Solomon Islands
Ministry of Forestry and Research

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

Final Report

September 2022

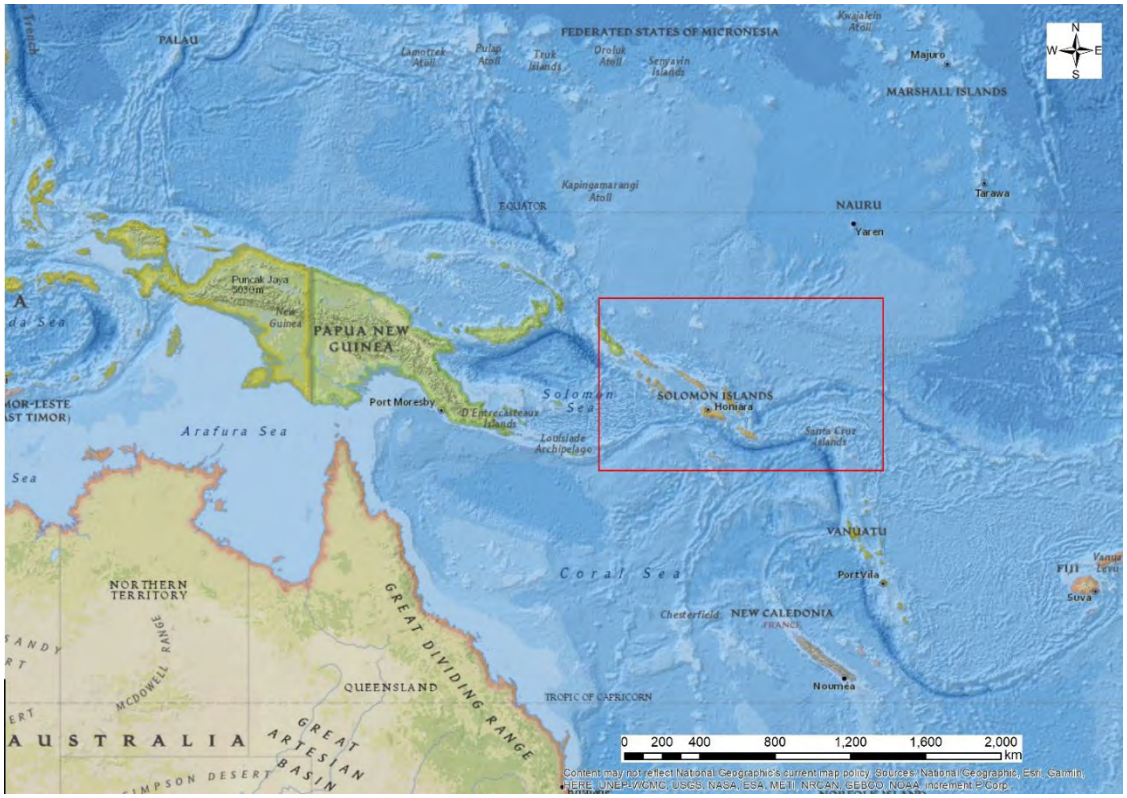
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Kokusai Kogyo Co., Ltd.
Rakuno Gakuen University

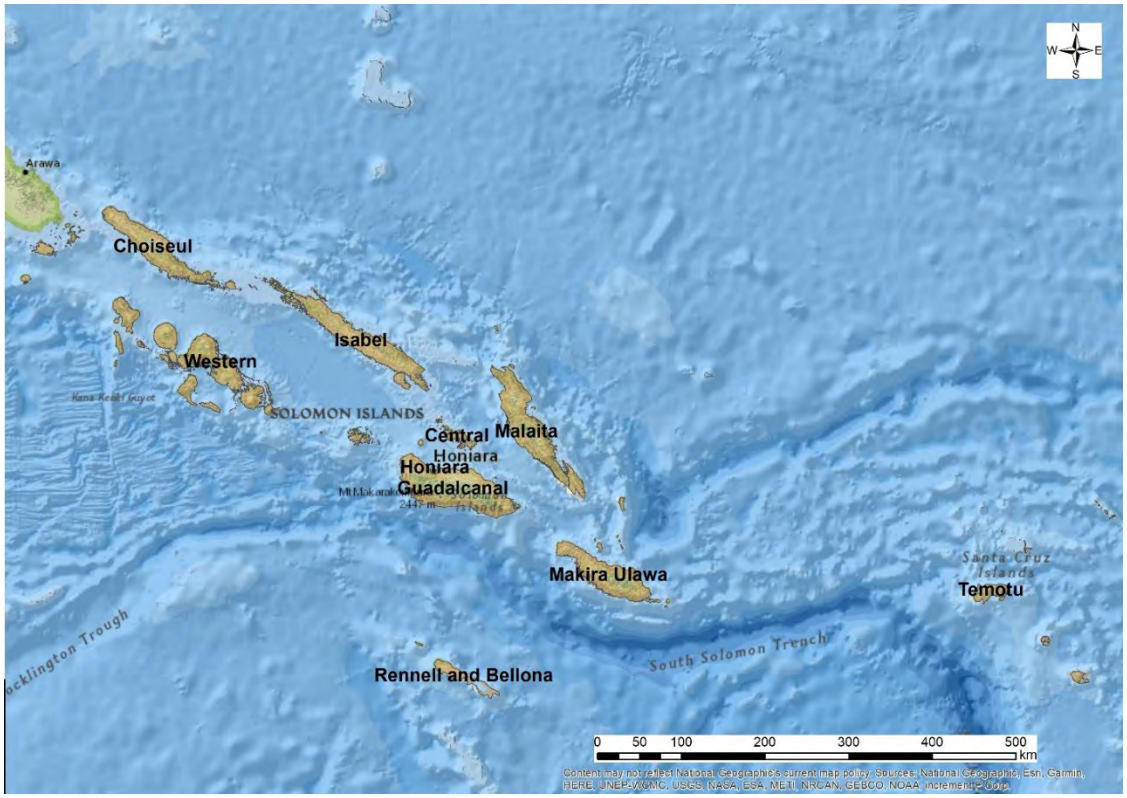
GE
JR
22-096

Project Location Map

Solomon Islands and Surrounding Countries



Solomon Islands



Photos of Local Activities

(December 2018 - August 2019)

4th JCC Meeting (ceremonial address by the Project Director, January 2019)

Drone survey (May 2019, Komuniboli)

1st consultation meeting on the development of the Forest Information Tool (June 2019)

Workshop on working with community (roles and attitudes of C/Ps) (June 2019)

Third Country Training (PNGFA/JICA Project Final Seminar, July 2019)

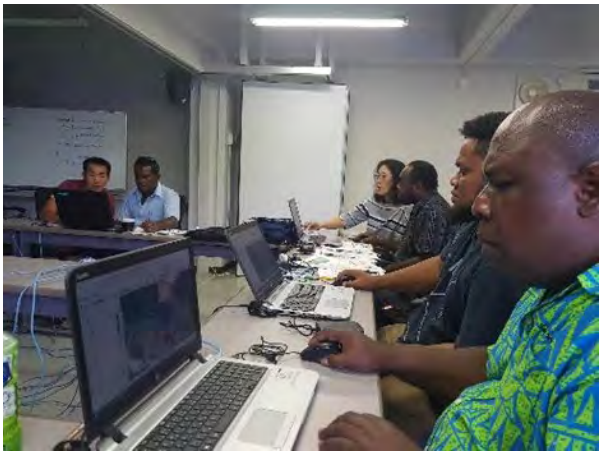
Training in Japan: water forest preservation activities in the village of Doshi (August 2019)

Photos of Local Activities

(August 2019 - February 2020)

Training in Japan: Forest Tree Breeding Center

(August 2019)



Training in Japan: GIS/Remote Sensing Training

(August 2019)

Land Use Planning Work

(Komuniboli, September 2019)

Hearing on Understanding and Practicing Agroforestry

(Komuniboli, September 2019)

Forest Information Tool Operation Training

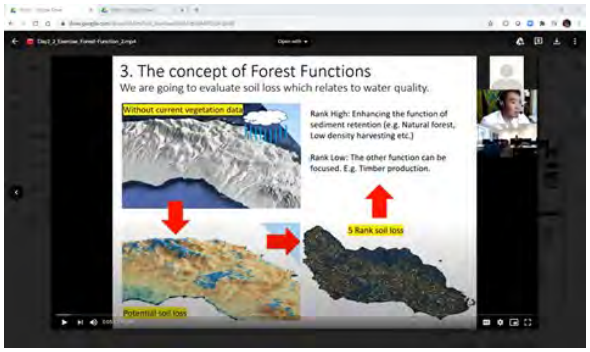
(October 2019)

The 2nd Forest Monitoring Training

(February 2020)

Photos of Local Activities

(August 2020 - October 2021)



Online Training (August 2020)

Participants in Forest Information Tool Management Training (September 2020)

Logging and Harvesting Safety Training (Falake, October 2020)

Leadership Training (Falake, October 2020)

Sorting and procurement of piglets (October 2021)

Grafting Training (Komuniboli) (October 2021)

Photos of Local Activities

(May 2022 - July 2022)

Chicken shed (Komuniboli) under construction (May 2022)

Status of Komuniboli Agroforestry Plot 1 (May 2022)

MOFR and community monitoring of agroforestry (May 2022)

Feedback of monitoring results to residents (Komuniboli) (June 2022)

Final Workshop Ceremony by Dr. Vaeno Vigulu, Project Director (July 2022)

Commemorative gift from the Minister of Forestry and Research, Solomon Islands, at the farewell dinner (July 2022).

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Annex 4 Gender Analysis Survey Report
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Abbreviations

AF	Agroforestry
ARFA	Ado Rural Farmers Association
CoLP	Code of Logging Practice
C/P	Counterpart(s)
DAC	Development Assistant Committee
DPCA	Drone Pictures and Creation Association
EnVision	Envision Conservation Office
EU	The European Union
FAO	Food and Agriculture Organization of the United Nations
FDRD	Forest Development and Reforestation Division
FMU	Forest Management Unit
FRA	Global Forest Resources Assessment
FRL	Forest Reference Levels
FRMTSD	Forest Resource Management and Technical Services Division
FS-TWG	Forest Sector-Technical Working Group
FTM	Forest Type Map
GEF	Global Environment Facility
GIS	Geographic Information System
GIZ	Gesellschaft fur Internationale Zusammenarbeit
GPS	Global Positioning System
HCV	High Conservation Value
IFM	The Integrated Forest Management
IG	Interest group
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
KKC	Kokusai Kogyo Co., Ltd.
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MOAL	Ministry of Agriculture and Livestock
MOFR	Ministry of Forestry and Research
MLHS	Ministry of Lands, Housing and Survey
NTFP	Non-Timber Forest Products
OECD	Organization for Economic Co-operation and Development
OJT	On-the-job Training
PNG	Papua New Guinea
PRA	Participatory Rural Appraisal
R/D	Record of Discussion
REDD+	Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
RGU	Rakuno Gakuen University
RS	Remote Sensing
SBD	Solomon Dollar
SEPAL	System for Earth observations, data access, Processing & Analysis for Land monitoring
SFRM	Sustainable Forest Resource Management
SI	Solomon Islands
SIG	Solomon Islands Government

SI-SFRM	The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands
SNS	Social Networking Service
SolGeo-FIMS	Solomon Geographic Forest Information Management System
TOT	Training of Trainers
TSC	Technical Support Committee
VATA	Value Added Timber Association
WHO	World Health Organization

Currency Equivalents

As of September 2022

USD 1.00 ＝ JPY 138.56

USD 1.00 ＝ SBD 8.21

Chapter 1. Outline of the Project

1.1 Background of the Project

The forest ratio of the Solomon Islands, a Pacific Island State in Oceania, was as much as 90% in[1], one of highest national ratios in the world. It is one of the world's biodiversity hot spots (part of the East Melanesian Islands). The country's rich forest resources generate 20% of national revenue, with export earnings in particular accounting for about 65% of foreign currency earnings. However, due to the rapid increase in timber exports, forest degradation and deforestation are expanding rapidly since the 1990s. The average annual log export volume from 2006 to 2011 was about 1.45 million m^3, with estimated sustainable yield of 250,000 m^3 per year, which is estimated to have been almost six times the sustainable yield, and about ten times in 2017. So the sustainability of economic activity is being threatened by the decrease in natural forest resources. Under these circumstances, it is an urgent task to realize the sustainable management of Solomon Islands' forest resources and to nurture and revitalize alternative industries.

Based on these circumstances, Solomon Islands Government (SIG) made a request to Japan for "The Project on Capacity Development for Sustainable Forest Resource Management in the Solomon Islands" (hereafter "the Project"). Based on this request, a preliminary survey by the Japan International Cooperation Agency (JICA) was conducted in 2016, and a Record of Discussion (R/D) was signed in March 2017. Based on the R/D, the Project is being implemented, with the Ministry of Forestry and Research (MOFR) as the counterpart (C/P), over a period of five years, from September 2017 to August 2022.

The National Development Strategy (2016 - 2035), which SIG is currently implementing, points out problems with the non-sustainability of timber exports, as well as with deforestation and forest degradation, and urgently calls for national forest resource conservation. The Project is highly relevant and necessary from the viewpoint of the Solomon Islands' national development strategy. However, it became clear during the Preliminary Survey of the Project that MOFR, which is responsible for forest resource management in SIG, does not necessarily have sufficient ability for policy decision-making and enforcement. As a result, in this Project, the enhancement of MOFR's capacity to implement sustainable forest resource management (hereafter, "SFRM") has been set as the Project purpose. The Project consists of three expected outputs and activities to achieve them. The strategy and plans of the Project activities are implemented by the Short-Term Expert Team, aiming to carry out the Project to its successful completion through these activities in cooperation with the Long-Term Experts, who were dispatched in 2017. Specifically, Short-Term Expert Team aims to support MOFR to "Develop forest information tool(s)" that help(s) MOFR to manage forest information more effectively and efficiently (Activity 1-5) and to implement "Pilot Activities" that try out a community-based participatory approach to SFRM (Activity 3-2 to 3-6), hence strengthening MOFR's capacity for SFRM. In the Project, the joint venture signed a contract with JICA on December 21, 2019, and

[1] Solomon Islands National Reference Level (2017)

participated in the project activities. This report summarizes the progress of the Project activities as a whole, with particular emphasis on the work carried out by the joint venture.

1.2 Purpose and Goal of the Project

The Project aims to achieve the Project purpose through the implementation of Project activities under collaboration with the C/P in cooperation with the Long-Term Experts. The overall goal, Project purpose, outputs, and activities of the Project are as follows:

(1) Overall goal

Sustainable forest resource management is promoted from a comprehensive perspective.

(2) Project purpose

Capacity of MOFR to implement SFRM is enhanced.

(3) Outputs

1: Capacity of MOFR to develop policies to promote SFRM is increased.

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

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

(4) Activities

[For Output 1]

Among the following activities, the Short-Term Expert Team will provide technical assistance to the Long-Term Experts in Activities 1-1, 1-2, 1-3, 1-4 and 1-6; manage activities 1-5 while obtaining advice from the Long-Term Experts.

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 from 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.

[For Output 2]

Among the following activities, the Project team will provide technical assistance to the Long-Term Experts in Activities 2-1, 2-2 and 2-3.

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.

[For Output 3]

Among the following activities, the Long-Term Experts manage activities 3-1; the Short-Term Expert Team will manage activities 3-2, 3-3, 3-4, 3-5 while obtaining advice from the Long-Term Experts.

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. Analyse and compile lessons learned from the Pilot Activities.

(5) Project target group

Implementing Agency: Ministry of Forestry and Research

Target Group: Staff of HQ of MOFR, Staff of MOFR provincial offices, and stakeholders concerned including Pilot Site communities

(6) Project target areas

The target area of the Project is the capital city of Honiara and the Pilot Sites, which were selected in Komuniboli (Guadalcanal) and Falake (Malaita)[2], according to the criteria agreed upon in the R/D.

[2] In order to disseminate the results of previous projects, Ngarinigela and Wairokai (both in Malaita) were added as Pilot sites in 2021.

1.3 Work Flow and Input

1.3.1 Flow Chart of the Project

The implementation flow of the Project is shown in Figure 1-1 Flow of the Project.

