Solomon Islands
Ministry of Forestry and Research

THE PROJECT ON CAPACITY DEVELOPMENT FOR SUSTAINABLE FOREST RESOURCE MANAGEMENT IN SOLOMON ISLANDS

Annexes

(PART III・IV)

September 2022

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
Kokusai Kogyo Co., Ltd.
Rakuno Gakuen University

GE
JR
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Forest Information Tool (FIT)
-Substainable Forest Resource Management Project (SFRM)-
Basic Design Document (Screen Design)

Ver.1.02

8 November 2019

Created Date	2019/08/16	NFMS(NationalForestMonitoringSystem)	NFMS 画面設計	－
Last Update	2019/12/02			
Version	Ver.1.02			

INTERNAL

Revision History

Created/Updated	Ver.	Updater	Reason for update	Updated Location	Updated details
16/08/2019	1.00	Takahashi	New Creation	Screen Item Specifications	Screen Item Specifications
12/10/2019	1.01	Takahashi	Additonal Creation	Data Management Screen Specifications	
03/11/2019	1.02	Haraguchi	Structure improvement	Overall	

Created Date	2019/08/16	NFMS(NationalForestMonitoringSystem)	NFMS 画面設計	－
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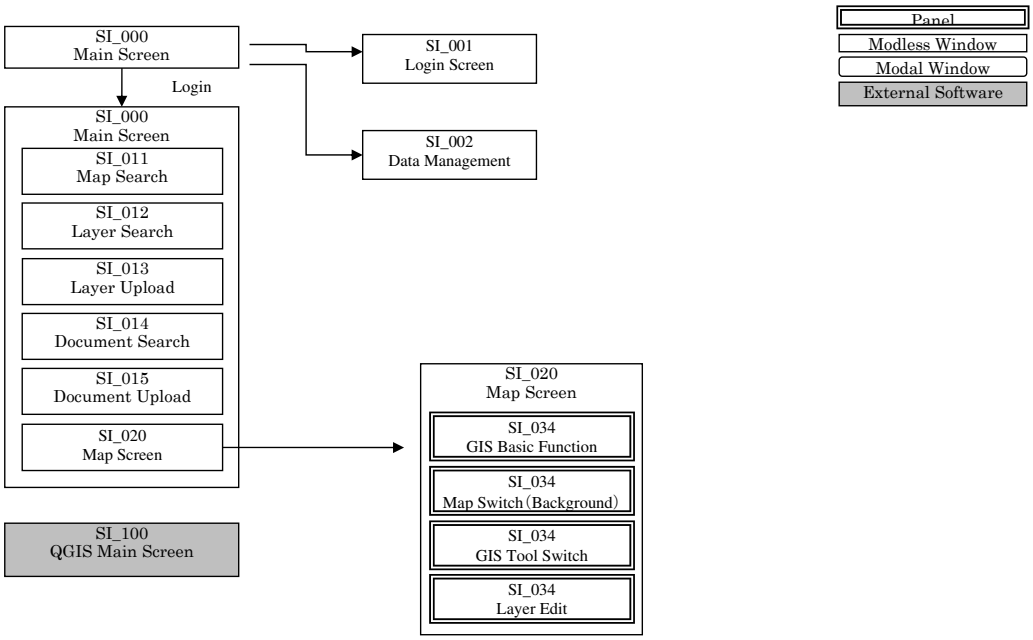
1.1 Screen Transition Diagram

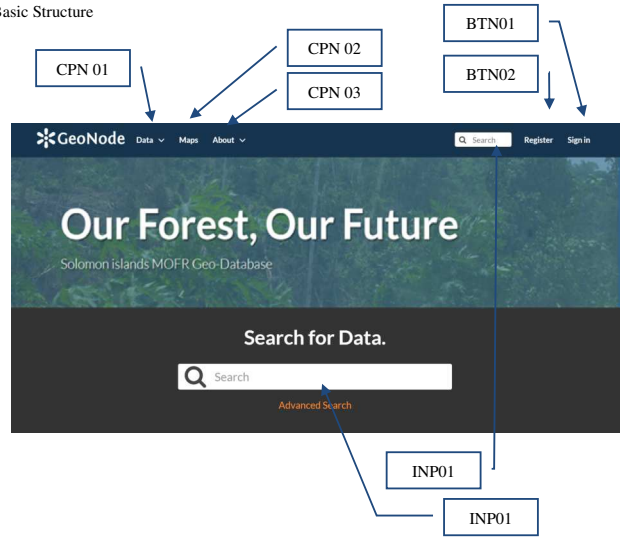


1.2 Screen Item Specifications

1.2.1 Main Screen (ID: SI_000)

1.2.1.1 Main Screen (ID: SI_000)

(1). Screen Layout and Outline of Processing

Screen Structure	Overview of Screen Processing
Basic Structure  	【Overview of Operation】 ✓ Display Home Screen ✓ 【Caller】 None 【Basic Action】 ➢ Register users with "Register" ➢ Press the "Sing in" button to display the sign-in screen ➢ Press the "Data" button to display a drop-down menu ➢ Press the “Maps” button to display the drop-down menu ➢ Press the "About" button to display a drop-down menu ➢ Perform data search by entering "Search"

INTERNAL

(2). Screen Item Definition

ID	Item Name	Type	Processing contents	Remarks
CPN01	Data	Collapsible Panel	Click to display the data search panel.	
CPN02	Maps	Collapsible Panel	Click to display the Pup Search panel.	
CPN03	Users	Collapsible Panel	Click to display the user / group search panel.	
BTN04	Register	Bootstrap Buttons	Click to display the user registration screen.	
BTN05	Sign in	Bootstrap Buttons	Click to display the sign-in panel.	
INP01	Search	Bootstrap Input	Search by the entered information.	
INP02	Search	Bootstrap Input	Search by the entered information.	

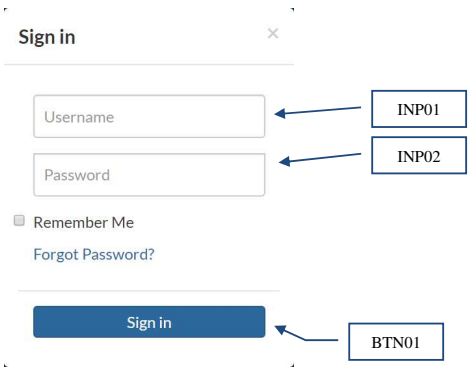
(3). Special Notes

(4). Items to be considered

INTERNAL

1.2.1.2 Sign-in Screen（ID: SI_001）

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ Authenticate with user ID and password. 【Caller】 BTN01 “Sign in” on SI_000 main screen 【Basic Action】 ➢ Enter your user ID and password. ➢ If the “Sing in” button is clicked, data can be accessed if registered.

(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
INP01	User	Bootstrap Input	Enter your user ID. Authenticate using the entered information.	
INP02	Password	Bootstrap Input	Enter the password. Authenticate using the entered information.	
BTN01	Sing in	Bootstrap Buttons	If registered, the main screen is displayed.	

INTERNAL

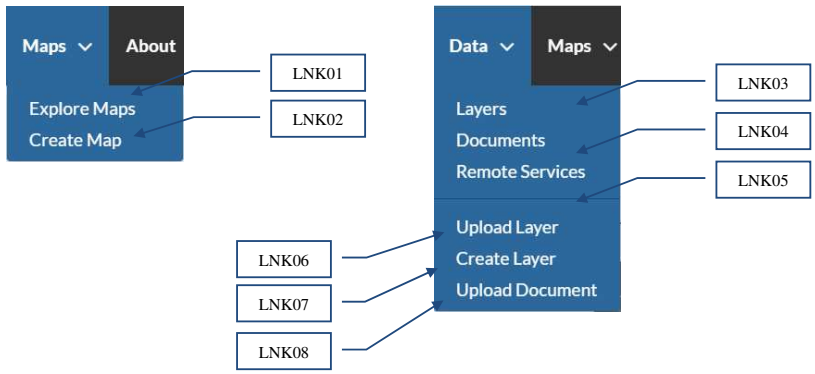
(3). Special Notes

Should the “Register” button be abolished and used as an alternative user management function?

(4). Items to be considered

1.2.1.3 Data Management (ID: SI_002)

(1). Screen layout and processing overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ It is possible to display the screen of the selection item by selecting the specified menu 【Caller】 SI_000 CPN01 "Data" and CPN02 "Maps" 【Basic Actions】 ➢ A map and data drop-down list is displayed. ➢ The screen of the link item selected and clicked is displayed.

INTERNAL

(2). Screen Iten Definition

ID	Item Name	Type	Processing Contents	Remarks
LNK01	Explore Maps	Link	Click to display the Explore Maps screen.	
LNK02	Create Map	Link	Click to display the Create Map screen.	
LNK03	Layers	Link	Click to display the Layers search screen.	
LNK04	Documents	Link	Click to display the Documents search screen.	
LNK05	Remote Services	Link	Click to display the Remote Services screen.	
LNK06	Upload Layer	Link	Click to display the Upload Layers screen.	
LNK07	Create Layer	Link	Click to display the Create Layers screen.	
LNK08	Download Document	Link	Click to display the Download Document screen.	

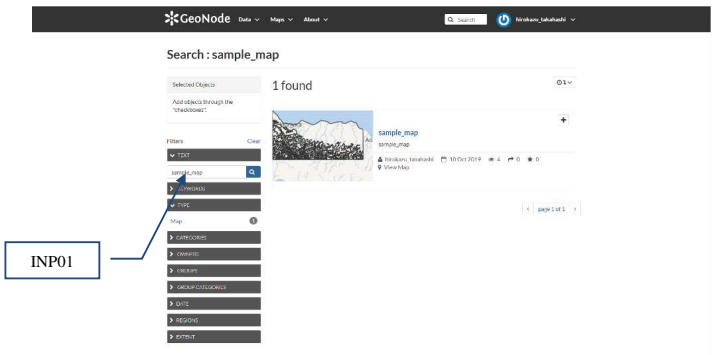
(3). Special Notes

(4). Items to be considered

1.2.2 Data Management (ID: SI_000)

1.2.2.1 Map Search (ID: SI_011)

(1). Screen layout and processing overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Overveiw of Operation】 ✓ Thematic maps can be searched according to the specified search conditions. ✓ The map can be displayed according to the selected search result. 【Caller】 SI_002 data management LNK01 "Explore Maps" link 【Basic Action】 ➢ It is possible to display the map search result on the server by entering in the search item. ➢ By clicking the displayed search result, it is possible to display the map screen.

(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
INP01	Filtered Search	Bootstrap Input	Enter search information. The result is displayed according to the input information.	

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(3). Special Notes

(4). Items to be considered

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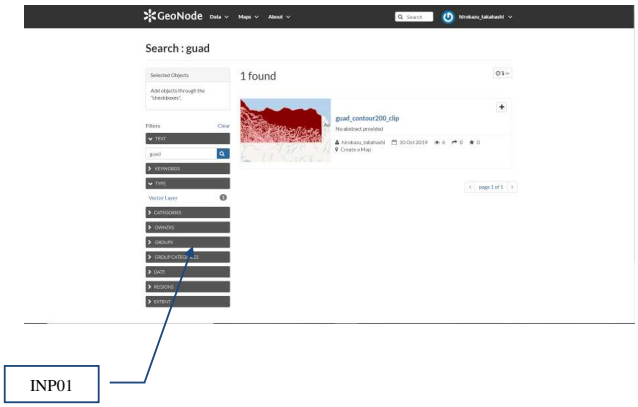
1.2.2.2 Layer Search (ID: SI_012)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ It is possible to display available layers for each user. ✓ Search results can be displayed according to the search conditions. 【Caller】 SI_002 Data Management LNK03 “Layer” link 【Basic Action】 ➢ Display available layers. ➢ It is possible to narrow down by search conditions.

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(2). Screen Item Definition

ID	Item Name	Type	Processing content	Remarks
INP01	Filtered Search	Bootstrap Input	Enter search information. The result is displayed according to the input information.	

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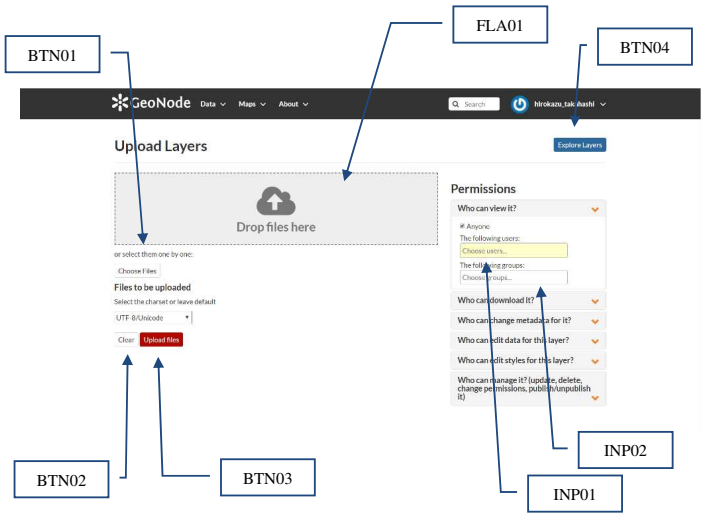
(3). Special Notes

(4). Items to be considered

1.2.2.3 Layer Upload (ID: SI_013)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure 	【Outline of Operation】 ✓ Upload the specified file as a layer to the server. 【Caller】 SI_002 Data Management LNK06 "Upload Layer" link 【Basic Action】 ➢ A file to be used as a layer can be specified as an upload file by selecting a file from the folder or dragging and dropping. ➢ It is possible to set edit rights. ➢ It is possible to deselect the specified upload file.

(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
BTN01	File Selection	Bootstrap Buttons	Open a window and select a file.	
BTN02	Clear	Bootstrap Buttons	Delete all input items.	
BTN03	Upload Data	Bootstrap Buttons	You can upload selected files.	
BTN04	Layer Search	Bootstrap Buttons	It is possible to display the layer search screen.	
FLR01	File Selection	File Input	Files can be selected by drag and drop.	
INP01	User Search Input	Bootstrap Input	It is possible to search for users.	
INP01	Group Search Input	Bootstrap Input	It is possible to search for groups.	

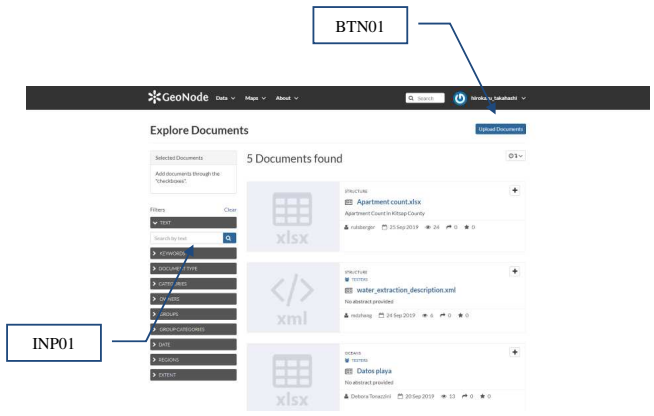
INTERNAL

(3). Special Notes

(4). Items to be considered

1.2.2.4 Document Search (ID: SI_014)

(1). Screen Layout andProcessing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ It is possible to display available layers for each user. ✓ Search results can be displayed according to the search conditions. 【Caller】 SI_002 Data Management LNK04 "Documents" link 【Basic Action】 ➢ Display available layers. ➢ It is possible to narrow down by search conditions. ➢ Display the upload screen by "Upload Documents" of BTN01.

INTERNAL

(2). Screen Item Definition

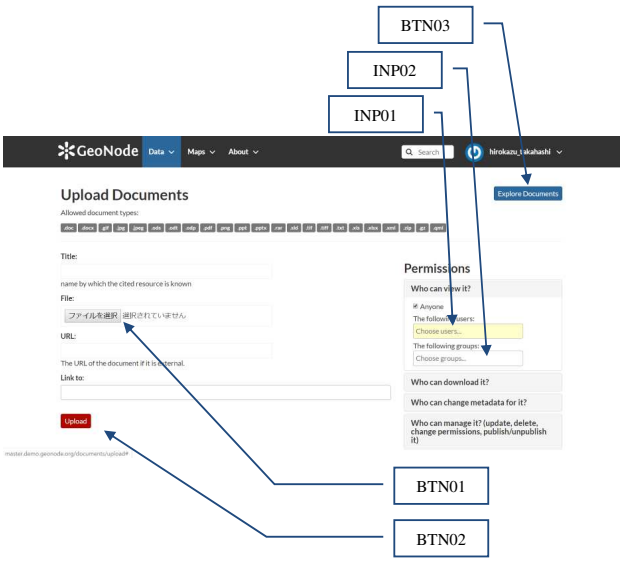
ID	Item Name	Type	Processing Contents	Remarks
INP01	Filtered Search	Bootstrap Input	Enter search information. Displays search results based on the information entered.	
BTN01	Upload Documents	Bootstrap Buttons	Display the document upload screen.	

(3). Special Notes

(4). Items to be considered

1.2.2.5 Document Upload (ID: SI_015)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ The selected file can be uploaded to the server 【Caller】 SI_002 Data Management LNK06 "Upload Layer" link 【Basic Action】 ➢ Display folders on your device and select files to upload ➢ It is possible to set file editing authority

(2). Screen Item Definition

ID	Item Names	Type	Processing Contents	Remarks
BTN01	Folder Selection	Bootstrap Buttons	It is possible to select a document.	
BTN02	Upload	Bootstrap Buttons	You can upload selected documents.	
BTN03	Document Search	Bootstrap Buttons	The document search screen can be displayed.	
INP01	User Search Input	Bootstrap Input	Users can be selected.	
INP02	Group Search Input	Bootstrap Input	It is possible to select a group.	

INTERNAL

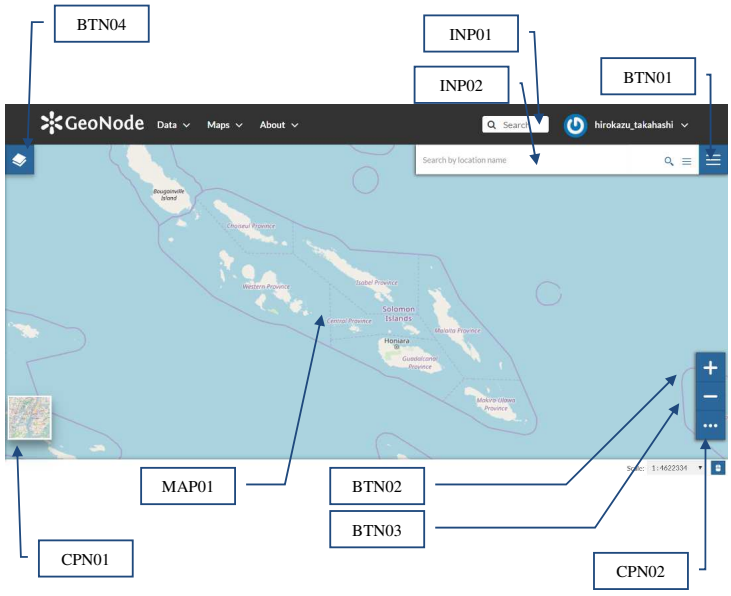
(3). Special Notes

(4). Items to be considered

1.2.3 Map Screen (ID: SI_020)

1.2.3.1 Map Screen (ID: SI_020)

(1). Screen layout and processing overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ Select the theme map to display a map of the en tire country of Solomon. ✓ It is possible to switch between thematic map an d background map on the map. ✓ Has basic GIS functions. 【Caller】 Map selected and displayed with SI_011 【Basic Action】 When the GIS basic function button is clicked, a drop-down menu can be invoked. The details are defined in 1.2.3.2 ➢ When the background map switch button is clicked, can be called. The details are defined in 1.2.3.3. ➢ It is possible to move the map by drag and drop. ➢ The map can be enlarged or reduced with BTN02, BTN03 and mouse wheel. ➢ Layer management tab can be displayed by BTN04. The details are defined in 1.2.3.5.

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(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
MAP01	Map of Solomon Country	Map	Display a map of the entire country of Solomon.	
BTN01	GIS Basic Functions	Bootstrap Buttons	You can call the GIS basic function Dropdown Menu. The details are defined in 1.2.3.2.	
CPN01	Background Map Switching	Collapsible Panel	You can call the Dropdown Menu that switches the background map. The details are defined in 1.2.3.3.	
CPN02	Map Operation Panel	Collapsible Panel	You can call the Dropdown Menu to select the map operation. The details are defined in 1.2.3.4.	
INP01	Data Search	Bootstrap Input	Enter search information. The result is displayed according to the input information.	
INP02	Location Search	Bootstrap Input	Enter search information. The result is displayed according to the input information.	
BTN02	Zoom out	Bootstrap Buttons	It is possible to reduce the map.	
BTN03	Zoom in	Bootstrap Buttons	The map can be enlarged.	
BTN04	Layer Management	Bootstrap Buttons	It is possible to display the layer management tab	

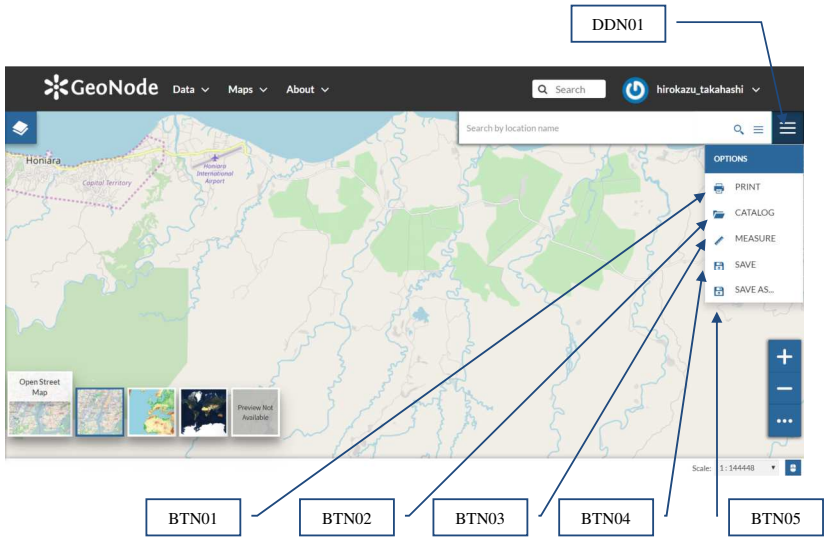
ID	Item Name	Type	Processing Contents	Remarks

(3). Special Notes

(4). Items to be considered

1.2.3.2 GIS Basic Functions (ID: SI_021)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ The GIS basic function drop-down menu can be called, and distance measurement, area measurement, printing, and saving can be operated by selecting from the drop-down menu options. 【Caller】 SI_020 Map screen CPN02 GIS basic function buttons 【Basic Action】 ➢ Display GIS basic function drop-down menu. ➢ Using the browser function, you can print using the “Print” drop-down menu. ➢ Additional data can be displayed using the “Catalog” drop-down menu. ➢ The distance, area, and coordinates can be measured using the “Measure” drop-down menu. ➢ The map can be saved by "Save" in the drop-down menu. ➢ A new map can be saved using the “Save as” drop-down menu.

(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
DDN01	Options	Basic Dropdown	It is possible to display GIS basic functions. Printing, distance measurement, area measurement, etc. are possible.	
BTN01	Print	Bootstrap Buttons	It is possible to print a map.	The displayed map is printed and UI elements are not printed.
BTN02	Catalog	Bootstrap Buttons	Search and add data.	
BTN03	Measure	Bootstrap Buttons	It is possible to measure distance, area and coordinates.	
BTN04	Save	Bootstrap Buttons	It is possible to save the map.	
BTN05	Save as	Bootstrap Buttons	The map can be overwritten and saved.	

INTERNAL

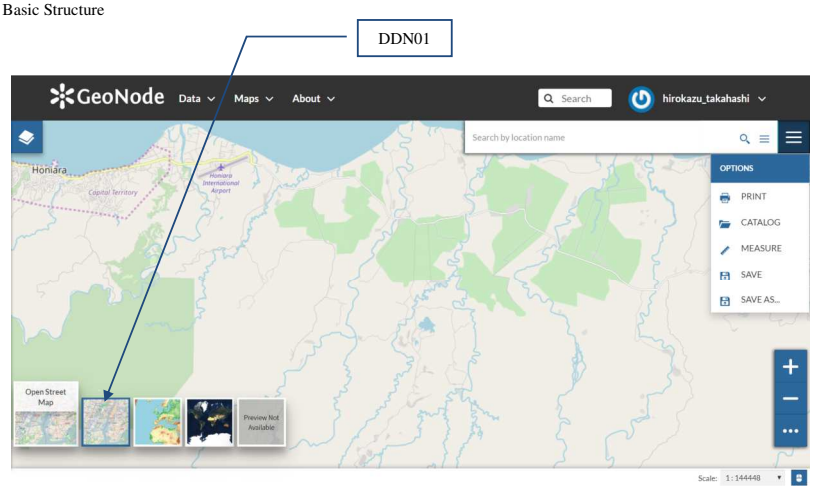
(3). Special Notes

When printing, only the map part is printed without printing UI elements.

(4). Items to be considered

1.2.3.3 Map Change (Background)(ID: SI_022)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ A drop-down menu for switching the background map is displayed, and the background map can be switched using the drop-down menu options. 【Caller】 SI_020 main screen CPN01 background map switching button 【Basic Action】 ➢ The background image can be switched by selecting the tile image. ➢ Multiple types of tiles can be loaded. ・Open Street Map tiles ・Open Topo Map tiles ・Sentinel-2(cloudless) tiles

INTERNAL

(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
DDN01	Background map drop-down menu	Basic Dropdown	By selecting the tile image, the background map can be switched and multiple types of tiles can be loaded (Open Street Map, Open Top Map, Sentinel-2 3 tiles).	

(3). Special Notes

The background map depends on GeoNode.

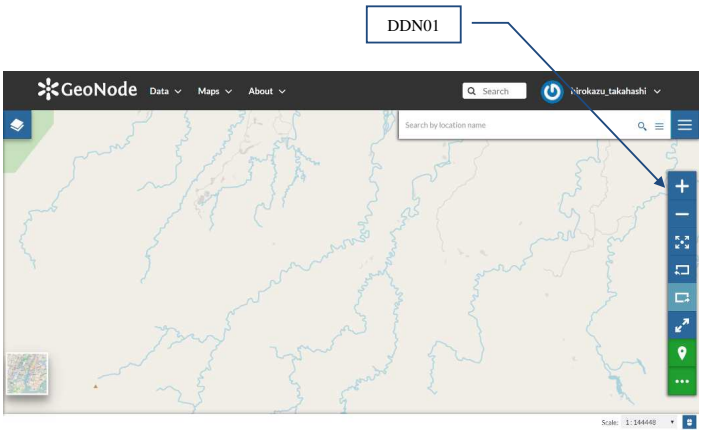
(4). Items to be considered

Can Google satellites be added?

INTERNAL

1.2.3.4 GIS Tool Switching (ID:SI_023)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ A drop-down menu for switching the map operation tool is displayed. Select a function by selecting from the drop-down menu. 【Caller】 CPN02 map operation tool button on SI_100 main screen 【Basic Action】 ➢ Operate the tools of enlargement, reduction, full screen display, back, forward, maximum enlargement, feature attribute display.

(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
DDN01	Map Manipulation Tool	Basic Dropdown	By selecting the tool, the map operation tool can be switched, and each tool can be operated (enlargement, reduction, full screen display, back, forward, maximum enlargement, feature attribute display 7 tools).	

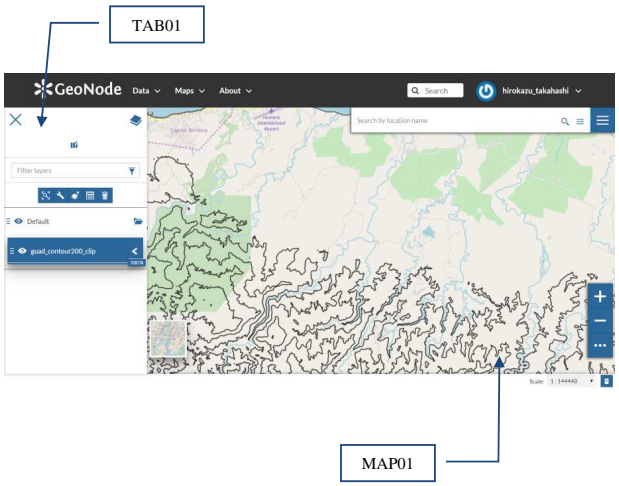
INTERNAL

(3). Special Notes

(4). Items to be considered

1.2.3.5 Layer Editing (ID: SI_024)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ Press the BTN04 “Layer Management” button to display the Layer Management tab. ✓ You can search, add, and delete layers. ✓ Layer display settings and forcing display. 【Caller】 SI_000 main screen BTN04 "Layer Management" button 【Basic Action】 ✓ Display the added layer on the background map. ✓ The display of the layer can be adjusted. ✓ The attributes of the selected layer can be displayed.

INTERNAL

(2). Screen Item Definition

ID	Items	Type	Processing Contents	Remarks
TAB01	Layer Management	Tab	Search, add, delete, display attributes, etc. for layers.	
MAP01	When on Map	Map	The selected layer can be displayed on the map.	

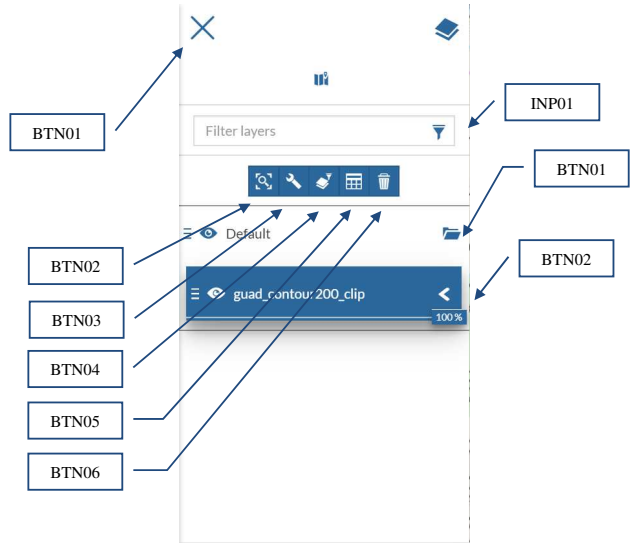
(3). Special Notes

(4). Items to be considered

INTERNAL

1.2.3.6 Layer Edit 2 (ID: SI_024)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure 	【Outline of Operation】 ✓ When BTN01 “Clear” is clicked, the “Layer Management” panel is cleared. ✓ Entering search items in INP01 displays search results for searchable layers. 【Caller】 SI_000 main screen BTN04 "Layer Management" button 【Basic Action】 ➢ Search and display of layers is possible ➢ Layers can be added / deleted ➢ Map display of added layers is possible ➢ The attributes of the selected layer can be displayed. ➢ The line type, transparency, and attributes of the layer display can be adjusted.

(2). Screen Item Definitions

ID	Item Name	Type	Processing Contents	Remarks
BTN01	Clear	Bootstrap Buttons	Clear “Layer Adjustment”.	
BTN02	Zoom to selected layer	Bootstrap Buttons	Display the entire selected layer.	
BTN03	Layer settings	Bootstrap Buttons	Display the layer setting panel.	
BTN04	Filter Layer	Bootstrap Buttons	Search and select from layer attributes.	
BTN05	Open attribution table	Bootstrap Buttons	Display the attribute table.	
BTN06	Remove selected layer	Bootstrap Buttons	Delete the selected layer.	
INP01	Filter Layer	Bootstrap Input	It is possible to select and display layers.	
BTN07	Open Group	Collapsible Panel	Display layers in a group	
BTN08	Display Legend	Collapsible Panel	Show legend for selected layer	

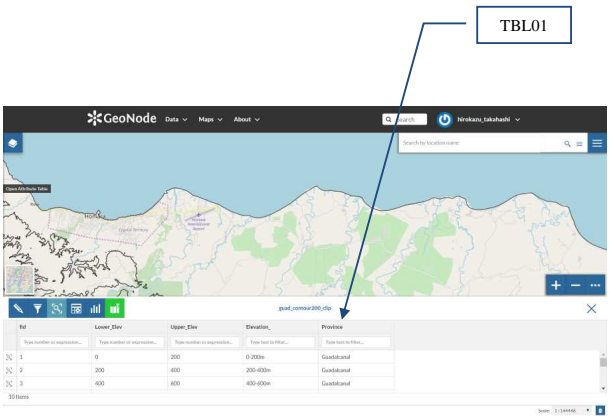
INTERNAL

(3). Special Notes

(4). Items to be considered

1.2.3.7 Attribute Panel (ID:SI_024)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ The attributes of the selected layer can be displayed in a table format. 【Caller】 BTN04 “Open attribution table” button on SI_020 map screen 【Basic Action】 ➢ Attributes can be displayed. ➢ Search for attributes and map linkage ➢ Editable attributes

INTERNAL

(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
TBL01	Attribute Table	Bootstrap Basic Table	Table showing attributes	

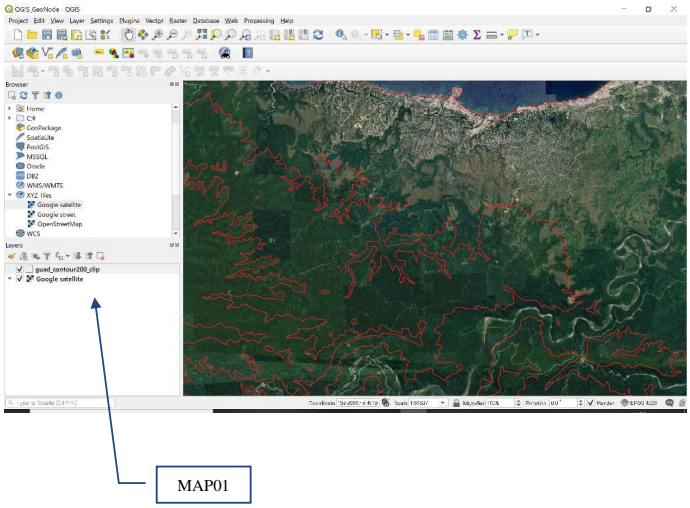
(3). Special Notes

(4). Items to be considers

1.2.4 QGIS Main Screen (ID: SI_100)

1.2.4.1 QGIS Main Screen (ID: SI_100)

(1). Screen Layout and Processing Overview

Screen Structure	Overview of Screen Processing
Basic Structure  	【Outline of Operation】 ✓ Server data can be displayed and edited with QGIS. 【Caller】 Connect to the server using the QGIS function 【Basic Action】 ➢ The selected layer can be displayed and edited on QGIS.

(2). Screen Item Definition

ID	Item Name	Type	Processing Contents	Remarks
MAP01	QGIS	QGIS	Connect geoserver in QGIS to display and analyze selected data.	

INTERNAL

(3). Special Notes

(4). Items to be considered

Whether to connect to PostGIS and edit settings in QGIS. Also, do you narrow down the target audience?

(A) REDD+ Unit:
Minute endorsed for your further Review.
15/7/19

MINUTE

To: Permanent Secretary
Ministry of Forestry and Research

Ref: Meeting Minute for Consultation meeting on Forest Information Tools under JICA/MOFR project

The following Meeting Minute and Questionaire are hereby recommended for your approval and endorsement as official view.
Refer attached for meeting minute and questionnaire
Your approval and endorsement is hereby sort for submitting to JICA project team.

Thank you

Cathy Unga
Chief REDD+ Officer,
Forest Resource Management and Technical Services Division

Date: 15/07/2019

Consultation Meeting on Developing Forest Information Tool - Follow-up Request –
Questions and Answers

	Key Questions	Key Requests
	***Do you/your division work with map currently? (Including maps from private companies)** ***If yes, what kind of maps/data are you using? Could you share them with us?** ***If not, how come you do not work with maps? Any specific reasons for that?** ***What kind of information do you want to know for your work? (e.g. topography, vegetation)**	***Assign the responsible officers who work for forest information tool (application side)** ***Organize and bring the maps and the report (tables) related to the forest area** ***If you have some kind of database (inc. Excel), could you share with us (document as well)** ***Referring to this presentation (PNG examples), could you consider data you need or provide?**
FRMTSD **(Forest Resource Management and Technical Services Division)**	Yes we have and use various maps we work with. In terms of GIS and Mapping, we have various maps we use such as logging concession area maps, land boundary maps, waterline, elevation etc. The kind of information or data we want to know or need to support and efficiently enhanced our work are vegetation types, watershed, forest composition, vegetation types, boundary of 400 m asl, boundaries of different land uses, layers demarcating steep slopes (<30°), logging concession boundaries including intensity of forest cover loss (eg high, medium and low), areas of logging re-entry, watersheds of main river systems and potential REDD+ sites and REDD+ related project sites etc.	The person or sections who responsible for the support towards the development of the forest information tool are GIS and Mapping Section, Policy Planning and the REDD+ Implementation Unit. Also we have databases but are scattered across the sections etc, The kind of data we need are vegetation types, watershed, forest composition, vegetation types, boundary of 400 m asl, boundaries of different land uses, layers demarcating steep slopes (<30°), logging concession boundaries including intensity of forest cover loss (eg high, medium and low), areas of logging re-entry, watersheds of main river systems and potential REDD+ sites and REDD+ related project sites etc. The kind of data we could provide are logging concession areas, rivers, administrative boundaries, REDD+ potential sites in the Solomon Islands, contour lines etc.
	Licensing Section – FRMTSD Yes, Form 1 application maps and registered land maps'. The latter is ok but the former is maps of customary land supposed to be specific customary tribal owned land. Their boundary needs to be confirmed in the field. Topography, Inventory of the area concern (cubic meters of wood likely to be obtained from the area), number of hectares covered by a specific land Note: The form 1 application form needed to be amended and when submitted, all requirements must be cross checked to ensure consistency with what they said in the application and what we have in our GIS system. We need a data base that links all forestry related activities together, example, if any area inside the concession had been replanted (how many hectare). Form 1 map submission must had GPS coordinates on them to assist determine the concession boundary as boundary overlaps or are different from the field compared to the submitted map. The other thing worth noting is that, land submitted for a Form 1 must have a landownership determination or show that the said land had been determined in a court of law. This will lessen the issues that stems from ownership claims and at the same time boost confident with investors	Licensing Section – FRMTSD Key requested noted, current excel data we use was put together by Lucy Takaoa
FDRD **(Forest Development and Reforestation Division)**	The Forest Development and Reforestation Division currently do not use maps because plantation are usual in small scale and scattered across the country.	Mr. Paul Hatamana is the person we assign to be responsible for the work for the forest information tool. The kind of information we do want to support our work are forest types , elevation, species compositions, existing logging roads and log over areas etc.

FID (Forest Industries Division)	Yes we use maps from the lands department such as contour and grid maps purposely to monitor logging operations and identify or determine trespasses or over boundaries (illegal logging operations on unlicensed lands etc.). Also UAV data also would be helpful to determine the exact sites or areas of illegal operations etc. where accessibility is difficult,	Mr. John Palmer Haga is the person assigned to be responsible for the work for the forest information tool. The kind of information we want to know and would support us in our work are vegetation, topography, logging roads and tracks (current and past), elevation, watershed, concession boundaries, UAV imageries, rivers and streams maps etc. We have contour and grid maps only and database of annual harvest plans. (See attachment of sample grid map and database we use). The data we need are terrain, contours, watershed, streams, rivers, elevations, forest types etc. The data we can have and can provide are contour, grip maps and annual harvest plans.
TUPD (Timber Utilization and Downstream Processing Division)	No, currently we do not use or work with maps but we realized that we need to use maps to support us with our monitoring of the compliance of the 8% of the annual quota and log pond sites etc. and vegetation maps. The kind of information we need or want to know or would be very usual to use are vegetation, log pond site maps, logging concession maps to track or monitor the 8% compliance of the annual quota.	Mr. Arnold Titiulu is the person assigned to be responsible for the work for the forest information tool. Only information related to the 8% compliance of the annual quota and sawn timber exports we have and we can provide them. We have database of sawn timber exports. We need information or data about vegetation, logging concession map, log pond sites etc. and data we can provide is sawn timber exports
NHBGD (National Herbarium and Botanical Garden)	NHBG Does work with maps, depending on the research groups that it collaborates with. However, most of the location data is collected using GPS. We are yet to upgrade our plant information system so that it could cater for maps. The information that we will be needing is the topography and the vegetation maps.	I shall not be answerable to this question since I have superiors who will be in the best position to assign duties.

Restricted only to concerned people
until agreed/authorized

(Draft) Work Plan for Developing Forest Information Tool(s)
(Break down of Activity 1.5 of PDM/PO) ver.1.0

8 November 2019
Before 2nd Consultation MTG

	Items	Output	In charge	Type	2019												2020												2021												2022					
					1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
	1.5 Develop forest information tool(s)	**Forest Information Tool(s)**	**main**	Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
			sub	Actual	X	X	X	X	X	X	X	X	X	X																															
a)	**1.5.1 Conduct consultation with MOFR and collect necessary information, documents and materials**	**Consultation Meeting (Minutes)**	Haraguchi	Plan	X	X	X																																					
			Yoshimura	Actual	X					X																																		
b)	**1.5.2 Analyze collected information in 1.5.1. and design the basic design for forest information tool**	**Collected Information ist** **Basic design document**	Haraguchi	Plan			X	X	X	X																																		
			Takahashi	Actual			X			X																																		
	Preliminary design for forest information tool (indicative proposal from PNG experience)	Preliminary proposal (presentation)	Haraguchi	Plan				X	X	X																																		
			Takahashi	Actual				X	X	X																																		
	Basic design for forest information tool (through trainings in PNG and Japan)	Basic design document (sceen design, data list and function list)	Haraguchi	Plan							X	X	X																																
			Takahashi	Actual							X	X		X	X																														
e)	**1.5.3 Technical backup and work support of MOFR which will be conducted on how to arrange and update the forest**	**Supporting activity reports**	Yoshimura	Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
			Takahashi	Actual	X				X	X	X	X		X																															
f)	**1.5.4 Produce trial forest information tool**	**(Trial) forest information tool**	Haraguchi	Plan							X	X	X	X	X	X																														
			Yoshimura	Actual							X	X		X	X																															
	Develop forest information platform	**Forest information platform**	Haraguchi	Plan																																									
			Yoshimura	Actual																																									
	Develop prototype forest information platform with GeoNode at MoFR	Prototype forest information platform	Yoshimura	Plan										X	X	X																														
			Haraguchi	Actual										X	X	X																														
	Discuss and organize map and data operational workflow	Map and data operational workflow	Yoshimura	Plan										X	X	X																														
			Haraguchi	Actual										X	X																															
	Upgrade/enhance forest information platform in government ICT (SOL-Geo)	Forest information platform on SIG-ICT (SOL-Geo)	Haraguchi	Plan											X		X	X	X	X	X	X			X			X			X			X			X			X					
			Yoshimura	Actual											X																															
	Update/maintain forest information platform (including Web-site) with national resources	Updated platform and web-site	Haraguchi	Plan											X		X	X	X	X	X	X			X			X			X			X			X			X					
			Yoshimura	Actual											X																															
c)	**Develop/update forest cover map**	**Forest cover map**	Haraguchi	Plan													X	X	X	X	X	X	X	X	X																					
			Yoshimura	Actual																																									
i)	Figure out forest area change by remote sensing	Forest area change and trend	Haraguchi	Plan													X	X	X																										
			Yoshimura	Actual																																									
ii)	Construct processing and analyzing remote sensing data	Processing and analyzing method	Haraguchi	Plan													X	X	X																										
			Yoshimura	Actual																																									
iii)	Identify additional and supplimental necessary information (other than remote sensing data)	Additional/supplimental information	Haraguchi	Plan																																									
			Yoshimura	Actual													X	X	X																										
iv)	Prepare a manual on updating forest cover map	Manual on updating forest cover map	Haraguchi	Plan																	X		X		X																				
			Yoshimura	Actual																																									
v)	Update forest cover map	Updated forest cover map	Haraguchi	Plan																X	X	X	X	X	X																				
			Yoshimura	Actual																																									
d)	**Develop/update forest carbon stock**	**Forest carbon stock** **(Timber volume)**	Haraguchi	Plan																						X	X	X	X	X	X	X	X	X	X	X	X	X							
			Takahashi	Actual																																									
i)	Consider methods of setting Forest Management Unit (FMU) based on operation-records/vegetation	Forest Management Unit (FMU)	Haraguchi	Plan																						X	X	X	X	X	X														
			Takahashi	Actual																																									
ii)	Consider introducing method of forest regrowth model	Regrowth model (or decision)	Haraguchi	Plan																									X	X	X	X	X	X											
			Takahashi	Actual																																									
iii)	Design and develop database to record logged volume and regrowth volume	Database on logging/regrowth	Haraguchi	Plan																											X	X	X	X	X	X	X	X						
			Takahashi	Actual																																									
g)	**1.5.5 Create an operation manual of the forest information tool**	**Operation manual**	Yoshimura	Plan										X	X	X	X																													
			Takahashi	Actual										X																																
	Prepare a simple operation manual (presentation based framework)	Simple operation manual(pptx)	Yoshimura	Plan										X	X	X	X																													
			Takahashi	Actual																																									
	Prepare a detail operation manual (documentation based userguide)	Detail operation manual(docx)	Yoshimura	Plan																																					X	X	X	X		
			Takahashi	Actual																																									
h)	**1.5.6 Technical training for the operation and management of forest information**	**Training materials and reports**	Yoshimura	Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
			Takahashi	Actual	X		X		X	X																																			
	Training in third country (PNG) and training in Japan (Remote Sensing/GIS, GPS/Tablet and Drone)	Report of training in PNG Report of training in Japan	Yoshimura	Plan							X	X																																	
			Takahashi	Actual							X	X																																		
	Field training (1) at MoFR (Remote Sensing/GIS, GPS/Tablet and Drone)	Training materials (RS/GIS/GPS/Tab) Training materials (Drone)	Yoshimura	Plan										X	X																														
			Takahashi	Actual										X	X																															
	Field training (2) at pilot sites (participatory forest monitoring with GPS/Tablet and Drone)		Yoshimura	Plan													X	X	X							X	X	X																	
			Takahashi	Actual																																									

9th Joint Coordinating Committee (JCC) Meeting

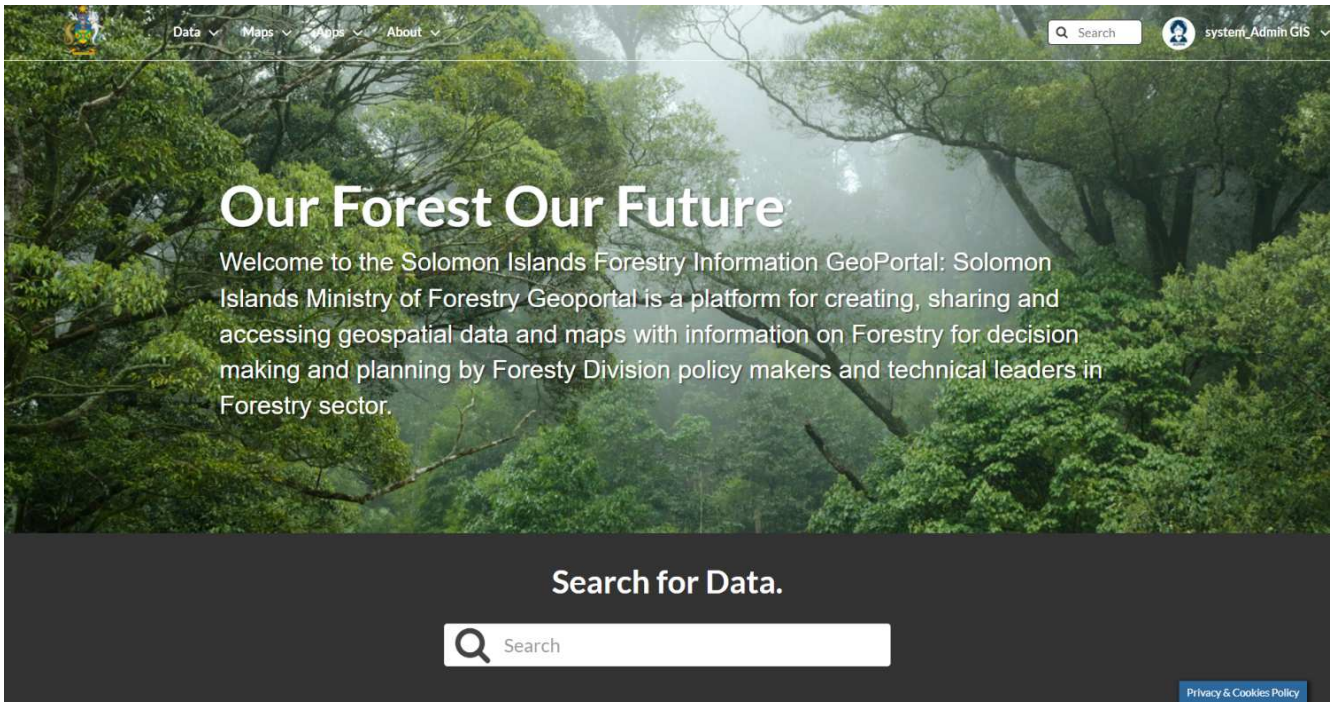
Demonstration
SolGeo-FIMS
Forest Information System

Official Version
http://solgeofims.mofr.gov.sb

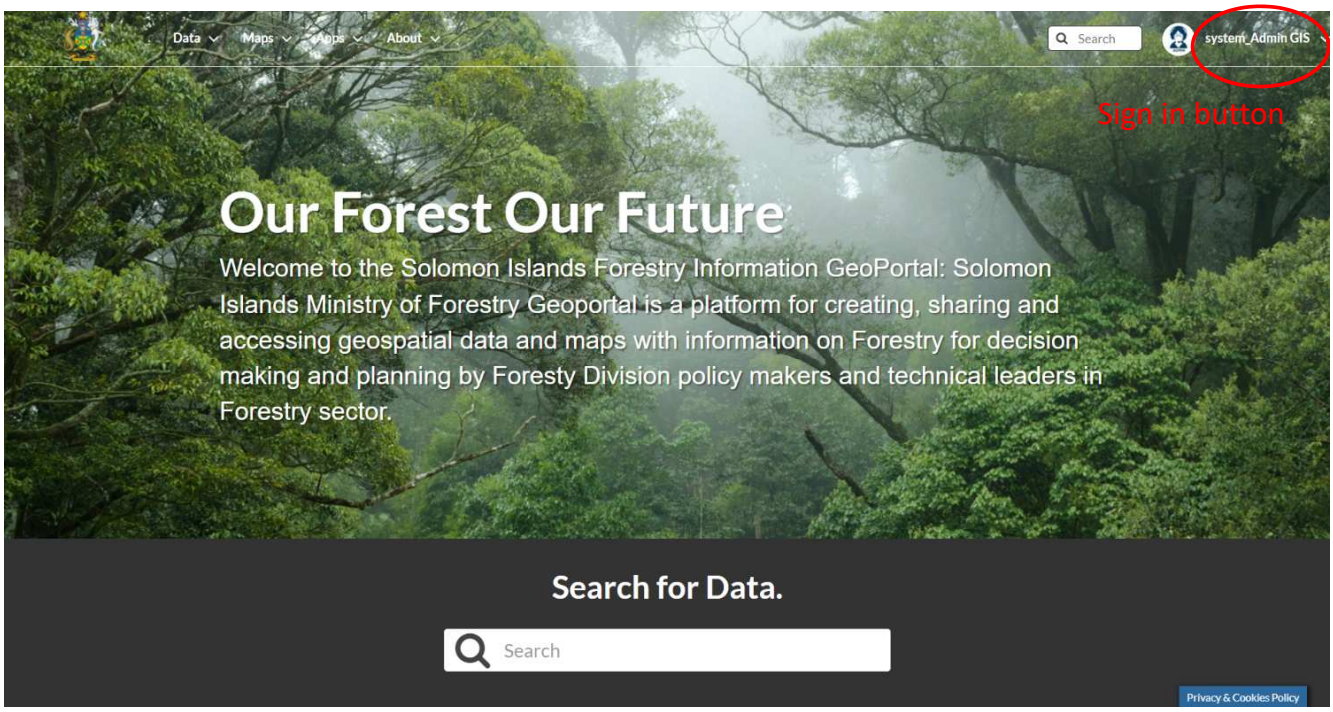
27 January 2022

Masamichi HARAGUCHI
Forest Information Management 1

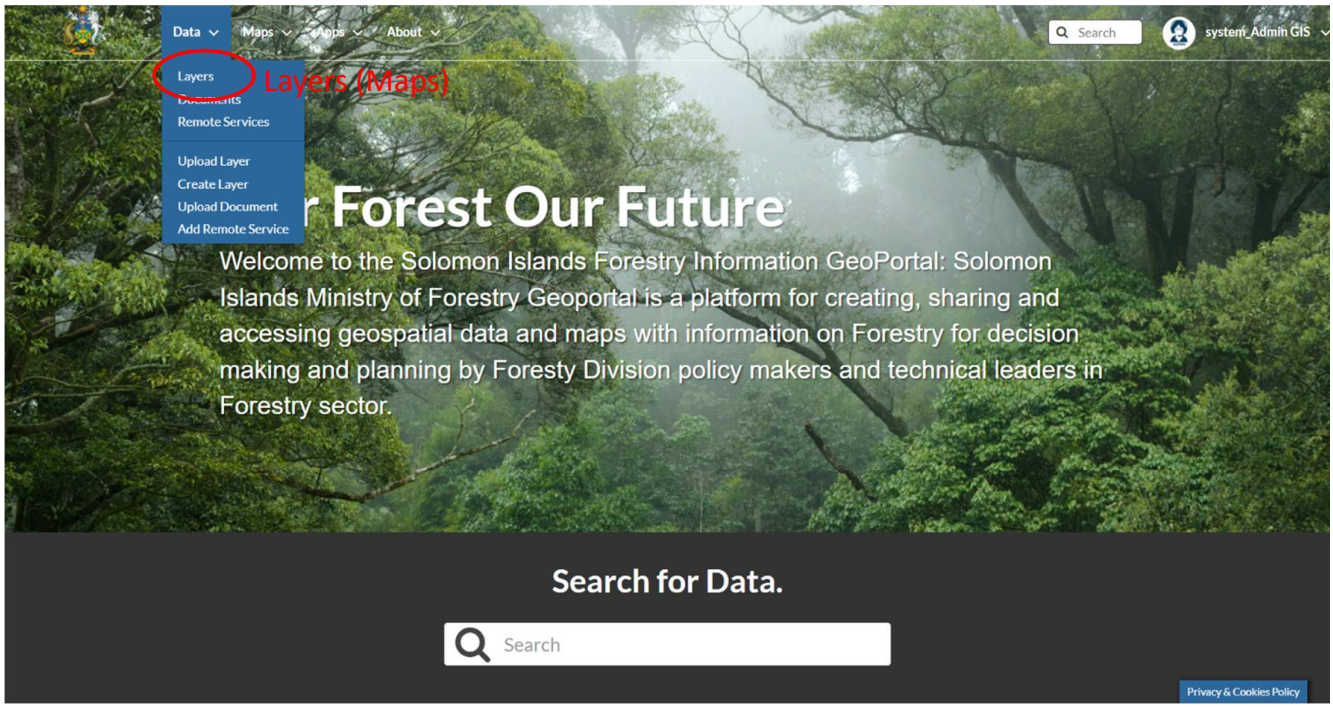
Main View



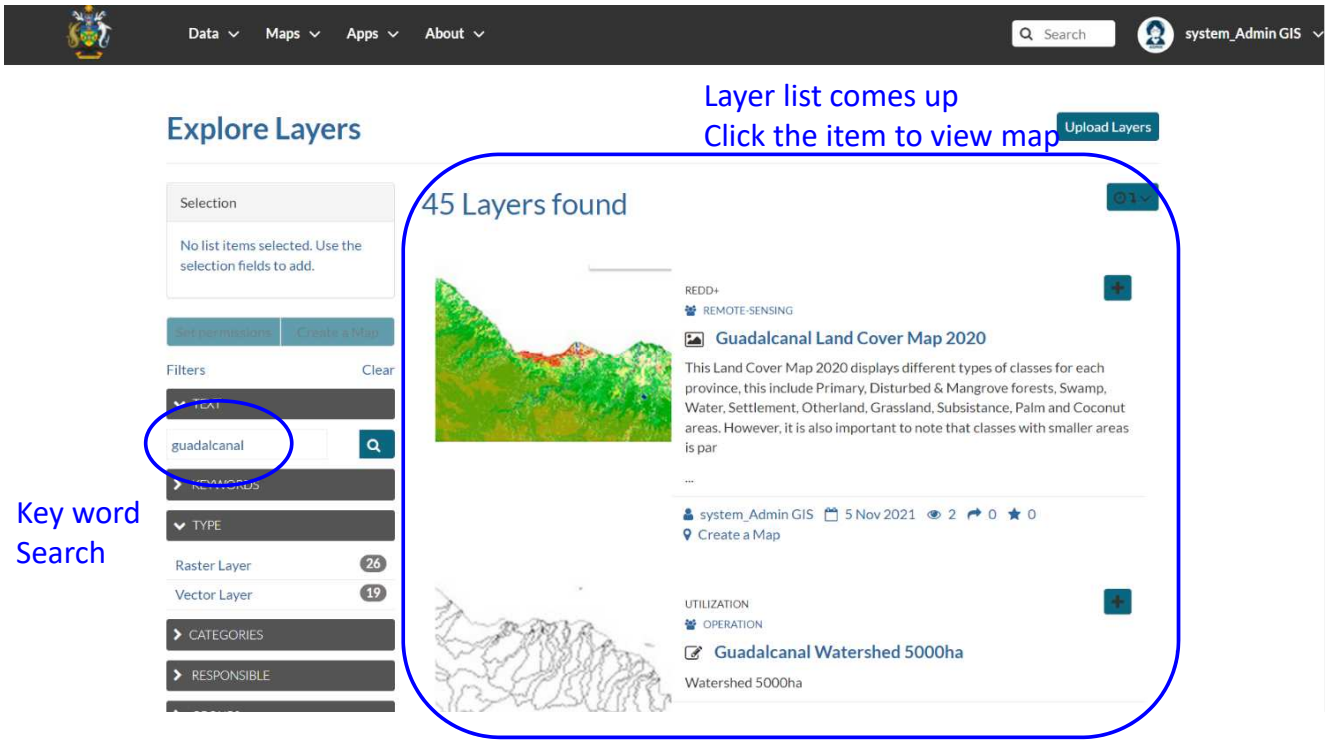
Main View



Data explore



Explore Layers

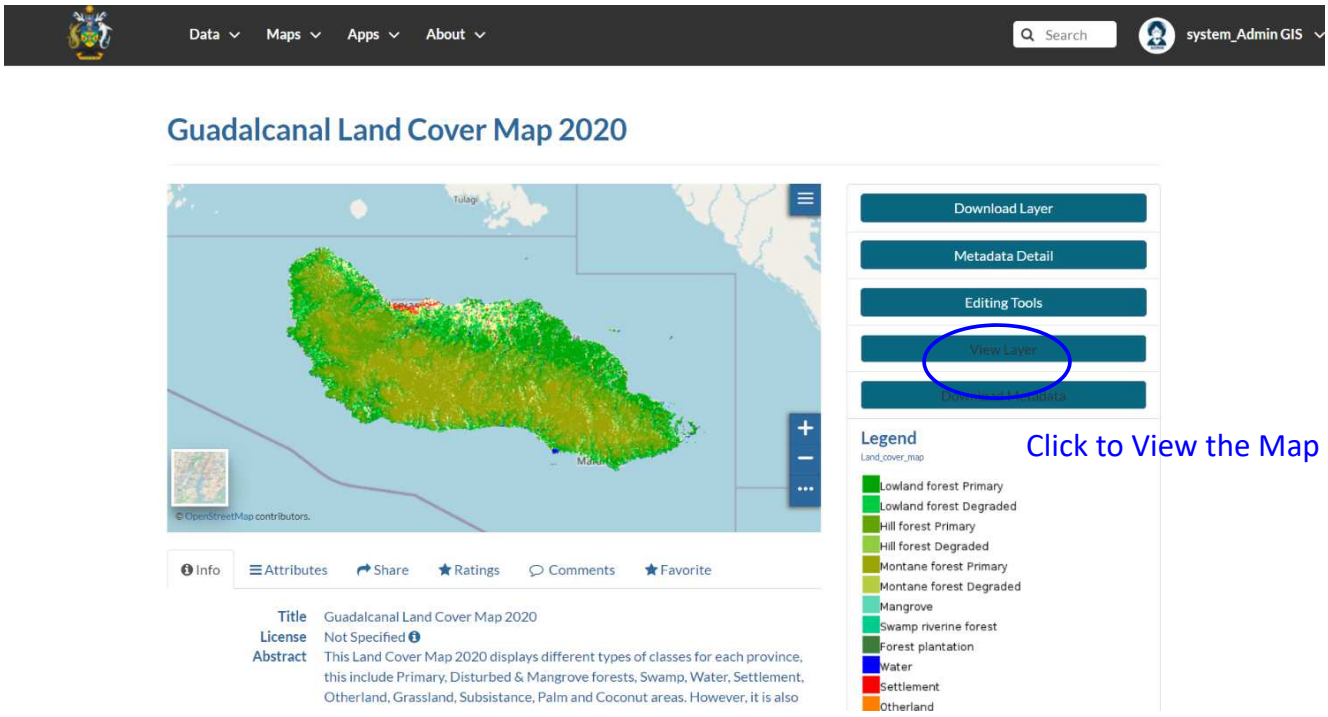


Layer list comes up
Click the item to view map

Key word Search

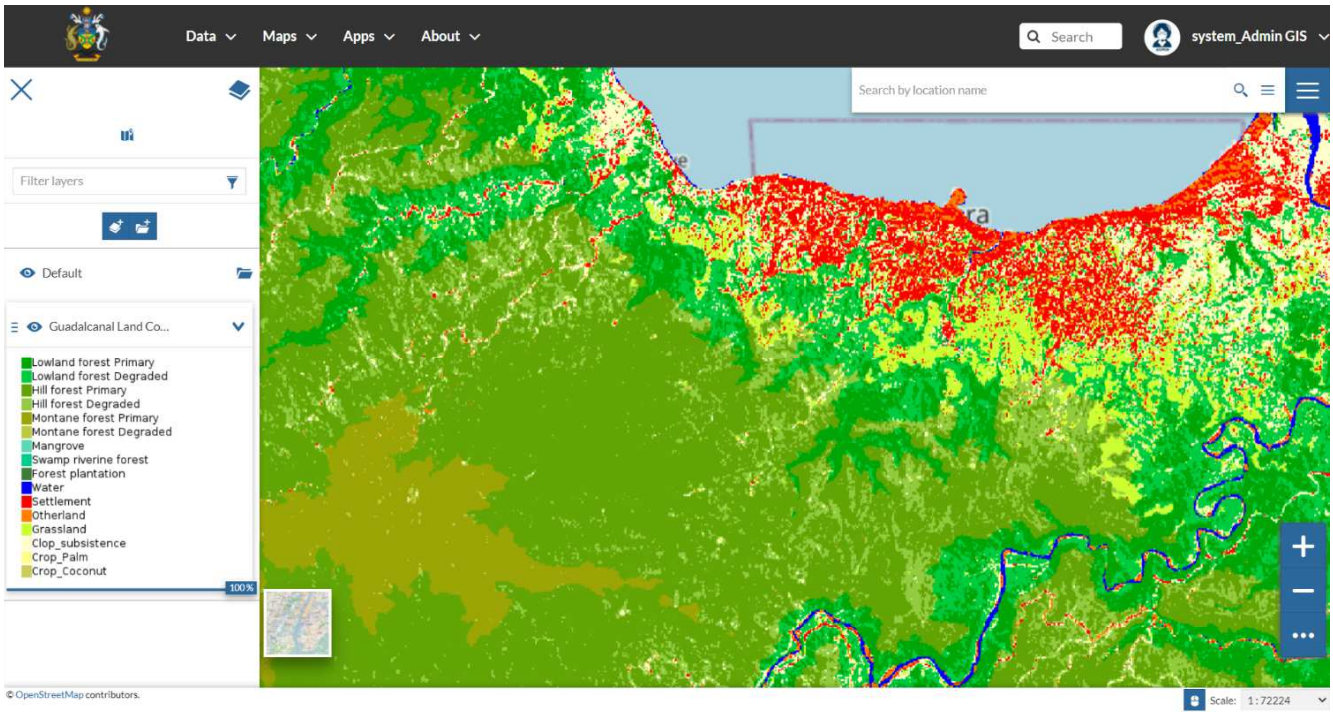
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands
Output1/Activity1.5: Forest Information Tool

Explore Layers

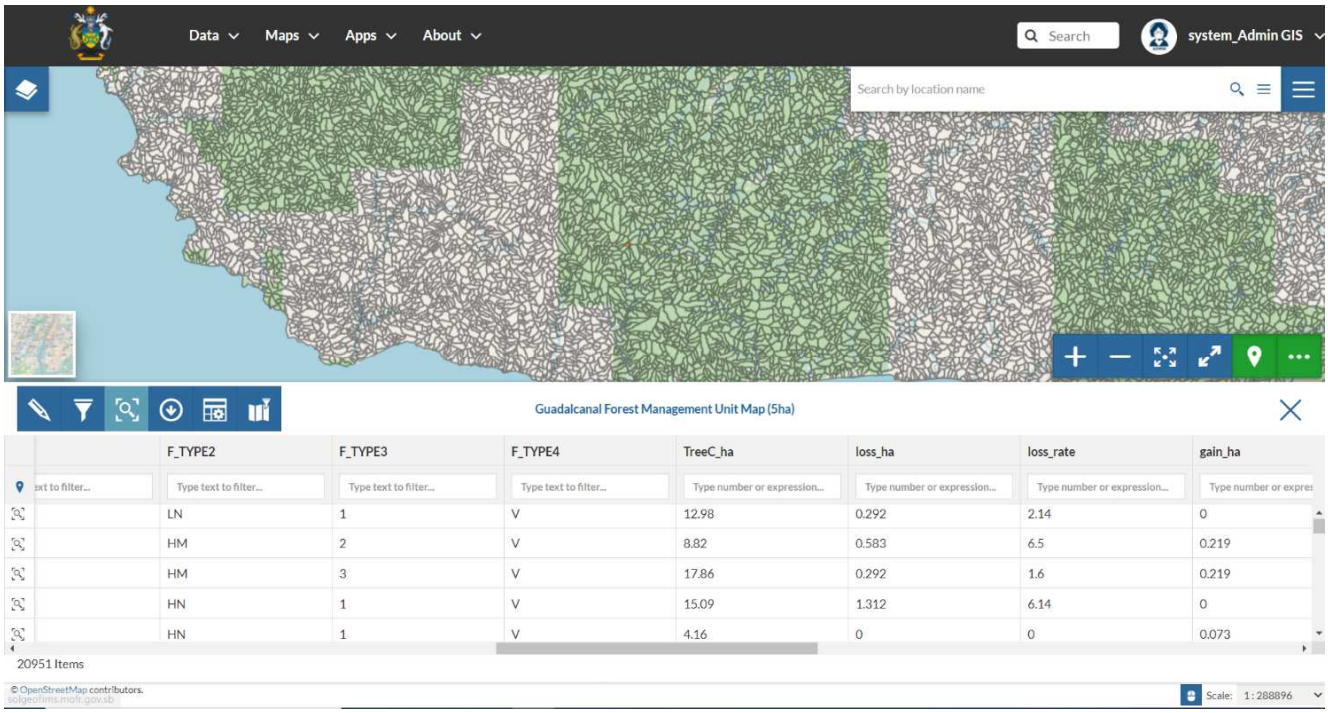


Click to View the Map

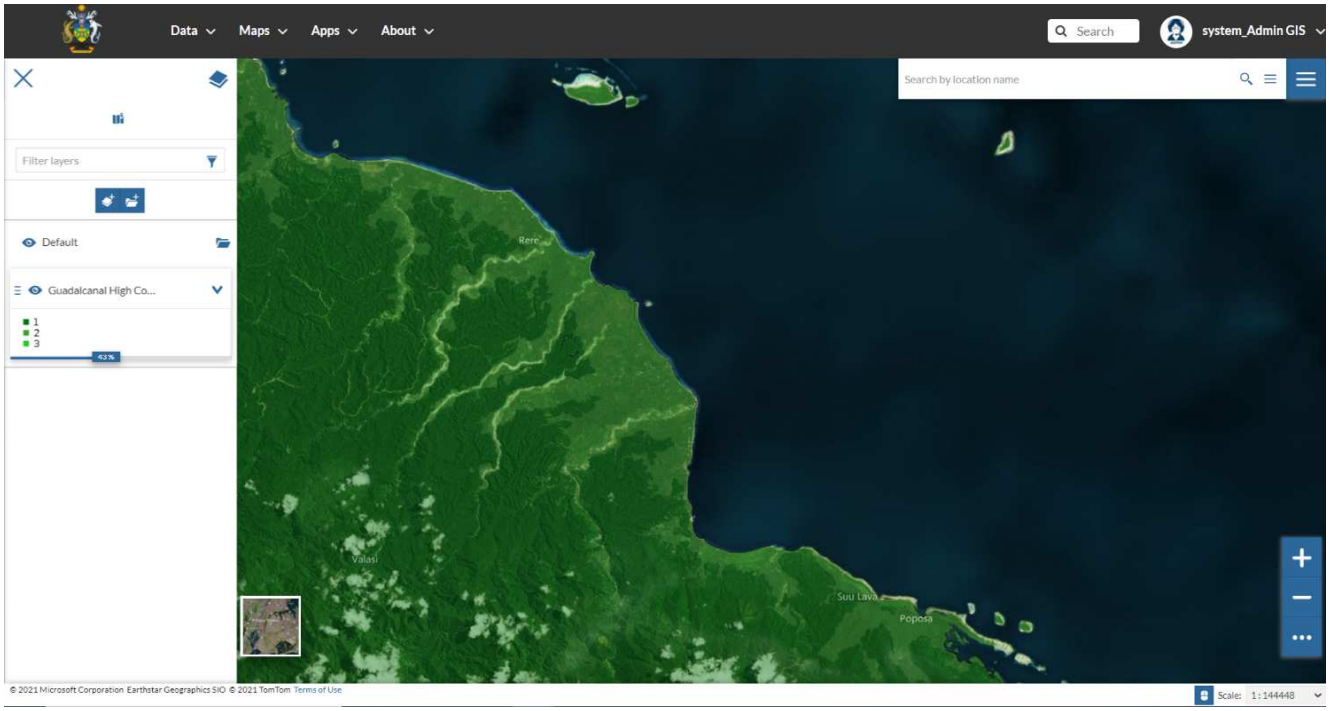
Land Cover Map



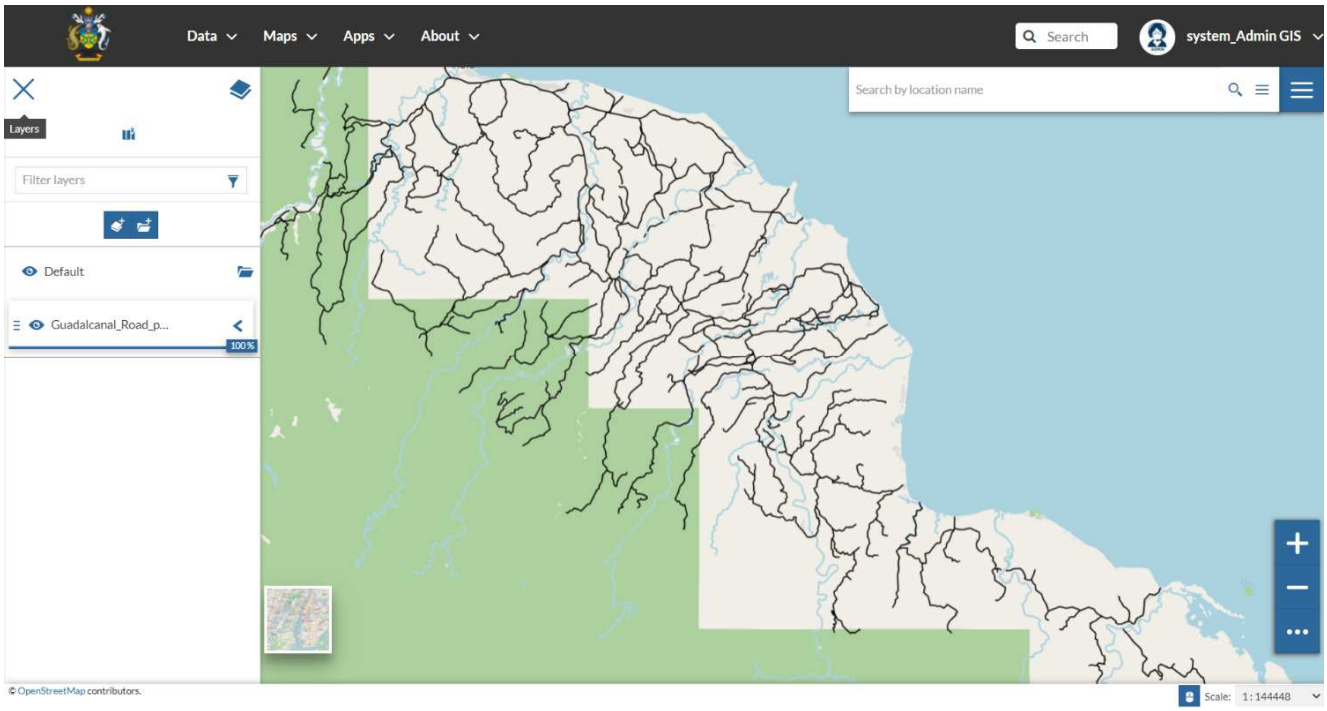
Forest Management Unit



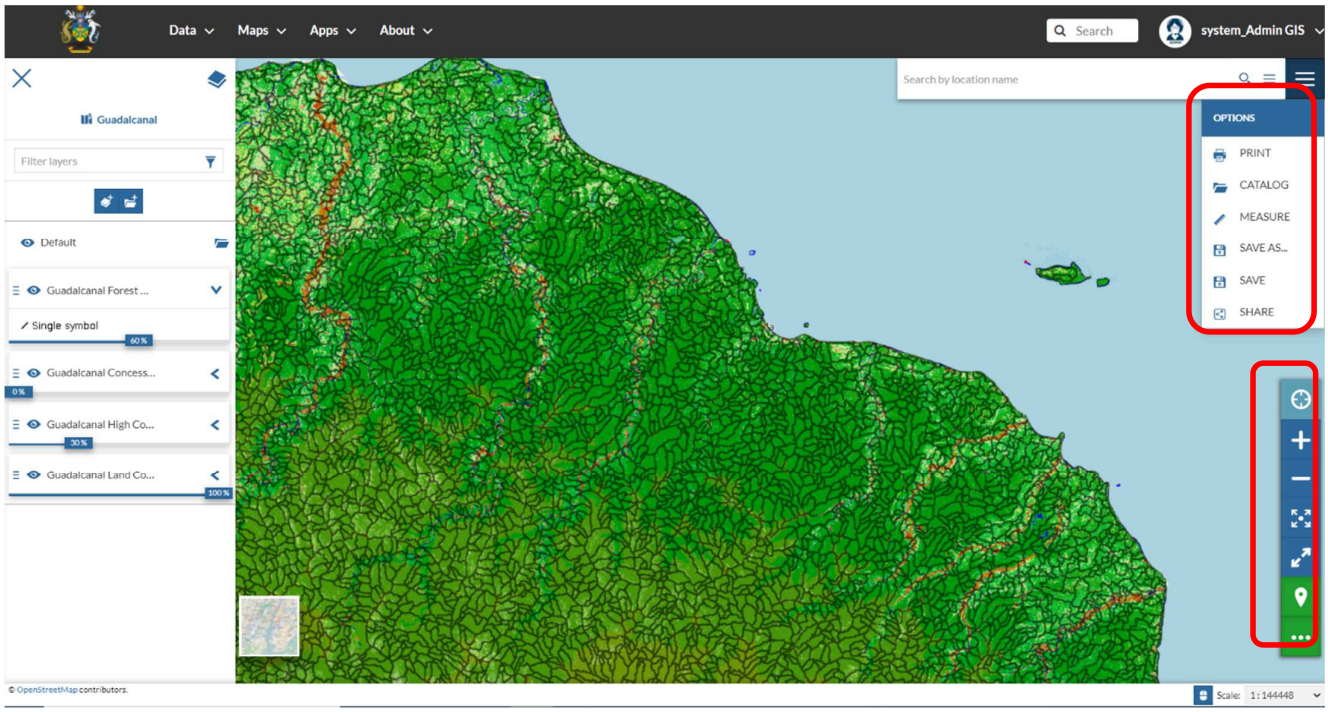
High Conservation Value Map



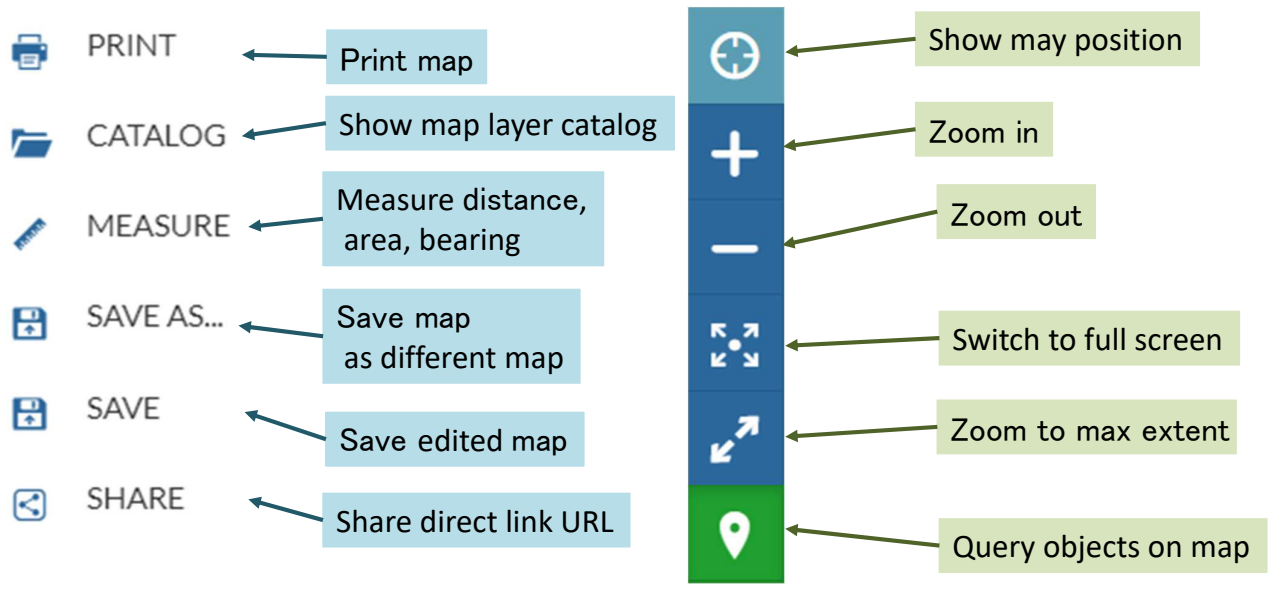
Road Data



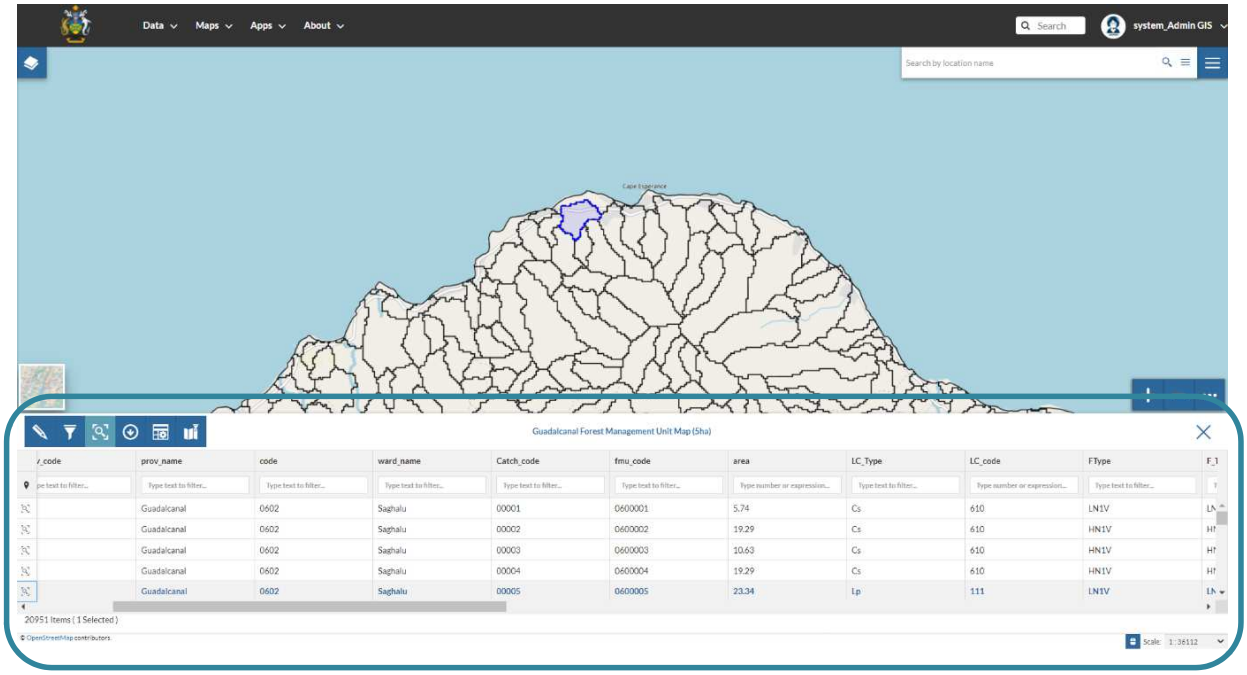
Map Function



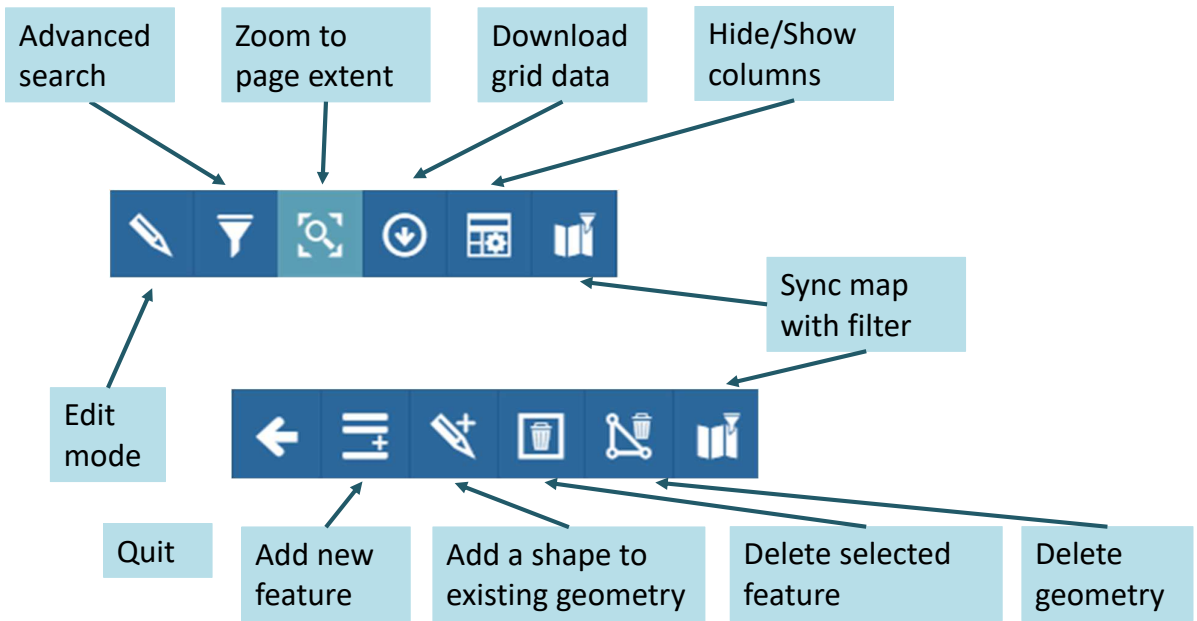
Map Function



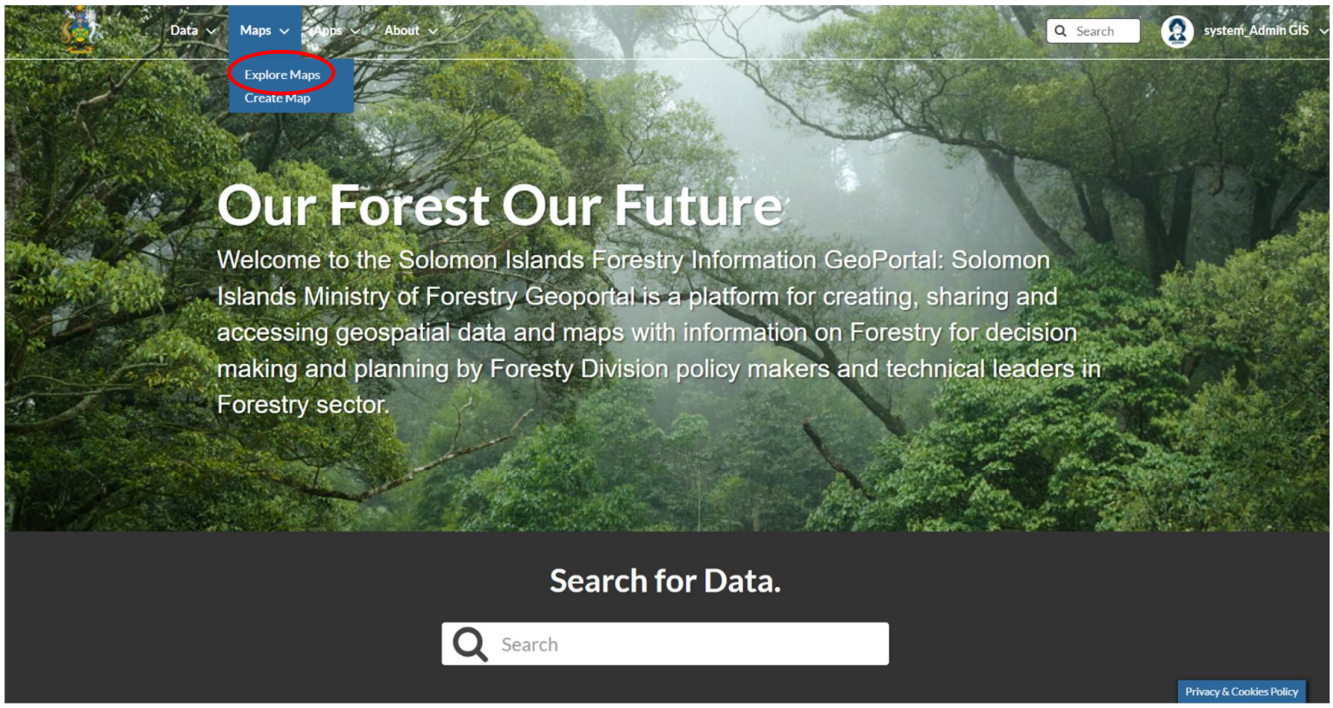
Attribute Function



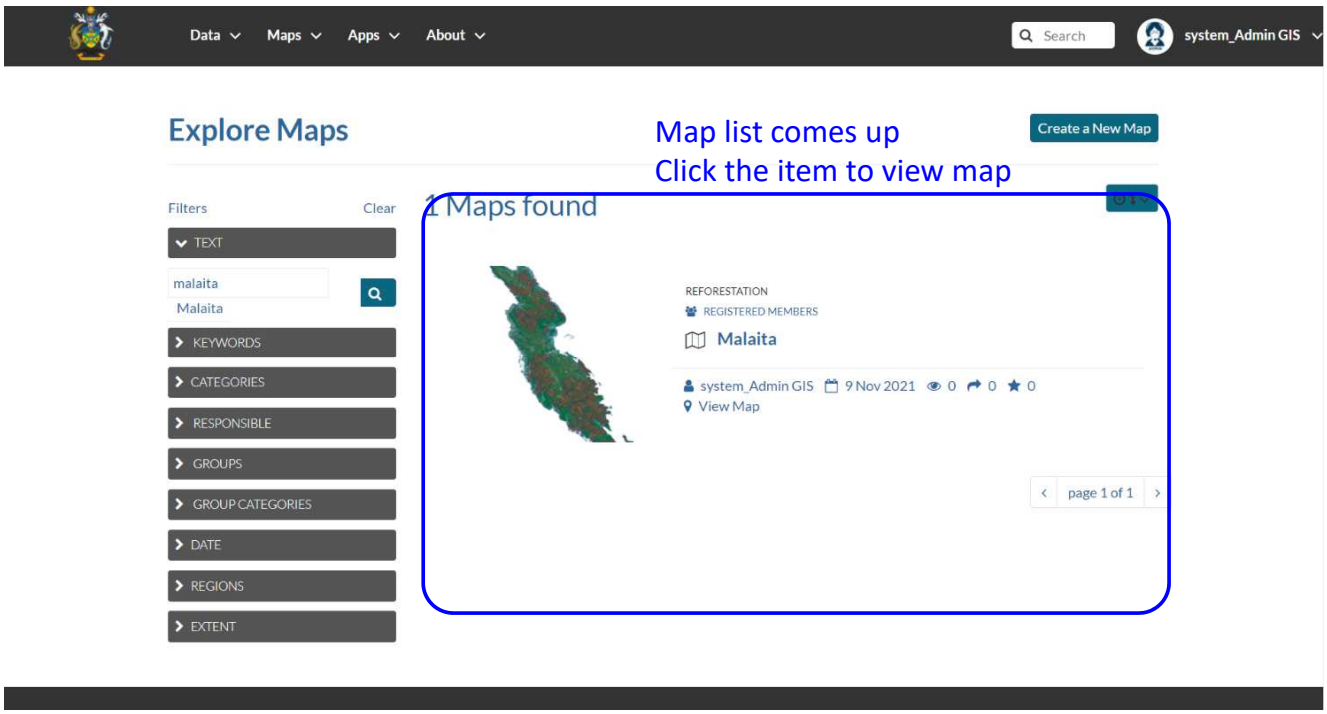
Attribute Function



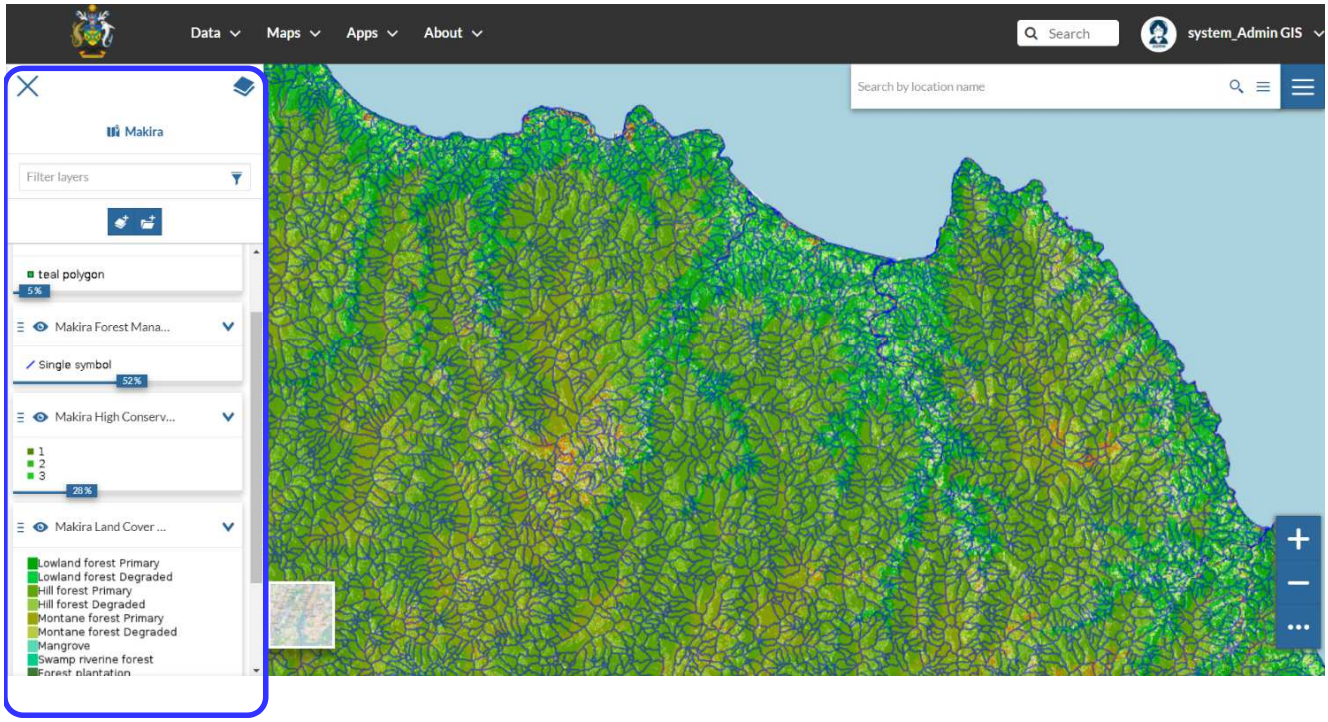
Main view



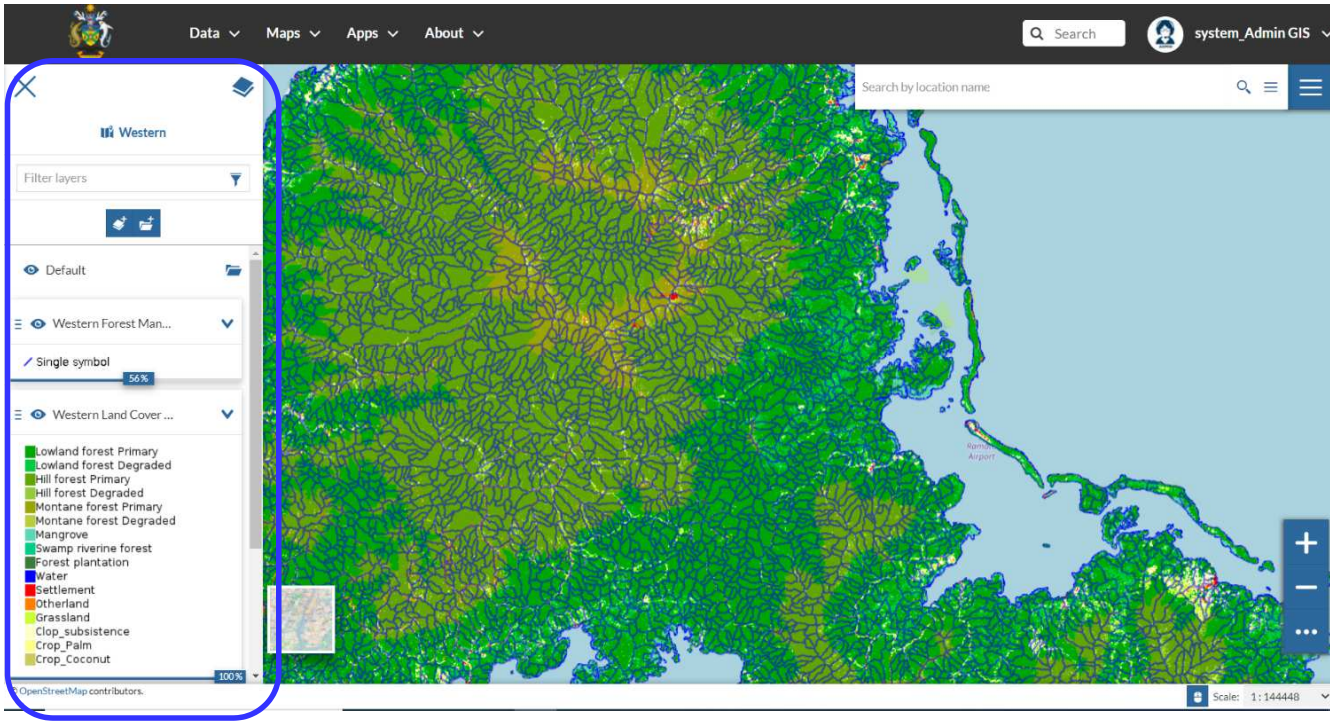
Explore Maps (Customized Maps)



