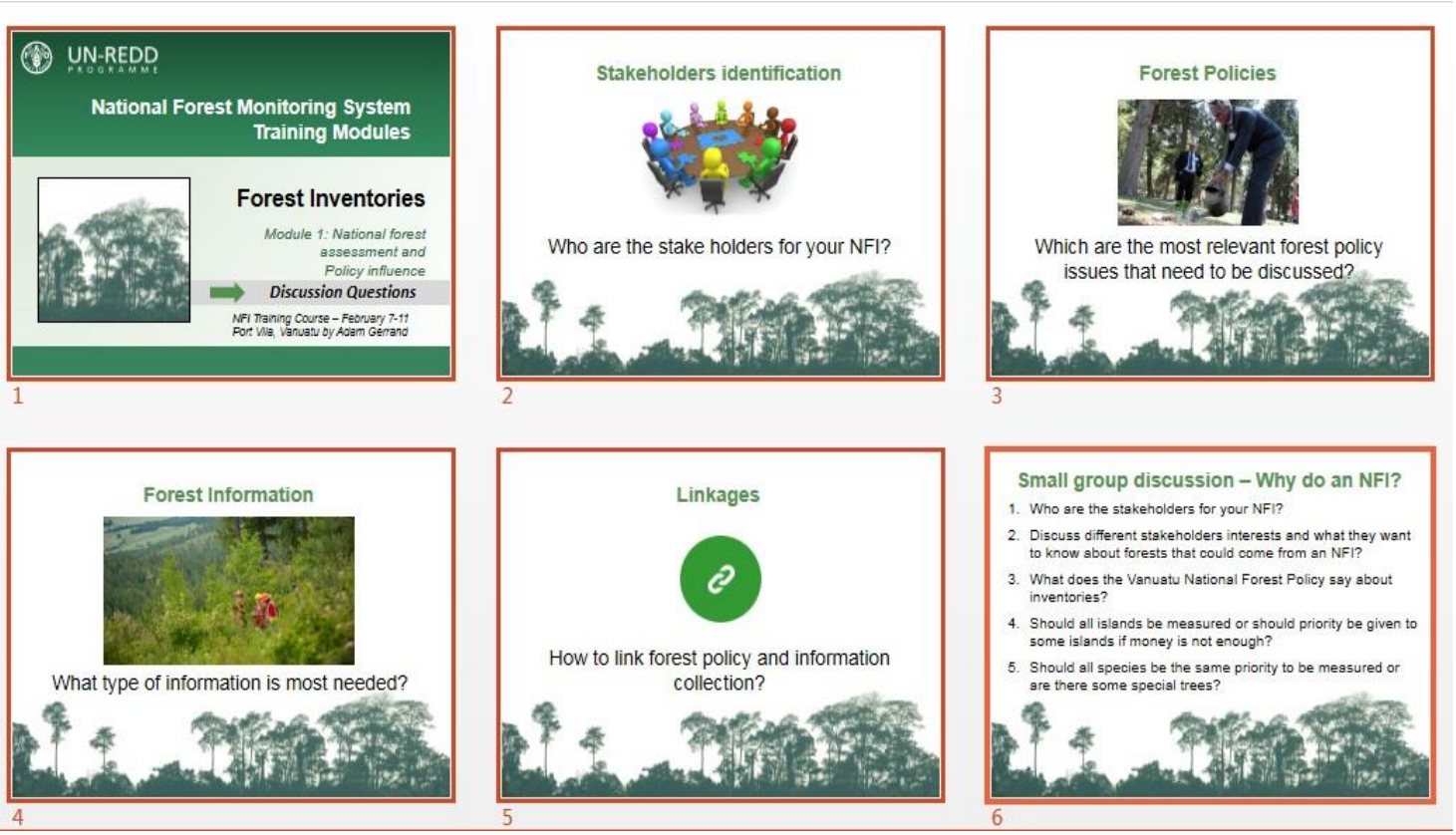
Forests supplying local communities - socio-economic needs often not well considered
- → development of policies to strengthen the beneficial roles of forests for rural communities and enable these communities to participate in sustainable forest management is often challenging

Other issues: e.g. biological diversity, forest fires, non-wood forest products, environmental benefit etc.

Carbon - increased attention to carbon (REDD+ or payment for environmental services)
- Carbon storage role is often mis-represented as the most important forest function

18

5.4.3 NFI Policy Exercise



5.4.4 How to do an NFI in 20 Steps Scott _Vanuatu

B. Remote Sensing

1. Availability of remote sensing – Analyze the availability of remote sensing sources, and their spatial resolution and frequency.
2. Remote sensing methodologies – determine the remote sensing methods:
   - To support forest classification and stratification.
   - To monitor forests using wall-to-wall imagery or sampling methods.
   - To evaluate historic rates of change.
   - To evaluate map uncertainty including a statistical accuracy assessment.

8

7

B. Remote Sensing (cont.)

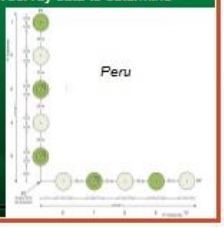
3. Remote sensing implementation - obtain the staff, train them, pre-process imagery, perform the analysis, and perhaps the land use change analysis.
4. Ground data collection – plan for the data collection, develop the field guide, obtain the equipment and materials, train the crews, and perform the data collection, and process the data.
5. Uncertainty analysis and reporting – using the data collected, assess and report on the uncertainty of any maps produced.

9

8

C. Inventory Design & Data Collection

1. Identify sampling methodology – including plot configuration, sampling design, estimation methods, use of existing data or pilot survey data to determine sample size.



10

9

C. Inventory Design & Data Collection

2. Develop a Quality Assurance/Quality Control plan – methods for checking that accuracy of crew measurements. REDD quality criteria: transparency, comparability, consistency, completeness and accuracy.
3. Prepare for field data collection – including logistics, contracts, equipment, field guide, training materials, conducting training, and certifying data collectors.
4. Conduct pilot test of the field logistics, to evaluate costs and precision options, and/or to estimate variability.
5. Conduct data collection. Supervise and provide continued training and QC. The use of Portable Data Recorders is encouraged.