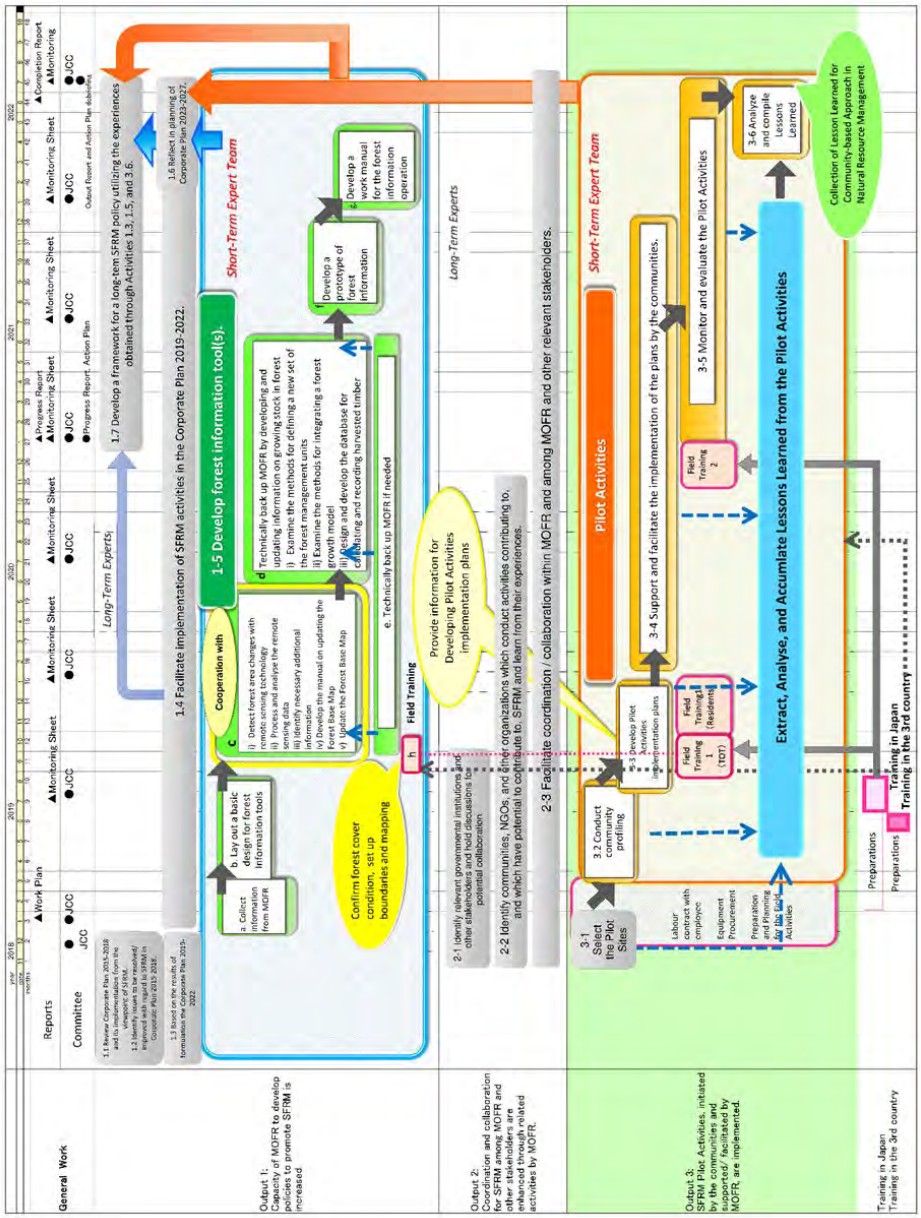


Figure 1-1 Flow of the Project

1.3.2 Implementation Flow of the Project

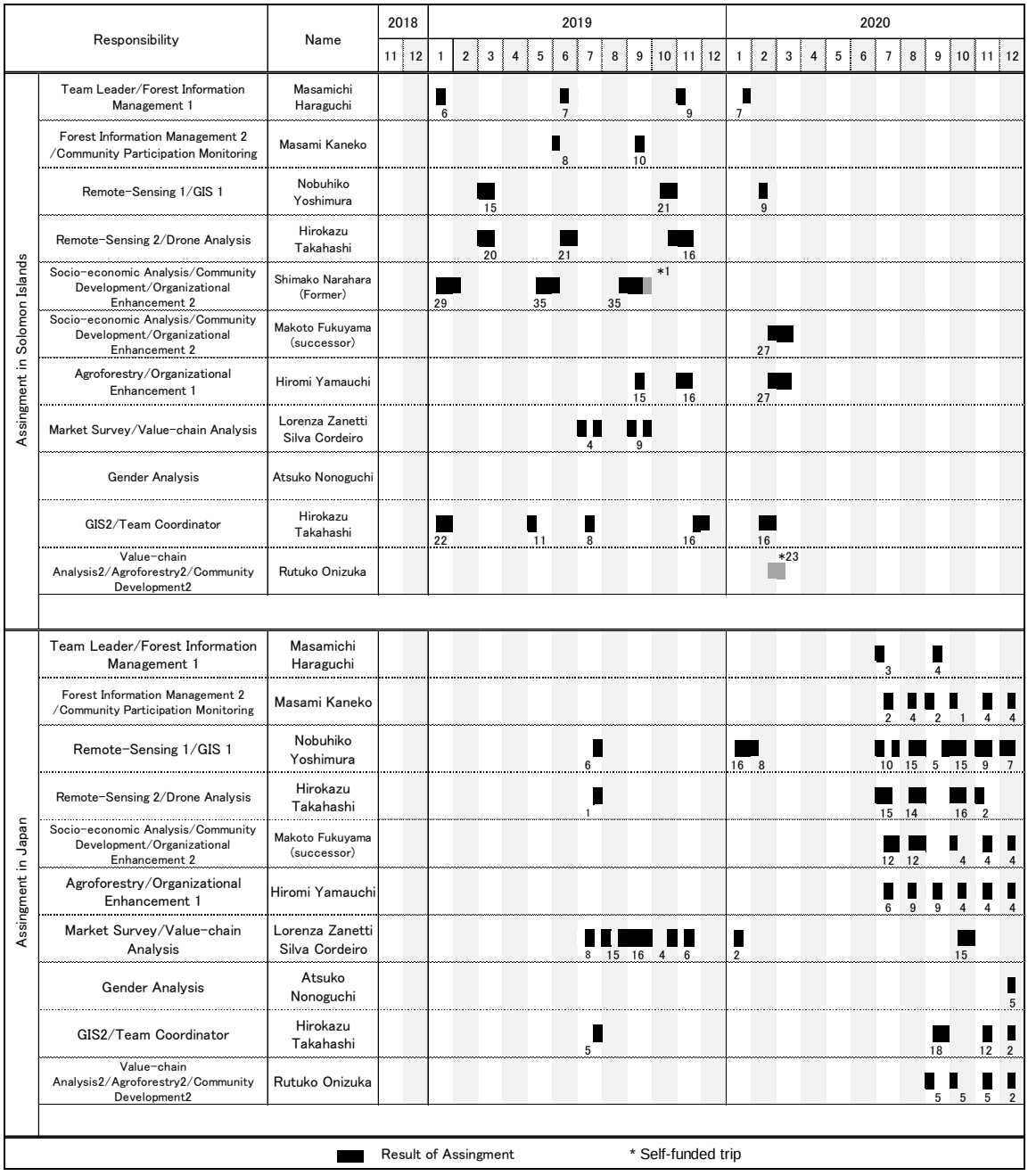
A comparison table of planned and actual Project activities is shown in Annex 73.

1.3.3 Short-Term Expert Team Assignment

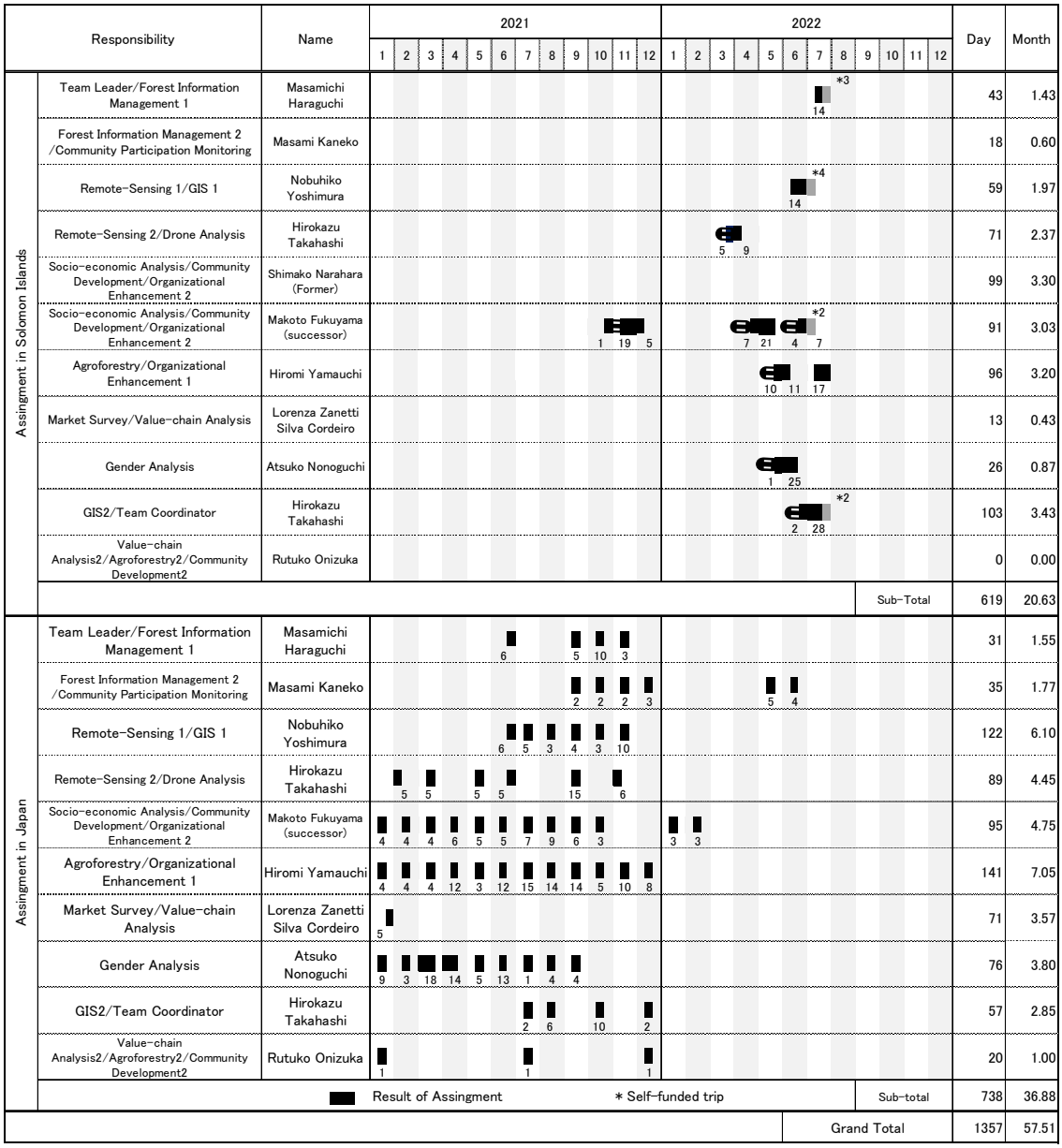
Due to the COVID-19 pandemic that began at the end of 2019, a state of emergency was declared and travel to the region was severely restricted, including long suspensions of commercial flights and restrictions on entry from abroad. As a result, a major change was made to the original plan, shifting most of the work from April 2020 to early 2022 to domestic operations and with the Project implemented remotely. The table below shows the results of the work performed by the Project members.

Table 1-1 Short-Term Expert Team Assignments

Short-Term Expert Team (2018～2020)



Short-Term Expert Team (2021～2022)



1.3.4 Equipment Provided

The table below lists the equipment and goods provided.

Table 1-2 List of Equipment and Goods Provided

Items	Specification / Part No.	Qty	Price	Currency	Amount Japanese Yen	Date of Purchase	Location	Current State	Financial Category
Tablet	iPad mini	2		SBD	91,580	2019/1/25	MOFR HQ	Being used (Handed over)	Equipment

PC(desktop)	Lenovo P330 SFF Workstation	2	39,658	SBD	557,734	2019/3/14	MOFR HQ	Being used (Handed over)	Equipment
Pix4D mapper	Software for Image Analysis	2		SBD	800,000	2019/3/20	MOFR HQ	Being used (Handed over)	Equipment
UPS	UPS1500VA	1	2,500	SBD	34,939	2019/6/13	MOFR HQ	Being used (Handed over)	Equipment
PC(Laptop)	HP250 G7	1	5,500	SBD	74,779	2019/7/10	MOFR HQ	Being used (Handed over)	Equipment
PC(Laptop)	HP Probook450 G5	1	11,799	SBD	158,193	2019/11/27	MOFR HQ	Being used (Handed over)	Equipment
PC(Laptop)	Microsoft Office for Laptop PC	1	1,550	SBD	20,781	2019/11/28	MOFR HQ	Being used (Handed over)	Equipment
PC(Laptop)	Lenovo AMD A4-9125	1	4,900	SBD	64,669	2020/6/11	MOFR HQ	Being used (Handed over)	Equipment
PC(Laptop)	Acer Swift 1-SF114-32	1	7,500	SBD	99,208	2020/12/17	MOFR HQ	Being used (Handed over)	Equipment
Tablet	Huawei MediaPad M5	1		SBD	40,727	2021/6/30	MOFR HQ	Being used (Handed over)	Equipment
Tablet	Samsung galaxy Tab Active Pro 4G 64GB	1	8,300	SBD	113,434	2021/9/15	MOFR HQ	Being used (Handed over)	Equipment
Tablet	Samsung galaxy Tab Active Pro 4G 64GB	4	33,200	SBD	470,948	2022/1/13	MOFR HQ	Being used (Handed over)	Equipment
PC(Laptop)	Lenovo ThinkPad E1515	1	15,000	SBD	212,778	2022/1/13	MOFR HQ	Being used (Handed over)	Equipment
NAS	Synology RackStation 4TB*4 SSD	1	58,850	SBD	843,102	2022/2/3	MOFR HQ	Being used (Handed over)	Equipment
Camera Gimbal	DJI Ronin RS2	1	12,480	SBD	178,792	2022/2/25	MOFR HQ	Being used (Handed over)	Equipment

1.3.5 Local Sub-contracting

An awareness-raising promotional video was created to introduce the pilot activities to be implemented by the Project. The objective was to raise awareness about activities that combine sustainable forest management and livelihood improvement by generating interest in the Project's activities. The TOR of the re-commissioning is shown in Annex 74. The deliverables were posted on YouTube and social networking sites (SNS) sites and used as PR materials

(https://www.youtube.com/channel/UC3_oJjc14Z6E0w0rcqtWRxw).

Name of the subcontract: Promotional Video Creation

Name of subcontractor: Torn Parachute Enterprises

Sub-contract period: February 15, 2021 - June 30, 2021

Amount of the subcontract: 30,200.00 SBD

1.4 Project Operations

The table below shows the composition of the work.

1.4.1 Joint Coordinating Committee and TWG

Although there were interruptions due to COVID-19, the JV participated in a total of five Joint Coordinating Committee (JCC) meetings with the Long-Term Experts, explained and discussed the results, progress, and challenges of the work with the Solomon Islands side, and obtained approval for the work plan. Together with this, the final workship/joint monitoring meeting was held to summarize the results of the Project and to make recommendations for the post-project period. In addition, the Long-Term Experts participated in the Forest Secctor Technical Working Group (TWG) which is comprised of national and international forest sector organizations in Solomon Islands, and serves as the Project's secretariat, to gather and disseminate the information. The JCC and TWG meetings are summarized in the table below. The agenda and presentation materials are shown in Annex 75 and Annex 76.

Table 1-3 Dates and Agendas of JCC Meetings

	Date	Agenda items
JCC4	30 Jan 2019	・ Project progress report ・ Explanation of Project Work Plan ・ Confirmation of PDM, PO, and annual Activity Plan
JCC5	24 Jul 2019 (Absence)	・ Project progress report ・ Report on detailed Project activities ・ Confirmation of PDM, PO, and annual Activity Plan ・ Report on Third Country Training (PNG)
JCC6	30 Jan 2020	・ Project progress report ・ Report on detailed Project activities ・ Confirmation of PDM, PO, and annual Activity Plan ・ Report on the training in Japan ・ Promotion of policy implementation for sustainable forest management ・ Sustainable forest management and community participation

JCC7	22 Apr 2021	・ Project progress report ・ Report on detailed Project activities ・ Confirmation of PDM, PO, and annual Activity Plan ・ Interim report on information collection/confirmation study on forest/forestry sector analysis
JCC8	24 Aug 2021	・ Project progress report ・ Report on detailed Project activities ・ Confirmation of PDM, PO, and annual plan ・ Report on completion of information gathering and verification surveys for forest/forestry sector analysis
JCC9 Final	28 Feb 2022 27 Jul 2022	・ Project progress report ・ Report on detailed Project activities ・ Confirmation of PDM, PO, and annual Activity Plan ・ Final Workshop Report on Project activities Recommendations for the future ・ Joint monitoring meeting Report on Project results

Table 1-4 Dates and Agendas of TWG Meetings

	Date	Agenda items
TWG6	8 Jan 2020	・ Activity reports from each member project and organization ・ Selection of the next secretariat ・ Report on forest inventory training ・ TWG's management policy
TWG7	7 May 2021	・ Activity reports from each member project and organization ・ Selection of the next secretariat ・ Issues and directions of the forest sector, forest management, wood processing, community livelihood improvement, environment and ecosystems ・ Wood processing, community livelihood improvement, environment and ecosystems
TWG8	27 Aug 2021	・ Activity reports from each member project and organization ・ Selection of the next secretariat ・ Impact of COVID-19 on the forest management sector ・ Direction of the downstream (wood processing) sector
TWG9	28 Feb 2022	・ Activity reports from each member project and organization

		・ Selection of the next secretariat

1.4.2 Technology Transfer

Aiming to improve the ability to propose sustainable use of natural resources, community participation methods, and policies that incorporate advanced technology in Solomon Islands, training was conducted in Japan for five staff members involved in forest information updating and forest resource management. In addition, a Third Country Training was conducted with the participation of senior officials of MOFR, who will lead the Project, to learn about the achievements and challenges of JICA and EU/FAO-supported projects in Papua New Guinea. The outline of the training in Japan and the training in the third country is shown in the table below.

The other training content and results on site were summarized in a table of technology transfer implementation status (Annex 8).

Table 1-5 Training in Japan

Name		Training in Japan
Trainee (Position)		Mr. Terence Titiulu Deputy Forestry Commissioner, Forest Resource Management and Technical Services, MOFR Ms. Cathy Unga Chief REDD+ Officer, Forest Resources Management and Technical Division Mr. Gusgrandy Mua Senior Forester, Forest Resources Management and Technical Division Mr. Kelvina Luse Senior Forester, Operation Unit Mr. Eric Maesu Kwaria Forest Ranger Officer, Forest Development and Reforestation Division
Schedule		20 July 2019 (arrival in Japan) – 24 August 2019 (departure from Japan)
Content		Community-based participatory forest management and monitoring for the Solomon Islands
1st week	Mon	・ JICA regulations briefing ・ Program orientation
	Tue Wed Thu Fri	・ Introduction to UAV and flight simulator ・ Practical UAV training (basic) ・ UAV practical training, automatic flight (advanced)
2nd week	Sun	(Travel from Hyogo to Tokyo)
	Mon	・ UAV data processing

	Thu	・ Overview and examples of the Satoyama Initiative ・ Public-Private Partnership (Travel from Tokyo to Yamanashi)
	Wed	・ Activities to conserve water source forests in Doshi Village (water source tax) ・ Utilization of forest resources in Doshi Village (tree stations, moutain bike wood boilers)
	Thu	・ Monitoring system of the Ministry of the Environment (Biodiversity Center of Japan) (Travel from Yamanashi to Tokyo)
	Fri	(Travel from Tokyo to Ibaraki) ・ Forest tree breeding (Forest Tree Breeding Center)
	Sat	(Travel from Tokyo to Hokkaido)
3rd week	Mon Tue	・ Integrated use of GIS, Remote Sensing (RS), and GPS ・ RS basics and image classification workflow ・ Understanding the characteristics of RS image data (optical, SAR) and pre-processing
	Wed Thu	・ RS image classification using GEE or Sepal (Basic) ・ RS image classification using GEE or Sepal (improvement of accuracy)
	Fri	・ Land cover map analysis using QGIS (overview using tree cover loss data and creation and comparison of watershed boundaries and river lines)
4th week	Mon Tue	・ Land cover map analysis using QGIS (overview, creation and comparison of watershed boundaries and river lines using tree cover loss data) ・ GIS data preparation (field data input, paper map input) and efficient operation ・ Case study of forest survey information sharing
	Wed Thu	・ Database design concept ・ Creating sample databases (ODK) ・ Creating sample databases (GeoNode)
	Fri	・ Community mapping ・ Visualization of community mapping data
5th week	Mon	・ Forest resource monitoring, management methods using GIS, etc., and forest management plans ・ The structure and role of forestry cooperatives as a leader in protecting and utilizing local private forest resources. ・ Tour of the forest cooperative
	Tue	・ Review and summary
	Wed	・ Training presentation/evaluation meeting ・ Closing ceremony

The knowledge and skills gained in the training were useful not only for the promotion of community-based forest resource monitoring in the Project, but also for improving the efficiency of the work of MOFR. The foundation for the use of open source applications and open data has increased the likelihood that the Project can be continued by MOFR after the Project ends, from both a financial and technical perspective. The experience of discussing how the knowledge and technology gained can be incorporated into their own work and preparing proposals will contribute to their continued consideration of available technology and improvement of their daily work. A presentation by the trainees reporting on their training in Japan is shown in Annex 45.

The following are the results obtained by the trainees from this training course.

Outcome 1: Acquisition of drone technology

The trainees understood forest monitoring methods using drones and learned necessary operations such as taking aerial photographs by autopilot. They also understood the post-processing of aerial photographs, such as ortho-rectification and 3D modeling. The participants were able to consider the feasibility of forest monitoring (logging management, etc.) in their own countries, including technical training on the use of drones.

Outcome 2: Understanding of methods related to forest resource management

Participants deepened their understanding of monitoring methods from an ecological perspective, such as for vegetation surveys, bird surveys, and long-term monitoring, as well as forest management methods, such as forest planning systems, private forest management by forest cooperatives, and forest information sharing methods. They were able to obtain ideas on how to form partnerships with local residents and NGOs, as well as on how to work toward sustainable forests, such as water source forest conservation, the introduction of tourism, and biomass utilization.