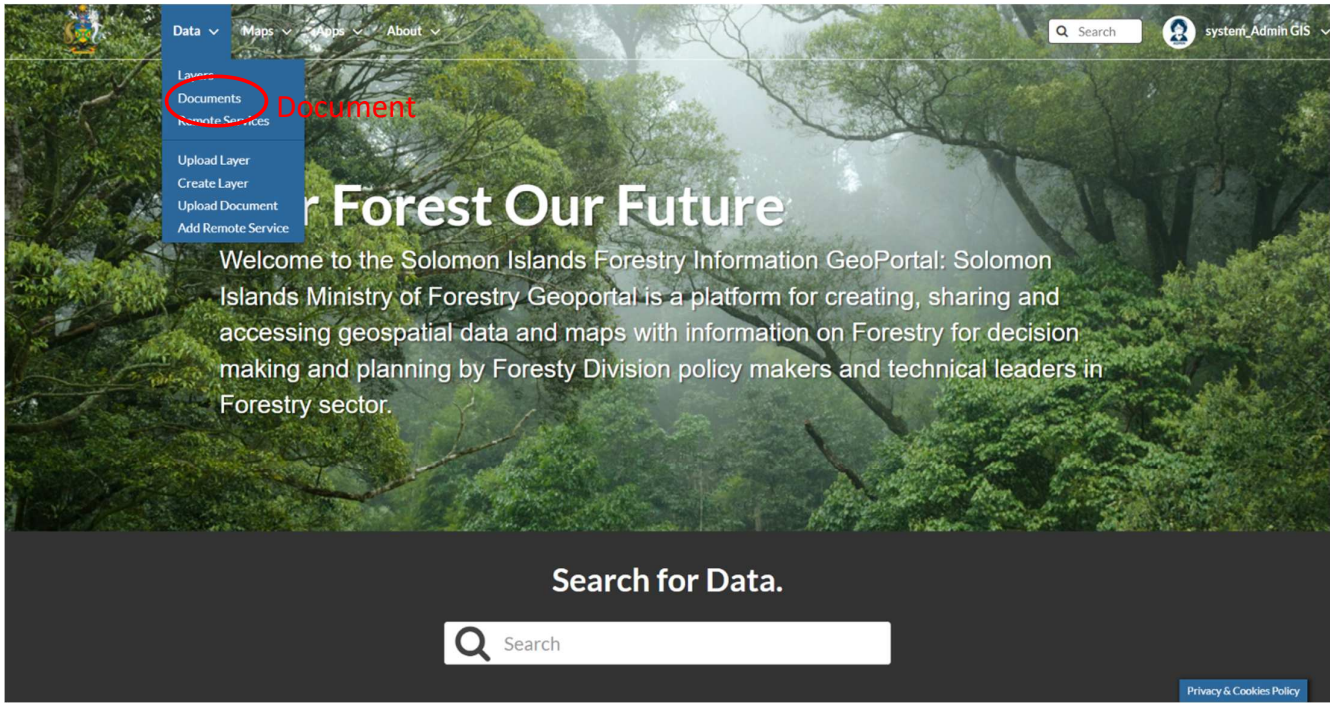
Explore Maps (Malaita Map)



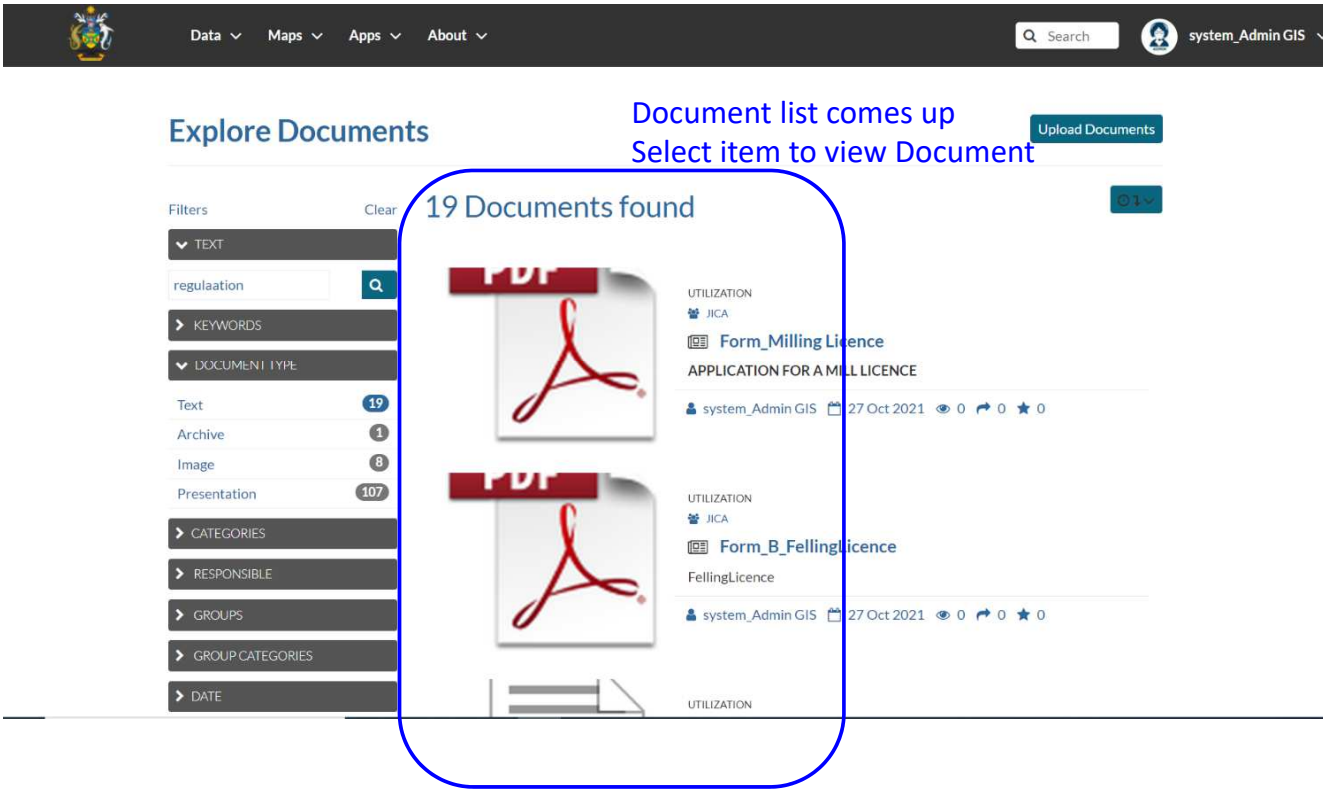
Explore Maps (Western Map)



Document explore



Explore Documents



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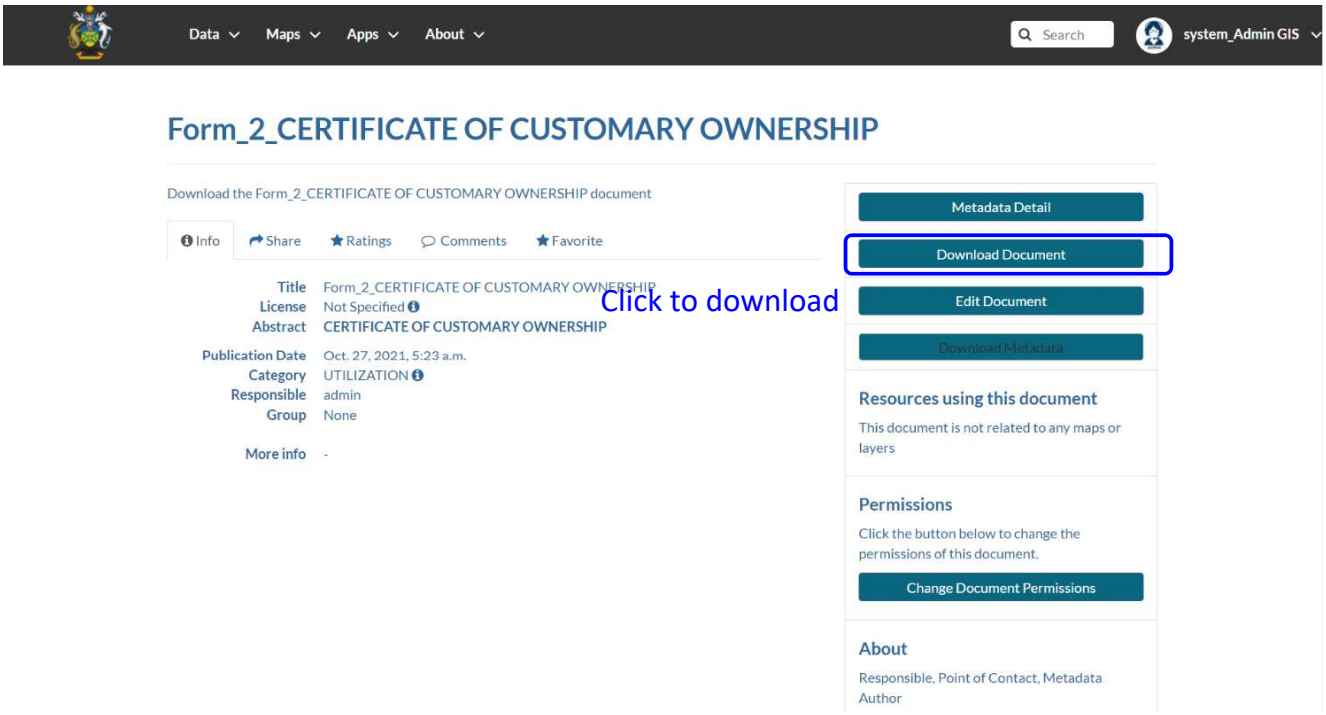
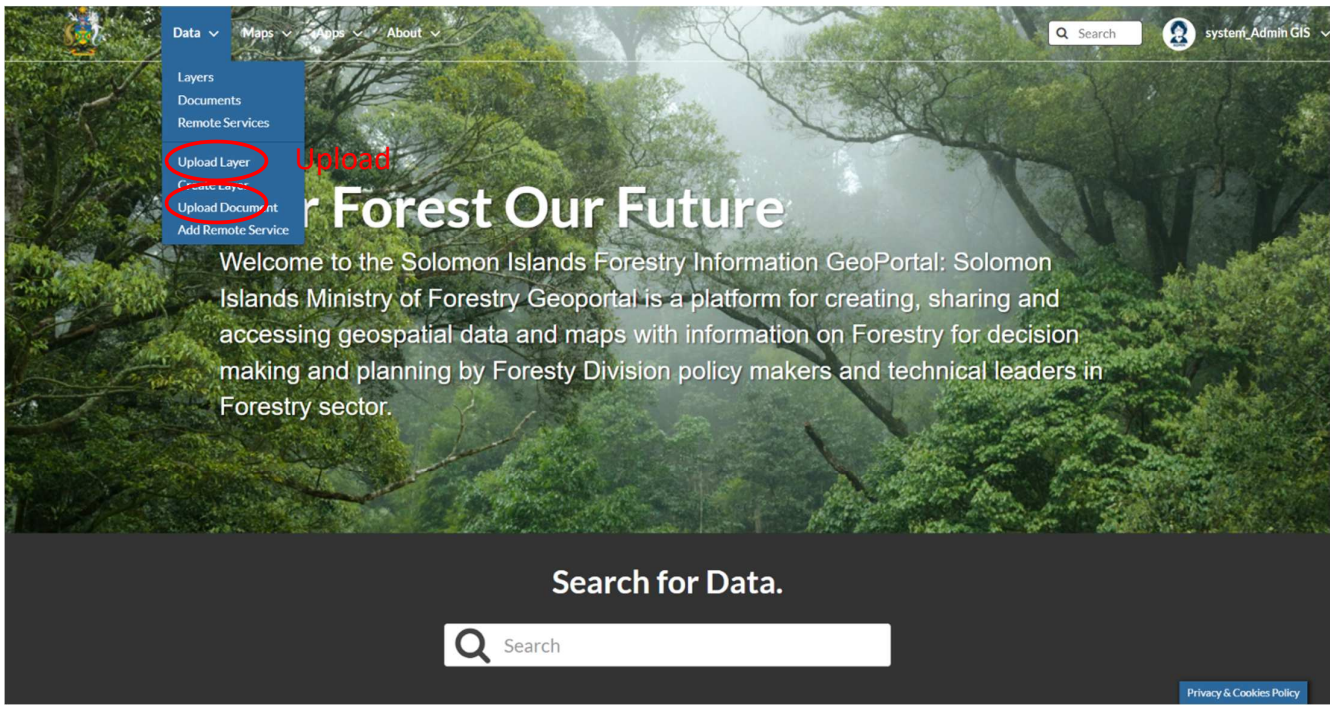
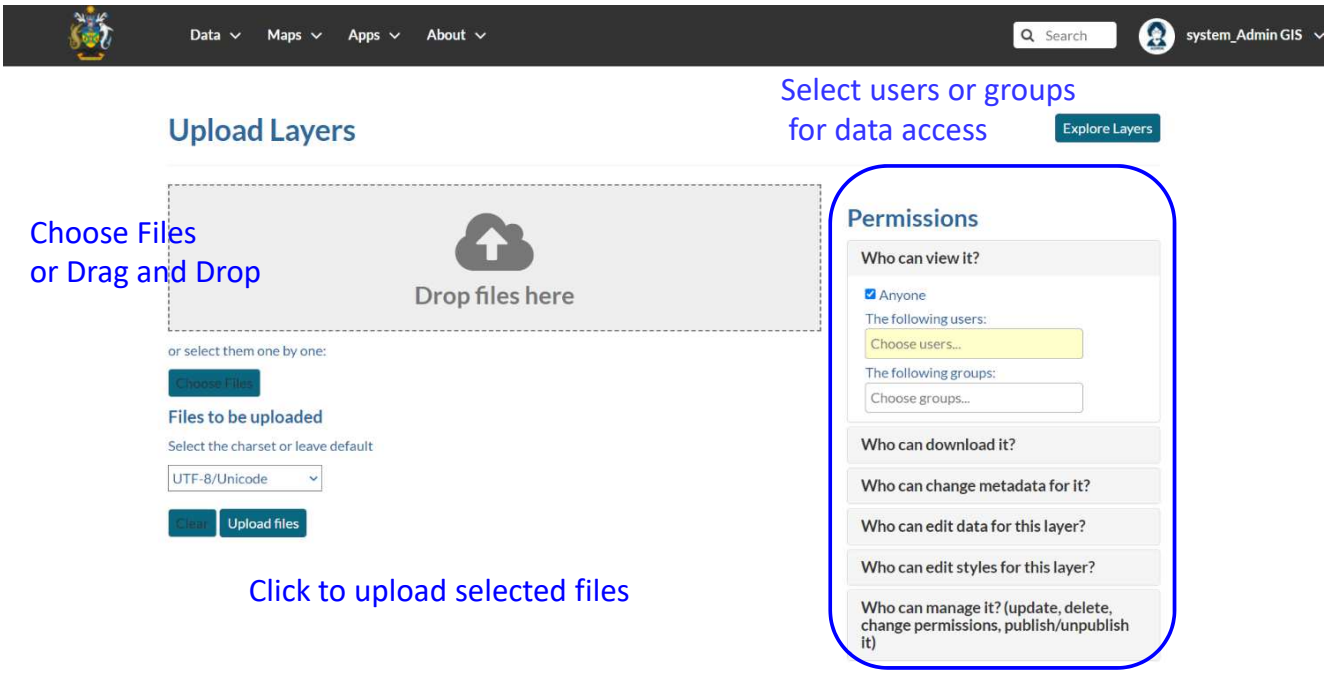


Upload File



Upload Layer

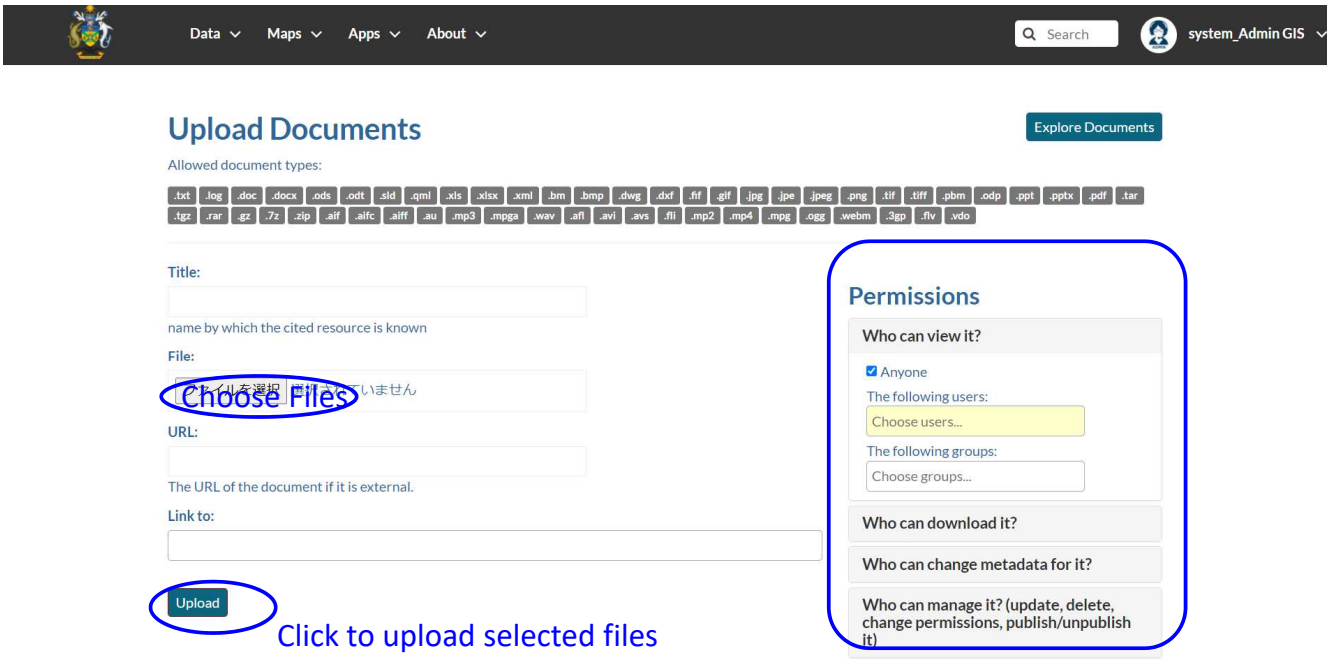


Select users or groups for data access

Choose Files or Drag and Drop

Click to upload selected files

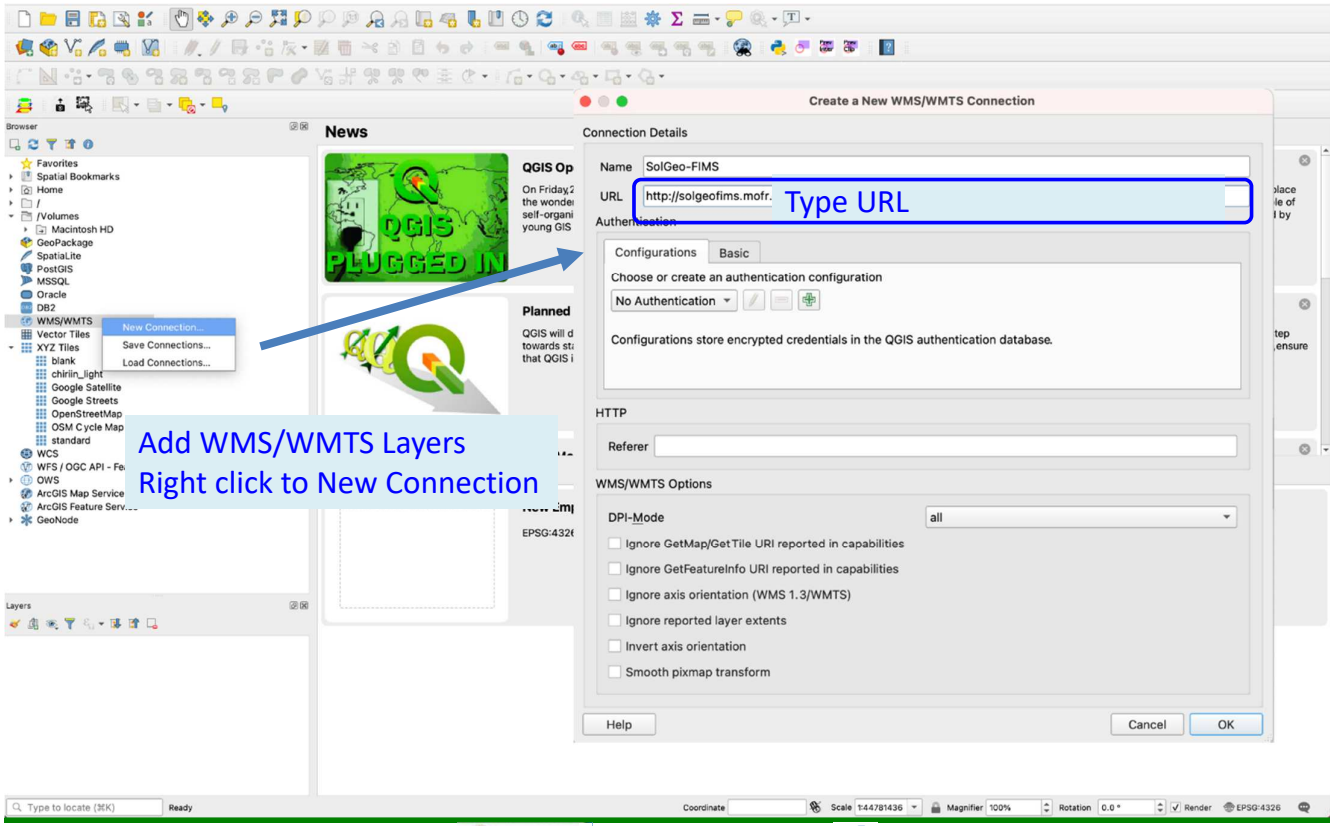
Upload Documents



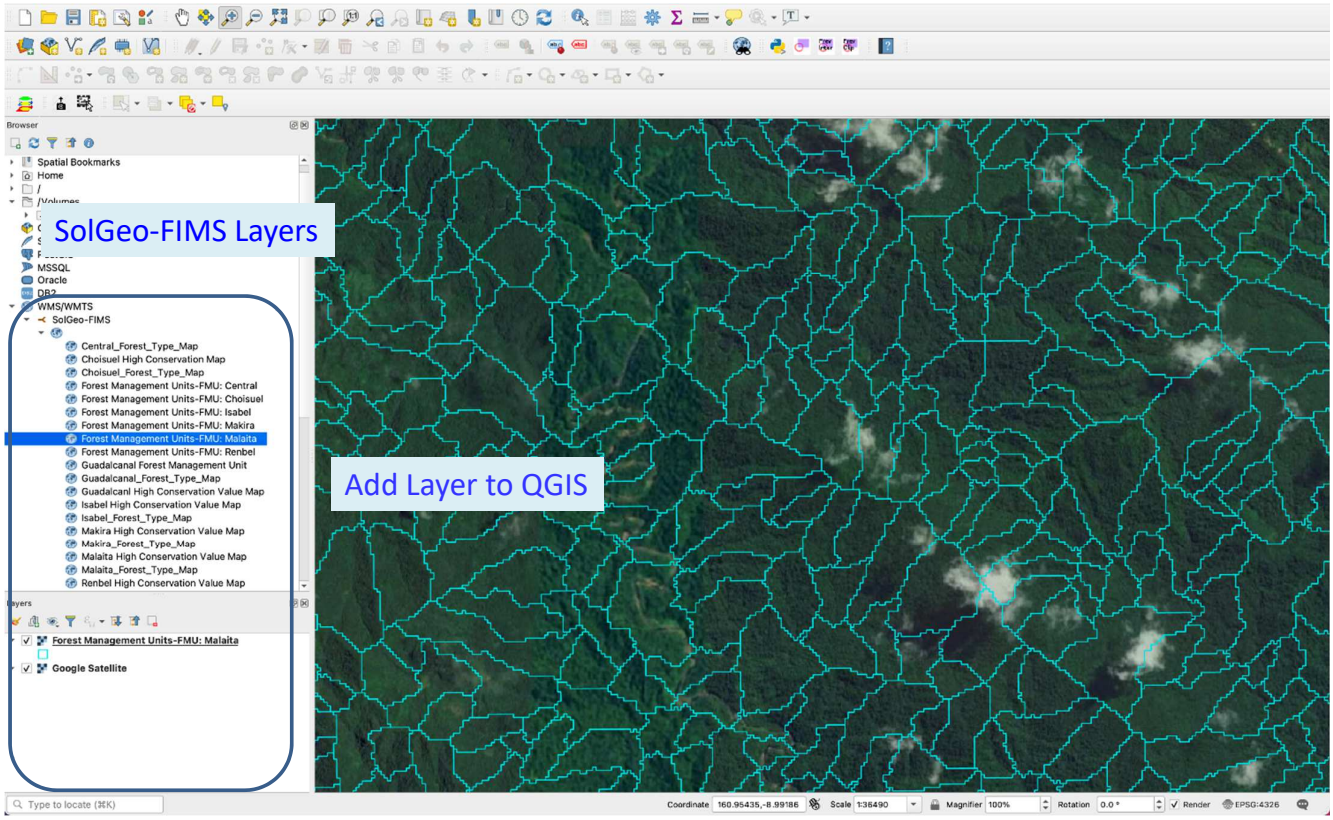
Click to upload selected files

Select users or groups for data access

GIS Software Connection to SolGeo-FIMS



SolGeo-FIMS Data View on QGIS



JICA Technical Cooperation Project
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands

Consultation Meeting on Developing Forest Information Tool

- Concept Note -

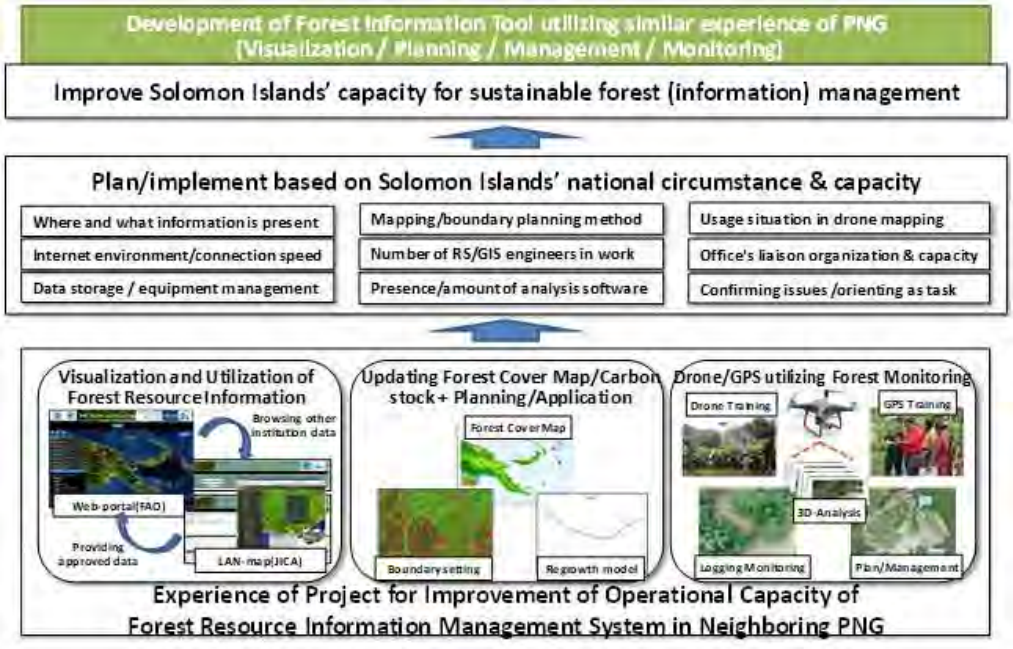
1. Background

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands had been started in middle of 2017 by the Ministry of Forest and Research (MoFR) as a technical cooperation of Japan International Cooperation Agency (JICA). The project has three outputs; Output1: Capacity of MOFR to develop policies to promote SFRM is increased, Output2: Coordination and collaboration for SFRM among MOFR and other stakeholders are enhanced through related activities by MOFR, Output3: SFRM Pilot Activities, initiated by the communities and supported/ facilitated by MOFR, are implemented.

To enhance the outputs of the project, especially Output1: activity 1.5 “Develop forest information tool(s)” and Output3: pilot activity implementation support in general, the short term expert’s team were selected in December 2018 and the draft Work Plan of the project was prepared, presented and approved in the Joint Coordination Committee (JCC), which was held in January 2019. Although there were a couple of unavoidable obstacles (difficulties) such as national election period, the project has been implementing the activities based on the Work Plan and Plan of Operation (PO).

One of the important activities under activity 1.5 “Develop forest information tools” is training in Japan, which is planned to explore the direction of the output through intensive technical training and discussion in July and August 2019 and the project has been preparing the training in Japan. Remote Sensing experts of the project had a first mission in March and conduct preliminary needs assessment and gap analysis through the consultation with Forest Resource Management and Technical Services Division (FRMTSD), which is in charge of GIS/mapping related work in MoFR.

On the other hand, since the participants of the training in Japan are limited people and divisions of MoFR, it is desirable to conduct the (initial) consultation not only with FRMTSD but also other divisions of MoFR, which are potential users of the forest information tool to get the inputs and feedbacks for the draft idea (basic design) of the tool based on the initial mission results of RS experts team before the training in Japan as well as the training in the third country (PNG), which is planned to explore the further detail design with experiences of Japan and lesson learns of PNG.



Conceptual Figure for Development of Forest Information Tool (source: Project Work Plan, January 2019)

2. Objectives

To introduce the draft idea (basic design) of forest information tool to be developed through the project as the initial consultation with divisions of MoFR, which are the potential users of the information and tool, specifically for the following points this time.

(1) To introduce the draft idea (basic design) of Forest Classification by Remote Sensing
(2) To introduce the draft idea (basic design) of Forest Information Portal (LAN-GIS/Map)
(3) To introduce the examples & experiences of Forest Information Applications (of PNG)

3. Expected Outcomes

To get inputs and feedback from divisions of MoFR for the basic design of forest information tools before the trial development of the tool will be tested through the training in Japan for detail design of the tool, specifically for the following points this time.

(1) To get inputs and feedback for the basic design of Forest Classification by Remote Sensing
(2) To get inputs and feedback for the basic design of Forest Information Portal (LAN-GIS/Map)
(3) To understand the basic idea of Forest Information Applications through the PNG examples

4. Expected Participants

The officers who understand the work, issues and requirements of the division, especially the work related to the application of map information (e.g, location, area, etc). The expected number of the participants is not limited but 2-4 are expected (whoever interested can attend as long as the capacity of a room allows).

- FRMTSD (Forest Resource Management and Technical Services Division)
- FDRD (Forest Development and Reforestation Division)
- FID (Forest Industries Division)
- TUPD (Timber Utilization and Downstream Processing Division)
- NHBGD (National Herbarium and Botanical Garden)
- CSD (Cooperate Service Division)

5. Proposed Schedule

Due to the limitation of the short-term expert's assignment schedule, the meeting date was already fixed as follows. If the important officers could not participate in the meeting, the officers who attended are expected to report in the division with the materials which were used in the meeting.

- 21 June (Friday) 9:30-14:00 (Refreshment will be provided)
- Venue: Meeting Room in New Herbarium Complex Building

6. Contents of Meeting

The following 3 (three) contents will be introduced from short-term experts team of the JICA project then the inputs and feedback from MoFR will be collected though Q&A and discussions as initial consultation. (3) might be optional (ad-hoc) topic depending on the discussion and progress of (1) and (2) topic.

(1) Forest Classification by Remote Sensing
(2) Forest Information Portal (LAN-GIS/Map)
(3) Forest Information Applications (PNG)

Consultation Meeting on Developing Forest Information Tool

- Agenda -

Date: 21 June 2019; **Time:** 9:30 – 14:00 (refreshments will be provided)

Venue: Meeting Room in New Herbarium Complex Building

Time	Topic	Facilitator/Presenter
9:00 - 9:30	Registration	
9:30 - 9:40	Background and objective of the consultation meeting	Mr. Terence Titiulu. ***Manager for FRMTSD (Forest Resource Management & Technical Services Division)***
09:40 - 10:20	(1) Forest Classification by Remote Sensing (a) Objective of Classification (b) Classification Item (c) Data/Information to use (d) Software/Tools to use (e) Processing workflow (f) Implementation plan	Mr. Masamichi Haraguchi ***Team Leader of Shor term Experts Forest Information Management 1***
10:20 - 10:30	Q&A	
10:30 - 10:40	Coffee/Tea Break	
10:40 - 11:20	(2) Forest Information Portal (LAN-GIS/Map) (a) Objective of the Portal (b) Contents/Layers to register (c) Software/System to use (d) Graphical User Interface (e) Identification of User/Group (f) Implementation plan	Mr. Masamichi Haraguchi ***Team Leader of Shor term Experts Forest Information Management 1***
11:20 - 11:30	Q&A	
11:30 - 12:00	Discussion (Inputs/Comments)	Mr. Terence Titiulu. ***Manager for FRMTSD (Forest Resource Management & Technical Services Division)***
12:00 - 13:00	Refreshments	
13:00 - 13:30	(3) Forest Information Application (PNG) (a) Forest Management Unit (b) Forest regrowth method (c) Annual logging plan/area	Mr. Masamichi Haraguchi ***Team Leader of Shor term Experts Forest Information Management 1***
13:30 - 13:40	Q&A	
13:40 - 14:00	Discussion (Way-Forward)	Mr. Terence Titiulu. ***Manager for FRMTSD (Forest Resource Management & Technical Services Division)***

Consultation Meeting
on
Developing Forest Information Tool

21 June 2019

Masamichi HARAGUCHI
JICA Short-term Expert
Forest Information Management 1

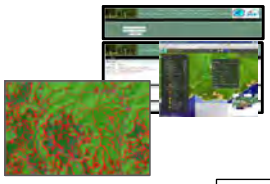
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Contents of Meeting

1. Background (Introduction, Objectives)
2. Introduction of Draft Idea (Basic Design) of Forest Information Tool
   1) Forest Classification by Remote Sensing
   2) Forest Information Portal (LAN-GIS/Map)
   3) Forest Information Applications (PNG)
3. Consultation to get inputs and feedback for Detail Design of the Tool

1. Background (Introduction, Objectives)

MOFR-JICA Project Overview



Overall Goal

Sustainable forest resource management is promoted from a comprehensive perspective

Project Purpose

Capacity of MOFR to implement SFRM is enhanced

Output1

Capacity of MOFR to develop policies to promote SFRM is increased

- 1-1 Review Corporate Plan 2015-2018 and its implementation from the viewpoint of SFRM.
- 1-2 Identify issues to be resolved/ improved with regard to SFRM in Corporate Plan 2015-2018.
- 1-3 Based on the results of Activities 1.1 and 1.2, formulate the Corporate Plan 2019-2022 which promotes SFRM.
- 1-4 Facilitate implementation of SFRM activities in the Corporate Plan 2019-2022.
- 1-5 Develop forest information tool(s).
- 1-6 Reflect the forest information provided through Activity 1.5 and the lessons learned form the Pilot Activities (Activity 3.6) into planning of Corporate Plan 2023-2027.
- 1-7 Develop a framework for a long-term SFRM policy utilizing the experiences obtained through Activities 1.3, 1.5, and 3.6.

Output2

Coordination and collaboration for SFRM among MOFR and other stakeholders are enhanced through related activities by MOFR

- 2-1 Identify relevant governmental institutions and other stakeholders with which MOFR would collaborate in promoting SFRM and hold discussions for potential collaboration.
- 2-2 Identify communities, NGOs, and other organizations which conduct activities contributing to, and which have potential to contribute to, SFRM and learn from their experiences.
- 2-3 Facilitate coordination / collaboration within MOFR and among MOFR and other relevant stakeholders.

Solomon Islands Government
Ministry of Forestry & Research

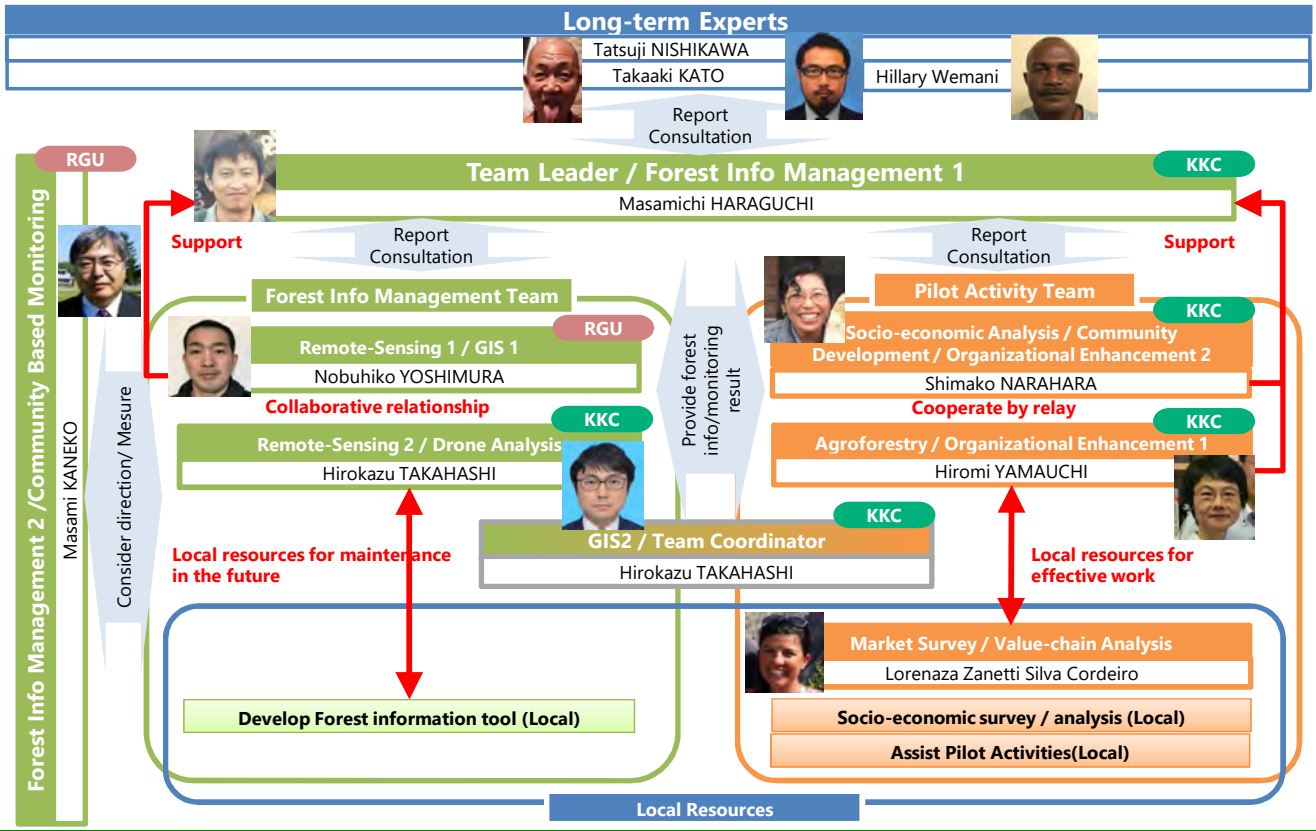
JICA

Output3

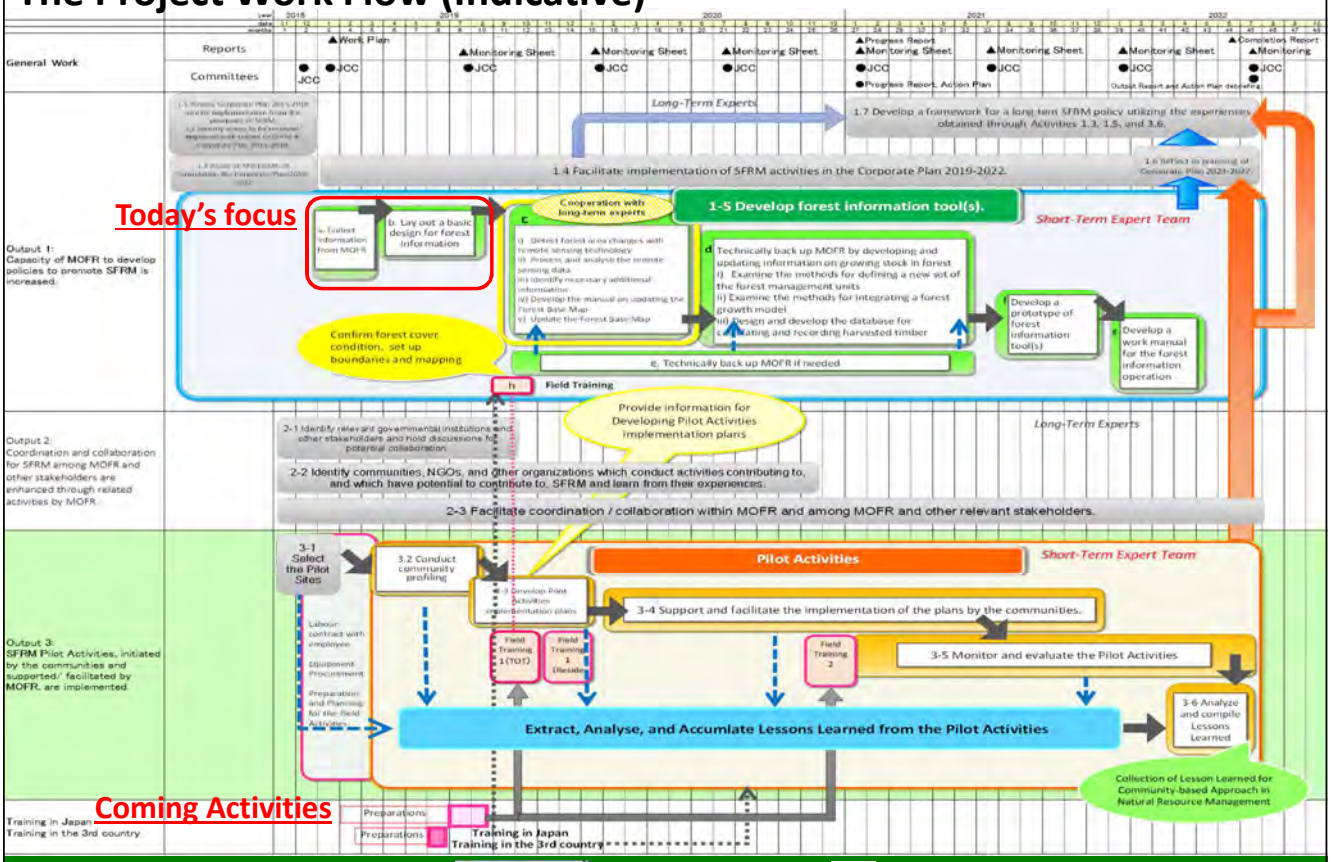
SFRM Pilot Activities, initiated by the communities and supported/ facilitated by MOFR, are implemented

- 3-1 Select the Pilot Sites in accordance with the Pilot Sites selection criteria.
- 3-2 Conduct community profiling in collaboration with the community people and socio-economic analysis in/around the Pilot Sites.
- 3-3 Support and facilitate the Pilot Sites communities to develop Pilot Activities implementation plans.
- 3-4 Support and facilitate the implementation of the plans by the communities.
- 3-5 Monitor and evaluate the Pilot Activities from the viewpoint of their contribution to SFRM.
- 3-6 Analyze and compile lessons learned from the Pilot Activities.

The Project Implementation System



The Project Work Flow (Indicative)



Technical Policy 1: Development of Forest Information Tool using Similar Work Experiences in PNG

Development of Forest Information Tool utilizing similar experience of PNG (Visualization / Planning / Management / Monitoring)

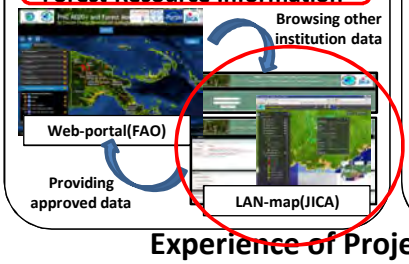
Improve Solomon Islands' capacity for sustainable forest (information) management

Plan/implement based on Solomon Islands' national circumstance & capacity

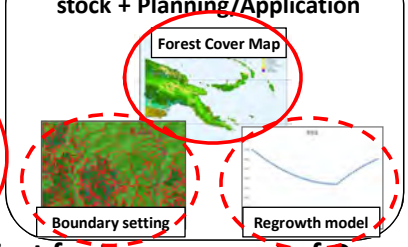
Where and what information is present	Mapping/boundary planning method	Usage situation in drone mapping
Internet environment/connection speed	Number of RS/GIS engineers in work	Office's liaison organization & capacity
Data storage / equipment management	Presence/amount of analysis software	Confirming issues /orienting as task

Today's focus

Visualization and Utilization of Forest Resource Information



Updating Forest Cover Map/Carbon stock + Planning/Application



Drone/GPS utilizing Forest Monitoring

Experience of Project for Improvement of Operational Capacity of Forest Resource Information Management System in Neighboring PNG

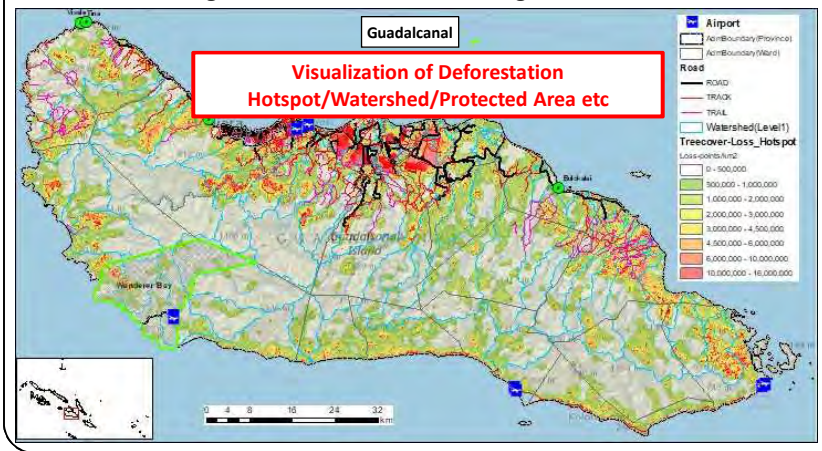
Technical Policy 2: Preparation and Provision of Forest Information with Consideration of Exit-Strategies

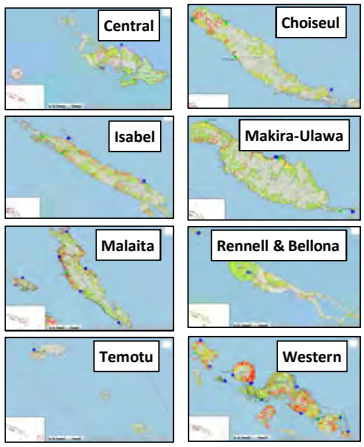
Providing Information about Pilot Target Area on REDD+/ Ecosystem Services/ Forest & Agriculture Certification

Introduce

REDD+	Ecosystem Services	Forest & Agri Certification
(e.g.) Deforestation/Degradation (Reference Level / Benchmark setting)	(e.g.) Landscape Approach Integrated Land-use Plan considering Ecosystem)	(e.g.) HCV/HCS Assessment (HCV: high conservation value, HCS: high carbon stock)
(e.g.) Conservation of places where deforestation is intense in recent years	(e.g.) land use and management plan considering water source and catchment	(e.g.) Palm-oil certification (RSPO) does not allow conversion of natural forest as of 2005

Providing Information about Pilot Target Area for Sustainable Forest Management（Image）





Objectives of MTG

To introduce the draft idea (basic design) of forest information tool to be developed through the project as the initial consultation with divisions of MoFR, which are the potential users of the information and tool, specifically for the following points this time.

(1) To introduce the draft idea (basic design) of Forest Classification by Remote Sensing
(2) To introduce the draft idea (basic design) of Forest Information Portal (LAN-GIS/Map)
(3) To introduce the examples & experiences of Forest Information Applications (of PNG)

Expected Outcomes

To get inputs and feedback from divisions of MoFR for the basic design of forest information tools before the trial development of the tool will be tested through the training in Japan for detail design of the tool, specifically for the following points this time.

(1) To get inputs and feedback for the basic design of Forest Classification by Remote Sensing
(2) To get inputs and feedback for the basic design of Forest Information Portal (LAN-GIS/Map)
(3) To understand the basic idea of Forest Information Applications through the PNG examples

2. 1) Forest Classification by Remote Sensing

Objective of Forest Classification (Idea)

- **Objectives**
  - To stratify and quantify the land and forest features of the country (to understand the area)
  - To provide spatial and boundary-based wall-to-wall mapping (base for land use planning)
  - To support forest management, planning and monitoring (especially land-scape level)
- **Basic Policies**
  - To be simple to update regularly (limited resource)
  - To be repeatable and sustainable (time and cost)
  - To use the existing achievements with innovations
    - No budget for expensive commercial software and data…

Definition of Land Use Classification

Land Cover or Land Use?

Land cover: *The type of vegetation, rock, water etc. covering the earth's surface*

Land use: *The type of activity being carried out on a unit of land*

Note: Remote Sensing (itself) does not directly assess land use but land cover

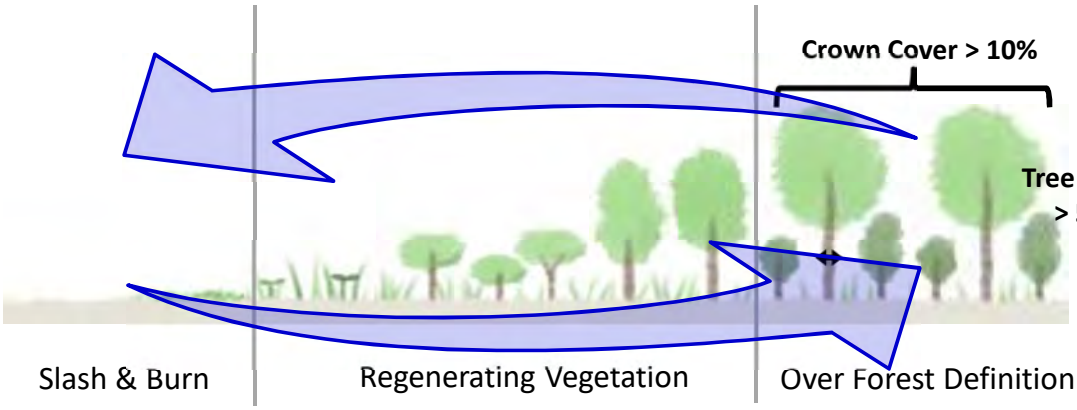
IPCC Land Use: Definition

- **Forest Land**
  This category includes all land with woody vegetation consistent with thresholds used to define Forest Land in the national greenhouse gas inventory.
- **Cropland**
  This category includes cropped land, including rice fields, and agro-forestry systems where the vegetation structure falls below the thresholds used for the Forest Land category.
- **Grassland**
  This category includes rangelands and pasture land that are not considered Cropland. It also includes systems with woody vegetation and other non-grass vegetation such as herbs and brushes that fall below the threshold values used in the Forest Land category. The category also includes all grassland from wild lands to recreational areas as well as agricultural and silvi-pastural systems, consistent with national definitions.
- **Wetlands**
  This category includes areas of peat extraction and land that is covered or saturated by water for all or part of the year. It includes reservoirs as a managed sub-division and natural rivers and lakes as unmanaged sub-divisions.
- **Settlements**
  This category includes all developed land, including transportation infrastructure and human settlements of anysize, unless they are already included under other categories.
- **Other Land**
  This category includes bare soil, rock, ice, and all land areas that do not fall into any of the other five categories.

Definition of Land Use Classification

(i) Forest land (IPCC categories)

This category includes all land with woody vegetation consistent with thresholds used to define forest land in the national GHG inventory, sub-divided into managed and unmanaged, and also by ecosystem type as specified in the IPCC Guidelines 3 . It also includes systems with vegetation that currently fall below, but are expected to exceed, the threshold of the forest land category.



Non-Forest | Forest — Land Cover

Cropland | Forest Land — Land Use

Forest and Land Use Classification in SI (for FRL*)

*FRL: Forest Reference Level

Land Use	Land Use Subtype	Land Use Subdivision	Land Use Disturbance
Forest Land	Natural Forest	Lowland Forests	Primary
			Logged or Degraded
		Hill Forests	Primary
			Logged or Degraded
		Montane Forests (Upland Rainforest)	Primary
			Logged or Degraded
		Freshwater Swamp and Riverline Forest	Primary
			Logged or Degraded
		Mangroves (Saline Swamp)	Primary
			Logged or Degraded
	Commercial Plantation	Eucalyptus	
		Mahoganies	
		Teak	
	Community Woodlot:	Terminalia	
		Acacia	
		Gmelina	
		Others	

Land Use	Land Use Subtype	Land Use Subdivision
Cropland	Subsistence Agriculture	Subsistence Agriculture
	Commercial Agriculture	Pineapple
		Palm Oil
		Coffee
		Cocoa
		Coconut
		Mixed(Coconut&Others)
		Other Agriculture
		Unknown Agriculture
Grassland	Grassland	Herbland
		Rangeland
	Other Woodedland	Shrub
		Other Woodland
Settlements	Settlements	Urban
		Village
		Hamlet
		Infrastructure
Other Land	Other land	Bare soil
		Rock
		Others
Wetlands	Wetlands	River
		Lake
		Dam
		Swamp
No Data	No Data	Sea
		Clouds
		Other

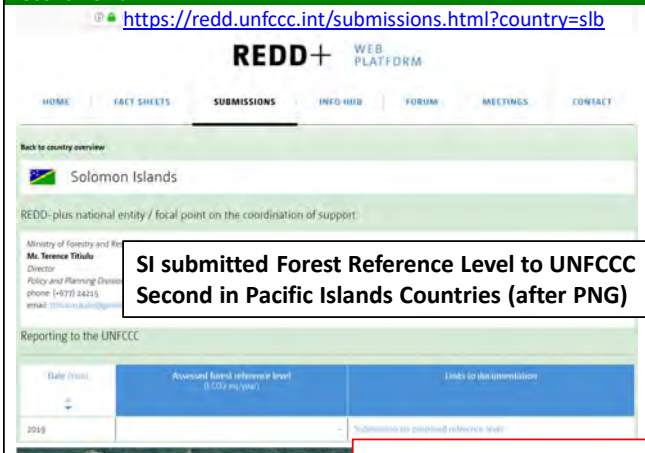
Disturbance Category/Type for Degradation (for FRL)

Disturbance under
FF = forest land remaining forest land
=> Degradation Analysis

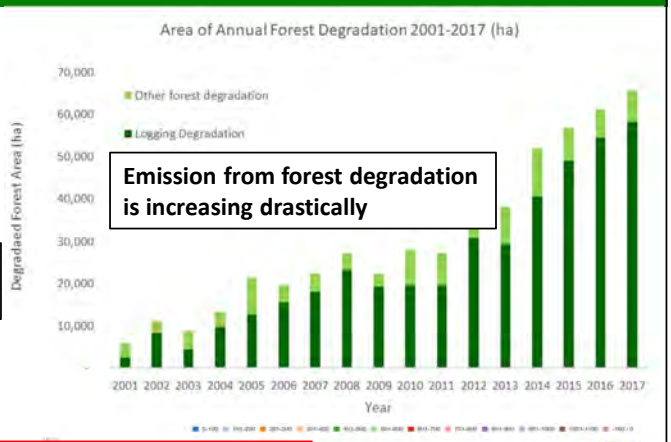
Disturbance Category	Disturbance Type
Human Impact	Commercial Logging
	Portable Saw Milling
	Temporary Gardening
	Grazing
	Other Impact
Natural Disturbance	Fire
	Landslide
	Flood
	Cyclone
No Impact (Primary/Intact)	No Impact (Primary/Intact)

Recent News

https://redd.unfccc.int/submissions.html?country=slb

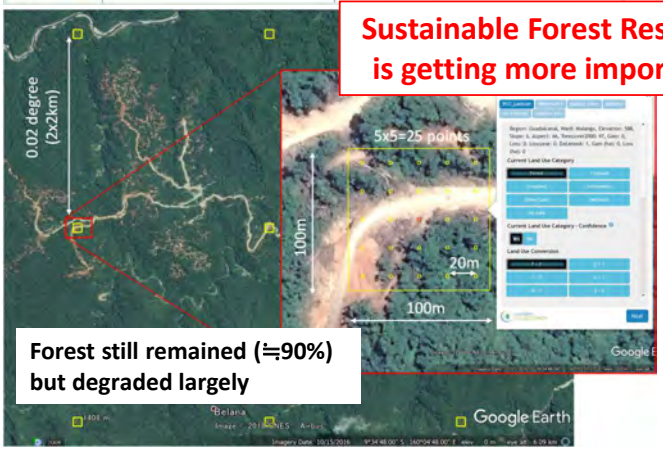


SI submitted Forest Reference Level to UNFCCC Second in Pacific Islands Countries (after PNG)

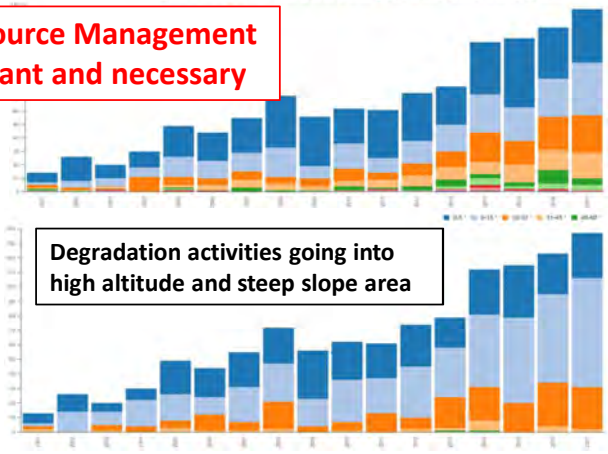


Emission from forest degradation is increasing drastically

Sustainable Forest Resource Management is getting more important and necessary

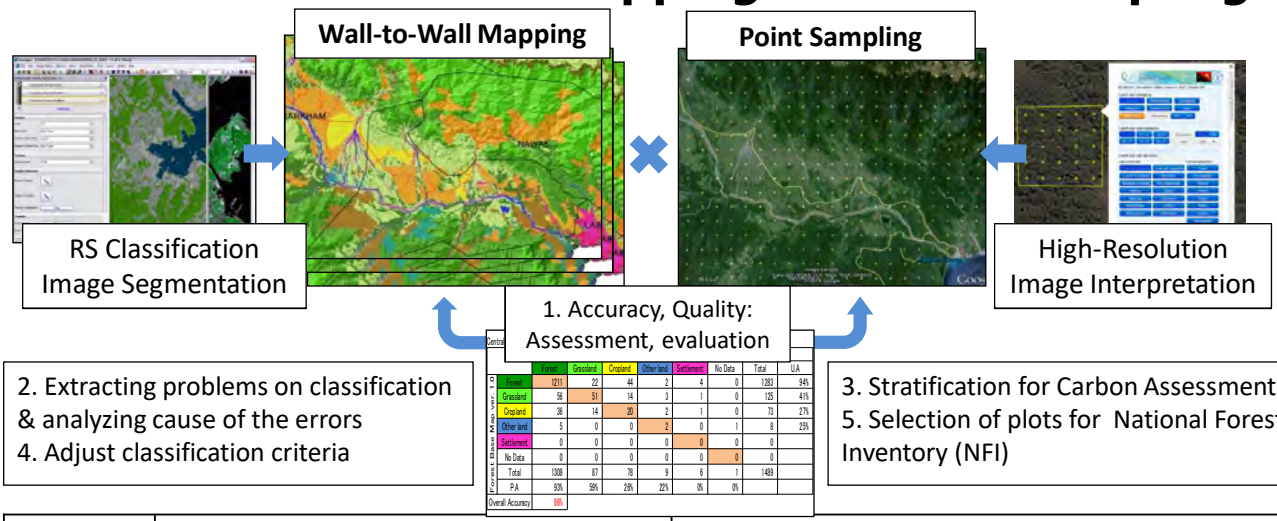


Forest still remained (≒90%) but degraded largely



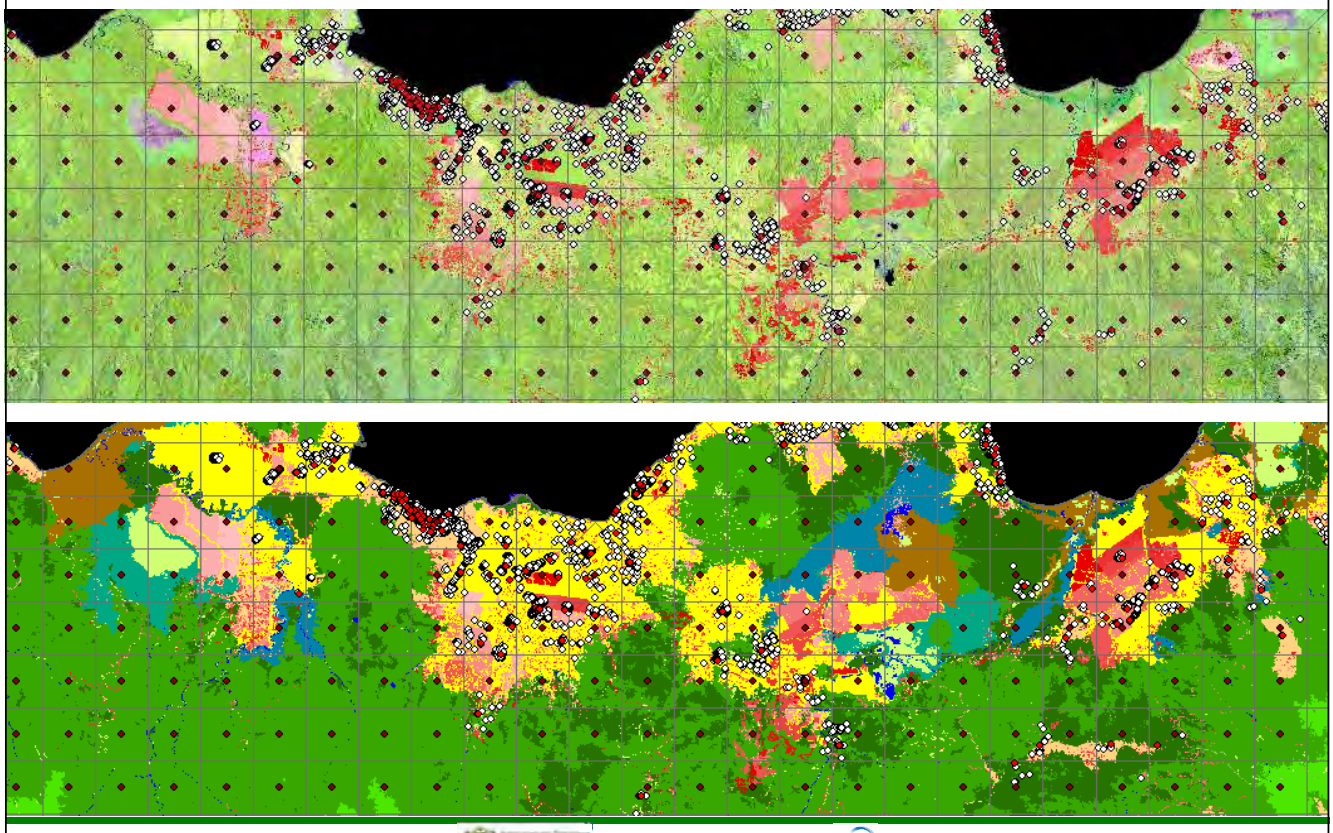
Degradation activities going into high altitude and steep slope area

Method: Wall-to-Wall Mapping and Point Sampling



	Wall-to-Wall Mapping	Point Sampling
Spatial Coverage	**Segmented polygons** Segmentation ≒ 1ha (100x100m)	**Sampling Plots** 2x2km 1ha unit with 25 check points
Area Calculation	Geographical	Statistical
Boundary	Yes	No
Statistical Analysis	Limited	Ample
Driver Analysis	Limited	Ample

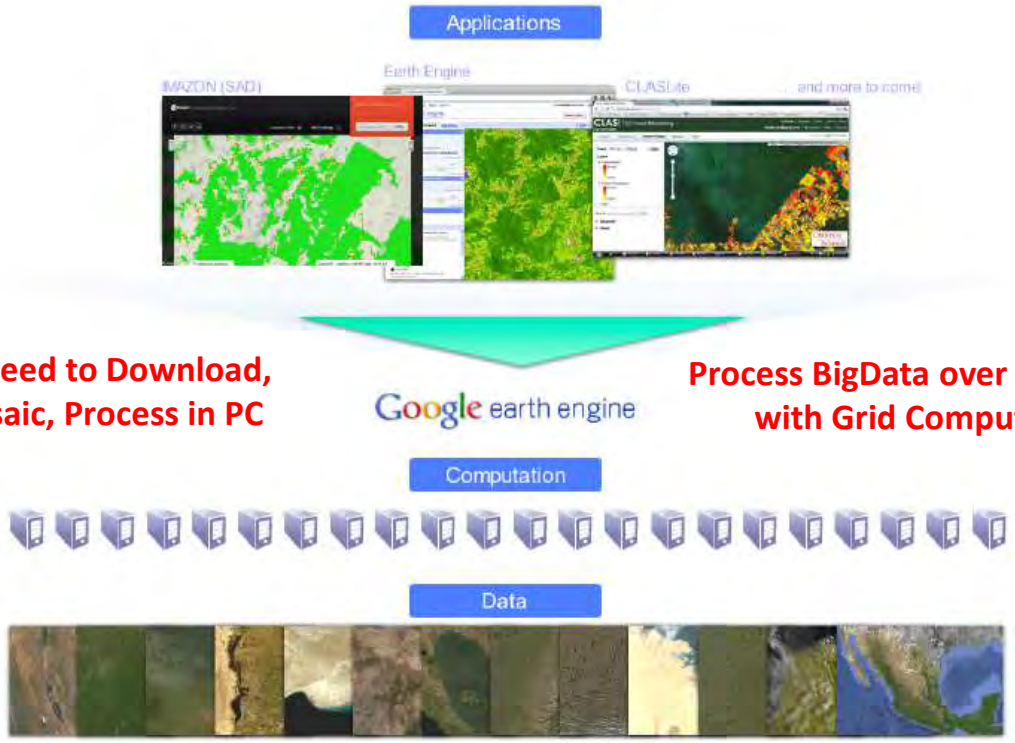
Example: Wall-to-Wall Mapping and Point Sampling



Software/Tool used for FRL in SI (Annual LU change)

Collect Earth is the innovative effective tool to utilize all the available data and software /database in the world for free of change! (Nb: Collect Earth does not do everything)

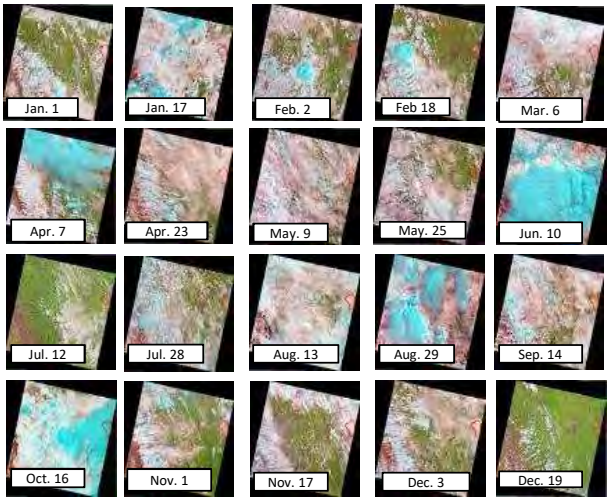
Google Earth Engine(GEE): What is difference?



No need to Download, Mosaic, Process in PC

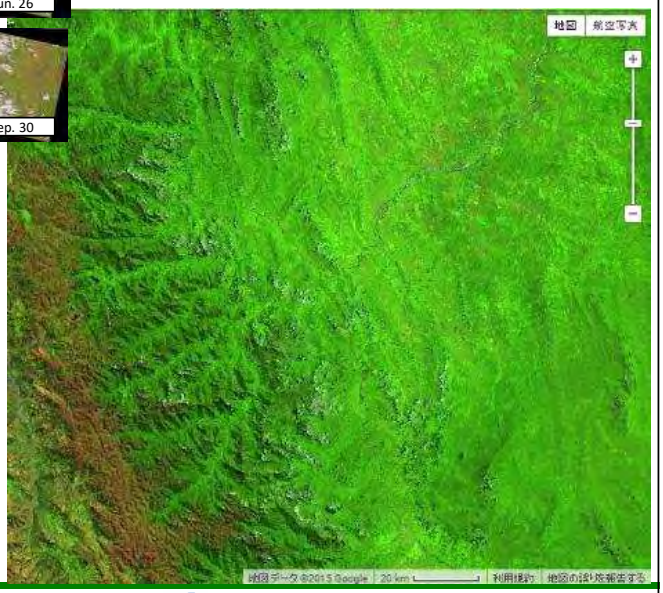
Process BigData over internet with Grid Computing

Data/Information to use: Cloud-free Mosaic by GEE



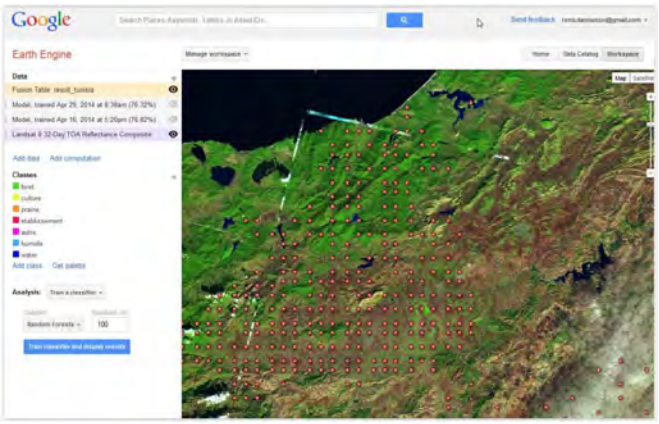
Annual Landsat data Situation per Scene
With many cloud (over 80 % of the image)

Cloud-free Mosaic processed by Google Earth Engine (GEE)

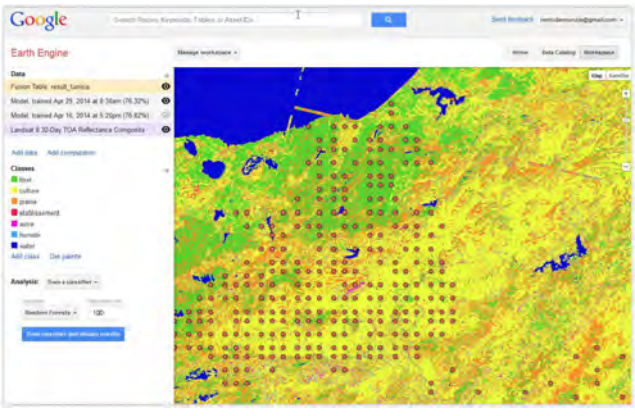


Google Earth Engine (GEE) & RS Classification

- The data collected can be exported to a Fusion table format, then uploaded to Google Drive and accessed through GEE to be used as a training set to produce a landuse/cover map

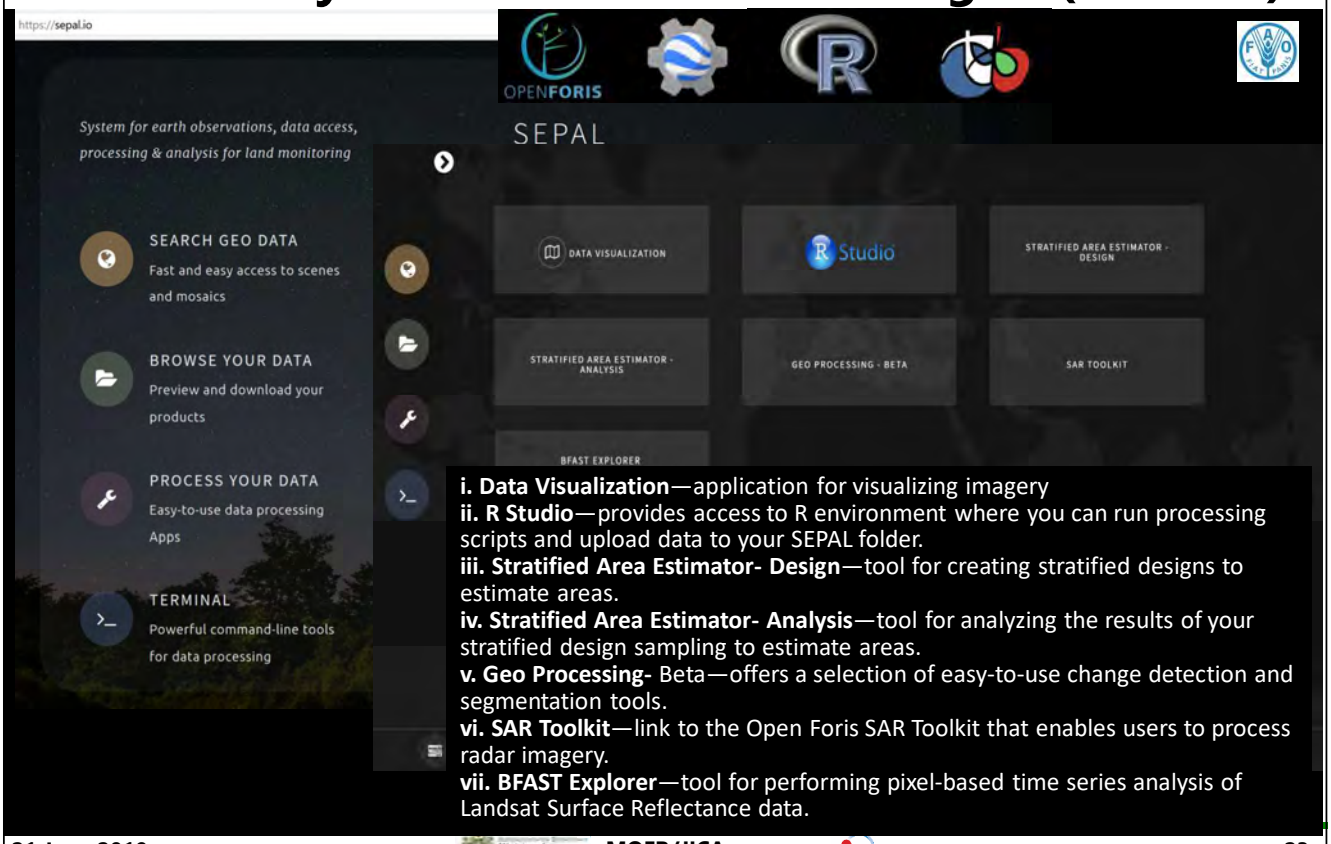


Data from Collect Earth embedded in Google Earth Engine



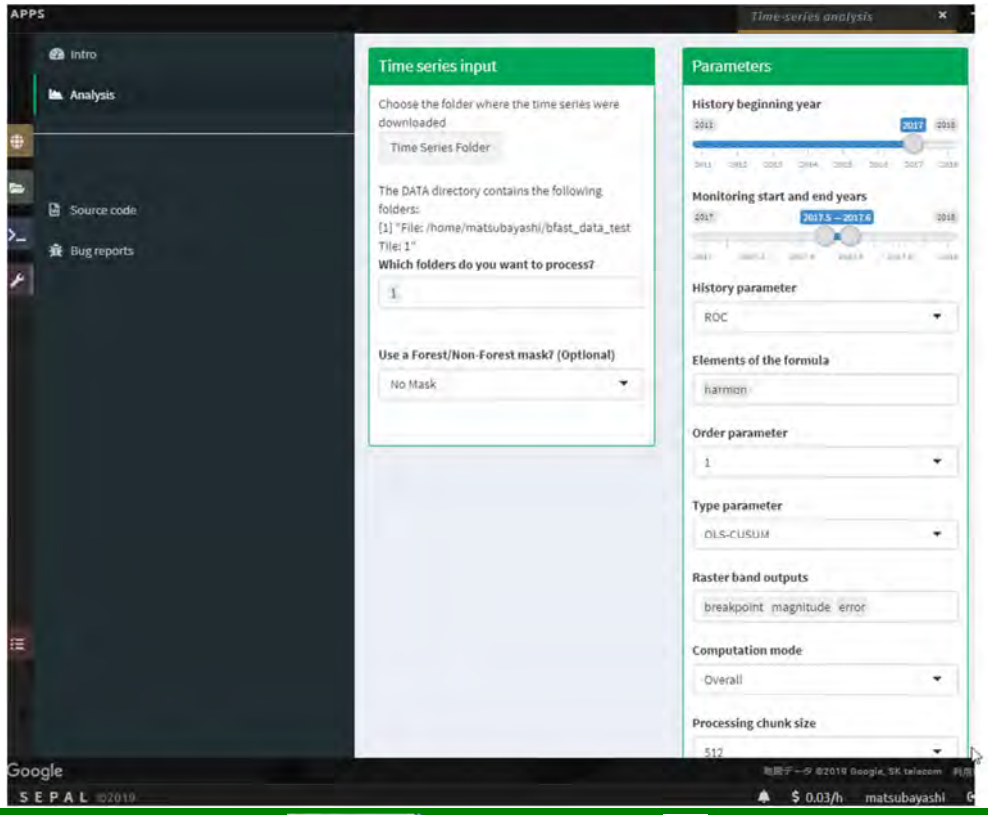
Results of the random-forests classifier using the collected data as a training set

SEPAL: Catalyst of innovative technologies (inc. GEE)

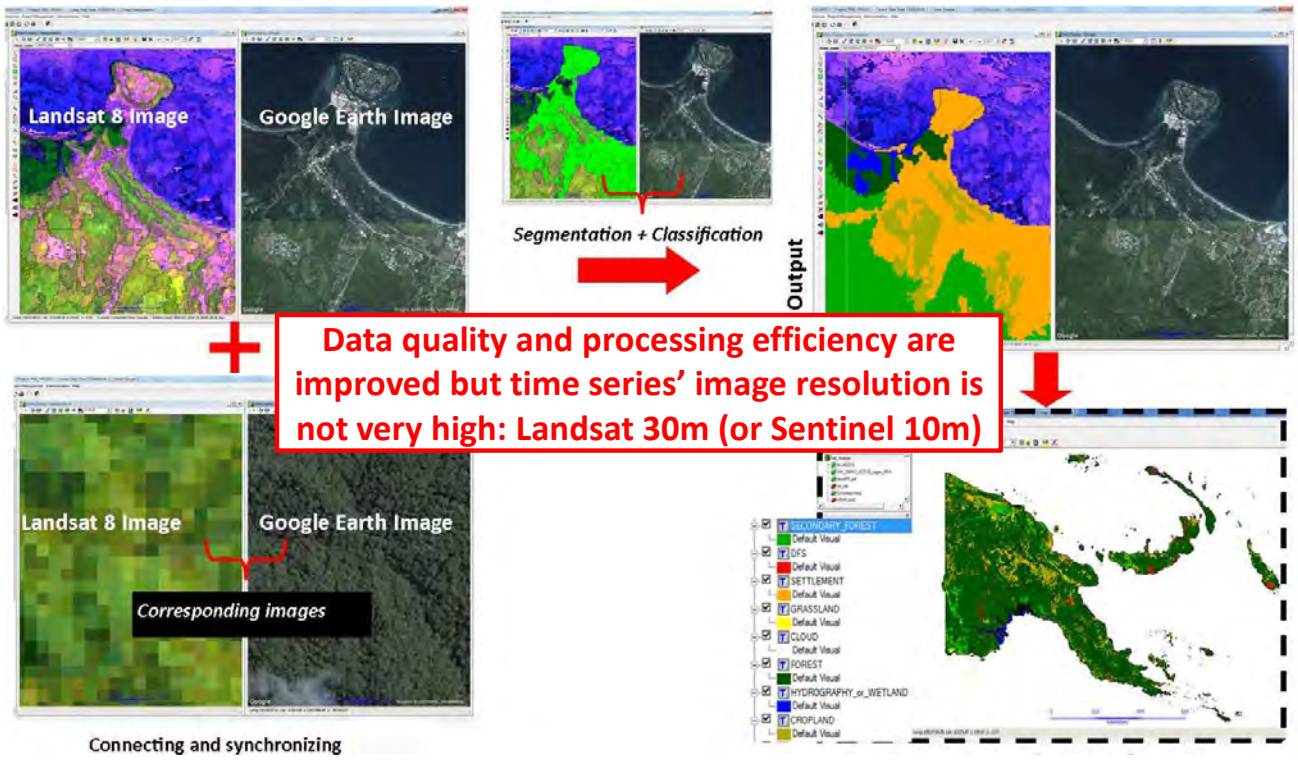


i. Data Visualization—application for visualizing imagery
ii. R Studio—provides access to R environment where you can run processing scripts and upload data to your SEPAL folder.
iii. Stratified Area Estimator- Design—tool for creating stratified designs to estimate areas.
iv. Stratified Area Estimator- Analysis—tool for analyzing the results of your stratified design sampling to estimate areas.
v. Geo Processing- Beta—offers a selection of easy-to-use change detection and segmentation tools.
vi. SAR Toolkit—link to the Open Foris SAR Toolkit that enables users to process radar imagery.
vii. BFAST Explorer—tool for performing pixel-based time series analysis of Landsat Surface Reflectance data.

