DRAFT Concept Note

Solomon Islands National Forest Inventory Capacity Building and Piloting

1 Overview

In the Solomon Islands, the forest sector is of substantial importance for the country's economy, but timber resources from natural forests are harvested in an unplanned and unsustainable way, which at the current rates could lead to their depletion in the near future. In response, the Solomon Islands Ministry of Forestry and Research (MoFR) is currently preparing a National Forest Monitoring System and a National Forest Inventory (NFI) for the collection of ground-based forest data and information. The availability of holistic information on forest resources is a fundamental requirement to design and implement national policies and strategies for sustainable use and conservation of forest ecosystems and reducing emissions from deforestation and forest degradation. The proposed activity will support MoFR in the early stages of NFI preparation through capacity building and the piloting and validation of the proposed sampling methodology.

2 Implementing Entities and Partners

The NFI training and piloting program will be funded and jointly implemented by the regional SPC/GIZ Project Forest Conservation in Pacific Island Countries (REDD+ II) and the JICA Sustainable Forest Management Project. The SPC/GIZ REDD+ II project is currently in its second phase (2015-2020) and provides technical support to prepare the 4 Melanesian Countries PNG, Solomon Islands. Vanuatu and Fiji for participation in the REDD+ mechanism. JICA's 5-year "Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands", was launched in September 2017, aiming to enhance MoFR's capacities of making policies contributing for SFM, networking and collaborating with stakeholders in forest sector, and designing and supporting trial community-based forest management activities.

The partner organization to both projects is the Solomon Islands Ministry of Forest and Research, which is the responsible agency for the implementation of the NFMS and the NFI. Other key partners in the NFI piloting are the members of the Komuniboli village, the Ministry of Agriculture and the Solomon Islands National University (SINU).

3 Objectives

1. Build and strengthen the capacity of MoFR officers and other relevant stakeholders in forest inventory planning, implementation and data analysis based on the Solomon Islands proposed NFI design;
2. Collect and analyze field data to optimize sampling design and maximize effectiveness and cost-efficiency for future NFI implementation at national scale

4 Main Activities

4.1 NFI Training Programme

Component 1: Theoretical Background (1-2 hours)

Presentation covering the fundamental elements to consider when designing and implementing a (national) forest inventory, such as data requirements, sampling design, sampling procedure and field operational *best practice,* operation of inventory instruments, as well as key practical considerations and recommendations.

Component 2: Practical GIS Training to design NFI (1 day)

Presentation covering the most important basics of Geographical Information Systems such as components, data formats and spatial attributes, software options, specifications of QGIS as well as an introduction to the use of free satellite imagery and radar data for forestry and spatial planning.

Practical desktop exercise to build/strengthen participant's skills in planning a forest sample plot Inventory using QGIS Free and open-source GIS software. The activities of component 2 include creating and processing vector files, creating a topographic base map from radar data, designing a sample plot grid, processing and uploading files into GPS devices and/or smartphones and setting up the GPS configuration for fieldwork.

Component 3: Forest Inventory field training (2 days)

Practical field training to build/strengthen participant's skills in forest inventory field data collection *best practice*, specifically using circular, nested, permanent sample plots (PSP), as follows:

- *Introduction to inventory instruments: Uses, functions and operational guidelines;*
- *Introduction to field forms and data recording procedures;*
- *Access to and installation of PSP center using GPS;*
- *Recording techniques of general plot information/observations;;*
- *Measuring and recording techniques for living trees;*
- *Measuring and recording techniques for lying deadwood;*
- *Recording techniques for woody debris and organic litter;*
- *Recording techniques for natural regeneration;*
- *Biodiversity assessment techniques;*
- *Non-timber forest products assessment techniques;*
- *Soil classification techniques;*
- *Introduction to Quality Assurance (QA) Procedures*

Component 4: NFI Data Analysis Training (2 days)

Practical desktop training to build/strengthen participant's skills in PSP data synthesis, analysis and generation of results, as follows:

- *Creating structured data tables;*
- *QA/QC of inventory data;*
- *Building a tree heights model;*

- *Calculating basic tree parameters (basal area, volume, above/below ground-biomass, carbon content);*
- *Calculating deadwood and organic litter biomass and carbon;*
- *Plot slope correction and application of area expansion factors;*
- *Forest data analysis and synthesis using Pivot table functions in Excel;*
- *Creating Results tables and charts for presentations.*

4.2 NFI Field Piloting

Sampling Design

The Solomon Islands currently choose to adopt Papua New Guinea's NFI design, due to the mostly similar forest structure, species composition and management practice. The sampling design consists of clusters composed of 4 circular, nested plots with a center plot and 3 satellite plots located at 300m distance and 60° intervals around the center. The nested plots are arranged in concentric circles of varying diameters, in which living trees and lying/standing deadwood are measured. Additionally, tree regeneration, herbaceous vegetation, organic litter and coarse woody debris are recorded in satellite quadrates (see annex 2). Due to the comparatively small size of the pilot site (355 ha), the clustered sampling methodology is unsuitable at the proposed plot spacing of 250 m. Instead, for piloting, single plots will be used as sampling units (see Annex 3).