Outcome 3: Acquisition of GIS/Remote Sensing technology

The participants deepened their understanding of Remote Sensing (RS) and GIS, including basic knowledge of coordinate systems, types of data, and the characteristics of satellite images, as well as how to use software. In addition, they were able to consider the introduction of RS and GIS technology to conservation planning and monitoring through practical training to improve work efficiency and identify problems using geospatial information.

Outcome 4: Application to own country

The participants were able to discuss and propose concrete plans applying the knowledge and techniques they learned (Output 1 and 2) to the work of MOFR.

Table 1-6 Third Country Training in Papua New Guinea

Name	Third Country Training (Papua New Guinea)

Trainee (Position)		Mr. Vaeno Vigulu Permanent Secretary, Ministry of Forestry and Research Mr. Samuel Pita Vazu Under Secretary (Technical), Ministry of Forestry and Research Mr. Wilfred Arnon Atomea Under Secretary (Administration), Ministry of Forestry and Research Mr. Stanly Lesinenea Mapping / GIS, Forest Resource Managemente and Technical Services
Schedule		17 July 2019 – 21 July 2019
Training Content		Community-based forest management and monitoring using GIS/Remote Sensing in PNG
Week	Wed	Travel day (Honiara to Port Moresby) ・ Orientation ・ Courtesy visit to PNG JICA office
	Thu	・ Participated in the final seminar of the "Capacity Development Project for Operationalization of PNG Forest Resource Information Management System for Addressing Climate Change"
	Fri	・ Participated in EU/FAO project seminar ・ Observation of actual forest management system and discussion with PNGFA staff
	Sat	・ Field trip to Nature Park, Varirata National Park
	Sun	Travel day (Port Moresby to Honiara)

The Third Country Training was attended by senior officials of MOFR who lead the Project to learn about the achievements and challenges of JICA and EU/FAO-supported projects in Papua New Guinea and to use this knowledge for future management with an eye to the results of the Project. This was an important opportunity for the effective promotion of the Project. It was also an opportunity for the trainees to gain a better understanding of the forest management situation in PNG, where, like Solomon Islands, income from commercial logging is the economic cornerstone of the country. A presentation by the trainees reporting on their training in PNG is shown in Annex 46

The following are the results obtained by the trainees from this training program.

Outcome 1: The trainees gained an understanding of similar JICA projects on forest management in Papua New Guinea and obtained knowledge useful for the management of the Project.

Outcome 2: The trainees gained an understanding of the EU/FAO project in Papua New Guinea and obtained knowledge that will be useful in promoting the national inventory and climate change REDD+ project preparation.

1.4.3 Outputs of the Project

The tables below shows the technical cooperation materials compiled for the Project.

Table 1-7 Technical Cooperation Materials

Deliverables	Overview	Attachment
Lessons Learnt from Participatory Forest Management	Compilation of lessons learned from individual activities through the implementation of the pilot activities	Annex 1
Work Manual of Forest Information Operation (includes Manual on Land Cover Map Update Methodology)	Manual for using the Forest Information Tool and operating/updating the onboard forest information	Annex 2
Report on the Study of Online Training Formats in Solomon Islands	A summary of considerations for the preparation and implementation of online training in the project	Annex 3
Gender Analysis Survey Report	A gender analysis report of the use and authority of men and women over forest resources, including the roles and needs of men and women in forest resource management.	Annex 4
Community Profiling and Socioeconomic and Gender Analysis Report	A survey and analysis of the situation regarding socio-economic and gender in the target community	Annex 5

Table 1-8 Deliverables

Deliverables	Overview	Attachment
Customized survey application	Application available on tablet devices for field activities	Data only
Website[3] for dissemination of activity history	Website to disseminate activity history in the form of stories with maps, images, etc.	URL only

[3] https://storymaps.arcgis.com/collections/bdb1cddb4e3847cba8183d67b344edc7

1.4.4 Dissemination of the Outcome and Public Relations

Under circumstances where local travel was not possible due to COVID-19, it was considered important to conduct public relations activities to disseminate the results. In general, there is little information dissemination on the Solomon Islands. Considering the future development of the country, it is essential to increase the number of ways of attracting people's interest by disseminating information on not only tourism but also various other things. Looking at the Project, the GPS transect walk[4], workshops by local residents on land use planning, training programs, and a trial online training program are activities that can be used as references for other projects. In addition to improving the MOFR website, which was requested and planned by MOFR, the Project decided to vigorously promote the creation of a Project SNS tool and a Project Factsheet to disseminate these types of information and create an environment to support its activities.

(1) Improvement of the Ministry of Forest Research website

It had taken years to develop the existing MOFR website and it was not well-maintained. Therefore, a decision was made to update the website and provide training on website management.

1) Establishment of working group

A working group was established between the Information and Communication Technology (ICT) Department of the Solomon Government (SIG-ICT), MOFR, and the Project to clarify the division of roles for the Forest Information Tool and the MOFR website. Furthermore, for the Forest Information Tool, a working group was established between MOFR and the SIG Information and Communication Technology Support Unit (ICTSU). A demonstration website was developed and the website design and content were discussed and finalized by the working group.

2) Migrating to the Solomon Islands Government server

In order to migrate the website to the government server, discussions were had with ICTSU and the website was migrated. In addition, a special page for the Project was added to the website, where reports and results were posted for publicity.

https://www.mofr.gov.sb/

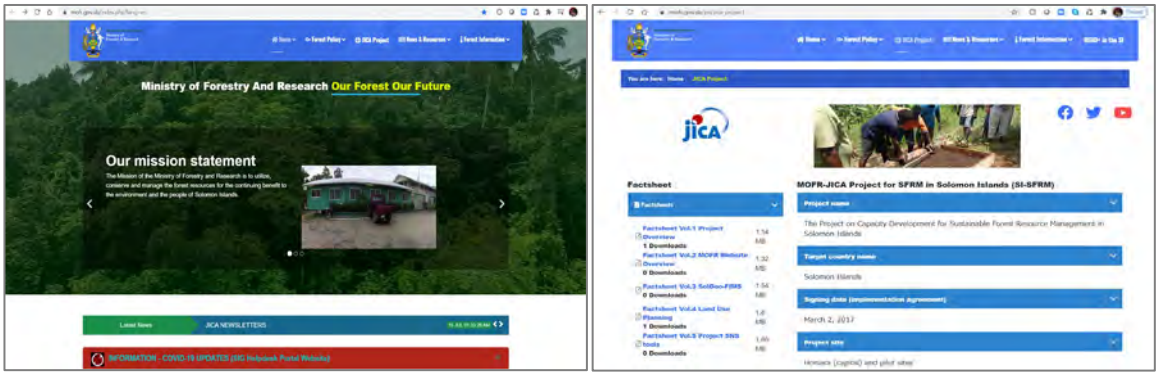


Figure 1-2 Screenshot of the Ministry of Forestry and Research website (Right: page for the Project)

[4] Filed survey conducted using GPS and tablets to enable land and resource owners and users to confirm and analyse their own resource status and create a land use plan based on accurate location information, with the intention of creating their own forest management plan led by themselves.

(2) Development of SNS tools for the Project

In order to disseminate and publicize the outcomes of the Project, it was considered effective and efficient to use SNS tools that are widely used in Solomon Islands. For an overview, see Factsheet Vol. 5: Project Public Relations SNS Tools (Annex 6).

A video distribution and management tool for the Project was also developed, as it was thought that video clips would be particularly effective in visually communicating the appeal of field activities in the Solomon Islands and as training materials. The video distribution tool is not strictly an SNS tool, but it has a strong connection with them, so it is reported here as a part of the group of SNS tools.

1) YouTube channel

YouTube is a video viewing site that is widely used and popular in Solomon Islands. Therefore, a YouTube channel was launched for the Project. It currently is streaming community field activities, online training lectures, drone surveys and training, and 360° camera footage of the forest.

https://www.youtube.com/channel/UC3_oJjc14Z6E0w0rcqtWRxw/

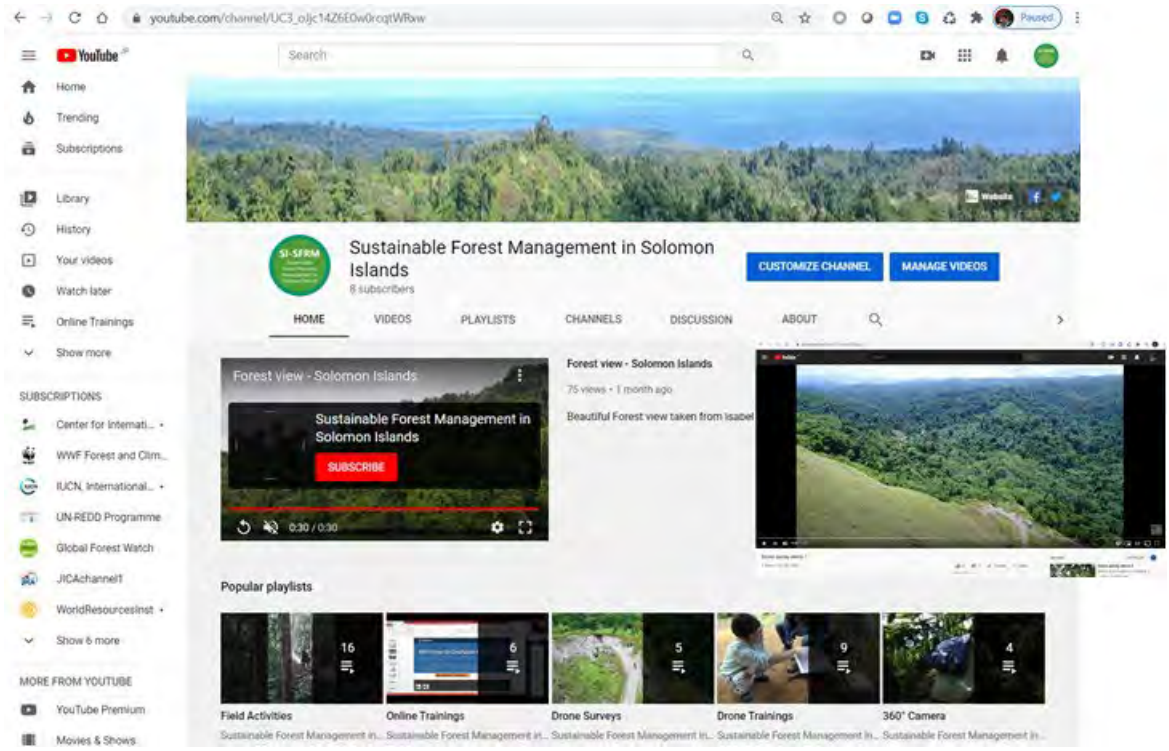


Figure 1-3 Project YouTube channel

2) Facebook page/group

Facebook is the most popular and widely used SNS tool in the Solomon Islands. Therefore, a Facebook page and a Facebook group were set up as platforms for the dissemination and promotion of the outcomes of SFRM and the sharing and exchange of information on future timber prices. For the time being, the Facebook group is open to people who wish to join and register, in order to ensure

active two-way communication and information management among its members (the group itself is open to the public, so anyone can apply).

https://www.facebook.com/sisfrm/

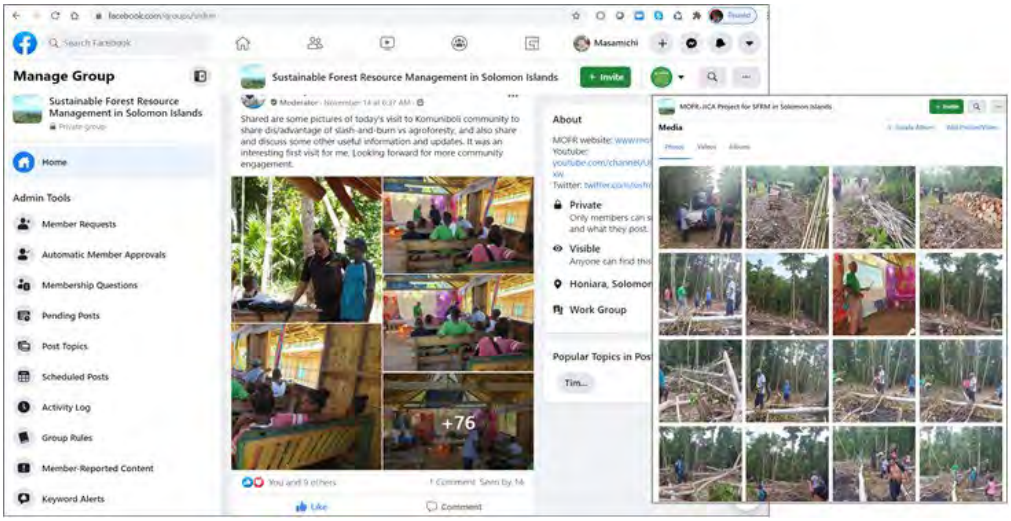


Figure 1-4 Project Facebook group

3) Twitter account

Although Twitter is not widely used in Solomon Islands, it is widely used by the international community to announce events and disseminate information to a large number of people. Thus, an account was set up. In order to improve the efficiency of posting, use of the Facebook page and linking it to the Twitter page will be considered in the future.

https://twitter.com/sisfrm

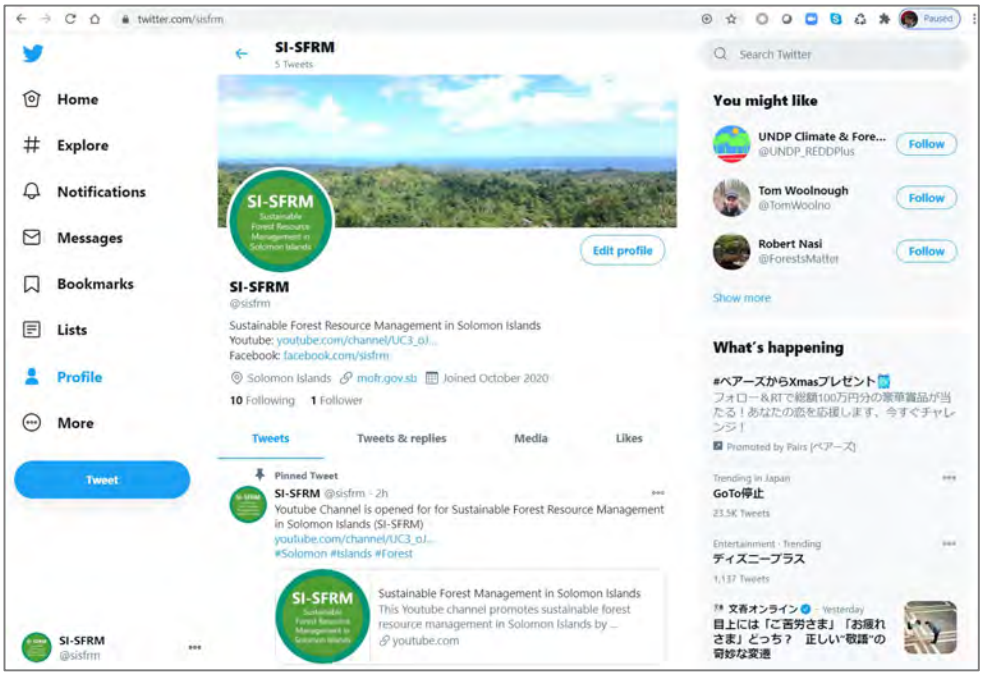


Figure 1-5 Project Twitter account

(Supplement) A YouTube channel has free and practically unlimited video storage, sharing, and viewing service, because if an account is verified, the size and duration of one video can be up to 128 GB and 24 hours (if the account is not verified, there is a 15-minute limit, but the Project channel has already been verified). Some drone survey videos have already been uploaded (two GB each, which normally would cause hesitation about storage on a hard drive or carrying it around), and it is very useful for anyone to be able to check the videos from anywhere (Google Drive is being used separately, which allows for the storage of more than just videos, but incurs a monthly/yearly fee depending on size).

(1) Creation of story maps and other websites

A StoryMaps story format platform was created using such things as maps and images. A StoryMaps website was created for the Project using the ESRI story map mechanism. The top screen is shown in Figure 1-6. A description of the Project and a list of story maps are displayed, each of which can be viewed by clicking on it .

The content of the story maps registered this time are: (1) an overview and current status of the Solomon Islands; and (2) participatory land-use planning. The story maps are written in English, the language most accessible to the widest audience. The story maps can be accessed via a link on the Solomon Islands Ministry of Forestry and Research website.
https://storymaps.arcgis.com/collections/bdb1cddb4e3847cba8183d67b344edc7

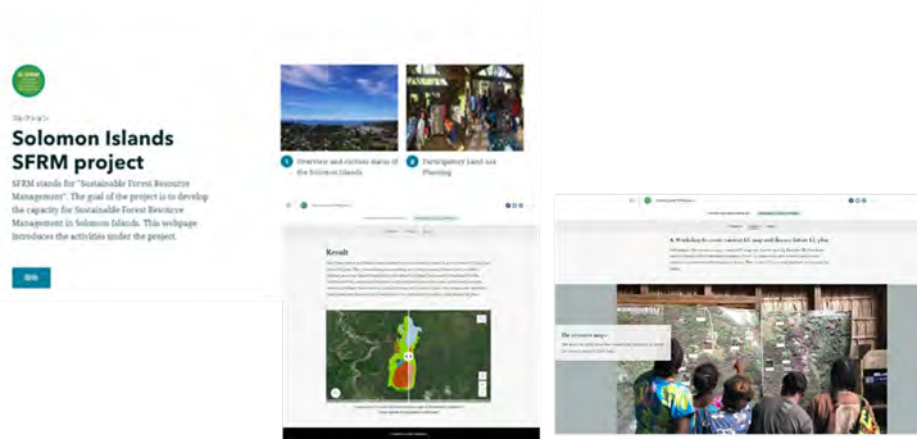


Figure 1-6 Project StoryMaps (left: top page, center: explanation with photos, right: explanation with map)

(2) Creation of Factsheet series

Factsheets were developed as a public relations tool to disseminate Project information. These have been uploaded to the Solomon Islands Ministry of Forestry and Research website (https://www.mofr.gov.sb/en/project-overview), where they can be viewed and downloaded (Annex 6).