SEPAL was greatly updated/enhanced! (ver 3.0)

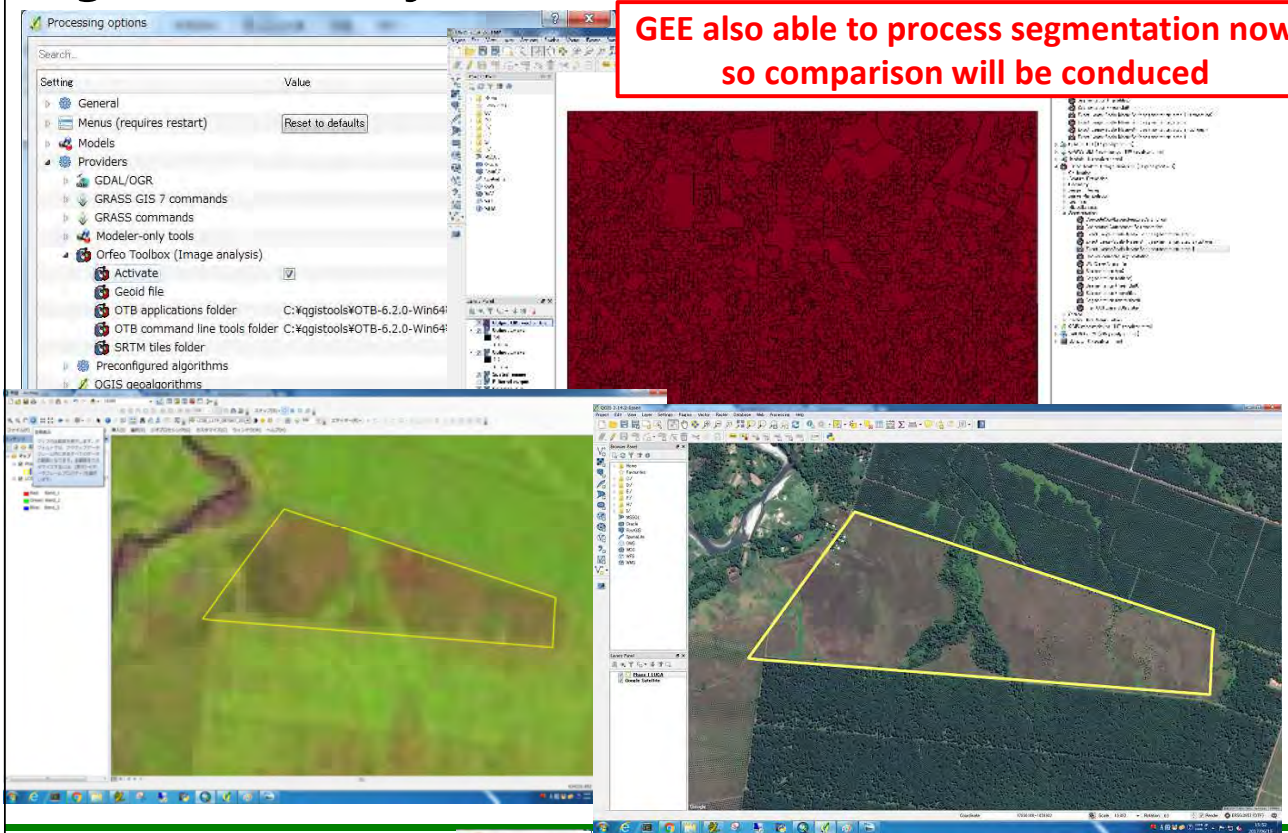


Classification Process/Work-Flow (PNG example)



Segmentation by OTB (Orfeo Tool Box) in QGIS

GEE also able to process segmentation now so comparison will be conduced



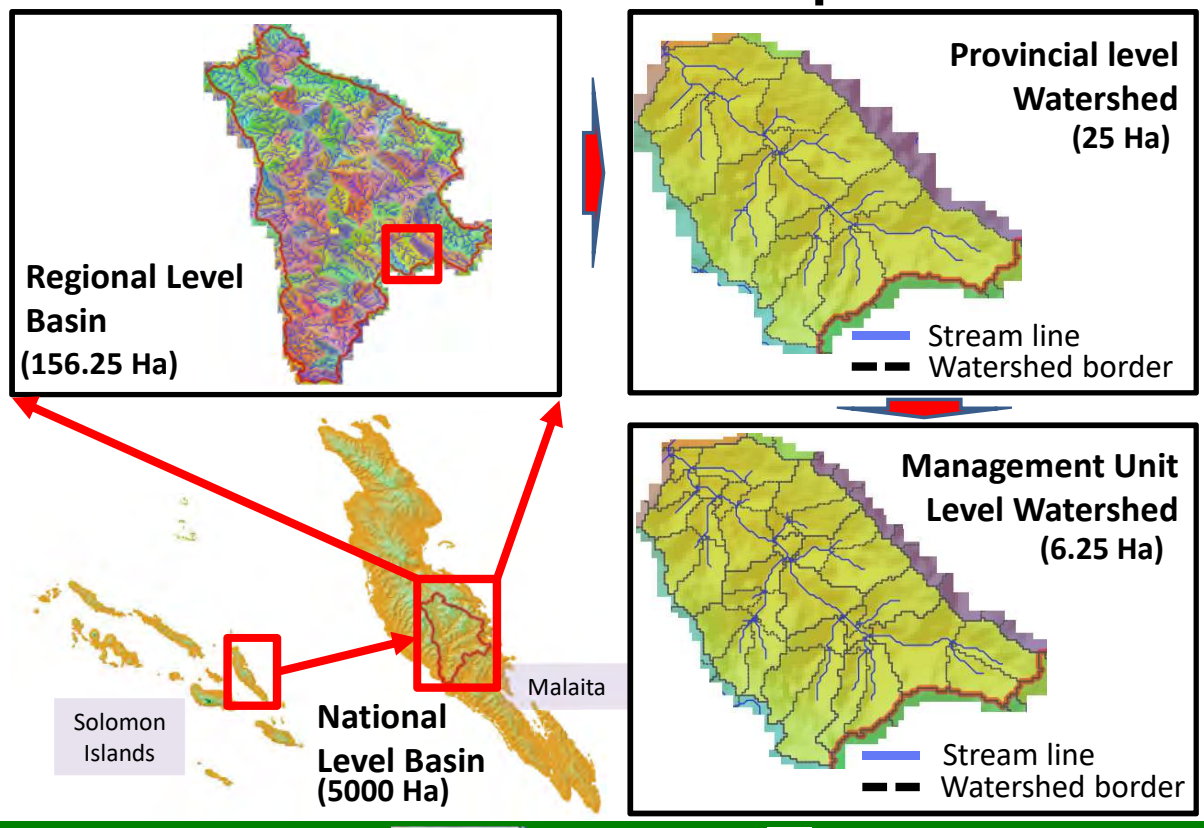
Classification Item of RS Forest Classification in SI

	IPCC LU Category	RS Land-Cover Type	FRL Stratified Category	Remark (example)
(a)	Forest land	Dense Forest	Primary Forest	Refer to VHR& Hansen
(b)		Disturbed Forest	Degraded Forest	Ref. segmentation stats
(c)	Grassland	Young Vegetation	Grassland / Cropland	Inc. Shrub/Woodland
(d)	Other lands	Bare Soil	Other land / Cropland	Field, Road (unpaved)
(e)	Settlements	Artificial Features	Settlements	Building, Road (paved)
(f)	Wetlands	River/Lake, etc	Wetlands	Refer to Water Index

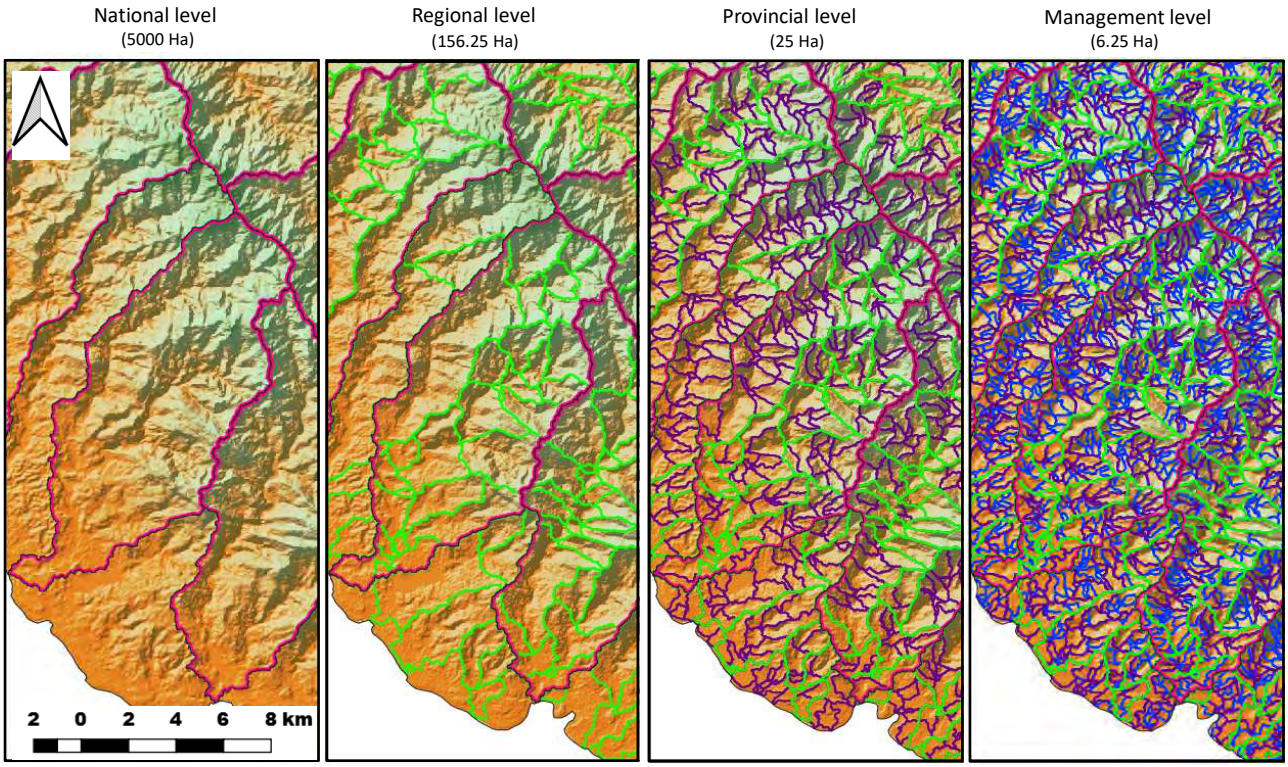
Note

- Name is tentative, need to be discussed and agreed
- Same "land-cover" but could be different "land-use"
- Cropland is land use, whose land cover could be varied
- Land use will be classified by decision tree process later
- (f)(e)(d) should be classified (extracted) accurately
  - ✓ E.g. utilizing SMA (Spectral Mixture Analysis)
- HCS method will be referred to distinguish (a) and (b)

Multi-scale/level Watershed Development



Multi-scale/level Watershed Development



HCV: High Conservation Value

Box 1: The Six High Conservation Values

HCV 2 Landscape-level ecosystems and mosaics
Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

HCV 1 Species diversity
Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.

HCV 3 Ecosystems and habitats
Rare, threatened, or endangered ecosystems, habitats or refugia.

HCV 6 Cultural values
Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.

HCV 4 Ecosystem services
Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

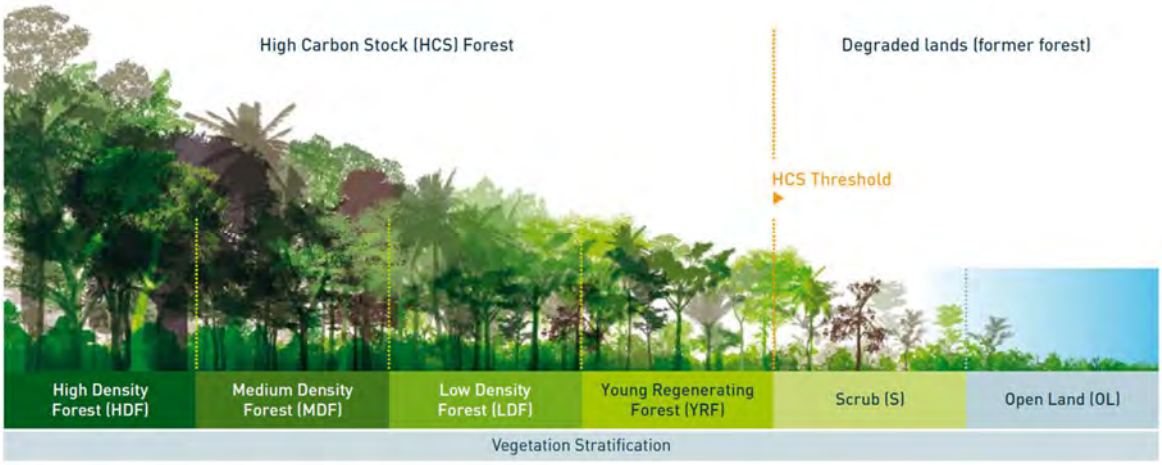
HCV 5 Community needs
Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc...), identified through engagement with these communities or indigenous peoples.

HCS: High Carbon Stock

+Secondary forests etc. are often not considered to be HCV and are consequently not protected.

+HCS Approach is the first practical, field-tested methodology for distinguishing forest areas that should be protected.

+HCSA uses field data on levels of biomass, vegetation structure and composition, together with a view from above (satellite or Light Detection and Ranging – LiDAR).



The figure is referred from "THE HCSA APPROACH TOOLKIT"

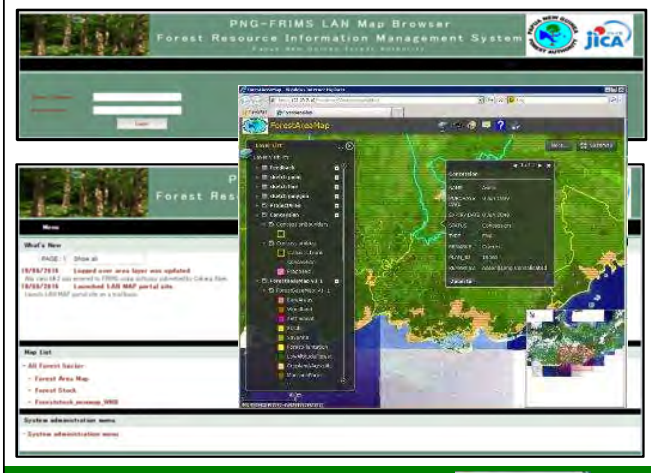
2. 2) Forest Information Portal (LAN-GIS/Map)

Objective of Forest Information Portal (idea)

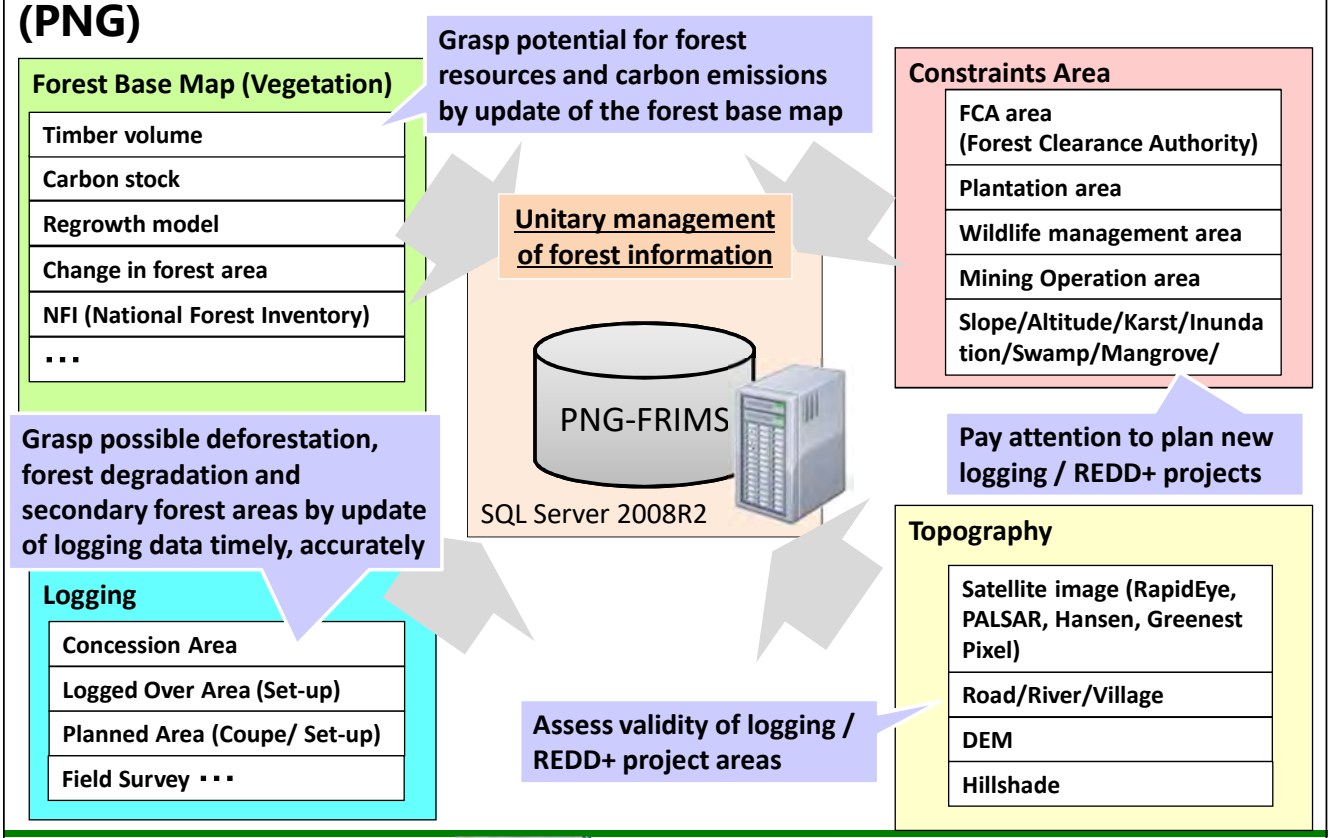
- **Objectives**
  - To make existing mapping (spatial) data/information viewable/browse-able without GIS software
  - To support forest planning and decision making based on the visual information
  - To provide the standard thematic maps via LAN to improve/reduce the repeating type works
- **Basic Policies**
  - To be simple to update regularly (limited resource)
  - To be customizable and sustainable (time and cost)
  - To use the existing achievements with innovations
    - No budget for expensive commercial software and data…

LAN Map: Available Spatial Data Browsable (PNG)

Goal	Function	Objectives	Examples of outcome
To improve the planning, monitoring and control procedures for forest logging operations	Shares forest information stored in PNG-FRIMS with relevant officers	[Portal site functions] - Manage the user access privileges - Manage the map availability - Announcement postings on PNG-FRIMS [Web GIS functions] - Overlay several forest information - Search location, Measure distance and extent - Edit and update forest information - Estimate forest volume etc.	To carry out more accurate assessment of logging plans submitted by logging companies To find encroachment logging and overlapping of project boundaries



Contents of Forest Resource Information Management System (PNG)

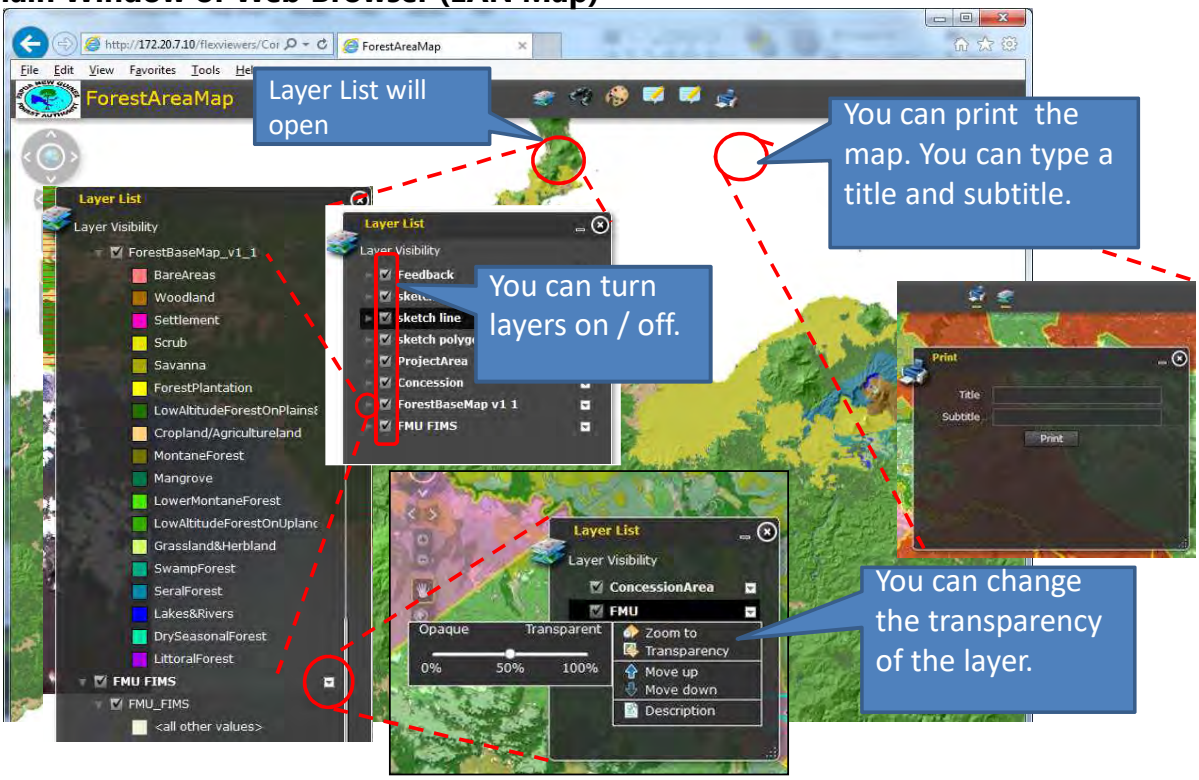


Basic functions of Forest Information Browsing System (PNG)

Functions		Note
1	Layer List	Turn layers (forest info) on and off.
2	Search	Search for location/ point of interest
3	Measure	Measure length or area on the map.
4	Sketch	Sketch simple graphics (point, line, polygon) on the map
5	Feedback	Send feedbacks to Administrator (e.g. the data error that you found etc.)
6	Print	Print a visible map displayed.
7	Switch background maps	Satellite imageries, topographic maps, etc (RapidEye2011, Landsat Annual Greenest Pixel 2000/ 2013/ 2014, Topomap, Hillshade)

Graphical User Interface of LAN GIS/Map (PNG)

Main Window of Web Browser (LAN Map)



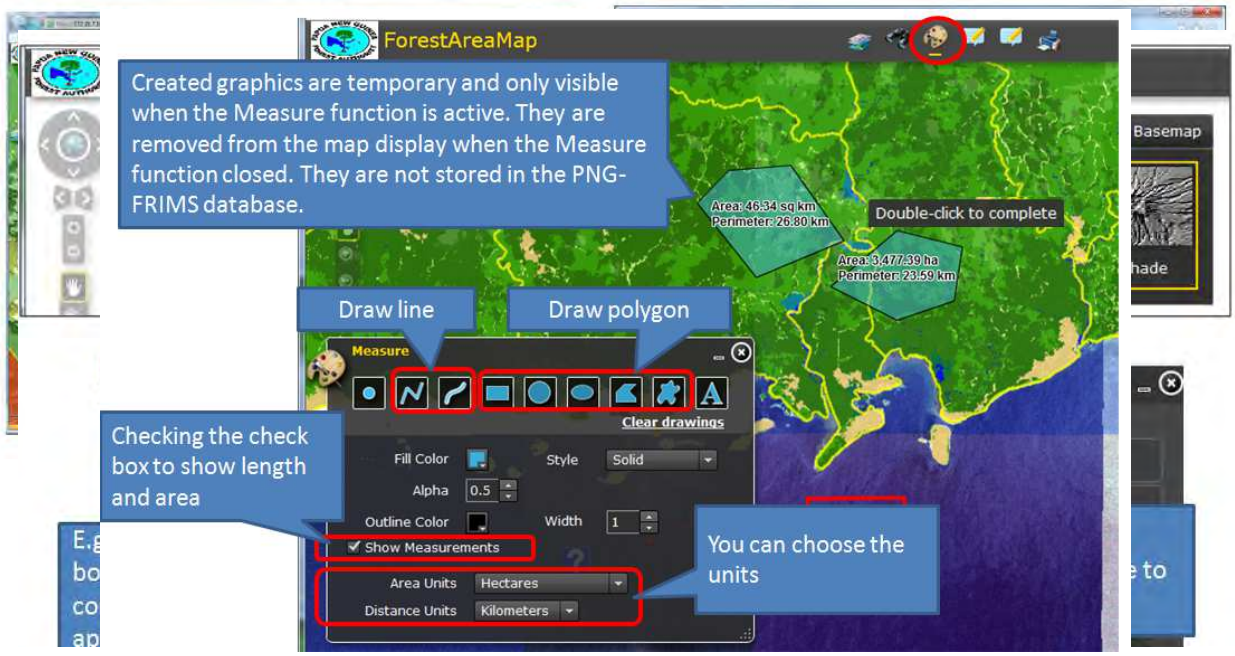
Graphical User Interface of LAN GIS/Map (PNG)

Basic Functions of Web Browser (LAN Map)

Viewing Attribute Table of Concession

Search by name of the concession area

Measure length and area of Area of Interest

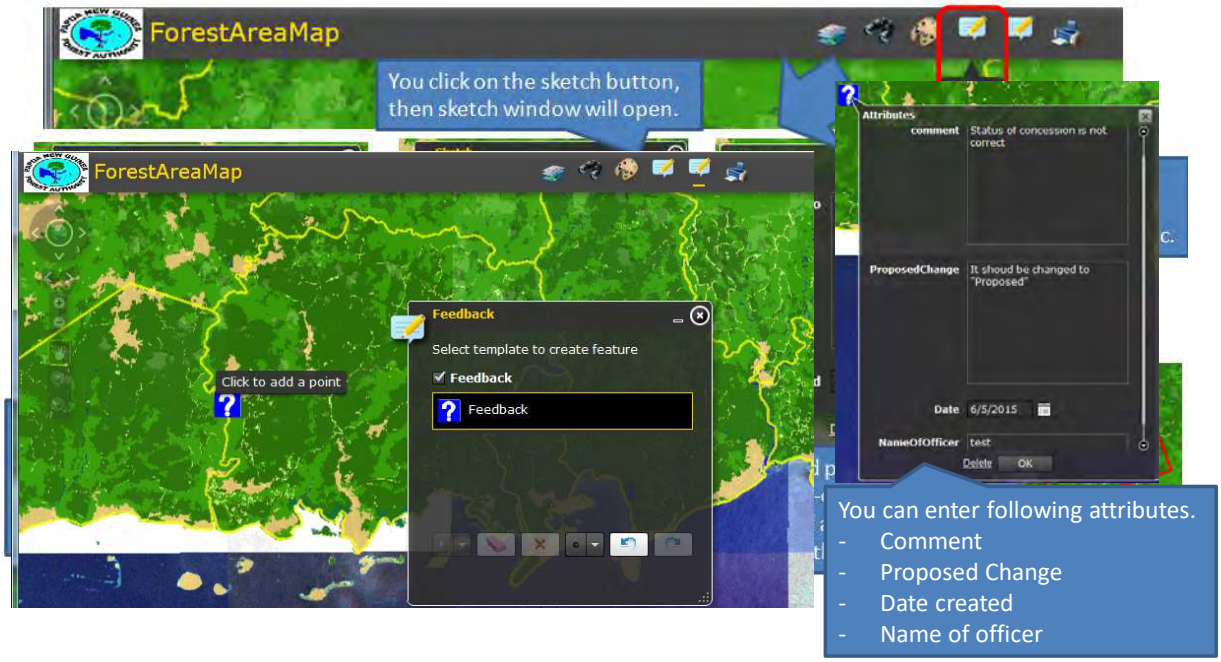


Graphical User Interface of LAN GIS/Map (PNG)

Basic Functions of Web Browser (LAN Map)

Sketch forest information for planning or monitoring

Feedback on the forest information inside PNG-FRIMS and the function of web browser map



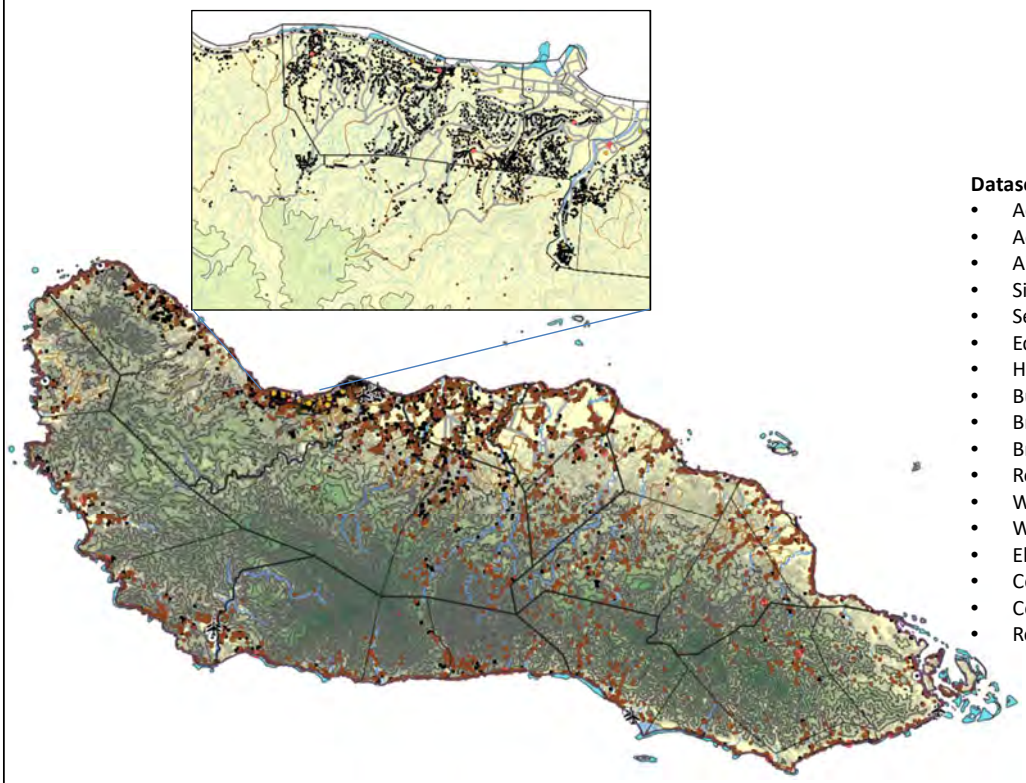
Identification of User/Group and functions (PNG)

Function			User privilege	
NO	Large category	Small category	Administrator	Viewer
1	Login		v	v
2	Main Screen（Province）	List of Provinces and Printing reports	v	v
3	Updating Timber Volumes	for Zone	v	-
4		for FMU	v	-
5	Reports	Print	v	V
6		Preview	v	v
7		Export	v	v
8	Main Screen（Concession data）	List of concession areas by province and Printing reports	v	v
9		File UP & Download	v	-
10	Large Map	Viewer	v	v
11		Editor	v	-
12		FMU Calculation	v	-
13		Import	v	-
14		Copy	v	v
15		Preview	v	v
16	Assessment by FIPS	List of concession areas by province	v	v
17	Administrator	Layer Management	v	-
18		User Management	v	-
19		FIPS Data Import	v	-
20		Appendix2 and 5 Calculation	v	-

Candidates of Forest Information Tool (WP in Jan 2019)

Category	Data	Situation	Notes
Forest	Forest Cover Map	Considering cooperation with FAO and JICA	Make simple content
	Forest Inventory Plots	FAO support pre-inventory may be available	Actual investigation is undecided
	Forest Zoning	Not prepared at MOFR	Utilizing the watershed and vegetation
	Logging Concession	MOFR possesses but there are inconsistent boundaries	Utilizing the watershed and vegetation
	Logging Plans and Records	Not developed as GIS data	Request to logging company
	Plantation Boundary	Not developed as GIS data	Request to plantation company
Agriculture	Agriculture Plantation Boundary	MOFR is confirming with the Ministry of Agriculture	Private companies, associations
Environment	Protected Area	Ministry of the Environment publishes protected areas on Web-GIS	Coordination with Ministry of Environment
Mining	Mining Concession	MOFR is checking with the Ministry (next to MOFR)	
Basic Information	Admin boundary/ Road/River/City & Village	There is data which MOFR possesses	
Global data	Global Forest Change	Annual Tree Cover Loss（FAO is utilizing）	Download in Japan
Satellite data	Landsat and Sentinel	Cloud-free mosaic is necessary (GEE）	Download in Japan
Analysis data	Deforestation Hotspots	already prepared -> training is necessary	Cooperation with FAO and GIZ, etc.
	Watershed/Catchment data	already prepared -> training is necessary	Cooperation with GEF6/ IUCN
Project	REDD+ Activities	Exists for each project, but not collected yet	Necessary for Registry

Existing Basemap in SI (provided by Ministry of Land)



Dataset

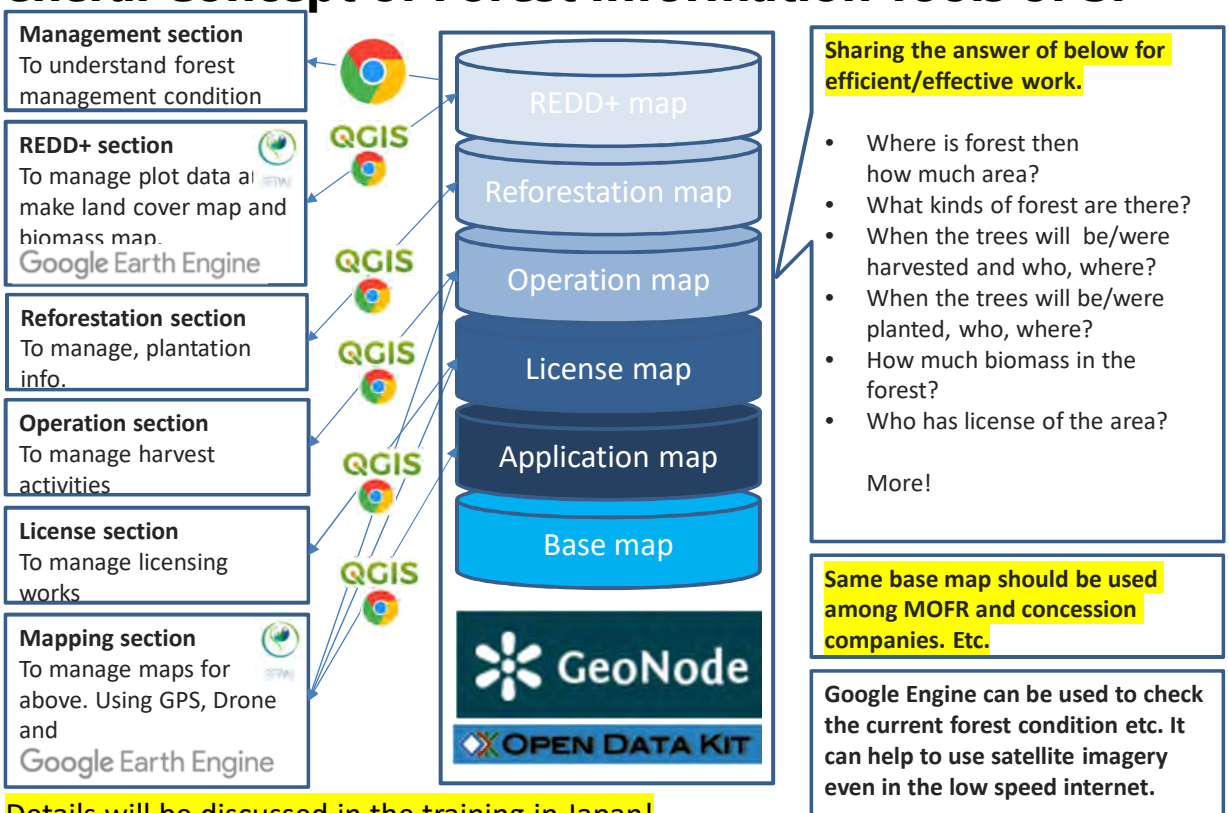
- Admin boundary Constituencies
- Admin boundary Wards
- Airport point
- Significant settlement point
- Settlements font point
- Education Facilities May07 point
- Health Facilities point
- Buildings point
- Bridges point
- Bridges polyline
- Roads polyline
- Watercourse polyline
- Watercourse region
- Elevation
- Contour
- Coastline
- Reef

Maps to be stored in Forest Information Tool of SI

Note: Need to be discussed

- **Base map**
  - Ministry of land map
  - Conservation site
  - Forest non forest map
    Land cover map
- **Application map**
  A concession company proposes the map which shows their planned harvesting area to get a license.
- **License map**
  License section gives a license to harvest using this map.
- **Operation map**
  Harvested area map by concession companies.
  GPS data, Aerial photos by drone.
- **Reforestation map**
  Plantation area by MOFR(planning/result). GPS data etc.
- **REDD+ map**
  - Pilot site location map
  - Landcover map(time series)
  - Permanent plots(forest inventory survey)
  - Photos

General Concept of Forest Information Tools of SI



Details will be discussed in the training in Japan!

Take into Considerations

- Simple system(only includes necessary function)
- Low cost system using open source
- Develop and test small system, then discussing an ideal system.
- Remote sensing will be used in GEE etc. without downloading heavy data.
- Location of the server need to be discussed.

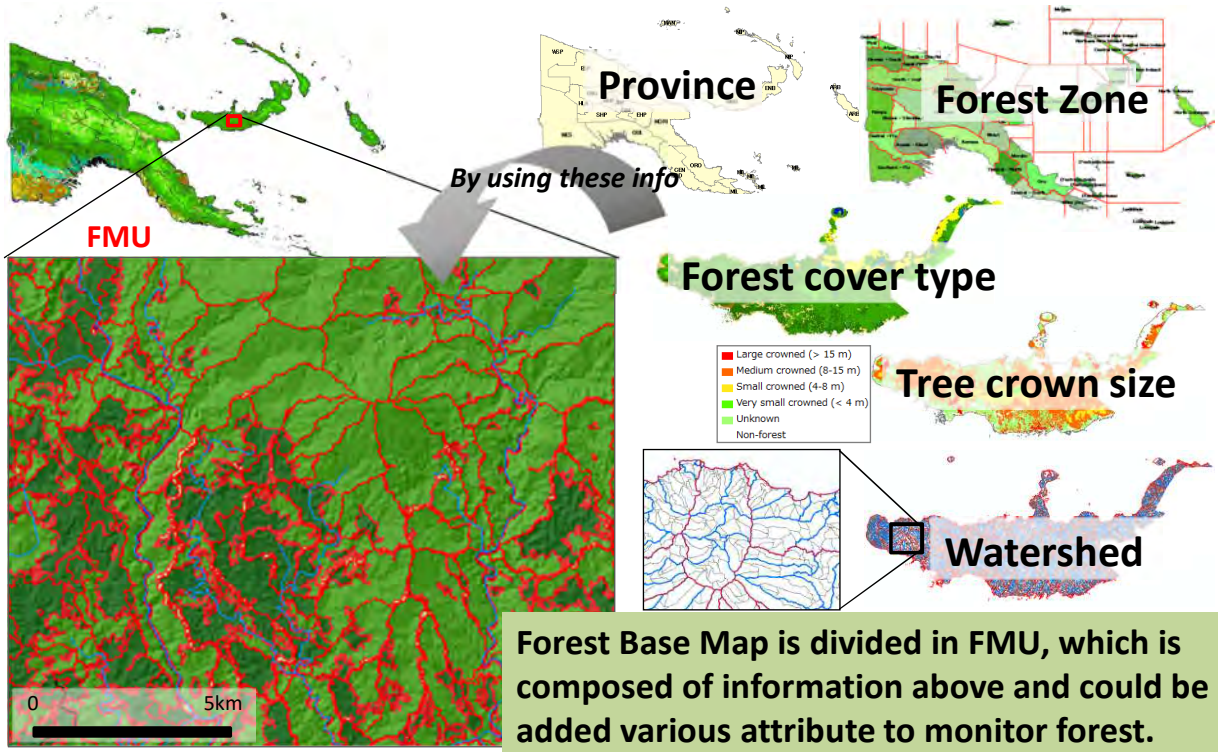
Training in Japan (Jul-Aug)

- Drone training for plot survey.
- GEE training for making Land cover map and calculating biomass.
- Deeper understanding Geodatabase and built sample database to think ideal one.
- Some field survey tools will be proposed.

2. 3) Forest Information Application (PNG)

Forest Management Unit (FMU) in PNG

Updating FMU: as Forest Monitoring Unit

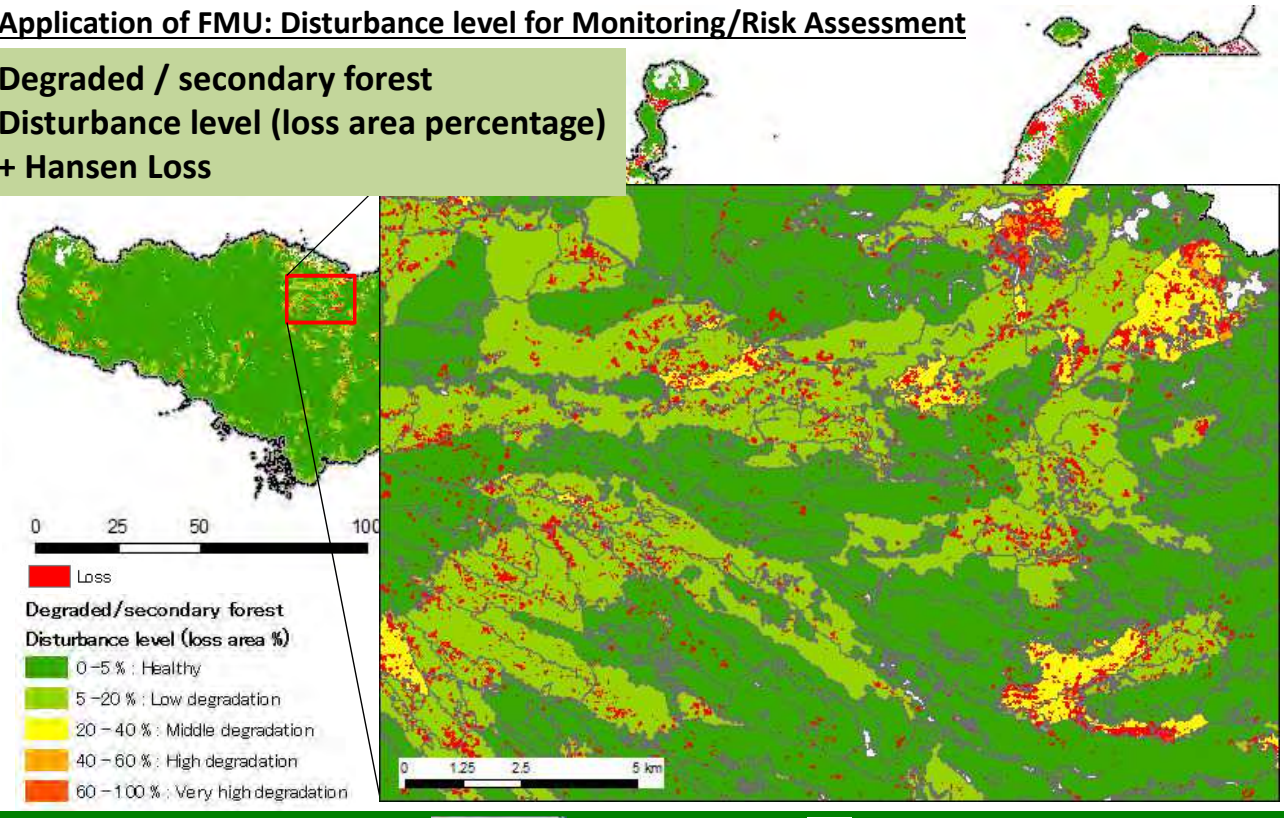


Forest Base Map is divided in FMU, which is composed of information above and could be added various attribute to monitor forest.

Forest Management Unit (FMU) in PNG

Application of FMU: Disturbance level for Monitoring/Risk Assessment

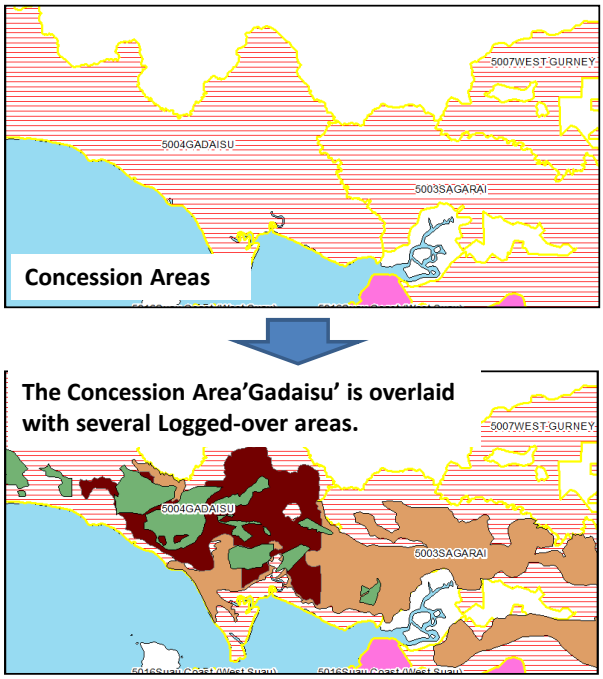
Degraded / secondary forest
Disturbance level (loss area percentage)
+ Hansen Loss



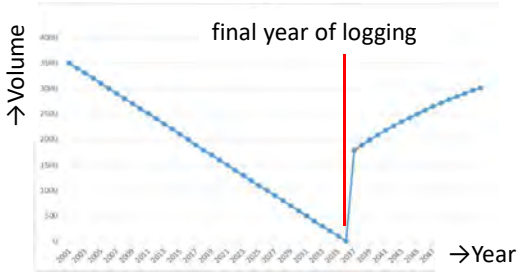
Forest Regrowth Model (and AAC*) in PNG

Original system only subtracts the harvested area from forest area for a rough estimate of timber volume. Not taking account of re-growth.

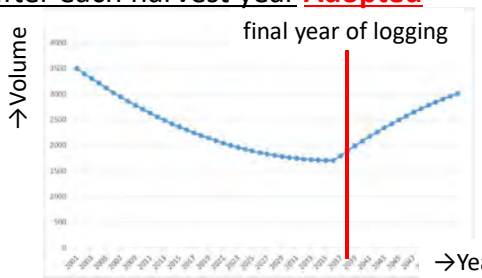
***AAC: Annual Allowable Cut**



Idea 1: Forest volume recovery starts after expiry year (after 35 years)



Idea 2: Forest volume recovery starts after each harvest year **Adopted**



This function adopted the idea that timber volume will recover over the next 35 years linearly, after the existingscientific approach was examined

Forest Regrowth Model (and AAC) in PNG

AAC considering re-growth volume after logging [1 / 3]

Existent AAC calculation

$$AAC = (Atotal - Alogged) * Vstandard \ / 35 * 0.4$$

Adjusting index

Improved AAC calculation

$$AAC = \{(Anet - Alogged) * Vstandard + \sum_{k=1}^{35}(Apermit /35) * 100k/35)\} / 35$$

Confine to net production area

Insert of regrowth volume

Notice:
Formula calculates total volume of some concession by 35 years later after launching logging.

Abbreviation:

Atotal	: Total Forest Area (inc. constraints)	*Apermit*	: Area authorized permit
Anet	: Net Production Area (inc. constraints)	*Vstandard*	: Standard Volume of each forest type
Alogged	: Logged Over Area in net production area	*k*	: elapsed year after logging

Forest Regrowth Model (and AAC) in PNG

AAC considering re-growth volume after logging [2 / 3]

Prerequisites of re-growth calculation and its issues

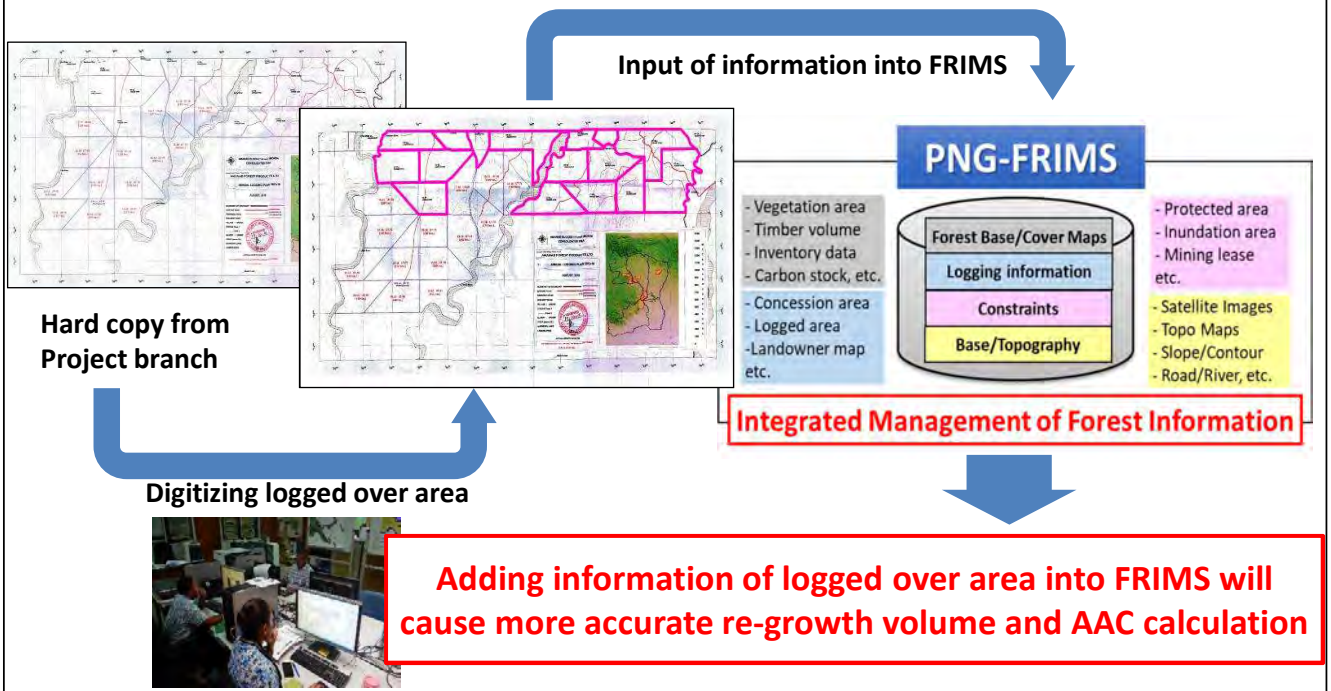
$$\sum_{k=1}^{35}((\ Apermit\ /35) * 100k/35)$$

Prerequisite	Issue	Handling line
Permitted area of logging is presumed that is religiously logged one thirty-fifth every year.	Actual logged over area may differ from one thirty-fifth.	Actual logged over area is being digitized based on ALP.
Volume after logging is presumed that recover in 35 years lineally.	Actual yield curve of volume is uncertain.	Function, switching time of years recovering volume, is implemented to FRIMS.
Regrowth volume is counted in AAC right away after logging.	Legislation limits re-entry after logging for 35 years.	Function, switching time of years adding volume to AAC, is implemented to FRIMS.

Forest Regrowth Model (and AAC) in PNG

AAC considering re-growth volume after logging [3 / 3]

Digitizing logged over area for accuracy



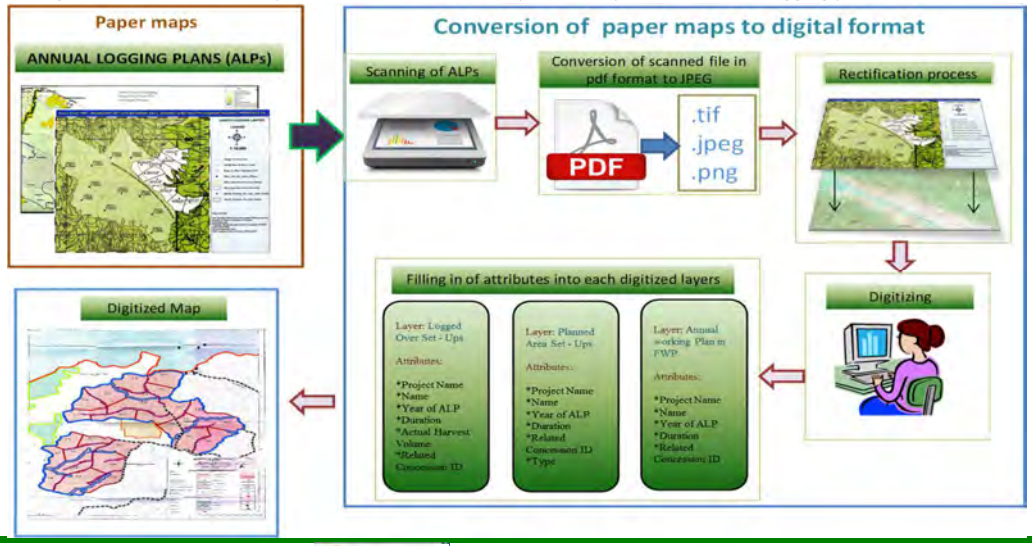
Adding information of logged over area into FRIMS will cause more accurate re-growth volume and AAC calculation

Forest Concession & Logging Plan/Area in PNG

Data Acquisition

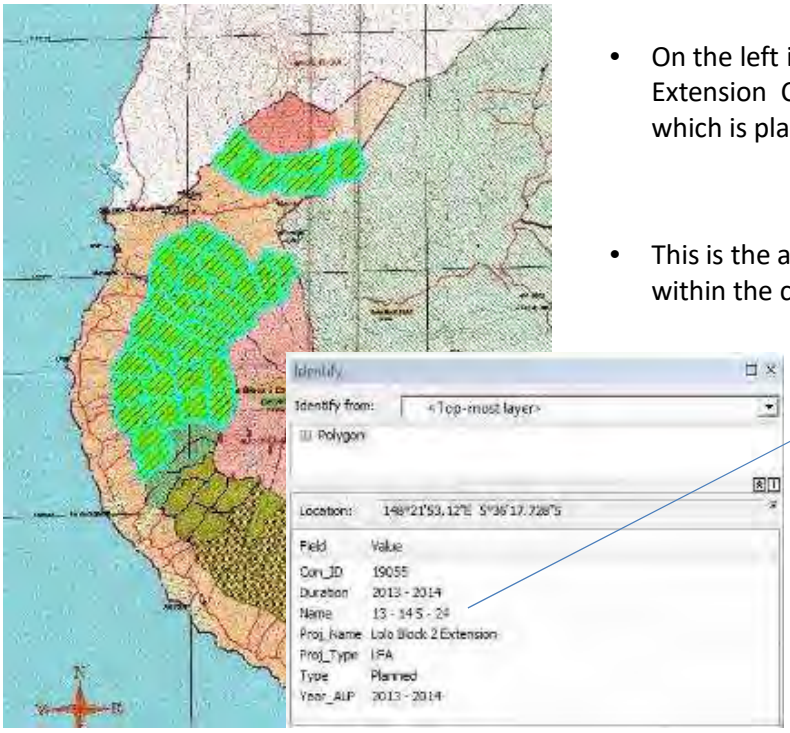
Data	Source	Format
Logging Concession Boundary	Acquisitions Branch - PNGFA	Hardcopy/Softcopy
Logging Plan and Logged Over Area	Annual Logging Plans or Forest Working Plans maps provided by logging company	Hardcopy/Softcopy
Forest Clearance Authority	Logging company or Allocations Branch - PNGFA	Hardcopy/Softcopy
Forest Plantation Boundary	Surveyed by GPS or extracted from Forest Basemap 2012	Softcopy

All data received in Hardcopy format is scanned and digitized so that it can be stored in FRIMS.
Below is a diagram that illustrates the process in which data is acquired and processed for all logging plans.



Forest Concession & Logging Plan/Area in PNG

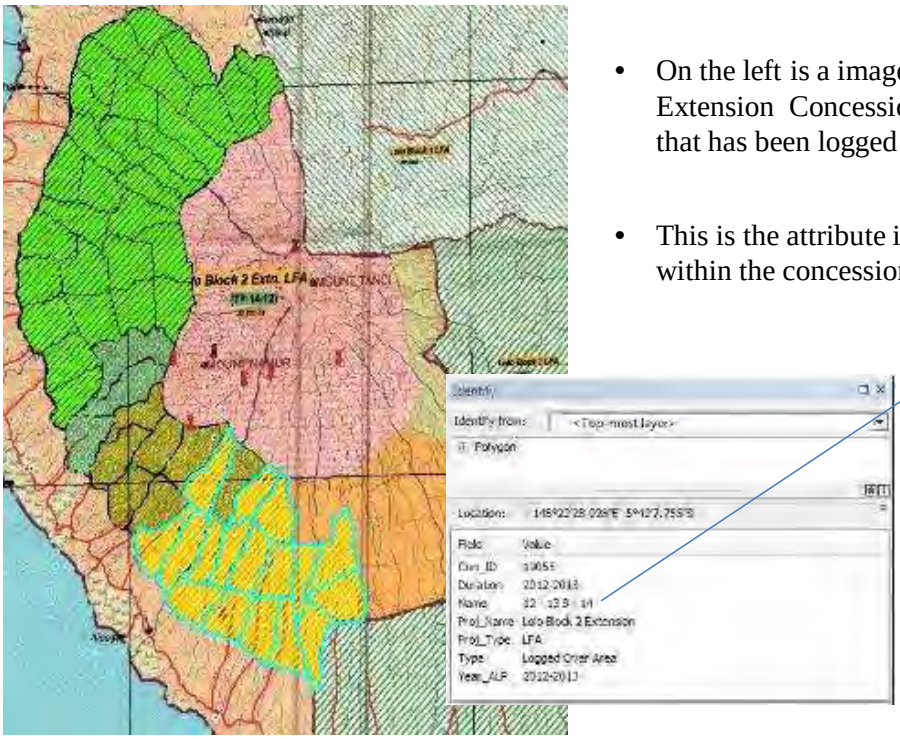
Logging Plan



- On the left is a image of the Lolo Block 2 Extension Concession, in which the area which is planned for logging is highlighted.
- This is the attribute information for a set-up within the concession, i.e. [*13-14 S – 24]*

Forest Concession & Logging Plan/Area in PNG

Logged Over Area



- On the left is a image of the Lolo Block 2 Extension Concession, in which the area that has been logged over is highlighted.
- This is the attribute information for a set-up within the concession, i.e. [*12-13 S – 24]*

Forest Concession & Logging Plan/Area in PNG

Attributes

Layer	Attributes
Logging Concession Boundary	Plan/Concession Id
	Name
	Area
	Purchase Date
	Expiry Date
	Concession Type
	Status
	Scale
	Province
Logging Plan	Project Name
	Project Type
	Name
	Year Of ALP
	Duration
	Concession ID
	Type

Layer	Attributes
Logged Over Area	Project Name
	Project Type
	Name
	Year of ALP
	Duration
	Harvest Volume (ha)
	Concession ID
Forest Clearance Authority	Project Name
	Project Type
	Name
	Year of ALP
	Duration
	Harvest Volume (ha)
	Concession ID
Forest Plantation Boundary	ID Name
	Species Name
	Date of Planting
	Date of Harvesting
	Area Size (ha)

3. Consultation to get inputs and feedback for Detail Design of the Tool

Key Questions

- Do you/your division work with map currently? (including maps from private companies)
- If yes, what kind of maps/data are you using? Could you share them with us?
- If not, how come you do not work with maps? Any specific reasons for that?
- What kind of information do you want to know for your work? (e.g. topography, vegetation)

Key Requests

- Assign the responsible officers who work for forest information tool (application side)
- Organize and bring the maps and the report (tables) related to the forest area
- If you have some kind of database (inc. Excel), could you share with us (document as well)
- Referring to this presentation (PNG examples), could you consider data you need or provide?

Way-Forward

- Next week: Report of the consultation of the meeting in your division and prepare the answers for Key Questions and Request and report to Mr. Takahashi (will organize the MTG)
- July & August: Trainees of PNG and Japan will consider further based on the inputs and feedbacks from each division
- Late August or early September (after Training in Japan): Organize the MTG of the result of the training for the Forest Information Tool
- October to February: Prepare detail design, implementation plan and prototype framework

JICA Technical Cooperation Project
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands

Consultation Meeting on Developing Forest Information Tool

- Follow-up Request –

(As of 24 June 2019)

1. Target Group/Division

- FRMTSD (Forest Resource Management and Technical Services Division)
- FDRD (Forest Development and Reforestation Division)
- FID (Forest Industries Division)
- TUPD (Timber Utilization and Downstream Processing Division)
- NHBGD (National Herbarium and Botanical Garden)
- CSD (Cooperate Service Division)

2. Key Questions

- Do you/your division work with map currently? (including maps from private companies)
- If yes, what kind of maps/data are you using? Could you share them with us?
- If not, how come you do not work with maps? Any specific reasons for that?
- What kind of information do you want to know for your work? (e.g. topography, vegetation)

3. Key Questions

- Do you/your division work with map currently? (including maps from private companies)
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4. Key Requests

- Assign the responsible officers who work for forest information tool (application side)
- Organize and bring the maps and the report (tables) related to the forest area
- If you have some kind of database (inc. Excel), could you share with us (document as well)
- Referring to this presentation (PNG examples), could you consider data you need or provide?

5. Way-Forward

- Next week: Report of the consultation of the meeting in your division and prepare the answers for Key Questions and Request and report to Mr. Takahashi (by Friday, 28 June)
- July & August: Trainees of PNG and Japan will consider further based on the inputs and feedbacks from each division
- Late August or early September (after Training in Japan): Organize the MTG of the result of the training for the Forest Information Tool
- October to February: Prepare detail implementation plan and capacity building

2nd Consultation Meeting on Developing Forest Information Tool

- Concept Note -

1. Background

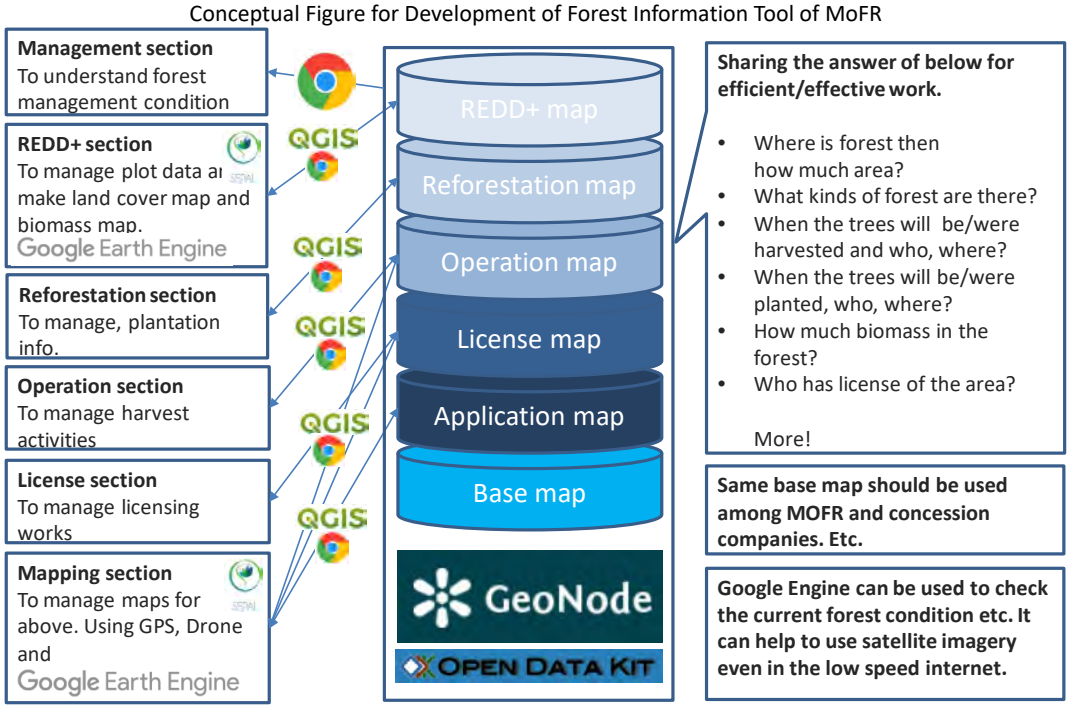
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands had been started in middle of 2017 by the Ministry of Forest and Research (MoFR) as a technical cooperation of Japan International Cooperation Agency (JICA). The project has three outputs; Output1: Capacity of MOFR to develop policies to promote SFRM is increased, Output2: Coordination and collaboration for SFRM among MOFR and other stakeholders are enhanced through related activities by MOFR, Output3: SFRM Pilot Activities, initiated by the communities and supported/ facilitated by MOFR, are implemented.

To enhance the outputs of the project, especially Output1: activity 1.5 "Develop forest information tool(s)" and Output3: pilot activity implementation support in general, the short term expert's team were selected in December 2018 and the draft Work Plan of the project was prepared, presented and approved in the Joint Coordination Committee (JCC), which was held in January 2019. Although there were a couple of challenges (such as limited human resources and the budget (inputs), the project has been implementing the activities based on the Work Plan and Plan of Operation (PO).

One of the important activities under activity 1.5 "Develop forest information tools" is training in Japan and PNG, which was conducted in July and August 2019 with the objectives to explore the direction of the output through intensive technical training and discussion. Several outcomes and challenges were organized and identified as the results of the training in Japan and PNG then Remote Sensing experts of the project conducted the follow-up training from late October to beginning of November hosted by Technical Services Division (FRMTSD), which is in charge of GIS/mapping related work in MoFR.

On the other hand, since the participants of the training in Japan and follow up training are limited people and divisions of MoFR, it is desirable to share the outcomes and way-forward with other members of FRMTSD but also with officers in other divisions of MoFR, which are potential users of the forest information to get the inputs and feedbacks for the demo version of the Forest Information Tools and basic design document developed as the results of training through the 2nd consultation meeting. Since the ideas and challenges are getting clear now, it is ready to prepare the detail work plan to develop the tools.

Conceptual Figure for Development of Forest Information Tool of MoFR



2. Objectives

As following up 1st consultation meeting (held on June 2019), the objectives of the 2nd consultation meeting are sharing the progress and achievements and way-forward for developing the Forest Information Tool, specifically for the following points.

(1) To report the outcomes and way-forward from training in Japan and follow-up training at MoFR
(2) To demonstrate a demo version (framework) of Forest Information Tool (using OSS: GeoNode)
(3) To introduce a basic design document (draft) of Forest Information Tool (using OSS: GeoNode)
(4) To discuss and prepare a detailed work plan on developing Forest Information Tool (for 6th JCC)
(5) To prepare an initial version of the operation manual of the Forest Information Tool (demo ver.)

3. Expected Outcomes

To prepare a detailed work plan on the developing forest information tools will be the main expected outcome as the results of sharing the results of the trainings, demo version of the tool, basic design documents, specifically for the followings.

(1) Outcomes and lesson learns through training in Japan and at MoFR are shared with other officers
(2) Ideas and images of the forest information tool are understood through demo version of the tools
(3) A basic design document (draft) is recognized as to explain and understand forest information tool
(4) A detailed work plan on developing forest information tools are prepared with overall agreements
(5) An initial version of operation manual of the forest information tool (demo ver.) are prepared

4. Expected Participants

The trainees who participated in the training in Japan and the follow-up training at MoFR are requested to participate in all sessions. The officers who are assigned or participated in the 1st consultation meeting (from the divisions below) are expected to participate in Session 1 and 2. The expected number of participants is not limited but 1-2 are expected (whoever interested can attend as long as the capacity of a room allows).

- FRMTSD (Forest Resource Management and Technical Services Division)
- FDRD (Forest Development and Reforestation Division)
- FID (Forest Industries Division)
- TUPD (Timber Utilization and Downstream Processing Division)
- NHBGD (National Herbarium and Botanical Garden)
- CSD (Cooperate Service Division)

5. Proposed Schedule

Due to the limitation of the short-term expert's assignment schedule, the meeting date was already fixed as follows. If the important officers could not participate in the meeting, the officers who attended are expected to report in the division with the materials which were used in the meeting.

- 8 November (Friday) 9:30-15:00 (refreshment will be provided)
- Venue: Office of REDD+ Implementation Unit at FRMTSD/MoFR

6. Contents of Meeting

The following 3 (three) sessions will be conducted. The inputs and feedback from MoFR will be collected though Q&A and Discussions as 2nd consultation. Session 3 will be only for the trainees of the trainings.

Session 1: Training Reporting (training in Japan and follow-up training at MOFR)
Session 2: Consultation Meeting (
Session 3: Working Session (writing initial operation manual of forest information tool)

2nd Consultation Meeting on Developing Forest Information Tool

- Agenda -

Date: 8 November 2019; **Time:** 9:30 – 15:00 (refreshments will be provided)

Venue: Office of REDD+ Implementation Unit at FRMTSD/MoFR

Time	Topic	Facilitator/Presenter/Remark
9:00 - 9:30	Registration	*Refreshments numbers will be counted at 9:30*
9:30 - 9:40	Background and objective of the 2nd consultation meeting	Mr. Masamichi Haraguchi *Team Leader of Short term Experts* *Forest Information Management 1*
Session 1: Training Reporting		
09:40 - 10:10	(1) Report the outcomes and way-forward from training in Japan and follow-up training at MOFR (a) 9:40-10:00 training in Japan (b) 10:00-10:10 follow-up training at MOFR:	Mr. Terence Titiulu and the team *Manager for FRMTSD* *(Forest Resource Management & Technical Services Division)*
10:10 - 10:15	Q&A (Recommendations)	
Session 2: Consultation Meeting		
10:15 - 10:30	(2) To demonstrate the demo version (framework) of Forest Information Tool (using OSS: GeoNode)	Mr. Hirokazu Takahashi & MoFR *Remote-Sensing 2/Drone Analysis* *GIS2/Team Coordinator*
10:30 - 10:40	(3) To introduce the basic design document (draft) of Forest Information Tool (using OSS: GeoNode)	
10:40 - 10:50	Discussion (Comments/Inputs)	
10:50 - 11:00	Coffee/Tea Break	
11:00 - 12:00	(4) To discuss and prepare the detailed work plan on developing Forest Information Tool (for 6th JCC)	Mr. Masamichi Haraguchi *Team Leader of Shor term Experts* *Forest Information Management 1*
11:50 - 12:00	Discussion (Summarizing)	
12:00 - 13:00	Refreshments	
Session 3: Working Session		
13:00 - 13:45	(5) To prepare the initial version of the operation manual of the Forest Information Tool (demo ver.) (kick-off)	Mr. Masamichi Haraguchi *Team Leader of Shor term Experts* *Forest Information Management 1*
13:45 - 14:00	Coffee/Tea Break	
14:00 - 14:45	(5) To prepare the initial version of the operation manual of the Forest Information Tool (demo ver.) (continued)	Mr. Hirokazu Takahashi *Remote-Sensing 2/Drone Analysis* *GIS2/Team Coordinator*
14:45 - 15:00	Discussion (Way-Forward)	Mr. Terence Titiulu. *Manager for FRMTSD* *(Forest Resource Management & Technical Services Division)*

Attachments:

- MEETING MINUTES_clean_f.docx (of 1st consultation meeting)
- Summary of questionair.xlsx (after 1st consultation meeting)

Participants List:

- Participants List for forest information tool meeting(nominated).xls (1st consultation meeting)
- Participants List for forest information tool meeting(participated).pdf(1st consultation meeting)

2nd Consultation Meeting
on
Developing Forest Information Tool

8 November 2019

Masamichi HARAGUCHI
JICA Short-term Expert
Forest Information Management 1

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

1. Background (Introduction, Objectives)

MOFR-JICA Project Overview

Overall Goal

Sustainable forest resource management is promoted from a comprehensive perspective

Project Purpose

Capacity of MOFR to implement SFRM is enhanced

Output1

Capacity of MOFR to develop policies to promote SFRM is increased

- 1-1 Review Corporate Plan 2015-2018 and its implementation from the viewpoint of SFRM.
- 1-2 Identify issues to be resolved/ improved with regard to SFRM in Corporate Plan 2015-2018.
- 1-3 Based on the results of Activities 1.1 and 1.2, formulate the Corporate Plan 2019-2022 which promotes SFRM.
- 1-4 Facilitate implementation of SFRM activities in the Corporate Plan 2019-2022.
- 1-5 Develop forest information tool(s).
- 1-6 Reflect the forest information provided through Activity 1.5 and the lessons learned form the Pilot Activities (Activity 3.6) into planning of Corporate Plan 2023-2027.
- 1-7 Develop a framework for a long-term SFRM policy utilizing the experiences obtained through Activities 1.3, 1.5, and 3.6.

Output2

Coordination and collaboration for SFRM among MOFR and other stakeholders are enhanced through related activities by MOFR

- 2-1 Identify relevant governmental institutions and other stakeholders with which MOFR would collaborate in promoting SFRM and hold discussions for potential collaboration.
- 2-2 Identify communities, NGOs, and other organizations which conduct activities contributing to, and which have potential to contribute to, SFRM and learn from their experiences.
- 2-3 Facilitate coordination / collaboration within MOFR and among MOFR and other relevant stakeholders.

Solomon Islands Government
Ministry of Forestry & Research

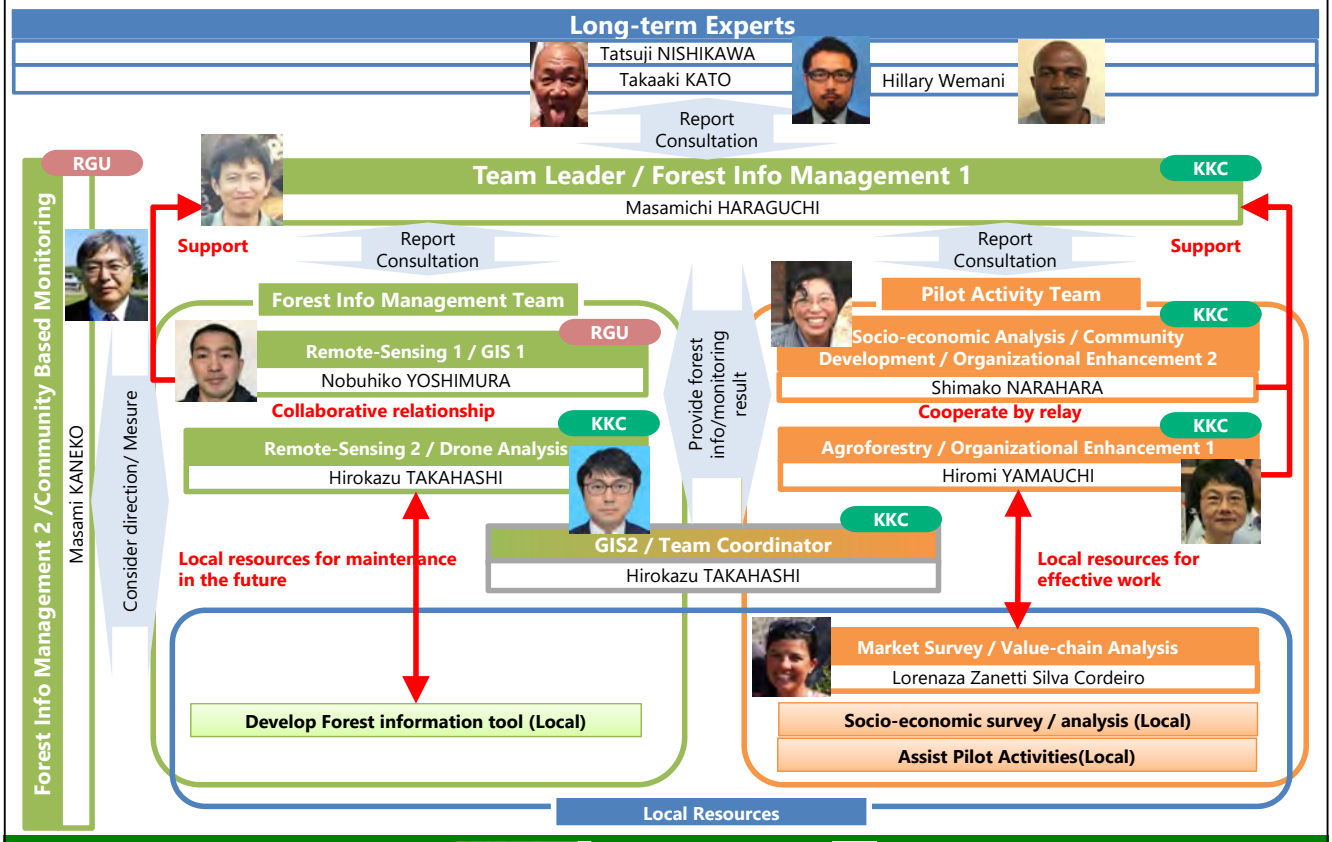
JICA

Output3

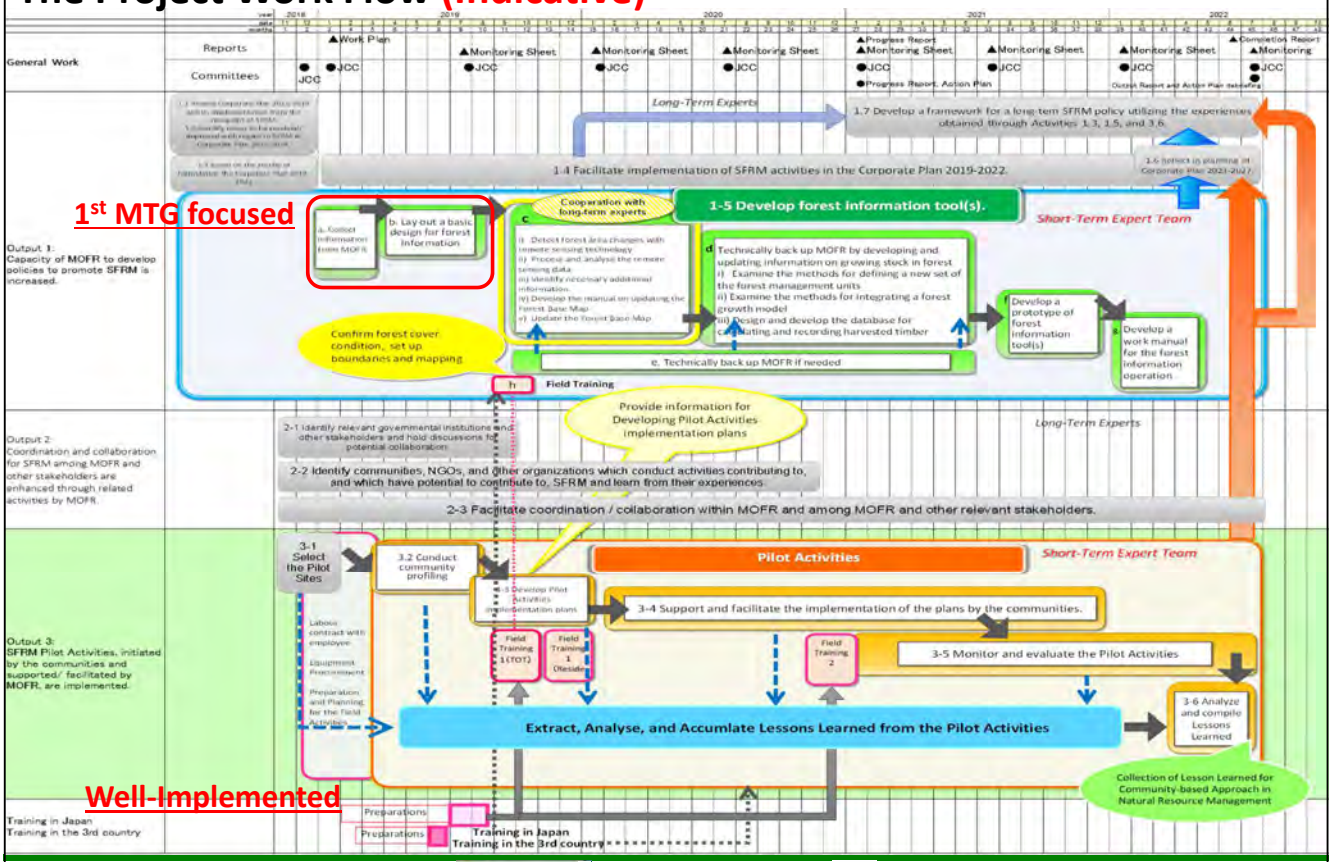
SFRM Pilot Activities, initiated by the communities and supported/ facilitated by MOFR, are implemented

- 3-1 Select the Pilot Sites in accordance with the Pilot Sites selection criteria.
- 3-2 Conduct community profiling in collaboration with the community people and socio-economic analysis in/around the Pilot Sites.
- 3-3 Support and facilitate the Pilot Sites communities to develop Pilot Activities implementation plans.
- 3-4 Support and facilitate the implementation of the plans by the communities.
- 3-5 Monitor and evaluate the Pilot Activities from the viewpoint of their contribution to SFRM.
- 3-6 Analyze and compile lessons learned from the Pilot Activities.

The Project Implementation System



The Project Work Flow (Indicative)



Technical Policy 1: Development of Forest Information Tool using Similar Work Experiences in PNG

Development of Forest Information Tool utilizing similar experience of PNG (Visualization / Planning / Management / Monitoring)

Improve Solomon Islands' capacity for sustainable forest (information) management

Plan/implement based on Solomon Islands' national circumstance & capacity

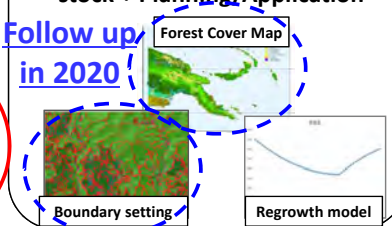
Where and what information is present	Mapping/boundary planning method	Usage situation in drone mapping
Internet environment/connection speed	Number of RS/GIS engineers in work	Office's liaison organization & capacity
Data storage / equipment management	Presence/amount of analysis software	Confirming issues /orienting as task

Progressed **Conduct Training**

Visualization and Utilization of Forest Resource Information

Updating Forest Cover Map/Carbon stock + Planning/Application

Follow up in 2020



Drone/GPS utilizing Forest Monitoring

Experience of Project for Improvement of Operational Capacity of Forest Resource Information Management System in Neighboring PNG

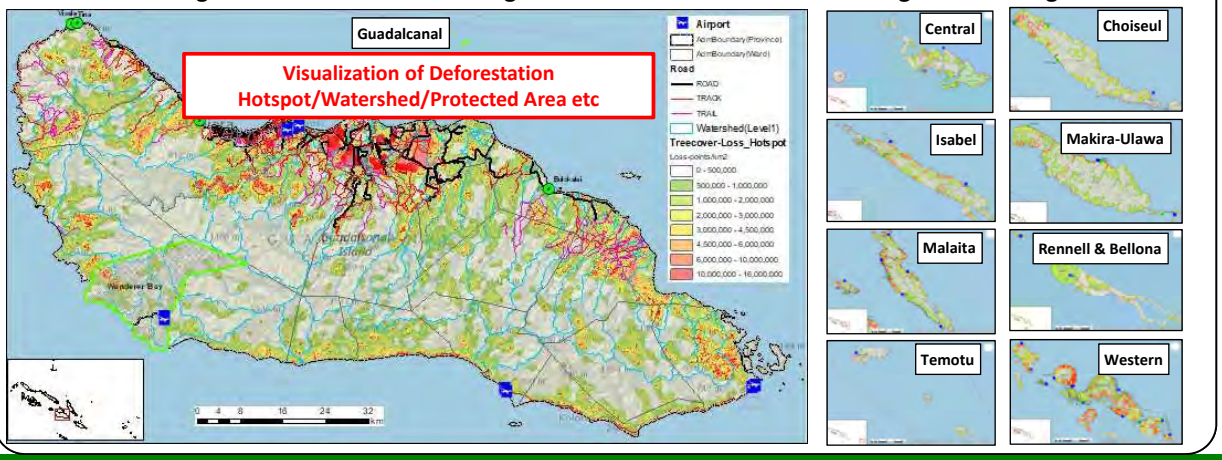
Technical Policy 2: Preparation and Provision of Forest Information with Consideration of Exit-Strategies

Follow up in 2020

Providing Information about Pilot Target Area on REDD+/ Ecosystem Services/ Forest & Agriculture Certification

REDD+	Ecosystem Services	Forest & Agri Certification
e.g.) Deforestation/Degradation (Reference Level / Benchmark setting)	(e.g.) Landscape Approach Integrated Land-use Plan considering Ecosystem)	(e.g.) HCV/HCS Assessment (HCV: high conservation value, HCS: high carbon stock)
(e.g.) Conservation of places where deforestation is intense in recent years	(e.g.) land use and management plan considering water source and catchment	(e.g.) Palm-oil certification (RSPO) does not allow conversion of natural forest as of 2005

Providing Information about Pilot Target Area for Sustainable Forest Management（Image）



Objectives of MTG

As following up 1st consultation meeting (held on June 2019), the objectives of the 2nd consultation meeting are **sharing the progress and achievements and way-forward** for developing the Forest Information Tool, specifically for the following

(1) To report the outcomes and way-forward from training in Japan and follow-up training at MoFR

(2) To demonstrate a demo version (framework) of Forest Information Tool (using OSS: GeoNode)

(3) To introduce a basic design document (draft) of Forest Information Tool (using OSS: GeoNode)

(4) To discuss and prepare a detailed work plan on developing Forest Information Tool (for 6th JCC)

(5) To prepare an initial version of the operation manual of the Forest Information Tool (demo ver.)

Expected Outcomes

To prepare a detailed work plan on the developing forest information tools will be the main expected outcome as the results of **sharing the results of the trainings, demo version of the tool, basic design documents**, specifically for the followings.

(1) Outcomes and lesson learns through training in Japan and at MoFR are shared with other officers

(2) Ideas and images of the forest information tool are understood through demo version of the tools

(3) A basic design document (draft) is recognized as to explain and understand forest information tool

(4) A detailed work plan on developing forest information tools are prepared with overall agreements

(5) An initial version of operation manual of the forest information tool (demo ver.) are prepared

Summary of 1st Consultation Meeting

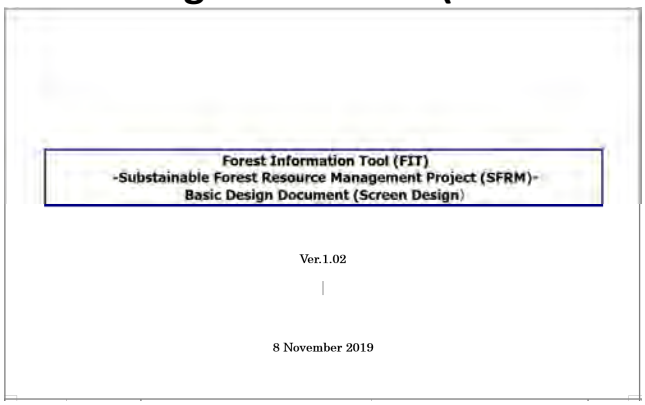
Consultation Meeting on Developing Forest Information Tool - Follow-up Request –

Questions and Answers

	Key Questions	Key Requests
	***Do you/your division work with map currently? (Including maps from private companies)** ***If yes, what kind of maps/data are you using? Could you share them with us?** ***If not, how come you do not work with maps? Any specific reasons for that?** ***What kind of information do you want to know for your work? (e.g. topography, vegetation)**	***Assign the responsible officers who work for forest information tool (application side)** ***Organize and bring the maps and the report (tables) related to the forest area** ***If you have some kind of database (inc. Excel), could you share with us (document as well)** ***Referring to this presentation (PNG examples), could you consider data you need or provide?**
FRMTSD (Forest Resource Management and Technical Services Division)	Yes we have and use various maps we work with. In terms of GIS and Mapping, we have various maps we use such as logging concession area maps, land boundary maps, waterline, elevation etc. The kind of information or data we want to know or need to support and efficiently enhanced our work are vegetation types, watershed, forest composition, vegetation types, boundary of 400 m asl, boundaries of different land uses, layers demarcating steep slopes (<30°), logging concession boundaries including intensity of forest cover loss (eg high, medium and low), areas of logging re-entry, watersheds of main river systems and potential REDD+ sites and REDD+ related project sites etc.	The person or sections who responsible for the support towards the development of the forest information tool are GIS and Mapping Section, Policy Planning and the REDD+ Implementation Unit. Also we have databases but are scattered across the sections etc, The kind of data we need are vegetation types, watershed, forest composition, vegetation types, boundary of 400 m asl, boundaries of different land uses, layers demarcating steep slopes (<30°), logging concession boundaries including intensity of forest cover loss (eg high, medium and low), areas of logging re-entry, watersheds of main river systems and potential REDD+ sites and REDD+ related project sites etc. The kind of data we could provide are logging concession areas, rivers, administrative boundaries, REDD+ potential sites in the Solomon Islands, contour lines etc.
	Licensing Section – FRMTSD Yes, Form 1 application maps and registered land maps'. The latter is ok but the former is maps of customary land supposed to be specific customary tribal owned land. Their boundary needs to be confirmed in the field. Topography, Inventory of the area concern (cubic meters of wood likely to be obtained from the area), number of hectares covered by a specific land Note: The form 1 application form needed to be amended and when submitted, all requirements must be cross checked to ensure consistency with what they said in the application and what we have in our GIS system. We need a data base that links all forestry related activities together, example, if any area inside the concession had been replanted (how many hectare). Form 1 map submission must had GPS coordinates on them to assist determine the concession boundary as boundary overlaps or are different from the field compared to the submitted map. The other thing worth noting is that, land submitted for a Form 1 must have a landownership determination or show that the said land had been determined in a court of law. This will lessen the issues that stems from ownership claims and at the same time boost confident with investors	Licensing Section – FRMTSD Key requested noted, current excel data we use was put together by Lucy Takaoa
FDRD (Forest Development and Reforestation Division)	The Forest Development and Reforestation Division currently do not use maps because plantation are usual in small scale and scattered across the country.	Mr. Paul Hatamana is the person we assign to be responsible for the work for the forest information tool. The kind of information we do want to support our work are forest types , elevation, species compositions, existing logging roads and log over areas etc.