Field Team Composition and Responsibilities

The fieldwork will be carried out with 4 teams. Each team will be composed of 7 people in the following composition:

Position	Qualification	Responsibility
1 team leader	Qualified forester	Plot Access Data recording Distance/Angle/Tree height Measurements
2 Assistants	Previously trained forester or similar	Tree Diameter Measurements
1 Tree Identifier	Botanist or Para-botanist	Tree Identification Assessment of tree qualitative criteria
3 Local field guides		Clearing of vegetation for plot access Providing common names of tree species General support to fieldwork where needed

Table 1: Field team composition and responsibilities

Field Gear

The gear for the NFI fieldwork will be jointly procured through GIZ REDD+ II and JICA SFM Project. Each team will be provided the following equipment:

Item	Description	Use	Quantity/team
Instruments			
Diameter Tape	10m measuring tape with metric and diameter scale	DBH Measurement	2
Long Tape (50m)	2-sided metric scale fiberglass tape	Distance Measurement	1

Item	Description	Use	Quantity/team
Caliper	50 cm aluminum caliper	Deadwood measurement	1
GPS Navigator	12 channel, water resistant GPS navigator with color display and preloaded topographic maps	Plot Access	1
Compass	Precision global quadrant 0-90-0° with declination adjustment	Angle Measurement	1
Clinometer	Clinometer with percent and topo scales	Slope Angle Measurement	1
Hypsometer	Complete field measuring instrument with ultrasound and laser combination technology	Range, height and angle measurements	1
Equipment			
Expedition Gear bag	Double-layer, military grade, water resistant tarpaulin bag.	Field instruments Storage and transport	1
Tent	Freestanding, ultralight backpacking tent.	Field Camping	5
Sleeping bag	Nylon Sleeping bag with temperature 13°C comfort	Field Camping	5
Back Packs	Polyester backpack with 80L Capacity	Field gear transport	5
Bush knife	20” bush knife	Cutting paths	2
Pocket knife	Small size pocket knife	Decay Assessment	1
Flashlight and batteries			As necessary
Safety Gear			
Rubber boots	Waterproof rubber boots	Foot Protection	As necessary
Rain Gear	Nylon poncho	Rain Protection	6
Gloves	Cotton gloves	Hand protection	7
First Aid kit	Standard First Aid kit	Treatment of sickness and small Injuries	1
Field Marking and Recording Equipment			
Field forms	A4 size paper field forms	record plot and tree data	As necessary
Species Checklist	Species list with botanical and local names	Species Identification	1
Sample Plot map	Printed map with sample plot grid	General Navigation aid	1
Writing tablet	Plastic tablet	Support for field recording	1
Pencils, markers, erasers		Field recording	10

Item	Description	Use	Quantity/team
Flagging Tape	Fluorescent glow vinyl flagging tape	Plot & tree marking	6
Tree marking Paint	Fluorescent orange aerosol tree marking paint	POM marking	6
PVC pipe	2" Diameter 1m length	Plot Center marking	40

Table 2: Inventory Gear for NFI training and field piloting

Quality Assurance

A Quality Assurance (QA) team will monitor and evaluate the technical quality of field measurements. The QA team visits completed NFI clusters 1-2 weeks after the original measurements and undertakes a complete control measurement. The QA team then examines the data collected by the field teams relative to the control measurement and quantitatively and qualitatively assesses the errors. The results of the QA assessment can be used to identify issues which were unclear for the teams after training.