Table 1-9 Factsheet Series

Volume	Theme	Overview	Date
Factsheet Vol. 1	Project Overview	Explanation of project background and activities	December 2020
Factsheet Vol. 2	MOFR Website Overview	Information about the MOFR website is presented.	November 2020 February 2022 Revision
Factsheet Vol. 3	MOFR SolGeo-FIMS	overview of how the Forest Information Tool works and the information it contains	November 2020 February 2022 Revision
Factsheet Vol. 4	Participatory Land Use Planning in Komuniboli and Falake Communities	Introduction of the preparation of the land use plan implemented in the project	November 2020
Factsheet Vol. 5	Project Public Relations and SNS Tools	Introduction of the contents of SNS operated by the project	November 2020 February 2022 Revision
Factsheet Vol. 6	Agroforestry	Introduction of agroforestry conducted as a pilot activity	February 2022
Factsheet Vol. 7	Pig Farming	Introduction of pig farming activities conducted as other livelihood-enhancing activities	February 2022
Factsheet Vol. 8	Forest Management Unit	Introduction of forest management units as administrative area created from watershed boundary data	February 2022
Factsheet Vol. 9	High Conservation Value Forest	Introduction of maps created to assess forest conservation values	February 2022
Factsheet Vol. 10	Land Cover Map	Introduction of land cover maps as basic information for forest management	February 2022
Factsheet Vol. 11	Carbon Biomass and Timber Volume Data	Introduction of forest resources estimated from satellite data	February 2022
Factsheet Vol. 12	Gender Analysis Survey	A summary of the gender analysis report conducted by the project	February 2022
Factsheet Vol. 13	Forest Management	Introduction of selective logging and subsequent forest	February 2022

		management operations as pilot activities.	
Factsheet Vol. 14	Road Network Data	Introduction of road network data created from satellite images	April 2022

(3) Creation of Newsletter series

To publicize the Project's efforts for the year, the compilation of activities posted on the JICA website was reorganized and posted on MOFR's website as a newsletter, starting with the 2018 edition. These have been uploaded to MOFR's and can be viewed or downloaded (Annex 7) (https://www.mofr.gov.sb/en/jica-project).

Table 1-10 Newsletter Series

No	Name	Overview	Date
1	Newsletter 2018	・JCC and establishment of FS-TWG ・Study tour to PNG ・Preparation of pilot site selection, selection and determination of candidates ・Participation in international conferences	July 2020
2	Newsletter 2019	・Pilot site boundary surveys and introduction to drone surveys and GPS transect walks ・Third country training, training in Japan ・Conducting socioeconomic/marketing and other surveys when starting pilot activities ・Land use planning ・Conduct technical training ・Introduction of Forest Information Tool ・Prepare Livelihood Improvement Activity Plan ・JCC and FS-TWG meetings, etc.	July 2020
3	Newsletter 2020	・Creation of new Corporate Plan[5] ・Temporary return of long-term experts due to the COVID-19 ・Consultation meeting on Forest Information Tool ・Agreement on detailed pilot activity plan ・Agreement on Livelihood Enhancement Action Plan ・Official release of Forest Information Tool	April 2021

[5] Programs and activities to be implemented by the departments of MOFR in accordance with the national forest policy.

		・Implementation of online training ・Training on pig farming and agroforestry, logging training, leadership ・Establishment of SNS site for the project ・High value-added forest products survey, etc.	
4	Newsletter 2021	・Return of Long-Term Experts ・Creation of promotional videos ・Logging operations, furniture making, and Implementation of agroforestry and pig farming ・Exchange training of community members ・Selection of new pilot sites and rent of portable sawmill ・Establishment of an exhibition room at MOFR for the pilot activities ・Pilot site visits by senior officials of MOFR ・Holding JCC and FS-TWG meetings	April 2022

(4) Creation of promotional videos

A promotional video introducing the Project's Pilot Activities was created to raise awareness and disseminate sustainable forest management in Solomon Islands and to publicize the Project through SNS and YouTube. This promotional video was posted on YouTube and SNS sites and used as a publicity material[6] (https://www.youtube.com/channel/UC3_oJjc14Z6E0w0rcqtWRxw).

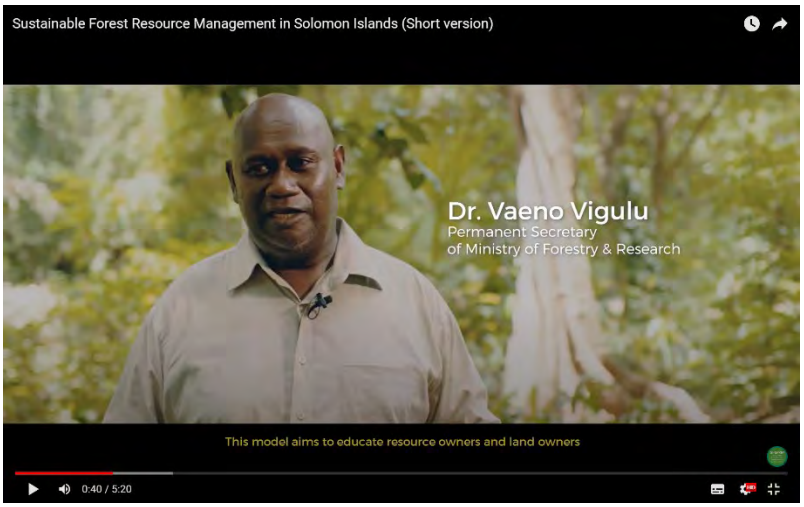


Figure 1-7 Promotional video

[6] When creating the SNS tool, it was necessary to establish a short project name and abbreviation due to the 50-character character limit, so the following was established and agreed upon after discussion with the project C/P. Name: MOFR-JICA Project for SFRM in Solomon Islands Abbreviation: SI-SFRM

Chapter 2. Achievements of the Project Activities

2.1 Activities for Output 1

It has been an administrative challenge in Solomon Islands that forest information has not been properly shared among the departments. Therefore, (1) information sharing was promoted through a newly developed Forest Information Tool, and (2) necessary forest information such as land cover maps were created, and uploaded onto the Forest Information Tool. In addition, (3) operation manuals for the Forest Information Tool were developed, and (4) online training was newly implemented for the project in order to promote operations even during travel restriction due to COVID-19. In addition, (5) technical support for the utilization of Forest Information Tool was provided through training related to the maintenance and updating of forest information.

2.1.1 Development of the Forest Information Tool

This section reports on the development of the Forest Information Tool platform (SolGeo-FIMS).

(1) Consultation and basic design

The first consultation meeting on the development of the Forest Information Tool was held on 21 June 2019, based on the information and materials that had been collected since January 2019, when the implementation team started its activities, and the results of interviews. At this meeting, a draft initial design of the Forest Information Tool was presented (Annex 41) with reference to the similar work experience of Papua New Guinea (PNG), and input and feedback was requested from various departments of MOFR. The input and feedback from the departments were compiled as attached in Annex 39.

Subsequently, following the Third Country Training conducted in PNG in July 2019 and the training in Japan conducted in July-August 2019, the basic design and prototype version of the Forest Information Tool was completed and the results were presented at the Second Consultation Meeting on the Development of the Forest Information Tool held on 8 November 2019 (Annex 42). At the meeting, a demonstration was given of the prototype version of the Forest Information Tool and the basic design document (Annex 38) was presented, on the basis of which a detailed Activity Plan for the future development of the Forest Information Tool (Annex 40) and the first version of the operation manual (Annex 2) were prepared.

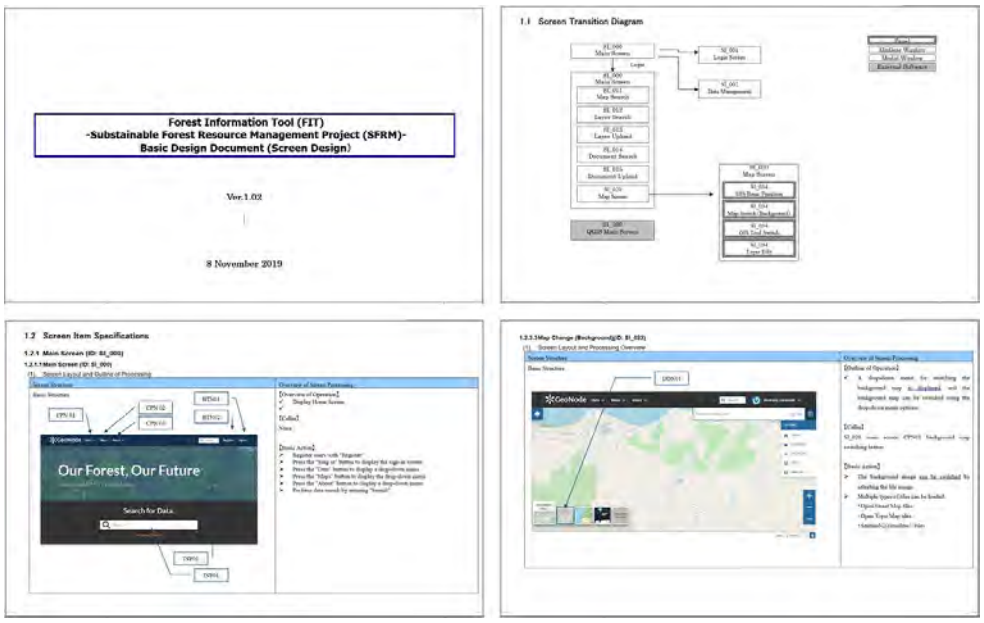


Figure 2-1 Basic design document of the Forest Information Tool (excerpt)

(2) Development of SolGeo-FIMS (demo version)

GeoNode (https://geonode.org/) was used for the development of the Forest Information Tool platform. GeoNode is a free geographic data management system based on GeoServer, GeoExplorer, pycsw, Django, and GeoExt. The functions that should be implemented as the Forest Information Tool in MOFR (Annex 43) were analysed. In addition, SolGeo-FIMS (demo version) was developed and installed on a MOFR PC so that it could be viewed on MOFR's network. It was unveiled at the Second Consultation Meeting on the Development of the Forest Information Tool mentioned above. The functions of SolGeo-FIMS (demo version) were introduced while actually using it. At the same time, training on how to use SolGeo-FIMS (demo version) was conducted through technical training.

(3) Establishment of working group

A working group and a task force were established between the ICT Department of SIG (SIG-ICT) and MOFR to clarify the division of roles for the purpose of managing and creating the Forest Information Tool and the content thereof.

(4) System migration to the Solomon Islands government server

In order to move from SolGeo-FIMS (demo version) to full-scale operation, the location of the server was considered from December 2019. As a result, it was decided to migrate it to the government server. The migration process (Annex 44) was carried out in consultation with the SIG department in charge (ICTSU). After forest information to be used were registered and screen view were modified, an online meeting was held with senior officials of MOFR in July 2020, where the

official release as SolGeo-FIMS was approved. Details of the registered forest information are described in 2.1.2.

2.1.2 Developing Forest Information

(1) Clarifying the necessary forest information for SolGeo-FIMS

A SolGeo-FIMS Task Force was formed and held review meetings on 7 May 2020 and 26 June 2020 to discuss maps and specifications prepared as base maps to be the content of SolGeo-FIMS. (For meeting materials, see Annex 42.) It was decided to prepare the base maps listed below in Table 2-1, combining existing information provided by MOFR and freely available information. Subsequently, work on data creation was done, mainly on land cover maps, watershed boundaries and forest management units (FMUs), areas with high conservation value (HCV), timber volume, biomass/carbon stock, and road network data. The details of these data are described below. Specification and management manuals for them were also created (Annex 2). In addition, the documents listed in Table 2-2 were prepared to improve access to relevant laws and regulations for administrative work with SolGeo-FIMS.

Table 2-1 Registered Maps on SolGeo-FIMS

No	Title	Source	Type	Public	Remarks
GIS map data					
1	00GIS Digital Data	MLHS	shp	Confidential	Base map owned by Ministry of Lands, Housing and Survey (MLHS)
2	00Join 50k Nedition	MLHS	tif	Confidential	Basic map (image file) owned by MLHS
3	Concessions	MOFR	shp	Confidential	Concession Boundaries
4	Forest TYPES	MOFR	shp	Public	Forest type map
5	LU_map (Pilot sites)	original	shp	Confidential	Land use maps of Pilot sites
6	Watershed	original	shp	Public	Multi-scale watershed boundaries
7	FMU	original	shp	Public	Forest management units
8	Contour	original	shp	Public	Contour lines
9	HCV	original	shp	Public	High conservation value area
10	Land Cover Map	original	tif	Public	Land cover map
11	Logging road	original	shp	Public	Logging road network line
12	Plantation boundary	unclear	shp	Confidential	Plantation boundaries
13	Volume	original	tif	Public	Volume information
14	Carbon stock	original	tif	Public	Carbon information

15	Biomass	original	tif	Public	Biomass information
16	Collect Earth point	original	shp	Confidential	Analytical points used for land use classification analysis
Image file					
1	Logging History	MOFR	image	Confidential	Logging locations maps as of 2019
2	Forest Type Map	MOFR	image	Public	Forest type maps
3	Land Cover Map	MOFR	image	Public	Land cover maps
4	Satellite image Planet	MOFR	image	Confidential	Satellite images
Global dataset					
1	Global Foret Watch		tif	Public	Deforestation area
2	Global Mangrove Watch		shp	Public	Mangrove area
3	Intact Forest Landscape		shp	Public	Areas presumed to be intact forest and free of human activity
4	Trop-Subtrop WetlandV2_2016_CIFOR		tif	Public	Tropical/subtropical wetland area
5	World Database on Protected Areas (WDPA)		shp	Public	Protected areas such as national parks.
6	Admin_boundary		shp	Public	Administrative boundary data

Table 2-2 Registered Documents on SolGeo-FIMS

No	Title	Source	Type	Public	Remarks
1	Solomon Islands National Forest Reference Level	MOFR	pdf	Public	FRL report prepared by MOFR
2	National Forest Policy	MOFR	pdf	Public	National Forest Policy in Solomon Island
3	Annual Report	MOFR	pdf	Public	Annual Activity Report of MOFR
4	Work Plans	MOFR	pdf	Public	Annual activity plan of MOFR
5	Fact Sheets	MOFR	pdf	Public	Introductory materials of the various themes
6	Field manual	MOFR	pdf	Public	Various field opration manuals
7	Other Reports and Manual	MOFR	pdf	Public	Introductory materials such as Project Report

8	The Logging Sustainability Committee Report Background Information	MOFR	pdf	Public	Report on Sustainable Forest Management in Solomon Islands
9	Forest Resources and Timber Utilization Act	MOFR	pdf	Public	regulations pertaining to forest resource management
10	License procedure flow chart1	MOFR	Word	Public	Flow for logging licensing
11	Logging Code E-VERSION	SPREP MOFR	pdf	Public	Introductory booklet on logging code
12	Forest Code of logging practice	MOFR	pdf	Public	Logging code to follow
13	TIMBER RIGHTS BRIEFING reference materials	MOFR	pdf	Public	Explanation materials pertaining to timber rights
14	PROTECTED AREAS ACT 2010	MECDM	pdf	Public	Legislation
15	Form 1 (APPLICATION FOR APPROVAL FOR NEGOTIATION TO AQUIRE TIMBER RIGHTS)	MOFR	Word	Public	Timber rights application form
16	Form 2 (CERTIFICATE OF CUSTOMARY OWNERSHIP)	MOFR	Word	Public	Timber rights application form
17	Form 3 (CERTIFICATE APPROVING TIMBER RIGHTS AGREEMENT NEGOTIATION)	MOFR	Word	Public	Timber rights application form
18	Form 4 (STANDARD LOGGING AGREEMENT CUSTOMARY LAND,FORM OF AGREEMENT FOR TIMBER RIGHTS)	MOFR	Word	Public	Timber rights application form
19	Form A (APPLICATION FOR GRANT OF FELLING LICENCE)	MOFR	Word	Public	Felling license application form
20	Form B (FELLING LICENCE)	MOFR	Word	Public	Felling license application form
21	Form (APPLICATION FOR A MILL LICENCE)	MOFR	Word	Public	Mill license application form

(2) Developing land cover maps

Land cover maps are very important information for understanding the area and type of forests in Solomon Islands. However, MOFR has not updated the forest type maps since they were created in the 1990s with the support of Australian AID, and it has not been possible to confirm the latest status. The Integrated Forest Management Project (SI-IFMP), which FAO is supporting with GEF5 funds for

implementation in Solomon Islands, has the same recognition, and the Project has decided to collaborate in the development of Land Cover Map. For the semi-automatic classification of land cover maps at the national level using RS, a cloud-based RS tool, Open Foris SEPAL (SYSTEM FOR EARTH OBSERVATIONS, DATA ACCESS, PROCESSING & ANALYSIS FOR LAND MONITORING) developed by the FAO was used. In the Project, the forest type held by MOFR and topography information were added to make detailed categories in forest area. Focus was then placed on this use of land cover maps in forest resource management.

In the early stage of the activities of the operational implementation team of the Project (22 March 2019), Training of Open Foris SEPAL was held by FAO/SI-IFMP at MOFR. Subsequently, RS training was conducted in Japan in July and the utilization of RS in the Project was considered.

The semi-automatic classification by RS does not go into forest “type” or land “use”, considering its limitation of classification, but focuses on distinguishing between “dense forests” and “disturbed forests” for forest area. These are also important categories in the Forest Reference Level (FRL) submitted by the Solomon Islands to the UNFCCC and are subject to rapid change and dynamics.

Therefore, at first forest area was classified as “Primary” and “Disturbed” by Open Foris SEPAL. Next, these forest categories were classified in detail using the forest type map described above and elevation levels (Table 2-3). As a final result, the land cover classification maps in Table 2-4 were produced.

Table 2-3 Classification of Forest Area

Forest Type map	**FRL**	**Disturbance**	**FRL-Type Description**
LOWLAND RAINFOREST ON NEAR LEVEL LANDS	Lowland Forest	Primary	Forest on level or nearly level land below 200 m.a.s.l. with no clearly visible indications of human activities and ecological disturbance.
		Degraded	Forest on level or nearly level land below 200 m.a.s.l. with visible indications of human disturbance.
HILL FOREST	Hill Forest	Primary	Forest between 200-600 m.a.s.l. on well-drained soils with no clearly visible indications of human activities and ecological disturbance.
		Degraded	Forest between 200-600 m.a.s.l. on well-drained soils with visible indications of human disturbance.

FRESHWATER SWAMP FOREST	Freshwater Swamp and Riverine Forest	Primary	Forest on land with little relief and impeded drainage with no clearly visible indications of human activities and ecological disturbance.
		Degraded	Forest on land with little relief and impeded drainage with visible indications of human disturbance.
UPLAND FOREST ON HILLS	Montane Forest (Upland Rainforest)	Primary	Forest on at higher altitude ridge tops, generally above 600 m.a.s.l. with no clearly visible indications of human activities and ecological disturbance.
		Degraded	Forest on at higher altitude ridge tops, generally above 600 m.a.s.l. with visible indications of human disturbance.
SALINE SWAMP FOREST	Mangrove forest (Saline Swamp Forest)	Primary	Forest on land subjected to tidal influences such as estuaries and foreshores with no clearly visible indications of human activities and ecological disturbance.
		Degraded	Forest on land subjected to tidal influences such as estuaries and foreshores with visible indications of human disturbance.
-	Industrial Plantation	Primary	Large-scale commercial plantations > 3000 trees, mainly eucalyptus, teak and *Gmelina*.
	Community Woodlots	Degraded	Small-scale plantations with 250-3000 trees, mainly teak, eucalyptus and mahogany. Agroforestry land-use systems that combine crops and trees.