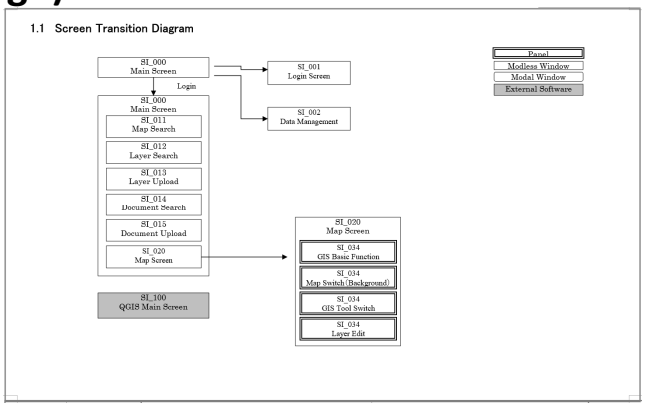
Progress for Consultation

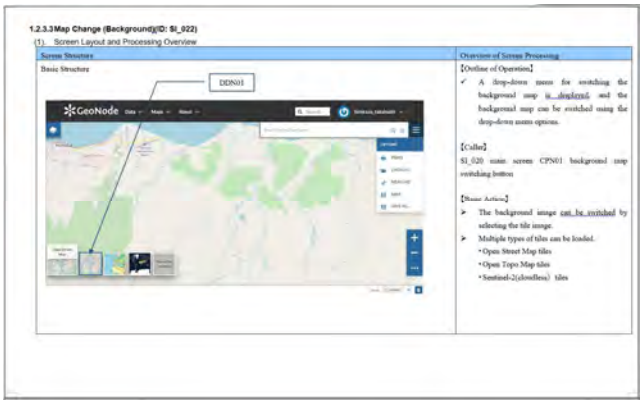
Basic Design Document (Screen Design)


Forest Information Tool (FIT)
-Substainable Forest Resource Management Project (SFRM)-
Basic Design Document (Screen Design)

Ver.1.02

8 November 2019

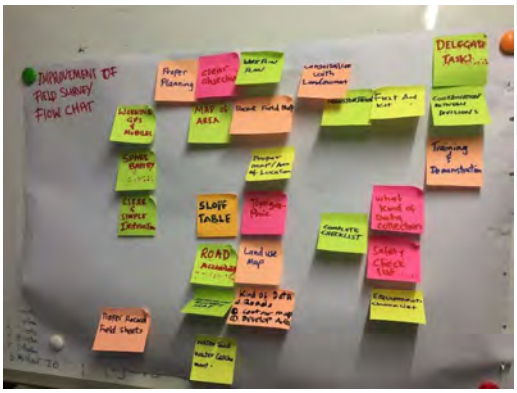




Map List (Note: need further work)

Map types	paper	digital	note
Vegetation types			logged species distribution(Aus)
forest compositon (species composition)			not existing
boundary of 400m	ok	ok	
boundary of different land uses			
layers demarcating steep slopes (<30°)	ok	ok	
logging concession boundaries			
log pond site			check Mapping (Gus)
logging road			check Mapping (Gus)
loggged over areas			check Mapping (Gus)
logging re-entry			check Mapping (Gus)
forest cover loss (intensity high, medium and low)			
watersheds of main river	ok	ok	
Topography	ok	ok	
Elevation	ok	ok	
number of hectares covered by a specific land			
plantation			check Reforestation div.
rivers	ok	ok	
administratives boundaries	ok	ok	
contour lines	ok	ok	
Inventory of the area concern (m3 of wood likely to be obtained)			
potential REDD+site			check REDD+ Office
REDD+ related project sites			check REDD+ Office

Work Flow Discussion



Improvement of Field Survey Flow-Chart

Proper Planning
Clear Objectives

Equipment(Hardware)
- GPSs and Mobiles(Usable)
- Spare Battery
- Clear & Simple Instruction

Equipment(Field note)
- Proper Record Field Sheets

Equipment(Data)
Required maps of target area
- Target area location
- Slope table
- Recent Field Map
- Road accessibility(Road)
- Watershed, water, catchment
- Topography
- Landuse map
- Contour map

Logistics
- Consultation with Landowners
- Transportation
- First Aid kit

Complete checklist for field survey
- Equipment checklist
- What kind of data collection
- Safety check list

→ Workflow Plan

Delegate Task(Including local officer)

Training & Demonstration

Improvement of Database

Purpose
- Linkage Access for Sharing
- Data Sharing for Decision Making
- Reporting
- Data Accessibility

Needs of data for database
To check logging activities
- Logging Map
- Logging History Map
- Forest Reserves
- Protected Forests
- Cultural Heritage Map Sites

For Planning
- Potential Site Maps for Development
- Planning Docs

Planning of restoration of forest
- Potential Reforestation Area
- Reforestation Planted Area
- Hansen Loss Data(deforestation)
- Highly Degraded Area

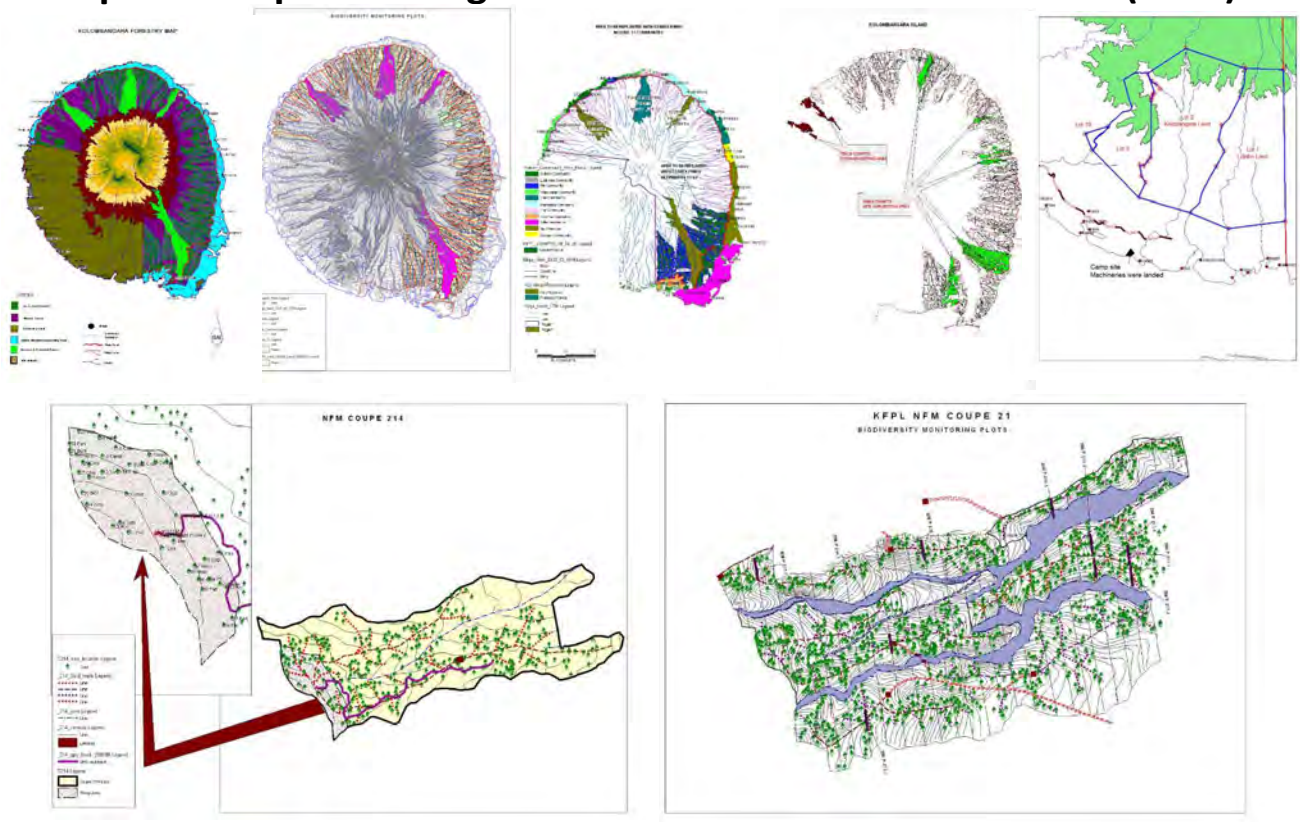
Planning production activities
- Forest Production Map
- Plantation Site and Map
- Plantation ID Location
- Land Use Map for Agroforestry Projects Site

Needs of data for database
Statistics
- Annual Harvest Map
- Export Volume Data
- Sawn Timber Export

Base map
- Forest Cover Map
- Tree SPP Distribution
- Special Forest Type
- Ministry of Lands Map

Project site
- Redd+ Pilot Sites

Example of Maps to be registered in Forest Information Tools (KFPL)



Collaboration with SIG ICT Support (SOL-GEO)

Application Form

Systems Development Project Request
FORM PRJ01

Project Details				
Ministry	Ministry of Forest and Research (MOFR)		Date Division	07/11/2019 Forest Resource Management & Technical Services Division (FRMTSD)
Requesting Officer	Terence Tituilu (Mr)		Manager of FRMTSD	
Project Name	The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands		Project Duration	From January 2019 to July 2022 (3 years and a half)
Project Description				
Project Sponsors	Donor	JICA	Project Budget	About 4M USD (for all activities)
	SIG	MOFR		TBC
Project Stakeholders	Keep Satisfied	Manage Closely	Keep Informed	Monitor
Project Team	Officer Names	Email Contact		Mobile Contact
Masamichi Haraguchi	Experts Team Leader	masamichi_haraguchi@kk-grp.jp		
Tatsuo Noakawa	Chief Adviser			
Takaaki Kato	Project Coordinator			
Nobuhiko Yoshimura	RS Expert 1			
Hirokazu Takahashi	RS Expert 2 / GIS	hirokazu_takahashi@kk-grp.jp		

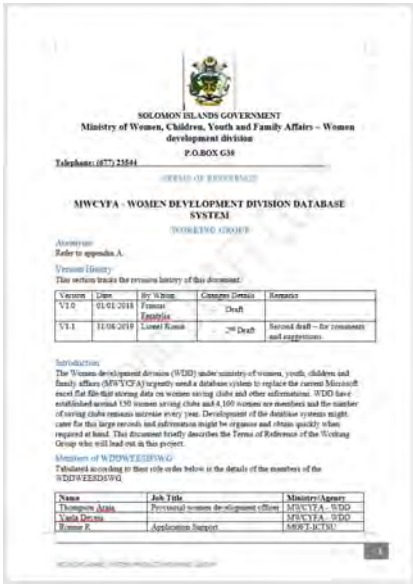
IT Resource Need Assessment – SIG ICTSU Official Use Only			
Subject Matter Experts	Client Services	Infrastructure	Information Systems
Comments			

Approval

Smith Iniakwala
Director ICTSU
SIG-ICTSU

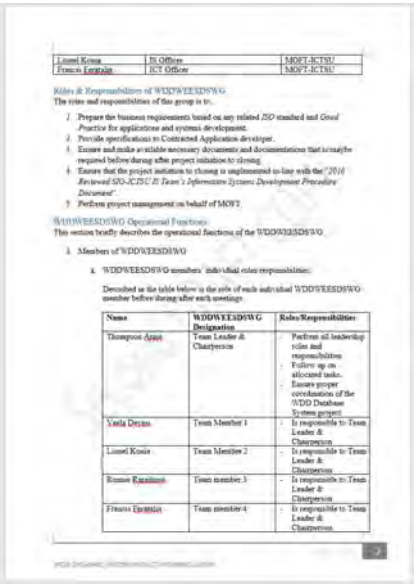
Steve Erehiru
Deputy Director/Projects
SIG-ICTSU

Working Group Document (Sample)



SOLOMON ISLANDS GOVERNMENT
Ministry of Women, Children, Youth and Family Affairs – Women development division
P.O.BOX G30
Telephone: (677) 23544

MWCYFA - WOMEN DEVELOPMENT DIVISION DATABASE SYSTEM



Collaboration with National ICT resources

Under Discussion

4 Company Services

4.1 Consultancy

- Thin-Client System Architecture Solutions Planning & Designing.
- Thick-Client System Architecture Solutions Planning & Designing.
- Project Management (Prince2 Framework).
- Network Architecture Solutions Planning & Designing.
- Server Architecture Solutions Planning & Designing.
- Network and security management
- MIS planning, development and implementation
- SSL Certificate.
- Other consultancy areas

4.2 ICT

- MS Access App Development.
- Web App Development.
- Desktop App Development.
- Mobile App Development.
- Reselling of Proprietary Software Applications.
- Customization of Open Source Software Applications.
- Resell of licensed Antivirus.
- Desktop & Laptop Supply/Repair/Maintenance.
- Printer Supply/Repair/Maintenance.
- Network Implementation - Data Cabling.
- Cloud Hosting Services.
- Email Services Infrastructure Design & Implementation (Microsoft Exchange Server).

4.3 GIS – Geographical Information services

- Geographical information system solution and consultation.
- GIS project management
- PostGIS, Geoserver, QGIS & MapInfo
- Geo-Marketing consulting and planning
- Geographic Information Systems and Geo-database development
- Application development and Information Technology
- Land surveying and mapping
- Aerial Photography and Remote Sensing
- Physical and Environmental planning
- Digital 2D mapping
- Digital 3D mapping
- Mobile mapping
- Forestry mapping
- Agriculture mapping

5 Company Structure

6 Selected Completed and Current Projects

YEAR	PROJECT
Client: SOLOMON WATER	
2013 till to date – Design, implement and support Solomon Water Management Information System.	Solomon Water: - Gather Client business needs. - Functional requirements - Design & Develop the MIS on both Desktop and web based database system. - The system is currently in operation since 2013.
Client: Ministry of Infrastructure – Western Provincial government	
2019 – Consult, Plan, Design, Development of the MID Management Information System (SMIS) for MID Western Province.	Consultation with Western Provincial secretary: - Scoping in progress
Client: MAKO FISHERIES LTD	
2018 – Design and Develop MIS for MAKO.	- Functional requirements - Design & Develop the MIS - Still on debugging phase
Client: GUADALCANAL EDUCATION AUTHORITY	
2018 – Consult , Plan , Design and implement Guadalcanal Education Authority MIS	- Gather Client business needs. - Functional requirements - Design & Develop the MIS on both web mobile applications. The system was completed and is currently in operation since 2018.
Client: West Guadalcanal Constituency (Ongoing)	
2019 - Consult , Plan , Design and implement Rural Development constituency Fund MIS for West Guadalcanal Constituency	- Gather Client business needs. - Functional requirements - Design & Develop the MIS on both web mobile applications.

Plan of Operation (ver. July 2019)

Project Monitoring Sf Operation)

Project Title: The Project on Capacity Development for Sustainable ment in Solomon Islands

Inputs	Plan/Actual	FY of SI 2019 I	II	III	IV	FY of SI 2020 I	II	III	IV	FY of SI 2021 I	II	III	IV	I
1.4.4 Make report of facilitate implementation of SFRM activities in the Corporate Plan 2019-2022.	Plan													
	Actual													
1.5 Develop forest information tool(s).	Plan													
	Actual													
1.5.1 Conduct consultation with MOFR and collect necessary information, documents and materials.	Plan													
	Actual													
1.5.2 Analyze collected information in 1.5.1. and design the basic design for forest information tool.	Plan													
	Actual													
1.5.3 Technical backup and work support of MOFR which will be conducted on how to arrange and update the forest information.	Plan													
	Actual													
1.5.4 Produce trial forest information tool.	Plan													
	Actual													
1.5.5 Create an operation manual of the forest information tool.	Plan													
	Actual													
1.5.6 Technical training for the operation and management of forest information.	Plan													
	Actual													

Example of Schedule (Output3: Pilot Activity in Communities)

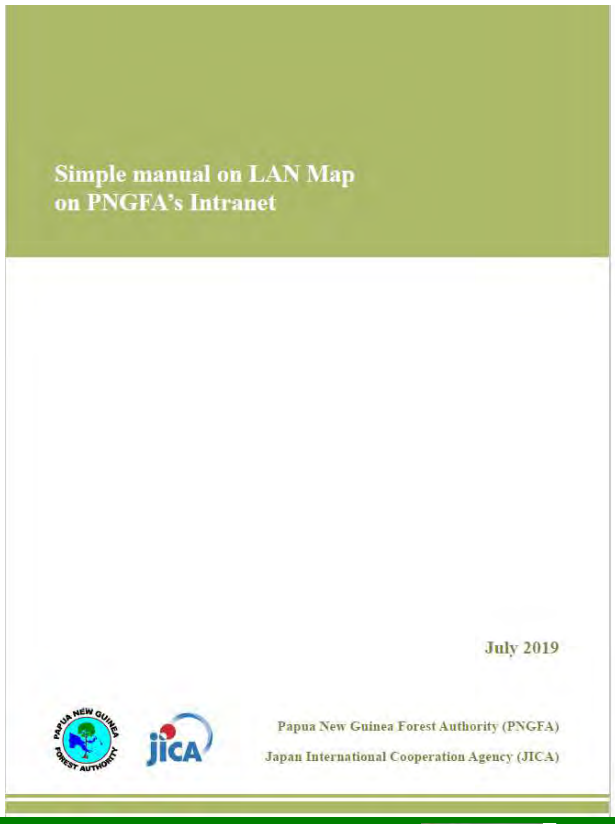
Pilot Activity Planning Schedule

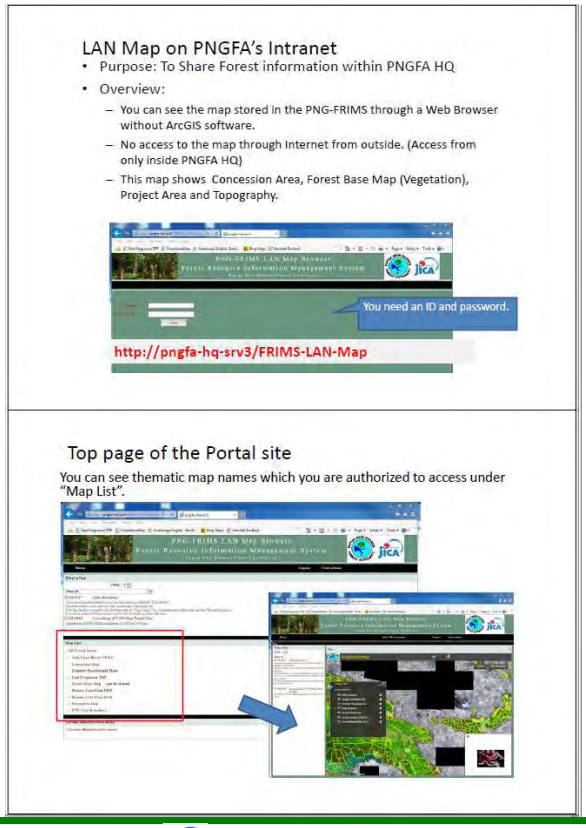
Activity	Schedule	Jun 1	2	3	4	Jul 1	2	3	4	Aug 1	2	3	4	Sep 1	2	3	4	Oct 1	2	3	4	Nov 1	2	3	4	Dec 1	2	3	4
Integrated Map Making	Planning and Preparation for GPS Transect Walk																												
	Participatory GPS Transect Walk @ Komuniboli																												
	Participatory GPS Transect Walk @ Falake																												
	GIS Data Analysis for Integrated Map Making																												
Drone Survey	Drone Survey @ Falake																												
Forest Inventory	Planning and Preparation for Forest Inventory																												
	Training for NFI Testing/Forest Inventory																												
	NFI Testing/Forest Inventory @ Komuniboli																												
	QA/QC @ Komuniboli																												
	Forest Inventory @ Falake																												
	QA/QC @ Falake																												
Socio-economic Analysis & Market Research	Preparation for Participatory Analysis for Integrated Map																												
	Designing & preparation for Socio-economic Analysis & Market Research																												
	Participatory Analysis for Integrated Map @ Komuniboli																												
	Socio-economic Survey & Market Research @ Komuniboli																												
	Participatory Analysis for Integrated Map @ Falake																												
	Socio-economic Survey & Market Research @ Falake																												
	Socio-economic Analysis and Value Chain Analysis																												
Land Use Planning	Designing and parepation for Land Use Planning																												
	Participatory Land Use Planning @ Komuniboli																												
	Participatory Land Use Planning @ Falake																												
Pilot Activity Planning	Designing and Preparation for Pilot Activity Planning																												
	Participatory Pilot Activity Planning @ Komuniboli																												
	Participatory Pilot Activity Planning @ Falake																												
	Finalisation of Pilot Activity Plans																												
JCC Approval	Joint Coordinating Committee (Project Steeling Committee)'s approval on Pilot Activity Plans																												

Draft Work Plan on Developing Forest Information Tool(s)

	Items	Output	In charge	Type	2019												2020												2021												2022					
					1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
	1.5 Develop forest information tool(s)	**Forest Information Tool(s)**	**main**	Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
			sub	Actual	X	X	X	X	X	X	X	X	X	X																																
a)	**1.5.1 Conduct consultation with MOFR and collect necessary information, documents and materials**	**Consultation Meeting (Minutes)**	Haraguchi	Plan	X	X	X																																						
			Yoshimura	Actual	X				X																																				
b)	**1.5.2 Analyze collected information in 1.5.1. and design the basic design for forest information tool**	**Collected Information ist**	Haraguchi	Plan			X	X	X	X																																			
		Basic design document	Takahashi	Actual			X			X																																			
	Preliminary design for forest information tool (indicative proposal from PNG experience)	Preliminary proposal (presentation)	Haraguchi	Plan				X	X	X																																			
			Takahashi	Actual				X	X	X																																			
	Basic design for forest information tool (through trainings in PNG and Japan)	Basic design document (sceen design, data list and function list)	Haraguchi	Plan							X	X	X																																
			Takahashi	Actual							X	X		X	X																															
e)	**1.5.3 Technical backup and work support of MOFR which will be conducted on how to arrange and update the forest information**	**Supporting activity reports**	Yoshimura	Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
			Takahashi	Actual	X				X	X	X	X		X																																
f)	**1.5.4 Produce trial forest information tool**	**(Trial) forest information tool**	Haraguchi	Plan							X	X	X	X	X	X																															
			Yoshimura	Actual							X	X		X	X																																
	Develop forest information platform	**Forest information platform**	Haraguchi	Plan																																									
			Yoshimura	Actual																																									
	Develop prototype forest information platform with GeoNode at MoFR	Prototype forest information platform	Yoshimura	Plan										X	X	X																													
			Haraguchi	Actual										X	X	X																														
	Discuss and organize map and data operational workflow	Map and data operational workflow	Yoshimura	Plan										X	X	X																													
			Haraguchi	Actual										X	X																															
	Upgrade/enhance forest information platform in government ICT (SOL-Geo)	Forest information platform on SIG-ICT (SOL-Geo)	Haraguchi	Plan											X			X	X	X	X	X	X		X			X			X			X			X							
			Yoshimura	Actual											X																															
	Update/maintain forest information platform (including Web-site) with national resources	Updated platform and web-site	Haraguchi	Plan											X			X	X	X	X	X	X		X			X			X			X			X							
			Yoshimura	Actual											X																															
c)	**Develop/update forest cover map**	**Forest cover map**	Haraguchi	Plan														X	X	X	X	X	X	X	X																					
			Yoshimura	Actual																																									
i)	Figure out forest area change by remote sensing	Forest area change and trend	Haraguchi	Plan														X	X	X																									
			Yoshimura	Actual																																									
ii)	Construct processing and analyzing remote sensing data	Processing and analyzing method	Haraguchi	Plan														X	X	X																									
			Yoshimura	Actual																																									
iii)	Identify additional and supplimental necessary information (other than remote sensing data)	Additional/supplimental information	Haraguchi	Plan																																									
			Yoshimura	Actual														X	X	X																									
iv)	Prepare a manual on updating forest cover map	Manual on updating forest cover map	Haraguchi	Plan																	X		X		X																				
			Yoshimura	Actual																																									
v)	Update forest cover map	Updated forest cover map	Haraguchi	Plan																	X	X	X	X	X																			
			Yoshimura	Actual																																									
d)	**Develop/update forest carbon stock**	**Forest carbon stock (Timber volume)**	Haraguchi	Plan																						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
			Takahashi	Actual																																									
i)	Consider methods of setting Forest Management Unit (FMU) based on operation-records/vegetation	Forest Management Unit (FMU)	Haraguchi	Plan																						X	X	X	X	X	X													
			Takahashi	Actual																																									
ii)	Consider introducing method of forest regrowth model	Regrowth model (or decision)	Haraguchi	Plan																									X	X	X	X	X	X											
			Takahashi	Actual																																									
iii)	Design and develop database to record logged volume and regrowth volume	Database on logging/regrowth	Haraguchi	Plan																											X	X	X	X	X	X	X	X	X					
			Takahashi	Actual																																									
g)	**1.5.5 Create an operation manual of the forest information tool**	**Operation manual**	Yoshimura	Plan											X	X	X	X																												
			Takahashi	Actual											X																															
	Prepare a simple operation manual (presentation based framework)	Simple operation manual(pptx)	Yoshimura	Plan											X	X	X	X																												
			Takahashi	Actual																																									
	Prepare a detail operation manual (documentation based userguide)	Detail operation manual(docx)	Yoshimura	Plan																																					X	X	X	X		
			Takahashi	Actual																																									
h)	**1.5.6 Technical training for the operation and management of forest information**	**Training materials and reports**	Yoshimura	Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
			Takahashi	Actual	X		X		X	X																																			
	Training in third country (PNG) and training in Japan (Remote Sensing/GIS, GPS/Tablet and Drone)	Report of training in PNG Report of training in Japan	Yoshimura	Plan							X	X																																	
			Takahashi	Actual							X	X																																	
	Field training (1) at MoFR (Remote Sensing/GIS, GPS/Tablet and Drone)	Training materials (RS/GIS/GPS/Tab) Training materials (Drone)	Yoshimura	Plan										X	X																														
			Takahashi	Actual										X	X																															
	Field training (2) at pilot sites (participatory forest monitoring with GPS/Tablet and Drone)		Yoshimura	Plan														X	X	X						X	X	X																
			Takahashi	Actual																																									

Preparation Simple Operation Manual (Example of PNG)





Annex
(Materials of 1st Meeting)

Sol-FIMS Task Force 1st Meeting Concept Note

1. Objective

It is needed to enhance and develop Sol-FIMS' contents based on the 2nd training at MOFR Headquarter and introduced demo site. As the first step, maps listed agenda are planned to develop, which are useful for our tasks. This meeting is held to understand these maps' properties and to determine their specification based on usage in MOFR. They will be uploaded on Sol-FIMS after finalized

2. Date: 7th May 2020 13:30-14:30 (tentative)

3. Venue: Planning Division Office

4. Agenda *Point of discussion

(1) Forest Type Map (FTM): Finalize coloring

*Check revised coloring

(2) High Conservation Value Map (HCV): Confirm the quality and consider needed dataset

*Check used dataset and Final output map. Additional information is needed?

(3) Watershed and Forest Management Unit (FMU):

7 levels watershed (15,000ha, 10,000ha, 5,000ha, 100ha, 50ha 10ha, 5ha) are prepared as sample boundary and for comparison. 3 Levels shall be selected watershed as administrative area and Forest management Unit (smallest level) after discussion at Task Force.

*Select three (or four) administrative watershed boundaris and Confirm forest management unit

(4) FMU Attribute: Determine the specification for FMU as attribute using existing dataset.

*Confirm what information are needed on your work

*All data specification are determined and approved by Task Force.

5. Schedule (tentative)

The draft maps shall be submitted to Planning Division and be discussed and determined specification.

Work item	Mar	Apr	May	Jun	Jul	Aug	Sep
(a) FTM draft (Guad)	X						
(b) FTM (all province)		X			X	X	X
(c) HCV draft (Guad)	X	X					
(d) Watershed draft (Guad)	X	X					
(e) HCV (all province)			X	X			
(f) Watershed and FMU (all province)			X				
(g)FMU attribute			X	X			
(g) FCM draft (Guad)				X			
(h) FCM (all province)					X	X	X

6. Planned Deliverables

(1) Dataset of each maps (FTM, HCV, Watershed, FMU, FCM)

(2) Meeting minutes of discussion at Task Force.

(3) Data Specification Description documents

Multiple Scale Watershed and Forest Management Unit

Japan Asia Group
KOKUSAI KOGYO CO., LTD.

Geospatial Information Group,
International Consulting Department,
KOKUSAI KOGYO Co., Ltd.
2 Rokubancho, Chiyoda-ku, Tokyo, 102-0085 JP

Objectives of the forest management

Create a watershed of Each province

Example:

- Reforestation(tree cover loss)
- Water quality
  (upstream of intakes, distance from streamline)
- Conservation biodiversity(Highland)
- Timber production (multi-criteria)
  (elevation, slope and distance from road)

Watershed and forest Management Unit

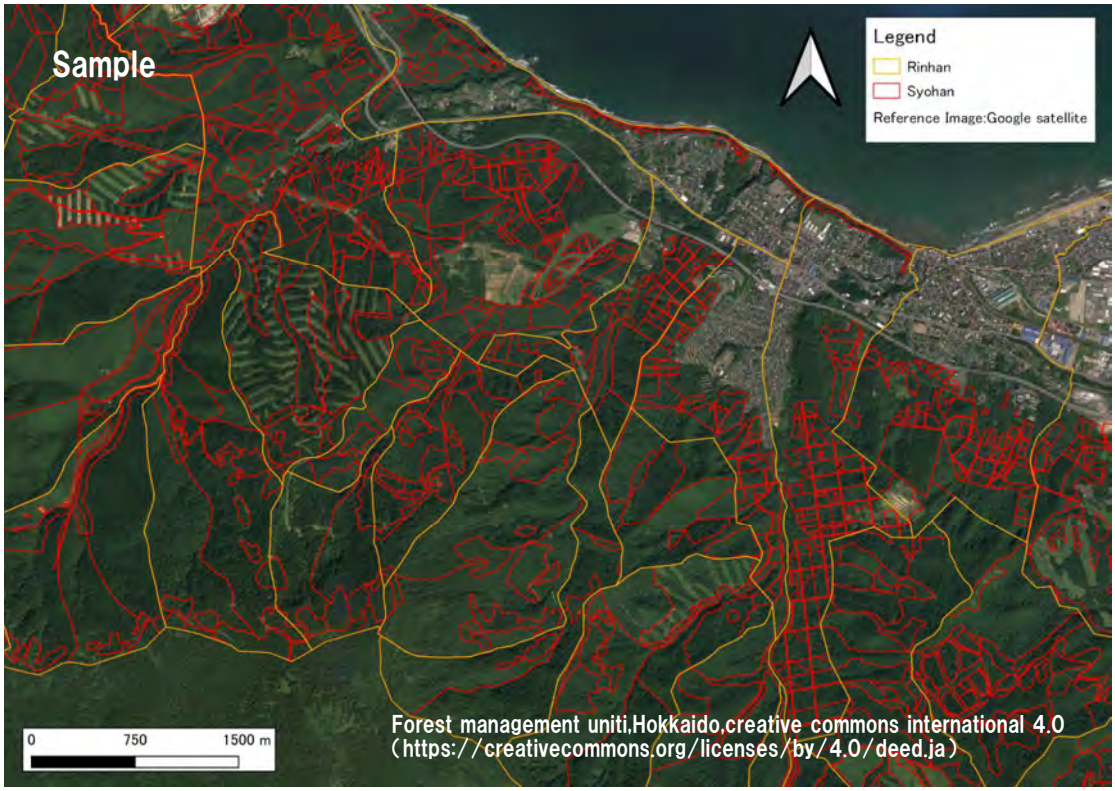
Forest Management Unit:

- A minimum unit of forest at “not too small” and “not too big” scale for forest monitoring.
- The FMU is used for monitoring and recording changes of forest.
- The small size of the watershed makes up the FMU.

Consideration of Management Scale

Consideration of Management Scale

Forest management unit in Japan



Forest management unit in Japan

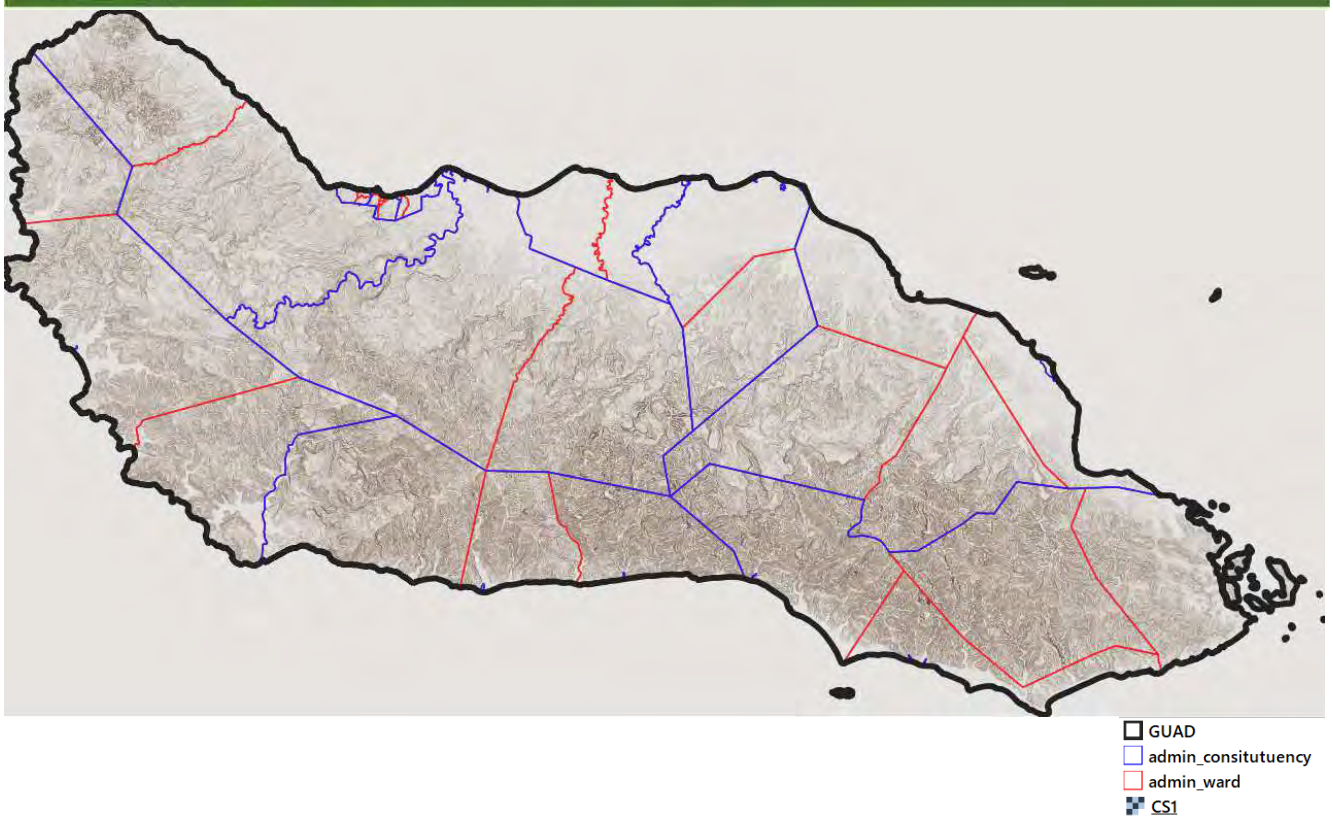
Mainly two levels of management unit.
Rinhan: Management unit (Group of Syohan based on topography, Boundary of municipality etc. around 50 ha.)
Syohan: Operation unit (Based on species, age etc. It is sometimes divided into some smaller group for detail management.)

**Syohan sometimes is divided to manage detail.
***Syohan sometimes is merged if there are too much syohan in one Rinhan.

Forest management unit in Japan

Type	Range	Level
Larger basin (Local Forest Management Plan)	10,000-20,000ha	5000-10,000ha
Rinhan	100-200ha	100ha
Syohan Group	5-10ha	5ha
Syohan	0.5-1ha	0.5-1ha

Administrative Boundary Scale in SI



Administrative Boundary Scale in SI

	Constituency	Ward
Ave.	48,814ha	15,857ha
Max.	97,810ha	54,410ha
Min.	623ha	10ha

Watershed Scale Levels

Consideration of Scale Levels

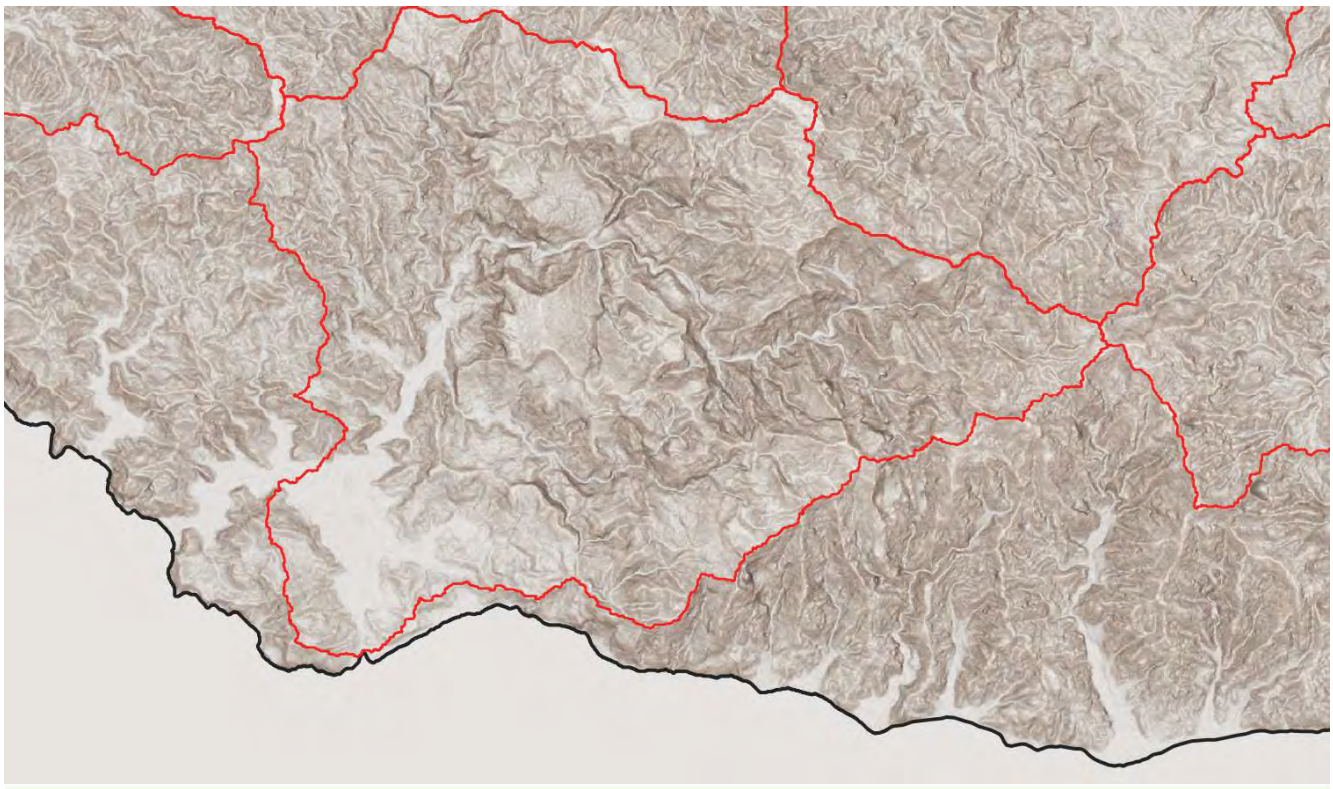
Level	Type	Type	Range	In Japan
Level 0	National	Larger Basin	5,000-25,000ha	Larger Basin
Level 1	Regional	Smaller Basin	100-200ha	Rinhan
		Watershed	50ha	
Level 2	Provincial	Watershed	25ha	
Level 3	District	Catchment	5-10ha	Syohan group
			0.5-1ha	Syohan

Watershed Scale Levels

15,000ha Level

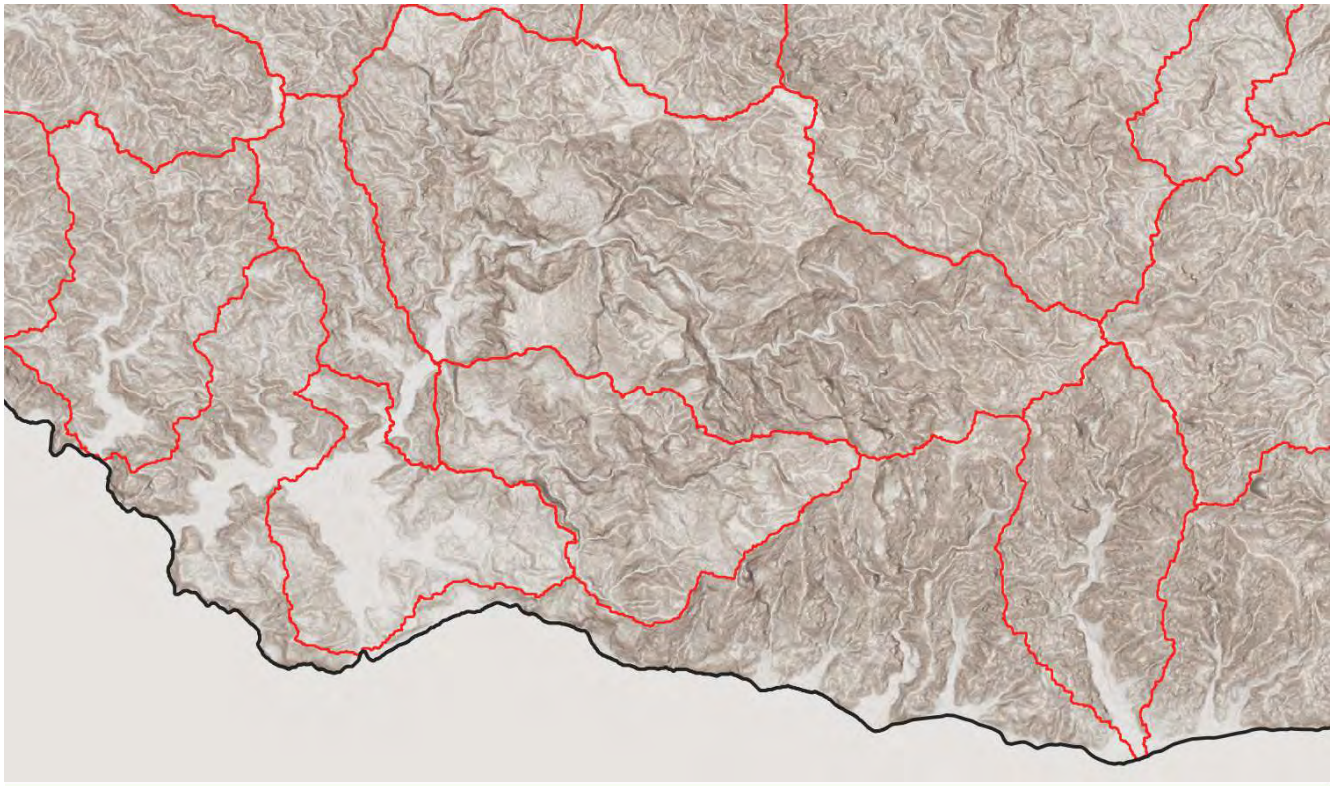
Watershed Scale Levels

10,000ha Level



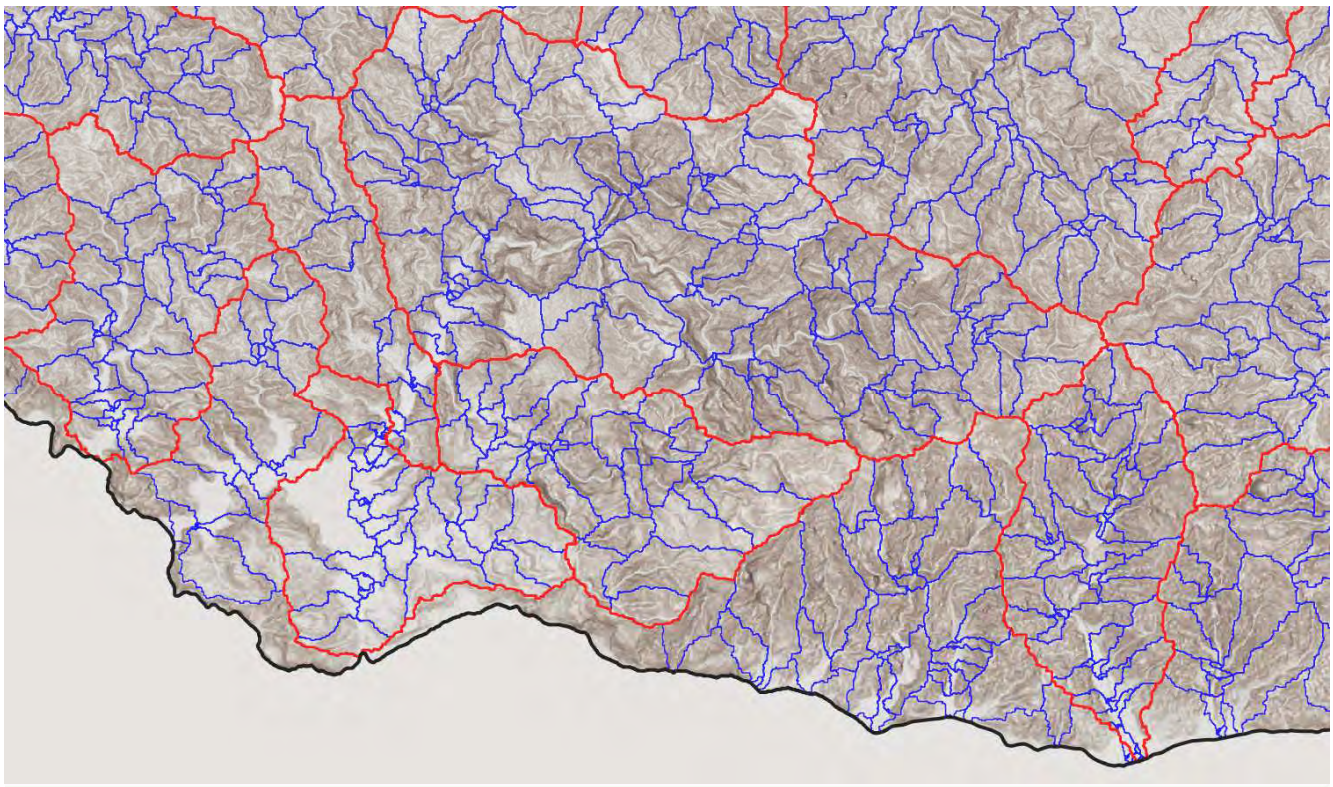
Watershed Scale Levels

5,000ha Level



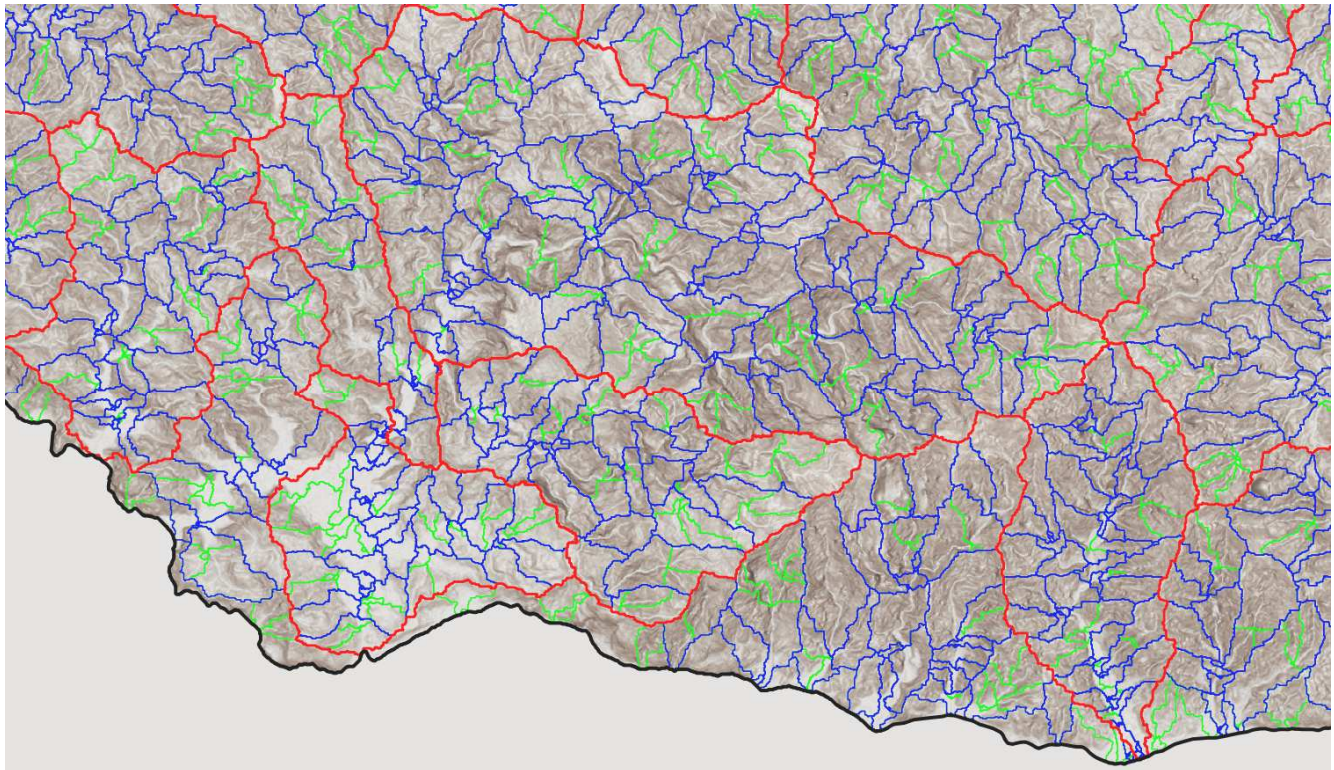
Watershed Scale Levels

100ha Level



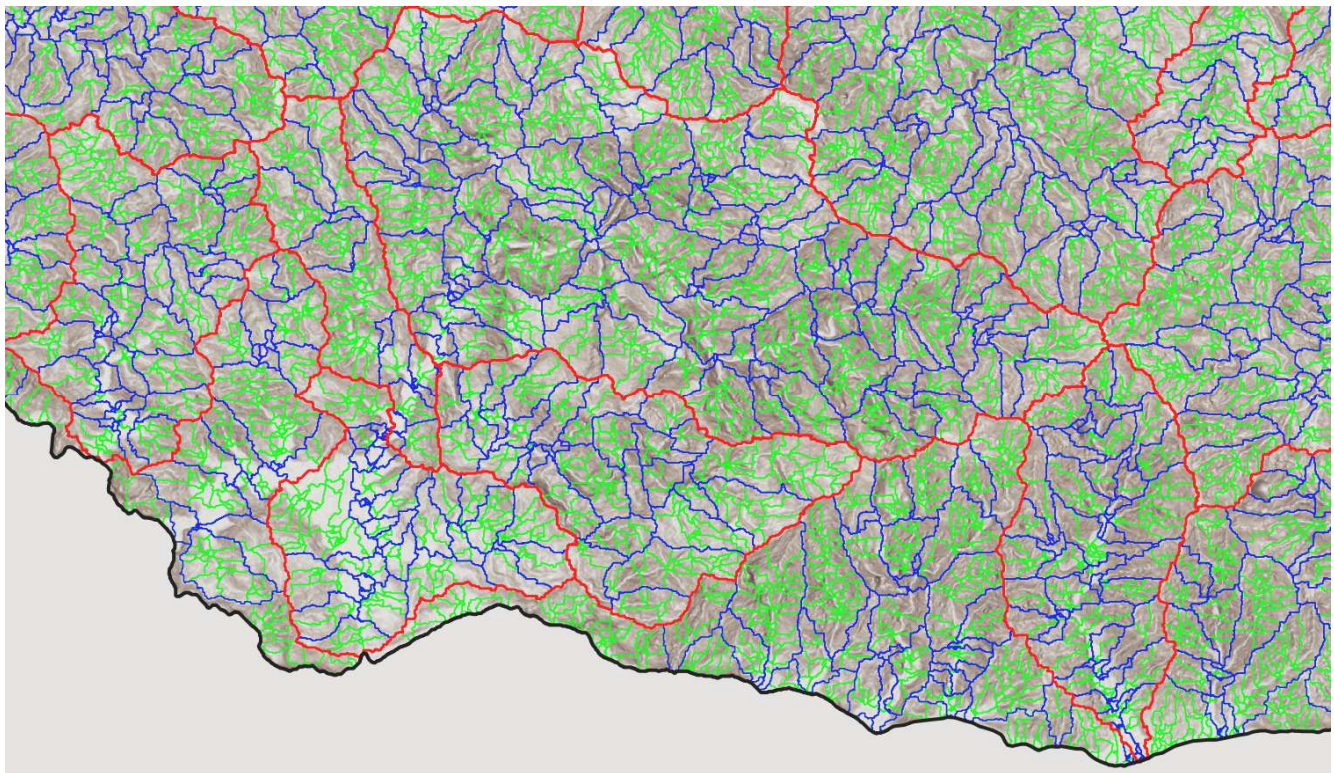
Watershed Scale Levels

50ha Level



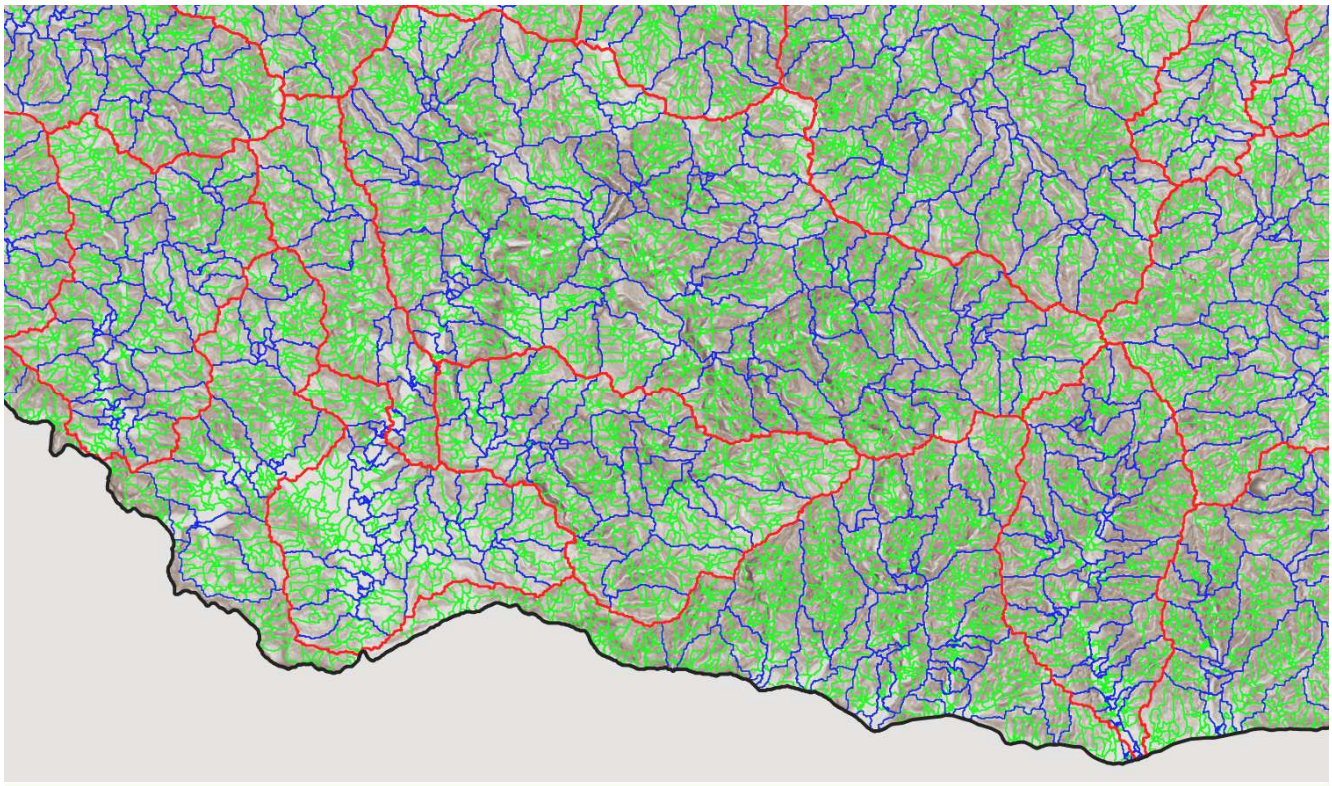
Watershed Scale Levels

10ha Level



Watershed Scale Levels

5ha Level

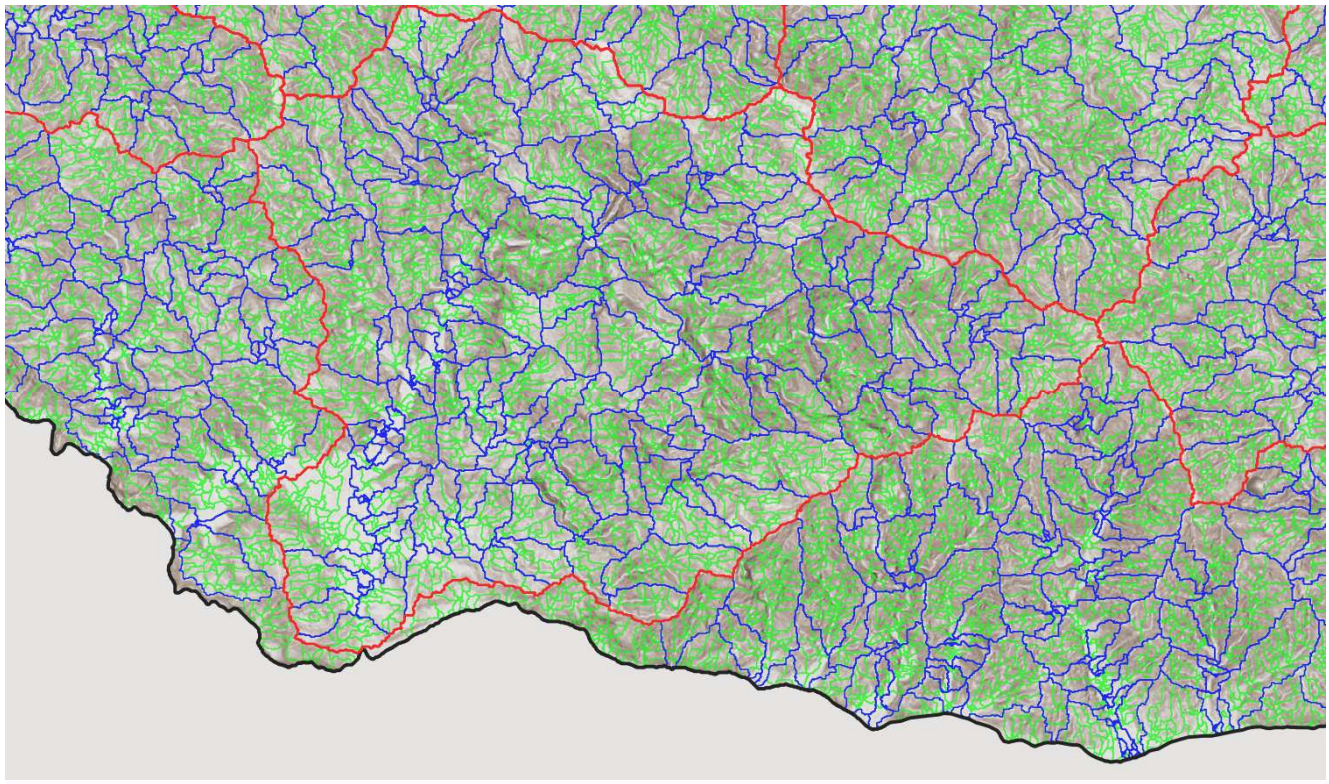


Watershed Scale Levels

Watershed(draft)

Multi-Scale Watershed

Draft1 : 10,000ha to 100ha to 5ha Levels



Watershed Scale Levels

Scale Levels for SI (draft1)

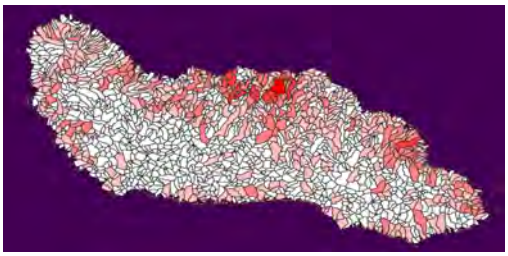
Level	Jurisdiction	Type	Range	Note
Level 1	National	Basin	10,000ha	Larger basin
Level 2	Regional	Watershed	100ha	Rinhan
Level 3	District	Catchment	5ha	Shohan

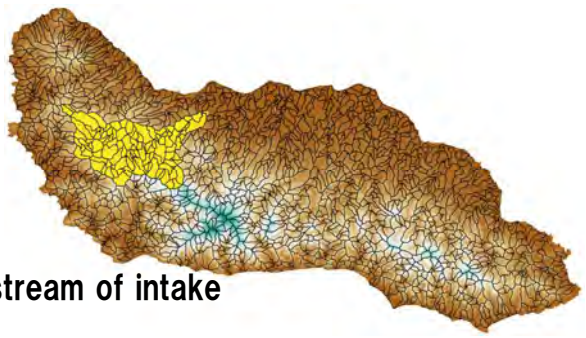
- Level 3 to be FMU

FMU(draft)

- Which information FMU need to have?

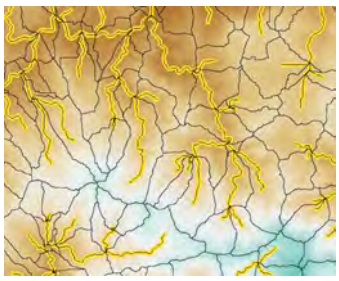
Tree cover loss



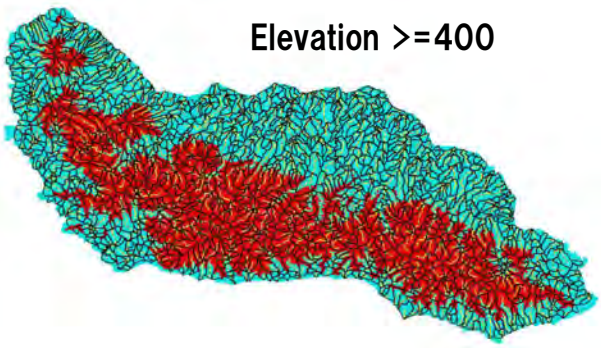


Upstream of intake

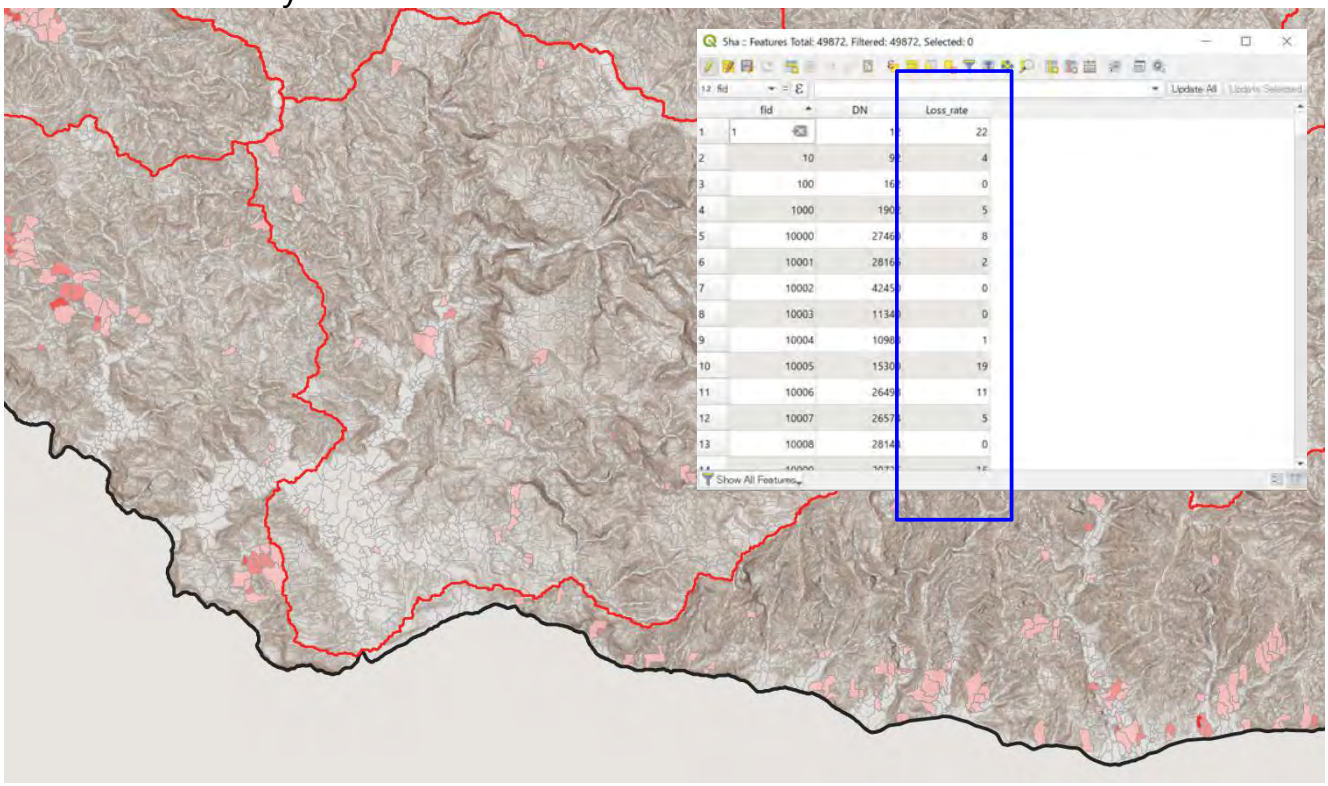
Distance from streamline



Elevation >=400



- FMU + Loss year→Put information on Attribute



Forest Management Unit

FMU attribute (draft) 1

No	Item	Source dataset
1	Regional code (province, ward)	Base Map, Ministry of Land
2	ID code (3 watershed levels)	Original
3	Area (ha)	Original
4	Forest cover Information code	Forest Type Map
5	(Ecological Class)	Forest Type Map
6	(Canopy condition)	Forest Type Map
7	(Crown Size)	Forest Type Map
8	Loss area (ha)	Hansen Lossyear
9	Loss ratio (%)	Hansen Lossyear

FMU attribute (draft) 2

No	Item	Source dataset
10	Gain area (ha)	Hansen Gain
11	Water sum (ha)	Hansen datamask
12	Elevation (m, area over 400m)	SRTM30
13	Slope (degree, area over 30 degrees)	SRTM30
14	Aspect (direction)	SRTM30
15	Treecover2000 (ha)	Hansen treecover
16	Distance from stream line	(watercourse, Base Map)
17	Distance from major road	(road, Base Map)
18	Volume (m3)	To be determined

Forest Management Unit

FMU code:
FMU code is comprised of Basin code, Watershed code and Catchment Code

Level	Spec.	Description	Eg
Basin	Top provincial initial and double digits number	Guadalcanal Number 1	G01
Watershed	Three digits #	#1 in Basin G01	001
Catchment	Five digits #	#1 in Baisn G01	00001
FMU code		Combination	G01-001-00001

Sample Attribute

ID	Ward	Basin Code	Watershed Code	Catchment Code	FMU code	Area	
1	606	G01	001	00001	G01-001-00001	5	
2	606	G01	001	00002	G01-001-00002	7	
3							

HCV forest Mapping in Solomon Islands

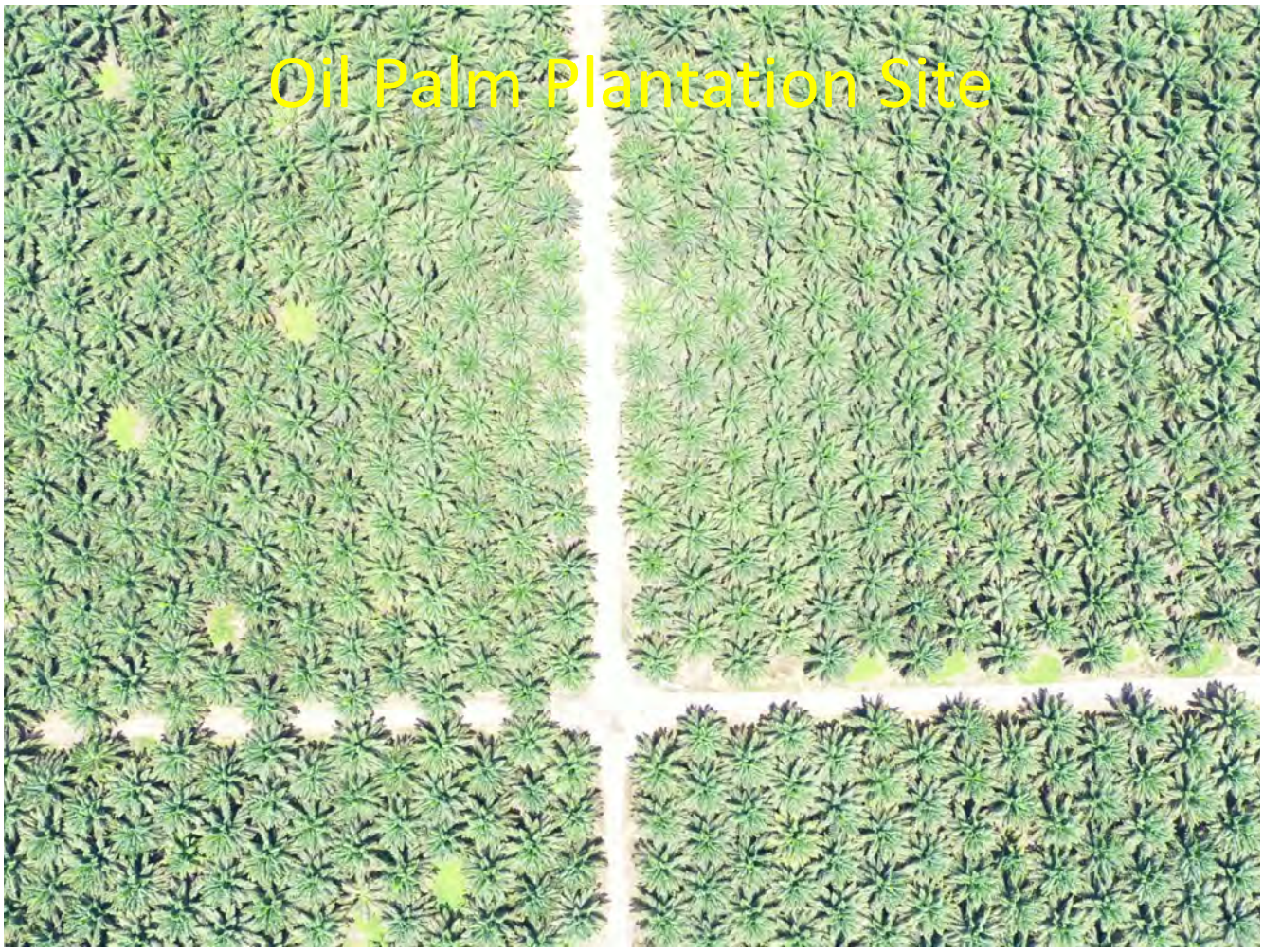
Japan Asia Group
国際航業株式会社

introduction

- What is RSPO

https://rspo.org/

https://rspo.org/news-and-events/news/what-you-need-to-know-about-the-hcv-assessor-licensing-scheme


Oil Palm Plantation Site


Oil Palm Plantation Site

Palm Fruit

Japan Asia Group
国際航業株式会社

Buffer Zone


HCV site


HCV site

Six HCVs

An HCV (High Conservation Value) is a biological, ecological, social or cultural value of outstanding significance or critical importance.

HCV 1: Species diversity

HCV 2: Landscape-level ecosystems and mosaics

HCV 3: Ecosystems and habitats

HCV 4: Ecosystem services

HCV 5: Community needs

HCV 6: Cultural values

HCV approach

1. Identification

1.Interpreting what the six HCV definitions mean in the local or national context
2.Deciding which HCVs are present in the area of interest or which HCVs in the wider landscape may be negatively impacted by project activities.

Stakeholder consultation
Analysis of existing information
Collection of additional information

Including
Spatial infromation

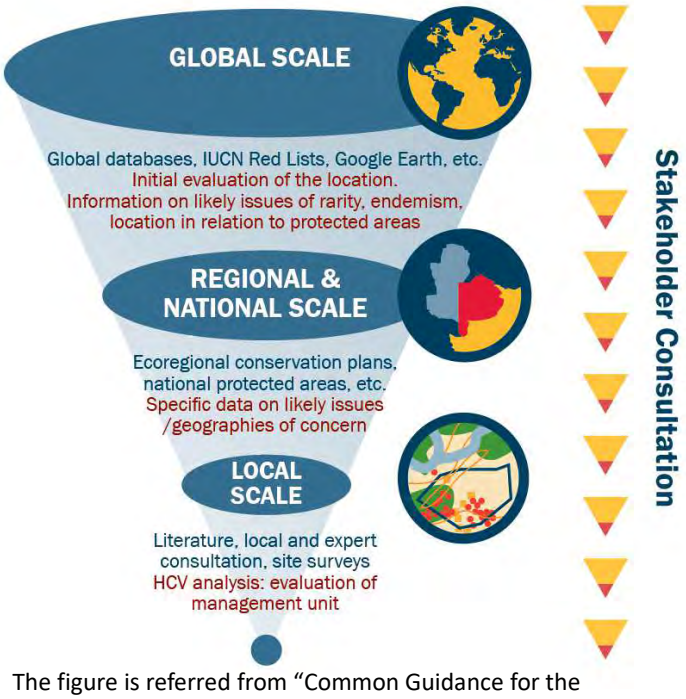
2. Management

Appropriate management decisions must be taken and implemented in order to maintain or enhance an HCV.

3. Monitoring

A monitoring regime should be established to ensure that management practices effectively maintain and/or enhance the HCVs over time.

Level of information



The figure is referred from “Common Guidance for the HIGH CONSERVATION VALUES”

The HCV assessment will ultimately be conducted at the site scale, requiring field survey data.

Global and national scale assessment is conducted as a scoping study prior to continuing with the full HCV assessment.

Access to national information is a key to identify specific country-level values saving money and resources for not carrying out a full HCV assessment for this area.

HCV 1: Species diversity

Concentrations of biological diversity including endemic species, and rare, threatened or endangered (RTE) species that are significant at global, regional or national levels.

The following would qualify as HCV 1:

- A high overall species richness, diversity or uniqueness.
- Populations of multiple endemic or RTE species.
- Important populations or a great abundance of individual endemic or RTE species.
- Year-round (e.g. key habitat for a specific species) or,
- Seasonally, including migratory corridors, sites for breeding, roosting or hibernation, or refuges from disturbance.
- Small populations of individual endemic or RTE species.
- Sites with significant RTE species richness, or populations of priority species.
- Particularly important genetic variants, subspecies or varieties.

Indicators:

- The presence of a recognized biodiversity priority area
- A designation by national authorities, or by reputable conservation organizations
- The presence of natural habitat in good condition

HCV 2: Landscape-level ecosystems and mosaics

Large landscape-level ecosystems and ecosystem mosaics, that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

The following would qualify as HCV 2:

- Large areas (e.g. could be greater than 50,000 ha, but this is not a rule) that are relatively far from human settlement, roads or other access.
- Smaller areas that provide key landscape functions such as connectivity and buffering. These smaller areas are only considered HCV 2 if they have a role in maintaining larger areas in the wider landscape.
- Large areas that are more natural and intact than most other such areas and which provide habitats of top predators or species with large range requirements.

Indicators:

- Existing landscape-level designations (e.g. Ramsar sites, etc.)
- Areas with low levels of overall disturbance and high connectivity
- Large, undisturbed landscape-level forests comes from the World Resources Institute
- Other forests matching criteria (with an area of at least 500 km^2 etc.)

HCV 3: Ecosystems and habitats

Rare, threatened, or endangered ecosystems, habitats or refugia.

The following ecosystems would qualify as HCV 3:

- Naturally rare because they depend on highly localised soil types, locations, hydrology or other climatic or physical features.
- Anthropogenically rare, because the extent of the ecosystem has been greatly reduced by human activities compared to their historic extent.
- Threatened or endangered (e.g. rapidly declining) due to current or proposed operations.
- Classified as threatened in national or international systems.

Indicators:

- In regions where many natural ecosystems or habitats have been eliminated, and others have been heavily impacted by development, remaining natural ecosystems of reasonable quality are likely to be HCV 3.
- Where ecosystem proxies indicate the presence of RTE ecosystems, even if these are inaccessible or have not been confirmed on the ground.

HCV 4 Ecosystem services

Basic ecosystem services in critical situations including protection of water catchments and control of erosion of vulnerable soils and slopes.

The following ecosystem (services) would qualify as HCV 4:

- Managing extreme flow events
- Maintaining downstream flow regimes
- Maintaining water quality characteristics
- Fire prevention and protection
- Protection of vulnerable soils, aquifers and fisheries
- Provision of clean water
- Protection against winds, and the regulation of humidity, rainfall etc.
- Pollination services
- Ecosystems which provide a protective barrier against destructive fires that could threaten communities, infrastructure or other HCVs.
- Groundwater recharge zones
- Grasslands providing buffering against flooding or desertification

Indicators:

- Remote and/or poor rural areas
- Where there is naturally low soil fertility
- Upstream of extensive or important wetlands, fish nurseries and spawning grounds, or sensitive coastal
- Upstream of municipal water sources
- Steep areas, or areas of high rainfall
- Arid or dryland areas particularly susceptible to erosion and desertification

HCV 5 : Community needs

Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for example for livelihoods, health, nutrition, water), identified through engagement with these communities or indigenous peoples.

The following would qualify as HCV 5:

- Hunting and trapping
- Fuel for household cooking, lighting and heating
- NTFPs such as nuts, berries, mushrooms medicinal plants, rattan
- Fish other freshwater species relied on by local communities
- Building materials
- Fodder for livestock and seasonal grazing
- Water sources necessary for drinking water and sanitation
- Items which are bartered in exchange for other essential goods, or sold for cash

Indicators:

- Access to health centres or hospitals is difficult,
- There is little or no water and electricity infrastructure
- People have a low capacity to accumulate wealth (living “day to day”)
- Farming and livestock raising are done on a small or subsistence scale
- Indigenous hunter-gatherers are present
- etc.

HCV 6: Cultural values

Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.

The following would qualify as HCV 6:

- Sites recognised as having high cultural value within national policy and legislation.
- Sites with official designation by national government and/or an international agency like UNESCO.
- Sites with recognised and important historical or cultural values, even if they remain unprotected by legislation.
- Religious or sacred sites, burial grounds or sites at which traditional ceremonies take place that have importance to local or indigenous people.
- Plant or animal resources with totemic values or used in traditional ceremonies.

Indicators:

- No description in the guidance

Availability of spatial information for HCV identification

	Global (examples)	National (SI)
Biodiversity priority area	Global IUCN Red List	
Designation of authorities	World Heritage Sites	
Natural habitat	Ramsar sites	
Low levels of disturbance	Hansen loss	
High connectivity	Hansen tree-cover	
Remaining natural ecosystems	Intact Forest Landscapes	
Presence of RTE ecosystems	Global IUCN Red List	
Remote and/or poor rural areas	Open Street Maps	
Naturally low soil fertility	FAO/UNESCO Soil Map	
Important wetlands	CIFOR map	
Municipal water sources	---	
Steep areas, or areas of high rainfall	WorldClim	
Arid or dryland areas	WorldClim	
Access to health centres or hospitals	Open Street Maps	
Water and electricity infrastructure	---	---
Low capacity to accumulate wealth	---	---
Living “day to day”	---	---
Small or subsistence scale farming	---	---
Indigenous hunter-gatherers	---	---

Scoping study: HCV 1-3 probability maps

Developed for the RSPO by Proforest, Daemeter, HCV Resource Network and World Resources Institute

*Red: optional

High probability of HCV 1-3 presence

- Natural Forest Patches over 1,000 hectares (plus an additional 100m buffer)
- Protected Areas, Ramsar sites, etc. (plus a 100m buffer)
- Intact Forest Landscapes (IFL) (plus a 100m buffer)

Medium probability of HCV 1-3 presence

- 100 - 500m buffer around natural forest patches >1,000ha
- 100m - 1 km buffer around PAs
- Savanna and Savannah forest
- Mixed Veg. on Limestone, Mixed Veg. on Ultrabasic, Heath Forest & Scrub and Savanna
- Karst limestone ecosystems
- Peatlands
- 100m – 2 km buffer around IFLs
- Natural forest patches of 50-1,000 ha
- Important areas for connectivity: corridors connecting any high HCV probability areas >1,000 ha that are within 5km of each other

Low probability of HCV 1-3 presence

- All remaining areas, consisting of existing agriculture, scrubland/degraded natural areas and natural forest patches <50 ha.

HCV 1-3 probability maps for Solomon Islands

High probability of HCV 1-3 presence

- Selected Treecover2018 Patches over 1,000 hectares (plus an additional 50m buffer)
- Protected Areas (plus a 50m buffer)
- Intact Forest Landscapes (IFL) (plus a 50m buffer)

Medium probability of HCV 1-3 presence

- 50 - 500m buffer around Selected Treecover2018 patches >1,000ha
- Code 20-100 area from WetlandV2 ecosystems
- 50m - 1 km buffer around PAs
- 50m – 2 km buffer around IFLs
- Selected Treecover2018 patched of 50-1,000 ha

Low probability of HCV 1-3 presence

- All remaining areas, consisting of existing agriculture, scrubland/degraded natural areas and natural forest patches <50 ha.

HCV 1-3 probability maps for Solomon Islands

Data sources (draft)

Natural forest cover

Hansen Treecover, Hansen Lossyear

Protected Areas

World Database on Protected Areas (WDPA)

Intact Forest Landscapes

Intact forest landscapes year 2016

Swamp ecosystems

SUBTROP WetlandV2

HCV 1-3 probability maps for Solomon Islands

Sol-FIMS Task Force 2nd Meeting Concept Note

1. Objective

After the 1st meeting, Sol-FIMS has been migrated to MOFR server and revised its design. This new Sol-FIMS is introduced on 3rd June and shared its URL with MOFR Task Force members. In response to this, the system is need to be approved at this Task Force meeting to release officially. The action items which is found at the last meeting shall be also updated at the meeting.