11

10

D. Processing, Reporting & Communication

1. Design information systems – including the data base, data entry system, data checking and editing, compilation system, and analysis system
2. Enter and store data – either upload data from the portable data recorders or enter from paper forms. Run edit checks on the data – data validation and crosschecks.
   - USFS has developed Systema Inventario Bosques Publico y Privado (SIBPP). Training has been done in Peru, Gabon, Honduras and Vietnam.

12

11

D. Processing, Reporting & Dissemination

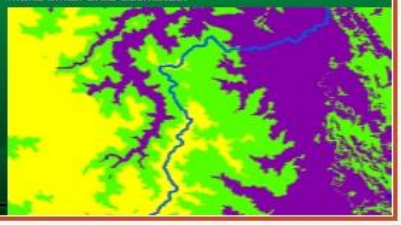
3. Process (analyse) the data – Once the data are clean, then computed variables are calculated (such as applying models for tree volume, biomass and carbon) and added to the database along with the field data. (FAO also has tools like CALC, GlobAllomtree etc.)
4. Analyze the data – Produce tables (with associated sampling errors) to answer the questions from step A.1. Share and communicate the *data* via the web. Create and disseminate *reports*. Communicate with users and ensure they understand and are using the results

13

12

D. Processing, Reporting & Dissemination

5. Map-based estimation – combine remote sensing data and field samples using modeling methods to make small-area estimates.



14

13

D. Processing, Reporting & Dissemination

6. Evaluate results for strategic planning. REDD+ results will be used to make decisions on payments to be made to the country, and as feedback on the effectiveness of policies, regulations, and programs.
7. Re-evaluate information needs and monitoring methodologies – Check that monitoring system met the users needs.

15

14

Topics

- Overview of Monitoring Steps
- **First Step: Information Needs**

16

15

A. Planning Steps

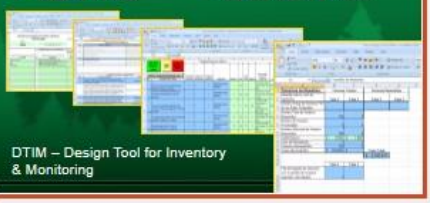
1. Information needs and priorities – determine the information needed to make management and policy decisions.
   a. Identify the stakeholders
   b. The stakeholders identify their broad objectives
   c. Select the monitoring questions to address the objectives
   d. Select metrics (indicators) to answer the questions.

17

16

Common Objectives in Forest Inventory

- Forest Health
- Biodiversity
- Value of Forests
- Wildlife Habitat
- Forest Productivity
- Carbon Stock & Flows



DTIM – Design Tool for Inventory & Monitoring

18

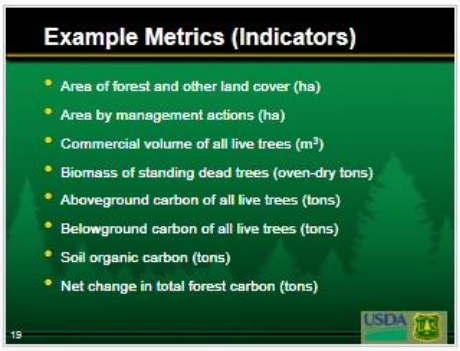
17

Example Monitoring Questions

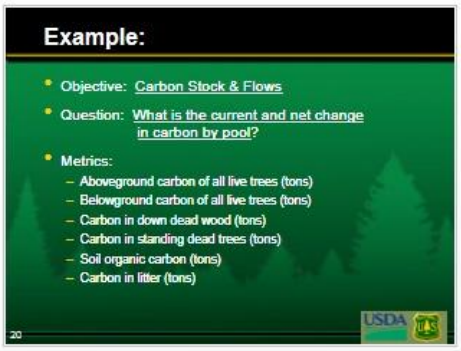
- What is the distribution of tree species across the landscape? What tree species are increasing or decreasing in importance?
- Are forests replacing themselves? What factors are impacting regeneration?
- What is the distribution of biomass across the forested landscape? Is total biomass increasing or decreasing? Does total net growth exceed removals?
- What is the current and net change in carbon by pool? How are the changes related to human activity?