Table 2-4 Land Cover Classification

Code	**LU**	**Land Cover Type**	**Disturbance**	**Color**	**RGB**	**Description**

111	Lp	Lowland Forest	Primary	#00a506	0, 165, 6	Forest on level or nearly level land below 200 m.a.s.l.
112	Ld		Degraded	#00cc41	0, 204, 65	
121	Hp	Hill Forest	Primary	#64a506	100, 165, 6	Forest between 200-600 m.a.s.l.
122	Hd		Degraded	#93cc41	147, 204, 65	
131	Up	Montane Forest	Primary	#9ba506	155, 165, 6	Forest on at higher altitude ridge tops, generally above 600 m.a.s.l.
132	Ud		Degraded	#bacc41	186, 204, 65	
140	M	Mangrove Forest	-	#5bd8b6	91, 216, 182	Forest on land subjected to tidal influences such as estuaries and foreshores
150	S	Freshwater Swamp and Riverine Forest	-	#00cc8c	0, 204, 140	Forest on land with little relief and impeded drainage
160	P	Forest Plantation	-	#3d7c3a	61, 124, 58	
200	W	Water	-	#0000ff	0, 0, 255	
300	S	Settlement	-	#ff0000	255, 0, 0	
400	O	Otherland	-	#ff8000	255, 128, 0	
500	G	Grassland	-	#ccff34	204, 255, 52	
610	Cs	Cropland	Subsistence	#ffffcc	255, 255, 204	
620	Cp		Palm	#ffff8a	255, 255, 138	
630	Cc		Coconut	#cccc5c	204, 204, 92	

The land cover map produced was compared with satellite imagery and global forest area analysis data by Global Forest Watch[7] and Global Mangrove Watch[8] to confirm the consistency of the current classification (Figure 2-2), and was statistically validated and the results were consistent and continuous with the land use classification of the FRL report conducted in 2017 by MOFR with the support of the FAO (Table 2-5).

[7] https://www.globalforestwatch.org/
[8] https://www.globalmangrovewatch.org/

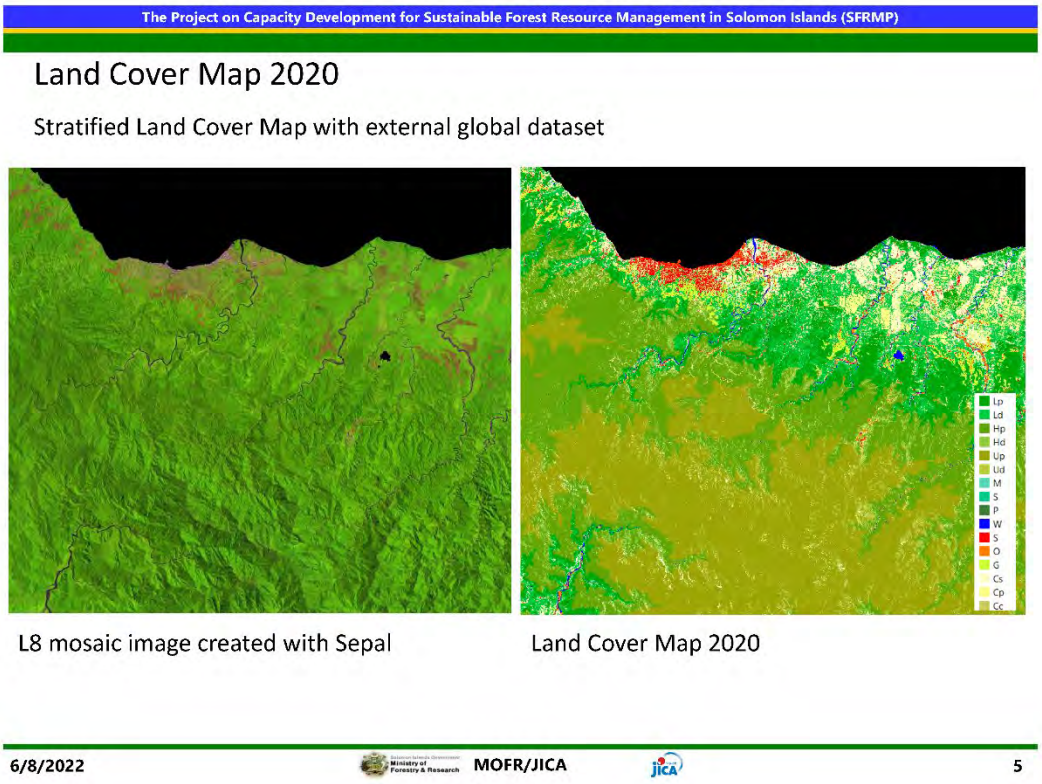


Figure 2-2 A comparison between Landsat8 image used for image classification and land cover map

Table 2-5 Comparison Land Cover between 2020 and 2017 in Six IPCC Categories

	2020			2017		
Category	**ha**	**%**	**%**	**ha**	**%**	**%**
Lowland Forest Primary	2,516,213.63	89.75%	89.75%	2,519,801.75	89.94%	89.94%
Lowland Forest Disturbed						
Hill Forest Primary						
Hill Forest Disturbed						
Montane Forest Primary						
Montane Forest Disturbed						
Mangrove Forest						

Freshwater Swamp and Riverine Forest						
Water	19,857.51	0.71%		26,800.49	0.96%	
Settlement	9,411.50	0.34%		19,615.94	0.70%	
Otherland	76,692.14	2.74%		5,822.65	0.21%	
Grassland	48,061.95	1.71%	10.25%	6,945.93	0.25%	10.06%
Cropland Subsistence						
Cropland Palm	133,442.13	4.76%		222,575.23	7.94%	
Cropland Coconut						
Total	2,803,678.86	100.00%	100.00%	2,801,561.99	100.00%	100.00%

The only forest type map mentioned above existed in Solomon Islands, and it was difficult to grasp the current status of forest areas, but this new land cover maps make it clear to define forest areas. This land cover classification information is assigned as attribute information for the forest management unit (FMU) described below, and is enable to assess the status of each unit.

(3) Developing the forest management unit

In order to contribute to efficient forest information management in forest administration, a forest management unit (FMU) was developed as the minimum basic unit. Since forest areas are basically managed from the perspective of consistent management of the watershed, the watershed boundaries were generated from elevation data (SRTM1). These were then used as the FMU. The size of the FMU was determined by comparing watershed boundaries at various levels and administrative boundaries referring to the concept of the Japanese forest compartment (Figure 2-3) from the viewpoint of making the size appropriately small for understanding changes in forest area, providing resource information such as timber volume, and environmental information. As a result, a decision was made to use a watershed of about 5 ha as the FMU. The FMU was assigned the forest information shown in the table below for convenience of use.

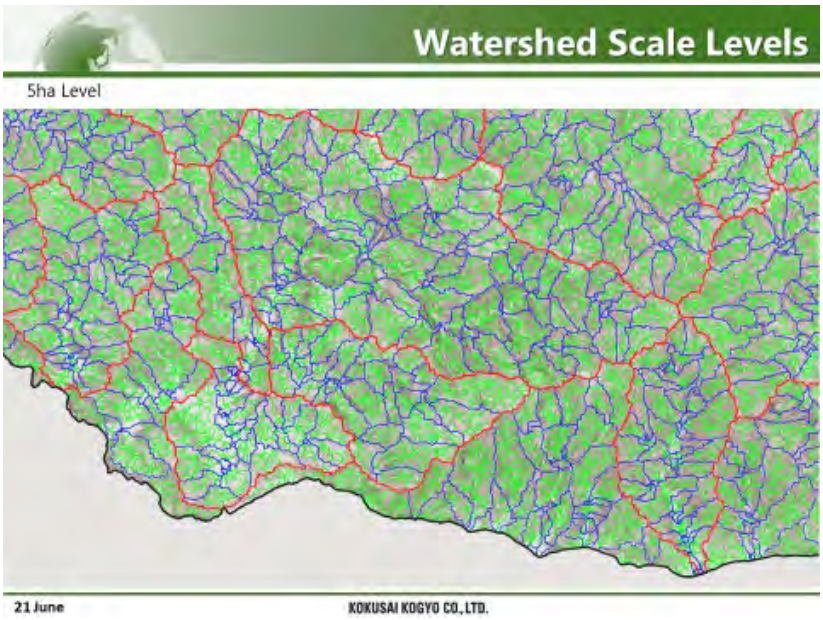


Figure 2-3 Deciding the size of FMU comparing with watersheds

Table 2-6 Attributes of FMU

No	Field Name	Type	Length	Precision	Note
1	fid	Integer	10	0	Serial number
2	Province Code	String	10	0	
3	Province Name	String	10	0	
4	Ward Code	String	10	0	
5	Ward Name	String	30	0	
6	Catchment Code	String	10	0	
7	FMU Code	String	10	0	#2+#6
8	Area (ha)	Real (double)	10	2	
9	LC_Type	String	10	0	Land cover type (Majority)
10	LC Code	String	10	0	Land cover code (Majority)
11	Forest Type	String	10	0	Forest type (Majority)
12	F_TYPE2	String	10	0	Canopy density
13	F_TYPE3	String	10	0	Crown Size

14	F_TYPE4	String	10	0	Forest type Level 3
15	Tree cover (ha)	Real (double)	10	2	Hansen Tree cover
16	Loss area (ha)	Real (double)	10	2	Hansen Loss year
17	Loss rate (ha)	Real (double)	10	2	Hansen Loss year
18	Gain area (ha)	Real (double)	10	2	Hansen Gain
19	Water area (ha)	Real (double)	10	2	Hansen water area
20	Elevation	Real (double)	10	2	Average elevation
21	Elevation ≥ 400 ratio	Real (double)	10	3	Percentage of elevation above 400 m
22	Slope	Real (double)	10	2	Average Slope
23	Aspect (8 directions)	Integer	10	0	Direction of aspect (Majority)
24	Distance (Major road)	Real (double)	10	2	Distance from main road
25	Distance (River)	Real (double)	10	2	Distance from main river
26	Volume_sum (m3)	Real (double)	10	2	Total volume
27	Volume_ha (m3)	Real (double)	10	2	Volume per ha
28	Carbon_sum (C-ton)	Real (double)	10	2	Total carbon stock
29	Carbon_ha	Real (double)	10	2	Carbon stock per ha

(4) Developing High Conservation Value map

High Conservation Value (HCV) refers to important biological, ecological, social, and cultural values unique to an area. HCV assessments are required when developing such things as palm plantations for obtaining certification at the Roundtable on Sustainable Palm Oil (RSPO: Roundtable for Sustainable Palm Oil), etc. HCV assessments are conducted at the site scale, as they require field survey data. However, HCV maps at national and global scales can be used for scoping studies. By introducing new global trends in land development to MOFR, HCV maps were developed focusing on biological and ecological values HCV1-3 (Table 2-7). The maps contribute that to the understanding of MOFR staff of the situation in Solomon Islands.

These maps are expected to be effective as basic data when considering the licensing of new land development in Solomon Islands. On the other hand, as the latest domestic data has been enhanced through the Project, it is necessary to consider replacing the dataset used and update the data in the future.

Table 2-7 HCV Mapping Methodology

High probability of HCV 1-3 presence	
Indicator	Dataset
Natural Forest Patched >=1,000ha (plus an additional 50m buffer)	Hansen Treecover Hansen Lossyear Create treecover2018 from above data
Protected Areas (plus a 50m buffer)	World Database on Protected Areas(WDPA)
Intact Forest Landscape (IFL) (plus a 50m buffer)	Intact Forest Landscape
Medium probability of HCV 1-3 presence	
Indicator	Dataset
50m to 500m buffer around natural forest patches >1,000ha	Treecover2018
Swamp ecosystems	TROP-SUBTROP_WetlandV2_2016_CIFOR
50m to 1km buffer around PAs	World Database on Protected Areas(WDPA)
50m to 1km buffer around IFLs	Intact Forest Landscape
Natural forest patches of 50-1,000ha	Treecover2018
Low probability of HCV 1-3 presence	
Indicator	Dataset
All remaining areas, consisting of existing agriculture, scrubland/degraded natural areas and natural forest patches <50ha	Remaining areas

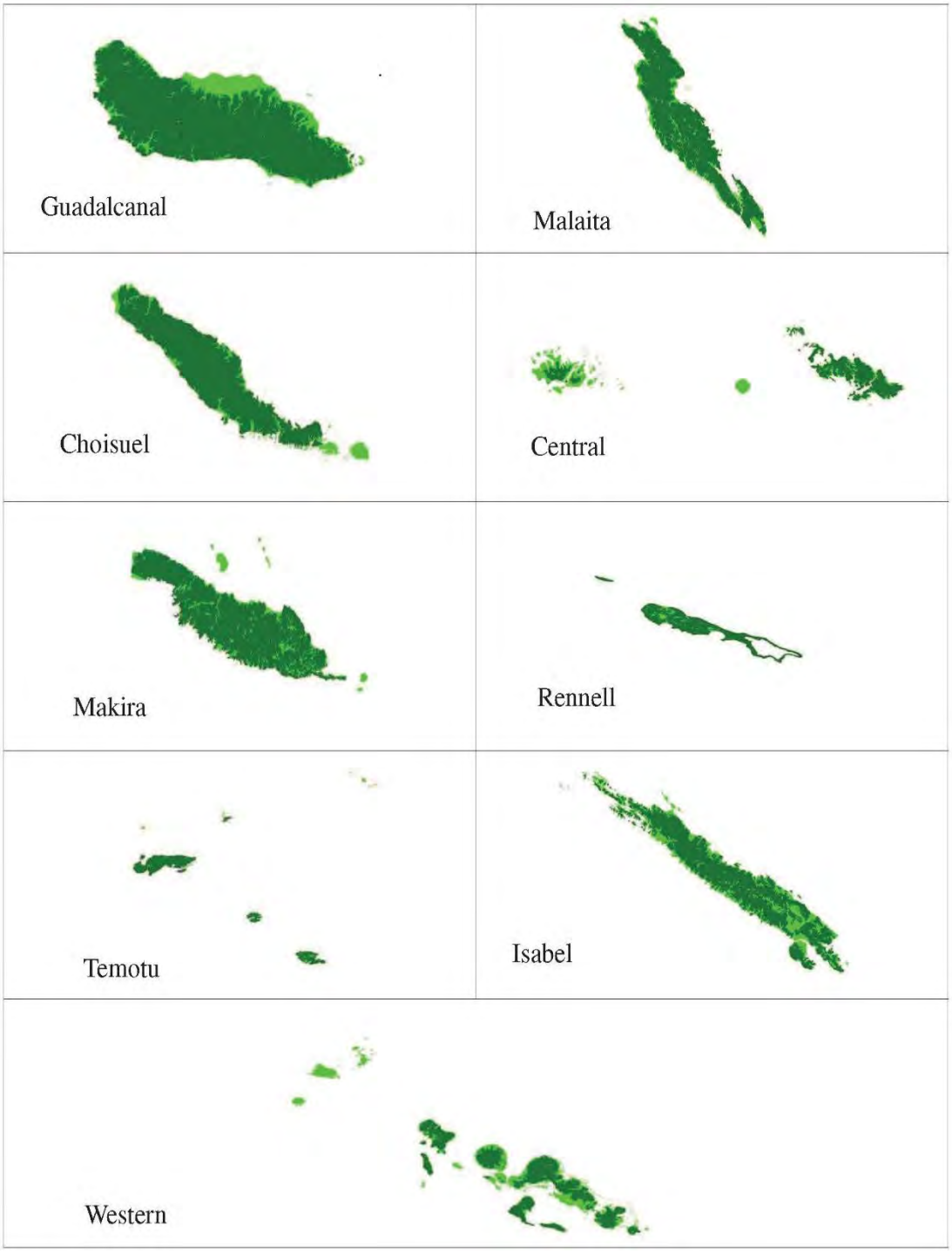


Figure 2-4 Developed HCV maps

(5) Developed forest resource information (carbon stock, biomass, timber volume, growth rate)

Data on current carbon stock, biomass, and timber volume is essential for the sustainable use of forest resources. The data set is estimated using GEDI Global Forest Canopy Height data[9] (GEDI that

[9] https://glad.umd.edu/dataset/gedi

is one of the products of Global Ecosystem Dynamics Investigation (GEDI[10]), which is a satellite LiDAR (Light Detection and RAging: Lidar) data and inventory data acquired in 2019 on the Pilot Sites, Komuniboli and Falake (29 plots in total). The spatial resolution of the data set is 30 m.

Three models to estimate Carbon, Biomass, and Volume and the maps are shown in Figure 2-5. In these models, even though the curves seem to fit the inventory plot data well, the coefficient of determination was 0.4 degrees. That is due to the limited plot data. Low (less than 20 m) overstory plots were not included in the plot data. Carbon, Biomass, and Volume in Solomon Islands were estimated 579 million tonnes, 1232 million tonnes, and 525 million tonnes, respectively, according to the results (Table 2-8). Since the volume is not limited to commercial timber volume, it is necessary to multiply by the rate of commercial timber volume.

For utilization, the estimates for 2019 were aggregated and attributed to the FMU described above. The attribute of timber volume of the FMU makes the estimation of timber volume in the area of interest easy. So, it is useful data for sustainable forest management. Both the raster data and FMU were registered in SolGeo-FIMS. These estimation models were based on the inventory results from the Pilot Sites. Therefore, the forest type used in the models is considered biased. In addition, there is room for improvement in these estimation models, such as using plot data with forest heights of less than 20 m. To overcome this, the progress of the inventory and the accumulation of the data in Solomon Islands are expected.

A growth rate using the volume estimation model and GEDICH were also estimated. Areas that had been logged once in the past and had not been disturbed since were visually sampled about 10 points every 5 years from time-series Landsat data using the Timelapse function of Google Earth Engine.[11] Using these samples, tree height growth and volume growth were modelled for elapsed years through 2019 (Figure 2-6). Since Landsat imagery has been available for the Solomon Islands since 1998, we targeted a growth period of about 20 years was targeted. As a result, height growth was estimated to be 0.92 m/year and timber volume growth was estimated to be 9.2 m^3/ha/year. For convenience, assuming BEF = 3.4 (IPCC) and volume density: 0.5, Above Ground Biomass was calculated at 15.64 t/ha/year, which is equivalent to the IPCC average annual AGB increase[12] under 20 years of 13 t/ha/year (Wet:R>2000) in Oceania island countries.

However, GEDICH may be affected by residual trees unless the logging area is somewhat large, due to 30 m spatial resolution. Although as large a logging area as possible was selected for the samples, it is not believed that this effect can be completely excluded.

The estimated timber volume was used to calculate commercial volume by province (Table 2-10). The logging prohibition conditions of elevation (>=400 m) and slope (>=30 degrees) defined by the Code of Logging Practice (CoLP) which is a logging regulation established to conserve the multiple functions of forests when conducting selective logging in the Solomon Islands were taken into account

[10] https://gedi.umd.edu/
[11] https://earthengine.google.com/timelapse/.
[12] Annex 3A.1 Biomass Default Tables for Section 3.2 Forest Land, https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/ Anx_3A_1_Data_Tables.pdf.

in the calculation of commercial volume. The commercial volume was assumed to be 50% of timber volume based on interviews with MOFR. As a result, the forest area in Solomon Islands is 90.4%. The harvestable area was 74% of the forest area. Total commercial volume was 186 million m^3. The provinces with the largest harvestable area were, in order, Western (432,945 ha), Isabel (343,454 ha), Choiseul (257,692 ha), Malaita (248,546 ha), and Guadalcanal (219,771 ha). As with the harvestable area, the order of commercial volume followed the same order: Western (43 million m^3), Isabel (36 million m^3), Choiseul (29 million m^3), Malaita (23 million m^3), and Guadalcanal (21 million m^3).

Assuming a growth rate of 9.2 m^3/ha/year as described above, the growth rate for all of Solomon Islands commercial volume was 8.6 m^3/ha/year. By province, growth volume per year was higher in Western (1.99 million m^3), Isabel (1.58 million m^3), Choiseul (1.19 million m^3), Malaita (1.14 million m^3), and Guadalcanal (1.01 million m^3), in that order. The commercial volume per hectare in the harvestable area was 99.2 m^3/ha.