2. Date:

26th June 2020 13:30-15:00

3. Venue:

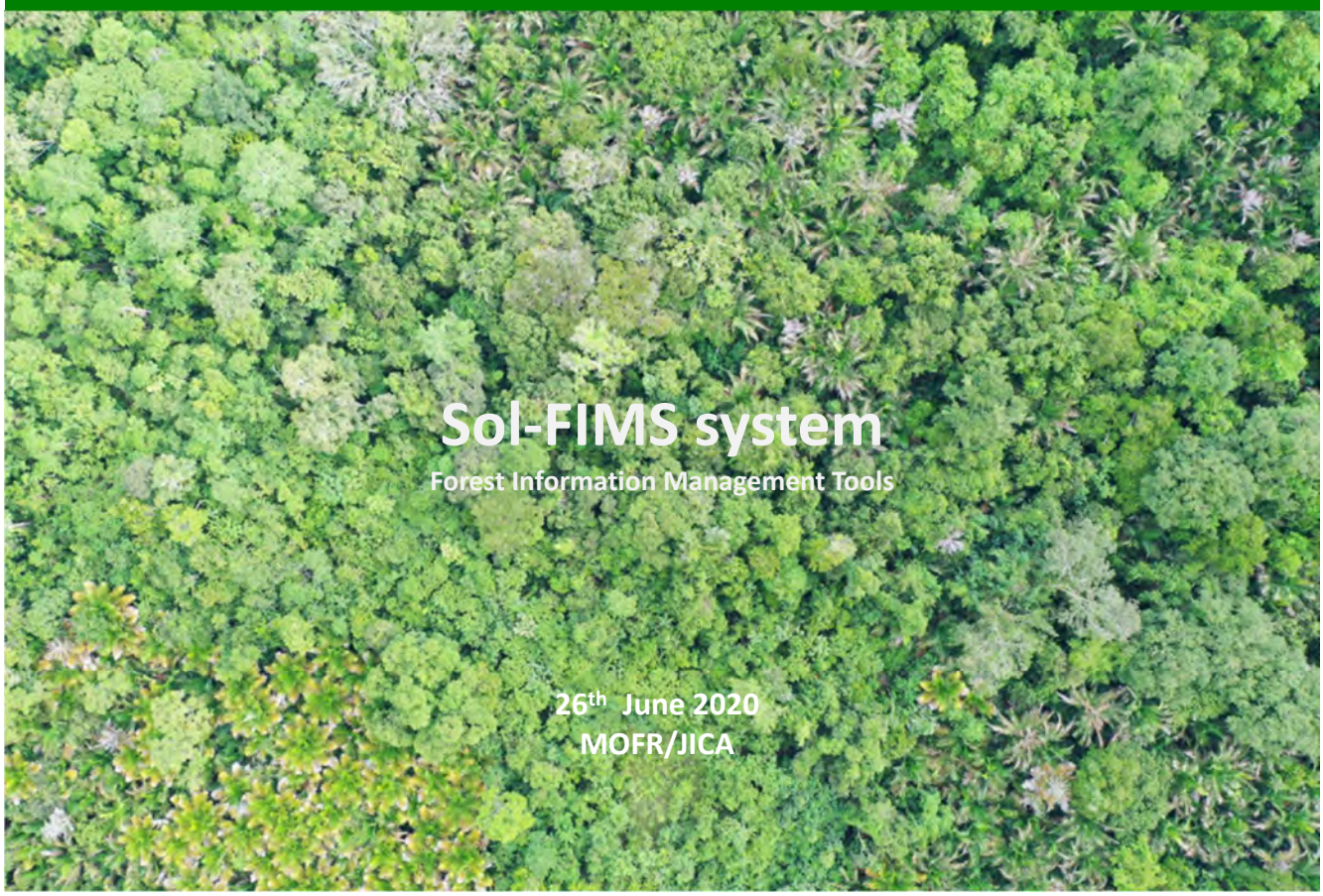
Planning Division Office （Access URL: https://meet.google.com/krf-eoii-vnz ）

4. Agenda

(1) Approval for New Sol-FIMS (Mr. Takahashi)
(2) Update action items and way forward (Mr. Solo, Mr. Takahashi)
(3) Final draft specification for Watershed and FMU attribute (Mr. Takahashi)
(4) Update the progress of mapping (Mr. Jerry)

5. Planned Deliverables

(1) Dataset of each maps (FTM, HCV, Watershed, FMU)
(2) Data Specification Description documents



Sol-FIMS system

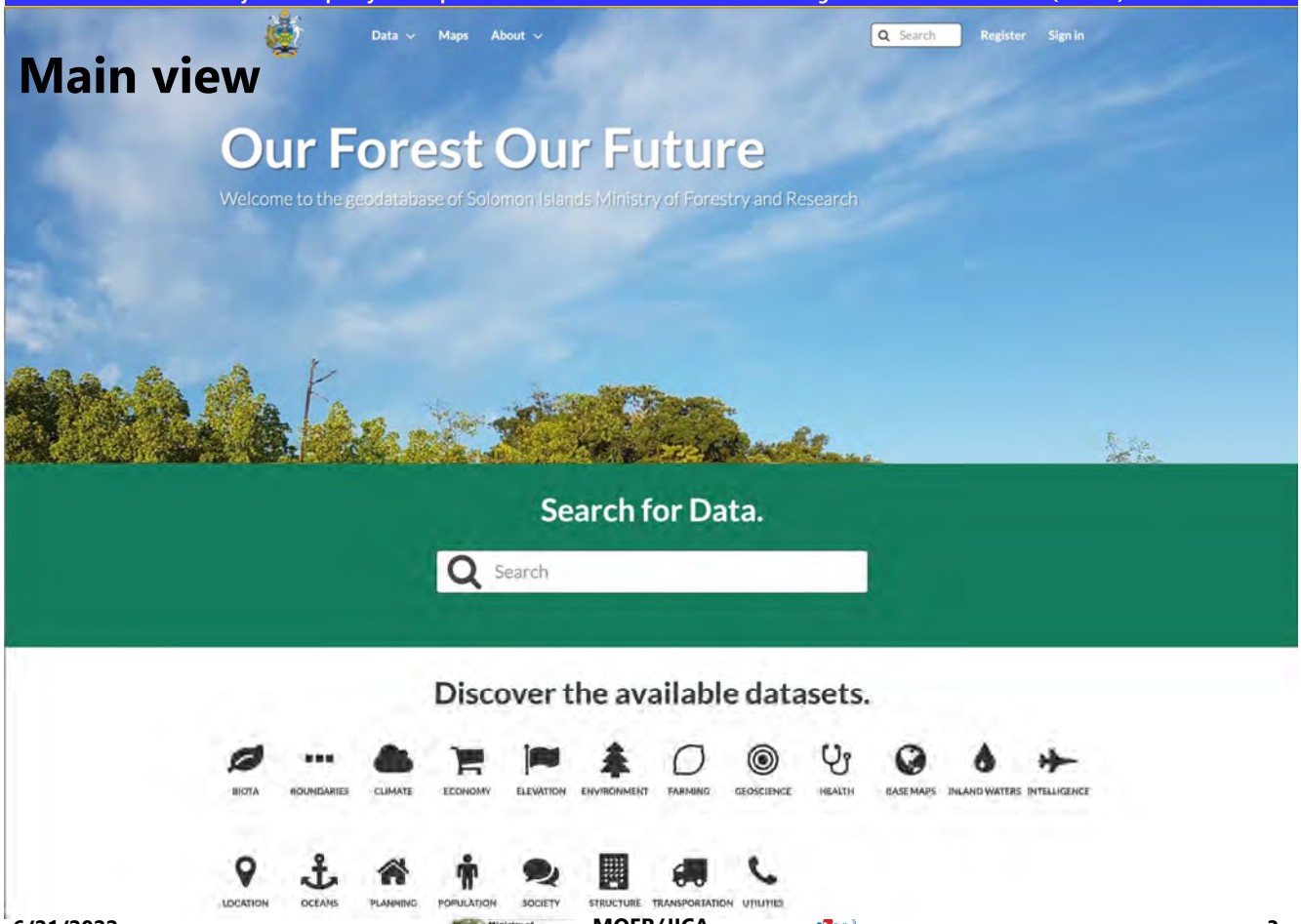
Forest Information Management Tools

26th June 2020
MOFR/JICA

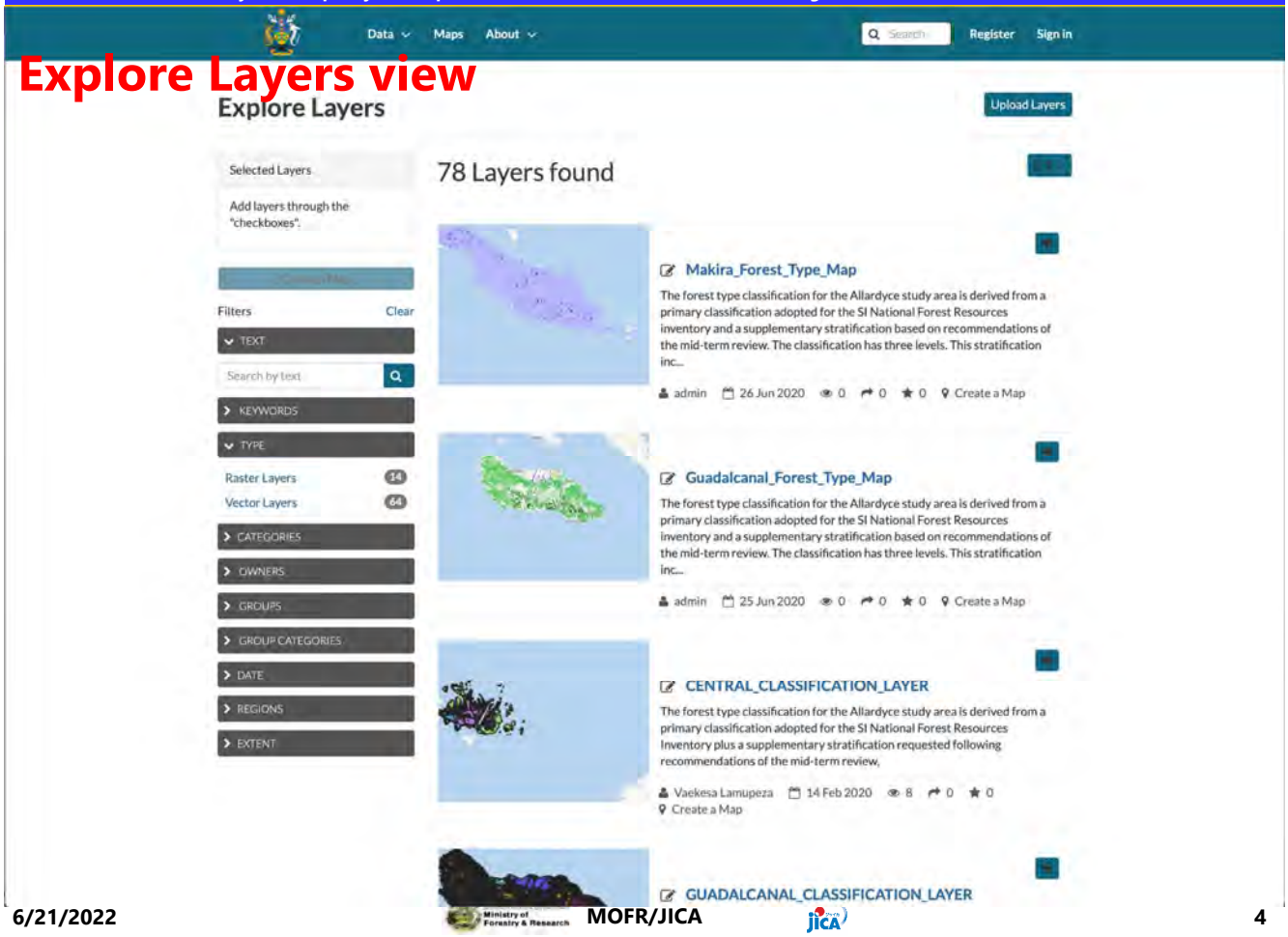
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Access the URL
http://solgeofims.mofr.gov.sb

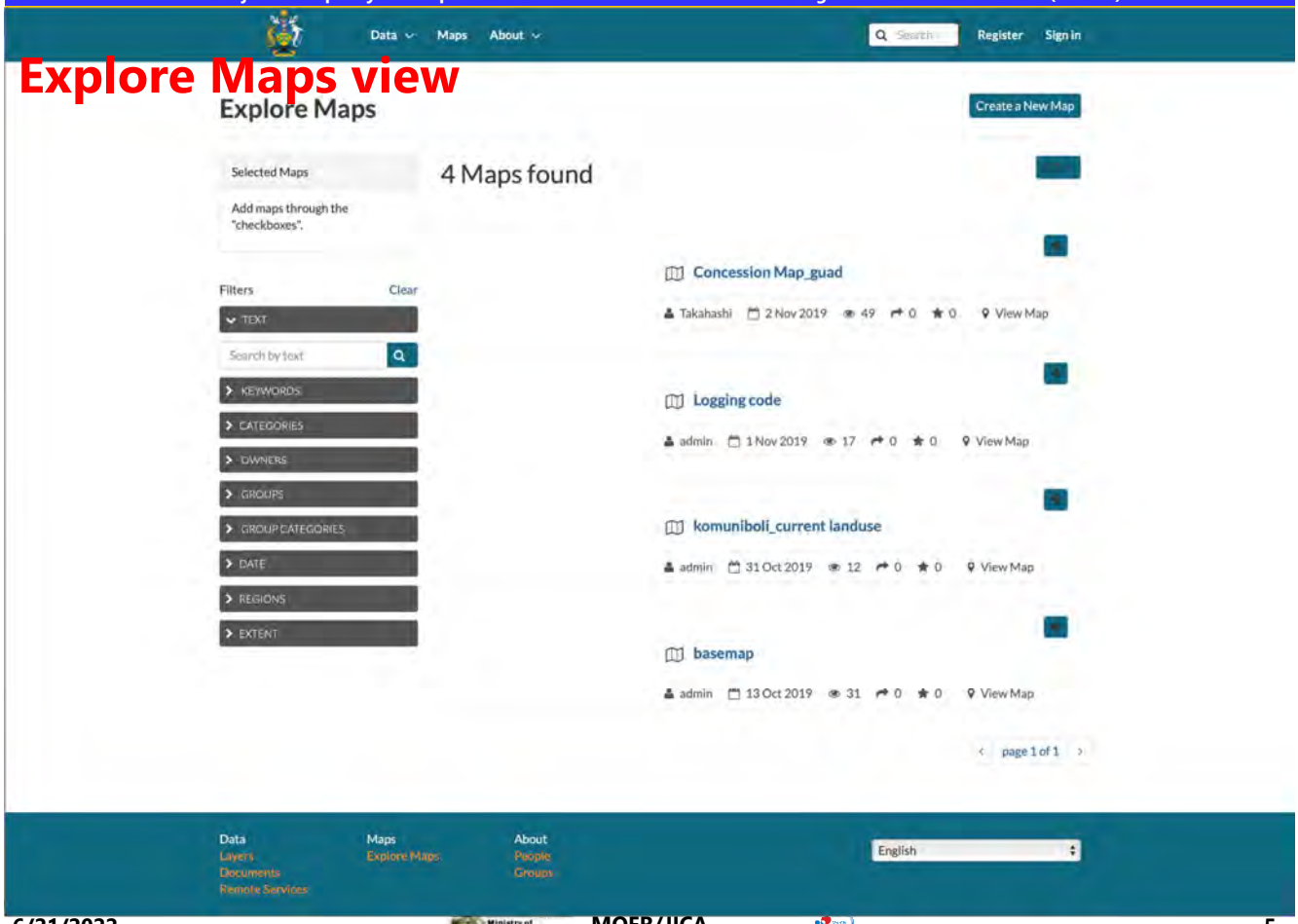
Main view



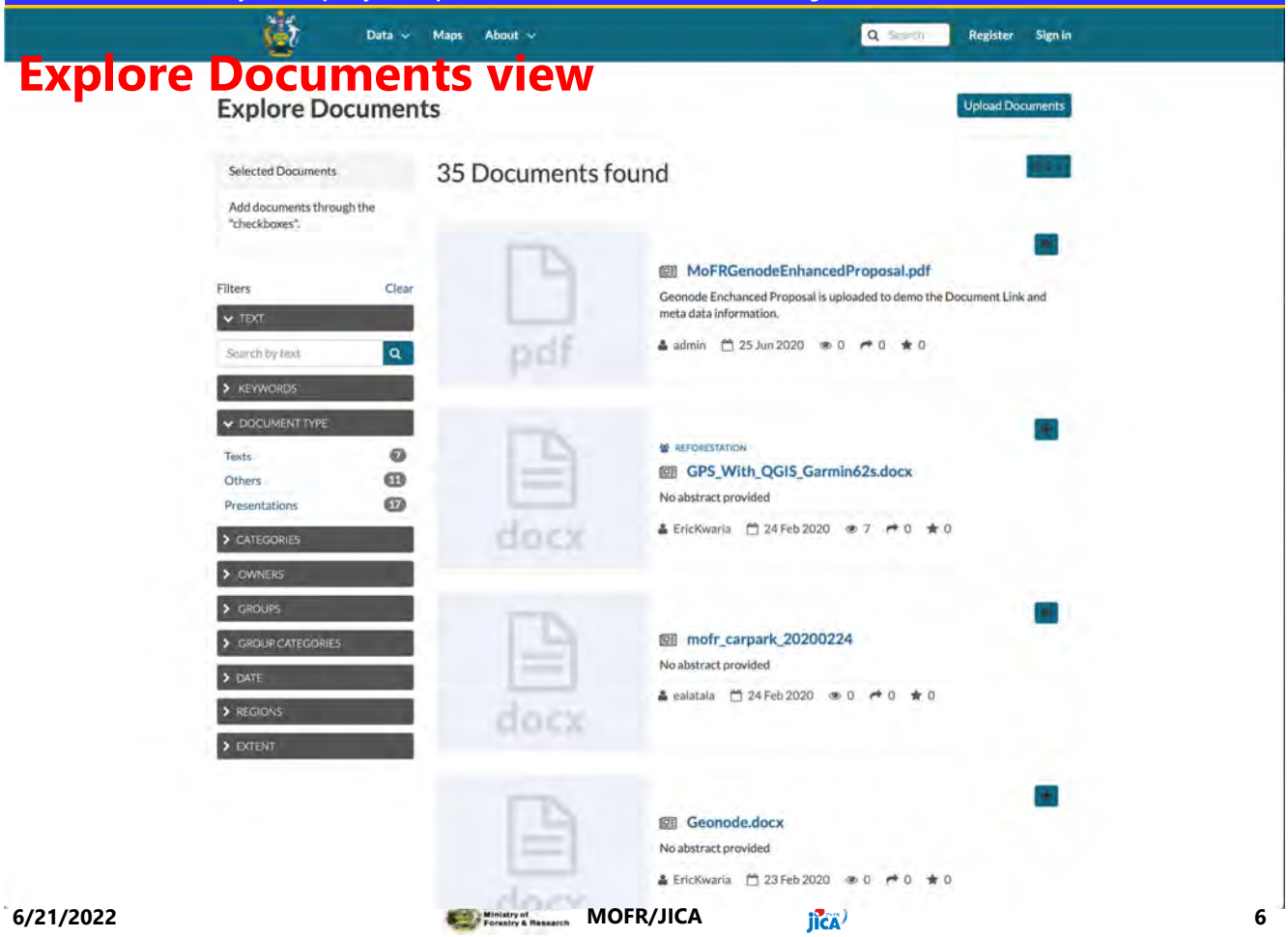
Explore Layers view



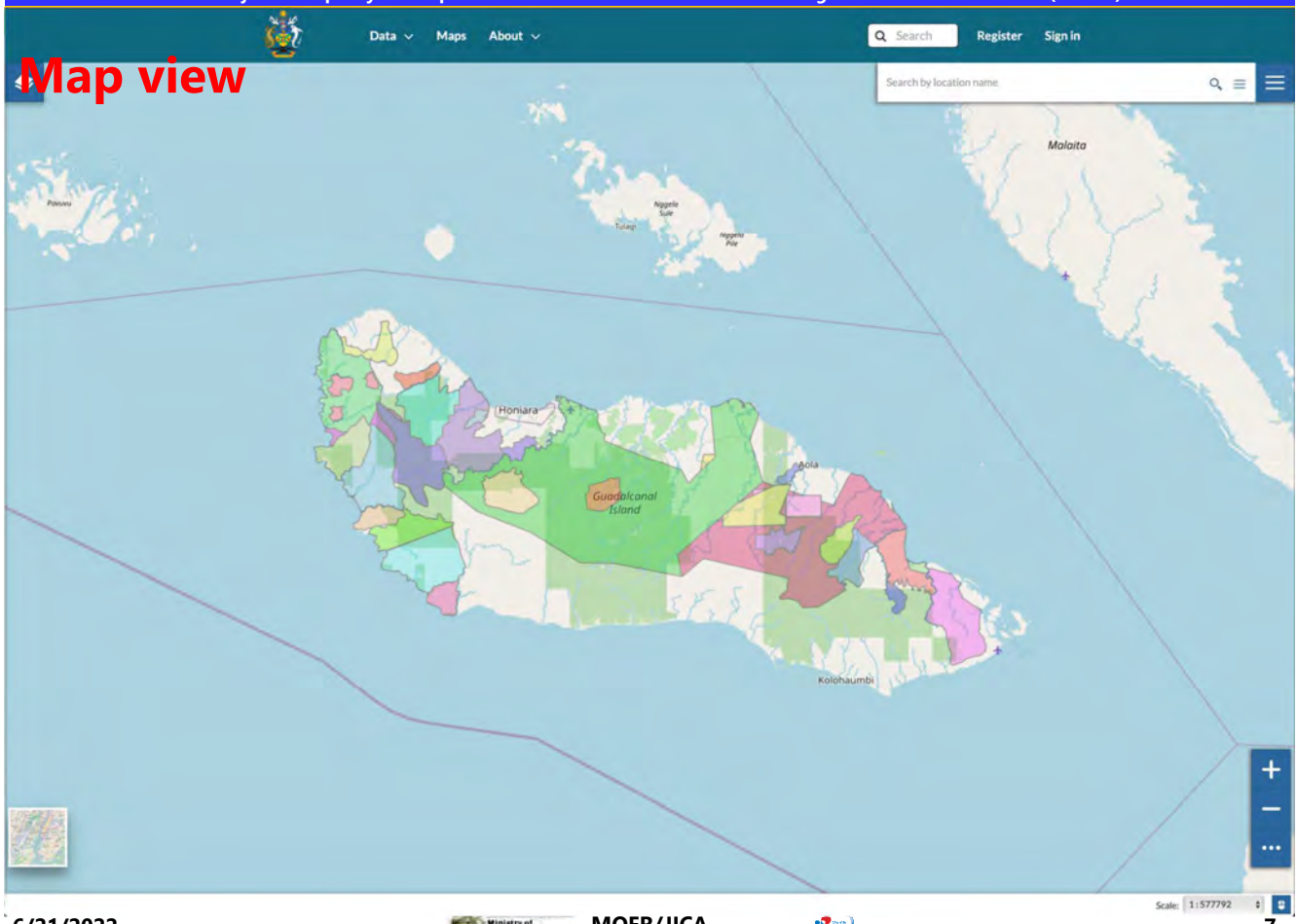
Explore Maps view



Explore Documents view

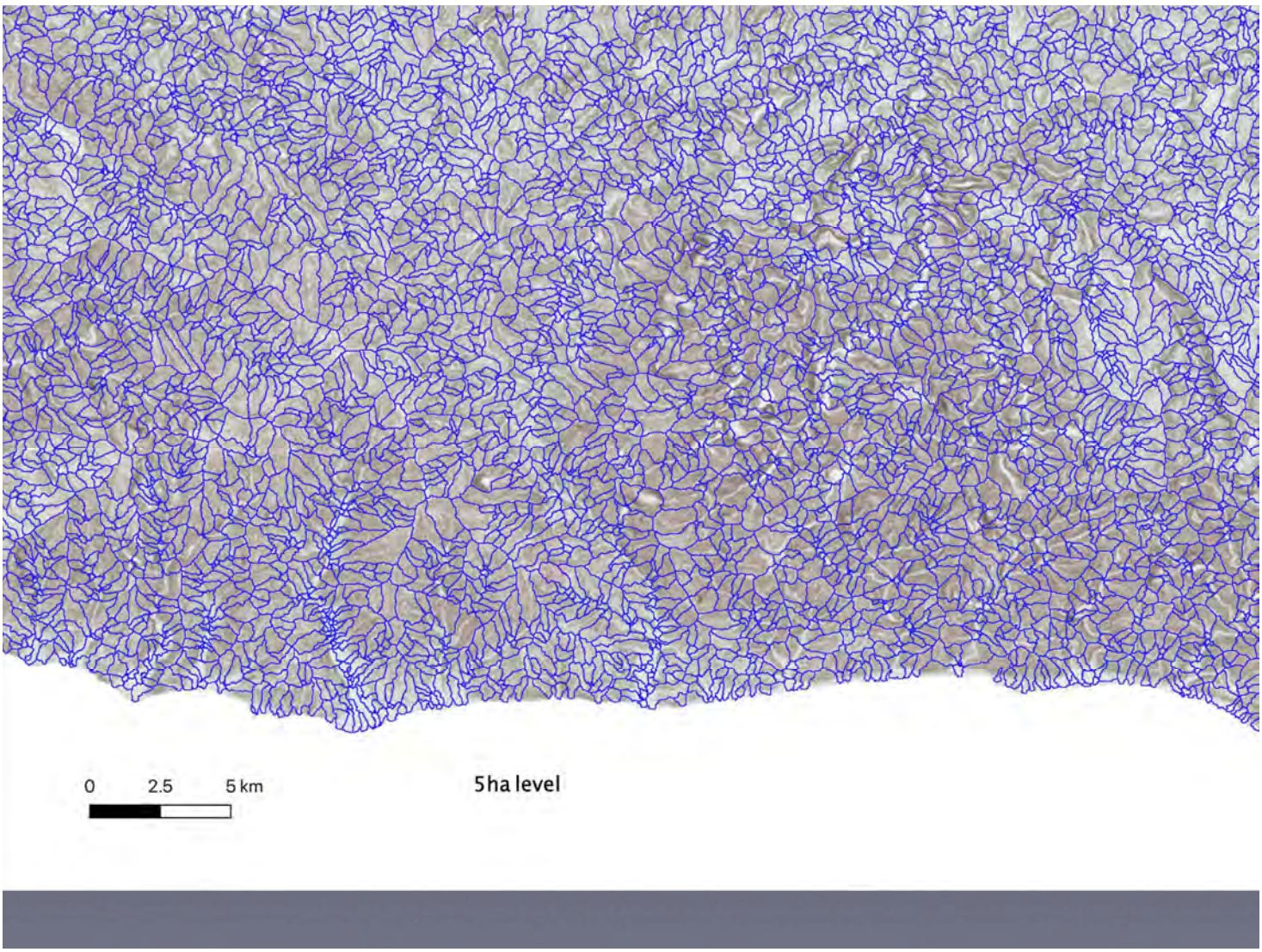


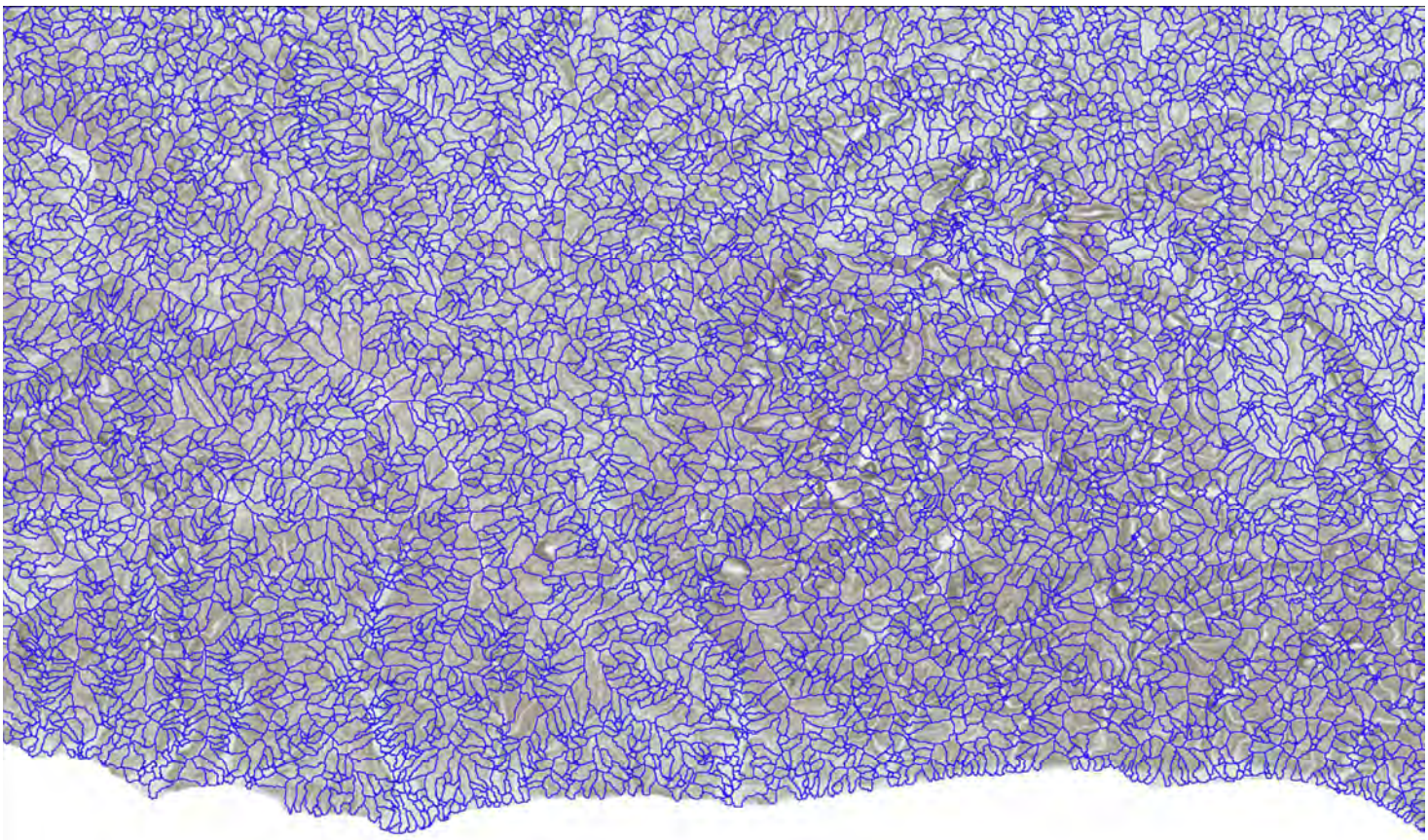
Map view


Data
Maps
About
Search
Register
Sign in
Search by location name
Malaita
Honiara
Guadalcanal Island
Kolohaumbi
Scale: 1:577792

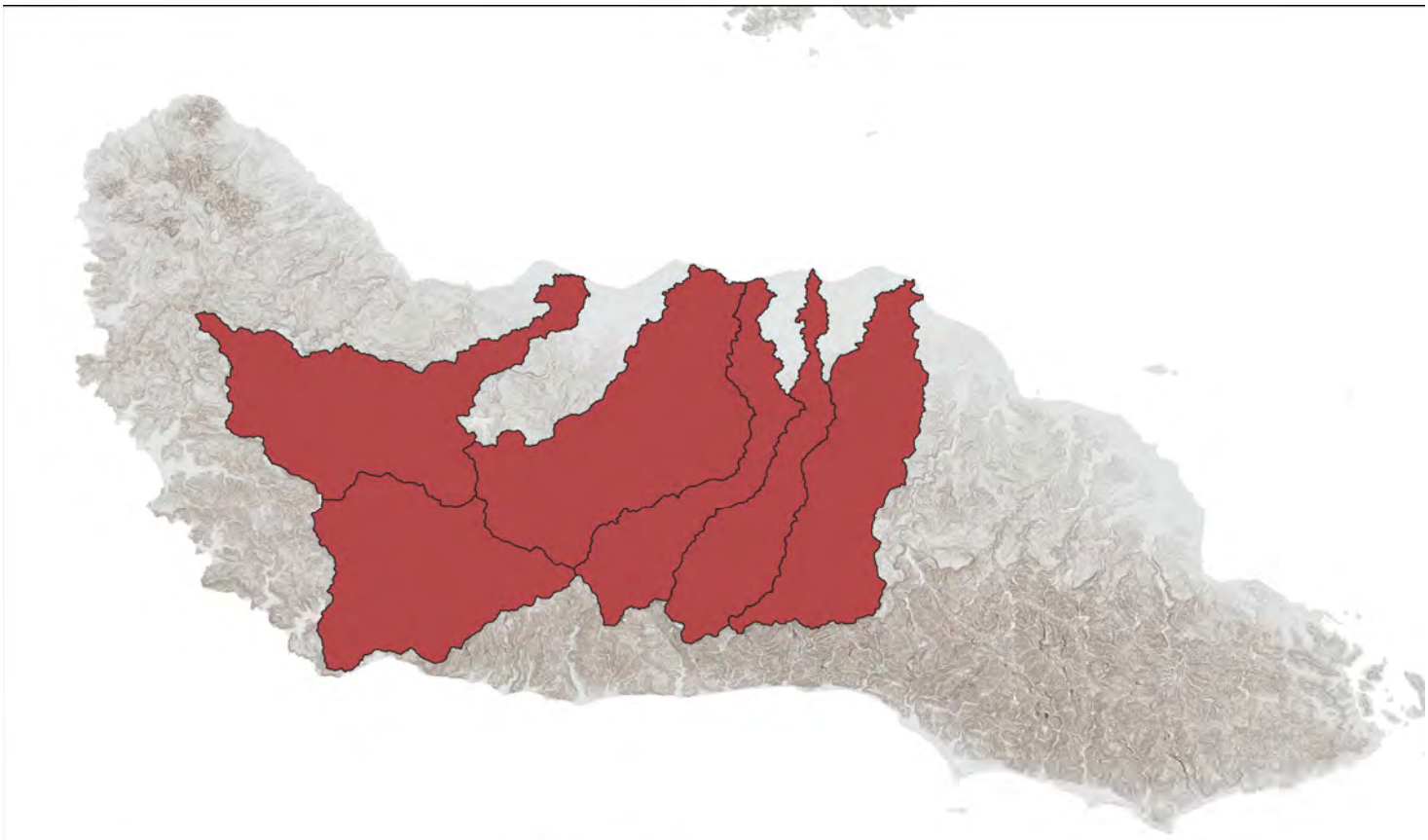
Watershed

Scaling

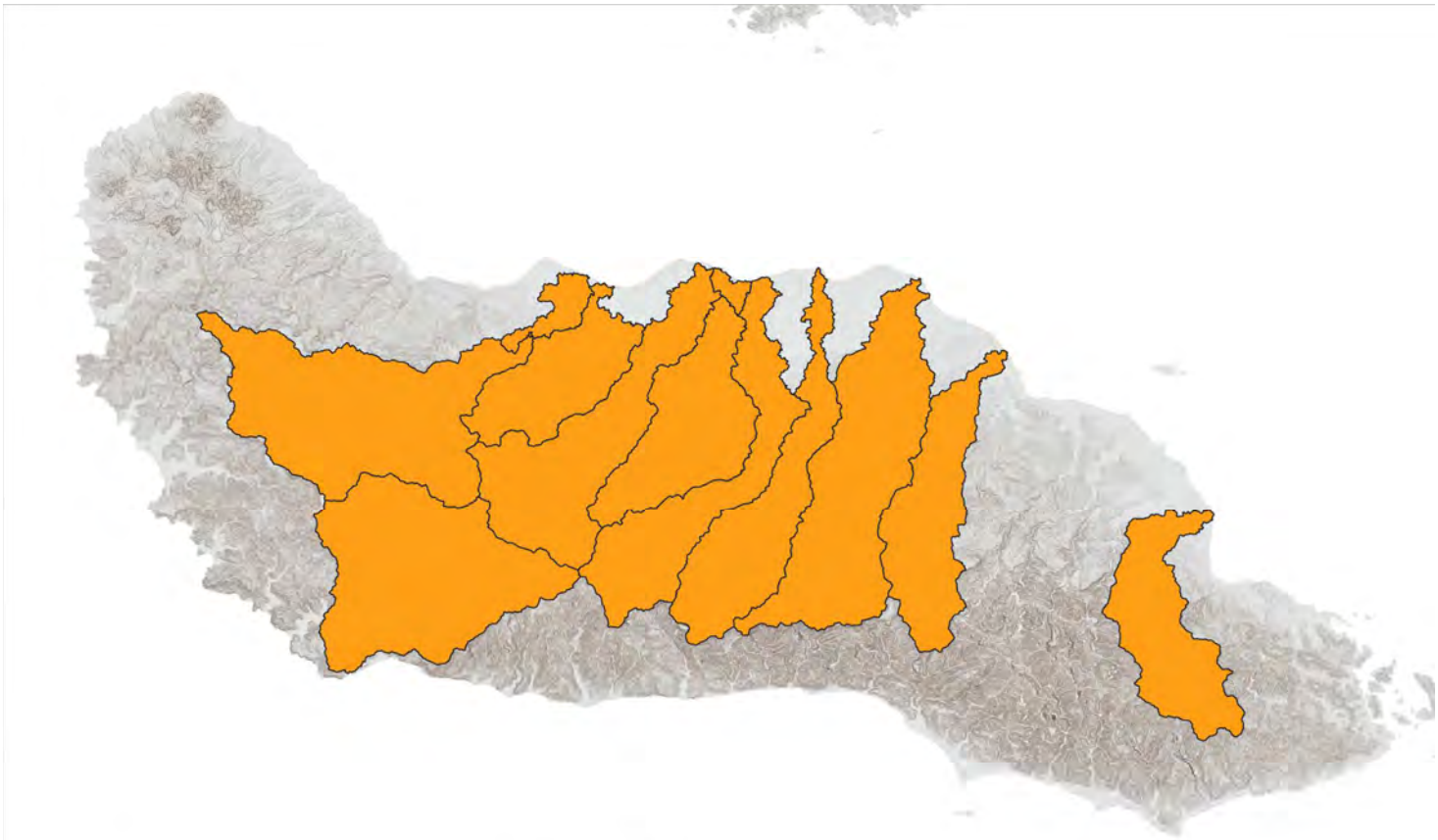




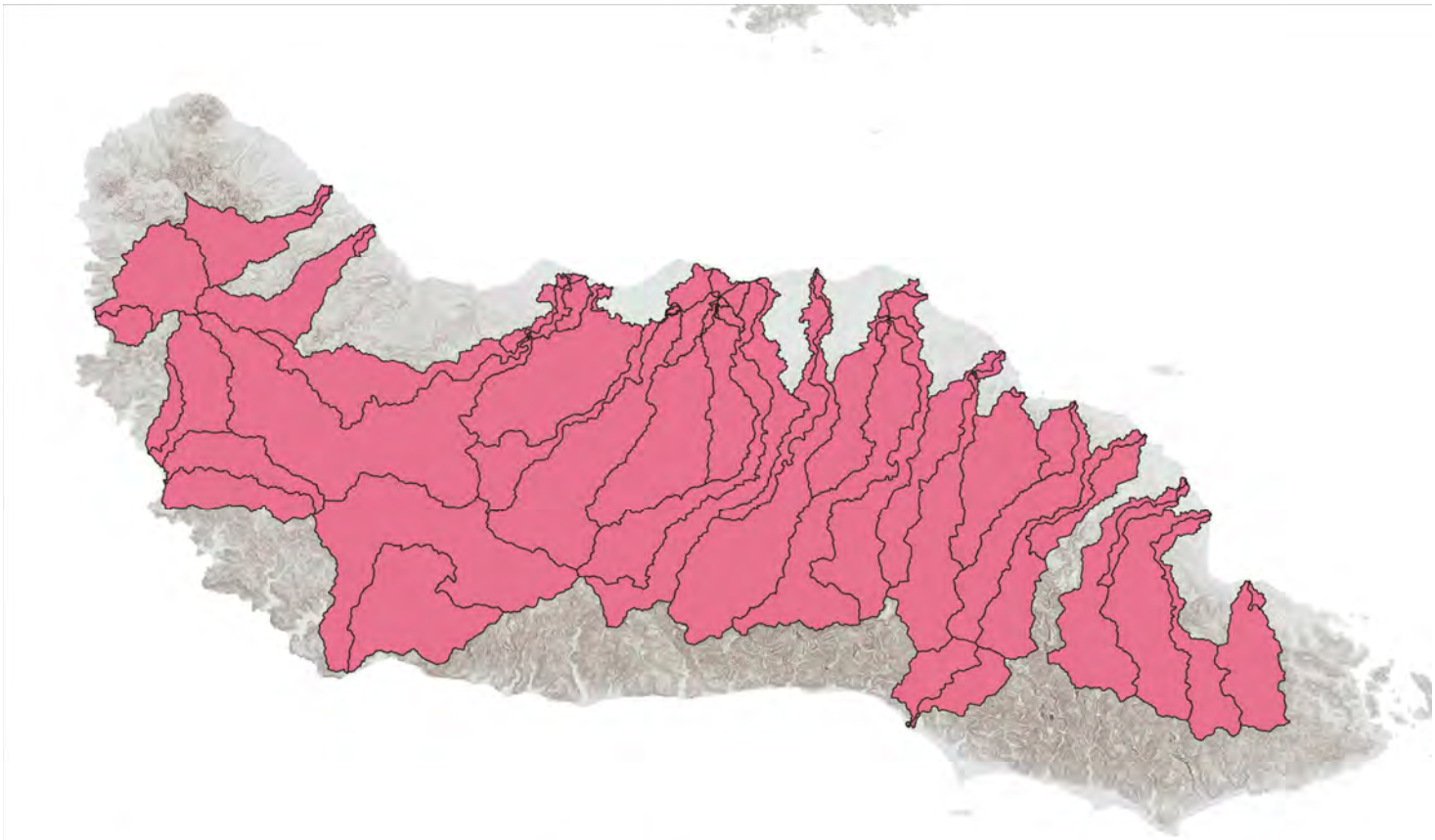
3ha level



15000ha level



10000ha level



5000ha level

Sol-FIMS Task Force Meeting Concept Note (Tentative)

1. Objective

The new Sol-FIMS is officially introduced on July 2020 and shared its URL with MOFR and Task Force members. However the system is still necessary to improve its contents for MOFR officers to utilize in the actual daily tasks. At this Task Force meeting, specifications of planned Land Cover Maps and Volume information will be discussed to introduce in SolGeo-FIMS.

2. Date:

16 September 2021　From 10:00 to 14:00

3. Venue:

Planning Division Office
ZoomVideo call link:
https://us06web.zoom.us/j/86459331640?pwd=NFc4RHNjaGdaZ0UvaXR2d1FsdE8xdz09

4. Agenda

(1)	10:00-10:45	Introduction and Specification of Land Cover Maps (Mr. Takahashi)
(2)	10:45-11:30	Introduction and Specification of Forest Resource Volume Information (Dr. Yoshimura)
(3)	11:30-12:00	Discussion of data specification
(4)	12:00-13:00	Lunch time
(5)	13:00-14:00	Discussion of and SolGeo-FIMS utilization in the actual task and data acquisition

5. Planned Deliverables

(1) Dataset of Tentative Land Cover Map and Volume information
(2) Data Specification Description documents

Land Cover Map 2020, Solomon Islands Assessment

16, September, 2021
Hirokazu Takahashi
Kokusai Kogyo Co., Ltd.

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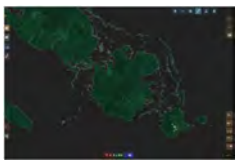
1. Work step to create land cover map using sepal

SEPAL allows users to harness cloud-based supercomputers and modern geospatial data infrastructures (e.g., Google Earth Engine)
Collect Earth sampling point made for FRL report shall be used as the basic training data

Step 1
Create mosaic image 2020



Step 2
Classify with basic training data

Step 3
Modify the map with external information

Step 4
Create shape file and organize attribute

2. Class definition

cd	td	discription	Remark
11	Primary	Dense Forest	ref. hansen
12	Disturbed	Disturbed Forest	ref. segmentation stats
13	Mangrove	Mangrove	
14	Swamp	Freshwater swamp	
20	Water	Water body	
30	Settlement	Settlements	Building , Road(paved)
40	Otherland	Bare Soil	Field, Road
50	Grassland	Young Vegetation	inc. Shrub / Woodland, Cropland
61	Subsistance	Gardening	Subsistance agriculture
62	Palm	Oil Palm plantation	
63	Coconut	Coconut plantation	

1. Evaluation of classification

When you evaluate a created classification, Note that the following matters and understand the level of importance for each classes

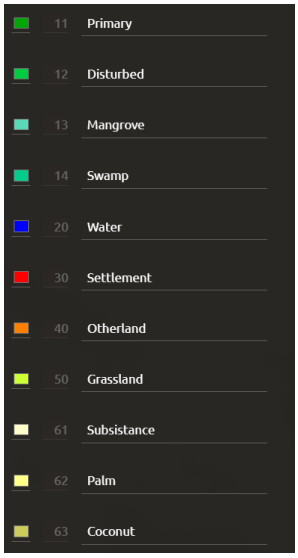
1.Primary Forest and Disturbed Forest are main target to classify

2. Mangrove, Swamp and Water have similar textures, it could be difficult to devide correctly.
>Use Global Forest Watch data separately
>Mangrove in inner islands could be convert to Swamp

3. Disturbed Forest and Grassland could be difficult to classify

4. Subsistence is one of the difficult class
>Use Forest Type Map to supplement to classify

5. Palm and Coconut are one of the difficult classes
>They don't have high priority to classify



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- Definition Mosaic image and Classification

Mosaic image specification

Source: Landsat8 and Landsat8TM image library,
Year to be used: Images from 1 Jan 2015 to 31 Dec 2019 (5 years) to make year 2020 data
Naming: (province name)_mosaic_L8_2020

Classification image specification
Source: Mosaic images defined above (Each province)
Naming: (province name)_classification_L8_2020

***The year 2020 data is defined to use images from 1 Jan 2015 to 31 Dec 2019 (5 years)

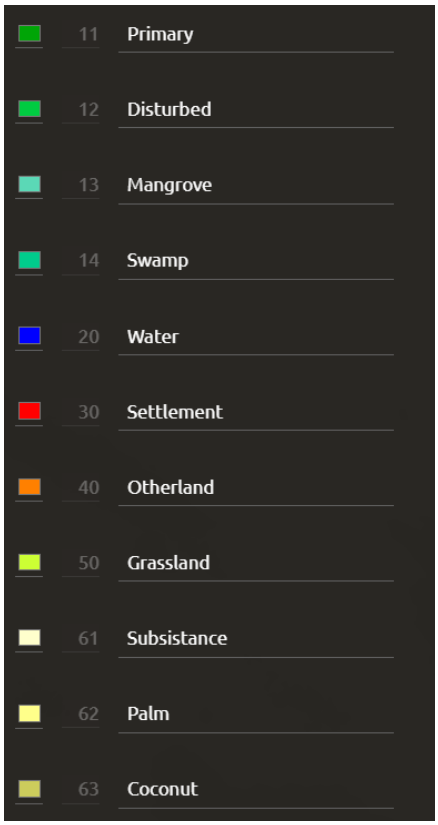
Definition Mosaic image and Classification

1. Mosaic image specification
Source: Landsat 8 and Landsat 8TM image library,
Year to be used: Images from 1 Jan 2015 to 31 Dec 2019 (5 years) to make year 2020 data
Naming: (province name)_mosaic_L8_2020

2. Classification image specification
Source: Mosaic images defined above (Each province)
Naming: (province name)_classification_L8_2020
***The year 2020 data is defined to use images from 1 Jan 2015 to 31 Dec 2019 (5 years)

3. Class specification

cd	td	color
11	Primary	#00a506
12	Disturbed	#00cc41
13	Mangrove	#5bd8b6
14	Swamp	#00cc8c
20	Water	#0000ff
30	Settlement	#ff0000
40	Otherland	#ff8000
50	Grassland	#ccff34
61	Subsistence	#ffffcc
62	Palm	#ffff8a
63	Coconut	#cccc5c



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Evaluation of Classification

Point to be checked

1. Primary and Disturbed (Forest Area) have consistency with satellite image and Global Forest Watch Loss year data

2. Mangrove have consistency with satellite image and Global Mangrove Watch data

3. Water have consistency with satellite image

4. Settlement have consistency with satellite image

5. Grassland, Otherland, and Subsistence, (Partialy Palm, Coconut) have consistency with satellite image. They might be often mixed.

Evaluation of Classification2020, Central

- The classification reflect Forest and and non-forest class very well, water too.
- Some of Primary seem to be classified to Mangrove.

The classification has basically good quality

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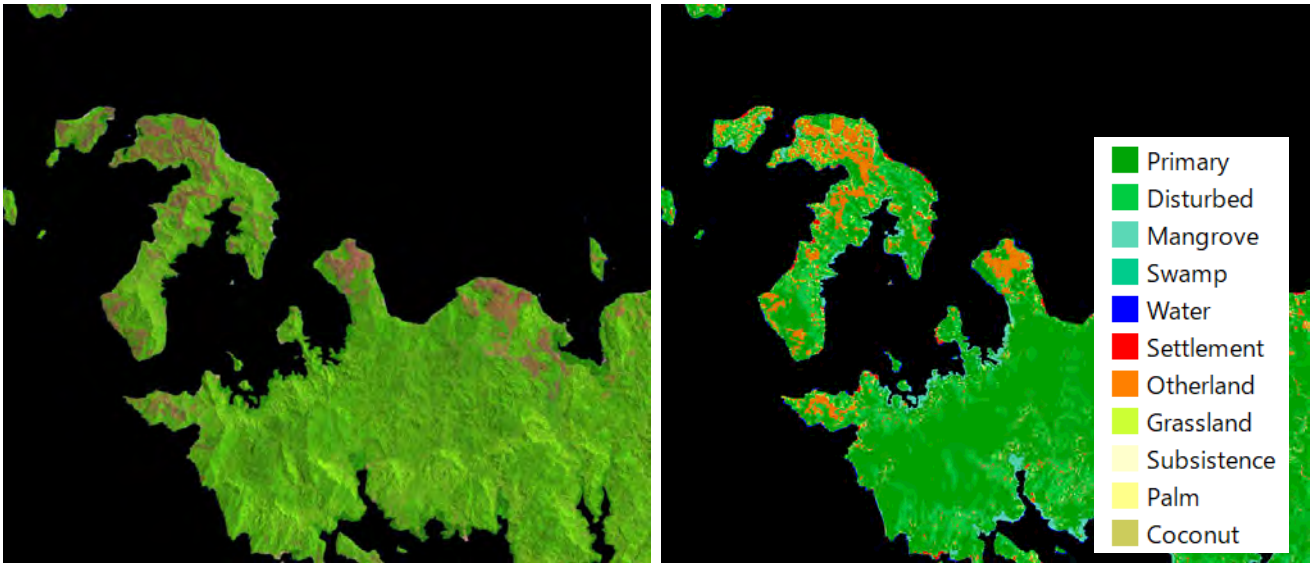
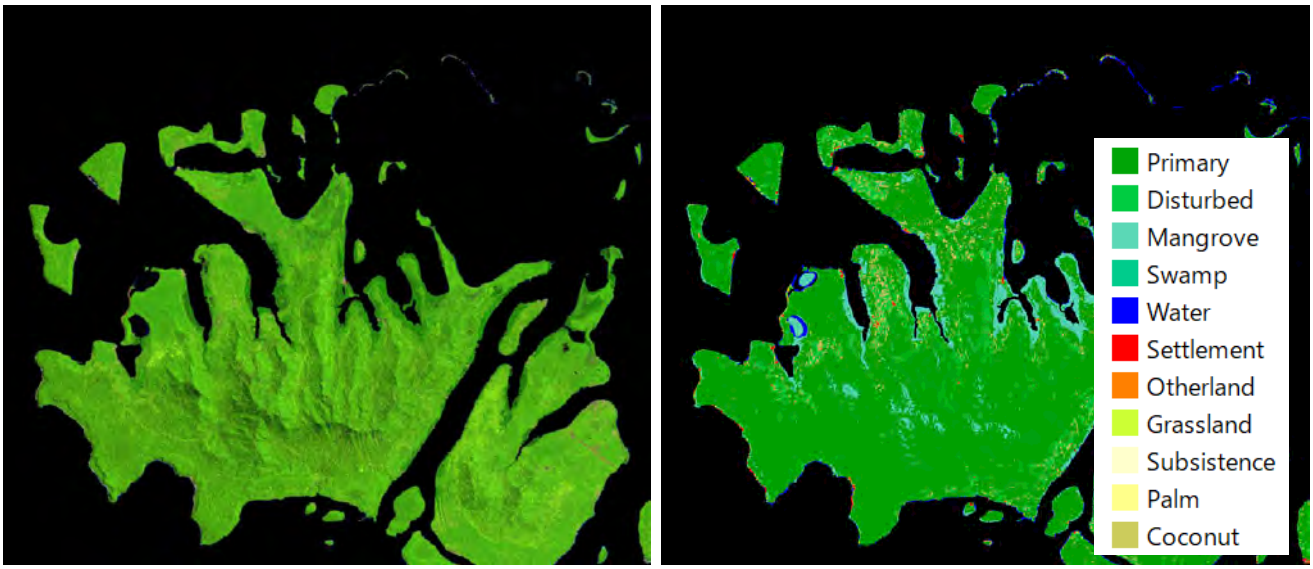
Over all Classification2020, Central



L8 mosaic image

The classification reflect Forest and and non-forest class very well, water too.

Over all Classification2020, Central



L8 mosaic image

The classification reflect Forest and and non-forest class very well, although some of inner Mangrove is Primary

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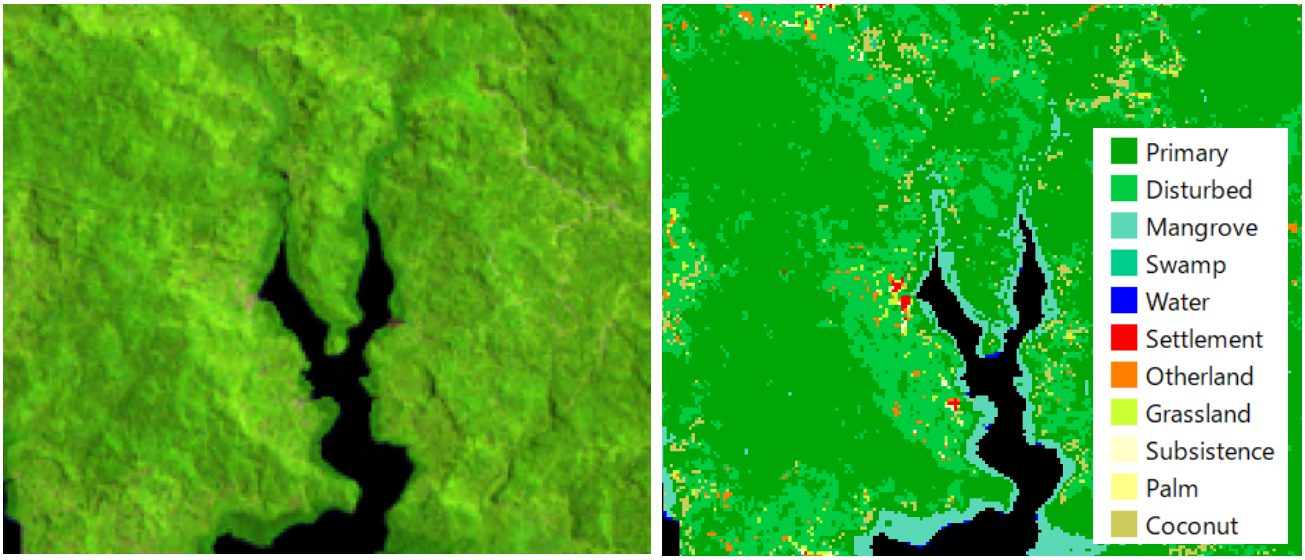
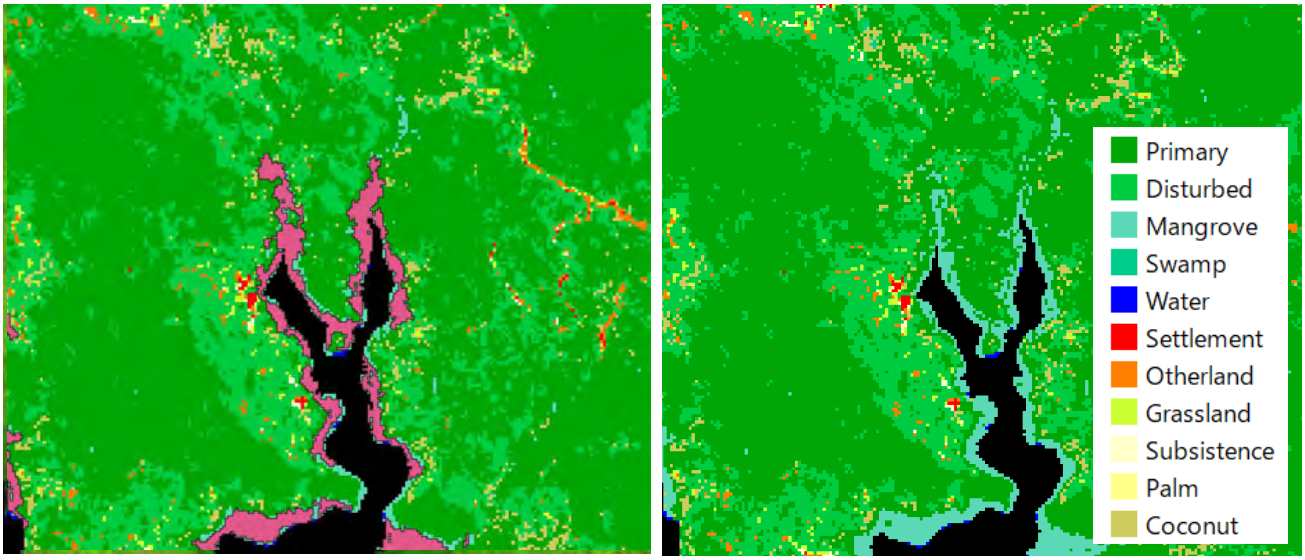
11: Primary, 12: Disturbed 13: Mangrove Classification2020, Central



L8 mosaic image

Primary, Disturbed and Mangrove have consistency with satellite image well, although some of grassland or subsisence is classified to Coconut.

11: Primary, 12: Disturbed 13: Mangrove Classification2020, Central



Global Mangrove Watch

Primary, Disturbed and Mangrove have consistency with Global Mangrove Watch

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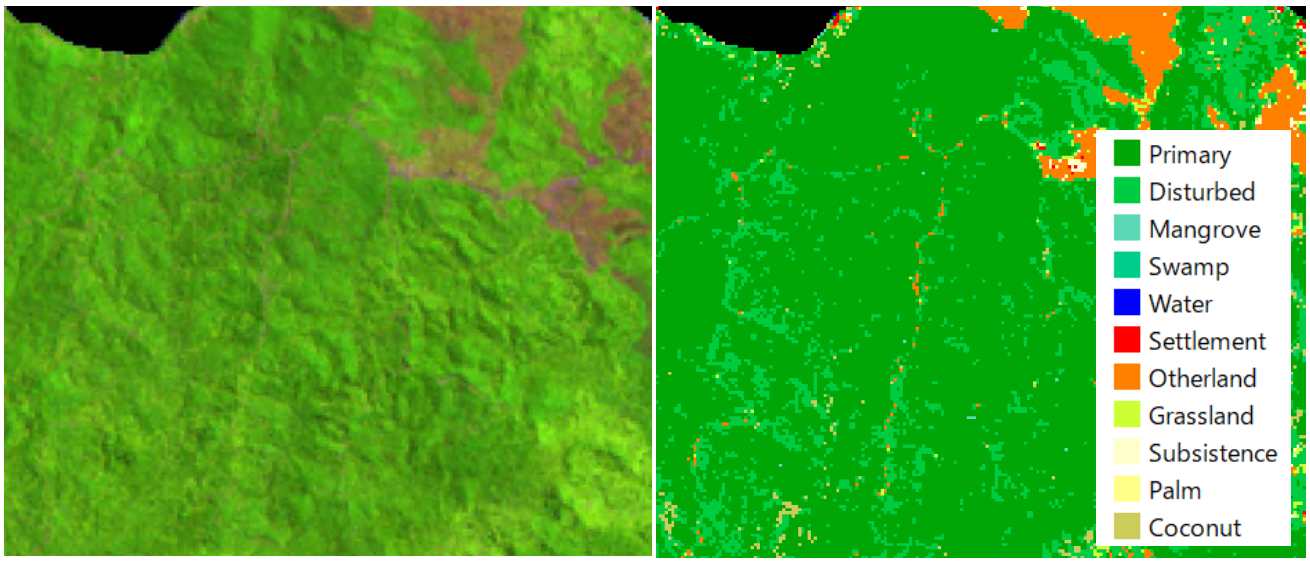
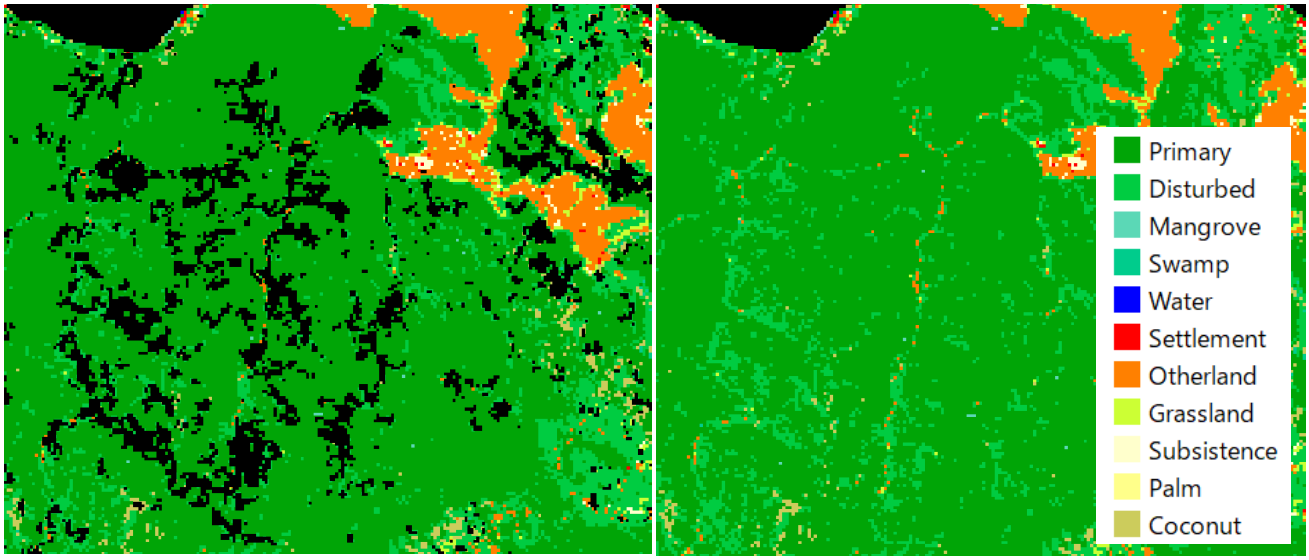
11: Primary, 12: Disturbed Classification2020, Central



L8 mosaic image

Primary, Disturbed have consistency with Satellite image

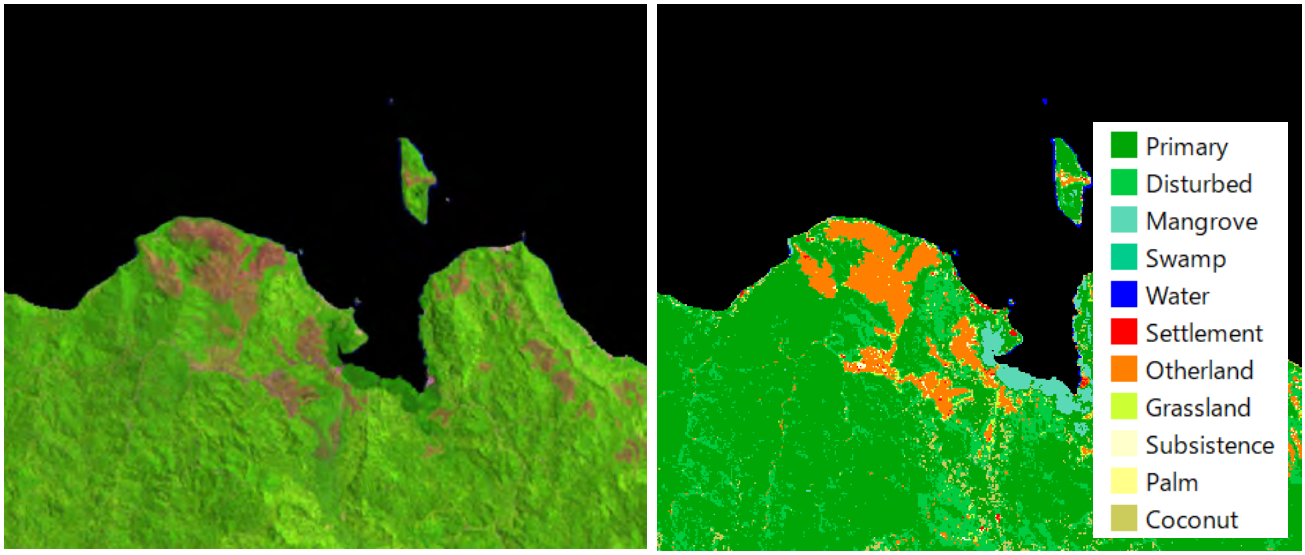
11: Primary, 12: Disturbed Classification2020, Central



Global Forest Watch 2010-2019

Primary, Disturbed have consistency with Global Forest Watch

30: Settlement, 40: Otherland and 50: Grassland Classification2020, Central



L8 mosaic image

Settelment, Otherland and Grassland reflect non-forest very well, although some of Otherland Grassland could be Subsistence.

Evaluation of Classification2020, Choiseul

- Forest and non forest have good consistency with satellite image, Settlement, Water Otherland are located well.
- Disturbed Forest have consistency with Global Forest Watch dataset
- Mangrove Primary has consistency with satellite image, although some part is classified to Water
- Mangrove has consistency with Global Mangrove Watch dataset, although some part shall be classified to Swamp

The classification has basically good quality

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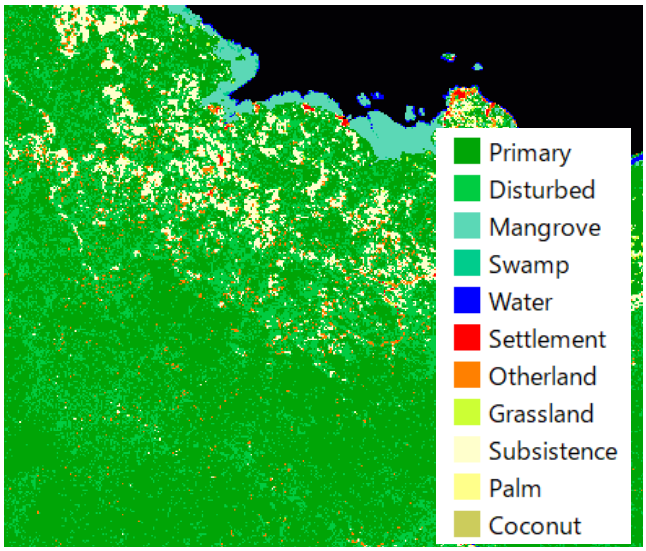
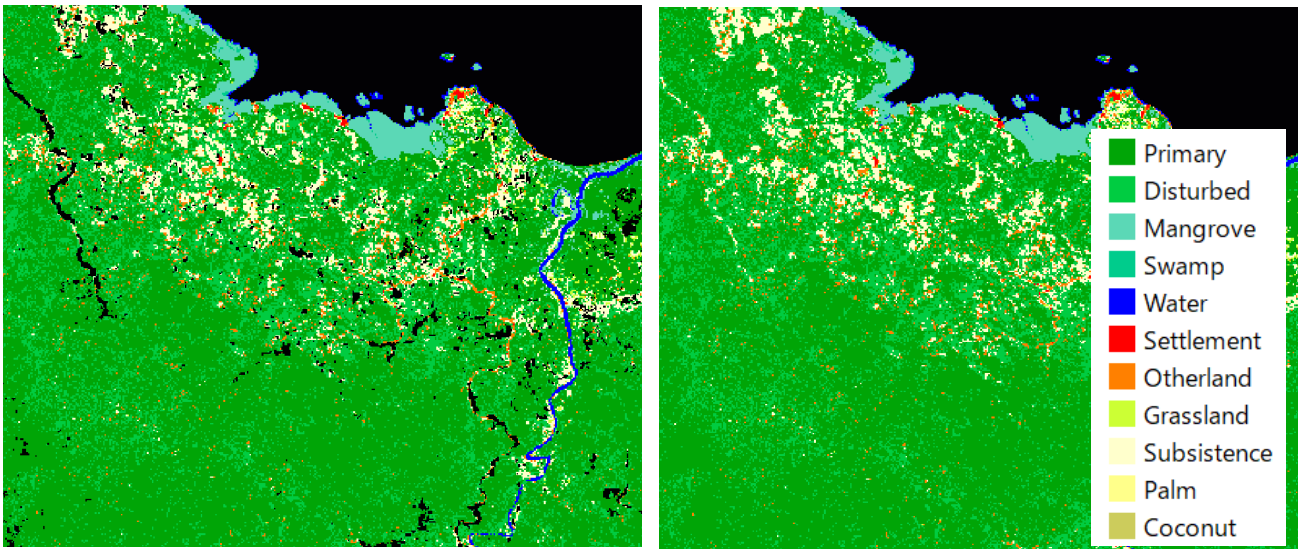
11: Primary Forest, 12: Disturbed Forest Classification2020, Choiseul



L8 mosaic image

Forest and Non Forest, Primary and Disturbed have consistence with satellite image very well

11: Primary Forest, 12: Disturbed Forest Classification2020, Choiseul



Global Forest Watch 2010-2019

Forest and Non Forest, Primary and Disturbed have consistence with Global Forest Watch.

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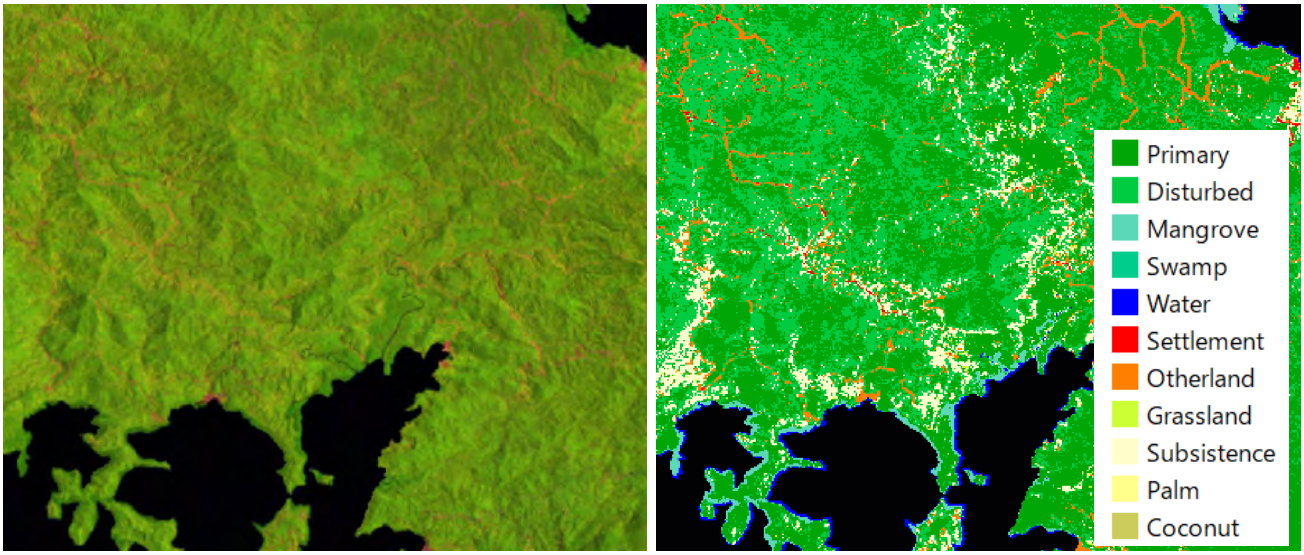
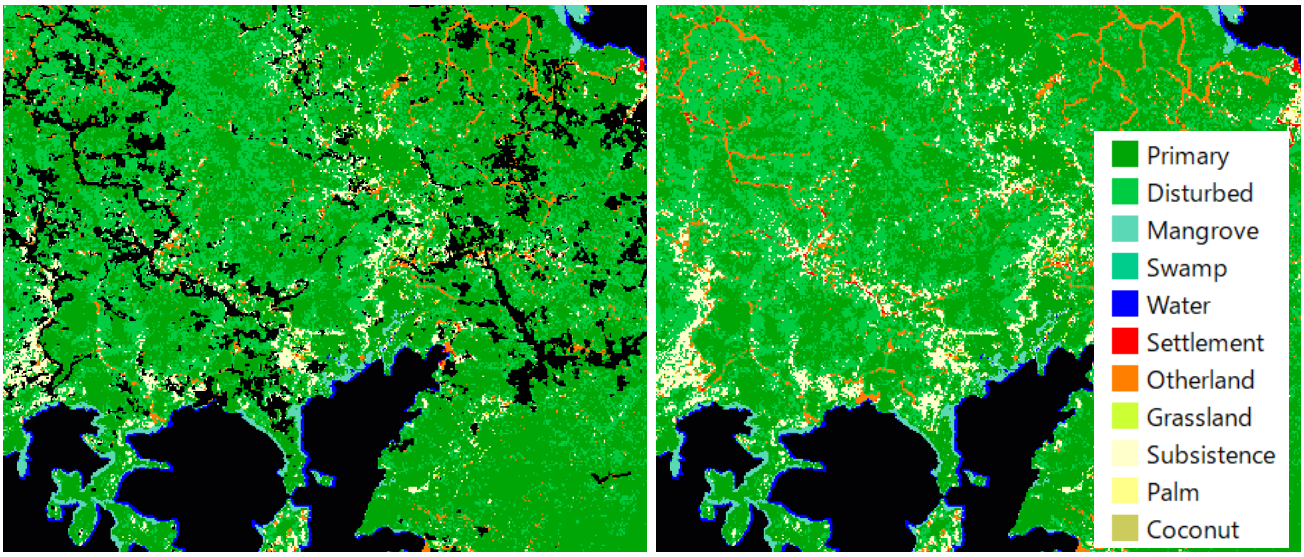
11: Primary Forest, 12: Disturbed Forest Classification2020, Choiseul



L8 mosaic image

Primary Forest and Disturbed Forest have consistence with satellite image very well

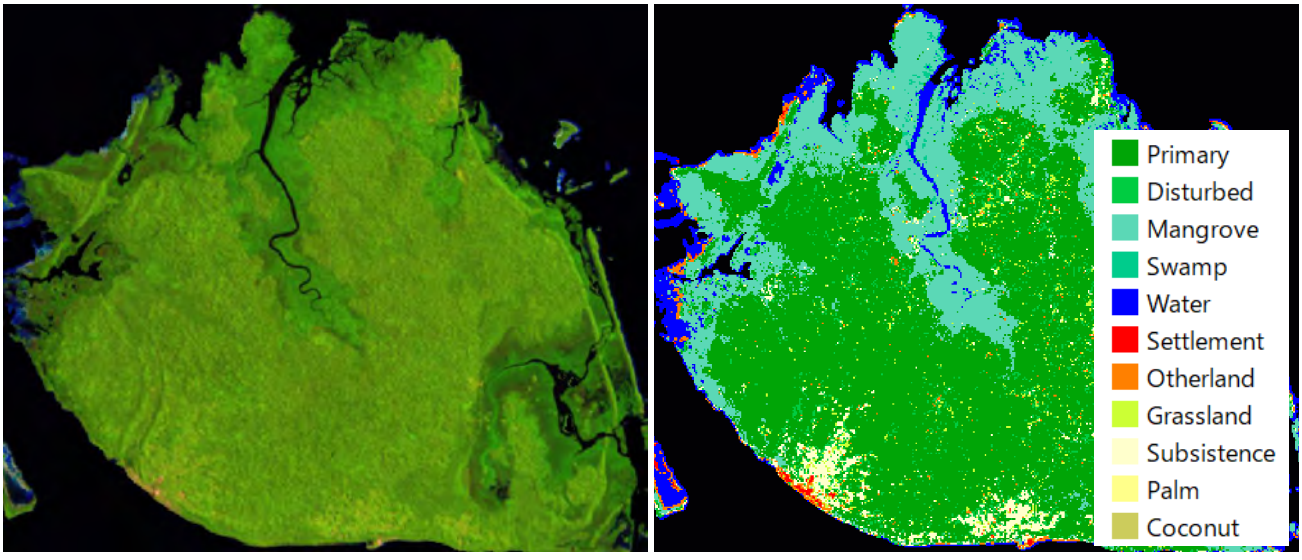
11: Primary Forest, 12: Disturbed Forest Classification2020, Choiseul



Global Forest Watch Loss year 2010-2019

Primary Forest and Disturbed Forest have consistency

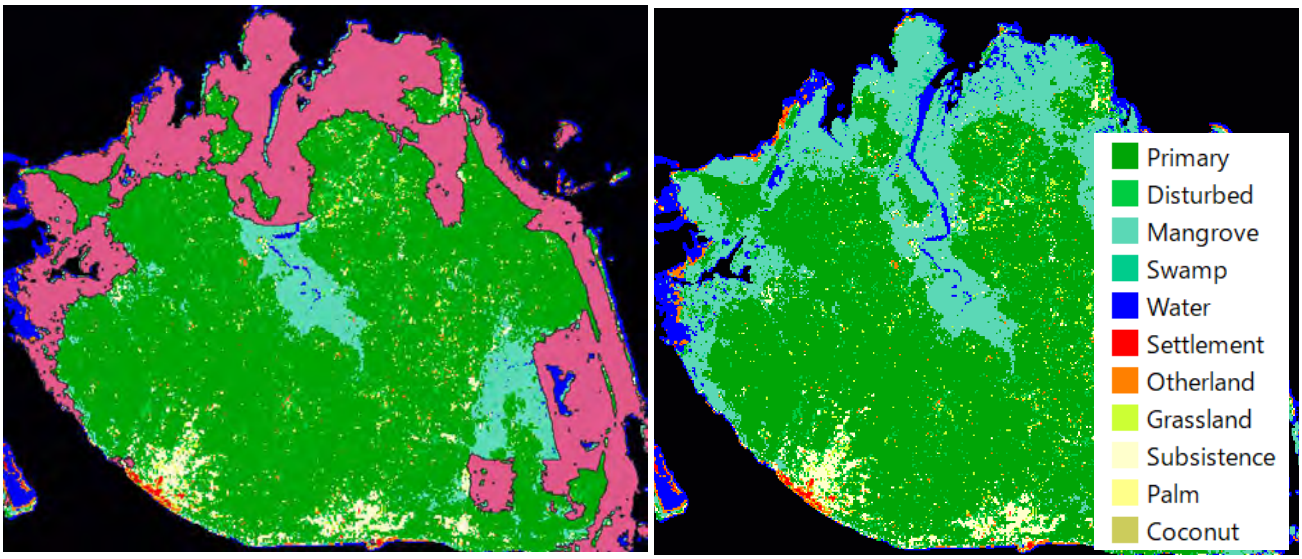
13: Mangrove Classification2020, Choiseul



L8 mosaic image

Mangrove Primary has consistency with satellite image

13: Mangrove Classification2020, Choiseul



Global Mangrove Watch

Mangrove Primary has consistency with Global Mangrove Watch dataset, although some part shall be classified to Swamp

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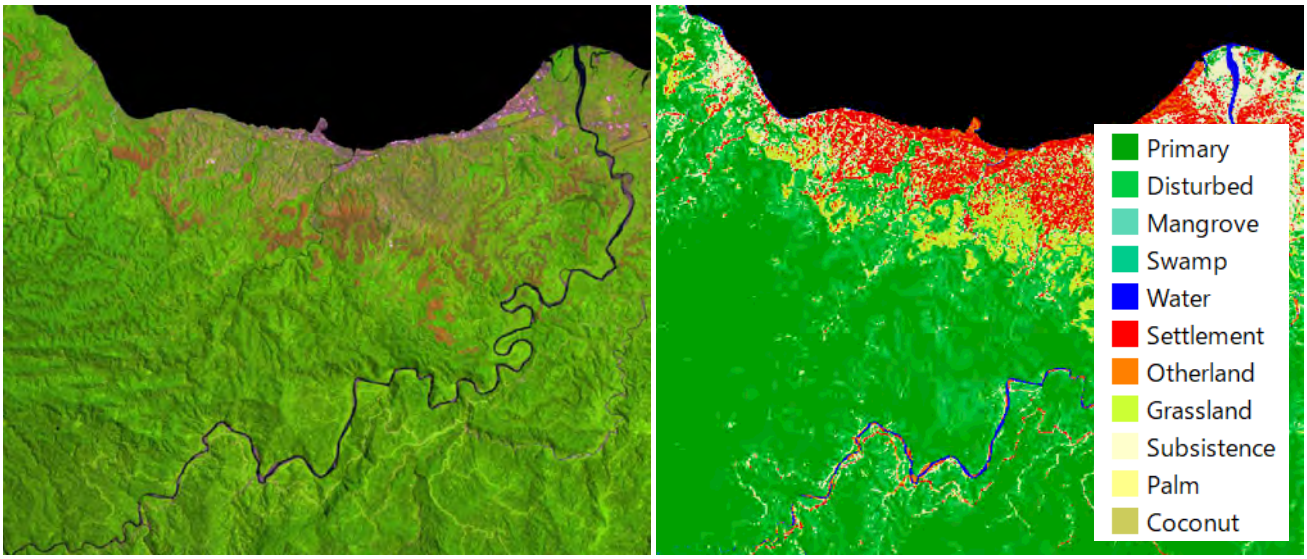
Evaluation of Classification2020, Guadalcanal

- Forest and non forest have high consistency with satellite image. Water, Settlement, Otherland are located well.
- Forest and non forest have high consistency with Global Forest Watch Loss year dataset
- Mangrove has high consistency with Global Forest Watch dataset
- Settlement and Grassland have high consistency with satellite image.
- Palm have high consistency with satellite image.

The classification has basically good quality

Over all Classification2020, Guadalcanal



L8 mosaic image

Forest and non forest have high consistency with satellite image, Settlement, Water Otherland are located well.

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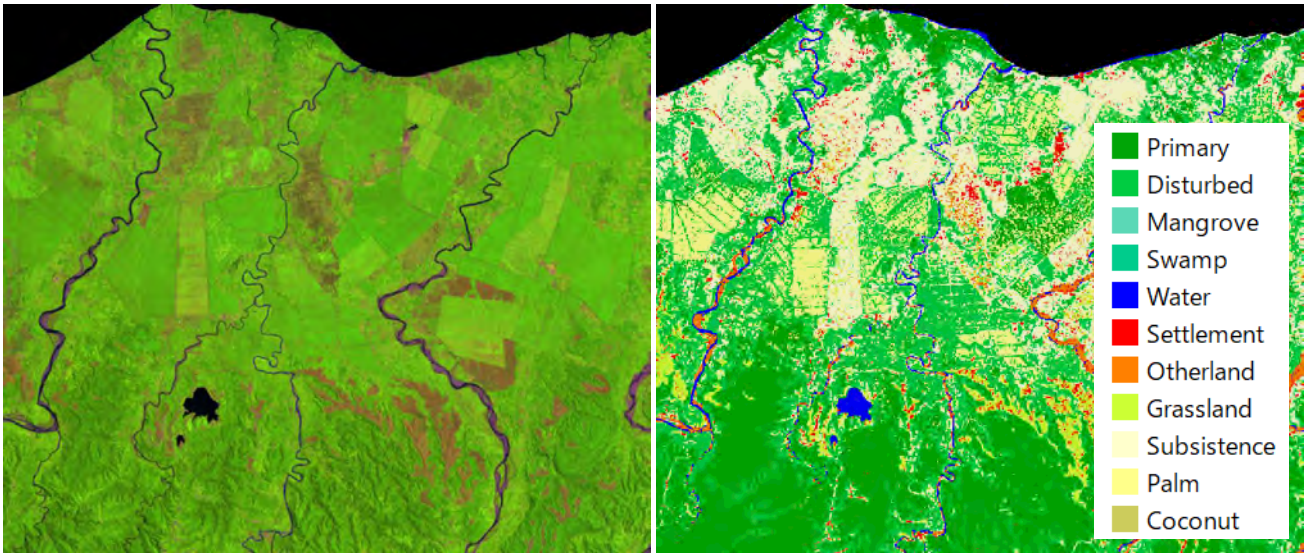
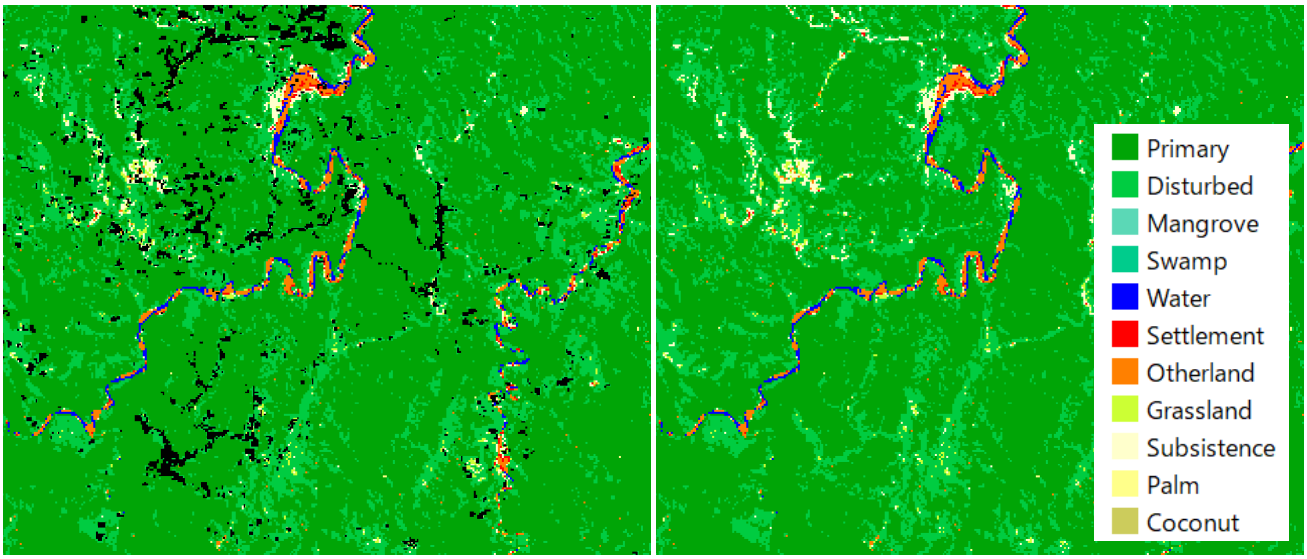
Over all Classification2020, Guadalcanal



L8 mosaic image

Palm have high consistency with satellite image, Settlement, Water, Subsistence are located well.

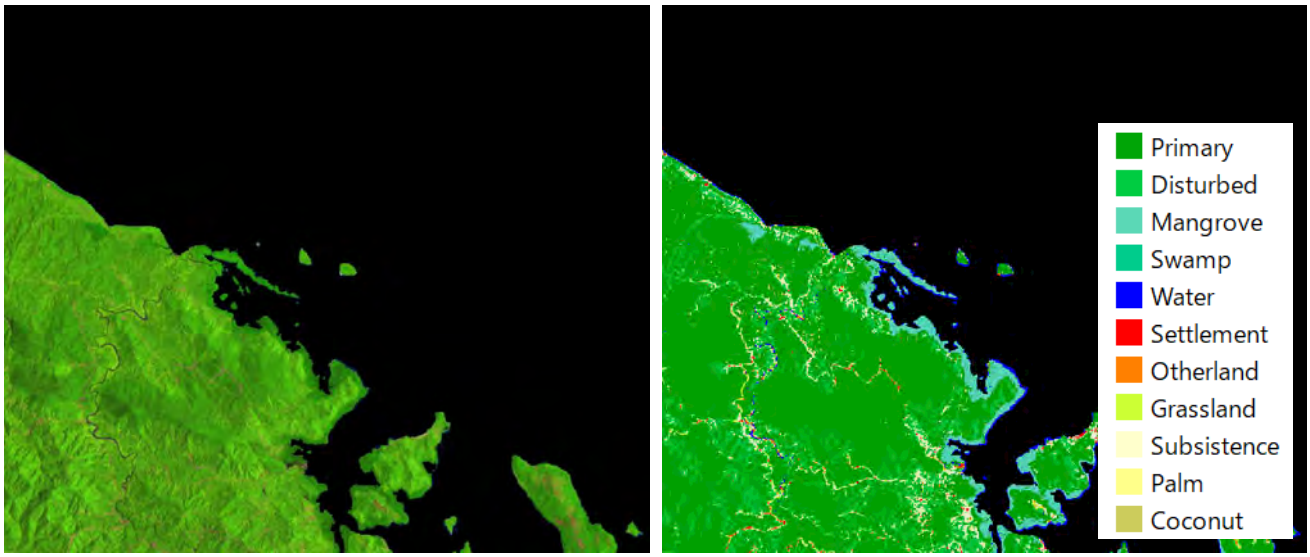
11: Primary, 12: Disturbed Classification2020, Guadalcanal



Global Forest Watch Loss year 2010-2019

Disturbed forest has high consistency

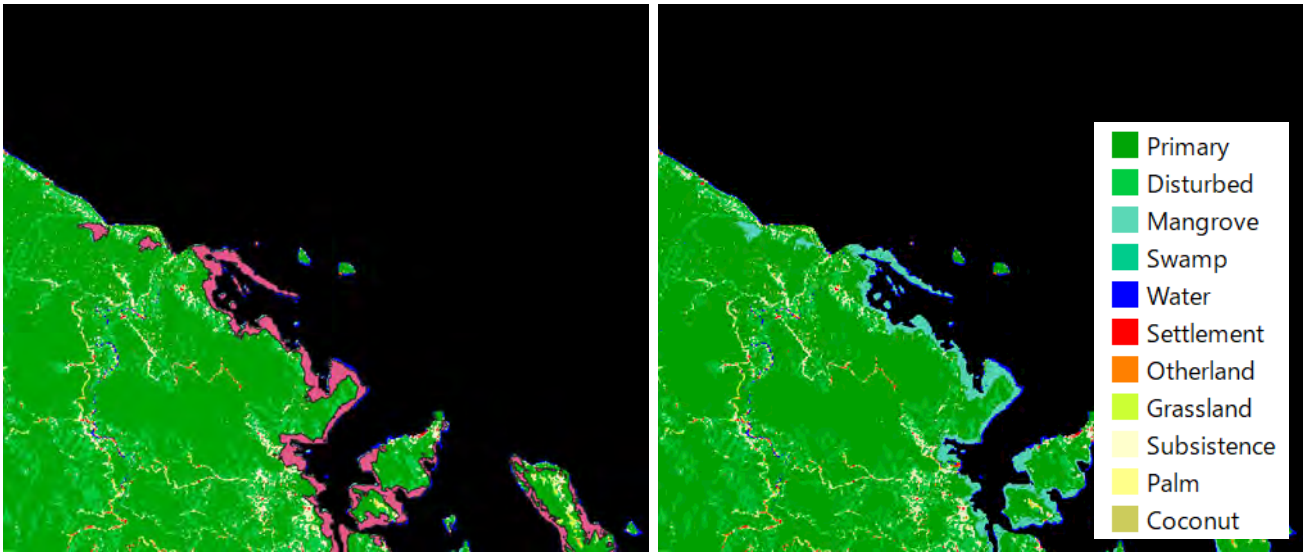
13: Mangrove Classification2020, Guadalcanal



L8 mosaic image

Mangrove has high consistency with satellite image

13: Mangrove Classification2020, Guadalcanal



Global Mangrove Watch

Mangrove has high consistency with Global Mangrove Watch

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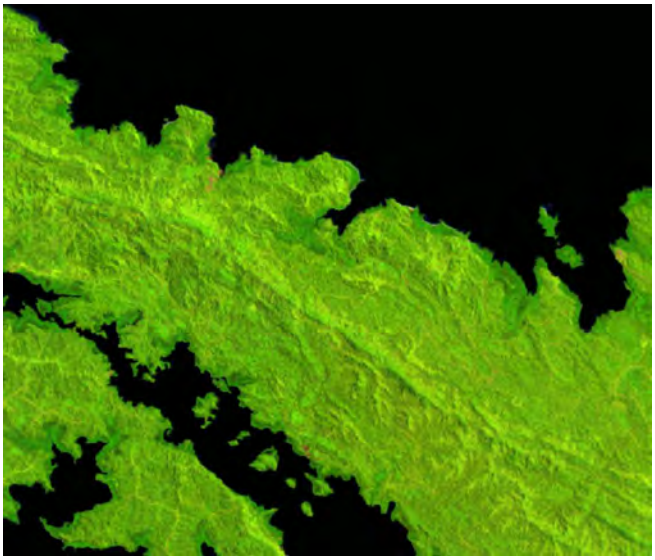
Evaluation of Classification2020, Isabel

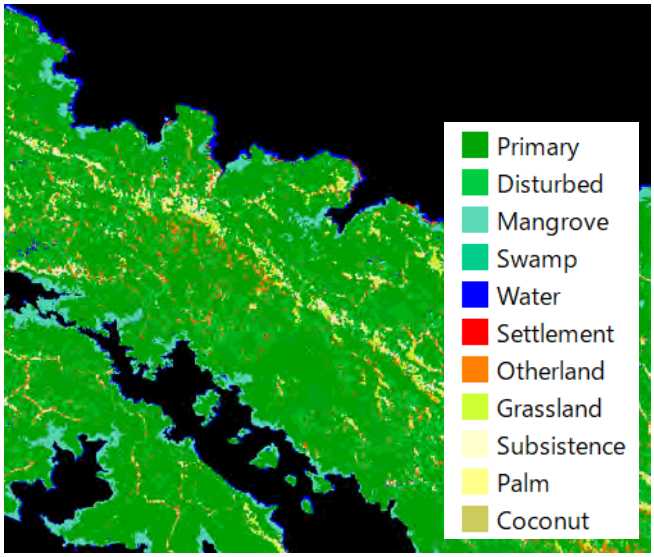
- Some of Otherland are rather bigger, it could be Glassland.
- It is seemed to be inconsistence with Global Forest Watch
- Mangrove is located very well
- Subsistence or Grassland is classified well

The classification has basically good quality

Ministry of Forestry & Research JICA

Over all Classification2020, Isabel





L8 mosaic image

Forest and Non-Forest seems to be classified well

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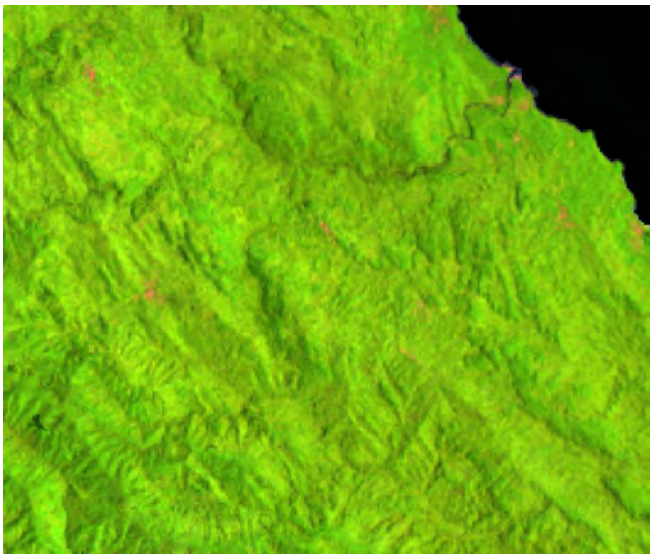
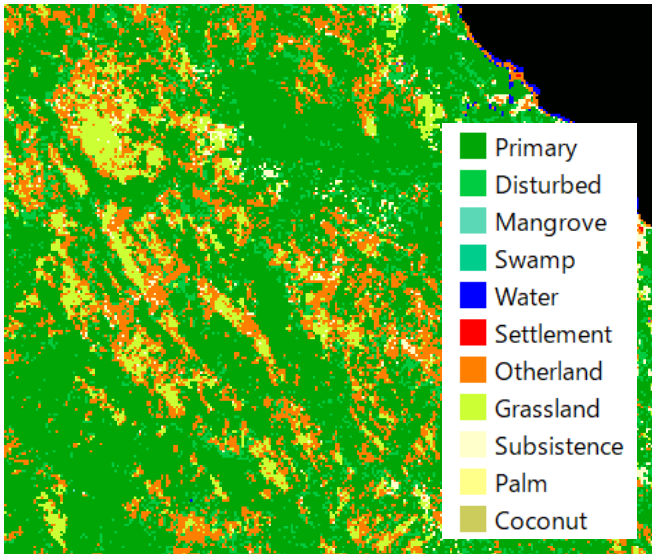
Over all Classification2020, Isabel

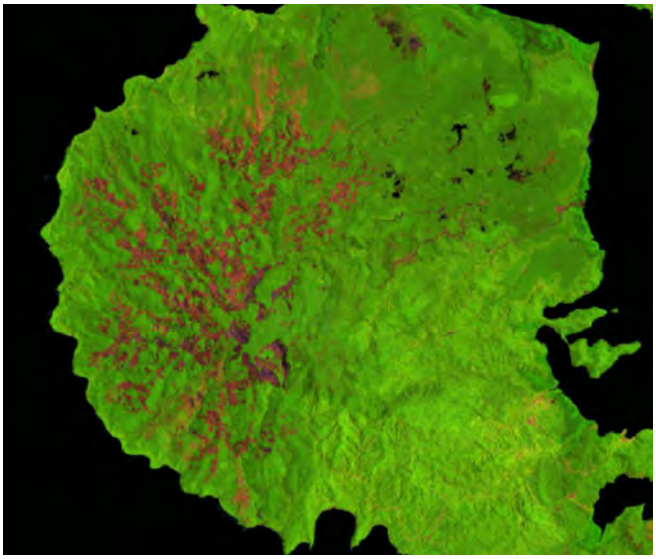


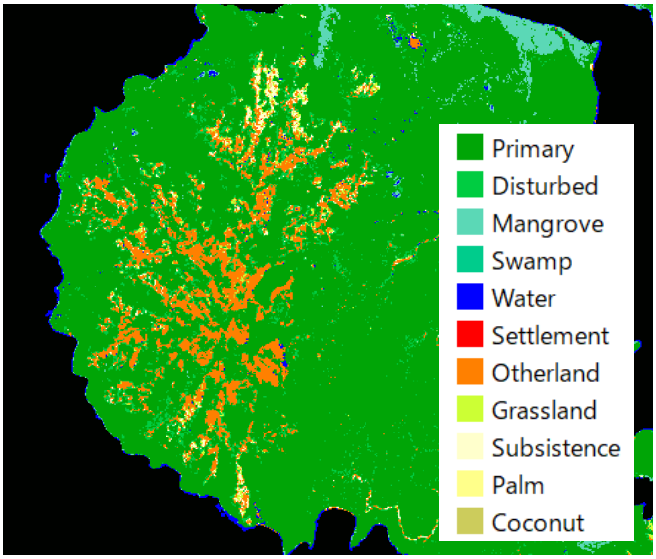


L8 mosaic image

Otherland is rather bigger, it could be Grassland

Over all Classification2020, Isabel





L8 mosaic image

Otherland, Grassland or Subsistence locate well,
Some of Subsistence could be grassland

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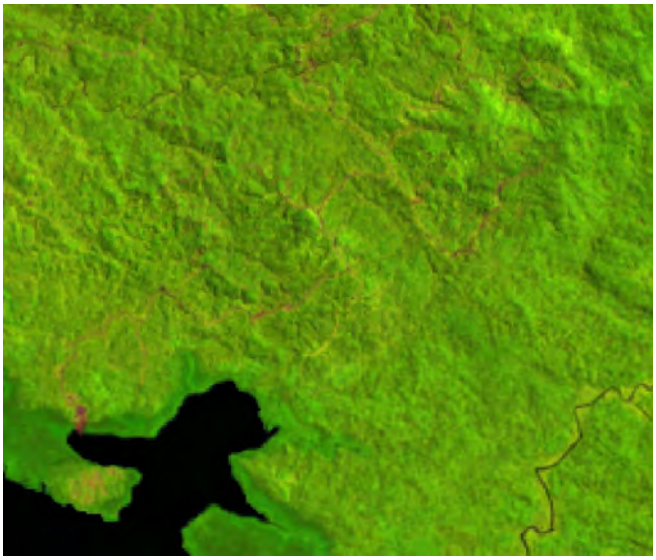
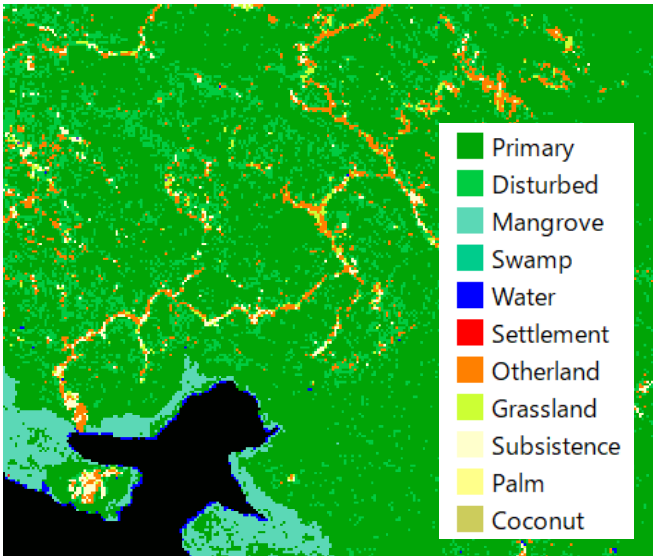
11: Primary, 12: Disturbed, 13: Mangrove Classification2020, Isabel

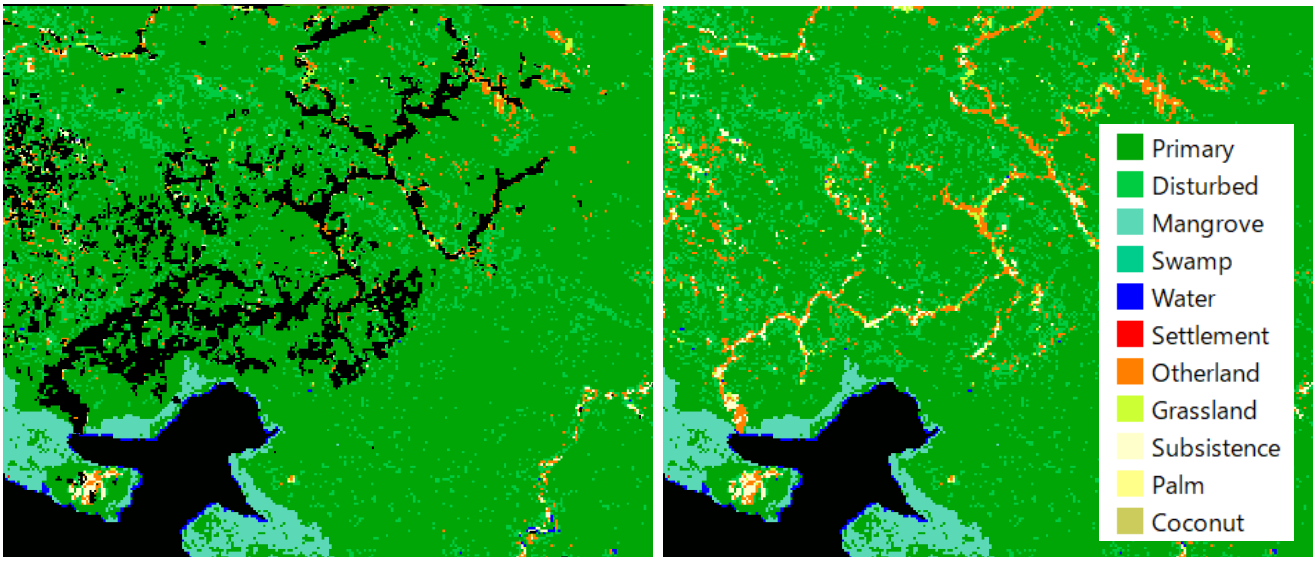




L8 mosaic image

Primary, Disturbed and Mangrove located very well.