19

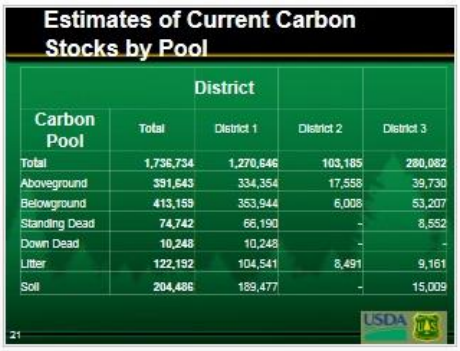
18



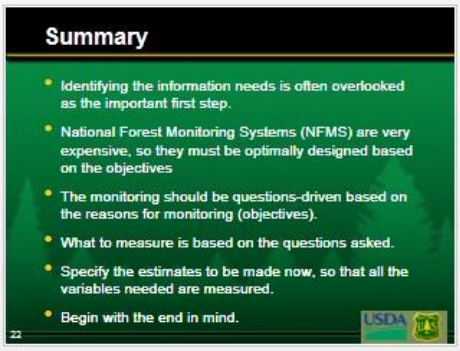
19



20



21

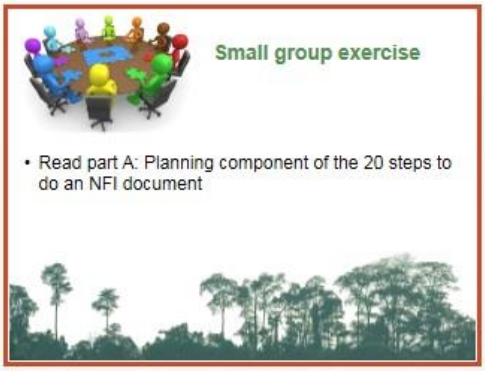


22

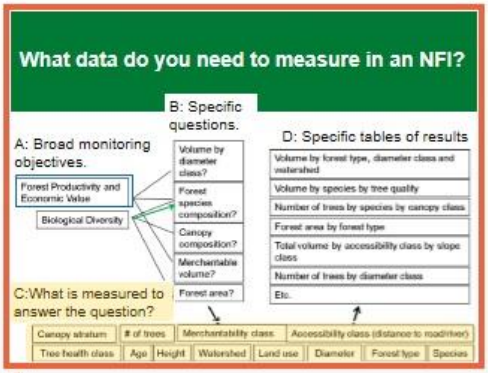
23

5.4.5 Exercise: How to do an NFI in 20 Steps

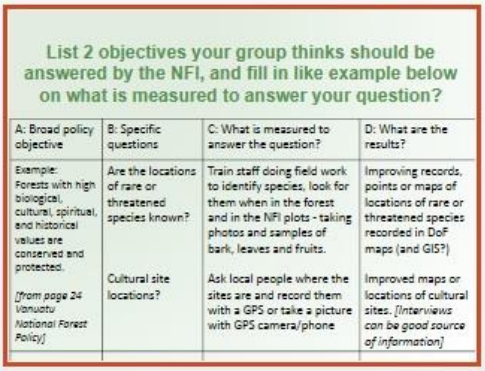
1



2



3



4

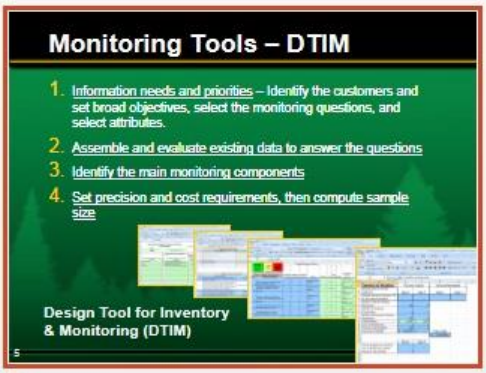
5.4.6 :US-FAO Collaboration on Forest Monitoring

1

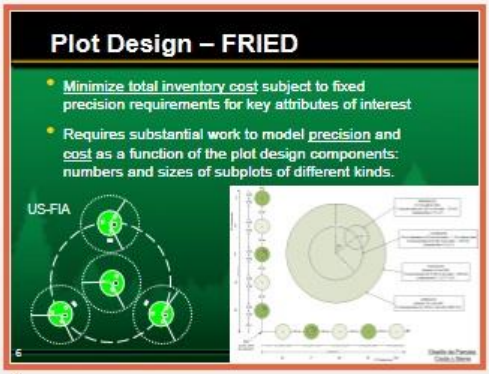
2

3

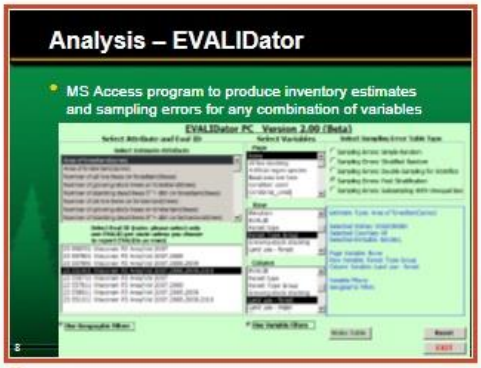
4



5



6



7

8

9

10

5.4.7 NFI Measurement Observations

UN-REDD PROGRAMME

National Forest Monitoring System Training Modules

Forest Inventories

Module 4: Observations and Measurements

1

UN-REDD PROGRAMME

Observations and Measurements

Module highlights:

- ✓ Methods for collecting observations at different sampling locations selected based on a given sample design
- ✓ General aspects of different observation units, such as points, lines and areal plots
- ✓ The different types of variables typically assessed in forest inventories.

2

Introduction

The design components of a sample-based inventory can be subdivided into: **(i) sample design, (ii) response design** and **(iii) estimation design**, following a logical and also a temporal order.

This module is concerned with the **response design**, (also called the ***observation design***), and examines observations and measurements made on population elements that were selected from the population by the sample design.

3

Types of variables

- ✓ Measurements and observations for National Forest Assessments (NFAs) are drawn from several different sources: **maps, aerial photographs, satellite imagery and the field**, but also: previous inventory reports, documents, research studies and expert knowledge.
- ✓ **Observations** produce values for variables and are made on defined observation units.
- ✓ **Variables** (or attributes) may be classified according to different criteria.

4

Types of variables

Variables in a statistical sense :

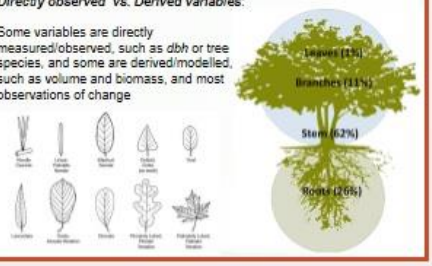
"measurements" may yield a **metric value** (for metric variables such as distance, diameter or height) or **a classification** into one out of a set of two or more categories (for categorical variables such as species, forest type and soil type).

5

Types of variables

Directly observed vs. Derived variables:

Some variables are directly measured/observed, such as *dbh* or tree species, and some are derived/modelled, such as volume and biomass, and most observations of change



6

Types of variables

Status vs. Change variables:

The majority of measurements give a *status* value for a given attribute.

Only a few *change* attributes can be measured directly at one point in time. [i.e. increment borings; length of terminal shoots of coniferous trees].

The estimation of change for other variables is therefore based on measurements taken at two points in time.

7

Types of variables

How many variables?

A wide number of attributes are typically covered in an NFI.

Traditionally, **biophysical variables**; more recently, **multipurpose inventories**: data on forest use, socio-economic variables, etc. to analyze drivers of change.