The compilation of basic statistics on commercial timber volume (total volume, per hectare) will facilitate the confirmation of the sustainability of harvest volumes per province and the rough estimation of commercial timber volume derived from harvested areas.

Table 2-8 Carbon, Biomass, and Timber Volume Results

Province	Volume(m3)	Biomass(t)	Carbon(t)
Central	9,727,811	22,223,777	10,440,410
Choiseul	71,849,868	171,814,714	80,716,074
Guadalcanal	104,076,288	247,356,251	116,204,399
Isabel	84,849,074	200,322,934	94,108,825
Makira	59,775,095	138,729,021	65,172,893
Malaita	70,138,073	161,855,284	76,037,277
Rennell and Bellona	11,227,194	25,294,625	11,883,050
Temotu	9,514,684	19,926,679	9,361,266
Western	104,311,249	244,179,313	114,711,919
Total	525,469,338	1,231,702,598	578,636,113

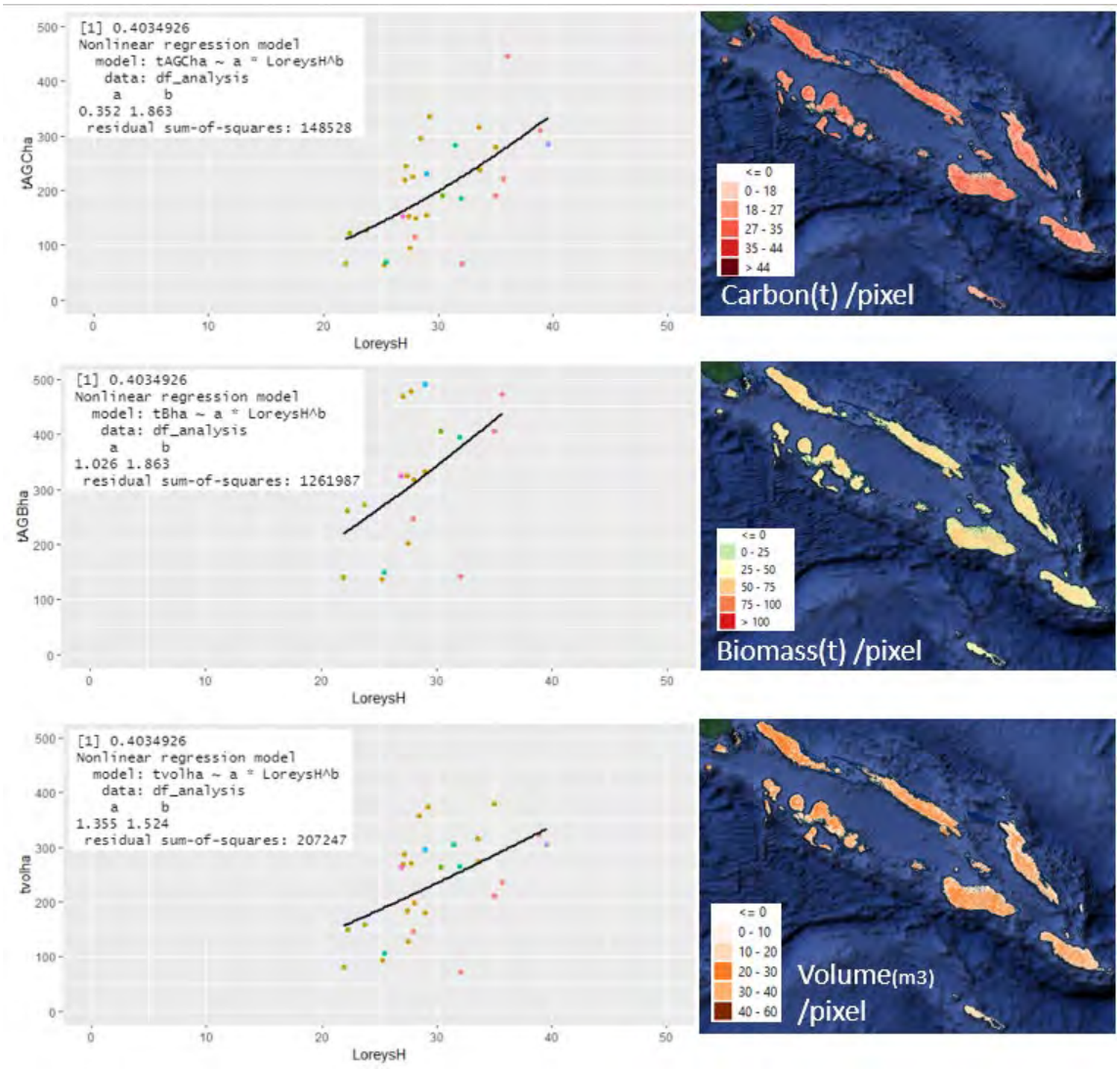


Figure 2-5 Maps of carbon, biomass, and timber volume

Table 2-9 Number of samples

Year	# of Sample	Average height	Std
1998	4	32.5	3.1
2000	7	30.0	3.3
2005	13	21.6	4.8
2010	12	17.7	8.5
2015	11	16.4	7.2

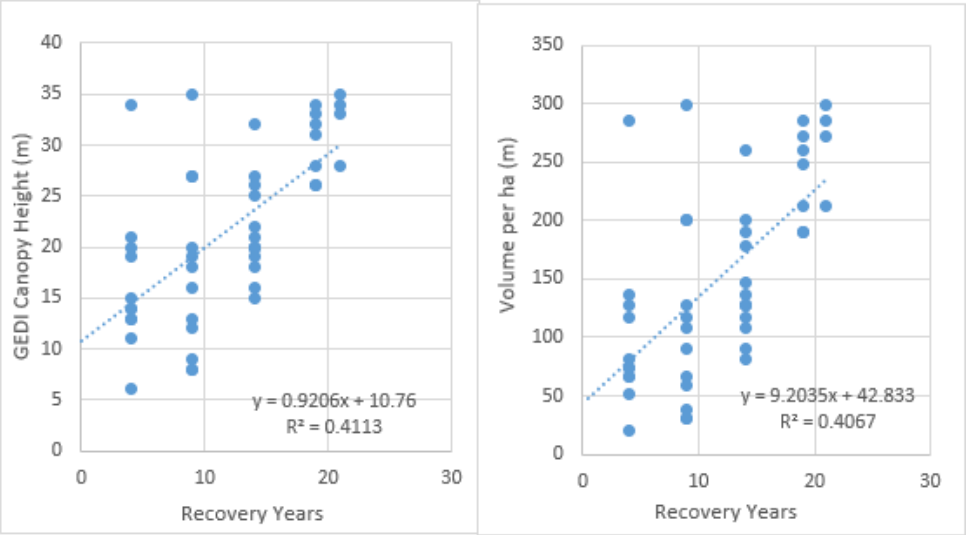


Figure 2-6 Developed growth model

Table 2-10 Estimated commercial volume by province (commercial volume was assumed to be 50% of tree volume)

		All area			Forest restricted mte400m,mte30 deg		Forest_harvestable Lt400m, lt30deg			
Name	All land area Area(ha)	Area(ha)	Volume (m3)	Com volume (m3)	Area (ha)	Com volume (m3)	Area(ha)	% of total forest area	Com volume (m3)	Increment of Commercial volume/year(m3)
Central	64,222	53,062	9,519,951	4,759,976	1,701	168,224	51,361	97	4,591,752	236,262
Choiseul	330,382	313,451	71,384,185	35,692,093	55,759	6,608,435	257,692	82	29,083,658	1,185,383
Guadalcanal	537,478	472,835	102,762,271	51,381,136	253,064	29,939,106	219,771	46	21,442,030	1,010,948
Isabel	421,808	396,902	84,161,046	42,080,523	53,449	5,659,452	343,454	87	36,421,072	1,579,887
Makira	321,902	301,040	59,023,512	29,511,756	107,547	11,148,868	193,493	64	18,362,889	890,066
Malaita	421,312	358,444	68,555,406	34,277,703	109,898	11,233,976	248,546	69	23,043,728	1,143,311
Rennell and Bellona	67,146	63,322	11,089,382	5,544,691	706	57,911	62,616	99	5,486,780	288,034
Temotu	89,887	72,295	9,077,900	4,538,950	6,190	368,872	66,105	91	4,170,078	304,083
Western	550,770	504,909	103,080,534	51,540,267	71,964	8,091,770	432,945	86	43,448,498	1,991,545
Total	2,804,905	2,536,260	518,654,187	259,327,094	660,277	73,276,612	1,875,983		**186,050,482**	**8,629,520**
	Percentage	**90.4**			**26.0**		**74.0**		**m3/ha (Commercial volume in**	**99.2**

(6) Developing road network data

The road network in forest areas strongly reflects logging activities. Therefore, data on this is essential for forest monitoring. In the Project, road network data for the year 2021 was developed using images from PlanetScope satellites.

PlanetScope satellites observe the entirety of the Earth's land surface every day. The satellite imagery is paid for. However, through Norway's International Climate and Forest Initiative (NICFI),

monthly mosaic datasets can be accessed for tropical countries. Based on these datasets, a cloud-free image of Solomon Islands was composed for 2021 using Google Earth Engine. Monthly mosaic images from January to October 2021 were used.

Road network data was created by the Ministry of Land, Housing and Survey (MLHS). However, it did not include roads in forest areas. This road data was used as base data for digitizing, then roads recognized in the cloud-free image of 2021 were added. MLHS watercourse data was used as a reference in order to avoid confusion with the river lines — because there are some river lines with no water. New attributes — Code and Year — were added to separate MOL roads. "Code" concerns vegetation conditions on the roads: 1 is a road covered by bare soil and 2 is a road mainly covered by vegetation. "Year" concerns the confirmed year of the roads, which was 2021.

This data should be effectively utilized through data sharing among the ministries of the Solomon Islands. Updating road network data every other year is considered appropriate for data management, as vegetation thrives quickly in tropical rainforest areas. It is also considered necessary to request logging companies to provide GIS of new roads.

Table 2-11 shows the total road length and density per province. In addition, Figure 2-7 shows a road map. The total length of roads in Solomon Islands was 19590.4 km. The average length by province was 2176.7 km. The longest road length was that of Western Island (5619.8). The second and third longest were those of Isabel Island (3470.3) and Guadalcanal Island (2948.7), respectively. The average density was 0.67 km/km^2. As with length, density was highest on Western Island (1.02). The second and third densest were those of Central Island (0.90) and Isabel Island (0.82), respectively.

The data has been registered in MOFR SolGeo-FIMS. On the system, one can overlay the road data on other layers such as elevation, slope, river line, estimated tree volume. If one needs a spatial analysis using the road data, it is possible to use the data with other layers on SolGeo-FIMS by using QGIS. Moreover, it is also possible to check the data not only as digital data, but also as printed maps. The posters of the road network with PlanetScope satellite imagery are displayed in the exhibition room at MOFR to be confirmed by community members.

Table 2-11 Road Network Length and Density by Province

Name	Road network		
	Area (km2)	Length (km)	Density (km/km2)
Central	642.1	577.8	0.90
Choiseul	3303.9	1763.8	0.53
Guadalcanal	5374.8	2948.7	0.55
Isabel	4218.1	3470.3	0.82
Makira	3219.0	2064.4	0.64
Malaita	4213.1	2370.4	0.56
Rennell and Bellona	671.4	266.9	0.40
Temotu	898.8	508.4	0.57
Western	5507.6	5619.8	1.02
Total		19590.4	
Average		2176.7	0.67

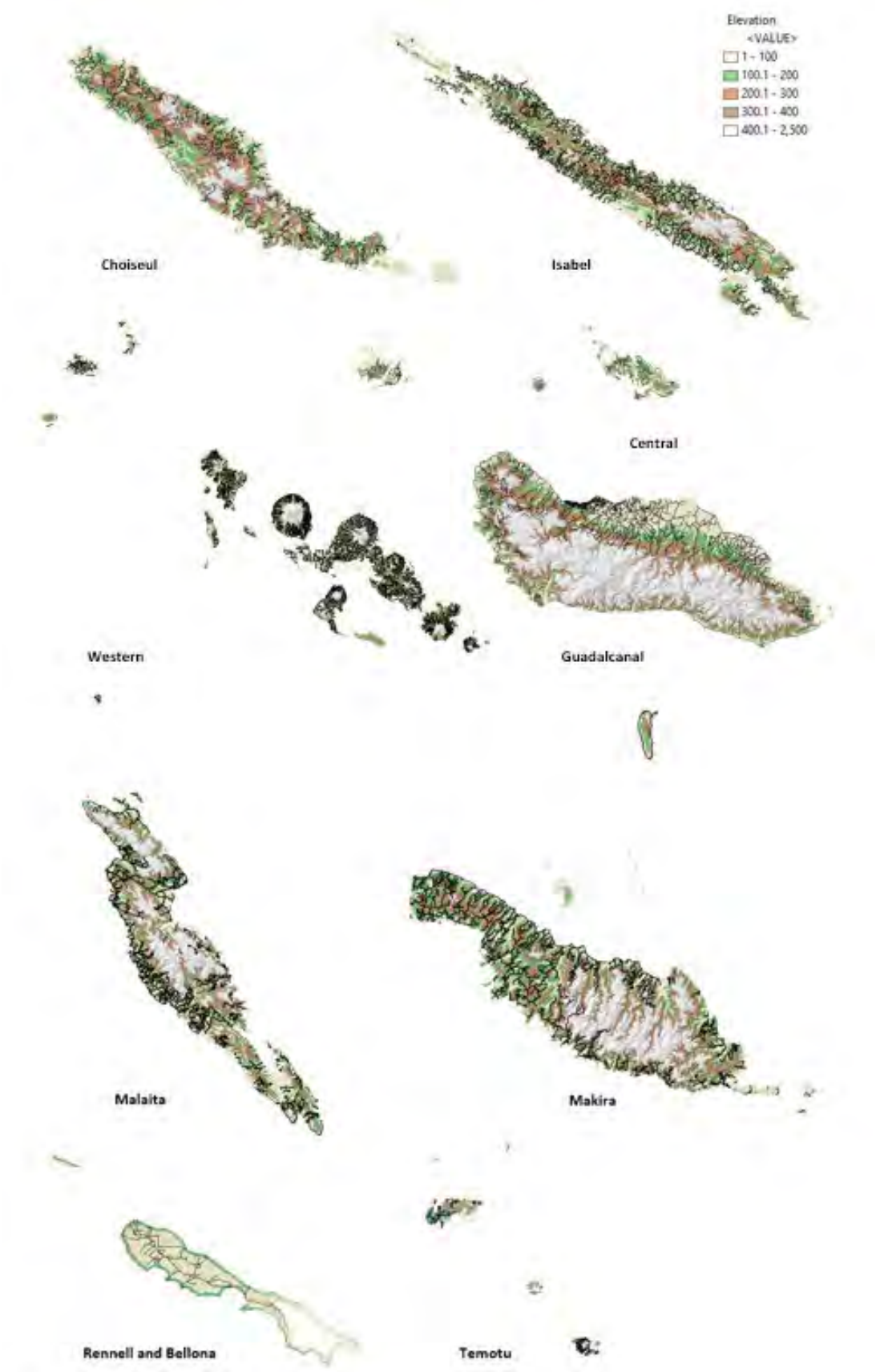


Figure 2-7 Road network map of Solomon Islands (background map is SRTM elevation data)

2.1.3 Developing the Forest Survey Tool

Efficient field data collection of forest information, such as inventory surveys, is essential for sustainable forest management. To this end, it is particularly important that survey forms be easy to design and that data aggregation be convenient. Forest surveys at MOFR have been conducted mainly using Garmin GPS. It has been difficult to organize location data with other data such as photographs. A smartphone/tablet app, Avenza Maps (commercial/non-commercial: an application that displays any map and allows you to check your location; if it remains non-commercial, the number of data holdings is small), and Garmin GPS were used for community mapping[13] at the Pilot Sites. The app made it easy to record photos and locations. However, when there were many survey items, as in a forest survey, complex operations were required for the preparations. This led to the development of a forest information collection application that can efficiently collect information based on survey forms, photographs, and location information in the field

Since there are many open source apps for field surveys, it is decided to make use of this. To use these apps, application updates should be considered and applications that are widely used and have a large number of users should be selected. OpenDataKit (ODK) is a field survey app for Android developed by the Google Earth Outreach program[14]. This app allows for the easy design of survey forms to be entered in the field, and easy aggregation of survey data using Google Drive as basic functions. This app is used by the WHO, Red Cross, and other organizations.

However, the Internet has not been fully adopted in the Solomon Islands. For example, communities and regional offices have faced difficulties in using the Internet. It is a major challenge to aggregate and share data collected without difficulty with poor Internet connections such as those found in communities and regional offices. ODK uses Wi-Fi connections to aggregate data, which is difficult with slow speed Internet connections. It does not have a navigation function. A navigation function that can be used in an offline environment is a very important when checking the site during forest surveys, such as before and after logging. Therefore, additional functions were created to utilize it for forest field surveys in Solomon Islands. The developed functions are shown in Figure 2-8.

Navigation function

As a navigation function, in addition to existing online maps such as Google satellite image, a function has been added to import offline maps (as MBTile format) from QGIS. On the navigation window, the current location can be checked by referring to the offline maps. It is possible to record one's tracks as with Garmin GPS.

[13] Resource survey using GPS and tablets in June 2019 in order for land and resource owners and users to check and analyse their own resource use and create a land use map based on accurate location information, with the intention of a community-based own forest management plan, prior to the preparation of the land use plan described later in this report.
[14] https://www.google.com/earth/outreach/learn/odk-collect-and-google-drive-integration-to-store-and-manage-your-data/)

Data download function in common format via USB cable connection

The acquired data can be downloaded to a PC via a USB cable. The added function converts the acquired data into csv and kml formats and packages them in a mobile device. This allows users to download without a Wi-Fi connection. The csv and kml formats are common formats, so users can view them in Microsoft Excel, Google Earth, and QGIS.