11: Primary, 12: Disturbed, 13: Mangrove Classification2020, Isabel



Global Forest Watch Loss year 2010-2019

Primary, Disturbed and Mangrove located very well.

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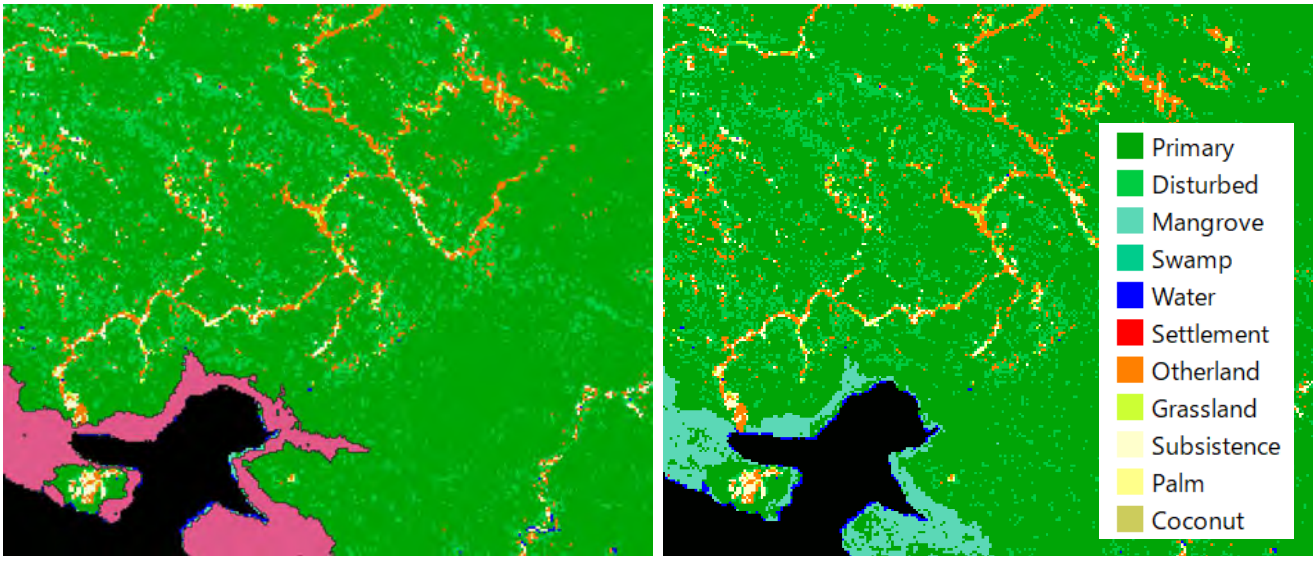
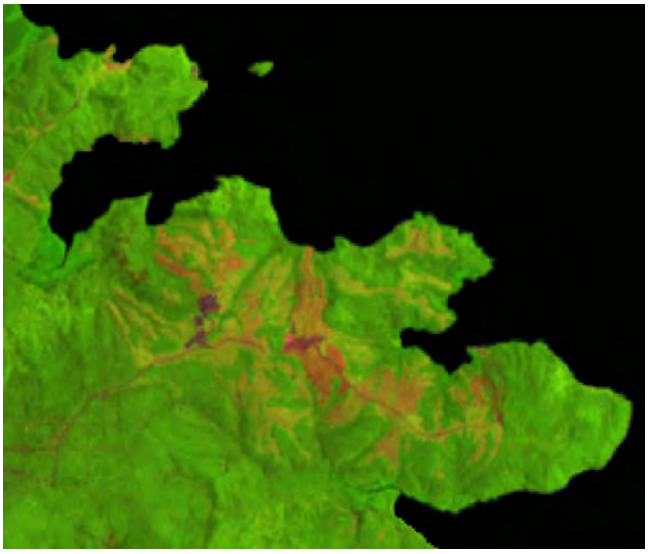
11: Primary, 12: Disturbed, 13: Mangrove Classification2020, Isabel

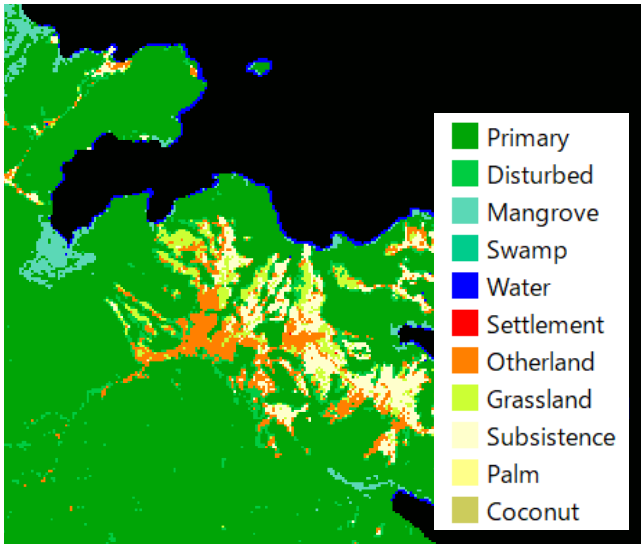


Global Mangrove Watch

Primary, Disturbed and Mangrove located very well.

40: Otherland, 50: Grassland, 61: Subsistence Classification2020, Isabel





L8 mosaic image

Otherland, Grassland, Subsistence are classified well

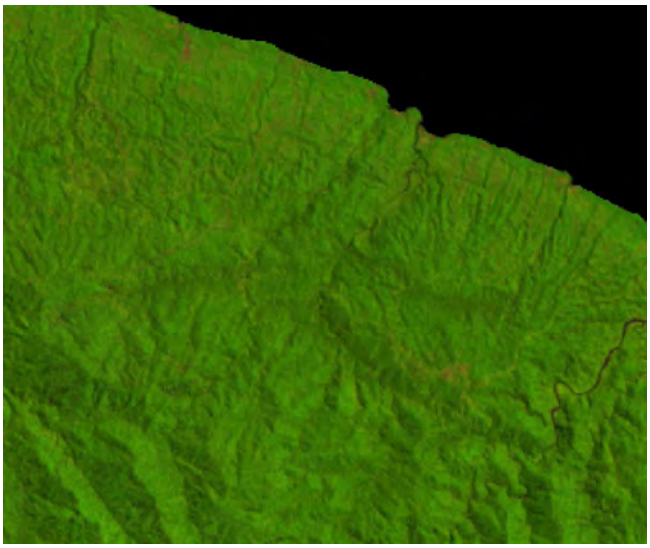
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

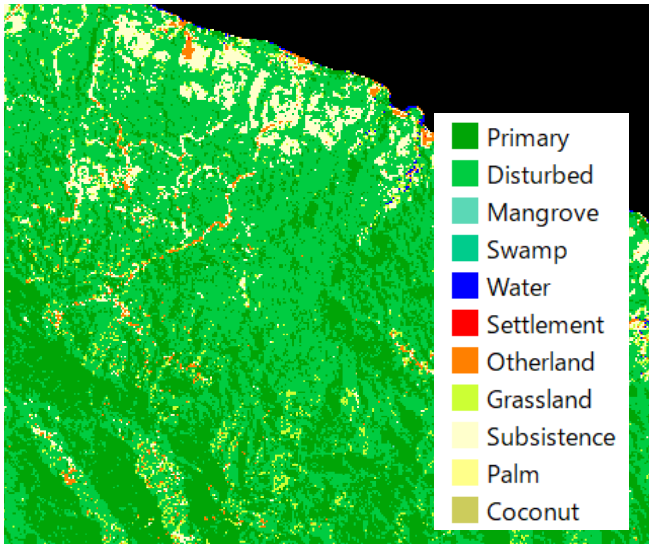
Evaluation of Classification2020, Makira

- Forest and non forest have consistency with satellite image
- Disturbed Forest has consistency with Global Forest Watch
- Mangrove is classified very well
- Some of Otherland seems to be created where satellite image lacks.

The classification has basically good quality

Over all Classification2020, Makira



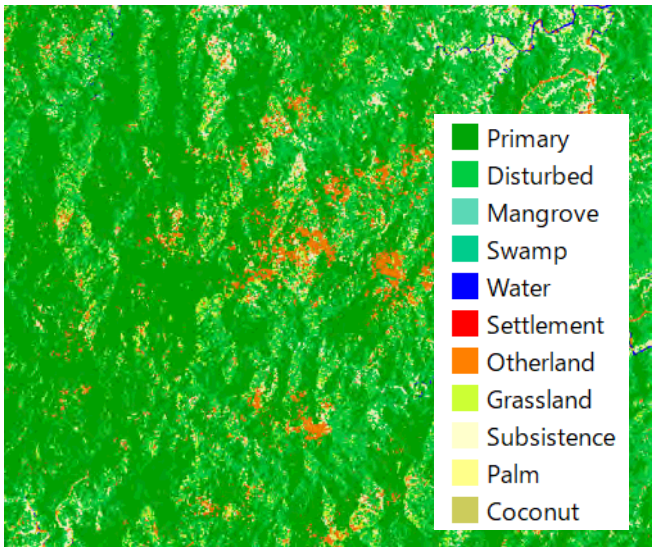


L8 mosaic image

Forest and non forest have consistency with satellite image

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

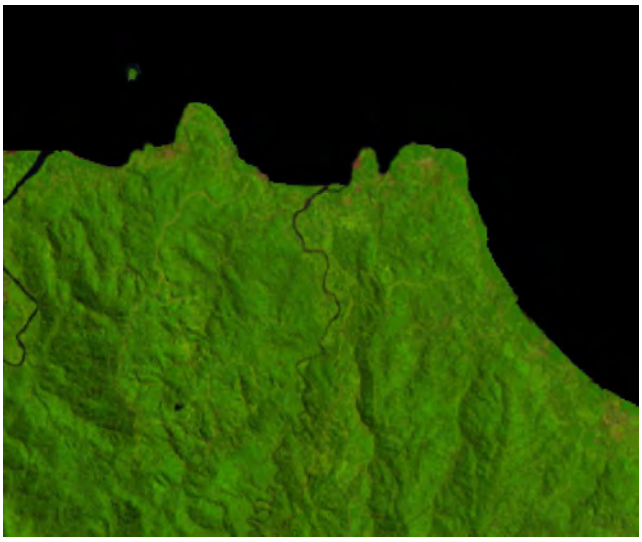
Over all Classification2020, Makira

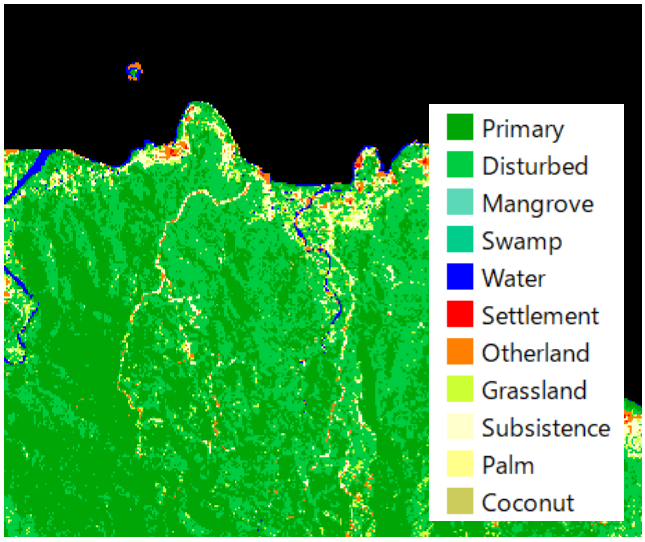


L8 mosaic image

Forest and non forest have consistency with satellite image,
Some of Otherland seems to be created where satellite image lacks.

11: Primary and 12: Disturbed Classification2020, Makira



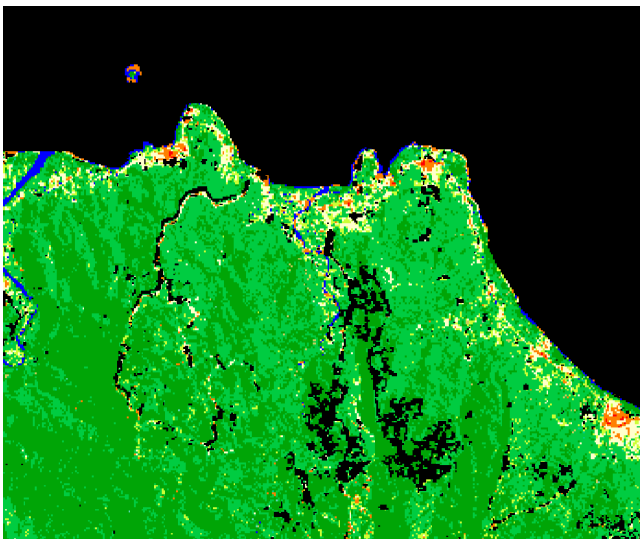


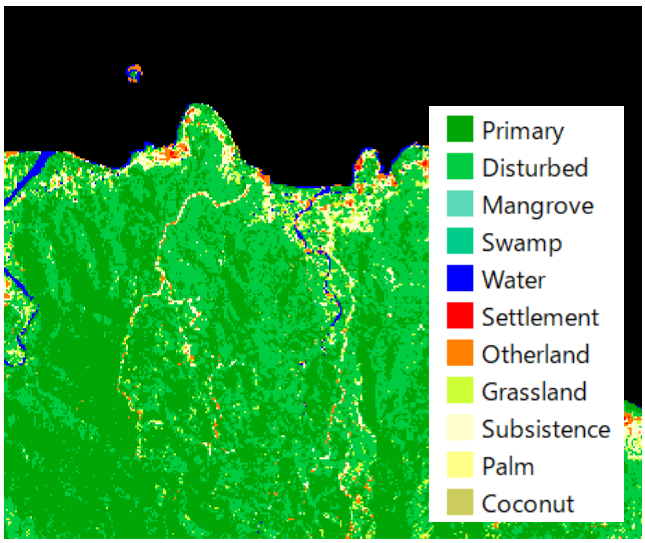
L8 mosaic image

Primary and Disturbed have consistency with satellite image

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

11: Primary and 12: Disturbed Classification2020, Makira

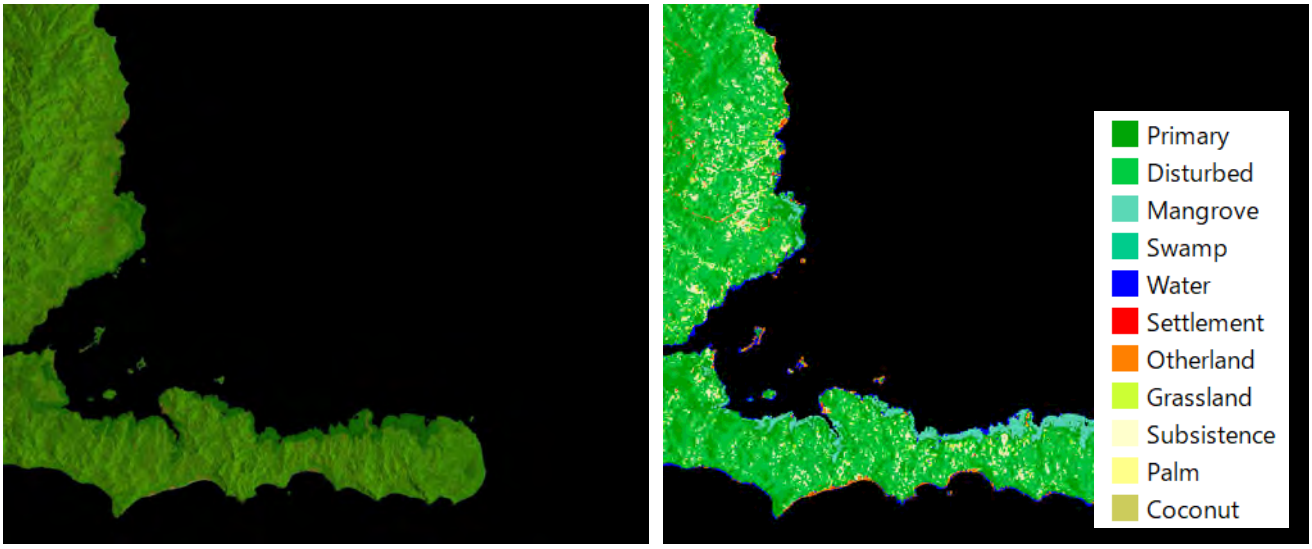




Global Forest Watch Loss year 2010-2019

Primary and Disturbed have also consistency with Global Forest Watch

13: Mangrove Classification2020, Makira

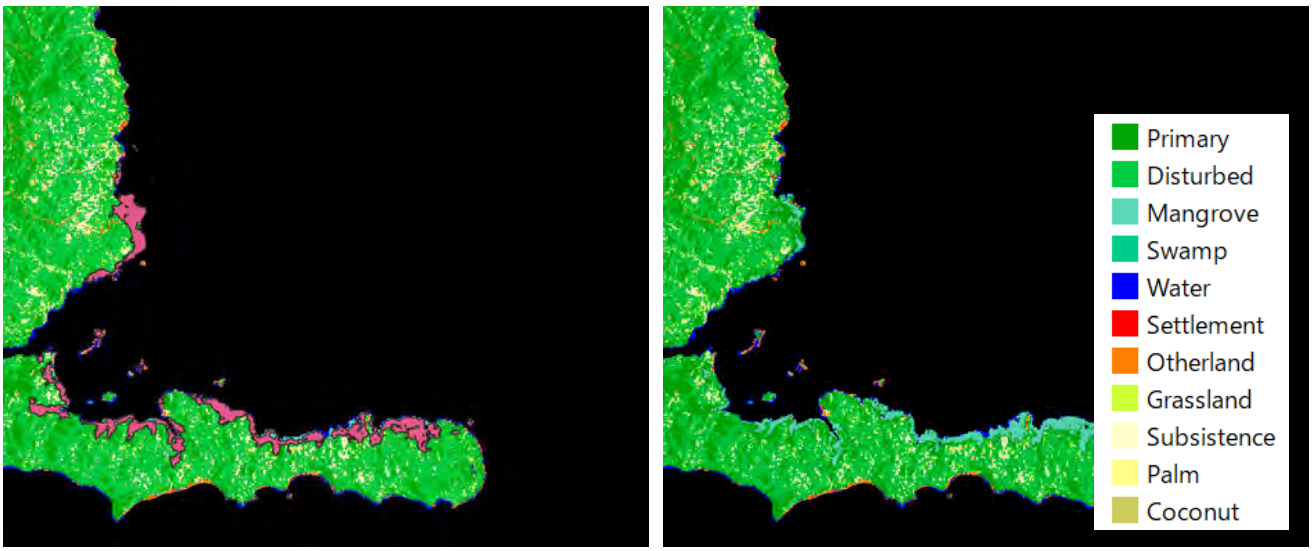


L8 mosaic image

Mangrove has consistency with satellite image

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

13: Mangrove Classification2020, Makira



Global Mangrove Watch

Mangrove has consistency with Global Mangrove Watch

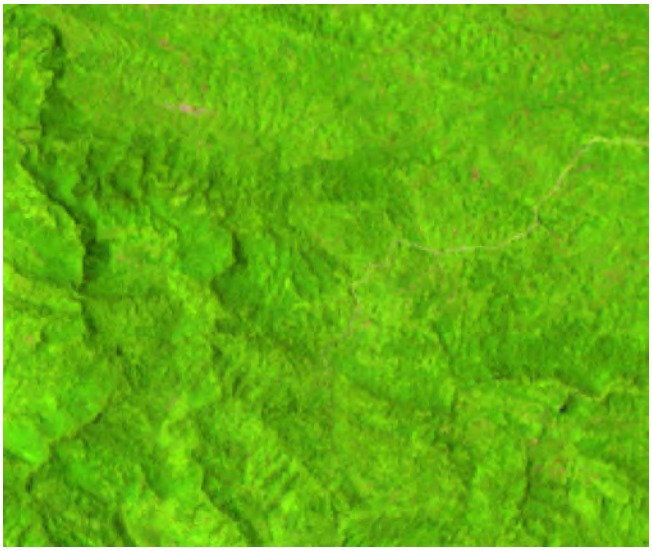
Evaluation of Classification2020, Malaita

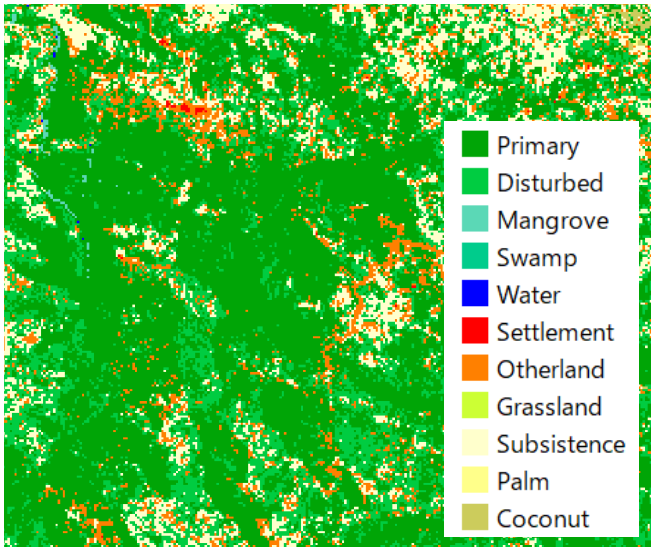
- Forest and non forest have good consistency with satellite image
- Water and Otherland have consistence with satellite image very well,
- Mangrove has consistency with Global Mangrove Watch,
- Water and Settlement have has consistency with satellite image
- Some part of Swamp seems to be classified as Mangrove

The classification has basically good quality

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Over all Classification2020, Malaita

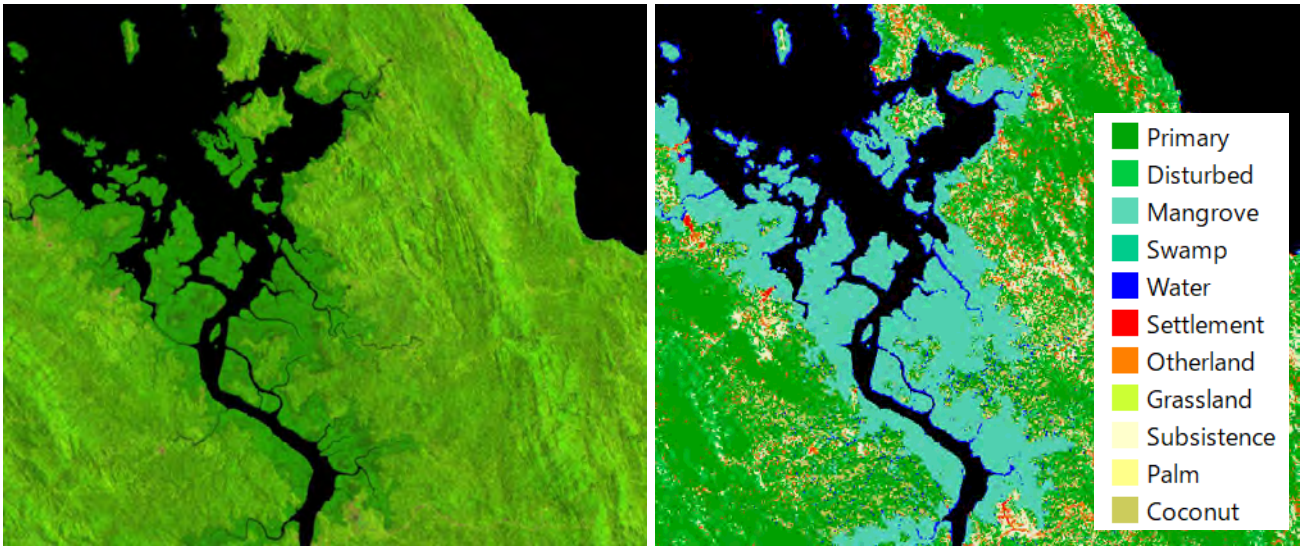




L8 mosaic image

Forest and non forest have good consistency with satellite image

13: Mangrove Classification2020, Malaita

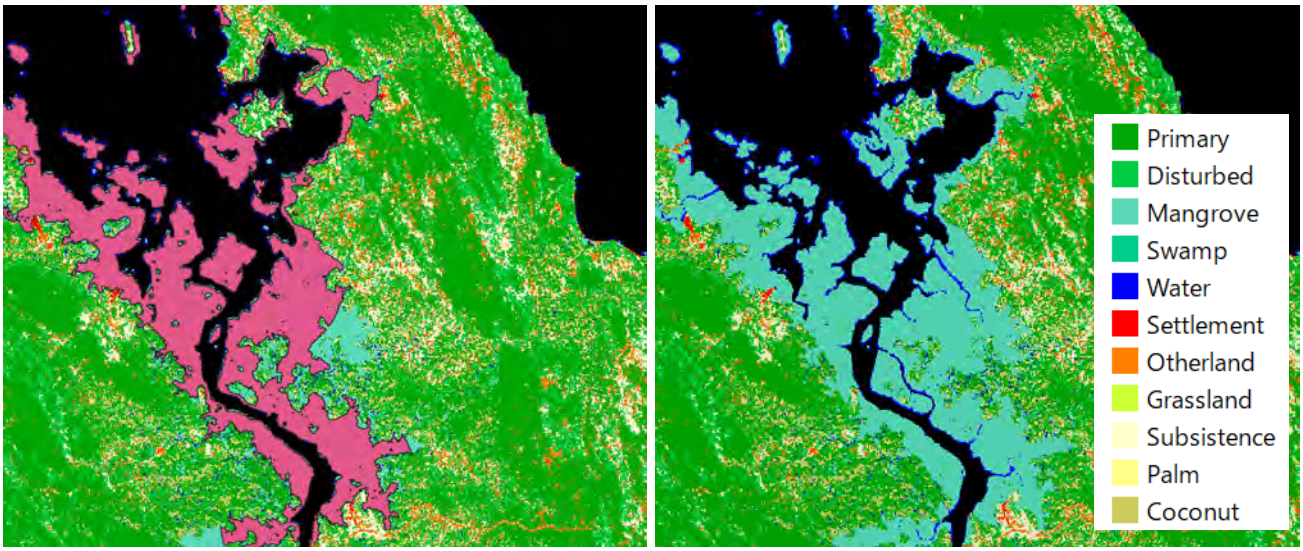


L8 mosaic image

Mangrove has good consistency with satellite image

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

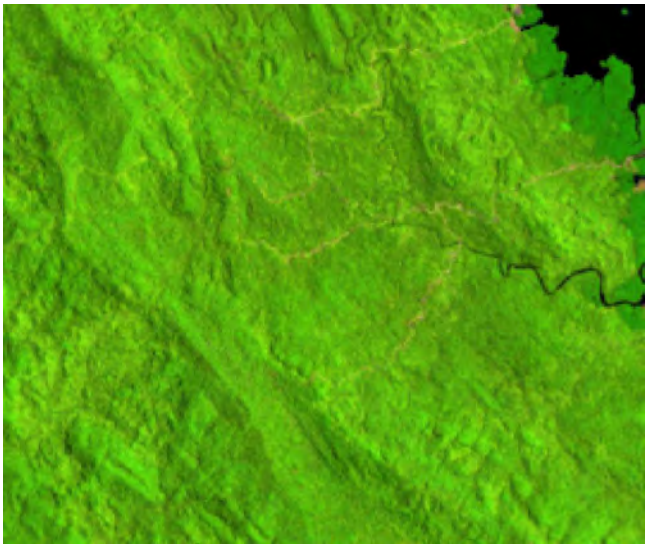
13: Mangrove Classification2020, Malaita

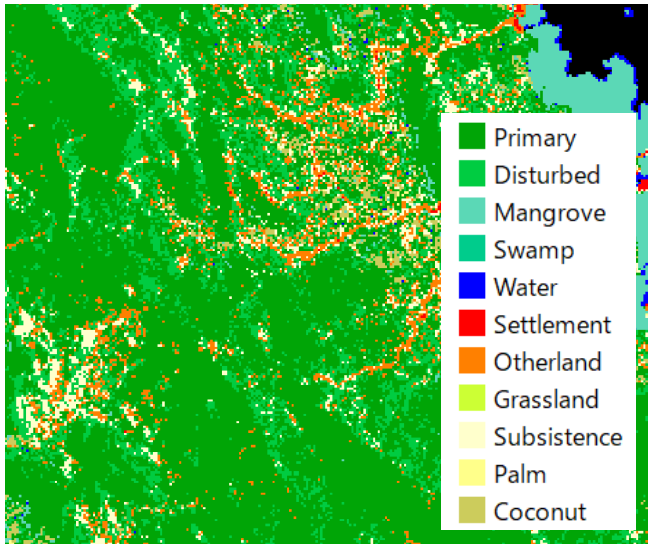


Global Mangrove Watch

Mangrove has good consistency with Global Mangrove Watch

11: Primary Forest, 12: Disturbed Forest Classification2020, Malaita



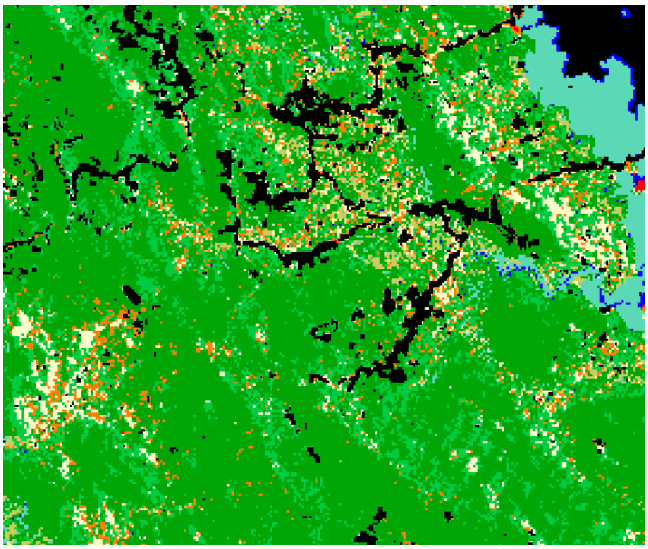


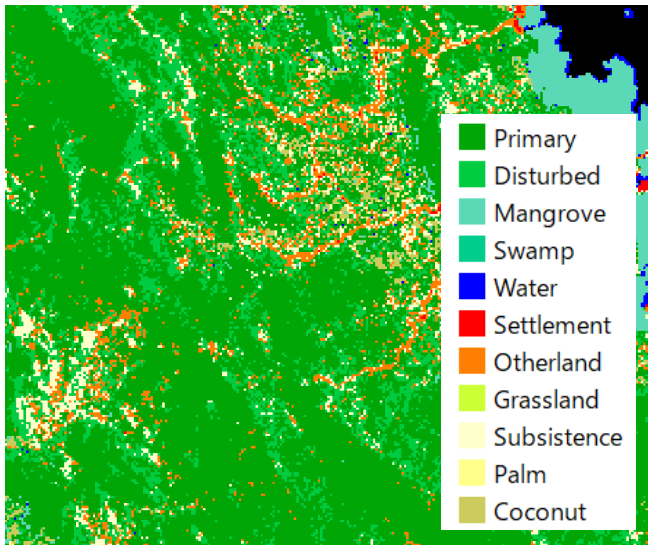
L8 mosaic image

Primary and Disturbed have consistence with satellite image very well

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

11: Primary Forest, 12: Disturbed Forest Classification2020, Malaita

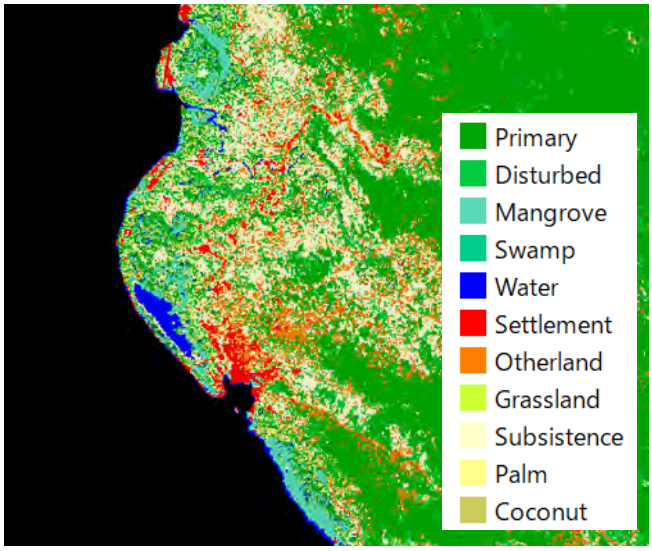




Global Forest Watch Loss year 2010-2019

Primary and Disturbed have consistence with Global Forest Watch

20: Water, 30: Settlement Classification2020, Malaita



L8 mosaic image

Water and Settlment have has consistency with satellite image, some part of Swamp seems to be classified as Mangrove

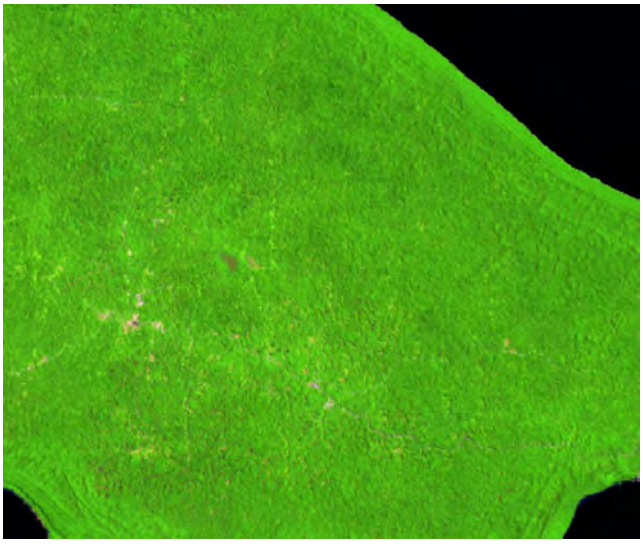
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

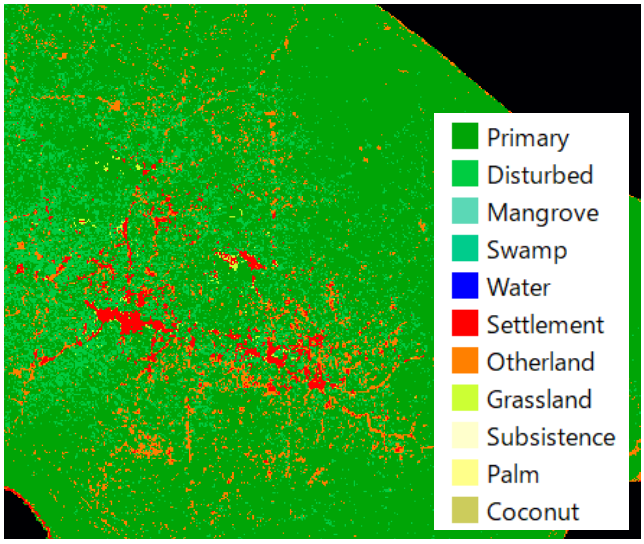
Evaluation of Classification2020, Renbell

- Forest and non forest have good consistency with satellite image, although Otherland is classified into Settlement in coastal area.
- Forest and non forest have good consistency with Global Forest Watch Loss year.

The classification has basically good quality

Over all Classification2020, Renbell



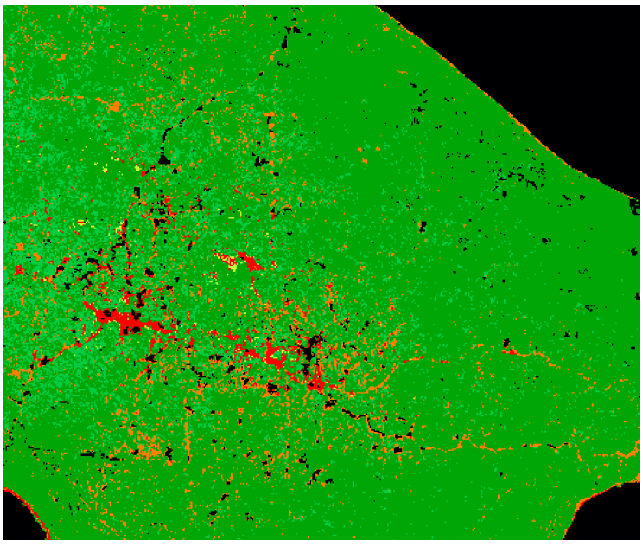


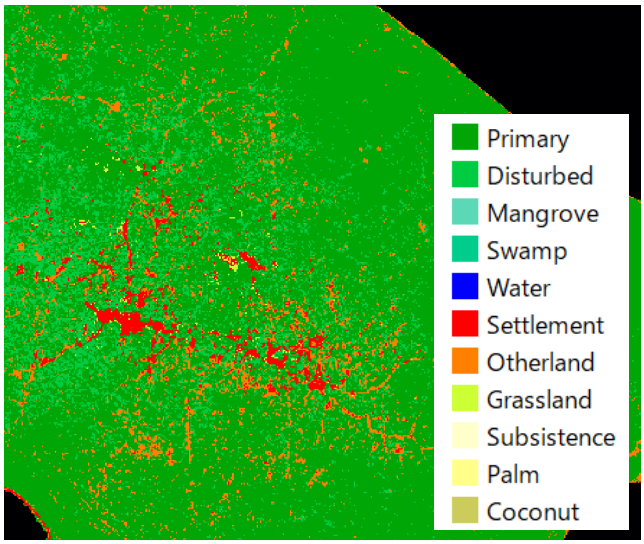
L8 mosaic image

Forest and non forest have good consistency with satellite image

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Over all Classification2020, Renbell





Global Forest Watch 2010-2019

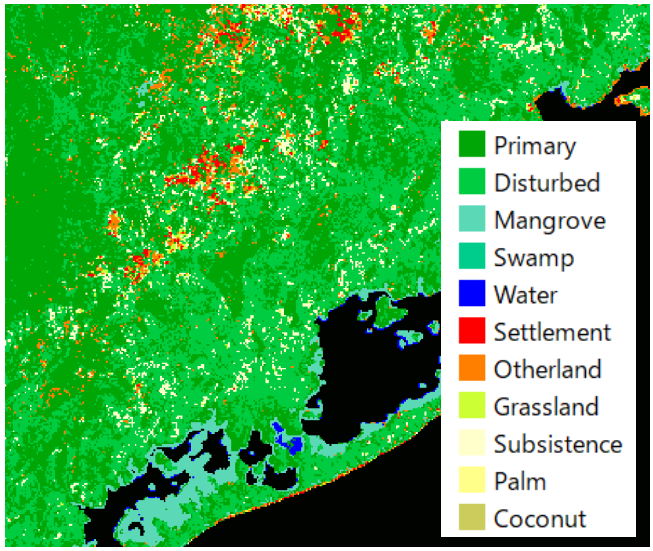
Forest and non forest have good consistency with Global Forest Watch Loss year.

Evaluation of Classification2020, Temotu

- Forest and Non-Forest has consistency with satellite image.

The classification has basically good quality

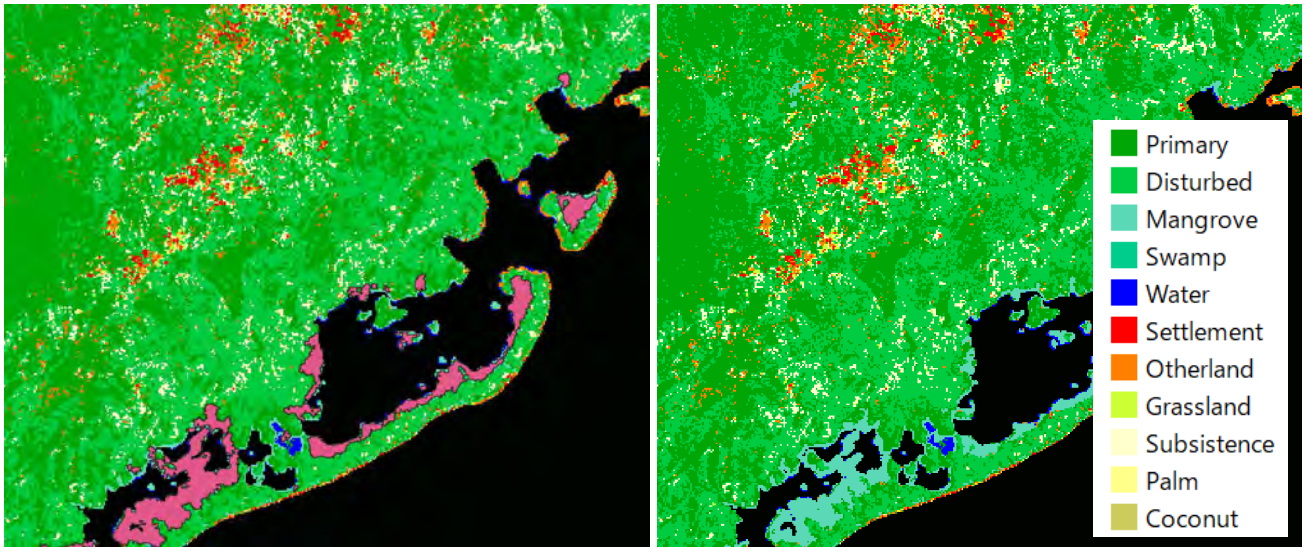
Over all Classification2020, Temotu



L8 mosaic image

Forest area and non-forest area have consistency with satellite image.

Over all Classification2020, Temotu

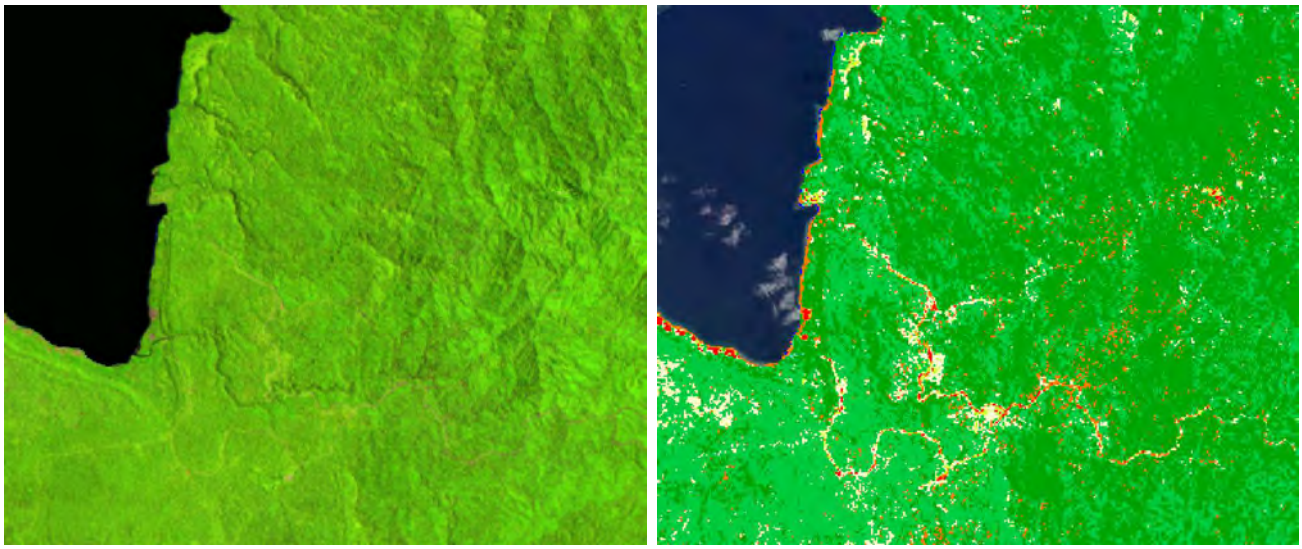


Global Mangrove Watch

Mangrove have consistency with Global Mangrove Watch data

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

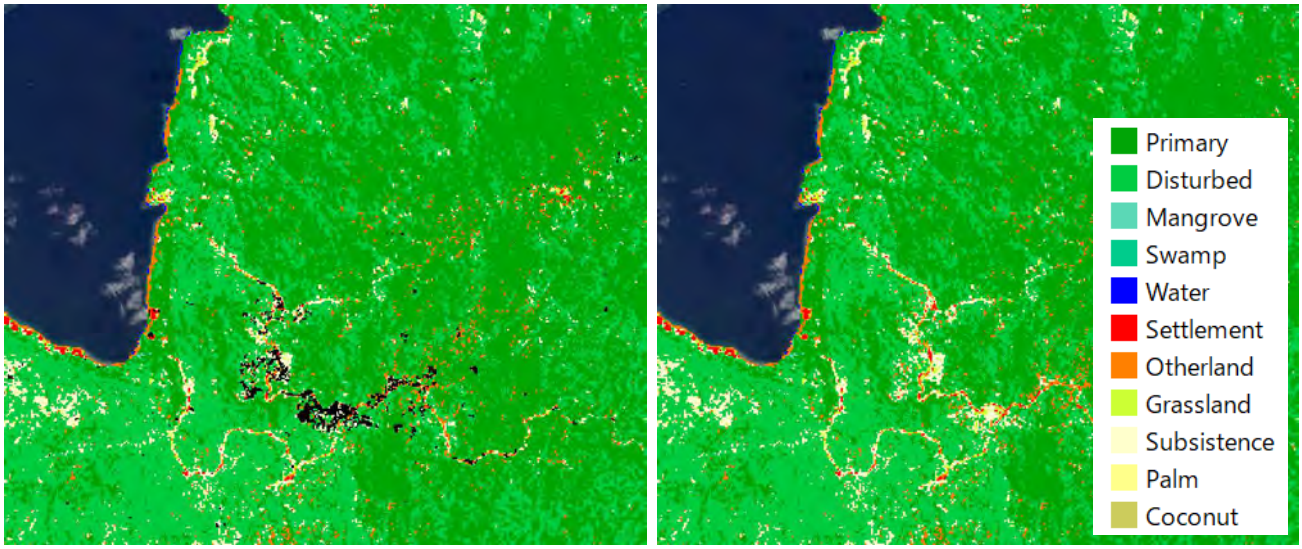
11: Primary, 12: Disturbed Classification2020, Temotu



L8 mosaic image

Disturbed Forest has consistency with satellite image.
It could be better if Otherland (road) appears clearly, though.

11: Primary, 12: Disturbed Classification2020, Temotu



Global Forest Watch Loss year 2010-2019

Primary and Disturbed have consistence with Global Forest Watch

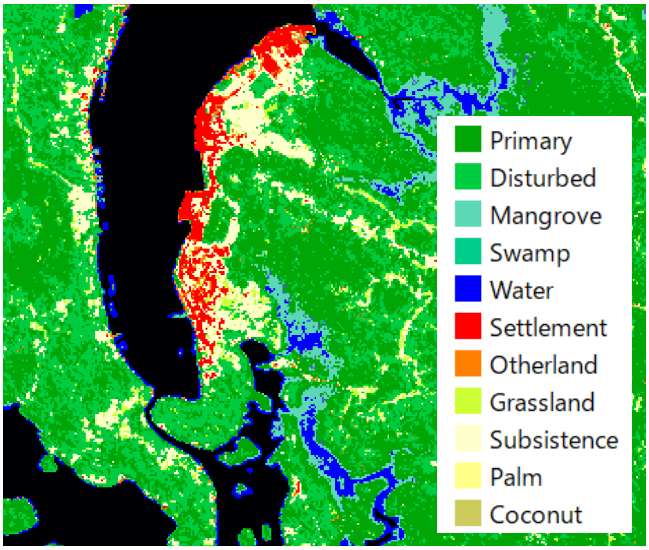
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Evaluation of Classification2020, Western

- Forest area and Non forest area have consistency with satellite image.
- Disturbed Forest and Subsistence have consistency with satellite image
- Disturbed Forest, Subsistence have consistency with Global Forest Watch Loss year image, although Distrubed Forest lacks a little
- Supposed Mangrove is classified very well, some of them could be changed to Swamp
- With Forest Plantation, Disturbed seems to be rather smaller

It could be trial to review the training point of Mangrove or Disturbed

Over all Classification2020, Western

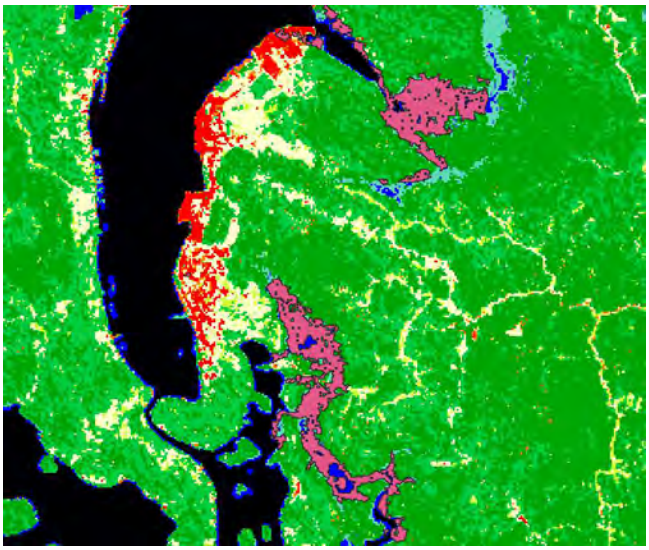


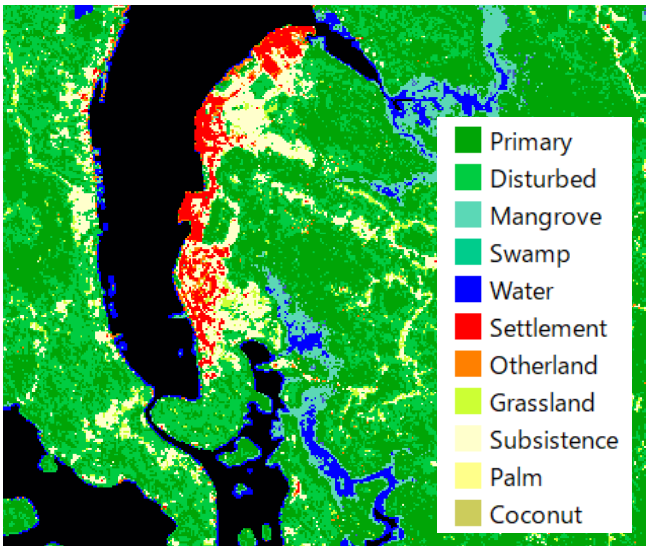
L8 mosaic image

Forest area and Non forest area have consistency with satellite image

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

13: Mangrove Classification2020, Western

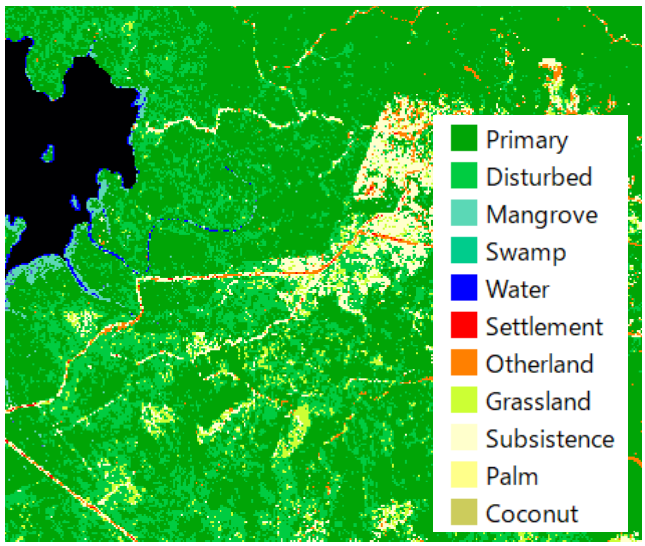




Global Mangrove Watch

Mangrove have consistency with Global Mangrove Watch data

11: Primary Forest and 12: Disturbed Forest Classification2020, Western

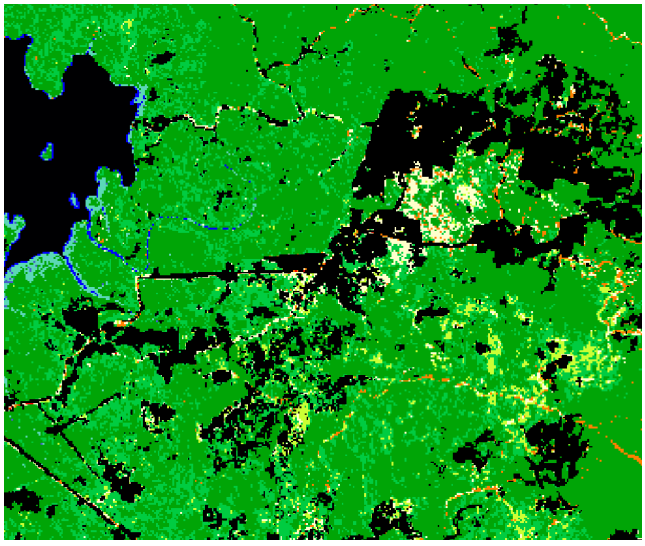


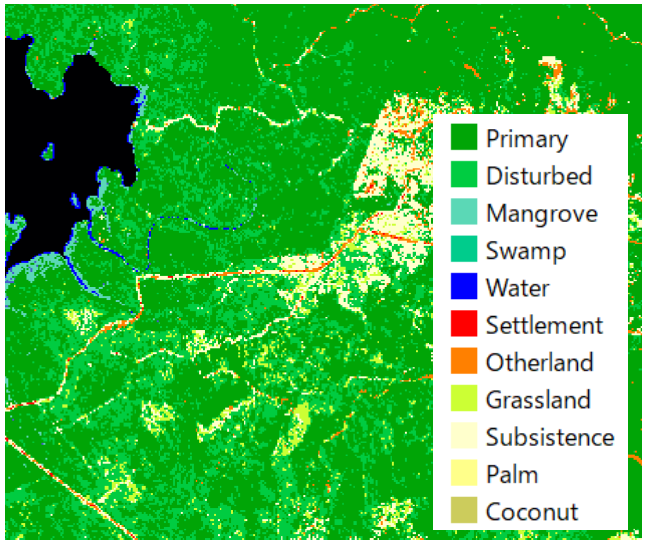
L8 mosaic image

Disturbed Forest and Subsistence have consistency with satellite image

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

11: Primary Forest and 12: Disturbed Forest Classification2020, Western

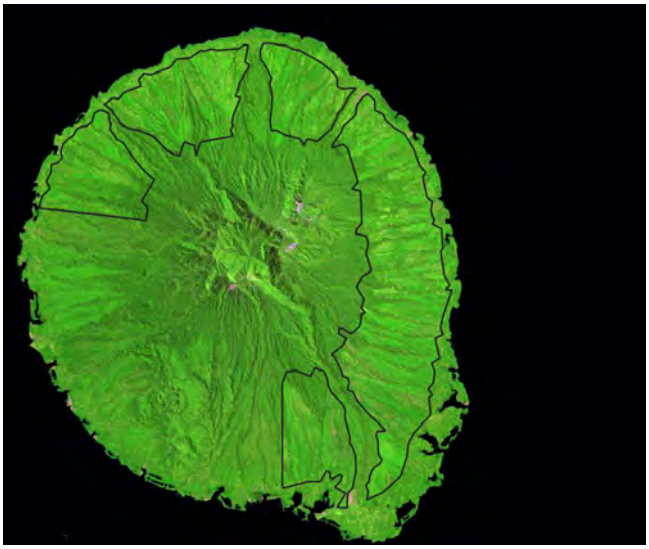


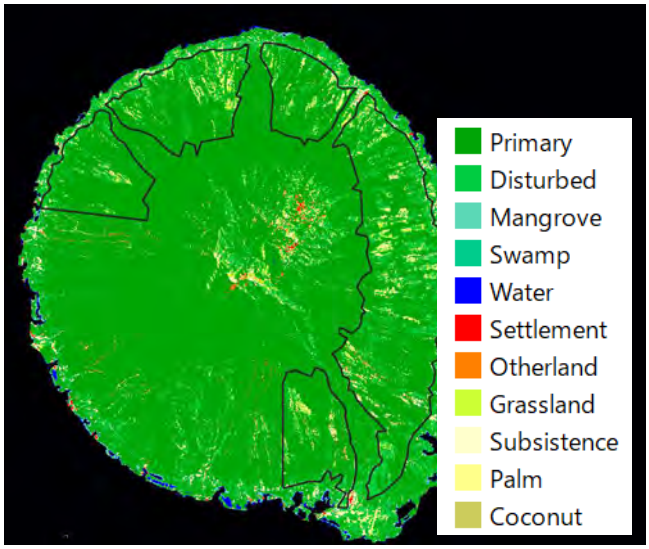


Global Forest Watch 2010-2019

Forest and non forest have good consistency with Global Forest Watch Loss year.

11: Primary Forest and 12: Disturbed Forest Classification2020, Western



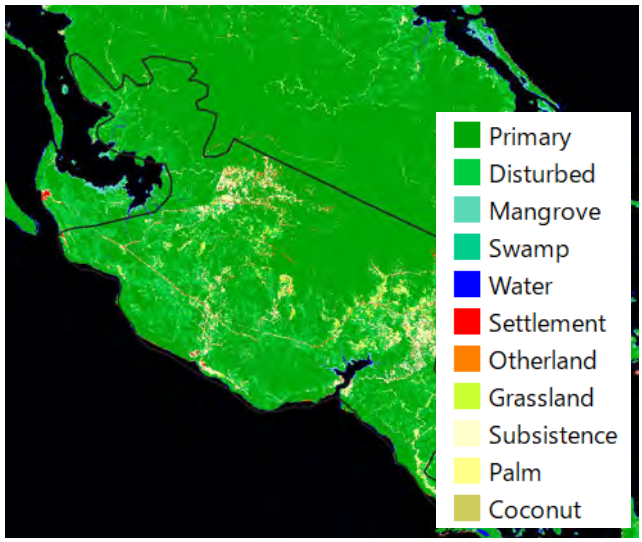


L8 mosaic image

With Forest Plantation, the Subsistence should be classified into Grassland or Otherland, Disturbed seems to be rather smaller

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

11: Primary Forest and 12: Disturbed Forest Classification2020, Western



L8 mosaic image

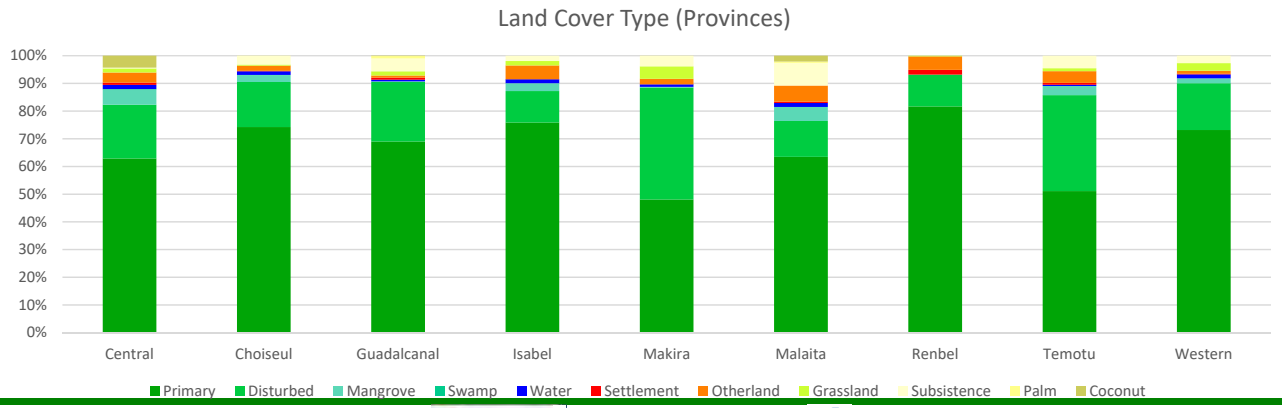
With Forest Plantation, Disturbed seems to be rather smaller

Assessment

Table shows the result of the classification map with Sepal

(ha)

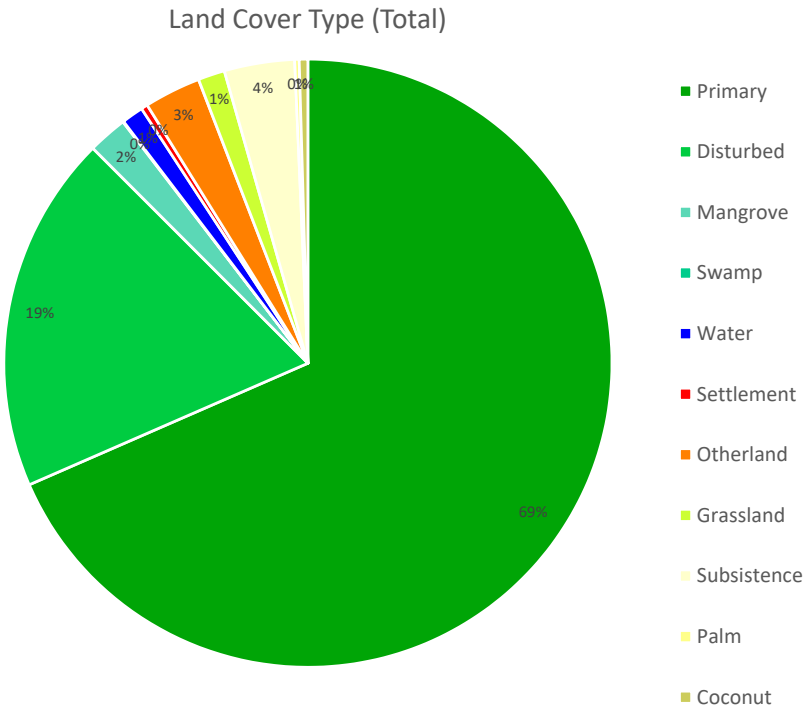
Class	Central	Choiseul	Guadalcanal	Isabel	Makira	Malaita	Renbel	Temotu	Western	Total	%
Primary	42,150	250,364	379,228	328,145	158,686	273,802	56,927	46,623	414,351	1,950,274	67.81%
Disturbed	13,017	54,768	118,163	49,265	133,274	55,998	7,992	31,596	95,767	559,840	19.47%
Mangrove	3,646	8,391	1,356	12,036	559	21,732	0	3,045	9,526	60,290	2.10%
Swamp	148	208	0	79	519	24	0	0	502	1,481	0.05%
Water	1,006	4,445	3,400	6,331	2,952	6,266	0	389	8,012	32,801	1.14%
Settlement	530	536	3,903	36	54	2,019	1,207	618	1,141	10,042	0.35%
Otherland	2,479	6,364	4,281	21,407	6,633	25,057	3,398	3,856	6,531	80,006	2.78%
Grassland	969	1,304	8,346	6,958	14,855	0	169	983	15,475	49,060	1.71%
Subsistence	211	10,877	25,553	8,386	12,575	35,386	0	4,125	15,258	112,371	3.91%
Palm	0	0	4,707	0	0	2,027	0	0	0	6,734	0.23%
Coconut	2,888	4	790	0	119	9,192	0	0	2	12,995	0.45%
Total	67,046	337,260	549,727	432,643	330,226	431,502	69,693	91,235	566,564	2,875,895	100.00%



The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Assessment

Table shows the result of the classification map with Sepal



Assessment Table shows the result of the classification map with Sepal

Class	Central	Choiseul	Guadalcanal	Isabel	Makira	Malaita	Renbel	Temotu	Western	%
Primary	62.87%	74.23%	68.98%	75.85%	48.05%	63.45%	81.68%	51.10%	73.13%	67.81%
Disturbed	19.42%	16.24%	21.49%	11.39%	40.36%	12.98%	11.47%	34.63%	16.90%	19.47%
Mangrove	5.44%	2.49%	0.25%	2.78%	0.17%	5.04%	0.00%	3.34%	1.68%	2.10%
Forest total	**87.72%**	**92.96%**	**90.73%**	**90.02%**	**88.58%**	**81.47%**	**93.15%**	**89.07%**	**91.72%**	**89.38%**
Non-forest	12.28%	7.04%	9.27%	9.98%	11.42%	18.53%	6.85%	10.93%	8.28%	10.62%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table shows the comparison of the classification 2020 with classification 2017 by FAO activity

2020	ha	%	2017	ha	%
Primary	2,570,404.23	89.38%	Forest	2,519,801.75	89.94%
Disturbed					
Mangrove					
Swamp	34,281.99	1.19%	Wetlands	26,800.49	0.96%
Water					
Settlement	10,041.93	0.35%	Settlement	19,615.94	0.70%
Otherland	261,166.77	9.08%	Other Land	5,822.65	8.40%
Grassland			Grassland	6,945.93	
Subsistence			Cropland	222,575.23	
Palm					
Coconut					
Total	2,875,894.92	100.00%	Total	2,801,561.99	100.00%

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Way Forward

- **Modify classification with external information**
- **Combine with Forest Type information**
- **Add the information to FMU attribute**

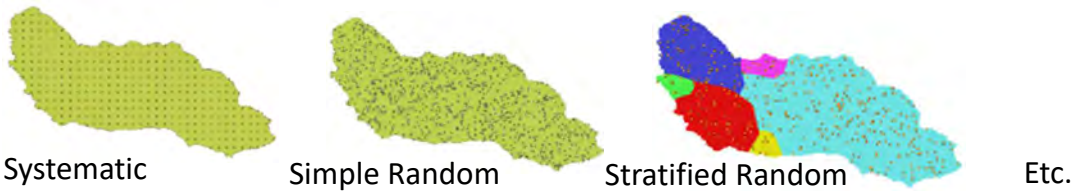
****Prepare map as raster and vector.**

Carbon stock estimation for Solomon islands

Method and example

Method to estimate carbon stocks per unit area

- Permanent sample plot method



Systematic Simple Random Stratified Random Etc.

- Stand carbon stock estimation models
  - Overstory height method with Lidar data
  - Crown diameter method with very high spatial resolution image(drone, aerial photo)
  - Back scattering coefficient method with SAR data
  - Model with Multidata, Multitemporal data (Landsat, sentinel2, SRTM, NDVI etc.)

Models are created using the sample plot survey.

1. Sample plot data for Stand carbon stock estimation models

- Sample plot data at Komuniboli and Falake in 2019

Komuniboli Falake

Estimated Tree volume, AGB ,carbon stocks per unit area(Above: Falake, Below: Komuniboli)

Index	Average of EST_H(m)	Sum of BA(m2)	TreeVol(m3)/ha	AGB(t)/ha	AGB C(t)/ha
Mean	19.7	5.2	245.5	455.6	214.1
SD	4.5	2.8	138.3	267.0	125.5
SE(95%CI)	2.6	1.6	78.3	151.1	71.0
95%CI UL	22.3	6.8	323.8	606.7	285.1
95%CI LL	17.1	3.6	167.3	304.5	143.1

Index	Average of EST_H(m)	Sum of BA(m2)	TreeVol(m3)/ha	AGB(t)/ha	AGB C(t)/ha
Mean	16.6	5.7	250.8	431.2	202.7
SD	4.4	2.5	102.8	193.3	90.9
SE(95%CI)	2.1	1.2	48.9	91.9	43.2
95%CI UL	18.7	6.9	299.6	523.1	245.8
95%CI LL	14.5	4.5	201.9	339.3	159.5

Sample plot data
(Above: Falake, Below: Komuniboli)

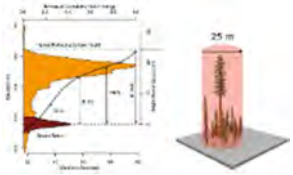
Plot No	Average of EST_H(m)	Sum of BA(m2)	TreeVol(m3)/ha	AGB(t)/ha	AGB C(t)/ha
4	12.7	1.6	76.1	114.5	53.8
5	16.1	3.2	134.7	212.9	100.1
8	30.6	7.6	341.6	727.0	341.7
11	17.8	4.1	174.6	281.5	132.3
18	21.3	4.7	249.8	503.7	236.7
19	15.9	3.1	138.8	237.4	111.6
20	23.2	8.4	353.1	590.3	277.4
21	19.9	4.3	213.6	421.8	198.2
22	20.1	6.5	349.4	721.5	339.1
23	17.1	1.4	68.2	134.9	63.4
24	22.0	6.7	309.9	566.3	266.2
25	19.5	10.6	536.7	955.4	449.0

Plot No	Average of EST_H(m)	Sum of BA(m2)	TreeVol(m3)/ha	AGB(t)/ha	AGB C(t)/ha
3	28.6	8.8	296.7	361.1	169.7
7	11.0	2.4	109.0	156.0	73.3
8	18.9	6.7	275.2	493.5	231.9
9	16.2	3.1	150.9	254.8	119.8
13	19.6	6.2	263.8	406.9	191.2
14	15.4	5.6	267.1	396.1	186.1
16	18.9	8.0	398.4	623.0	292.8
17	19.8	8.5	352.3	678.3	318.8
18	18.3	8.8	366.2	653.4	307.1
19	14.5	4.1	179.7	324.8	152.7
20	17.0	1.4	58.3	104.1	48.9
21	16.2	9.2	384.6	739.7	347.7
22	17.3	6.5	278.8	493.2	231.8
23	17.7	4.3	190.2	350.3	164.7
24	11.1	6.0	263.7	459.9	216.2
25	9.1	5.4	321.9	650.1	305.5
26	12.9	2.0	106.2	184.8	86.9

2-1. Overstory height method with Lidar data

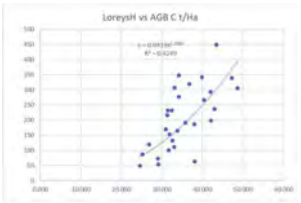
Step 1. Preprocessing of GEDI data

GEDI stands for Global Ecosystem Dynamics Investigation.
High resolution Lidar data of Earth's forests and topography from the International Space Station (ISS) .
GEDI consists of many point (25m) on the track of ISS. Each point has the data of laser return.
Detail: https://gedi.umd.edu/



Step 2. Estimation carbon stock of GEDI points based on inventory data

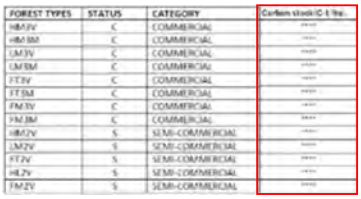
Plot based Carbon/ha



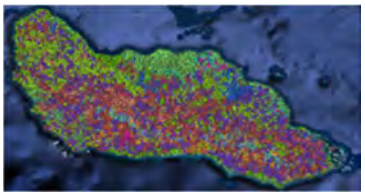
Model: Overstory height vs Carbon

Estimating AGB/ha of GEDI points.

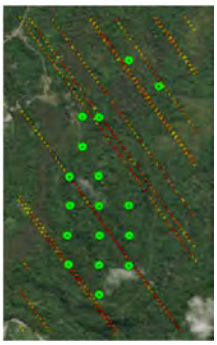
Step 3. Calculate Carbon stock(C-t/ha) by forest type using estimated carbon stock of GEDI points



Step 4. Calculate Carbon stock(C-t) by FMU



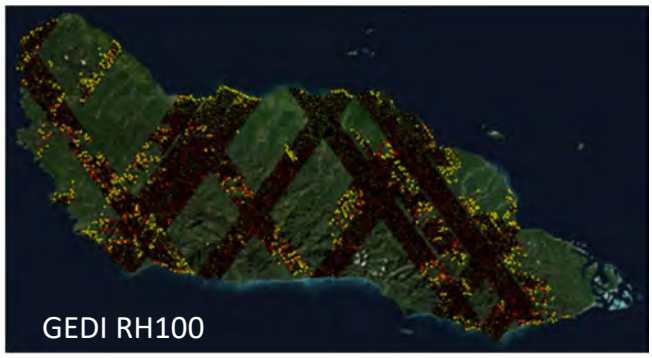
2-2. Result of overstory height method

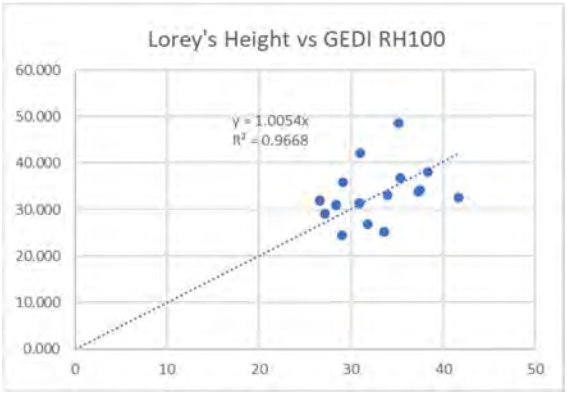


Komuniboli sample plot and GEDI RH100 (in 2019 and 2020).

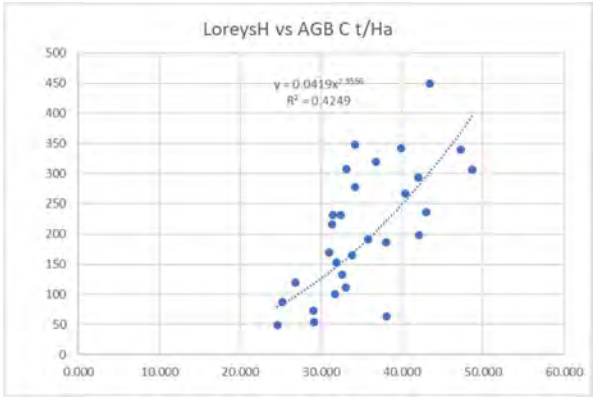
Nearest GEDI RH100 was transferred to Sample plots

(Disturbances on this area need to be checked.





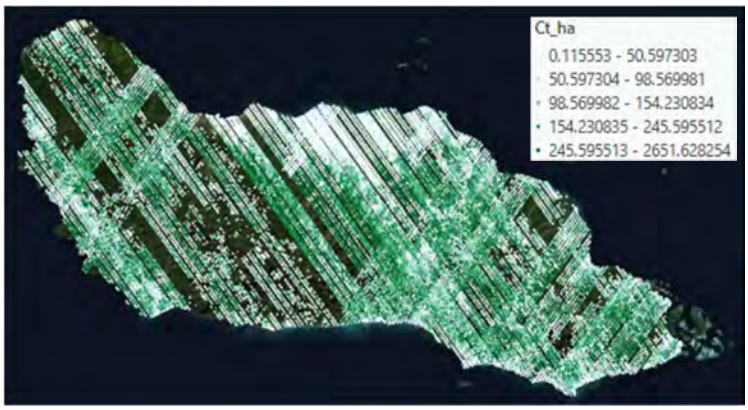
Estimation of Lorey's Height from GEDI RH100
(GEDI2019,2020 at Komuniboli were used.)



Estimation of AGB Carbon/Ha from Lorey's Height
(Sample plot data at Komuniboli and Falake was used)

2-3. Result of Above Ground Carbon stock(t) / Ha of GEDI points

2019@Guadalcanal

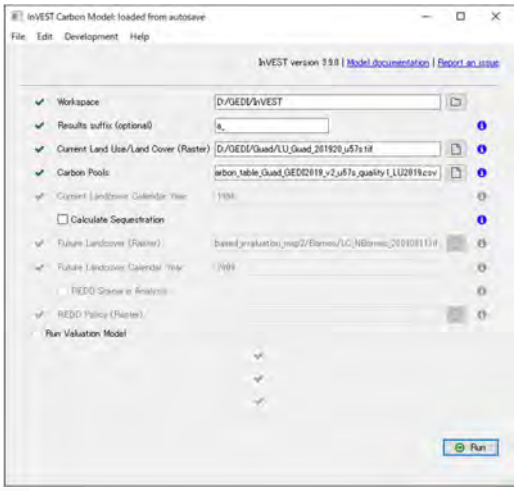


2020@Guadalcanal

2-4. Method of Carbon Mapping of Guadalcanal.

lucode	LULC_Nai	C_above	C_below	C_soil	C_dead
0	Null	0	0	0	0
11	Primary	151.6	56.1	0	0
12	Disturbed	61.6	22.8	0	0
13	Mangrove	44.2	16.4	0	0
20	Water	0.0	0.0	0	0
30	Settlemen	0.0	0.0	0	0
40	Otherland	36.0	13.3	0	0
50	Grassland	18.1	6.7	0	0
61	Subsistan	17.7	6.5	0	0
62	Palm	44.2	16.4	0	0
63	Coconut	86.2	31.9	0	0

Carbon table (Based on GEDI Lidar in 2019 data)



InVEST model(Carbon)

https://naturalcapitalproject.stanford.edu/software/invest

Landuse2020

The year 2020 data is defined to use images from 1 Jan 2015 to 31 Dec 2019 (5 years)

2-5. Carbon table calculation(Detail)

Carbon table with error metrics and comparison with FRL

		Based on GEDI (Lidar)									FRL of Solomon islands				
lucode	LULC_Name	AVG_ RH100	AVG_ AGB_C(t)	SD_ AGB_C(t)	Count	SE_ CI95	EST_ BGB_C(t)	Carbon stock	UL_ CI95	LL_ CI95	Lowland/Hill forest/Fresh water/swamp	Montane Forest	Primary	Disturbed	Ref
11	Primary	27.7	128.5	107.8	5796	2.8	47.5	176.1	179.9	172.3	193.2	83.6			
12	Disturbed	17.0	47.8	66.6	4296	2.0	17.7	65.5	68.3	62.8	126.5	54.7			
13	Mangrove	16.2	41.4	46.3	33	15.8	15.3	56.7	78.4	35.1			134.5	88.0	
20	Water	15.7	44.6	91.8	237	11.7	16.5	61.0	77.1	45.0	-				
30	Settlement	11.1	17.8	35.4	345	3.7	6.6	24.3	29.5	19.2	-				
40	Otherland	13.7	29.6	43.4	620	3.4	10.9	40.5	45.2	35.8	-				
50	Grassland	10.8	16.8	23.1	228	3.0	6.2	23.0	27.1	18.9	8.0				46(shrub)
61	Subsistance	11.7	17.5	17.2	60	4.3	6.5	24.0	30.0	18.1	21.0				
62	Palm	17.1	43.4	46.6	1617	2.3	16.1	59.4	62.5	56.3	88.0				
63	Coconut	23.5	83.5	57.1	78	12.7	30.9	114.3	131.7	97.0	126.0				

GEDI data was filtered by

(1) RH100: >= 5m, <=80m*

(2) Elevation <= 1500 m**

(3) Slope <= 6 degree**

Over/underestimate happens in GEDI RH100 metric due to a slope within the footprint (25m radius). Higher RH100 may be affected by cloud cover.

*Hayashi et al(2015) Regional forest biomass estimation using ICESat/GLAS spaceborne LiDAR over Borneo 80m

**Potapov et al(2020) Mapping global forest canopy height through integration of GEDI and Landsat data

2-5. Carbon table calculation(Detail)

Carbon table with error metrics and comparison with FRL

		Based on GEDI (Lidar)									FRL of Solomon islands				
lucode	LULC_Name	AVG_ RH100	AVG_ AGB_C(t)	SD_ AGB_C(t)	Count	SE_ CI95	EST_ BGB_C(t)	Carbon stock	UL_ CI95	LL_ CI95	Lowland/Hill forest/Fresh water/swamp	Montane Forest	Prim ary	Distu rbed	Ref
11	Primary	29.9	151.6	121.0	14101	2.0	56.1	207.7	210.4	205.0	193.2	83.6			
12	Disturbed	18.8	61.6	83.5	6292	2.1	22.8	84.4	87.2	81.6	126.5	54.7			
13	Mangrove	16.6	44.2	48.8	35	16.2	16.4	60.6	82.8	38.5			134.5	88.0	
20	Water	16.3	46.4	85.6	292	9.8	17.2	63.5	77.0	50.1	-				
30	Settlement	11.6	19.3	34.8	429	3.3	7.1	26.4	30.9	21.9	-				
40	Otherland	14.6	36.0	60.1	858	4.0	13.3	49.3	54.8	43.8	-				
50	Grassland	11.1	18.1	26.0	457	2.4	6.7	24.8	28.1	21.6	8.0				46(shrub)
61	Subsistance	11.7	17.7	17.1	61	4.3	6.5	24.2	30.1	18.3	21.0				
62	Palm	17.2	44.2	47.6	1667	2.3	16.4	60.6	63.7	57.4	88.0				
63	Coconut	23.7	86.2	59.6	80	13.1	31.9	118.1	136.0	100.2	126.0				

GEDI data was filtered by
(1) RH100: >= 5m, <=80m
(2) Elevation <= 1500 m
(3) Slope <= 12 degree*

Over/underestimate happens in GEDI RH100 metric due to a slope within the footprint (25m radius). Higher RH100 may be affected by cloud cover.

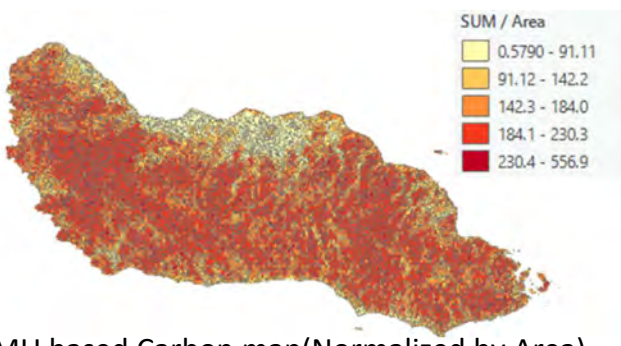
*Fayad et al(2021) Terrain slope effect on forest height and wood volume estimation from GEDI data :more than 20%

2-6. Result of Carbon Mapping of Guadalcanal.