The number of attributes observed on each plot can be as high as over **250** and, in most cases, is **not less than about 100**.

Some examples: *land use, forest area, forest type, growing stock, non-wood forest products, biodiversity, soil erosion*, etc.

8

Which variables to include?

- ✓ The decision concerning which variables to observe is **strategic**
- ✓ Commonly a core set of variables but **customization** is possible
- ✓ Focus on those variables that will yield the target information or are required as input for models (i.e. height)
- ✓ Decision depends also on **staff capacity** and **resources availability**

9

Variables definition and Measurement protocol

All variables need to be clearly defined

Measurement procedure must also be defined in detail.

Field manual

Example: for the variable *dbh* a complete definition comprises the following:

- The height in which the dbh is to be measured (1.3 m)
- How to proceed in cases where 1.3 m is an impossible height to measure
- The measurement unit to be taken and the scale (e.g. centimetre, to the first decimal)
- The measurement device to be used and what to observe while using it.

10

Measurements

Measurements that are carried out in forest inventories are usually of the following types:

- ✓ Measurement of **distance/lengths**
- ✓ Measurement of **angles**
- ✓ Measurement of **areas** (using maps or remotely sensed data).
- ✓ Measurement of **position** (satellite navigation).
- ✓ "Measurement" of a **condition** class (i.e. classification - assigning an object to a defined set of condition classes).

11

Measurements

Measurement of **distance/lengths**

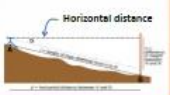
- for individual tree characteristics (diameter and height)
- plot establishment (e.g. the radius of a circular plot)
- when navigating to the chosen plot location

Direct vs. indirect measurements

How?

Pacing, tape, mechanical-optical devices (Suunto), laser technology (Vertex)

Always follow clear definitions!

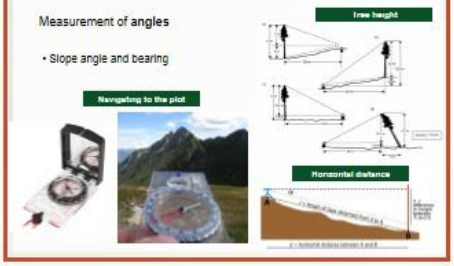


12

Measurements

Measurement of **angles**

- Slope angle and bearing

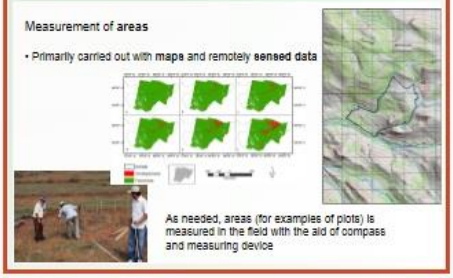


13

Measurements

Measurement of **areas**

- Primarily carried out with **maps** and remotely **sensed data**



As needed, areas (for examples of plots) is measured in the field with the aid of compass and measuring device

14

Measurements

Measurement of **position**

Satellite navigation uses distance measurements via a set of satellites to determine three-dimensional positions

Three basic functions for NFIs:

- **navigation** or "finding the way to the sample plot in the field"
- **position** or "determining the position of sample points or other reference points in the field"
- **tracking** or "monitoring the movement of people". (can be used to document the access path to a plot, thereby helping to ensure that field crews reached the correct target sample plot location).

the highest-grade GPS receivers affordable should be considered !!

15

Measurements

Measurement of a **condition** (Class

For categorical variables, measurement to one of a set of defined classes. Here, (classes) needs to be defined. Typical e type" or "tree species".

Classes	Code
Forest	
Forest with natural or natural assisted regeneration	
Broadleaved forest	FB
Coniferous forest	FC
Bamboo or palm forest	FS
Mixed forest	FM
Forest plantations	
Broadleaved forest plantation	PB
Coniferous forest plantations	PC
Mixed forest plantations	PM
Other wooded lands	
Shrubs	Sh
Fallow	Fa
Wooded grassland	WGL
Other land	
Natural and semi natural land	
Barren land	Bl
Grassland	Gl
Marshland	Ml
Cultivated and managed land	
Annual crop	AC
Perennial crop	PC
Pastures	Pa
Built up area (urban or rural)	BUA

16

Measurements

Lastly, the **set of variables** to be covered by a specific NFA depends on the specific **set of objectives**. The variables can be grouped into major subject areas.

An example:

- Geographic and **topographic** variables.
- **Ownership** variables.
- Variables on **wood production**.
- Variables of site and **soil**.
- Variables concerning **forest structure**.
- Variables concerning **regeneration**.
- Variables concerning **forest condition**.
- Variables concerning **accessibility and harvesting**.
- Variables describing **forest ecosystems**.
- Variables concerning **non-wood forest products**.

17

Observation units and their characteristics

The "objects" selected for observation in NFAs usually comprise one of the following types:

- ***Individual elements*** *(e.g. tree)*
- ***Points*** *(dimensionless observation units)* – often center of the plot - one point determines the characteristic of the plot (forest/non forest; forest type, soil type, ownership etc.)
- ***Lines*** – "line intersect sampling" *i.e. for measuring deadwood*
- ***Areas (fixed/variable)*** *- entire plot* is the observation unit and each plot delivers one independent observation for estimation (i.e. the plot mean or the plot total).
  - *Fixed area plot – most frequent*
  - *Nested plot (regeneration plot)*

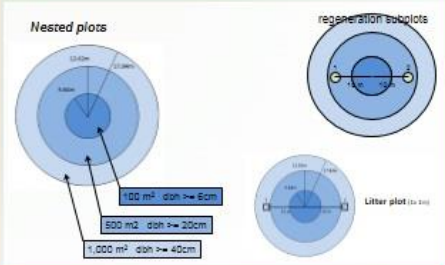
18

Observation units and their characteristics

- **Nested plots** contain smaller subunits of various shapes and sizes depending on the variables to be measured
- For example, saplings could be measured on a small subunit, trees between 5-50 cm on a medium subunit and trees above 50 cm could be measured on the entire plot
- Nested plots can be cost-efficient for forests with a wide range of tree diameters or stands with changing diameters and stem densities