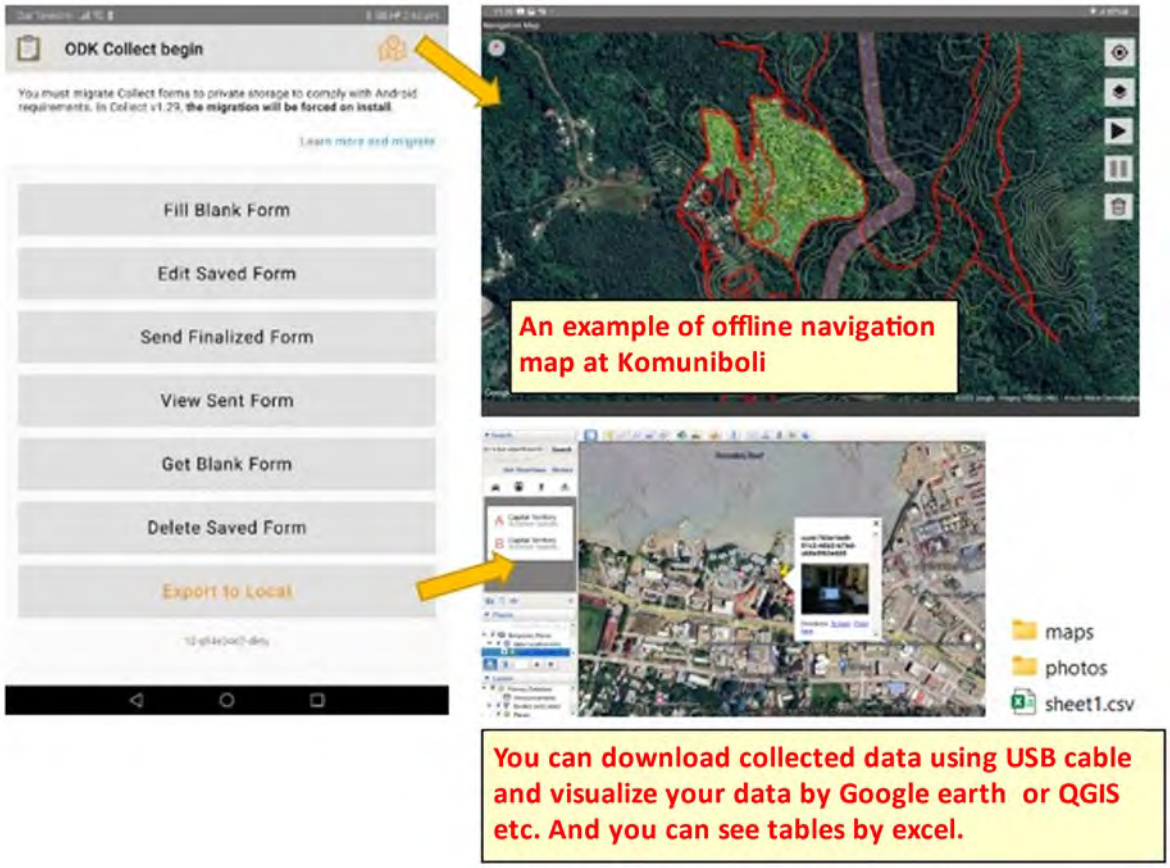


Figure 2-8 Customized ODK navigation and USB data download functions

(1) Prepared templates for survey form

Four types of templates were prepared as references for surveys at MOFR. The templates were about sawing management, forest plot surveys, agroforestry, and forest management method in communities. These were developed during the online training held on 31 March 2021.

Sawing management

This sample form was used to register the species name, number of logs, and volume (Figure 2-9). Volume was automatically calculated from diameter at breast height (DBH) and the length of the log. Photographs taken at the log yard could also be registered.

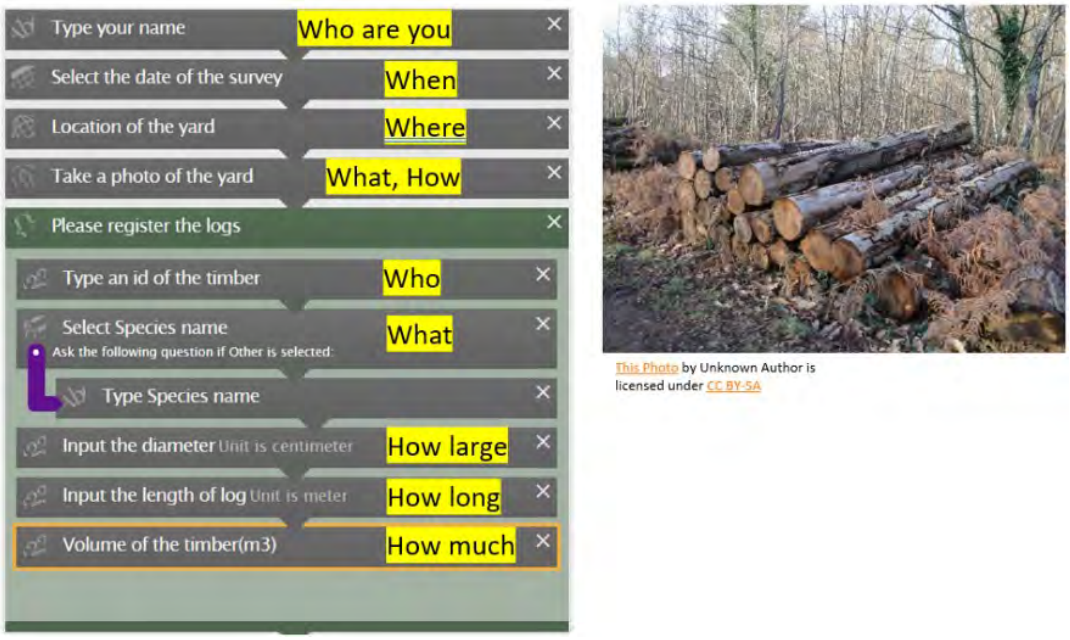


Figure 2-9 Sample form for sawing management

Agroforestry monitoring

This sample form was used to register agroforestry information, assuming an agroforestry monitoring survey (Figure 2-10). Plot location, plot photo, crop name, number of crops, growing conditions, and crop photos could be registered.

Figure 2-10 Sample form for agroforestry monitoring

Tree plot survey

This sample form was used to register species name, distance from plot center, DBH, tree height, photos, and forest management information, assuming a forest monitoring survey (Figure 2-11). The plot center location was registered using GPS.

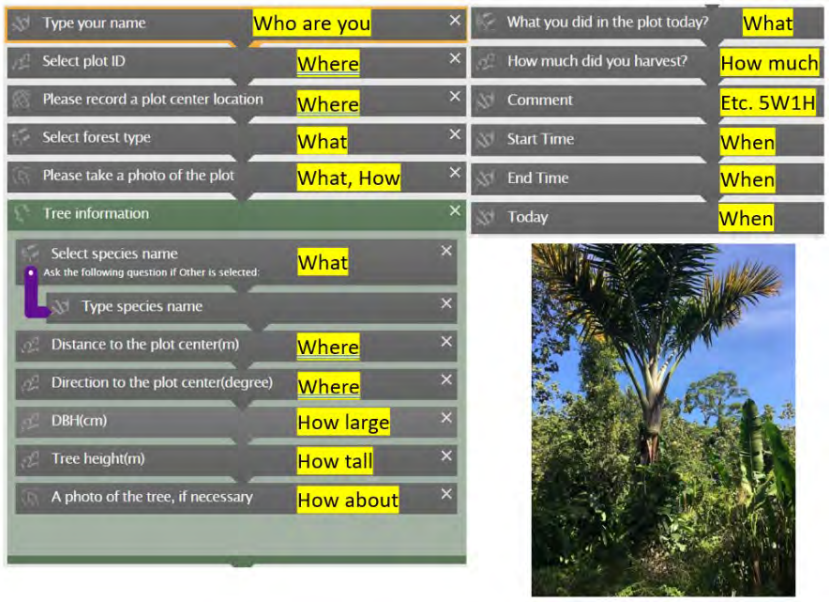


Figure 2-11 Sample form for a tree plot survey

Forest management method in communities

This sample form was used to register information, assuming a monitoring survey on the forest management methods of a community (Figure 2-12). Community information, management type, machinery, etc. could be registered.

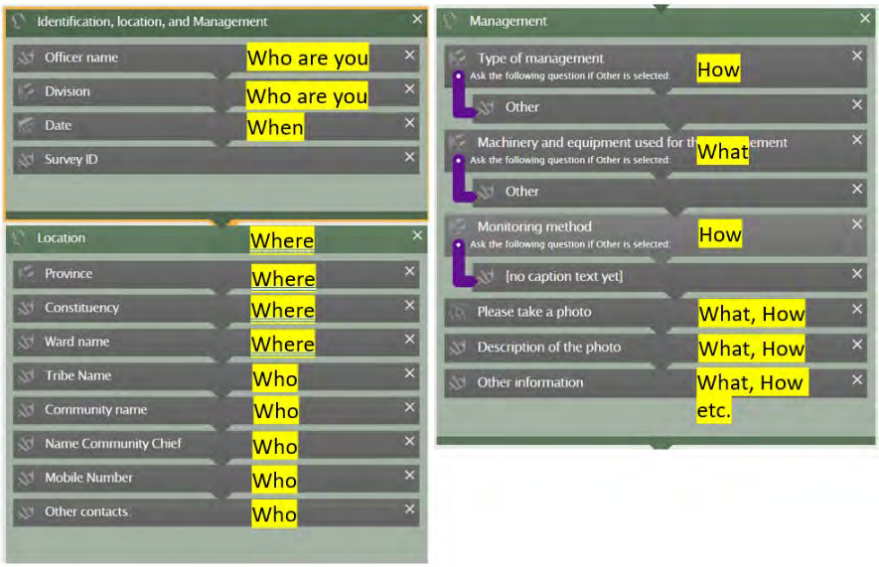


Figure 2-12 Sample form for community forest management method

(2) Training on field survey tools

The online training conducted in March 2021 included an overview of monitoring and the creation of a survey form using the tablet survey app ODK. Additionally, as a follow-up to the online training, a training was held from 27-29 June 2022 on the theme of monitoring post-logging forest conditions and other aspects of sustainable forestry plots in the Komuniboli community. The training included design and creation of survey items and forms, actual surveys using the created survey forms, and consolidation of results. Through the actual field survey, the participants were able to understand the detailed steps of the field survey using the Forest Information Tool (tablet). It is expected that MOFR will take advantage of the ability to easily consolidate and share information on field surveys using survey tools in actual task at MOFR.

	
ODK form creation after confirmation of survey objectives	Field survey in Komuniboli
	
MOFR staff reporting their results	Registering field data in SolGeo-FIMS

Figure 2-13 Training on the field survey tools (promoting utilization of the ODK tablet app)

2.1.4 Developing Forest Information Tool operation manuals

The Forest Resource Management and Technical Services Division (FRMTSD), which is the central office for information development for the Project and MOFR, took the lead in compiling the following nine manuals through the practical training on the Forest Information Tool described in 2.1.5 (Table 2-12, Annex 2).

Table 2-12 Manuals Prepared

NO	Name of manual	Remarks

1	User Manual on Forest Information Tool	Explanation of how to operate the Forest Information Tool for users
2	Geonode Administrator Manual	Explanation of the management functions of the Forest Information Tool for system administrator
3	Drone General Information and Safe Adminitration for Forest Monitoring	An overview of drones and their safety management
4	Drone User Manual for Forest Monitoring	A document explaining how to use drones in forest monitoring
5	Ministry of Forestry and Research GPS Utilization Manual	Explanation of the use of GPS in forest monitoring
6	SI LCM_SPECIFICATION AND MAINTENANCE	Description of specifications and maintenance procedures for Land Cover Map
7	SI HCV SPECIFICATION AND MAINTENACE	Description of specifications and maintenance procedures for HCV map
8	SI FMU SPECIFICATION AND MAINTENACE	Description of Specifications and maintenance procedures for FMU
9	SI Tree VOLUME Data SPECIFICATION AND MANAGEMENT	Description of Specifications and maintenance procedures for Tree Volume

2.1.5 Technical Training for the Operation and Management of Forest Information

(1) SolGeo-FIMS and website administrator training

Considering the sustainability of the project results, it is important that the MOFR staff themselves be responsible for system administration tasks such as user management and content updating. With the official release of SolGeo-FIMS in July 2020, training for SolGeo-FIMS and website administrators was conducted (Table 2-13). Due to the impact of COVID-19, the training could not be conducted onsite. It was instead conducted at the Training Lab, a facility of the ICT Department of SIG, with a local staff member as the instructor. In this training, participants learned the structure of SolGeo-FIMS and the website, and received practical training on how to manage them. Japanese experts who were not able to participate onsite participated using Zoom.

Table 2-13 Training for System Administrators

Theme	Date	Number of	Main content	Remarks

		participants		
Website Administrator Training	29 September 2022	2 and others	Understand the structure of a website and learn how to manage the display and content	Training materials (Annex 68)
SolGeo-FIMS Administrator Training	30 September 2022	2 and others	Understand the structure of a forest information system and learn how to manage users and content	Training materials (Annex 69)

2.1.6 Technical Support on Forest Monitoring

(1) The first forest monitoring training

MOFR is considering the use of GPS, tablets, and drones to enhance the capacity to collect local forest information in forest monitoring, following the report on the results of the 2019 training in Japan. A request was made for follow-up training on these technologies. These tools have been used as monitoring tools in Pilot Activities. At the same time, these technologies are necessary for MOFR to independently acquire forest information and implement appropriate forest management. MOFR, which manages logging sites in Solomon Islands, a country with vast commercial logging areas, will need to implement efficient field management practices by utilizing monitoring tools with SolGeo-FIMS. So many staff members will be required to have skills sufficient for using these tools. Therefore, based on the request from MOFR, the training was conducted mainly for the purpose of learning to operate GPS, tablets, and drones, in addition to learning to operate SolGeo-FIMS. Their utilization in work was also discussed (Table 2-14). The use of satellite images was added to the training items because it is a necessary technology to improve the efficiency of monitoring and can be used for preliminary surveys using GPS and tablets.

Table 2-14 First Forest Monitoring Training

Theme	Date	Number of participants	Main content
Understanding the General Situation Using Satellite/Drone Imagery	30 October 2019	10	Understanding land use at Pilot Sites using drone imagery, collecting time-series satellite

			imagery, and understanding land use change over a wide area
Creating Watershed Boundaries Using GIS	30 October 2019	10	Understanding the need for forest management zones and the use of watershed boundaries
Utilization of GPS/tablet	31 October 2019	8	>Practical training on how to use GPS and tablets for field surveys. >Study on how to improve the efficiency of survey work by using these devices.
Data Sharing Using SolGeo-FIMS	1 November 2019	9	Trial of SolGeo-FIMS based information sharing system using SolGeo-FIMS in the MOFR LAN system and consideration of database
Introduction to Drones and Safety Management	4 November 2019	9	Basic knowledge about drones and safety management
UAV Basic Operation	4 November 2019	9	Practice basic operations
Automatic UAV Flight	5 November 2019	10	Set up automatic flight using GSpro and points to remember for GSpro
Field Survey by UAV	6 November 2019	9	Operation practice in forest area
Analysis of UAV Data and its Utilization	7 November 2019	9	Analysis of drone image data using Pix4D

In the discussion on the use of GPS/tablets/drones in forest monitoring (31 October), points to remember and improvements to be made when using GPS/tablets for forest monitoring in the future were organized (Figure 2-14). In addition, the database necessary to support these surveys was also organized. This provided the basic information for the study of the database to be developed for SolGeo-FIMS (Figure 2-15).

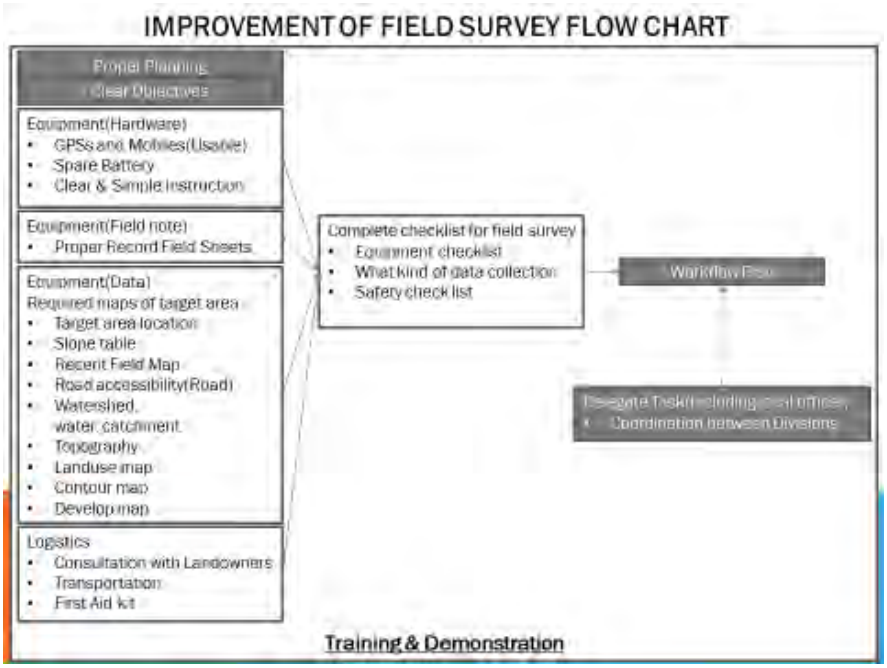


Figure 2-14 Field Survey Flow

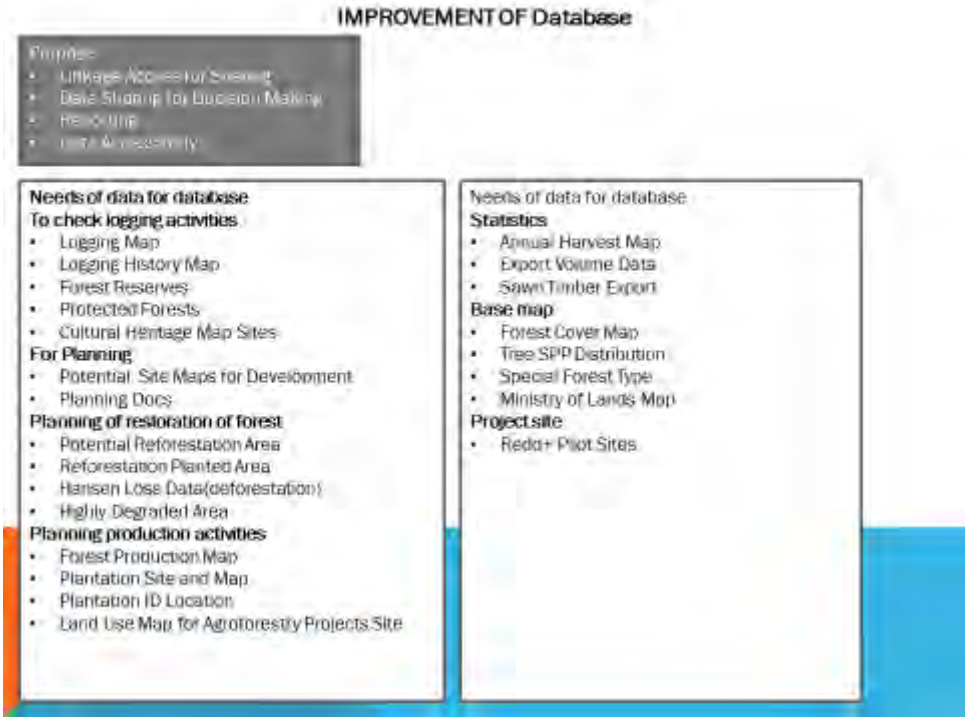


Figure 2-15 Information required for monitoring

Workflows and usage scenarios were also organized (Figure 2-16, Figure 2-17) for information sharing with SolGeo-FIMS (1 November). Most of opinions for the use of GIS are with the management of natural forest logging in concessions[15] in mind, and it is expected that MOFR will utilize in the management of concessions in the future.