Total carbon: 90,877,599 ton of C (12 degree). (if 6 degree: 76,451,144)
(Total Tree volume: roughly about 113,739,172 m3 (12 degree), (if 6 degree: 95,683,534 m3))
(Wood density: 0.5)

Carbon stock map of Guadalcanal island

FMU based Carbon map



FMU based Carbon map(Normalized by Area)

Maps are based on 12-degree filter

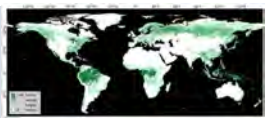
2-7. Way forward

- The model was reasonable compared with related studies.
- Many of the sample points did not locate at GEDI point(Nearest GEDI points were used).
- Sample plot data may be biased.
  Only Komuniboli. GEDI data at Falake could not be used because of cloud cover.
  → Further sample data at GEDI points helps to improve the model(Considering the forest type).
- Calculation of error range is needed.
- The carbon stock of Solomon islands can be calculated using latest landcover map with forest type(Step3,4)

3-1. Overstory height method with Lidar data

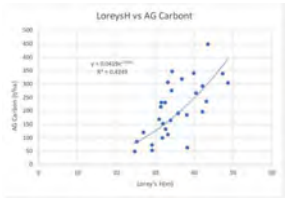
Step 1. Prepare GEDI Global Height data

GEDI Global Forest Canopy Height, 2019
30-m spatial resolution global forest canopy height map was developed through the integration of the Global Ecosystem Dynamics Investigation (GEDI) lidar forest structure measurements and Landsat analysis-ready data time-series.
https://glad.umd.edu/dataset/gedi



Step 2. Estimation carbon stock of GEDI points based on inventory data

Plot based Carbon/ha

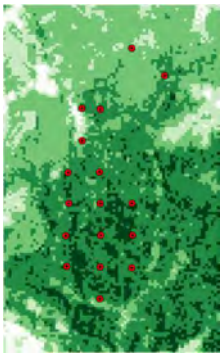


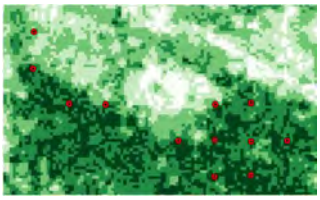
Modeling: Overstory height vs Carbon

Estimating AG Carbon/ha of each pixel

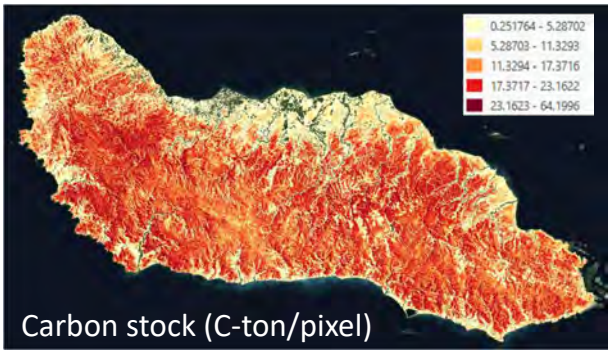
Step 3. Calculate Carbon stock(C-t) by FMU

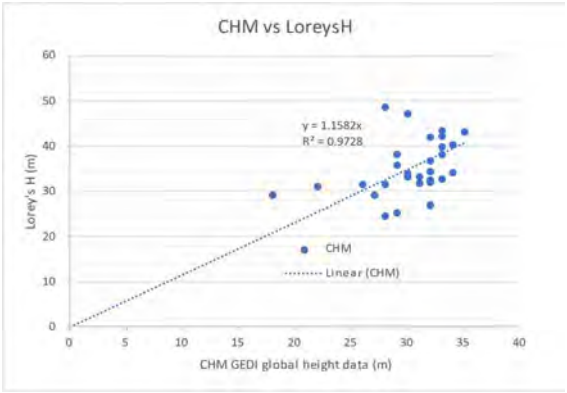
3-2. Result of overstory height method



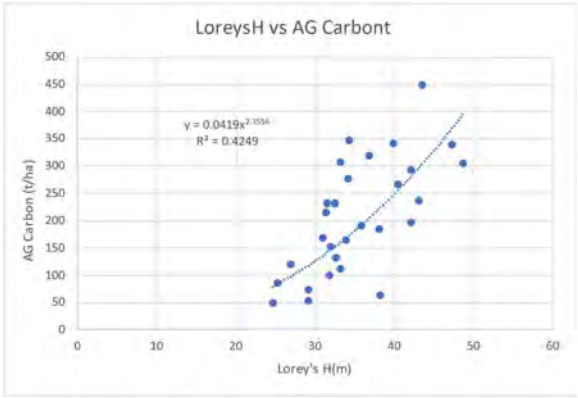


Komuniboli and Falake sample plot and GEDI Global Height data.





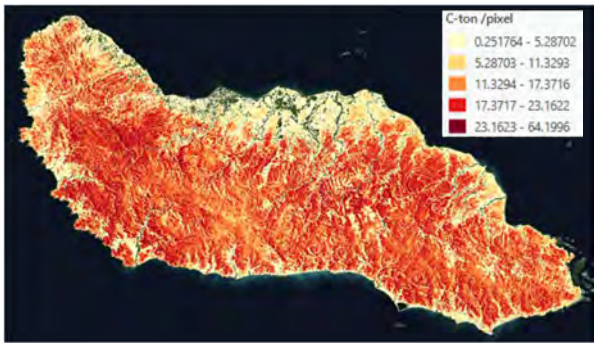
Estimation of Lorey's Height from GEDI Global Height



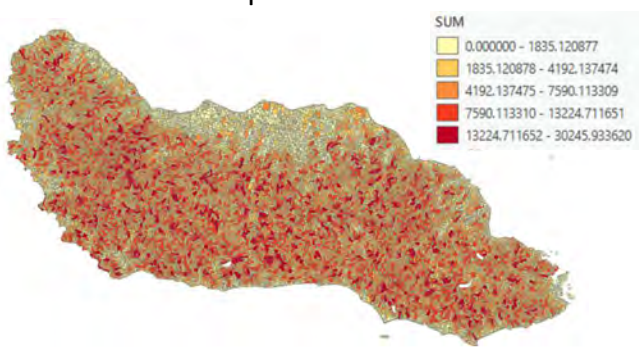
Estimation of AGB CO2/Ha from Lorey's Height
(Sample plot data at Komuniboli and Falake was used)

3-3. Result of Carbon Mapping of Guadalcanal.

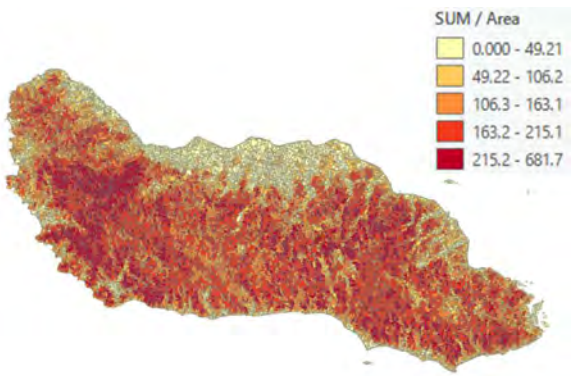
Total carbon: 78,855,798 C-ton
(Total Tree volume: roughly about 98,693,114 m3 (Wood density: 0.5)



Carbon stock map of Guadalcanal island



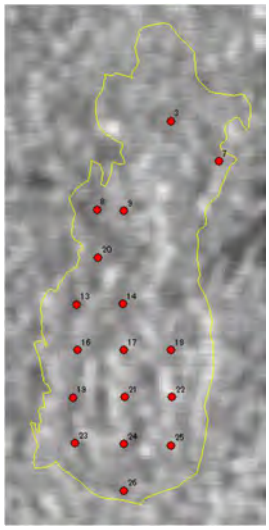
FMU based Carbon map



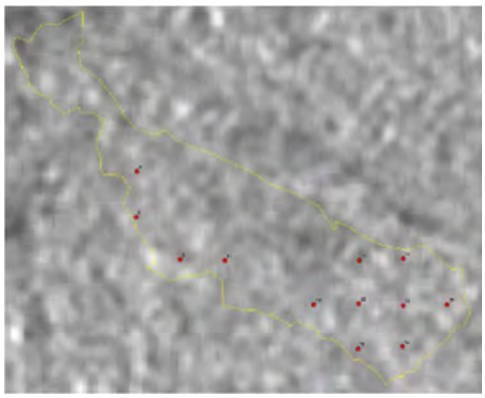
FMU based Carbon map(Normalized by Area)

4. Back scattering coefficient method with SAR data

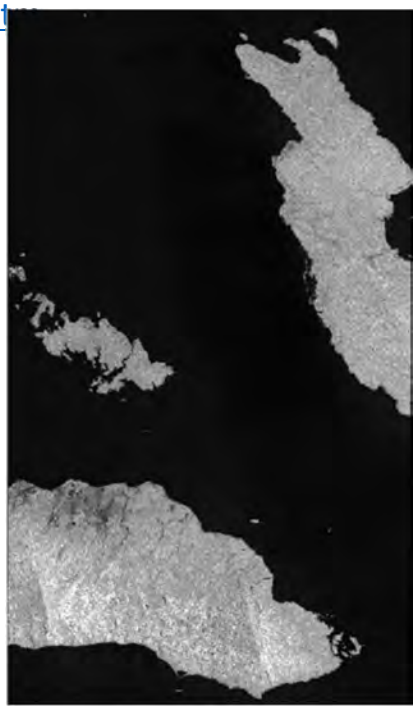
- HV band of PALSAR usually shows correlation(legalistic curve) with AGB/ha
- SAR data: PALSAR2 global mosaic(γ0: slope corrected, 25m spatial resolution) https://www.eorc.jaxa.jp/ALOS/a/en/dataset/fnf_e.ht
- Sample plot data
  Komuniboli and Falake



@Komuniboli

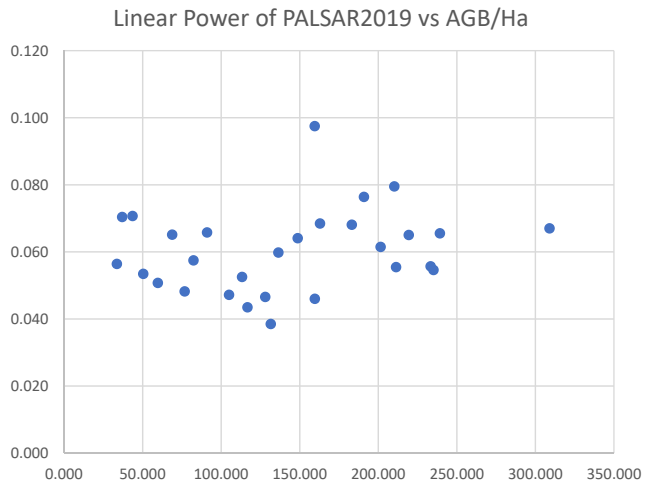


@Falake

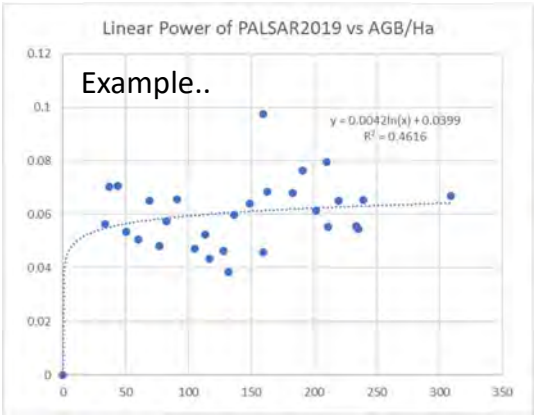


PALSAR HV in 2019

4-2. Result of Back scattering coefficient method with SAR data



The low biomass area data was missing. Around 50-100t/Ha, it may be saturated. The result shows similar result with other researches.



If a point near 0,0 v is added….

References

TABLE 3A.1.10
DEFAULT VALUES OF BIOMASS EXPANSION FACTORS (BEFs)
(BEF $_2$ to be used in connection with growing stock biomass data in Equation 3.2.3;
and BEF $_1$ to be used in connection with increment data in Equation 3.2.5)

Climatic zone	Forest type	Minimum dbh (cm)	BEF_2 (overbark) to be used in connection to growing stock biomass data (Equation 3.2.3)	BEF_1 (overbark) to be used in connection to increment data (Equation 3.2.5)
Boreal	Conifers	0-8.0	1.35 (1.15-3.8)	1.15 (1-1.3)
	Broadleaf	0-8.0	1.3 (1.15-4.2)	1.1 (1-1.3)
Temperate	Conifers: Spruce-fir	0-12.5	1.3 (1.15-4.2)	1.15 (1-1.3)
	Pines	0-12.5	1.3 (1.15-3.4)	1.05 (1-1.2)
	Broadleaf	0-12.5	1.4 (1.15-3.2)	1.2 (1.1-1.3)
Tropical	Pines	10.0	1.3 (1.2-4.0)	1.2 (1.1-1.3)
	Broadleaf	10.0	3.4 (2.0-9.0)	1.5 (1.3-1.7)

Note: BEF_2s given here represent averages for average growing stock or age, the upper limit of the range represents young forests or forests with low growing stock; lower limits of the range approximate mature forests or those with high growing stock. The values apply to growing stock biomass (dry weight) including bark and for given minimum diameter at breast height; Minimum top diameters and treatment of branches is unspecified. Result is above-ground tree biomass.

Sources: Isaev *et al.*, 1993; Brown, 1997; Brown and Schroeder, 1999; Schoene, 1999; ECE/FAO TBFRA, 2000; Lowe *et al.*, 2000; please also refer to FRA Working Paper 68 and 69 for average values for developing countries (http://www.fao.org/forestry/index.jsp)

https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Anx_3A_1_Data_Tables.pdf

4.3.3 Biomass and Carbon Values and Emission Factors in Forest Land (Tier 1)

In chapter 4.3.3, the following assumptions were made on the EF forest degradation:

Currently, Solomon Islands has no reliable data regarding the differences in carbon stocks between intact and degraded forest. Therefore, a proxy had to be used to estimate emissions from forest degradation. PNG calculated a corresponding ratio based on field assessments, which is expected to be sufficiently applicable for forests in the Solomon Islands due to (a) floristic and structural similarity of commercial forests (mainly low land and hill forests) and (b) similar, largely unplanned logging practices with high harvesting intensity. It can furthermore be expected that due to a higher level of supervision by the Forest Authority in PNG, the frequency of re-entry logging is lower than in the Solomon Islands. This means that Solomon Islands commercial forests are likely more degraded and have lower carbon stocks than PNG's commercial forests. In this sense, the application of the PNG EF for forest degradation ratio can be considered conservative. Solomon Islands considers the establishment of a national Emission Factor for forest degradation a future improvement of the FRL (cp.chapter 10), once reliable data becomes available.

Biomass/ Carbon Pool	*Components*	*Units*	*Lowland Forests*	*Hill Forests*	*Freshwater Swamp/ Riverine Forest*	*Montane Forests*	*Mangrove Forest*	*Plantation Forests*
Biomass in primary forest	Above-ground biomass	t d.m. ha^{-1}	300.0	300.0	300.0	140.0	192.0	150.0
	Root-shoot ratio	BGB /AGB	0.37	0.37	0.37	0.27	0.49	0.37
	Below-ground biomass	t d.m. ha^{-1}	111.0	111.0	111.0	37.8	94.1	55.5
	Total living biomass	t d.m. ha^{-1}	411.0	411.0	411.0	177.8	286.1	205.5
Biomass in degraded forest[6]	Above-ground biomass	t d.m. ha^{-1}	196.0	196.0	196.0	92.0	126.0	98.0
	Root-shoot ratio	BGB /AGB	0.37	0.37	0.37	0.27	0.49	0.37
	Below-ground biomass	t d.m. ha^{-1}	72.7	72.7	72.7	24.7	61.6	36.3
	Total living biomass	t d.m. ha^{-1}	269.1	269.1	269.1	116.4	187.3	134.5
EF primary deforestation	Before	t d.m. ha^{-1}	411.0	411.0	411.0	177.8	286.1	205.5
	After	t d.m. ha^{-1}	0.0	0.0	0.0	0.0	0.0	0.0
	Difference	t d.m. ha^{-1}	411.0	411.0	411.0	177.8	286.1	205.5
	Conversion	t d.m. / t CO_{2e}	1.72	1.72	1.72	1.72	1.65	1.72
	Emission factor	t CO_{2e} ha^{-1}	708.3	708.3	708.3	306.4	473.1	354.1
EF forest degradation	Before	t d.m. ha^{-1}	411.0	411.0	411.0	177.8	286.1	205.5
	After	t d.m. ha^{-1}	269.1	269.1	269.1	116.4	187.3	134.5

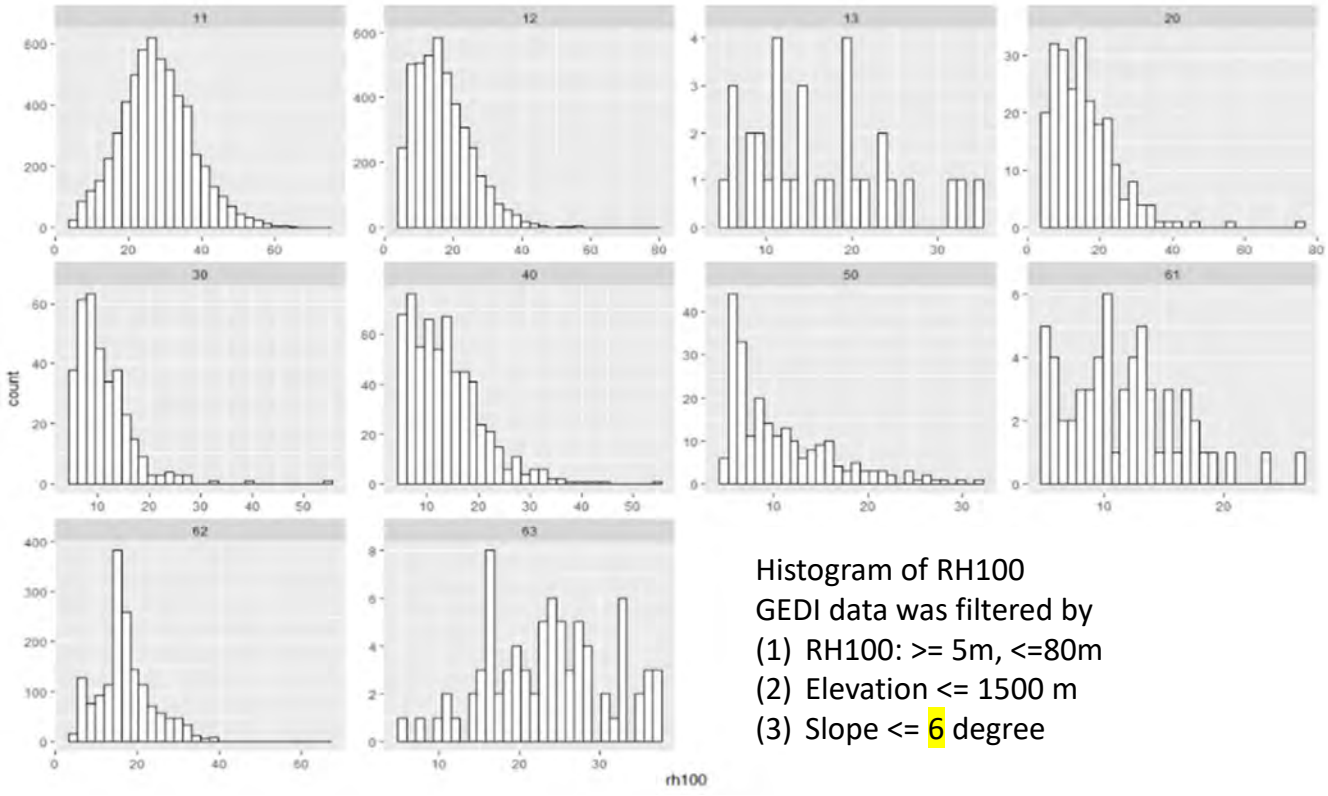
Definition Mosaic image and Classification

1. Mosaic image specification
Source: Landsat 8 and Landsat 8TM image library,
Year to be used: Images from 1 Jan 2015 to 31 Dec 2019 (5 years) to make year 2020 data
Naming: (province name)_mosaic_L8_2020

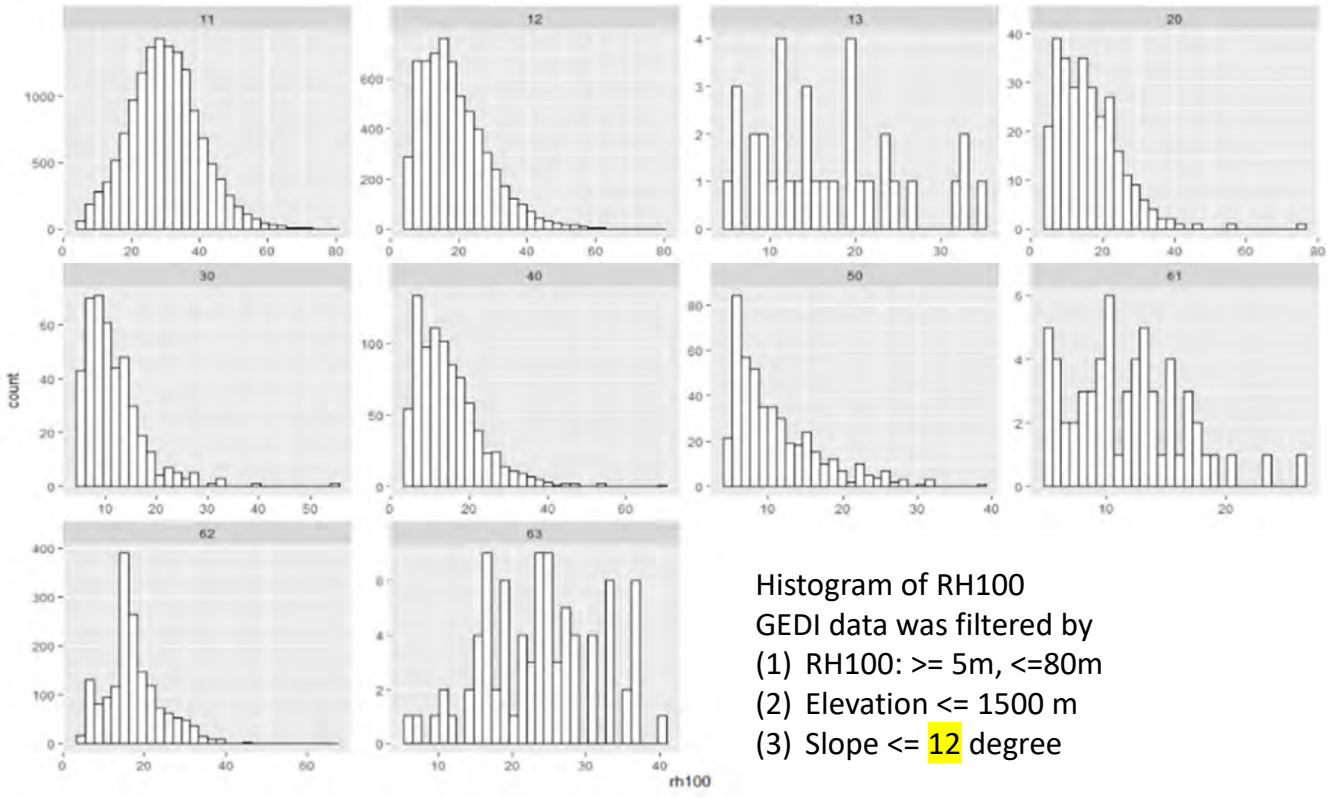
2. Classification image specification
Source: Mosaic images defined above (Each province)
Naming: (province name)_classification_L8_2020
***The year 2020 data is defined to use images from 1 Jan 2015 to 31 Dec 2019 (5 years)

3. Class specification

CD	td	color
11	Primary	#00a506
12	Disturbed	#00cc41
13	Mangrove	#009900
14	Swamp	#00cc8c
20	Water	#0000ff
30	Settlement	#ff0000
40	Otherland	#ff8000
50	Grassland	#ccff34
61	Subsistance	#ffffcc
62	Palm	#ffff8a
63	Coconut	#cccc5c



Histogram of RH100
GEDI data was filtered by
(1) RH100: >= 5m, <=80m
(2) Elevation <= 1500 m
(3) Slope <= 6 degree



Histogram of RH100
GEDI data was filtered by
(1) RH100: >= 5m, <=80m
(2) Elevation <= 1500 m
(3) Slope <= 12 degree

Utilization and Management of SolGeo-FIMS

16, September, 2021
Hirokazu Takahashi
Kokusai Kogyo Co., Ltd.

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

The objective

The forest information tools (SolGeo-FIMS) has already been developed and is in operation, but its utilization in line with the actual work of the Ministry of Forestry and Research has not progressed sufficiently. The reasons for this need to be investigated and analyzed in this meeting

The points of discussion

For example The following issues can be considered in case of FRMTS.

- It is not possible to set up a workflow that is directly useful for the daily work of the GIS/Mapping Section such as information sharing.

- The data which is directly useful for the work of the REDD+ (international reporting, etc.) is not included.

>Not upload document, dataset(maps), training(GIS, system) photo,
>Problem:, access, network
>continuous training, (for decision making), officer get a view for system and get accustomed
>Accesss to system,
>Awareness for officers, plus training

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

The points to be Improved

- It is not possible to set up a workflow that is directly useful for the daily work of the GIS/Mapping Section such as information sharing.

➢ Make workflows for daily tasks using SolGeo-FIMS
➢ Make a rule for data sharing

- The data which is directly useful for the work of the REDD+ (international reporting, etc.) is not included.

➢ Collect documents or dataset.
➢ Organize document or dataset
➢ upload necessary information to SolGeo-FIMS.
➢ Create new dataset

Way Forward

- 1. Challenge, Neck bottle
>Not upload document, dataset(maps), training(GIS, system) photo,
>Problem:, access, network
>continuous training, (for decision making), officer get a view for system and get accustomed
>Accesss to system,
>Awareness for officers, plus training

>Reminder of Access site
>Training which concentrates Logging concession map eg.) thematic training

2. Necessary Information
Documents
>Application Form (web-site, but exits sensitive document), Regulation, Workplan, Policy

Map or Dataset
>>Logging road, Plantation,
>>reforestation area (small holder)

Sol-FIMS Task Force Meeting Concept Note (Tentative)

1. Objective

The forest information tools (SolGeo-FIMS) has already been developed and is in operation, but its utilization in line with the actual work of the Ministry of Forestry and Research has not progressed sufficiently. In this meeting the first step to be taken will be discussed to utilize SolGeo-FIMS efficiently in MOFR, based on the analysis of the previous discussion

2. Date:

13 October 2021 From 10:00am to 14:00pm

3. Venue:

Planning Division Office

ZoomVideo call link:

https://us06web.zoom.us/j/81793753728?pwd=clZveHdjclVEVHZSZFJiclp3a2xDdz09

4. Agenda

(1)	10:00-11:00	Utilization and Management of SolGeo-FIMS (Mr. Takahashi)
(2)	10:00-12:00	Discussion of Way forward (Data collection, Training contents and schedule)
(3)	12:00-13:00	Lunch time
(4)	13:00-14:00	Planning of Trainings

SolGeo-FIMS taskforce meeting for Utilization and Management of Forest Information Tools

16, September, 2021
Hirokazu Takahashi
Kokusai Kogyo Co., Ltd.

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

The objective

The forest information tools (SolGeo-FIMS) has already been developed and is in operation, but its utilization in line with the actual work of the Ministry of Forestry and Research has not progressed sufficiently. The reasons for this need to be investigated and analyzed in this meeting

Discussion (SolGeo)

- Information uploaded into SolGeo for use by officers is very useful, and some officers have accessed the information shared.
- Most of the officers are not accustomed to using new platforms such as this, thus could be the main reason why officers are still collecting information in the old ways of doing so in the Ministry.
- More capacity building or training on how to access the platform is necessary, so that officers can truly see the ease of dissemination and accessing of information using SolGeo
- Internet connection problems, and not every officer in the Ministry have their own computer, which could be why some don't access the platform.
- Awareness of SolGeo platform to all officers of all the divisions of the Ministry, and on the job trainings regarding this.
- Information good to be shared in formats easily understood by officers. For instance, maps are readily available in formats such as jpeg.
- A suggestion to have a linkage between MoFR website and SolGeo-FIMS
- Another suggestion to conducting a focus training for the GIS team of the Ministry.
- Creating a simple workflow for the SolGeo –FIMS.
- Ministry of Infrastructure roads sector are seeking advice from MOFR in regards to existing logging roads for connecting road network across the country, thus this could be a good dataset to include in the system.
- Plantation woodlots for reforestation should be digitized, mapped (polygon)and included as well

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Challenge, Bottle Neck

1. Lack of information
   - Necessary document, datasets (map), photos are Not uploaded

2. Awareness
   - Officers need to get a view of the system, and to get accustomed.
   - Skill to utilize GIS and System

3. Others
   - Network Problem
   - PC procurement
   - Linkage of MOFR web-site and SolGeo-FIMS etc.

Suggestions for improvement

1. Additional Information
>Documents
>>Application Form
Regulation, Workplan, Policy

>Map or Dataset
>>Logging road,
>>Plantation
>>Reforestation woodlots

1. Workflow
>Establish workflow using Forest Information Tools
>>Logging Application and Logging Monitoring
2. Training
>Continuous training, (for decision making), training for officer to get a view for system and to get accustomed.
>Thematic training which focus on the specific subject such as Logging Concession map
3. Information sharing
>Some of accessibility problem come from lack of how to

Way forward

No	Item	TaskForce	Japanese Experts
1	Organization Information	• Upload Application Form, Regulation, Workplan, Policy by each division • Industrial Plantation dataset (Ongoing by Stanley) • Maps ready to use (pdf or image style) • Create reforestation woodlots	• Upload useful global dataset • Create Logging road data from satellite image. • Land Cover Map • Update other information (Volume, FMU etc.)
2	Workflow	• Establish workflow using Forest Information Tools 1. Logging Application 2. Forest Monitoring	
3	Training	• General training of training for SolGeo-FIMS for MOFR officers • Thematic training 1. Logging Concession 2. FMU	• Workflow(on the Job training) training for Taskforce members

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Discussion

Data Upload

No	Item	TaskForce	Japanese Experts
1		• International Report (FRL report, Project reports, Annual report etc) • Upload Application Form, (logging, milling application, Export, protected area, etc) Regulation, (forest and timber utlizi act, CoLP,) Workplan, Policy by each division • Industrial Plantation dataset (Ongoing by Stanley) • Maps ready to use (pdf or image style) Data list to be upload (confidential(SolGeo) and public(web-site)) ---------- • Create reforestation woodlots	• Upload useful global dataset • Create Logging road data from satellite image. • Land Cover Map • Update other information (Volume, FMU etc.)

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Work Flow

No	Item	Task Force	Japanese Experts
1	Logging milling Application	• Provide the current workflow	• Create new workflow with SolGeo-FIMS
2	Forest Monitoring	• Provide the current workflow They need to be able to implement.	• Create new workflow with SolGeo-FIMS
3			

Training Theme

No	Item	TaskForce	Japanese Experts
1	Workflow training		• Hold a training with new Workflow and SolGeo-FIMS 8 to 12 November
2	General information for SolGeo-FIMS	• General training • How to access Next year, mid-February For Licensing, utilization, etc.	
2	Logging Concession	• Hold a training of Concession data with SolGeo-FIMS for MOFR officers	
3	FMU	• Hold a training of FMU for MOFR officers	
4	Drone	• Hold a training of Drone for MOFR officers	
5	Tablet app		
6	Forest Type		

MINISTRY OF FORESTRY RESOURCE MANAGEMENT (MOFR) IN SOLOMON ISLANDS

KOKUSAI KOGYO CO.LTD

1.0 Project Title

MOFR Geonode and Geoserver Geospatial Content Management System

2.0 About this Document

The introduction of the system analysis report for the Ministry of forestry and resource provides an overview of the entire Software requirement specification with purpose, system capabilities and scope, system architecture, user goals, event table, references and Definitions, and Acronyms. The aim of this report is to gather and analyze and give an in-depth insight into the complete **MOFR Geonode & Geoserver Geospatial Content Management System** by defining the problem statement in detail. Nevertheless, it also concentrates on the capabilities required by stakeholders and users with their needs as well as defining high-level user requirements. The detailed requirements of the **MOFR Geonode & Geoserver Geospatial Content Management System** are provided in this document.

3.0 Purpose

The purpose of the document is to collect and analyze all assorted ideas that have come up to define the system, its requirements with respect to the user's requirement. Also, we shall predict and sort out how we hope this product will be used in order to gain a better understanding of the system, outline concepts that may be developed later, and document ideas that are being considered. In short, the purpose of this report is to provide a detailed overview of the MOFR **Geonode & Geoserver Geospatial Content Management System**, its parameters and its goals. This document describes the project's target audience and its user interface, hardware and software requirements.

4.0 Project Team

John Smith Daffe	Wayin Solution CEO & Managing Director
Japhliet Rouhana	Hire Consultant
JICA/KOKUSAI KOGYO CO.LTD	Project Stakeholder

5.0 System Capabilities and Scope

This subsection contains the requirement for the MOFR geospatial content management. These requirements are organized by each of the following requirements: User requirement, System requirement, functional requirement, and non-functional requirement. Requirements from these categories are then refined into user goal table and event table to best capture the functional requirement of the system.

- **Internal User Requirement**
  - Admin user shall be able to approve the user registration of new user
  - User shall be able to login to geonode/geoserver before viewing the data
  - Admin User shall able to assign new user privilege based on their organizational roles
  - User shall able to upload spatial data to the geonode and geoserver
  - User shall able to explore a map in any given zoom level
  - User shall able to create a map
  - User shall able to create a group
  - User shall able to invite other end users
  - User shall able to view spatial data information
  - User shall able to view spatial data attribute
  - User shall able to share a map with friends

- User shall able to comment on any given map
- User shall able to make an announcement
- User shall able to views uploaded layers
- User shall able to views uploaded documents
- User shall able to upload layers
- User shall able to upload Documents

- **System Requirement**

  - The system shall display all the GIS layer or Map that uploaded
  - The system shall allow the user to upload any GIS data format
  - The system shall notify the user when new data is uploaded
  - The system shall provide detailed information or metadata of the spatial data
  - The system shall provide the attribute table of spatial data
  - The system shall provide browsing option to see the data
  - The system shall provide editing tool to edit the spatial data
  - The system shall allow to download the metadata
  - The system shall provide legend for the map created using Geonode
  - The system shall allow rating on spatial data or map
  - The system shall enable user to search all spatial data
  - The system shall display all the matching results based on current search
  - The system shall provide storage of all database on redundant computer
  - The system shall provide for replication of database to off-site storage location

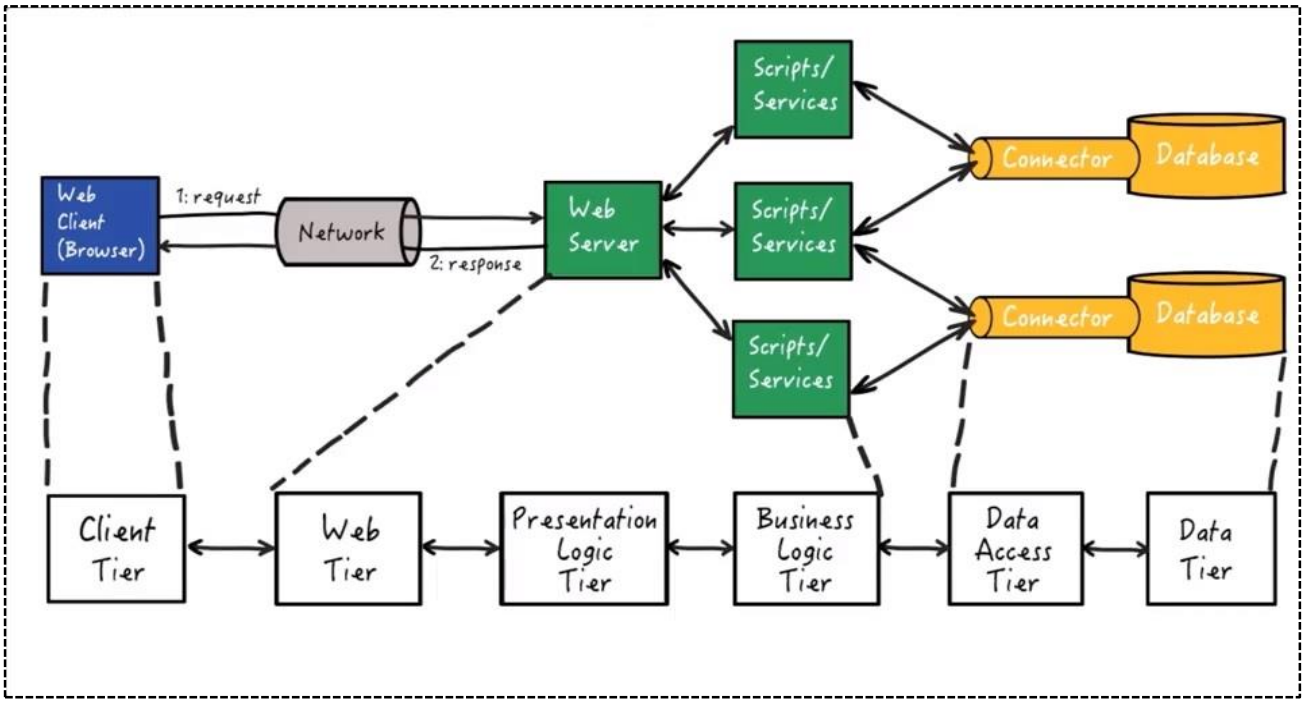
- **Functional Requirements**
  - How the system should react to particular inputs
  - How the system should react to an upload
  - How the system should react to particular situation
  - The system shall provide appropriate view for the user to view the map
  - The user shall be able to search for a map

- **Non-functional Requirements**

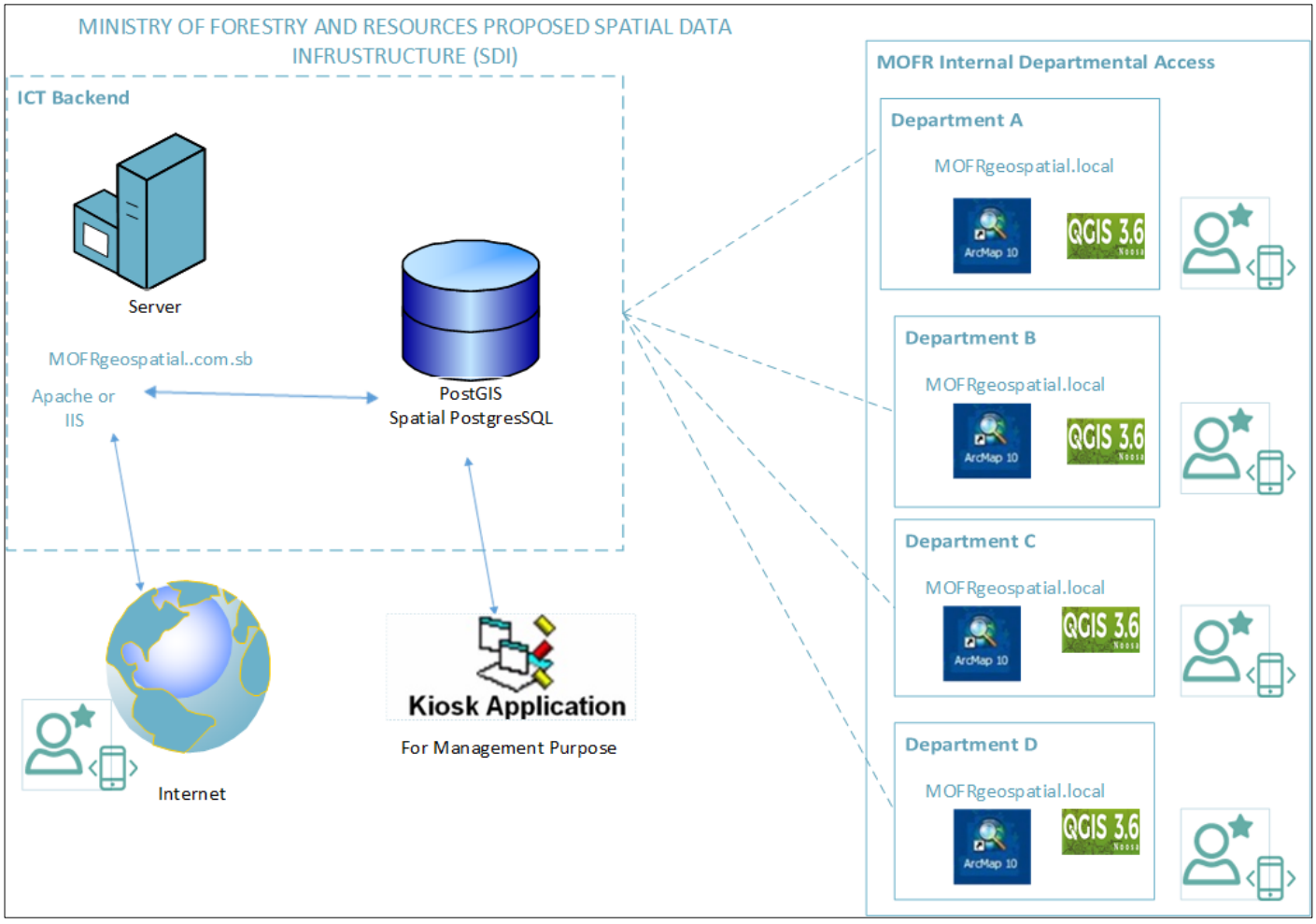
These are requirements that related to qualities and properties of the system that makes the system attractive (performance, usability, reliability and security)

  - The system shall be able to support maximum processing on system
  - The system must be operational 24/7
  - The system must be robust
  - The system down time shall not be more than one day
  - The system shall be able to reduce backlog of claims
  - The system shall be design with a secure communication protocol
  - The system shall be deploy with standard encryption algorithm to secure the data storage
  - The system shall provide a uniform look and feel between all the web pages
  - The system shall be safe guided by Ministry Information Technology Policies

6.0 System Architecture



High Level Abstraction of Geonode & Geoserver Implementation



7.0 User Goals Table

USERS/ACTORS	GOALS
Internal End User	➢ Register an Account ➢ View the spatial data info ➢ View spatial data attribute ➢ View metadata details ➢ able to share the map ➢ able to rate the map ➢ Comment on the map ➢ Download given spatial data ➢ Switch between different image backdrop such as Openstreetmap, Google map & Open topography ➢ Print a map ➢ Place a Placeholder on a map ➢
GIS User	➢ Register an Account ➢ View the spatial data info ➢ View spatial data attribute ➢ View metadata details ➢ Able to share the map ➢ Able to rate the map ➢ Comment on the map ➢ Upload the spatial data layer ➢ Upload the map document ➢ Create & design the map ➢ Recommend spatial data to upload ➢ Add new user when approved ➢ Update exiting account when required
Executive User	➢ Access to sensitive data ➢ Make a critical decision making based on spatial data ➢ View the spatial data info ➢ View spatial data attribute ➢ View metadata details ➢ Able to share the map ➢ Able to rate the map ➢ Comment on the map
ICT Infrastructure Section	➢ Provide Infrastructure to support the system ➢
Administrator	➢ Manage all user account ➢ Delete User account ➢ Add new user when approved ➢ Update exiting account when required ➢ Manage the entire system ➢ Set privilege on user account

8.0 Event Table

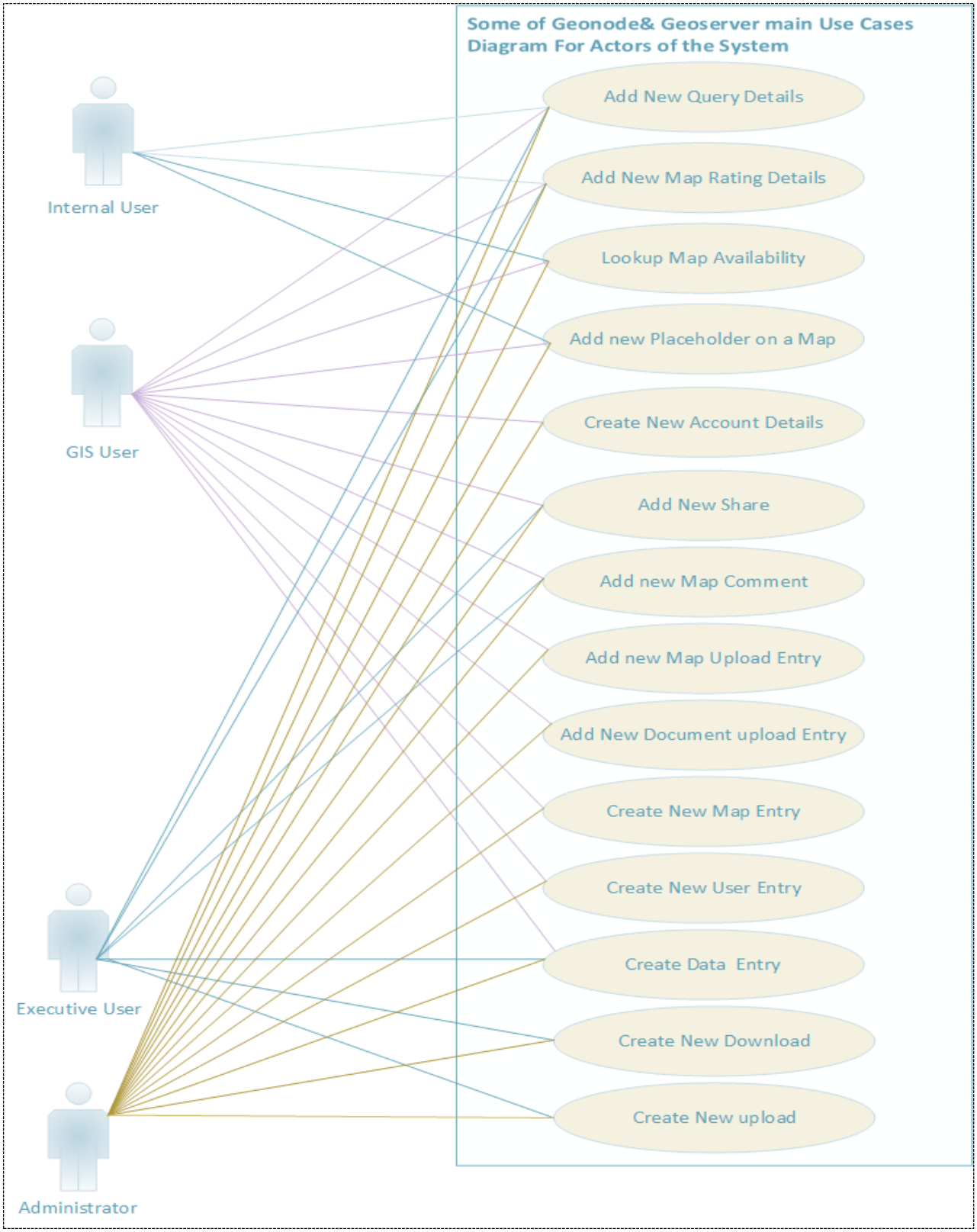
Assist to identify the user, input, output, processes & functional requirement of the system

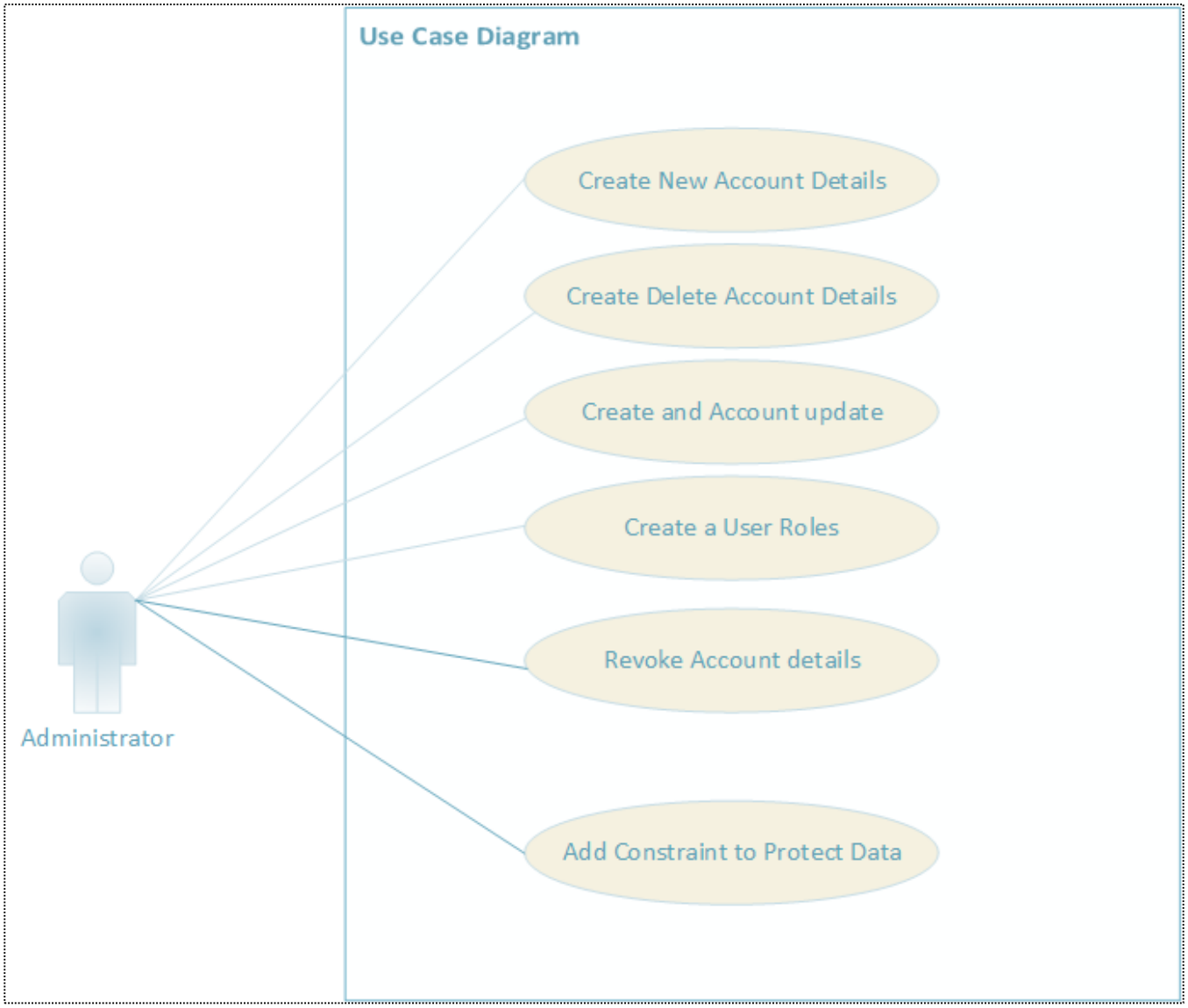
Event	Trigger (input)	Source	Use Case	Response (Output)	Destination
Internal User wants to Create Account	New Account Entry	Internal User	Create New account Details	Notification of Confirmation	Internal User
Internal User Wants to Query a System	New Query Entry	Internal User	Add New Query Details	Confirmation of Query	Internal User
Internal User wants to Rate a map	New Map Rating	Internal User	Add New Map Rating Details	Confirmation of Rating Details	Internal User
Internal User wants to Search for Available Map	Map Inquiry	Internal User	Lookup Map Availability	Map Availability Details	Internal User
Internal User wants to Place a placeholder on a Map	Placing Placeholder on	Internal User	Add New Placeholder on a Map	Notification of Placeholder of the map	Internal User
GIS User wants to create account	New Account Entry	GIS User	Create New account Details	Notification of confirmation	GIS User
GIS User Wants to Query a System	New Query Entry	GIS User	Add New Query Details	Confirmation of Query list	GIS User
GIS User wants to Rate a map	New Map Rating	GIS User	Add New Map Rating	Confirmation of Rating Details	GIS User
GIS User wants to Search for a Map	Map query	GIS User	Lookup Map Availability	Map Availability details list	GIS User
GIS User wants to share the map on any social media	New Map share	GIS User	Add New share	Confirmation of share	GIS User
GIS User wants to comment on map	New Map Comment	GIS User	Add New map comment	Confirmation of comment	GIS User
GIS User wants to upload spatial data	New upload Entry	GIS User	Add New map upload Entry	Confirmation of upload status	GIS User

GIS User wants to upload Document	New upload Entry	GIS User	Add New Document upload Entry	Confirmation of upload status	GIS User
GIS User wants to Create Map	New Map Entry	GIS User	Create New Map Entry	Notification of Confirmation	GIS User
GIS User wants to add new user	New User Entry	GIS User	Create New User Entry	Notification of Confirmation	GIS User
Executive User wants to add Sensitive data	New data Entry	Executive User	Create New data Entry	Notification of Confirmation	Executive User
Executive User wants to download spatial data	New download	Executive User	Create New download	Download Status	Executive User
Executive User wants to upload spatial data	New upload	Executive User	Create New upload	Upload Status	Executive User
Executive User Wants to Query a System	New Query Entry	Executive User	Add New Query Details	Confirmation of Query	Executive User
Executive User wants to Rate a map	New Map Rating	Executive User	Add New Map Rating	Status of Rating	Executive User
Executive User wants to Search for a Map	New Query Entry	Executive User	Lookup Map Availability	Map Availability Details	Executive User
Administrator User wants to Create Account	New Account Entry	Administrator User	Create New account Details	Notification of Confirmation	Administrator User
Administrator User wants to delete Account	New delete	Administrator User	Delete Account	Notification of Confirmation	Administrator User
Administrator User wants to update an account	New update Entry	Administrator User	Add an update Entry	Notification of Confirmation	Administrator User
Administrator User wants to revoke an account	Revoke an Account Entry	Administrator User	Remove an account Entry	Notification of Confirmation	Administrator User

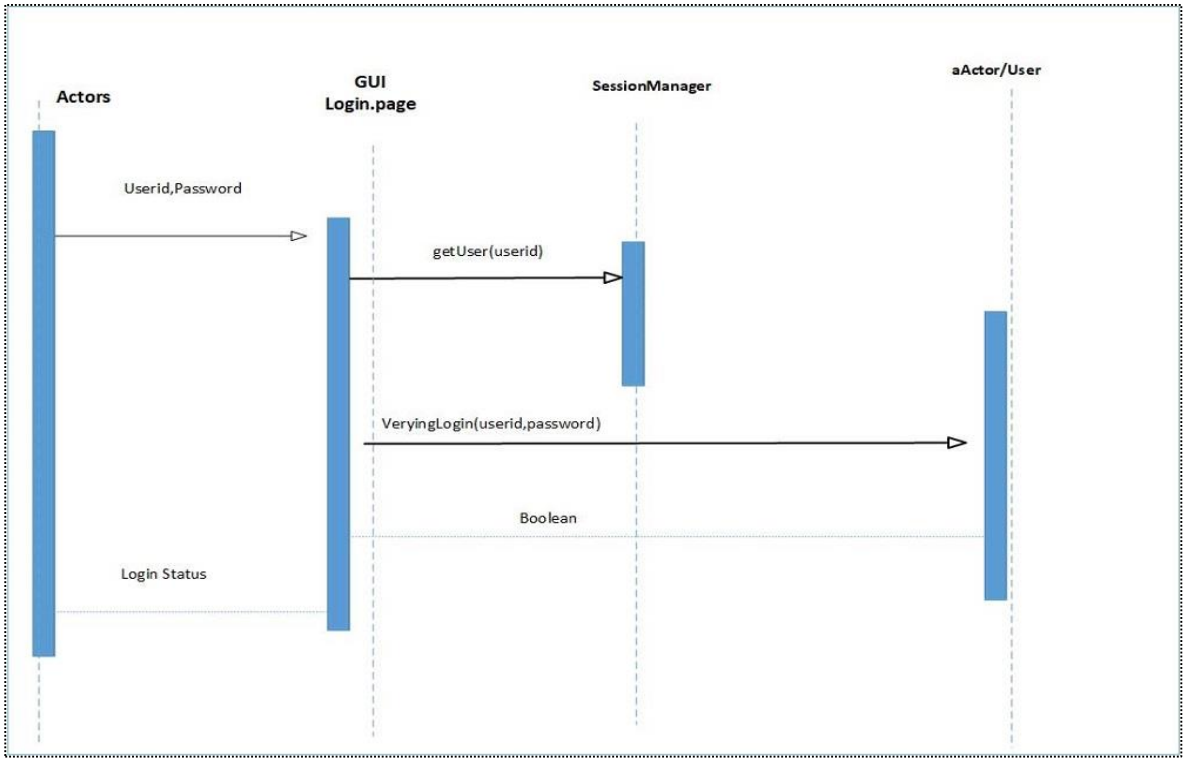
7.0 Object-Oriented Analysis Artifacts

- **Use-Case Diagram**





Geonode & Geoserver User Login Sequence Diagram



8.0 References

Baird.S, Johnson. B. R, Satinger.W. 2012. *System Analysis and design in changing world.*

9.0 Definitions and Acronyms

Administrator	Looks after the whole system, can add, remove, upgrade and run queries based on the system.
User Requirement	Document used in software engineering that specifies what the user expects the software to be able to do
System Requirement	Configuration that a system must have in order for hardware or software application to run smoothly and efficiently
Functional Requirements	Are user visible features and are typically initiated by stakeholder of the system
Non- Functional Requirements	Are non-visible features and but required for an effective running of an application-security, backup, etc...
Geoserver	Open-source server for sharing geospatial data
Geonode	Web-based application and platform for developing geospatial information system and spatial data infrastructure (SDI)
System	A set of procedures or process deciding to which something is done.
Queries	Comments that can be made or used to find information about a set of specific data on a system.
User Goal	A text of maximum of two lines written from point of view of end users.
Event Table	Table that list all such events and behavior the system is expected to exhibit in reaction to each event.
User	People who will be using the system
Use Case	Use Case represent system functionality, the requirements of the system from the user's perspective. Or A diagram that shows a set of use cases and actors and their relationship
GIS	Geographical Information System

MOFR Geonode System Migration Proposal Plan

The proposed migration plan for the MOFR Geonode system is to migrate the entire virtual machine that is running Geonode to a new host server with high capabilities and capacity.
The new server can be obtained in four ways depending on JICA's preference and as follows:

1. Negotiate with ICTSU to provide a Virtual machine host. This would mean access to MOFR Geonode will be via SIGNET.
This option is more ideal for enterprise-scale but in terms of reliability, it may not be guaranteed.
Bandwidth speed may also not be guaranteed for high performance due to high traffic congestion usually experience on SIGNET.

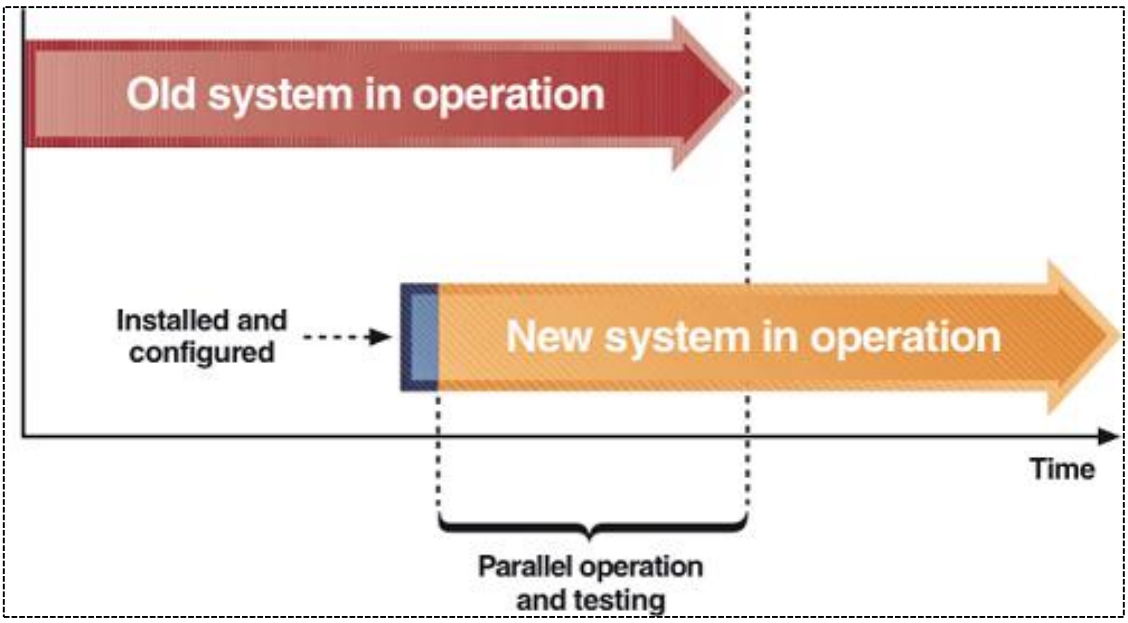
2. JICA to provide a dedicated host server with high capacity. This can be beneficial in terms of performance and availability.

3. AZURE infrastructure (Cloud hosting) - This is the most reliable and 24 hours guaranteed availability.
Network performance may be below the minimum required throughput for local users.
However, this option is ideal for public access as it provides 24/7 online access.

4. Hybrid option - Combination of Option 1 and 3 or Option 2 and 3. This is a more reliable option with a disaster and business continuity plan option. If considering option 1 and 3 under the hybrid then
Azure infrastructure will be the backup server for disaster recovery and business continuity and server from ICTSU will be the main server. On the other hand, if option 2 and 3 is selected under
the hybrid then Azure infrastructure will be the backup server for disaster recovery and business continuity and JICA dedicated server will be the main server.
Depending on Budget the project team highly recommends a Hybrid option due to an advantage over business continuity and disaster recovery plans.

Parallel Deployment and Operation.

The Implementation will be carried out using **phased parallel installation and operation**, which means the existing Geonode system will be run in parallel with the new Geonode system for sometimes before demoting the old system. Below is an illustration of phased parallel installation and operation.



MINISTRY OF FORESTRY RESOURCE MANAGEMENT (MOFR) IN SOLOMON ISLANDS

KOKUSAI KOGYO.LTD

MOFR GEOSPATIAL CONTENT MANAGEMENT SYSTEM PROPOSAL

GEONODE & GEOSERVER

Contents

Executive summary

The use of spatial data in the Ministry of Forestry and Research will help to make faster and better decisions. Spatial data should be as much updated as possible and easy to access. As the Ministry continues to grow and innovate in the Forestry sector, it needs a geospatial content management system that can help in data sharing among the Ministry itself as well as throughout the Internet. GeoNode and Geoserver are two open-source software that proposes for the implementation.

The exiting Geonode works fine, however as many users increase it requires to migrate to server hardware that supports multiple concurrency access to avoid user request bottleneck and adhere to best security practice. Thus it is really important to plan accurately each step of this propose architecture from the hardware part to the software component.

The newly enhancement design will base on client-server architecture with SSL (secure sockets layer) for maximum protection on communication over the unsecured network for data protection. In addition to that, it will also incorporate the current logo and color palette, so it will be easily identified as the property of Solomon Islands Ministry of Forestry and Research.

As the webGIS need to be maintained in-house either by GIS administrator or a Webmaster any spatial data to be uploaded need to be approved by the GIS administrator who is accountable for verifying the spatial data contents and ensure it is relevant and consistent. The WebGIS administrator will be trained and also access the administrative manual along with the user manual.

Current Issues

Server Infrastructure Review:

- The current Geonode server was hosted on a Laptop via a virtualized environment. While this is ideal for a small scale environment it is not ideal for large enterprise environments with large datasets.
- Below were issues identified from the current infrastructure review:
- The current Server infrastructure is ad-hoc based.
- Laptop hardware is used as server hosting, which technically does not have the capacity to support large datasets and user base.
- Var directory needs to be mount to a separate partition from the main partition.
- The current environment does not operate under a local DNS server so as to allow URL access based on domain name and not an IP. (To allow access flexibility).
- The Laptop where the Geonode Server is hosted is vulnerable to the theft which MOFR and JICA could potentially lose vital information.
- No backup strategy is in-placed for backup.
- The Geonode should be kept on a protected environment from physical intrusion and fire hazard.

Network Infrastructure Review:

- The Current design on a local network context will work well but as it opens up for public access it will suffer from high latency and bottleneck effect.
- Minimum throughput required for better Geonode access within the local network is 300mpbs for faster rendering of raster data. Current, Wifi connection at the JICA office performs below the throughput.
-

Database Infrastructure Review:

- Geonode is designed using the Model-view-controller architecture which is the best requirement for an application.
- Geonode is properly normalized as per the best database standard.
- Geonode designed with referential integrity applied (primary Key and Foreign Key) which is good.
- Need to Index the tables so it optimizes search speed. This is one best design approach need to be taken into consideration during the enhancement process of the Geonode.
- Currently, vector data and raster data are stored in the same database (more overhead especially with raster data). This will be part of the enhancement process.
- No naming culture employed for internal database attribute naming. This will be part of the enhancement process.
- Important to select Data type correctly. This will be part of the enhancement process.

Desired Outcome

- It is desired that at the end of this project Ministry of Forestry and Research (MOFR) will have a better GIS system in place and more assured the system will satisfy the following goals:
- Enable the sharing of spatial data to important stakeholders and enable online access.
- Provide better storage and high processing power for spatial data.
- Improve the overall GIS workflow within the Ministry of Forestry and Research.
- Provide all MOFR staff with more spatial data visualization without license needed.
- Electronize MOFR spatial data from paperwork to digital format.
- Provide a centric location for all GIS data for MOFR in Solomon Islands including MOFR stakeholders.
- Enable GIS integration with other government GIS systems.
- Better Geospatial Content Management System performance and robustness.

Geonode Enhanced Proposed Design Structure

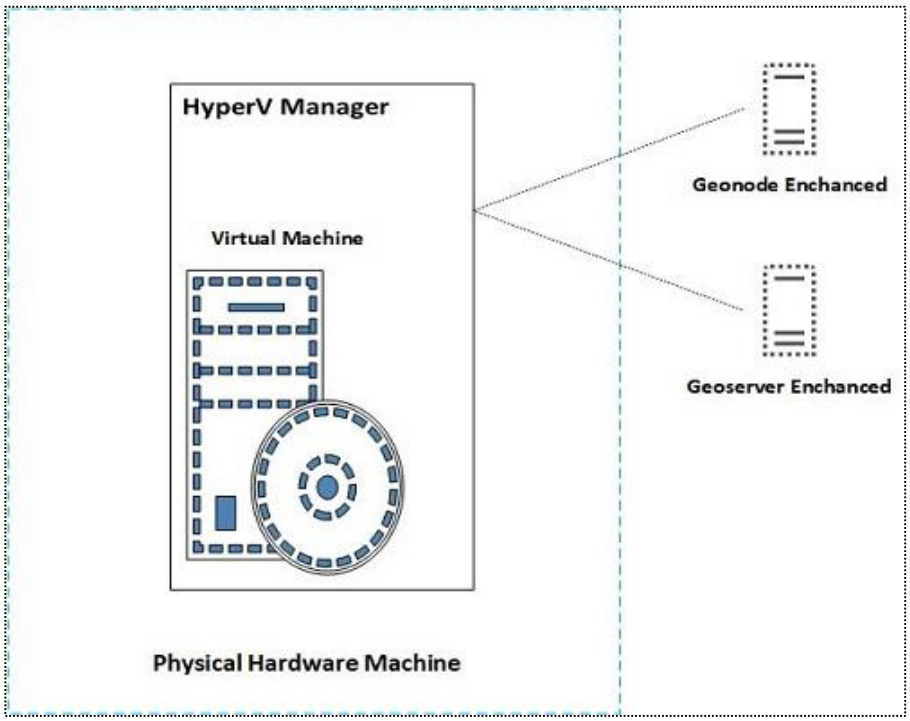
The Geonode proposed enhancement structure is based on an existing setup. The current Geonode is running on a virtual machine and will be migrated to an allocated server hosted by ICTSU. The front-end of the exiting Geonode will remain the same but color will reflect the branding of the Ministry of Forestry and Research.

Most changes will be on the server infrastructure, database infrastructure and the network infrastructure.

Proposed server infrastructure

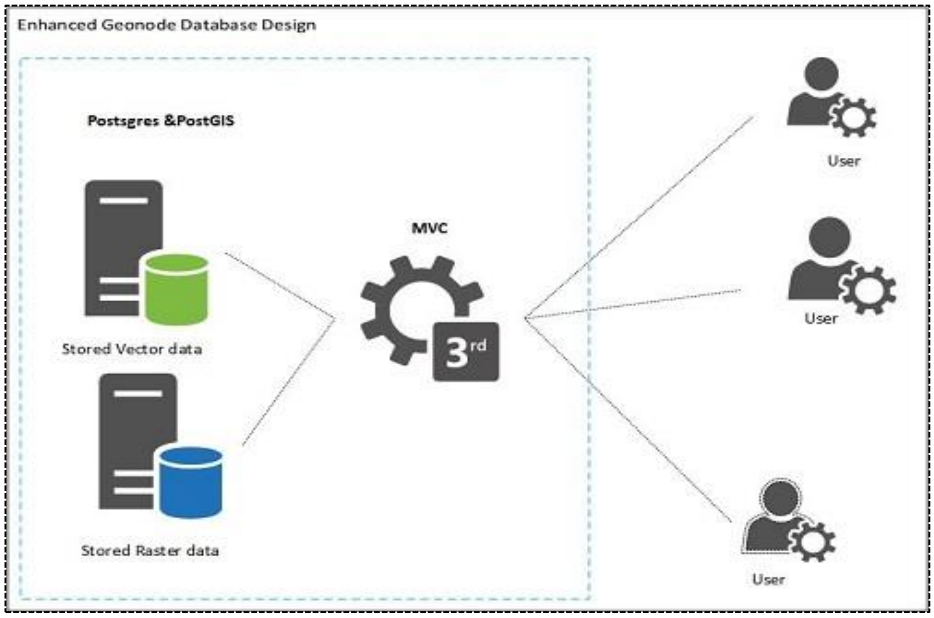
1. The current Geonode server running Ubuntu will be migrated across to SIGNET Server under the virtual environment. We prefer Window server 2012 R2 standard or latest.
2. The installation of Ubuntu server based will be on the primary disk that runs all the server services but the frequent changes directories such as **Var** directory will be mounted to separate partition to avoid interrupting the main services on the server.
3. All network information such as **DNS**, **IP Address** and **Hostname** should be configured into network files located in the /etc/Network-Manager Directory to avoid changes without notice.
4. ICTSU to configure the DNS name for the new Geonode.
5. The HyperV manager virtual Machine at least configured with space capacity that more than **1Terabytes for GIS data storage** to allow scalability for the future.
6. Network drive Quota that label **GISDrive** should be configured for GIS-related data and access only by the GIS administrator and select personal.
7. The elevated access privilege will be given to whoever responsible for, plus manual and training.

Migration to Window Server 2012 or 2016, HyperV Manager Environment



Proposed enhanced database infrastructure

1. The current PostgreSQL database and PostGIS schema will be maintained from the existing system.
2. The PostGIS schema will be used to store all **vector** data.
3. Other Schema will be created and it will store the **Raster** data that will be used as a backdrop and a new one that will be added to the system. Separating the database schema has an advantage over performance.
4. Database Administrator can able to setup the Views and Trigger to alert some of the temporal change within the system.
5. QGIS and other mapping software will be configured to link to the database schemas.
6. Ensure Support multiple concurrency access with the help of server concurrency services and database configuration.
7. Support various access methods to cater for a different group of specialist working on the system.
8. Support Application Programming Integration (API) with other third-party services (RESTFUL)
9. Implement secure ssh-mysql connection to manage database backend.



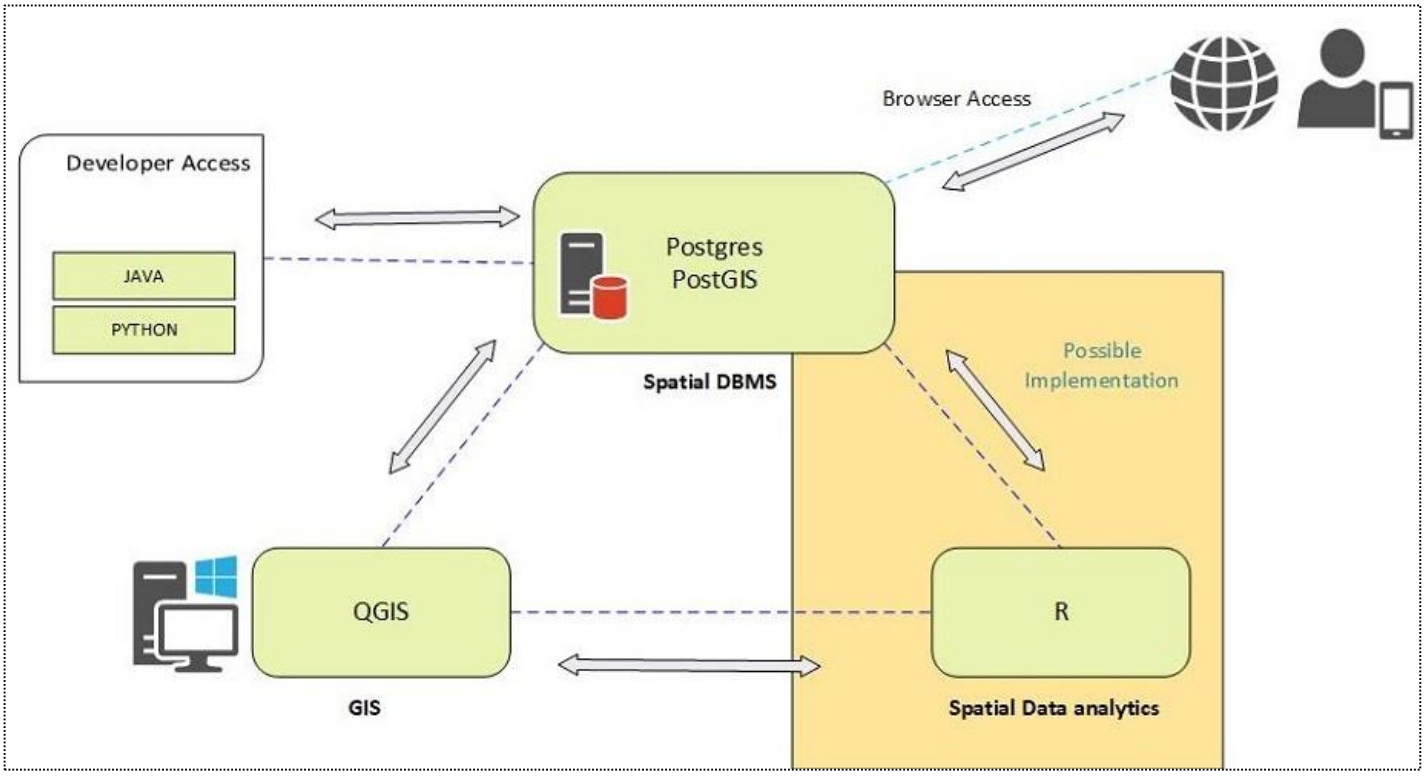
Recommended Network infrastructure characteristics

1. Access to the Internet connection
2. The minimum throughput requirement should be 300mps or above for faster connectivity and high reliability.
3. All IP Address allocated for the Geonode and Geoserver should be a **static** IP. DNS name must be registered so to allow domain name access.
4. Configure all Network Management protocol so that Host Machine and Virtual Machine can be managed remotely by the administrator.

Enhanced Proposed Geonode and Migration Plan

1. Leaflet will be integrated to the Existing Front-End Geonode so it behaves as Single Page Application. Advantage of Single Page Application is that; it does not send multiple requests to the web Server while users are interacting with the Map Application. This prevents traffic congestion and high throughout utilization.
2. Currently, Openstreetmap is a default backdrop map for the Geonode but we will add more backdrop options including ArcGIS based Map for user usability.
3. Customize the Geonode Front-End to meet the Ministry of Forestry and Research branding needs.
4. Increase the Geonode concurrency so it cater for multiple user access on the system
5. Configure Geonode OGC services to integrate with external clients
6. Provide instruction and documentation for Geonode Administrators for better system management.

Geonode integrate with other External Clients:



Migration Plan

The proposed migration plan for the MOFR Geonode system is to migrate the entire virtual machine that is running Geonode to a new host server with high capabilities and capacity.
The new server can be obtained in four ways depending on JICA's preference and as follows:

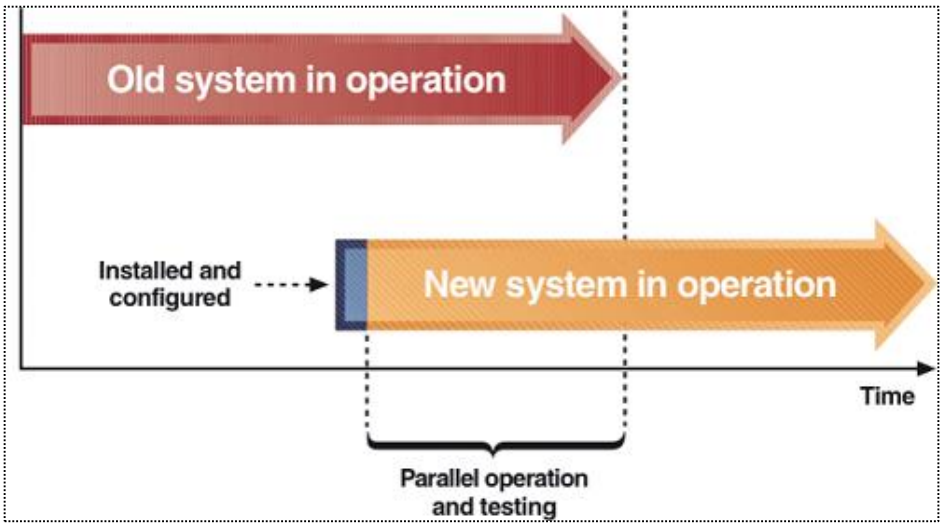
1. Negotiate with ICTSU to provide a Virtual machine host. This would mean access to MOFR Geonode will be via SIGNET.
This option is more ideal for enterprise-scale but in terms of reliability, it may not be guaranteed.
Bandwidth speed may also not be guaranteed for high performance due to high traffic congestion usually experience on SIGNET.

2. JICA to provide a dedicated host server with high capacity. This can be beneficial in terms of performance and availability.

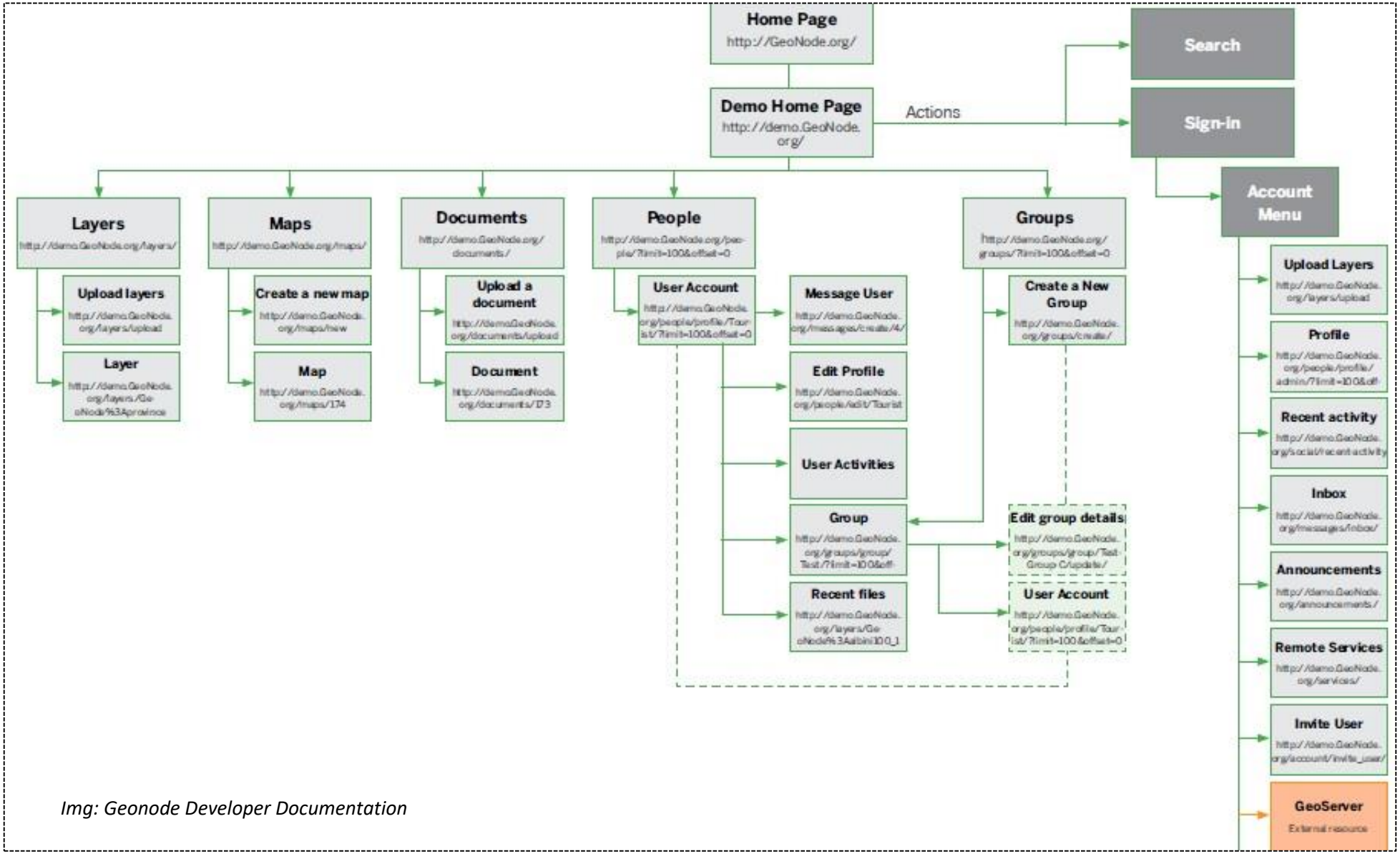
3. AZURE infrastructure (Cloud hosting) - This is the most reliable and 24 hours guaranteed availability.
Network performance may be below the minimum required throughput for local users.
However, this option is ideal for public access as it provides 24/7 online access.

4. Hybrid option - Combination of Option 1 and 3 or Option 2 and 3. This is a more reliable option with a disaster and business continuity plan option. If considering option 1 and 3 under the hybrid then
Azure infrastructure will be the backup server for disaster recovery and business continuity and server from ICTSU will be the main server. On the other hand, if option 2 and 3 is selected under
the hybrid then Azure infrastructure will be the backup server for disaster recovery and business continuity and JICA dedicated server will be the main server.
Depending on Budget the project team highly recommends a Hybrid option due to an advantage over business continuity and disaster recovery plans.

Parallel Installation and Operation



Geonode Layout Structure will remained same as the original layout structure.



Img: Geonode Developer Documentation

Deliverable

- Functional, reliable and robust Geonode content management system.
- Trainings.
- User manual and administrative manual.
- etc

Risks

Risks are minimal in terms of implementation, the entire GIS server and applications will be setup on a dedicated Virtual Machine. Since the new Geonode virtual Machine will be set up in parallel to the existing setup the end user will not experience system down time. Overall risks involved in this implementation are minimal.

Project Team

Japhliet Rouhanna – Geospatial Specialist.

John Smith Daffe – Support specialist.

Ministry Of Forestry and Research (MOFR) - Migration Report of Geonode to Sol-FIMS (ICTSU Server).

MOFR/JICA

Introduction

This document describes the migration process to an ESXi Server(VSphere) VM prepared and provided by ICTSU located at ICTSU Building in Lengakiki for the successful migration of the Geonode server that was previously hosted from a virtual box VM used to be located at the JICA MOFR office in Lengakiki.

This process was carried out, known as virtual migration or V2V migration. Since the two VM hosts involved had been from different vendors. The migration process uses third party tool to migrate the VM file from JICA Geonode VirtualBox to ICTSU ESXi Server VMware vSphere Machine:

This migration involves two processes.

1. Prepare the Source Machine.

2. Transfer the prepared source virtual machine to the hard drive of an ICTSU virtual Machine server.

The section in this documents are:

- V2V Migration Requirements
- Preparing for a V2V Migration
- Migrating a JICA Geonode to an ICTSU ESXi Server (VSphere) machine.

V2V Migration Requirements.

Following tools were required for the migration.

- Linux Shell Interpreter-to prepare the source Virtual Machine installed with latest updates and dependency on particular version.
- VMware OVF- (VMWare Conversion Tool**)-**To convert VirtualBox OVA file format to OVF VSphere file format.
- VMware vSphere Virtual Machines - To install on destination Machine and run the newly migrated JICA Geonode.

V2V Migration Destination Machine Requirements.

The new server comes with the following specification.

System Components	Minimum Requirements
Operating System	Linux (Debian Distribution)
CPU	2.0 GHz processor
Virtual Machine	VMWare VSphere
vCPU	6
Memory	16GB
Hard Disk (SSD)	600 GB

V2V Migration Restrictions.

- ACPI and non-ACPI hardware migration (Compatibility Matrix):
- Export the VirtualBox OVA files with the Network NAT Attributes.

Preparing for a V2V Migration

Followings were performed during the V2V migration preparation process:

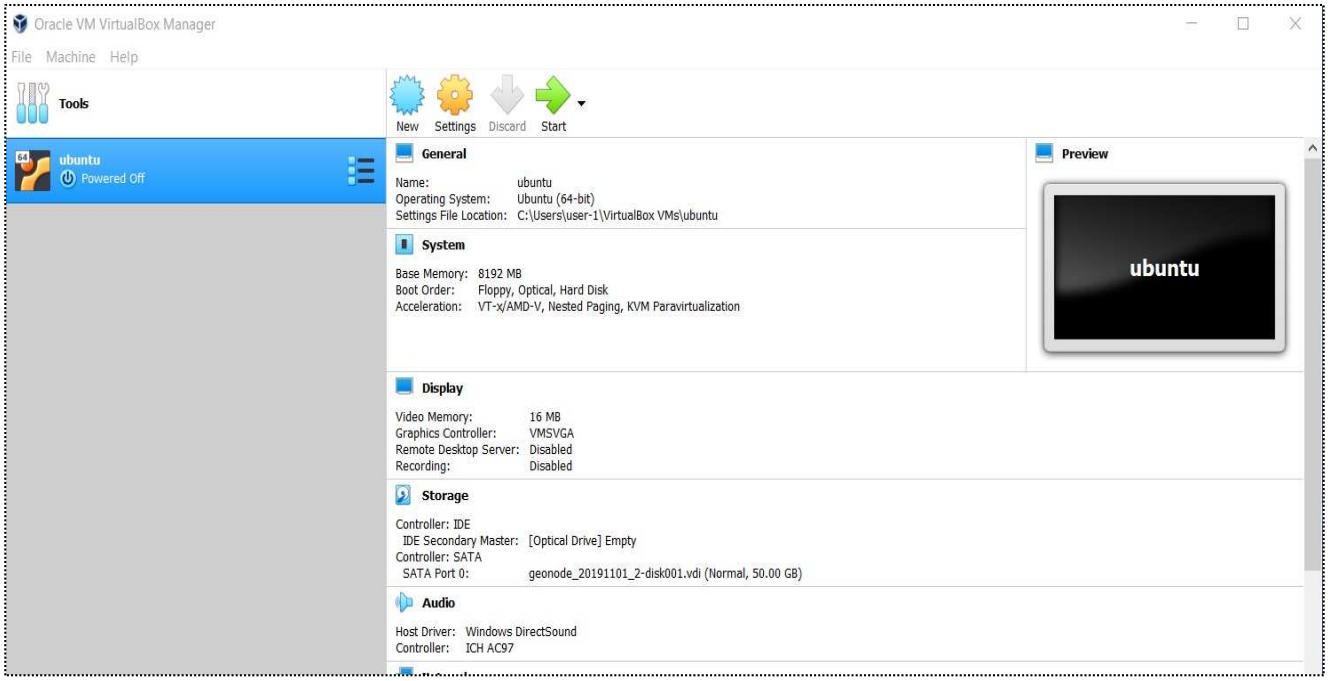
1. Identify the source virtual machine to migrate. This can be an original virtual machine or a copy of a virtual machine.

2. Identify the target Virtual machine to migrate to and its VMWare Sphere virtualization.

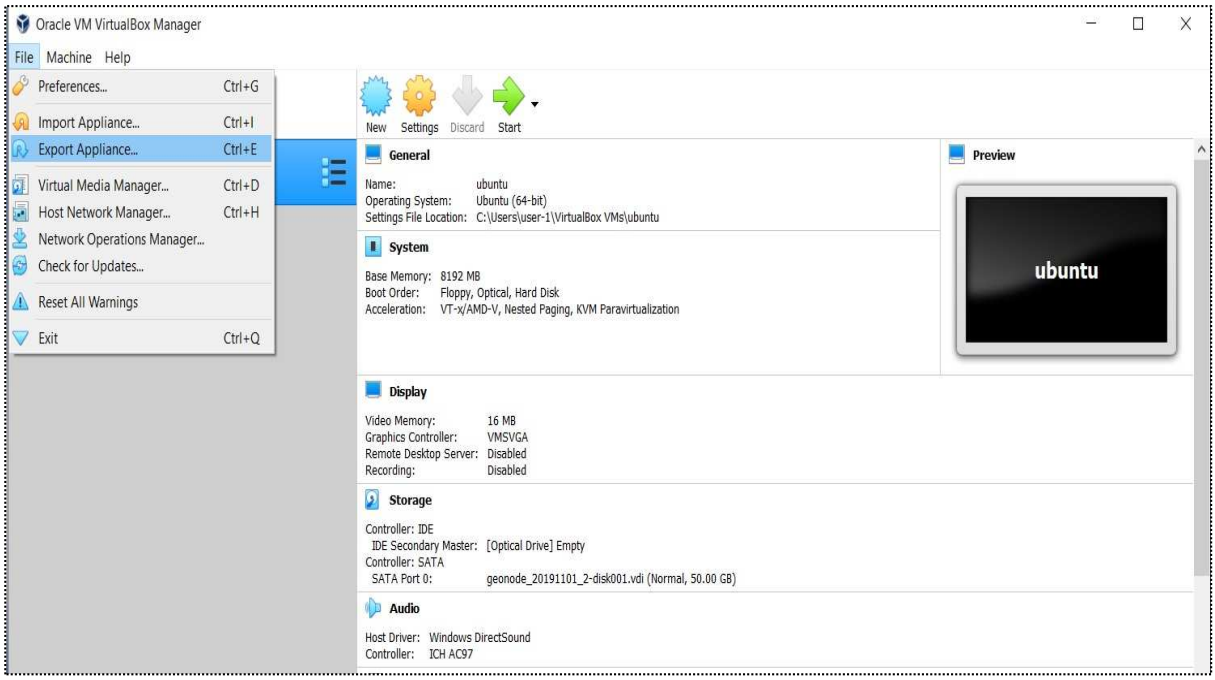
3. List all the hardware components of the target machine.