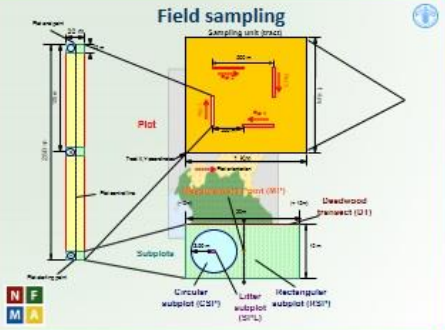
19

Observation units and their characteristics



20

Field sampling



21

Sample Plots / Plot Size

Objective:

- to achieve the **highest possible precision** for a **given cost** (or the lowest cost for a defined level of precision).
- to **maximize variability** by encompassing as many different conditions as possible.
- **High variability within a plot** minimizes the differences between plot values of a sample, which in turn leads to **smaller standard error**.

Key principles:

- **Optimization** is usually undertaken for **one principal variable**, often growing stock.
- In the case of NFIs, many important variables are observed → advisable to make a formal optimization along a key variable (usually volume) and make a **pragmatic decision** taking into account general experiences from other NFAs.

22

Sample Plots / Plot Size

Key principles (2):

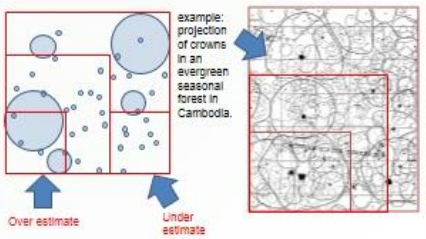
- **Practical consideration** (time and budget) often become determining factors for decision.
- In **Cluster plots** the field crews spend much time walking
- In **Strip plots** the number of boundary trees is much higher than in circular plots of the same area (because of the minimized perimeter).
- In **Circular plots** field implementation is more straightforward, as these are defined by locating a single centre point.

Also consider:

- **Visibility**: strip plots are preferred for poor visibility while Circle plots are preferred for good visibility.
- A valid (though uncommon) approach is to combine in the same survey, plots of the **same area** but **different shapes**.
- Integration with **Remote Sensing**
- Empirical evidence has found that about 15-20 trees per plot is a good value for plot size.

23

Sample Plots / Plot Size



example: projection of crowns in an evergreen seasonal forest in Cambodia.

24

Sample Plots / Plot Size

Basically, the more similar the observations are, the more efficient is the small plot, and vice versa.

As a rule of thumb, a plot should be large enough to contain enough trees per plot to be representative of the population

It follows that **small plots** should be employed for **dense stands** with small trees, and **large plots** for **open stands** and large trees

When travel time is significant, as in a tropical forest, the size of inventory plots tends to be large, often in the 0.4–0.5-ha range.

25

Sample Plots / Plot Size

A Case study:
Biomass assessment in 9 ha of tropical rainforest in Ghana. Data from *Henry et al. 2010*

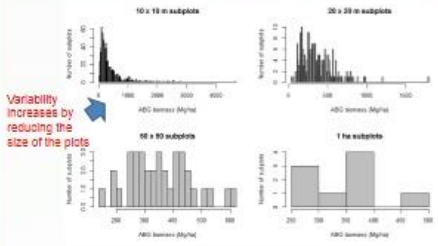
We produced different estimates of AGB/ha by reducing progressively the sample size of the plots.

The analyzed sample size were:

- 100 x 100 m
- 50 x 50 m
- 20 x 20 m
- 10 x 10 m

26

Sample Plots / Plot Size



27

Sample Plots / Plot Size

Uncertainty and normality of the AGB estimates in the sub plot

sub plot size (m)	number of plots	standard deviation	min	max	skewness	kurtosis
10x10	900	434.218	1.791	4662	3.559777	20.17818
20x20	225	216.5175	52.85	1798	2.056252	5.700665
50x50	36	109.9192	145.4	611.2	0.544912	-0.42548
100x100	9	71.22415	277.4	499.9	0.854559	-0.8778

One quarter hectare is the minimal size such that the normality criterion is satisfied in this forest.

This result is consistent with that of Chave et. al 2004

28

Conclusions

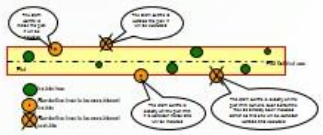
Data quality
- Each single measurement is made with care and accuracy.
- All measurements of a particular attribute follow the same specifications (in terms of definition and measurement procedure).
  → Avoid (minimize) measurement errors!

Assessment and measurement protocols: ensure complete and clear documentation and descriptions.
Staff: undertake careful selection and training of field crews.
Supervision: ensure oversight and control of fieldwork, measurement devices (calibration) and data delivered.
Verification: undertake careful checks and calibration of measurement devices.
Plausibility: undertake final checks when data are entered into the database.

29

Observation units and their characteristics

BOUNDARY TREES



30

5.4.8: NFI Data Collection and Interviews

UN-REDD PROGRAMME

National Forest Monitoring System Training Modules

Forest Inventories

Module 5: Data Collection through interviews

Adam Gerrand UN-REDD / FAO
NFI capacity development workshop
8-11 March 2016 Port Vila Vanuatu

1

Outline

1. Introduction
2. Some practical examples when field interviews have been useful for the collection of relevant data
3. Four key questions are to be addressed in order to guarantee the quality of data from interviews
   - 3.1 What questions should be asked?
   - 3.2 Who should be interviewed?
   - 3.3 What to measure?
   - 3.4 How should the interview be conducted?
   - 3.5 What is the best way to verify data quality?
4. Conclusions

References

2

1. Introduction

Governments have limited information about the effects of their changes in public policy, regarding forestry and rural development.

Policy actors demand answers to questions related to forestry and food security, changes in forest-use patterns and deforestation attributed to policy interventions.

3

Policy-makers need monitoring programmes that assess characteristics of resource users (and their use of resources).