4.3 Expected Outputs

The expected principal outputs from the NFI training components are:

1. Enhanced understanding regarding the concept, methodology and sampling design of an NFI and raised awareness on the importance of forest data and information for forest governance in the Solomon Islands;
2. Enhanced practical skills in the use GIS tools and techniques for inventory design and planning;
3. Enhanced knowledge and skills regarding the operation of inventory instruments and tree measurement *best practice*
4. Enhanced knowledge in ecosystem assessment techniques (i.e. biodiversity, soil
5. Enhanced understanding and skills regarding inventory data processing and analysis

The expected principal outputs from the NFI field piloting are:

1. In-depth practical skills and experience regarding NFI fieldwork
2. Availability of comprehensive and reliable forest ecosystem data and information for activity planning in the pilot site
3. Availability of data to determine the most cost-efficient sampling design for future, national-level NFI implementation

Production Indicator: With the given sampling design, it is expected that each team will complete on average 2 plots per day. In the allocated timeframe of 6 fieldwork days, a total of 48 plots will be sampled.

5 Timeframe and Implementation Schedule

The time allocations for the program implementation are:

Program Component	Time Allocation
Training Components #1 and #2 (desktop)	4 days (2 groups of up to 10 people)
Training Component #3 (field)	4 days (2 groups of 10 people)
NFI Piloting fieldwork	6 days (4 teams)
Quality Assurance (fieldwork)	3 days (1 team)

Program Component	Time Allocation
Training component #4	4 days (2 groups of up to 10 people)
Travelling days	4 days
Total	**25 days**

	June				July				August			
	1	2	3	4	1	2	3	4	1	2	3	4
Training Component #1												
Training Component #2												
Training Component #3												
NFI Field Piloting												
Quality Assurance												
Training Component #4												

Tables 3 & 4: Implementation Schedule (*Tentative*)

6 Training and Fieldwork Locations

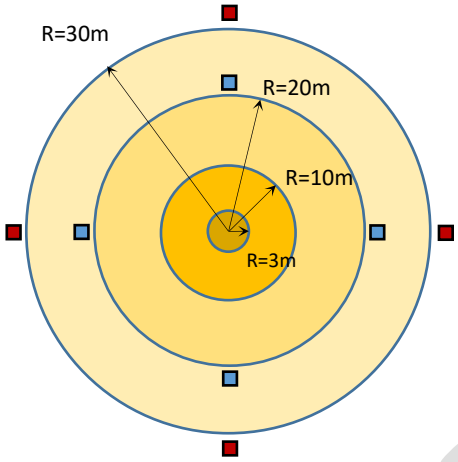
All NFI field training and piloting activities will be carried out in the JICA-SFM Project Pilot activity area in Komuniboli, Guadalcanal Province, located about 45 km east of Honiara. The desktop training exercises will be carried out at MoFR.

Training	Location
Training Component #1	MoFR Conference Room
Training Component #2	MoFR FRMTS Computer Lab
Training Component #3	Komuniboli Forest Area
NFI Field Piloting	Komuniboli Forest Area
Training Component #4	MoFR FRMTS

Table 5: Training and field work locations

Annexes

Annex 1: Sampling Design



Plot	Measurements
Subplot 1 R=30m (0.28 ha):	Trees ≥ 40cm DBH Non-timber forest products
Subplot 2 R=20m (0.13 ha):	Trees ≥ 20 cm and < 40cm DBH
Subplot 3 R=10m (0.03 ha):	Poles ≥ 10 cm and < 20cm DBH Coarse Woody Debris > 10cm diameter
Subplot 4 R=3m:	Saplings ≥ 1 cm and < 10cm DBH Climbers ≥ 1 cm DBH
Satellite Quadrates ($1m^2$):	Tree regeneration < 1cm DBH and <1.3m height Fine woody debris Organic litter

Figure 2: Nested Subplot arranged in concentric circles of varying diameters and measurements

Annex 2: Sample plot data and tree measurements

Measurements	Parameter
Plot Observations	Cluster/Plot ID Date and Time Team Name Plot XY Coordinates Slope Angle and Direction Land use Forest type Forest disturbance type and impact
Living Tree & Standing Deadwood Measurements	Species identification Distance and angle from plot center Diameter at breast height (DBH) Point of measurement (marked) Tree total height (every 5 trees only) Commercial bole length Stem form Canopy form Damage
Coarse Woody Debris Measurements	Length Top/bottom diameters Decay
Recording of herbs, woody debris and organic litter:	Weighing and sampling

Measurements	Parameter
Recording of natural regeneration:	Recording of seedlings.
Recording of Non-timber forest products	
Biodiversity	Tree species
Soil Classification	Assessment of soil type and texture