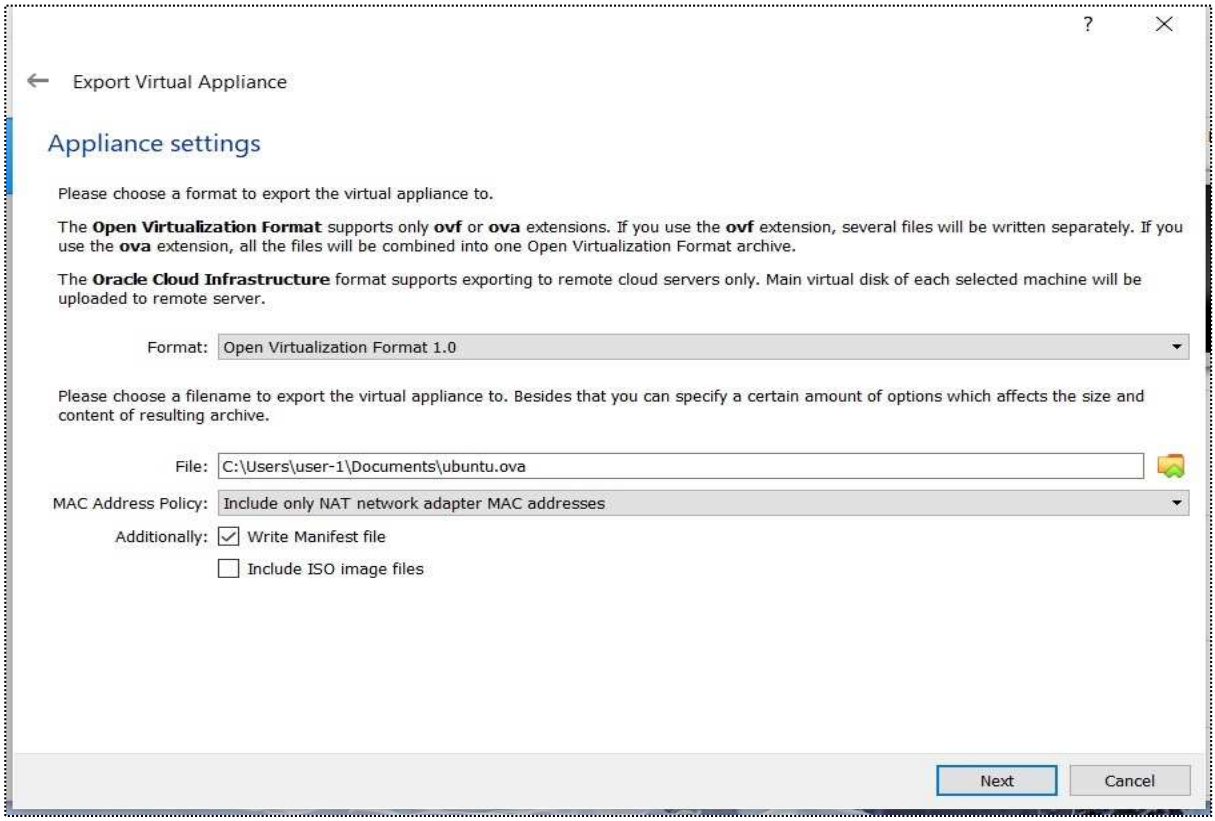
Migrating a JICA Geonode to an ICTSU ESXi Server (VSphere) machine

Steps: 1-Power off the source virtual Machine and choose the virtual Machine to export (in this case JICA Geonode)

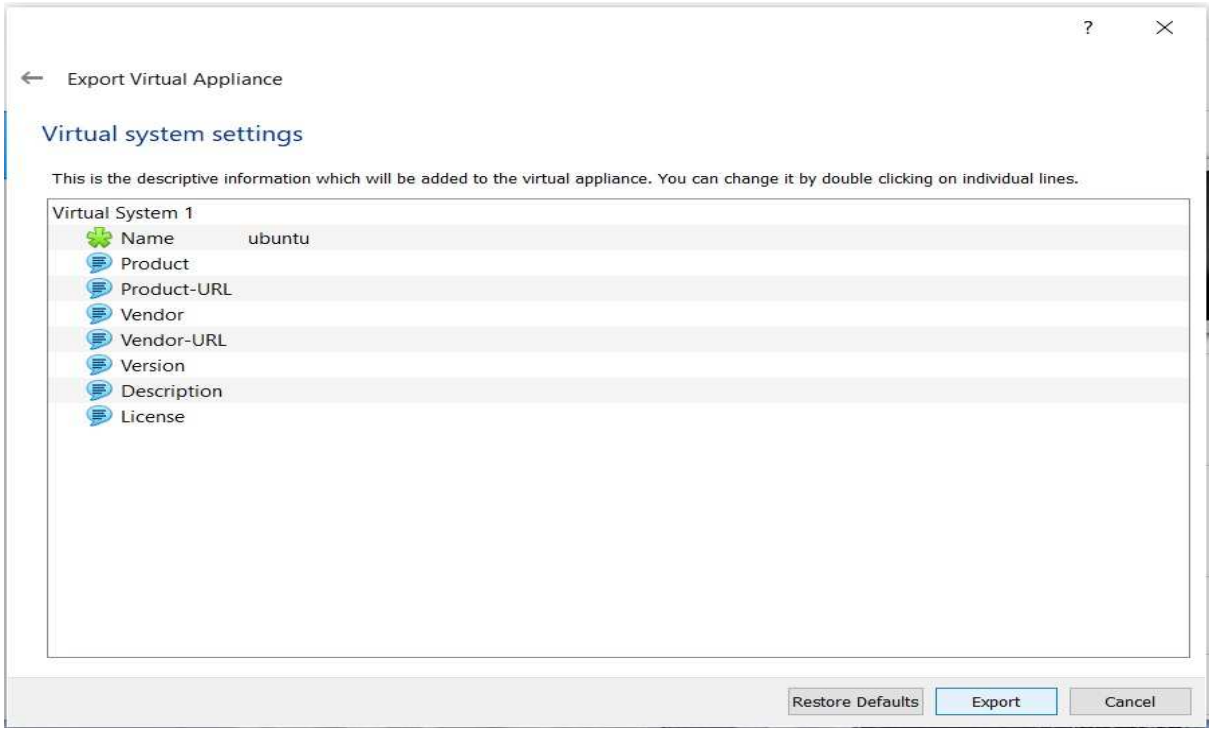


Steps: 2-Go to File and Click Export Appliance as OVA files (JICA Geonode) and choose the following Options below and Click **Next.**

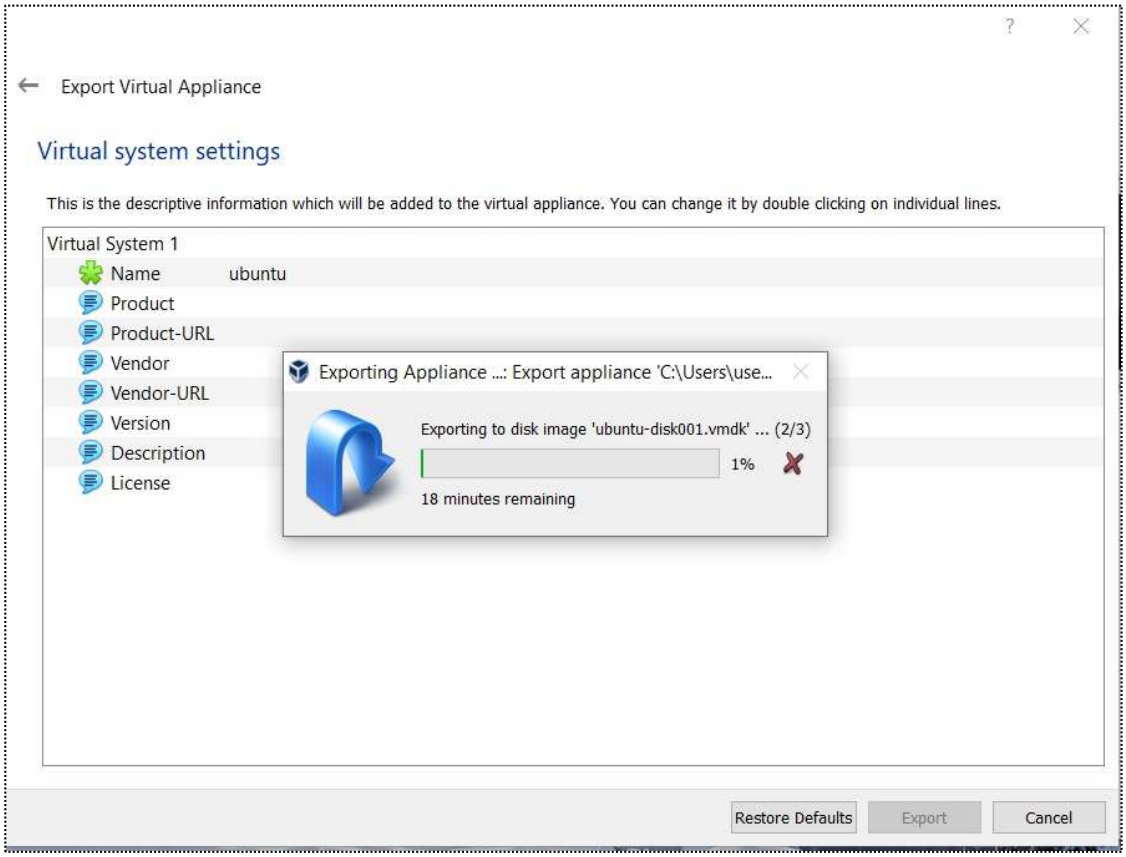




Step 3: Keep all descriptive information as default.



Step 4: Wait until the Export Progress finished and transfer **OVA files** for conversion.



Step 5: Convert VirtualBox OVA file format to OVF files VMWare VSphere file format.

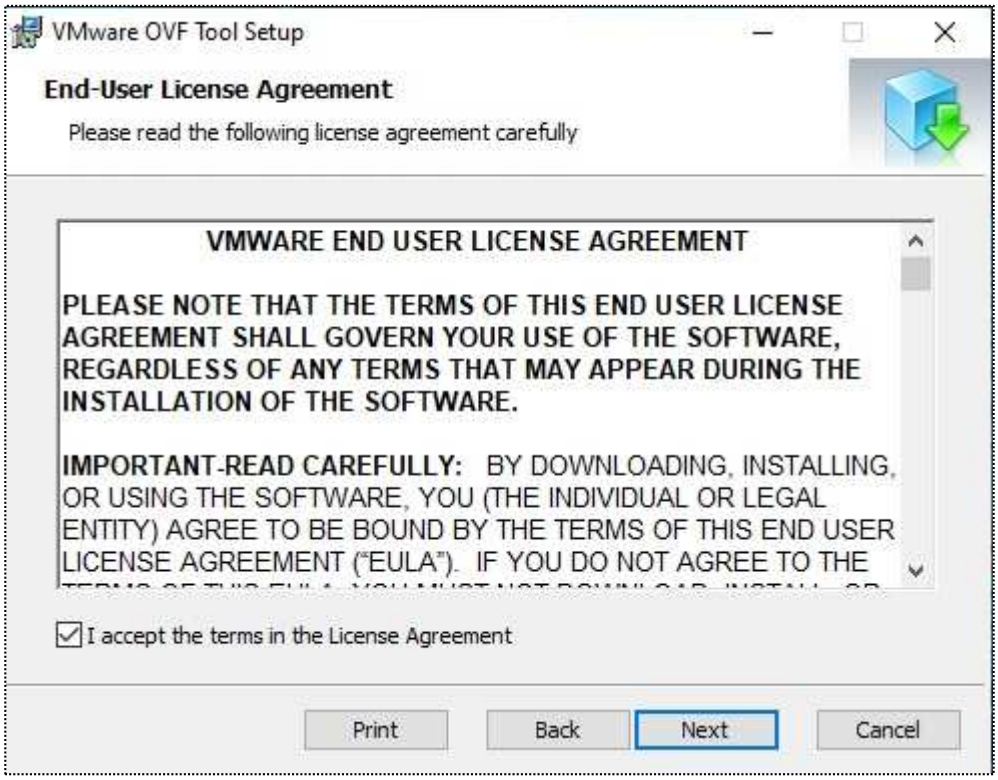
First download VMware OVF Tool and installed it on Source Machine.

Installation Procedure:

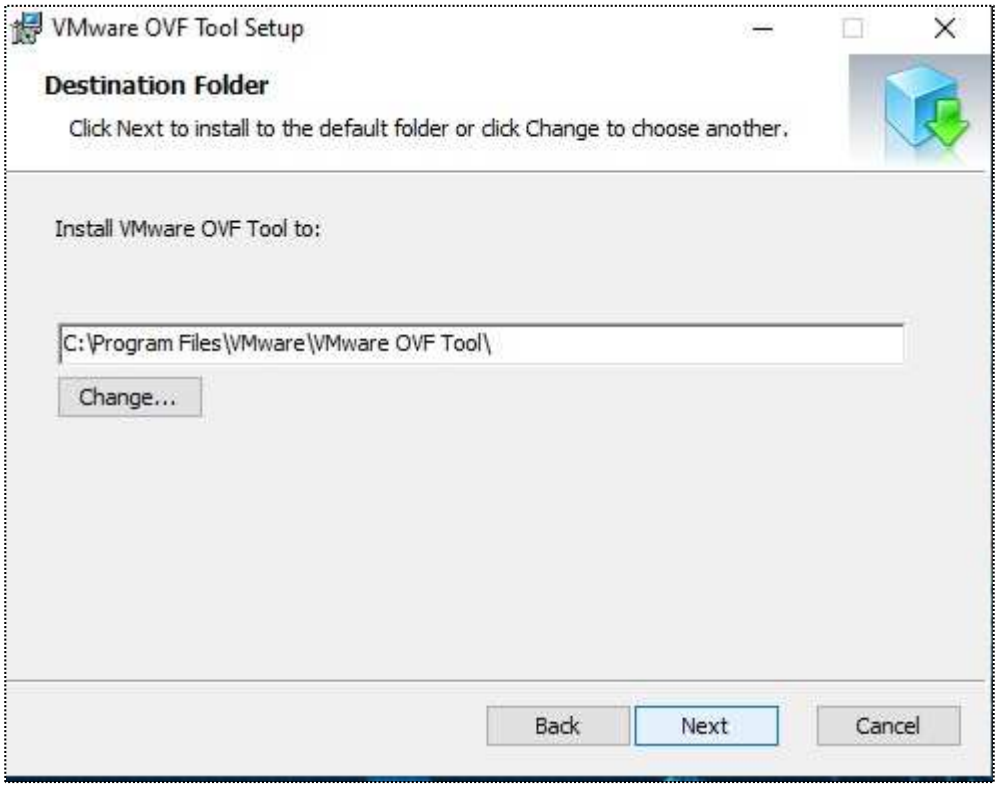
Run it with elevated account as Administrator

Step 1: Click Next

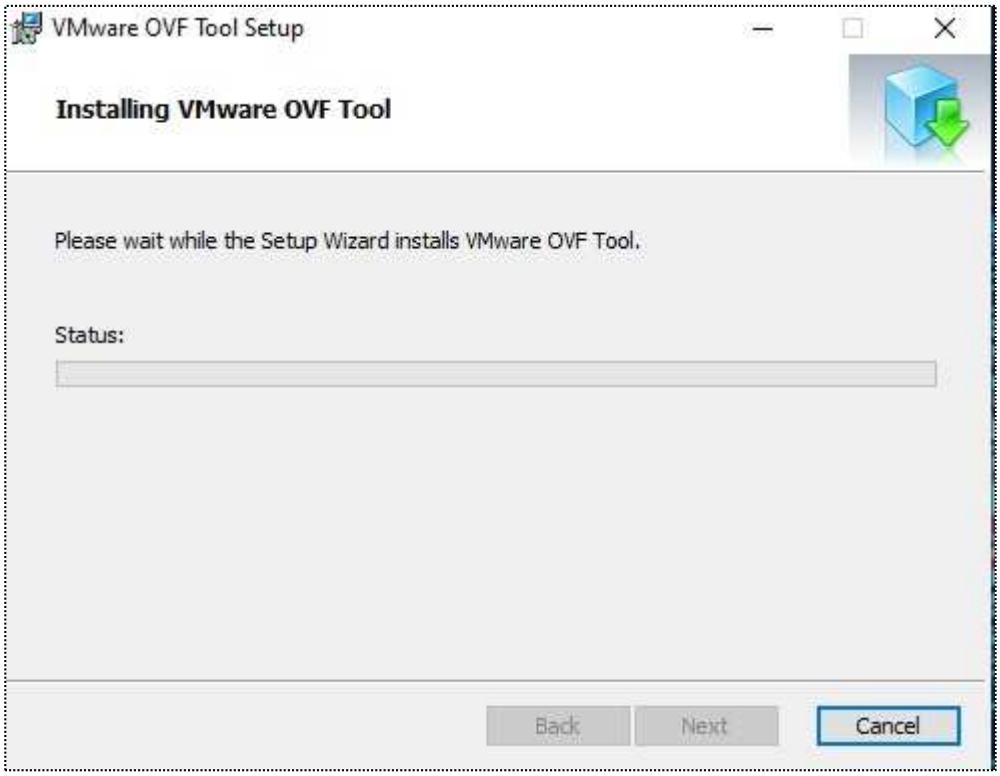
Step 2: Accept the terms in the License Agreement.



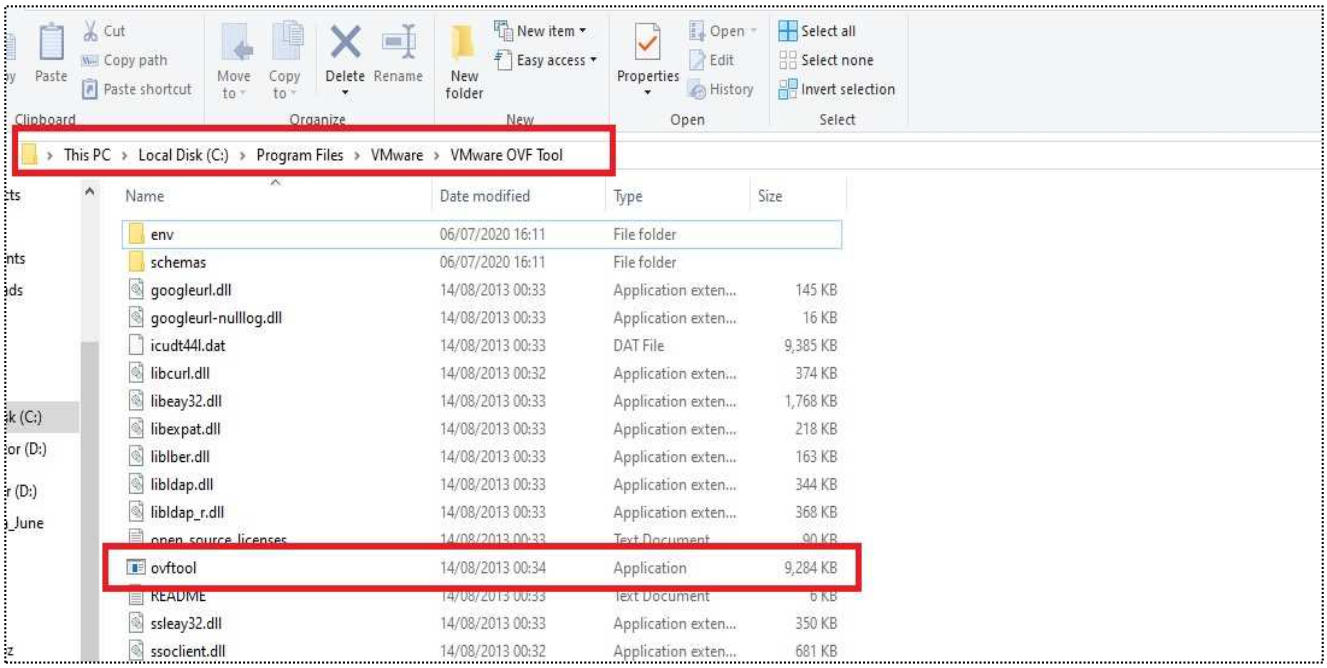
Step 3: Install in default directory is fine



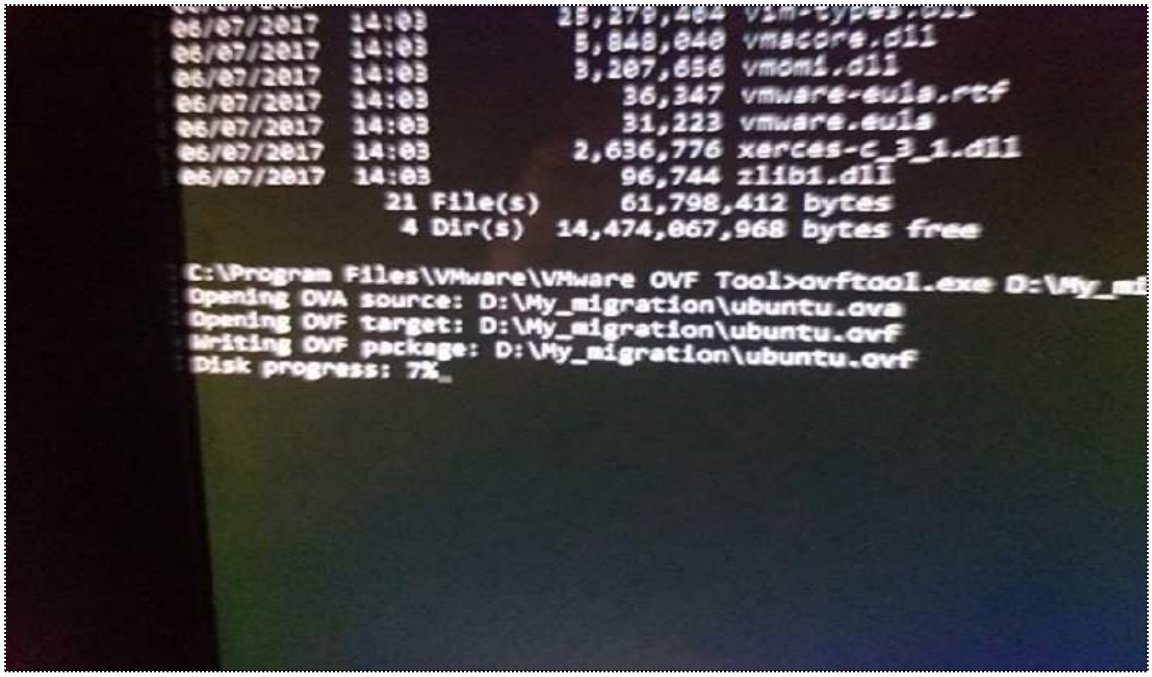
Step 4: Wait until installation is completed



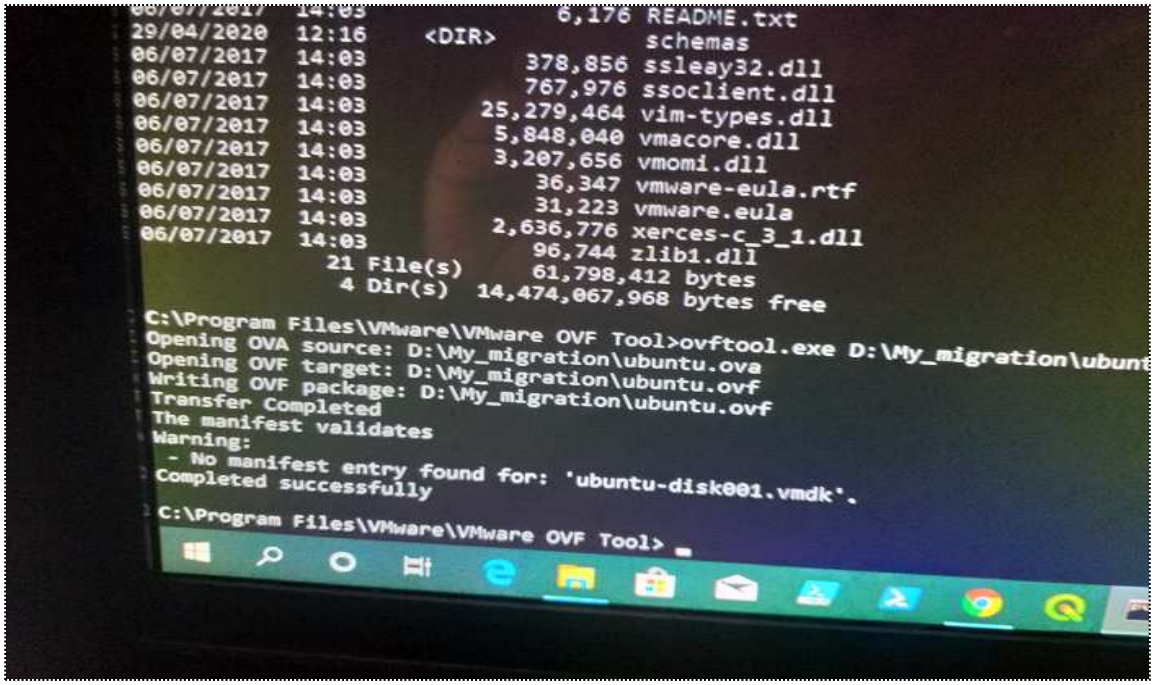
Step 6: Navigate to VMWare Installation directory in C drive.



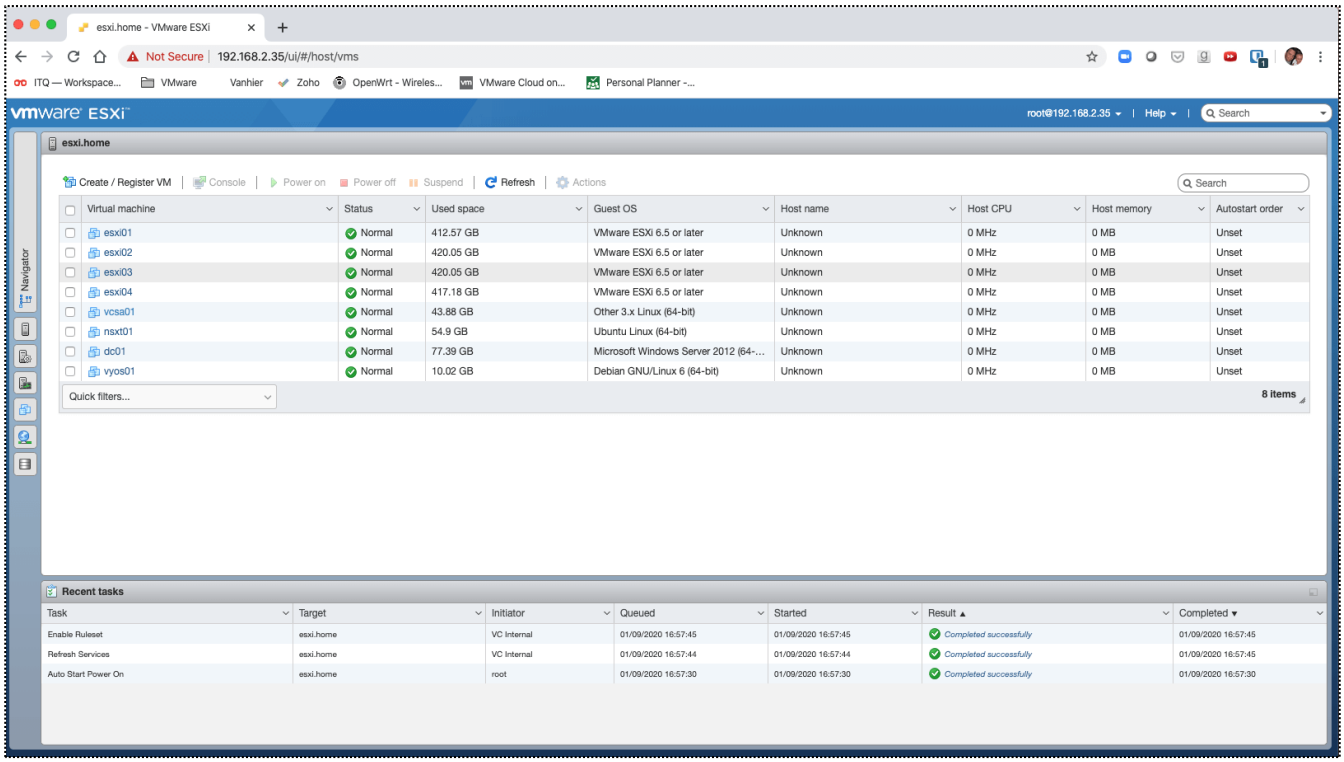
Step 7: Navigate to VMWare Installation directory in C drive via Command prompt and run the OVF tool for the conversion of OVA format (VirtualBox format) to OVF Format (VMWare VSphere format).



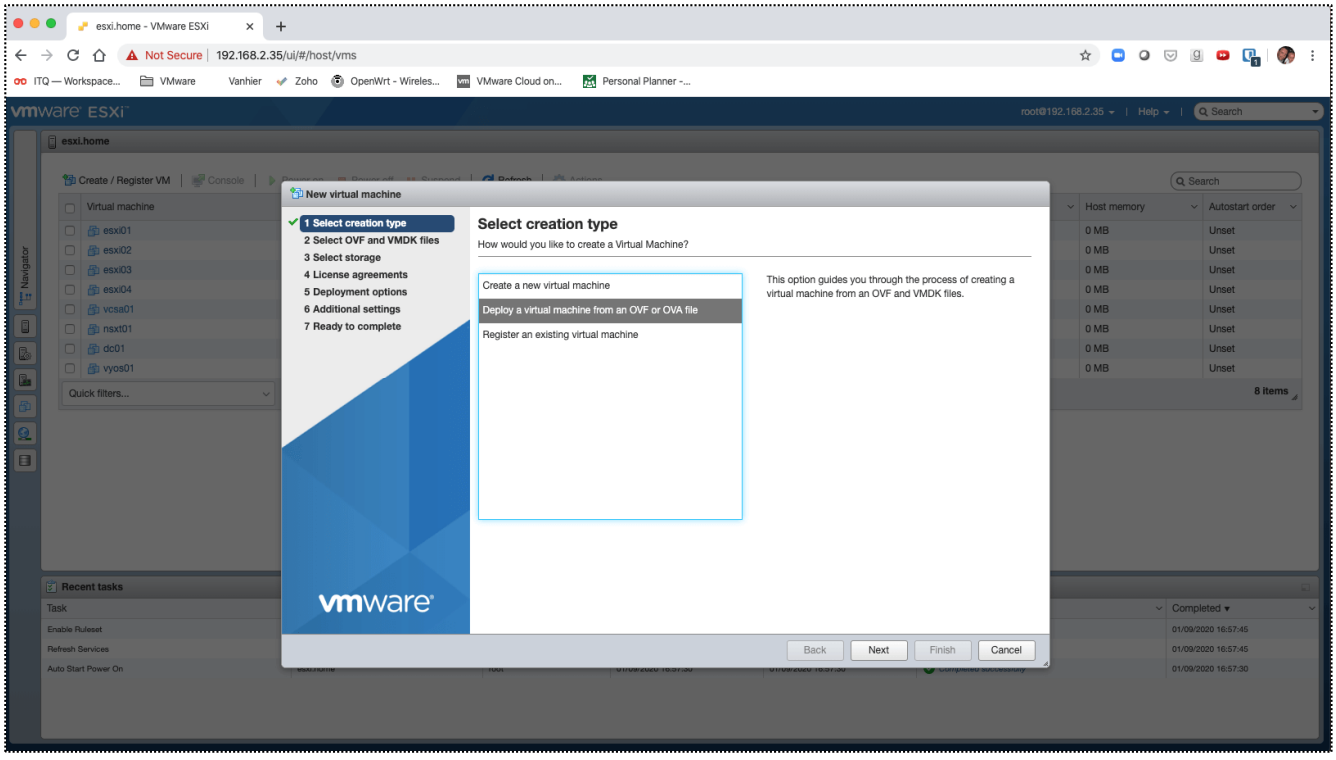
Step 8: Wait until the conversion is completed successful.



Step 9: Using the same converted OVF from the previous process, we will now be importing it into VMware ESXi Server, which is a bare metal Type 1 hypervisor.

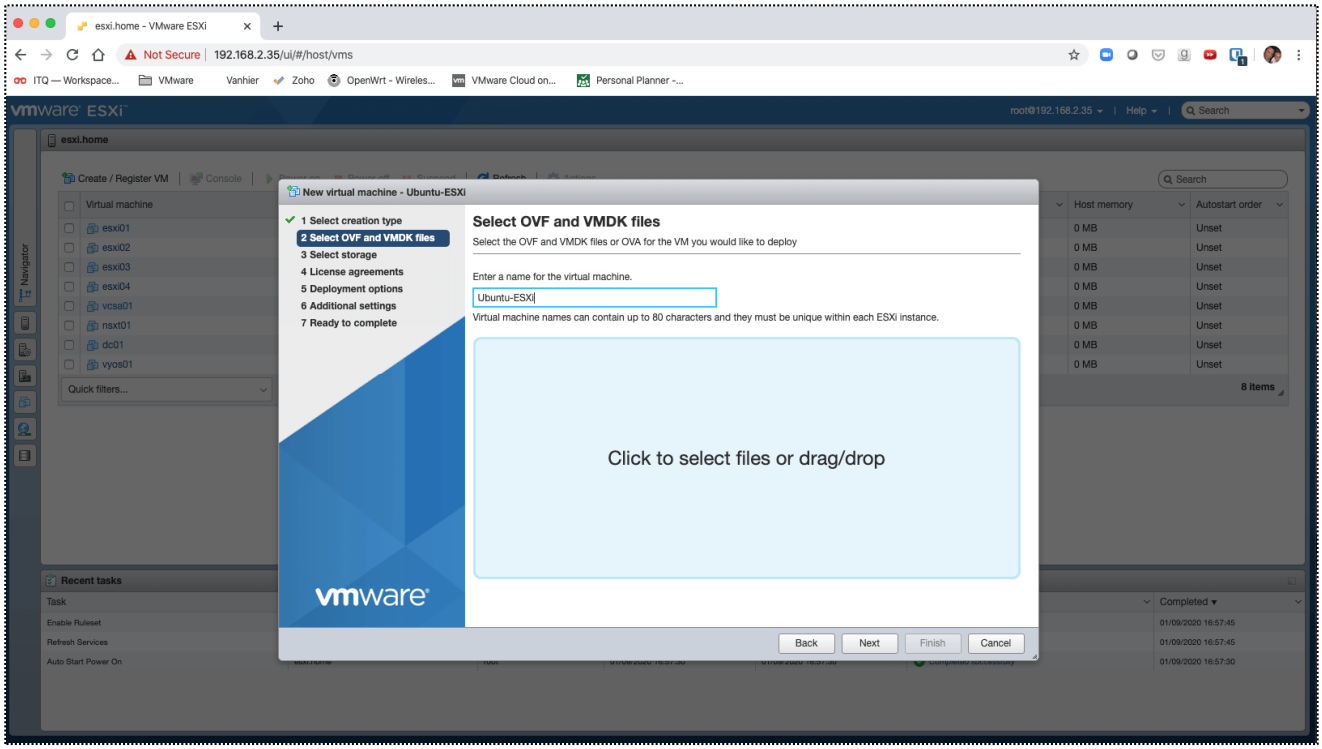


Step 10: Select Deploy a virtual machine from an OVF and click Next

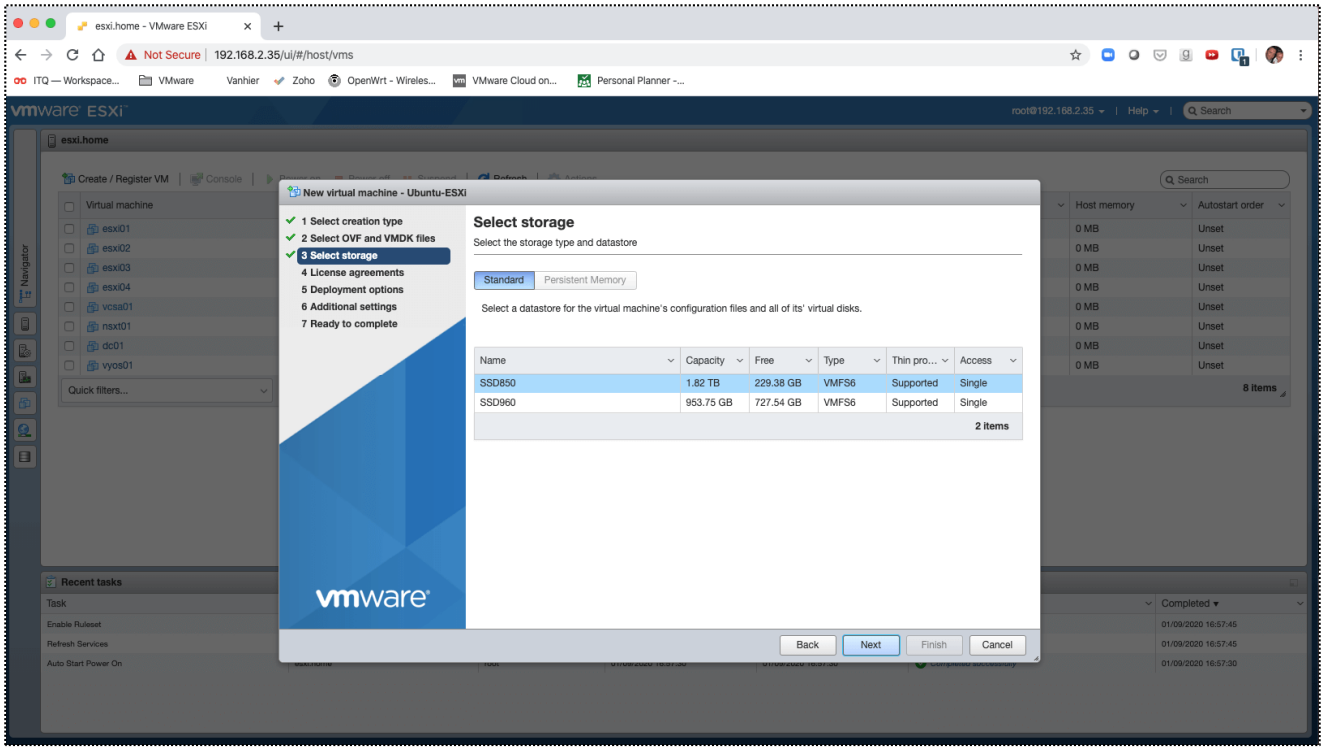


Step 3: Provide a name for the VM and “Click to select files”

Step 4: Select the OVF and click Next.



Step 5: Select a datastore and click Next.



Conclusion

We have successfully migrated an Ubuntu VM to VMware ESXi.ESXi is a Datacenter product that mostly runs backend servers.

Solomon Islands Government
Ministry of
Forestry & Research

JICA

Community –Based Forest Management/ Monitoring For Solomon Islands

Action Plan

Japan- July 20- August 21 2019

Participants: Terence Titiulu
Cathy Unga
Gusgrandy Mua
Kelvina Luse
Eric Kwaria

Presentation Outline

- Introduction- Objectives and Modules Overview
- Relevant Outcomes
- Action Plan
- Challenges
- Recommendation
- Conclusions

Introduction

Objectives

- To learn recent technologies in forest resource monitoring
- To acquire advanced skills related to data collecting, processing and management for forest monitoring
- To discuss possibility and challenges in utilizing the technologies for future community-based forest monitoring / management in Solomon Islands

Modules Overview and Relevant outcomes

Module Output 1 Overview: Drone Training

- Principal of two types of Drone.
- Drone Operation Cases ,regulations and Management
- Drone structures and camera settings
- Operation methods
- Application of drone in forestry monitoring
- Possible challenges of using drone in community based management
- Data Simulation




Module 1: Relevant Outcome

- Unmanned Aerial Vehicle (UAV) flight simulation
- Processing of UAV data
- UAV advantage
- UAV Disadvantages
- Drone operation- Camera settings and flight plan.
- Analyse of UAV images
- UAV Advantages- High Resolution images and saves times.
- Disadvantages – Lost signals in certain conditions, vulnerable to birds and other obstacles.

Module Output 2: Different Approaches to Conservation

- Case study of Satoyama Initiative
- Institutional Arrangements between Public and Private Partnership (PPP)
- Forest Conservation approaches and appropriate laws and regulations.- Water catchment conservation and Eco tourism.
- Forest biodiversity conservation and monitoring sites.
- Methods of Forestry breeding.

Module 2: Relevant Outcomes

- Water source and forest conservation activities.
- Monitoring of Biodiversity with forest eco tourism activity

Module 2: Relevant Outcomes Cont..

- Tree breeding research

Module Output 3: GIS and Remote Sensing for Forest Management

- GIS and Remote Sensing
- Approach to Database and GIS
- Forest Information Management and Sharing.
- Institutional arrangements between local government and Forestry Cooperatives.

Module 3: Relevant Outcomes

- All upgrade technology skills on GIS, Remote Sensing, GPS
- Image classification and processing of remote sensing
- Analysis of land cover map with QGIS
- GIS data Creation and efficient operation
- Database design concept and Sharing of forest survey information
- Community mapping
- Management method and forest management plan using forest resource monitoring and GIS etc.
- Structure and role of the forest association to utilize local private forest resources.

Action Plan

Aim: Develop forest community map for sustainable management.

Objectives:

- To identify potential forest areas for community sustainable livelihood.

- Capacity building for community and forestry officers in sustainable forest management.
- Improve and develop the Information system for Ministry of Forestry and Research

Refer to Excel Sheet

Challenges

- Determined customary land boundaries from land owners and provincial government (Prefecture).
- Inconsistency of data collection of reforestation areas.
- There is no Data base linkage within Government Line Ministry's and even at Ministry of Forestry and Research Divisions and Sections.
- The financial system for processing activity budget costs is slow.

Recommendation

- Need for a central data base server for Ministry Information System.
- Establishment of research centers, trial plots and seed collection source supplier.
- Encourage conservation approaches to be under Protected Areas Act.
- Proper mapping filling information of hard copy to soft copy.
- Improved data sharing and management within the departments.
- Prepare activity plans and budget ahead of time frame.

Conclusion

- Recent new technologies learned during this training for community Based Forest Management and Monitoring are important tools for Sustainable Forest Management in Solomon Islands.
- Participants successfully acquired advanced skills related to data collecting, processing and management for forest monitoring using QGIS as the software for analysis with linkages to other Google Online Remote sensing software's.
- A Community Action Plan will be developed as a result of the relevant outcomes learned from this training for implementation in Solomon Islands.
- Important for the MOFR Management Team (PS, Com,GIS/Mapping & Licensing, Operations) to approve and endorse new guidelines as administrative procedures for assessing applications.

Way forward Action Plan Evaluation Meeting for Solomon Islands

- More Drone Field application in Familiar typical Forest type.
- Using Mobile with Avenza Map application
- Google Earth Base map to QGIS
- Data Sharing from different polygons of Operations, Reforestation, Utilization, and REDD+ for management.
- Using Drone and GPS and PC

The Project on Capacity Development for Sustainable Forest Resources Management in Solomon Islands

- Study tour in PNG -

17th to 21st July 2019

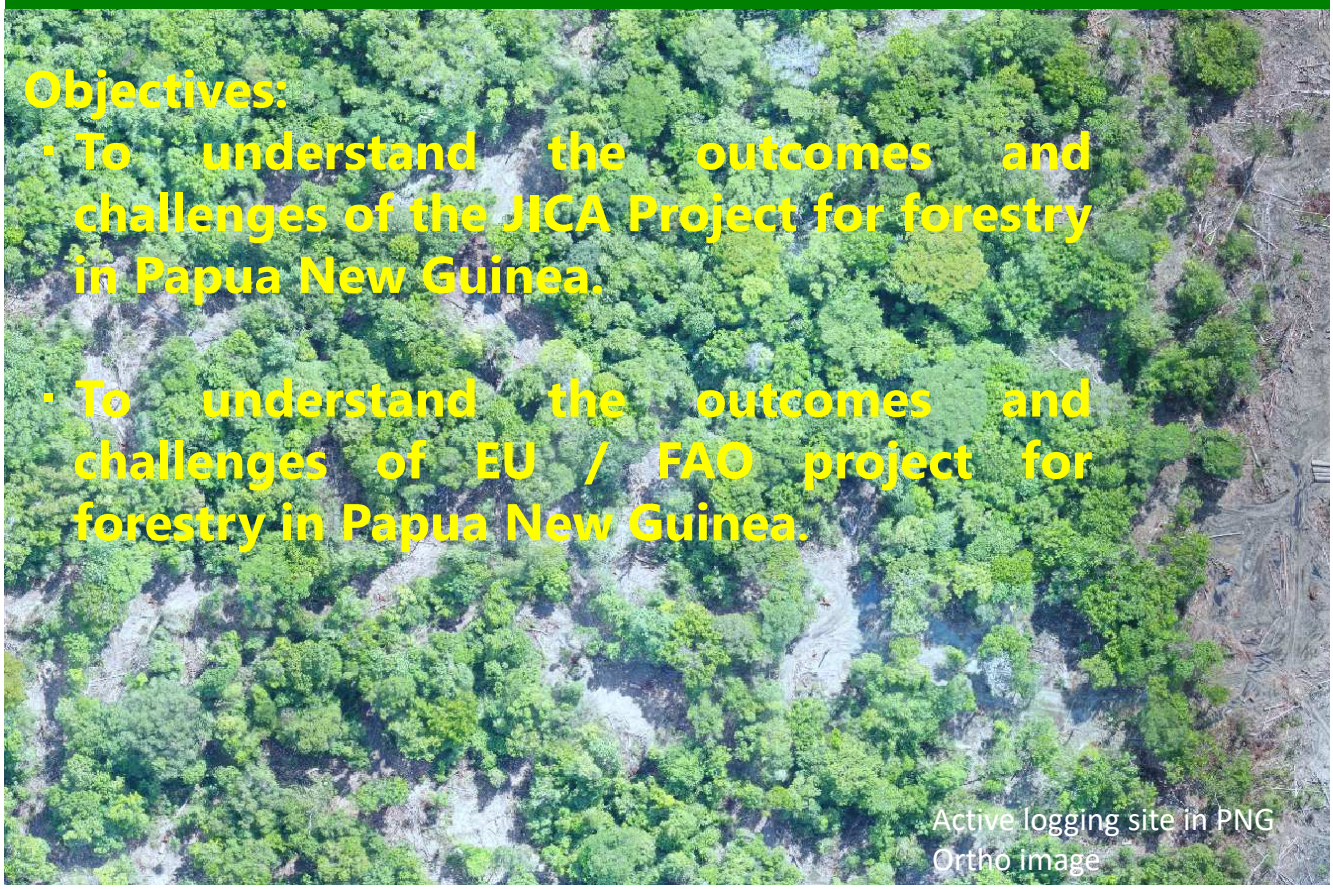
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands

Participants

- Mr. Vaeno Vigulu
  Permanent Secretary
- Mr. Samuel Pita Vazu
  Under Secretary Technical
- Mr. Wilfred Arnon Atomea
  Under Secretary Administration
- Mr. Stanley Lesinenea
  Mapping / GIS, Forest Resource Management and Technical Services

- JICA Project Team
  Masamichi Haraguchi
  Hirokazu Takahashi

Logging site in PNG



Schedule:

date		time			Contents	Venue
17-Jul	Wed	10:50	~	12:10	Flight(Honiara to Port Moresby)	
17-Jul	Wed	14:00	~	15:00	Orientation	JICA PNG office
17-Jul	Wed	15:00	~	16:00	Courtesy call to JICA PNG office	
18-Jul	Thu	9:00	~	12:00	JICA project workshop	Hilton Hotel
18-Jul	Thu	13:00	~	15:00		
19-Jul	Fri	10:00	~	12:00	FAO project visit	PNGFA office
19-Jul	Fri	13:00	~	15:00	Discussion with PNGFA officers	
20-Jul	Sat	9:00	~	15:00	Varirata National Park, Nature Park visit	
21-Jul	Sun	8:55	~	12:15	Flight (Port Moresby to Honiara)	

JICA PNG Office

SI mission discussed about PNG and SI forest sector situation, with Mr. Koimuma, representative of JICA PNG office.

PS/MoFR. Dr. Vaeno handing over a gift to Mr. Koimuma, representative of JICA PNG office..

Papua New Guinea Forest Authority Final Seminar

Topics:

- Opening remarks by the Managing Director PNG FA.
- Statement by Minister PNG Forest.
- Speech by 1st Sec. to Ambassador of Japan.
- Overview of the Project by Chief TA of JICA project.
- Output 1 Enhanced PNG-FRIMS
- Output 2 Improvement of Forest planning system utilizing PNG – FRIMS
- Output 3 Identified Forest infor for addressing REED+
- Speech by representative of JICA- Office PNG

PS expressed acknowledgement

OVERVIEW OF JICA-PNGFA CAPACITY DEV. PROJECT

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020

Grant Aid Program

GIS facility, Satellite images and training

PNGFA/JICA 1st Project

Capacity for monitoring Nation wide forest resource including carbon

1. Forest Base Map2102(1.0)
2. PNG-FRIMS(GIS Database)
3. Carbon monitoring

PNGFA/JICA 2nd Project

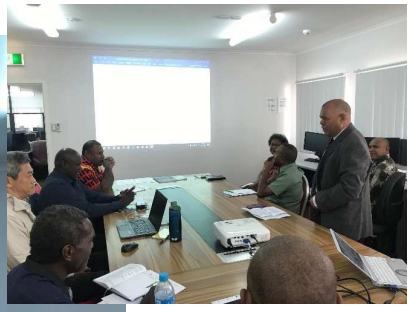
Capacity to continuously update and fully utilize forest information for SFM and Climate Change

1. Enhancing PNG-FRIMS
2. Applying PNG-FRIMS to forest management
3. Preparing Information for addressing REDD+

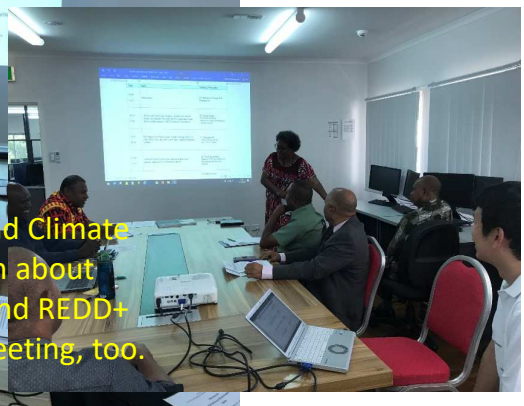
The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands

Papua New Guinea Forest Authority FAO project visit

Dr. Abe, FAO, explained "FAO Support for forestry and Climate Change/REDD+ in PNG". CCDA also give presentation about REDD+ activities. SI mission explained JICA project and REDD+ activities in SI. PNGFA officers participated in this meeting, too.

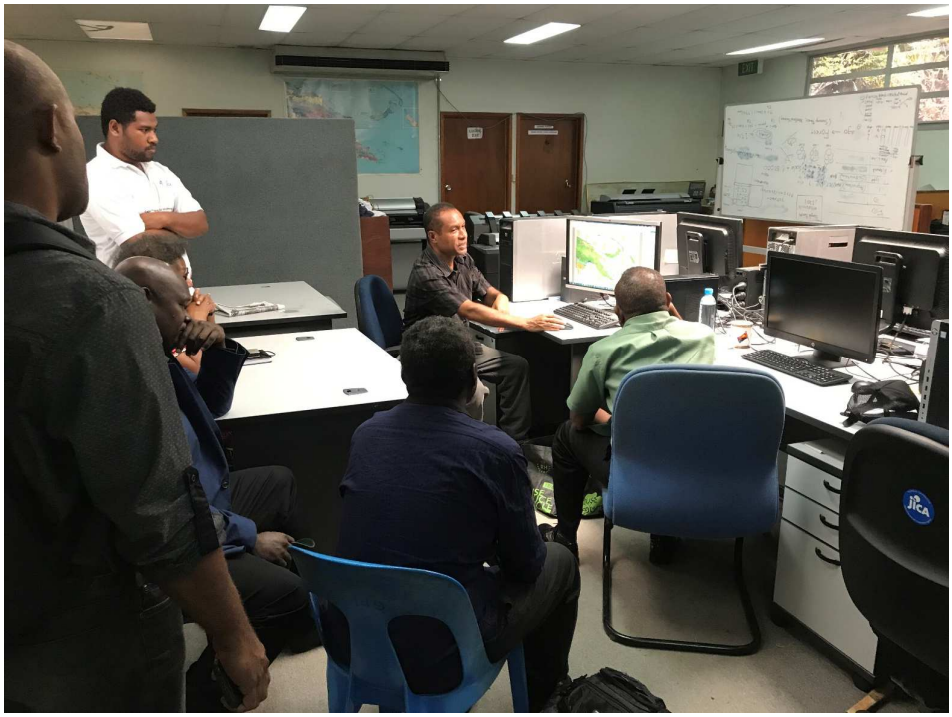


Mr. Anga, SI H.C.



PNGFA executives

Papua New Guinea Forest Authority GIS/Mapping office



Mr. Malan, PNGFA, explained actual map data in GIS.

PNGFA team sharing experiences of PNG forest sector with SI mission.

- Emerging issues
- National Timber Legality Standard Verification System
- Regulatory measures
- Climate change Framework for Action
- Ban on Round log export

Papua New Guinea Forest Authority

Attendees deepened friendship at the party after the seminar.

Minister and Managing Director also attended.

PNGFA JICA team

Varirata National Park

SI Mission at Varirata Information centre funded by JICA

Summary

- Achievement
- PNG- FRIMS enhanced
- PNG- FRIMS provides bases for improving Forest Planning system –Annual Allowable Cut.
- FRIMS provides data for addressing REDD+
- Challenges
- Timely updating of Logged Over Information.
- Regular updating of Satellite images
- Over cutting by issuance of FCA
- Using Models (LCM) to predict future scenarios

Acknowledgement

- JICA Project SFRM SI for sponsoring the study tour
- PNGFA for accepting SI request to undertake the study tour.
- SI MoFR participants for accepting the opportunity to be part of the study team.
- HE. SI Ambassador to PNG Mr. Banabas Anga for attending and contributing during FAO/EU and SI JICA project presentation.

Taqio tumas

12 May 2022

Solomon Islands Government

Ministry of Forestry & Research

P.O Box G24,
Honiara,
Solomon Islands.

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(677) 24660
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mofr.gov.sb

To: Heads of Divisions
Responsible Officers

Circular notice: Improvement for forest management operations in the ministry.

The forest information tools (SolGeo-FIMS) has already been developed and is in operation. The effective use of the forest information leads MOFR to the effective forest management in Solomon Islands. To improve the current forest management operations in the ministry, the relevant divisions shall follow next four items

1. There are many missing information such as the license period in the concession dataset on SolGeo-FIMS. These information should be properly provided to the **Technical Service Section (Mapping Unit)** by **the Licensing Section** for proper information sharing as concession management on SolGeo-FIMS. Inactive concessions/licenses could be those that cease to operate before their 5-years license term ends due to smaller concession areas or other reasons. This will be updated on the SolGeo-FIMS when detected. The updated concession map and its attribute by the Mapping Unit shall also be shared appropriately with the relevant divisions.

2. The input of quota volume has been suspended due to discrepancies between existing volume information and the current status, but the new forest resource volume information has been developed, so this will be resumed. The input of quota timber volume will be calculated using Concession Maps and Forest Management Units (FMU). In addition, the amount of felling in each concession is subtracted from the estimated commercial volume in the FMU each year in order to maintain the appropriate timber volume information on the FMU by the **Technical Service Section (Mapping Unit)**. Hence, Log Export data from each concession should be provided to the Technical Service Section (Mapping Unit) by **the Marketing Section**.

3. Where a new concession boundary overlaps with an existing valid concession, the overlapping area should be eliminated in order to be approved. Appropriate records should also be kept when the overlap is eliminated on the data by the **Technical Service Section (Mapping Unit)**.

4. It is necessary that plantation companies submit forest stock information for appropriate forest management in Solomon Islands. The **Forest Plantation Development and Reforestation Division (FPDRD)** shall negotiate with the main plantation companies for the submission every year.

Solomon Is.

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Mr. Reeves Moveni
Commissioner of Forest,
Ministry of Forestry and Research,
Solomon Islands

Mr. Terence Titiulu
Deputy Forestry Commissioner
Forest Resource Management
and Technical Services Division
Ministry of Forestry and Research,
Solomon Islands

Mr. Richard Raomae
Deputy Commissioner Forest Plantation
Development and Reforestation Division
Ministry of Forestry and Research,
Solomon Islands

Solomon Is.

Agroforestry in SFRM

- Basic Concept & Practices in SI -

18 September 2019

Hiromi YAMAUCHI

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Purposes of Today's AF Session

Purpose

- To have common understanding on AF among TSC members

Specific Objectives

- To understand basic concepts of AF
- To review AF policies in SI
- To review AF experiments and practices in SI
- To understand the current practices and perception of AF in the pilot communities

Agenda

1. What is Agroforestry?
2. Benefits of Agroforestry
3. Agroforestry Policies in Solomon Islands
4. Agroforestry Experiments in Solomon Islands
5. Practices and Perception of AF in the Pilot Communities
6. Wrap up & Way Forward

1. What is Agroforestry

■ Definition

➢ World Agroforestry Center (ICRAF)

- Agroforestry is defined as 'agriculture with trees'.
- Agroforestry is the interaction of agriculture and trees, including the agricultural use of trees.

➢ FAO

- Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used in the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence.

➢ Solomon Islands' Definition

- Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence.

1. What is Agroforestry? (cont')

■ Types

➢ Agrisilvicultural system

- Combination of crops and trees
- E.g. Alley cropping, Homegarden

➢ Silvopastoral system

- Combination of forestry and grazing

➢ Aquasilviculture system

- Combination of forestry and aquaculture

2. Benefits of Agroforestry

What kinds of benefits does agroforestry provide?

<Perception of AF Benefits of MoFR Officials>

- Available of wide range of food/forest products
- Benefit in short-term and long-term
- Long-term crop & short-term crop together on same land
- Increase economic growth
- Increase crop yield
- Interaction of trees and animals (nutrition sharing)
- Increase biodiversity
- Efficient use of solar energy (sunlight)
- Effective use of land
- Management of soil mineral
- Maintain soil organic matter
- Control soil erosion
- Control runoff

2. Benefits of Agroforestry (cont')

- Improvement of soil-fertility through nitrogen fixation or build-up of organic matter
- Improvement of water infiltration into the soil
- Provision of long, medium, and short-term revenue
- Creation better microclimate through provision of shade and performance of windbreak by trees and shrubs
- Provision of multi products such as food, fodder, fuelwood and timber for both domestic use and commercial purposes
- Suppression of weed growth

3. Agroforestry Policies in SI

- National Development Strategies 2016-2035
  - NDS Objective One: The productive and resource sectors (agriculture, livestock, agro-forestry, aquaculture, ,,,, forestry and reforestation,,,,) need reinvigorating to increase value added and export earning to achieve sustained growth.
- Draft National Forestry Policy
  - Draft National Forestry Policy under discussion at the cabinet includes agroforestry
- Four-year short-term policy
  - Four-year short-term policy indicates promotion of AF as a rehabilitation mechanism
- AF policies by MoA

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

3. Agroforestry Policies in SI

- National Development Strategies 2016-2035
  - NDS Objective One: The productive and resource sectors (agriculture, livestock, agro-forestry, aquaculture, ,,,, forestry and reforestation,,,,) need reinvigorating to increase value added and export earning to achieve sustained growth.
- Draft National Forestry Policy
  - Draft National Forestry Policy under discussion at the cabinet includes agroforestry
- Four-year short-term policy
  - Four-year short-term policy indicates promotion of AF as a rehabilitation mechanism
- AF policies by MoA
  - No specific policies or programmes on AF
  - Under "Coconut Development Program", AF with coconut, cocoa, and cattle has been supported.

4. Agroforestry Experiments & Practices in SI

■ ACIAR

- ➢ Provide technical support to communities, including thinning operation, seedling production, and high-value timber production.
- ➢ Support facilities and equipment for soil test and wood quality test
- ➢ Challenges:
  - Lack of knowledge about forest operations such as thinning
  - Lack of access to markets of timber

4. Agroforestry Experiments & Practices in SI

■ACIAR &RTC & JOCV

- ➢Experimental plots of AF in Tabaka RTC in collaboration with ACIAR and JOCV.
- ➢It originally aimed at obtaining short and long-term revenue from crops and timber.
- ➢The AF system was intercropping of potato, cassava, cabbage and pineapple in rows of teak or fluggea or mahogany.
- ➢The crops were cultivated for the first three years before tree crown would be closed.
- ➢Initially it included vegetables that would be sold at high price, however, purchasing seeds was a problem.

(Munda)

4. Agroforestry Experiments & Practices in SI (cont')

SPC

Choiseul Integrated Climate Change Programme (CHICCAP)

- Aimed at enhancement of resilience of food security against climate change
- Designed AF models and implement trials
  - Contour-based improved AF
  - Demonstration goat farming and introduction of more suitable chicken and pig varieties
  - Assessment of feasibility establishing virgin coconut oil production and honey farming
- Challenges
  - Land tenure
  - Weakness of cultivation techniques and market access
  - Lack of women's participation by village head decision

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

4. Agroforestry Experiments & Practices in SI (cont')

UNDP-SWoCK

- AF for improve soil productivity which degraded due to shifting cultivation.
- MoA provided technical and material support such as tools and seedlings.

Model Farmer of AF supported by SWoCK (Maraita)

4. Agroforestry Experiments & Practices in SI

Guadalcanal (Individual farmer)

- Originally, pineapples were planted for income generation, however, in order to secure long-term revenue, tree species such as teak and mahogany were planted in 2014.
- Planting pineapples between the rows of trees reduced workload of weeding.

5. Current Practices and Perceptions of Agroforestry in the Pilot Communities

Falake

Betel nut & Cassava

Betel nut & Potato & Papaya

Betel nut & Cocoa

5. Current Practices and Perceptions of Agroforestry in the Pilot Communities

- Falake

Kava plantation near Tamboo site

Vitex planted beside Kava plantation

. Current Practices and Perception of Agroforestry in the Pilot Communities

- Falake
  - Practices of "AF", integrated planting trees and crops, are limited.
  - Some community members are interested in "AF" planting trees mixed with crops to improve efficiency of management work for tree plantation as well as crops.
  - Some community members do not want to plant trees and crops together because they worry that crop yields may reduce.

5. Current Practices and Perception of Agroforestry in the Pilot Communities

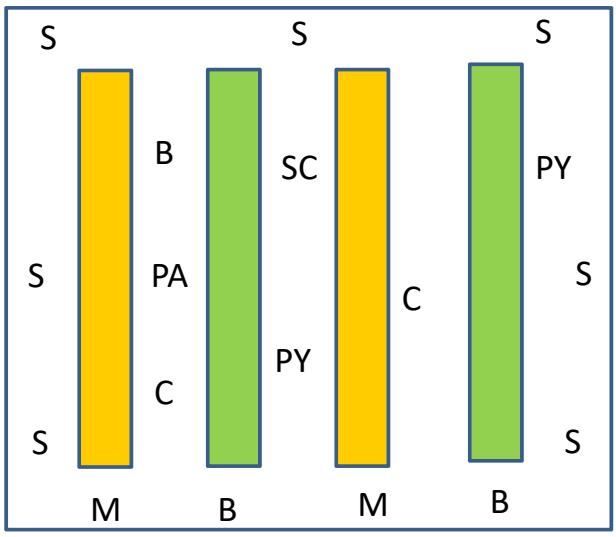
Komunibori

Mahogany plantation

A kind of AF beside compound

Garden inside forest

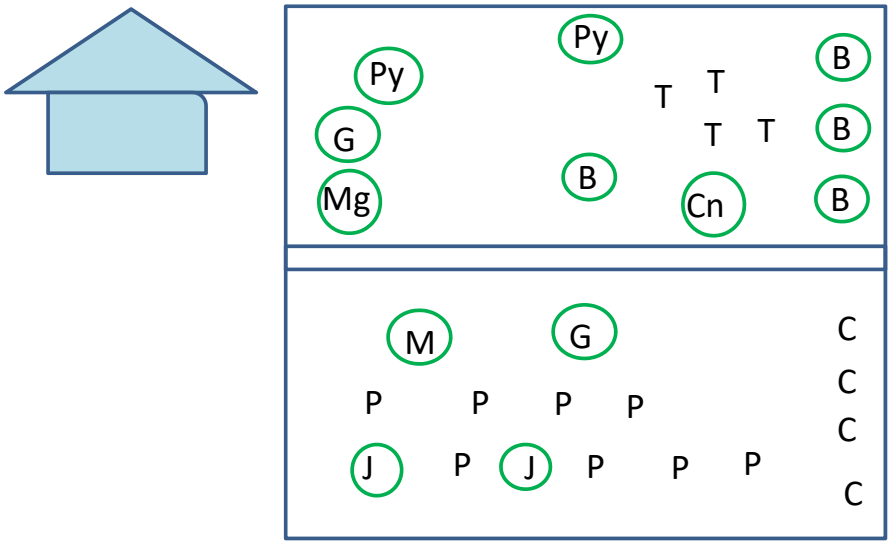
Some AF practices outside the pilot site in Komunibori



M: Mandarin
B: Betlenut
S: Soursoap
B: Banana
PA: Pineapple
C: Cassava
SC: Sugar cane
PY: Papaya

Coconut and Cocoa are planted on another plot.

■ Some AF practices outside the pilot site in Komunibori



M: Mandarin
J: Jackfruit
G: Guava
Mg: Mango
Cn: Cut nut
Py: Papaya
B: Banana
P: Pineapple
C: Cabbage
T: Taro

5. Current Practices and Perception of Community Members in the Pilot Sites

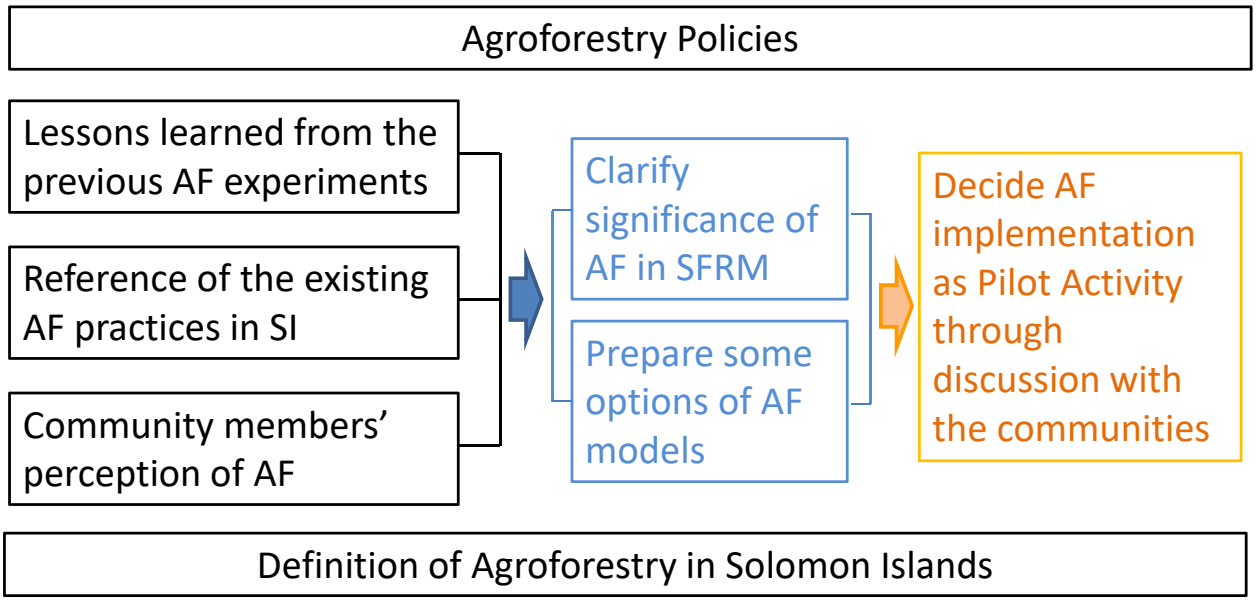
■ Komunibori

- ➢ Some community members are interested in AF.
- ➢ It may be difficult to introduce AF in the existing plantation since distance between trees and trees is narrow.
- ➢ A community member is interested in AF because teak plantations occupy land.

Interests and Perception on AF in Komunibori Community

- Many community members including women are interested in AF.
- Most interviewees implemented mix cropping of agriculture crops.
- One of reasons for mix cropping is efficiency of work.
- Some people want to expand cultivation areas and increase amount of crops cultivated.
- Some people are interested in planting trees such as vitex (*Vitex cofassus*), kwila (*Instia jijunga*), *Calophyllum*, rosewood (*Pterocarpus indicus*), and akwa (*Pometia pinnata*) for domestic purpose for house construction, furniture, and commercial purpose of selling timber.
- Some people think that crop yields might reduce if they were planted under trees.
- It is possible to establish an AF plot in the pilot site by collective work by all community member house holds. In this case, benefit sharing of yield or revenue generated from the AF plot will be discussed and decided by the community committee.

6. Wrap Up & Way Forward



Thank You for Your Attention

Progress of

Agroforestry Pilot Activity

16 March 2020

Hiromi YAMAUCHI

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRMP)

Agenda

1. Activities conducted in 2019
2. Progress of making AF implementation plan
   - 2.1 Komuniboli
   - 2.2 Falake
3. Finalization of AF implementation plan

1. Activities conducted in 2019

■ Site observation in two pilot site

- ➢ Visit Komuniboli and Falake and observe the pilot sites
- ➢ Grasp perceptions and understanding on AF of community members

■ AF workshop for TSC members

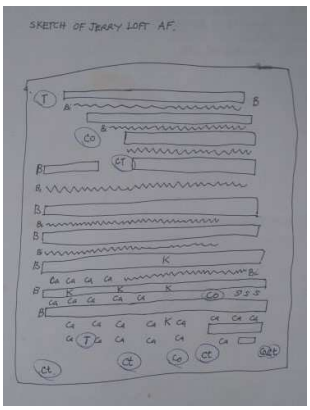
- ➢ Have common understanding on concept and practice of agroforestry in SI
- ➢ Share current situations on AF in two pilot sites

Betel nut & Cassava (Falake)

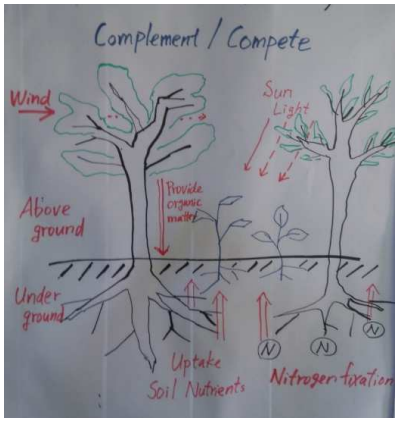
1. Activities conducted in 2019

■ AF Basic Concept Presentation

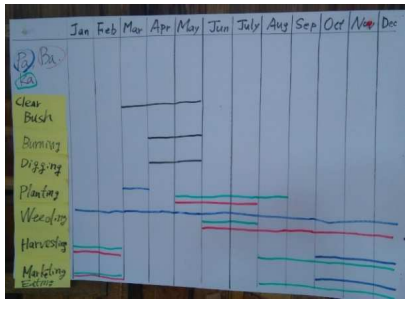
■ AF Baseline Survey & Detailed Seasonal Calendar



Practice of sketching AF practice



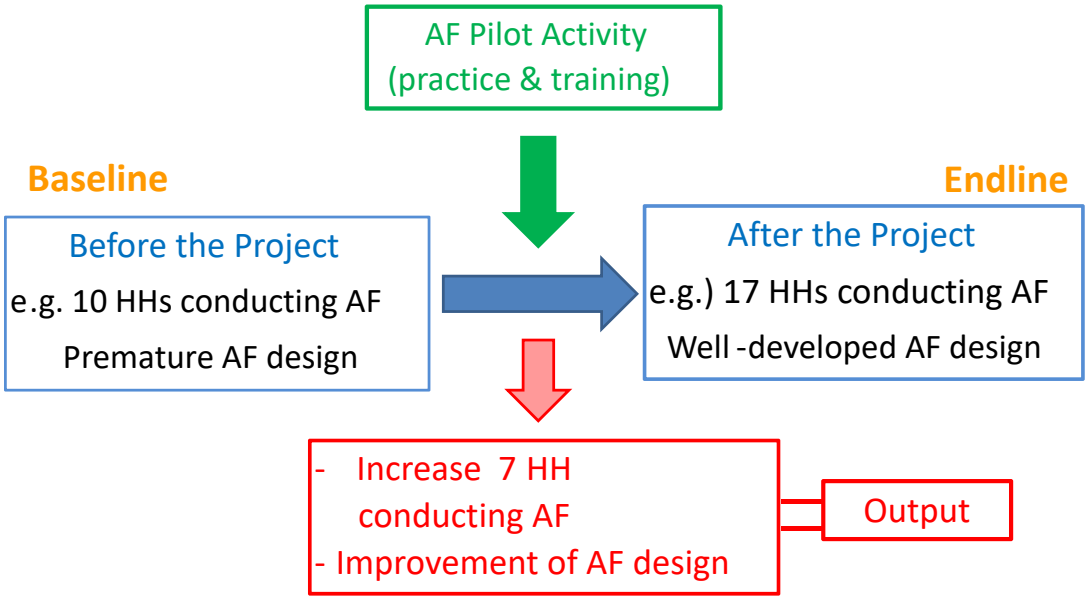
Presentation at Komuniboli & Falake



Detailed seasonal calendar

1. Activities conducted in 2019

■ AF Baseline Survey



2. Progress of making AF implementation plan

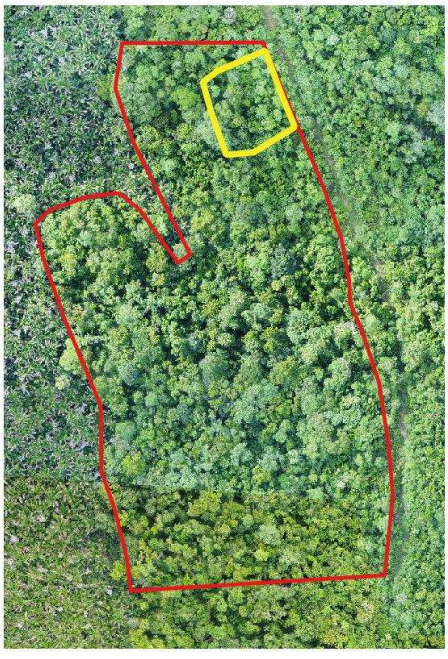
Vision & Objective	● Objectives of AF
Measure the plot	● Identify and measure the plot
Species election & Layout	● Selection of tree/crop species & Layout
Activities & Schedule	● Breakdown activities ● Schedule of each activities
Inputs	● Necessary materials & workload
Management Structure	● Members & Roles
Management mechanisms	● Management rules ● Benefit sharing
Monitoring & Evaluation	● M & E structure ● Methods & Schedule/Frequency

2.1 Komuniboli

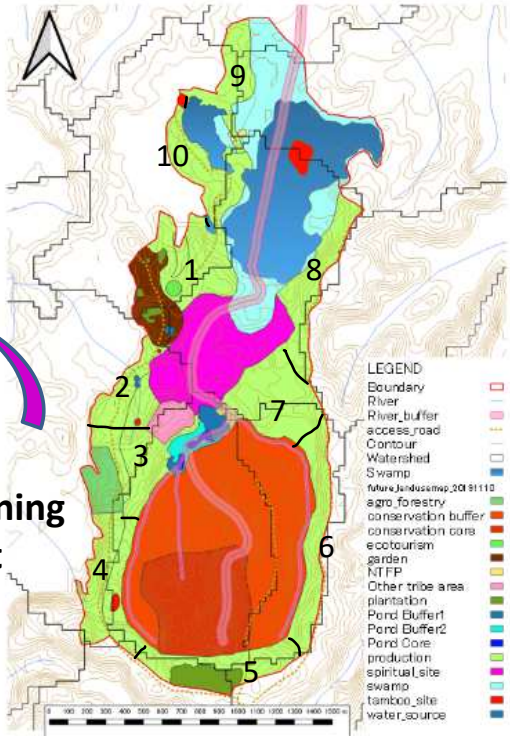
■Objectives of AF training pilot

- To generate income
- To improve food security
- To improve knowledge and skills on AF
- To learn/practice effectiveness land use for maximizing benefits

■ Location of AF Training Plot



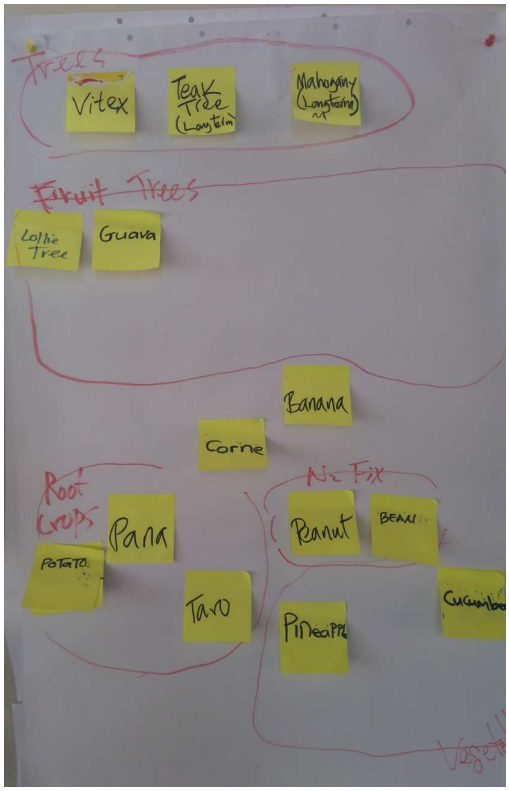
AF training plot



Tree/Crop Species Selection

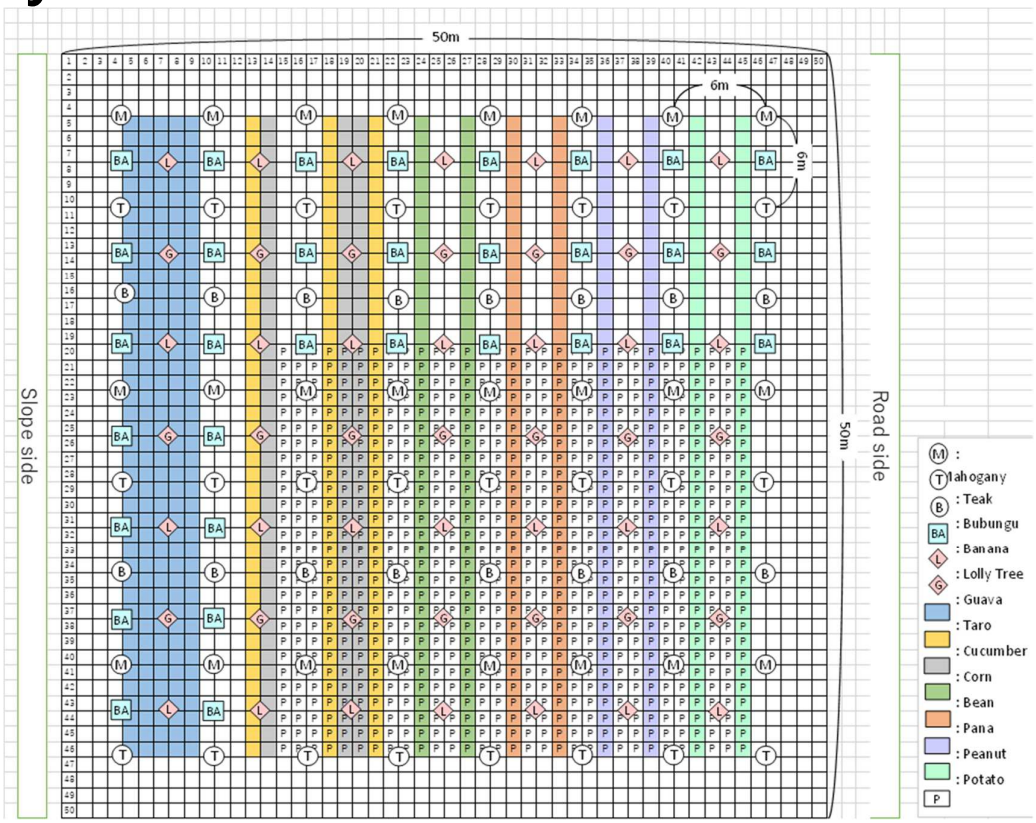
<Aspects>

- Achievement of the objectives
- Long, medium, and short-term benefits
- Markets of the trees/crops
- Improvement of soil condition (N, P)
- Procurement of seeds/seedlings
- Compatibility of the trees and crops
- Manpower
- Field conditions



AF Layout

AF Layout

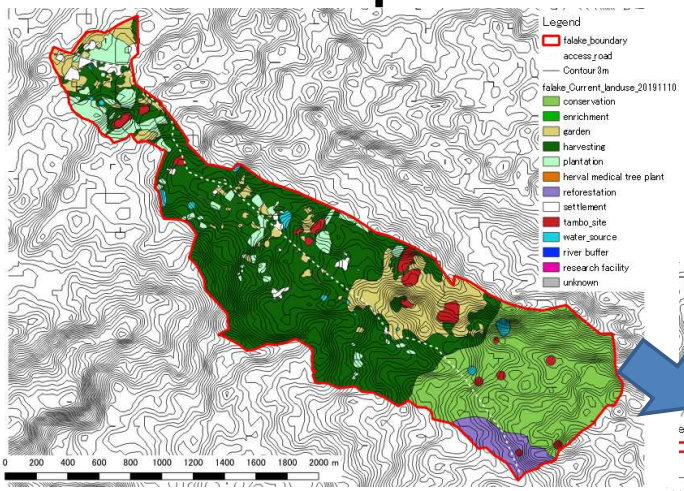


Activities & Schedule (Annual Work Plan 2020)

	2020									2021		
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
<Tree>												
Pencil-cider	Site cleaning	<Milling of trees harvested through site cleaning>	Collect seedlings	Marking, Digging, Planting		Spot weeding	Clear weeding	Clear weeding	Spot weeding Singling out		Singling out	Weeding
Mahogany				Collect seeds/raise (30)		Planting	Spot weeding					Weeding
Teak		Collect seeds (30)			Planting	Spot weeding	Clear weeding		Monitoring			
Guava		Collect/ Raise		Planting		Spot weeding	Clear weeding		Monitoring			
Lolley tree		Collect/ Raise		Planting		Spot weeding	Clear weeding					
<Crop>												
Sweet potato	Site cleaning	Land preparation	Land prepartion	Collect planting materials	Mount & planting	Weeding	Market research	Harvest/ market	Benefit sharing			
Pineapple					Mount & planting							(Harvest in Oct 2021)
Taro					Mount & planting	Weeding				Market research	Harvest/ market	Benfit sharing

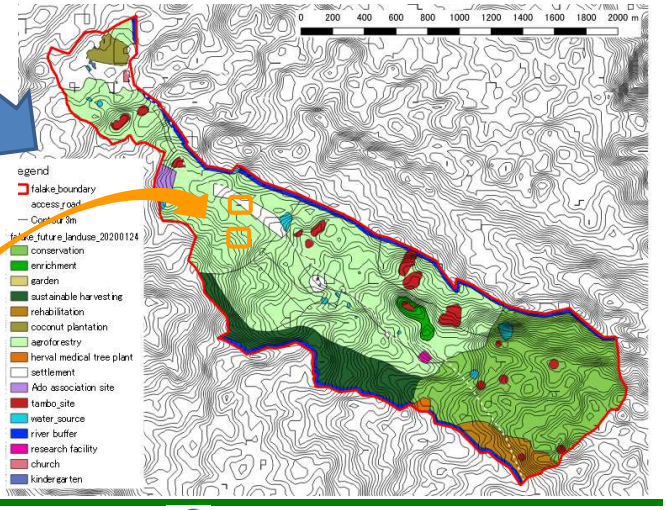
2.2 Falake

■ AF land & AF plot selection



Current Landuse

Future Landuse plan



AF pilot plots

■ AF Pilot Plots

Selecting AF pilot plots

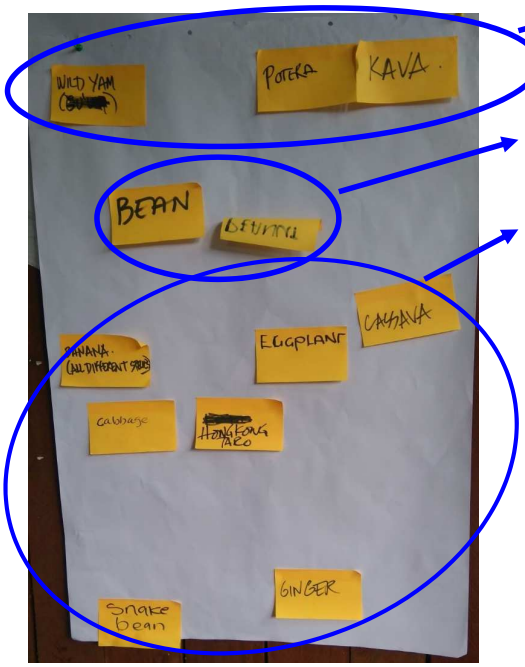
AF Plot 1 Garden

AF Plot 2 Mahogany Plantation

Objectives of AF Pilot Activity

- To try an alternative approach to slush and burn, which does not need to move place to place unlike slush and burn.
- To generate income throughout the year.
- To obtain long, medium, and short-term benefits.
- To reduce workload through agroforestry practice.
- To produce timber without putting pressure on natural forest since it shall be conserved for water source recharge.
- To create shade by planting trees for crops and human being since sunshine becomes very strong recently due to climate change.
- To protect crops from strong wind.
- To learn organized ways of crop and tree cultivation and management including recoding input and output.
- To learn what kind of crops are suitable under tree shade.
- To confirm how much agroforestry practice contrbiutes to soil improvement, especially the level of nitrogen.

Species Selection



Medium-term benefit

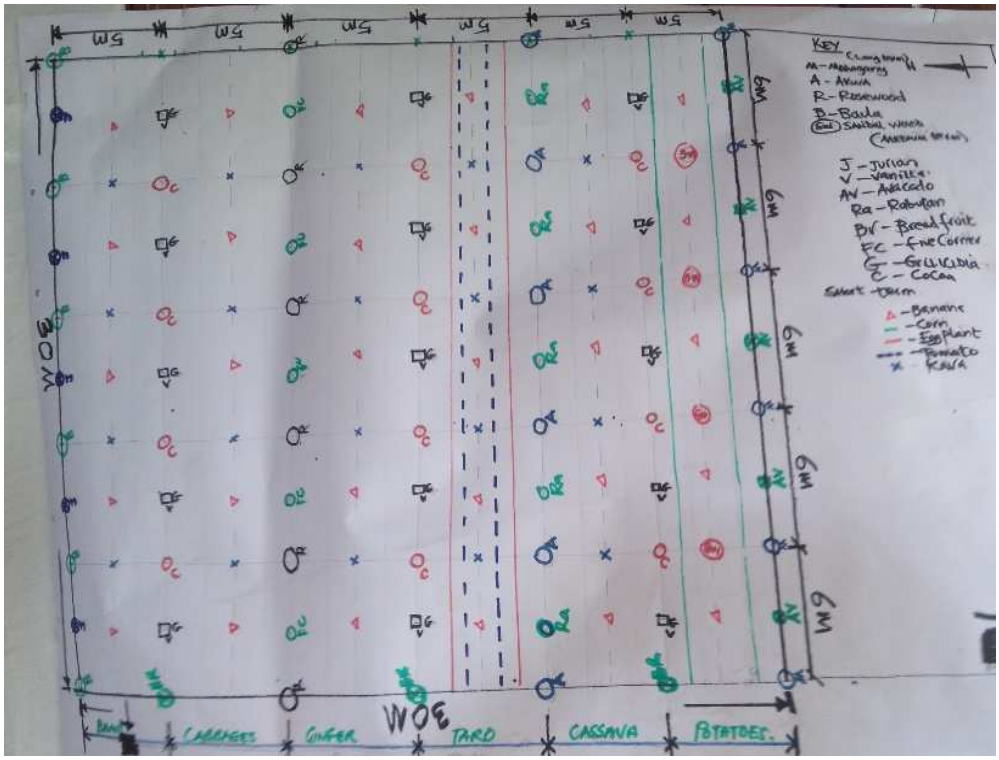
Soil improvement (Nitrogen fixation)

Short-term benefit

Crop selection for Plot 2

Species selection & Layout for Plot 1

■ Layout (Plot 1)



3. Finalization of AF implementation plan

- Vision & Objective
- Measure the plot
- Species election & Layout
- Activities & Schedule
- Inputs
- Management Structure
- Management mechanisms
- Monitoring & Evaluation

Finished

Komuniboli: 17-19 Mar.
Falake: 23-25 Mar.

Agroforestry implementation Plan (ver.1) (March)

Put into practice (May -)

Thank you very much for your attention!