These cannot rely only on conventional forest inventories (quantitative estimates).
Interviews (providing qualitative information) are also of great help.

4

Social units and forest types are not distributed equally…

5

Individuals involved in forest inventories typically have not received training on conducting personal interviews

Information gathered about forest use and forest users should be both valid and reliable.

Field interviews can increase the policy relevance of inventory results.

6

They can include information about the human use of forests and the human factors affecting forest conditions.

Key for monitoring forest governance performance (and human drivers of forest change), the effectiveness of policy objectives and the efficacy of policy interventions.

UN-REDD PROGRAMME

7

2. SOME PRACTICAL EXAMPLES WHEN FIELD INTERVIEWS HAVE BEEN USEFUL FOR THE COLLECTION OF RELEVANT DATA

8

In the context of GHGI, some information can be obtained through socio-economic survey

Interviews with individuals, representing various perspectives on GHG inventorying for Small-to-medium-size companies (SMEs), were used as input for a brochure and a database to facilitate SMEs' ability to conduct GHG inventories (Grandoni et al, 2014).

Collection of data on livelihoods and agricultural practices, in the framework of the Mitigation of Climate Change in Agriculture (MICCA), have taken place in Kenya. Knowledge about impacts of climate change is gained and surveys can be used as a tool for the assessment of greenhouse gases (Zegst, 2012).

9

Social management of natural resources

In Gambia, interviews and Participatory Learning elements served in the assessment of Market Analysis and Development (MA&D) impacts in rural communities, and the capacities of Community Forest Committees (CFCs) in forest management (FAO, 2011).

Kessy et al (2010) provide fieldwork instructions for socioeconomic data collection in the framework of the National Forestry Resources Monitoring and Assessment (NAFORMA) Programme in Tanzania.

10

Identification of drivers of deforestation

Community level consultations and stakeholder interviews have been useful for understanding the drivers of deforestation in Zambia and assess the current impact of consumption, production and development on deforestation (Vynia et al, 2012).

Qualitative information from stakeholders, at the sites of deforestation (e.g. through key informant interviews, focussed group discussions, participatory rural appraisal sessions and livelihood analyses), is important for FAO to understand the dynamics of the drivers of deforestation[1].

[1] http://unfccc.int/resource/docs/2012/smsn/go70.pdf

11

Land tenure

Participatory observation, self-administered interviews and questionnaire survey have been used to collect information and explore the impacts of land tenure change on forest covers in Pakistan (Rahman et al, 2014)

Multi-stakeholder consultation processes have been fundamental for the assessment of issues and actions included in the Voluntary Guidelines of FAO on the Responsible Governance of Tenure of Land, Fisheries and Forests (FAO, 2012).

12

3. FOUR KEY QUESTIONS ARE TO BE ADDRESSED IN ORDER TO GUARANTEE THE QUALITY OF DATA FROM INTERVIEWS:

UN-REDD PROGRAMME

13

3.1 What questions should be asked?

A needs assessment during the planning help decide what variables should be measured.

These are series of meetings with stakeholders where they express their opinions and suggestions regarding the conduction of field interviews.

It helps clarify and prioritize gaps and information regarding forestry planning and decision-making.

14

3.1 What questions should be asked?

The needs assessment help clarify some issues, such as:

- "Hot topics" related to forest use and forest users that could light on
- Current knowledge gaps that may prevent national forest policy from increasing its cost-effectiveness
- Analytical products that stakeholders may find most useful

15

3.2 Who should be interviewed?

An agreement among stakeholders, concerning the desired outputs of the NFA, is the basis for the definition of the population of interest.

People near forests are of great importance. They depend directly on forests for their livelihoods, and constitute a very vulnerable group.

16

3.2 Who should be interviewed?

Possible definitions of populations of interest may include:

(i) the entire nation's population at large;
(ii) forestry firms;
(iii) forest owners;
(iv) associations of forest users;
(v) communities participating in community forestry activities;
(vi) the primary agents of deforestation;
(vii) indigenous people, and many others.

17

3.3 What to measure?

18

3.4 How should the interview be conducted?

- Building rapport.
- Taking notes.
- To be sensitive t… …acing women.
- Use an open-ende…
- Transect walks.
- Structured/Semi-st…

19

3.4 How should the interview be conducted?

- Probing and the use of non-leading "helper questions".
- Giving interviewees a chance to ask questions.
- Maps or aerial photographs may stimulate discussion about local forest use
- Community mapping.
- Direct observation.

20

3.5 What is the best way to verify data quality?

1. Test of representativeness during the data collection phase

This may help assess whether the complexities of the country's forest use are being captured by the measurements in the sampled sites.

21

3.5 What is the best way to verify data quality?

2. Reliability tests

The degree to which measurements are repeatable and consistent. Formal ways of testing involve examining stability (whether a measurement is repeatable) and equivalence (whether a measurement is consistent).

Reliability (and validity) testing of an archery

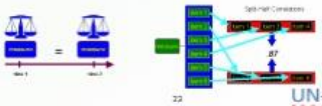
22

3.5 What is the best way to verify data quality?

2. Reliability tests

In terms of stability, a measure is reliable if its test-retest correlation score is greater than r=0.70.

For Equivalence. A test can be split, e.g. by odd and even numbers (The Split-half Method). When the two halves provide similar results, the test has internal reliability.



23

3.5 What is the best way to verify data quality?

3. Validity tests

An independent team of experts can compare the NFA survey results with their own in-depth measurements.

Measurements at a selected number of sites help obtain an idea of the validity of the original measurements.

The validity of the interviews may be further strengthened by a survey pre-test.

24

4. Conclusions

The quality of a study is related to the questions the NFA team asks, who they ask, how they ask their questions and how they go about verifying the information obtained.

The credibility of the NFA results hinges on how the NFA team presents its estimate of uncertainty.

Without a good description of the degree of uncertainty, a particular finding is difficult to interpret.

25

4. Conclusions

It is important to estimate explicitly the bounds of uncertainty for the conclusions drawn from the results.