Table 6: Plot and tree parameters collected during NFI

Annex 3: Sampling design

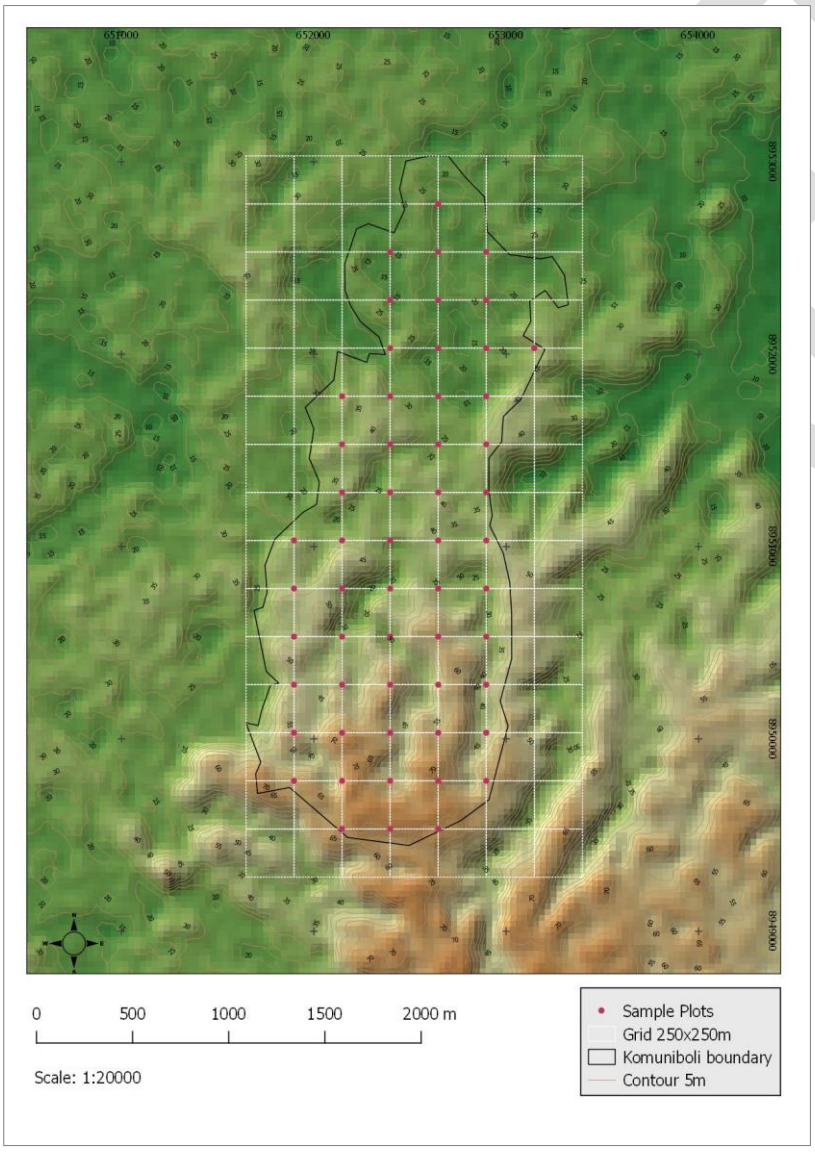


Figure 3: Sampling Design for NFI Field Piloting

Annex 4: Participant List (Tentative)

	Name	Organization	Division/Office
1	Johnson Palmer	MoFR	Operation
2	Stephanie Rikoi	MoFR	Utilization
3	Verity Halinge	MoFR	Utilization
4	Erick Kwaria	MoFR	Reforestation
5	Ethel Falu	MoFR	Reforestation
6	Christina Gabuvai	MoFR	NHBG
7	Ruvie Pitavaqa	MoFR	NHBG
8	Myknee Sirikolo	MoFR	NHBG
9	Ben Fafale	MoFR	Licensing
10	Gideon Solo	MoFR	FRMTS
11	Gusgrandy Mua	MoFR	GIS
12	Bradford Theonomi	MoFR	Corporate Service
13	Lawrence Pongo	MoFR	Guadalcanal Province Office
14	Philip Micah	MoFR	Guadalcanal Province Office
15	Chris Ghiro	MoFR	REDD+ Unit
16	Cathy Unga	MoFR	REDD+ Unit
17	Ano Augwaroa	MoFR	REDD+ Unit
18	Takaaki Kato	JICA-SFRM Project	
19	Nishikawa Tatsuji	JICA-SFRM Project	
20	Hillary	JICA-SFRM Project	
21	Manuel Haas	SPC/GIZ REDD+ II Project	SPC/GIZ REDD+ II Project
22			
23	?	SINU	
24	?	SINU	
25	?	SINU	
26	?	SINU	