The degree of uncertainty can be estimated by considering how observed limitations in reliability and validity might influence the study's findings.

Presenting the study's limitations up-front and in a systematic fashion, strengthens the scientific merit of the results and increases the credibility of the study.

26

References

FAO. 2011. Socio-Economic Evaluation of Community-Based Forest Enterprise Development using the Market Analysis and Development Approach in Community Forestry in the Gambia, by K.Camara. Forestry Policy and Institutions Working Paper No. 27. Rome.

Grandoni, M., Pakatar, N., Renganathan, S. & Veigara, S. 2014. Connecting SMEs to GHG Inventory Resources.Available at: https://www.wpi.edu/Pubs/E-project/Available/E-project-050614-204056/unrestricted/Connecting_SMEs_to_GHG_Inventory_Resources_-_CNPL_2014.pdf

Kessy, J., Anderson, K. & Dalsgaard, S. National forestry resources. Monitoring and assessment of Tanzania (NAFORMA). Field Manual: Socioeconomic survey. NAFORMA document M05-2010. Available at: http://www.fao.org/forestry/23486-0c45f59c134a7d94ee6361374fac93ob.pdf.

27

Rahman, F., Hao, F., Tabassum, I., & Ullah, I. (2014). Socio-economic drivers of deforestation in Roghani Valley, Hindu-Raj Mountains, Northern Pakistan. Journal of Mountain Science, 11(1), 167-179.

Seufert, P. (2013). The FAO voluntary guidelines on the responsible governance of tenure of land, fisheries and forests. Globalizations, 10(1), 181-186.

Vinya, R., Syampungani, S., Kasumu, E.C., Monde, C. & Kasubika, R. (2011). Preliminary Study on the Drivers of Deforestation and Potential for REDD+ in Zambia. A consultancy report prepared for Forestry Department and FAO under the national UN-REDD+ Programme Ministry of Lands & Natural Resources. Lusaka, Zambia.

Zagst, L. 2012. Socio-economic Survey EADD-MICCA Pilot Project in Kenya. Mitigation of Climate Change in Agriculture (MICCA) Programme Background Report 4. Food and Agriculture Organization. Available at: http://www.fao.org/climatechange/32989-03e9a9693df0c024fe193dd15e7c9b710.pdf.

28

5.4.9 Open Foris Vanuatu

openforis

Open Foris Initiative

Free and Open Source Tools and Methods for Data Collection, Analysis and Reporting

Antti Peltokorpi
FAO Forestry

1

openforis

Collect | Collect Mobile | Collect Earth | Calc | Geospatial Toolkit

2

openforis

Collect

For Office | For Field | For Fast Delivery

3

openforis

openforis COLLECT

4

openforis

openforis COLLECT

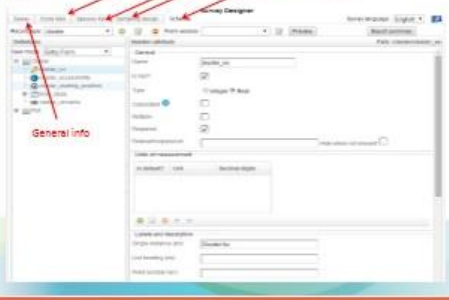
Main Features

- Easy-to-use interface for complex surveys
- Survey designer
  - From scratch/using template
  - Validation rules
- Data entry interface generated automatically
- Standard workflow: entry, cleansing, analysis
- Server / desktop

5

openforis

openforis COLLECT



6

7

openforis

openforis COLLECT MOBILE

8

openforis

Collect Mobile - Main Features

- Field-data collection using Collect survey
- On-the-fly validation
- Export collected data to Collect Desktop
- Android 4+ devices

9

openforis

Objectives

- Support large, complex, surveys
- Simple and efficient to use
- Optimize for field use
- Use device camera and GPS
- Focus on data quality
- Data safety

10

openforis

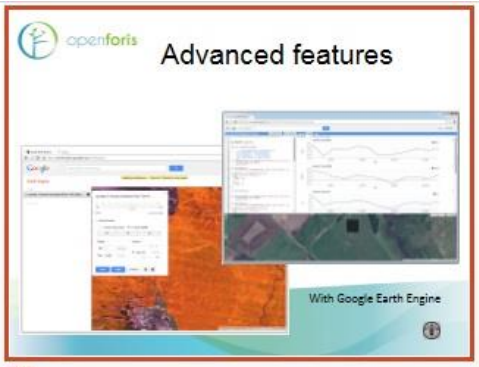
- Validation in the field
- Integrated code and species lists
- Easy backups
- No transcription of handwritten forms

11

Show CollectEarth video

12

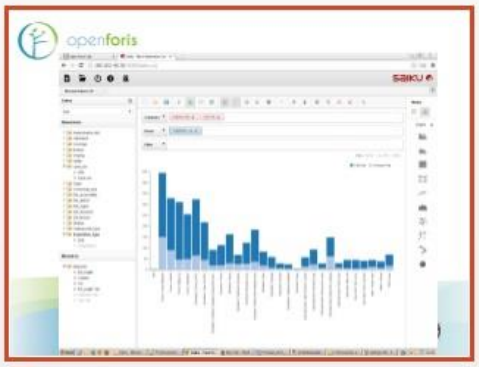
19



20

21

22

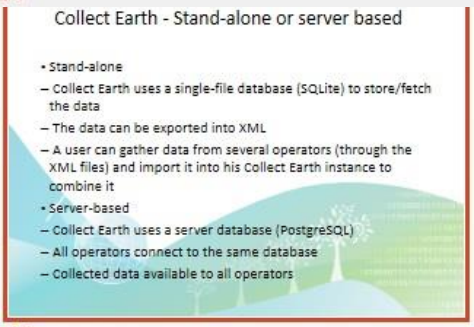


23

24

13

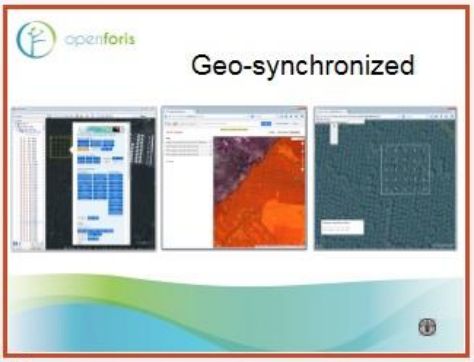
14



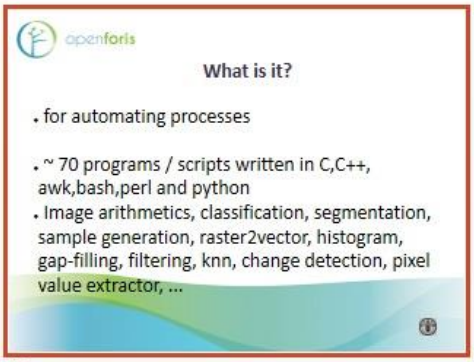
15

16

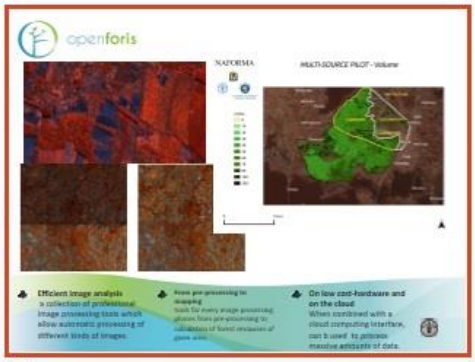
17



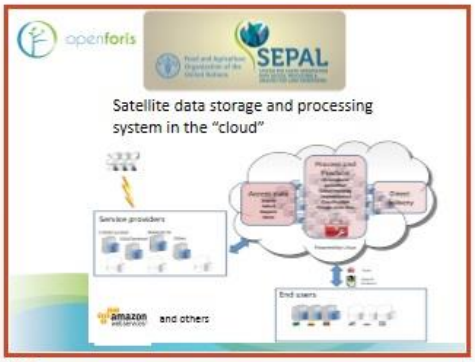
18



25



26



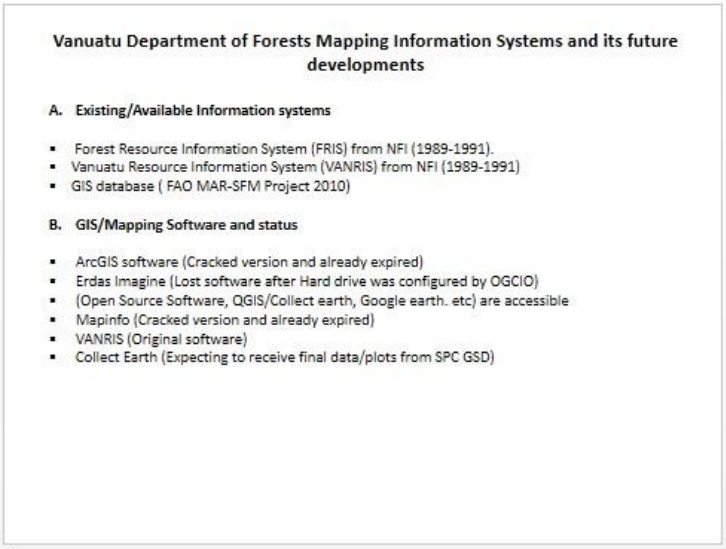
27

28

29

30

5.4.10 Vanuatu Department of Forest Mapping Information System.



Vanuatu Department of Forests Mapping Information Systems and its future developments

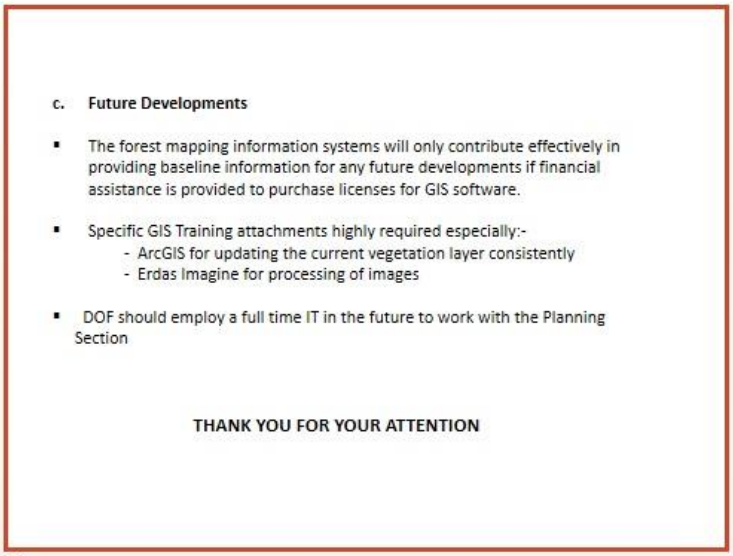
A. Existing/Available Information systems

- Forest Resource Information System (FRIS) from NFI (1989-1991).
- Vanuatu Resource Information System (VANRIS) from NFI (1989-1991)
- GIS database (FAO MAR-SFM Project 2010)

B. GIS/Mapping Software and status

- ArcGIS software (Cracked version and already expired)
- Erdas Imagine (Lost software after Hard drive was configured by OGCIO)
- (Open Source Software, QGIS/Collect earth, Google earth. etc) are accessible
- Mapinfo (Cracked version and already expired)
- VANRIS (Original software)
- Collect Earth (Expecting to receive final data/plots from SPC GSD)

1



c. Future Developments

- The forest mapping information systems will only contribute effectively in providing baseline information for any future developments if financial assistance is provided to purchase licenses for GIS software.
- Specific GIS Training attachments highly required especially:-
  - ArcGIS for updating the current vegetation layer consistently
  - Erdas Imagine for processing of images
- DOF should employ a full time IT in the future to work with the Planning Section

THANK YOU FOR YOUR ATTENTION

2

f

The end