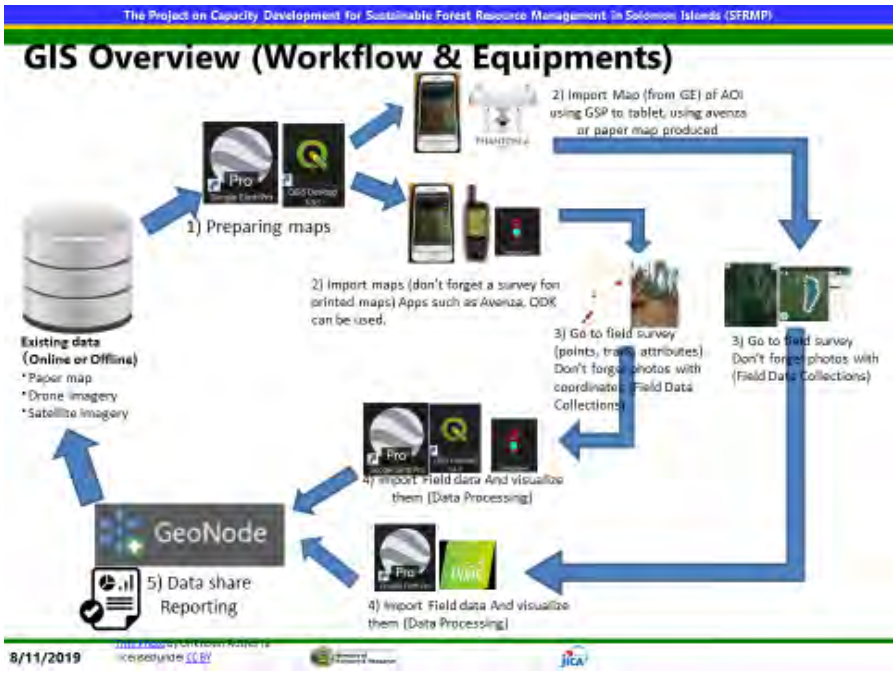


Figure 2-16 GIS-centred workflow

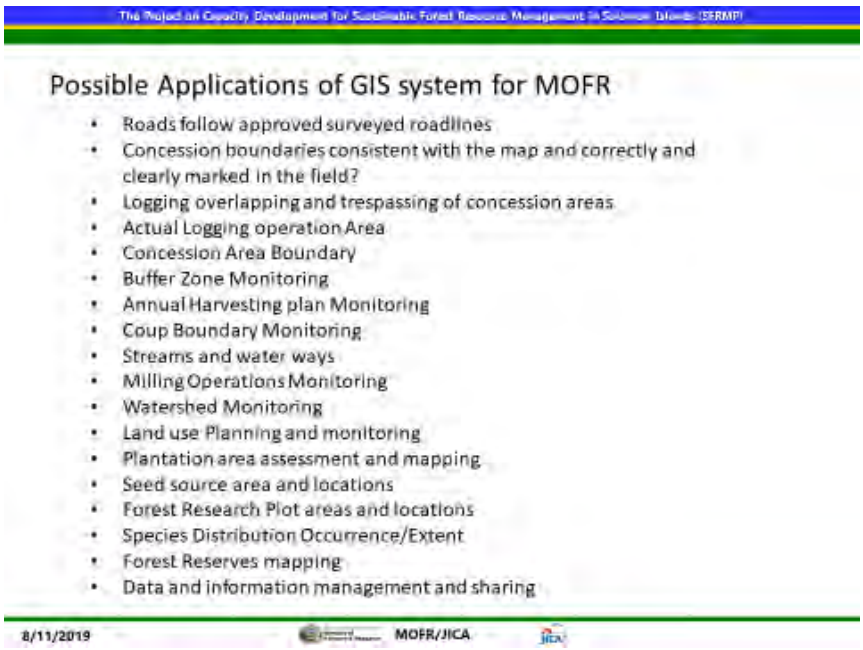


Figure 2-17 GIS application in MOFR

[15] Area or right to log natural forest commercially on customary lands in the Solomon Islands.

After 4 November, in field monitoring using drones and tablets, aerial photos were taken at the Konglai water source area and orthoimages were generated as the output (Figure 2-18).

Figure 2-18 Orthoimage of Konglai water source using Google Earth

(2) Second forest monitoring training

Following the discussion in the first forest monitoring training, the second forest monitoring training (Table 2-15), on the utilization of GPS/drones and SolGeo-FIMS was held, with the main target group being staff members of the Forest Development and Reforestation Division (FDRD) who have many opportunities to work in the field. Requests were made by MOFR for the development of manuals (Annex 9 and Annex 10).

Table 2-15 Second Forest Monitoring Training

Theme	Date	Number of participants	Main content
Introduction to Drones and Safety Management	19 February 2020	15	Understand the functions of drones and the basic operation method
Utilization of Avenza Maps and GPS	20 February 2020	14	Learn the basic operation of the GPS (Garmin) that participants have, and consider its utilization for their survey work
Utilization of GeoNode (SolGeo-FIMS)	21 February 2020	8	Learn how to use SolGeo-FIMS and share data
Wrap-up Discussion, Part 1	24 February 2020	11	Summary of the first half of the training

Drone Safety Management	25 February 2020	9	Understand drone safety management methods
Automatic Drone Flight	26 February 2020	10	Understand automatic flight and flight planning using GSpro.
Drone Data Analysis	27 February 2020	10	Understand how to create orthoimages using data captured by automatic flight.
Wrap-up Discussion, Part 2	27 February 2020	10	Summary of the second half of the training
Wrap-up Meeting	28 February 2020	17	Presentation of training outputs

In this training, the participants were repeatedly trained on simulated surveys using GPS, data organization, and information sharing using SolGeo-FIMS until they mastered it. After the training, the participants reviewed and organized the workflow and methods for GPS usage. The results were summarized in the MOFR GPS Utilization Manual described below in Annex 11.

Drone training in the field was conducted at the MOFR botanical garden, where aerial photographs were taken by automatic drone flight, and orthoimages were created from the aerial photographs (Figure 2-19).

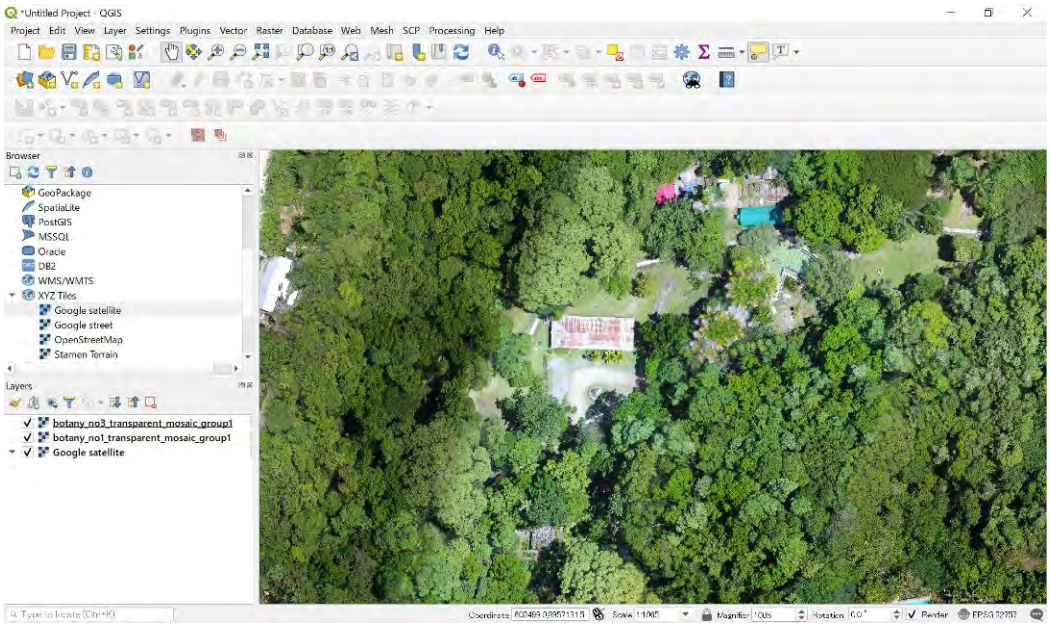


Figure 2-19 Orthoimage of the botanical garden created in the second forest monitoring training

In addition, based on the results of the second training, the procurement of GPS and drones by MOFR was discussed, but this was not realized due to changes in circumstances, such as the government's strained financial situation caused by COVID-19. The use of drones and GPS is supposed to be used by regional office staff to improve the efficiency of inspection at commercial

logging sites. It is expected that MOFR will continue to consider the possibility of full-scale introduction of these technologies after sorting out the targets of monitoring.

2.1.7 Online Training

A decision was made to conduct online training using Zoom as an additional activity (Table 2-16), because it is very significant to continue training, even under travel restrictions due to COVID-19, promote sustainable forest management using Forest Information Tools, and improve the skills and maintain the motivation of the C/P. Since the online training was an unprecedented experiment, the process from planning to execution is summarized here.

(1) Planning and implementation of online training

When conducting online training, it is difficult to conduct training outdoors, such as with drones. In addition, when participants have training individually, it is difficult for them to support each other and maintain focus. This lessons the effects of fostering trust and mutual inspiration through discussions and workshops. On the other hand, there is more flexibility with regards to the number of participants, time, and location. While sorting out the above advantages and disadvantages, themes and formats were considered that would be effective as online training. The following online training was then implemented.

Thinking that it was better for participants' to concentrate over a short period of time, the online training lasted approximately three hours from 11:00 to 15:00 (with a lunch break from 12:00 to 13:00). Normally, participants in online training participate from different locations using their own PCs. However, this was difficult given the Internet environment and hardware ownership in the Solomon Islands. Since there were no COVID-19 cases in the country at the time due to early restrictions on entry and exit by the government's border control measure, a decision was made to have the participants gather at a location with a sufficient Internet and hardware environment to take the trainings (Figure 2-20).

The first and second training sessions were held at the ICT Training Lab. However, the third training session was postponed until the end of the fiscal year due to an increase of COVID-19 cases in Solomon Islands after the second session. This training was held at MOFR because the training facility was closed for the time being. Local staff supported all of the training sessions.

The training themes were determined based on Project progress and need. The first session focused on forest management based on FMU created from watershed boundaries. The session included a lecture and practical training on the developed FMU: forest management methods based on FMU and forest function classification such as sediment runoff. The second session focused on the theme of forest inventory with lectures and practical training: estimating the timber volume of the Pilot Sites from existing inventory data and community-based participatory mapping methods for inventory surveys. The third session focused on the theme of monitoring. The significance and concept of

monitoring in relation to the activities at the Pilot Sites were explained. This was followed by conducting hands-on practice with the tablet app ODK. The third session included practice collecting data using ODK in the MOFR parking lot. The communication tool used was originally planned to be Google Meet, which was also used for Project meetings. However, due to problems at the venue, the decision was made to use Zoom. The training was recorded using Zoom. Training materials and recorded videos were shared via cloud storage (Google Drive).

Online training by the Project set a precedent among JICA projects. Therefore, a review was made of the planning, preparation, and operation of the online training and the key points arranged for reference in implementing online training in other projects (Annex 3).

Table 2-16 Overview of the online trainings

Theme	Date	Number of participants	Main content	Remarks
Forest Information Tools and FMU-based Forest Management	25 August 2020	6	Understand the origins of FMU and forest management practices based on it.	Related documents are organized as Annex 3.
Zoning by Forest Function Classification and Sediment Runoff	26 August 2020		Understand the meaning of classifying forests according to function, and practice methods of functional classification.	
Utilization of Forest Survey Data	1 October 2020	6	Understand how to utilize the data acquired through forest surveys and create maps for forest management.	
Community-based participatory mapping method and Its Facilitation	2 October 2020		Understand the methodology through various case studies in participatory forest management.	
Forest monitoring	30 March 2021	6	Explanation of the significance of and concept of monitoring as it relates to the Pilot Sites.	
Forest Information Tool for forest monitoring	31 March 2021		Practice creating survey forms using ODK as an application for monitoring.	

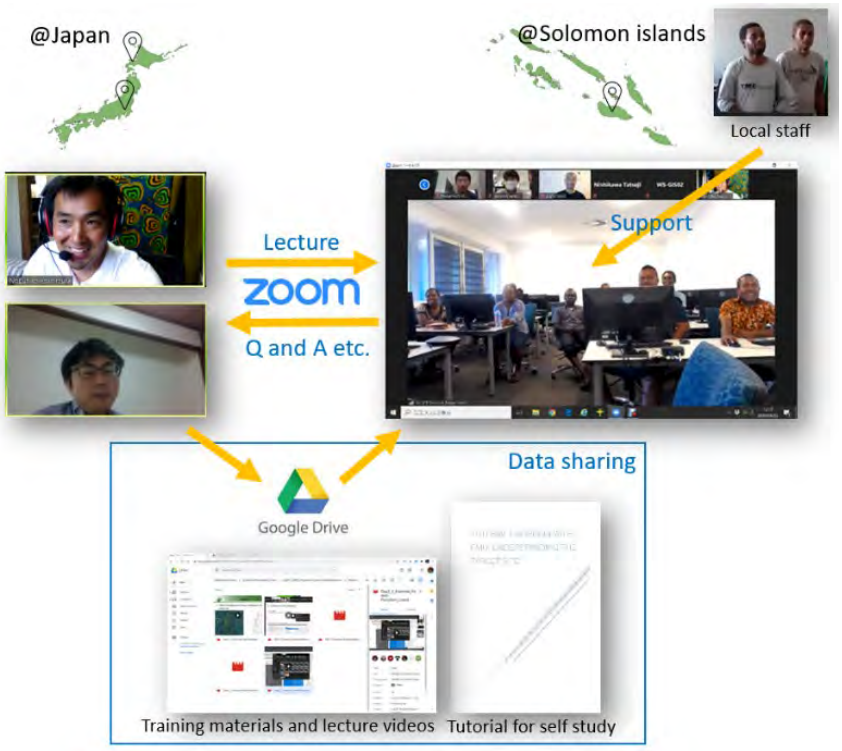


Figure 2-20 Concept of the online training format

(2) Creating tutorials and dataset for the online trainings

As mentioned above, the training sessions were approximately three hours per day, and lecture recordings and training materials were shared via Google Drive. For training materials for hands-on practice, step-by-step tutorials were provided to allow the participants to continue practicing even when the Internet connection was interrupted. The tutorials also allowed them to review the practice on their own after sessions (Table 2-17). The data needed to conduct these tutorials were also organized and shared. The tutorial outlined specific procedures on topics such as advancing the understanding of the target site based on FMU, the use of inventory data, and the design of inventory and monitoring surveys. In particular, FMU and the results that were generated based on the tutorials could not lead to efficient forest management without a concrete image of data maintenance and use in daily work. For this reason, data analysis methods were more important than software operation. These tutorials contributed to sharing such knowledge and skills (Annex 3).

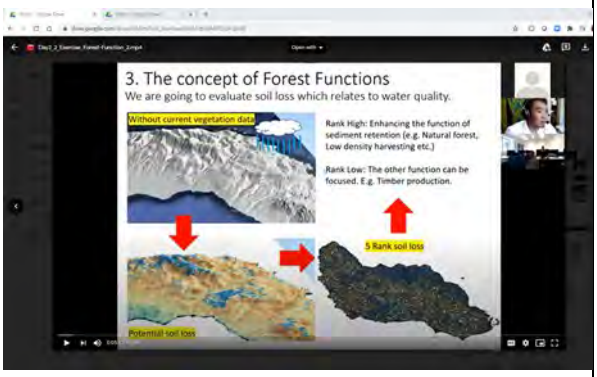
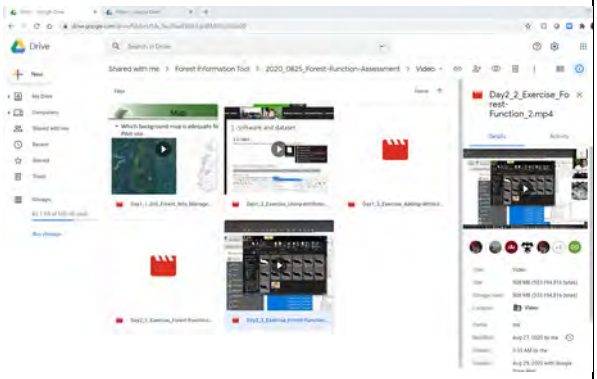
	
Screen shot of online training	Video and lecture materials were shared on Google Drive

Figure 2-21 Online training and training material shared on Google Drive

Table 2-17 Tutorials Prepared for Online Training

No	Name	Overview
1	WORKING WITH FMU. UNDERSTANDING THE TARGET SITE	Forest Management Based on SolGeo-FIMS and FMU
2	FOREST FUNCTION. EVALUATING THE POTENTIAL OF THE LAND	Zoning by Forest Functional Classification and Sediment Runoff
3	UTILIZING INVENTORY SURVEY DATA	Utilization of Forest Survey Data
4	MONITORING AND INVENTORY	The use of inventory in forest monitoring
5	ODK Build Minitutorial	Explanation of how to set up ODK

2.1.8 Technical Support for the Utilization of Forest Information Tool through Modification and Updating of Forest Information

In order to provide details on how to utilize SolGeo-FIMS and forest monitoring tools in actual operations, the SolGeo-FIMS working group held an online discussion in September 2021 to discuss operational bottlenecks, necessary information maintenance, and workflow (Table 2-18). Particularly, challenges were raised regarding the improvement of staff skills through dissemination activities and additional training, as well as the need for follow-up on workflow for the implementation of tasks.

Table 2-18 Challenges for utilization of SolGeo-FIMS

Challenges	Countermeasure
1. Lack of information ・ Required documents such as relevant laws and regulations ・ Additional maps and photo images	・ Maintain additional documents such as relevant laws and regulations, policies, work plans, etc. ・ Additional information on logging roads, plantations, small plantations, etc. ・ Develop image maps that can be used by those who do not know GIS.
2. Awareness-raising activities for SolGeo-FIMS ・ Staff needs to be knowledgeable about the system and become familiar with it. ・ Improve skills in GIS and system use	Workflow ・ Develop a workflow using SolGeo-FIMS for logging license procedures and monitoring. Training ・ Conduct ongoing training to familiarize staff with SolGeo-FIMS. ・ Conduct training on specific topics such as logging concession maps.
3. Other ・ Problems with the internal network ・ Lack of available PCs	Other. ・ Utilize the SolGeo-FIMS link from the Ministry of Forestry and Research website.

In response to this, training on the use of the Forest Information Tools (online) was conducted on 11 November 2021. The participants understood the actual workflow of managing licenses for logging, which is a major task of MOFR and essential for sustainable forest management, and identified how SolGeo-FIMS can be used for these tasks. The licensing procedures for commercial logging include the acquisition of timber right, felling license, and milling license. The procedures for obtaining these licenses were confirmed and the items required were verified at each stage using the forest information in SolGeo-FIMS. In accordance with the CoLP, map data such as elevation, slope, river location, logging history (Hansen Loss data), and timber volume data estimated by the Project were used. In addition, the monitoring items were referred at the logging site according to the CoLP, and were confirmed where drone, GPS, and tablet device could be used in the field forest monitoring.

As a follow-up to this training to report its results, a SolGeo-FIMS workshop was held in April 2022 as part of activities to promote the use of the Forest Information Tool for all of MOFR to motivate the improvement of forest management operations. A series of efforts related to the utilization of SolGeo-FIMS resulted in May 2022 in the issuance of a MOFR internal work instruction letter (Circular notice: Improvement for forest management operation in the ministry) for information sharing, updating and acquisition within MOFR (Annex 47).

Table 2-19 Training for SolGeo-FIMS utilization

Theme	Date	Number of participants	Main content	Remarks

Licensing workflow utilizing SolGeo-FIMS	11 November 2021	5	The items to be checked for license review when conducting forest harvesting were actually checked using SolGeo-FIMS.	Training material （Annex 70）
Forest monitoring workflow with CoLP	11 November 2021	5	The items to be confirmed to utilize the monitoring tools according to the items in the CoLP.	Training material （Annex 71）
SolGeo-FIMS workshop	6 November 2021	8 and others	SolGeo-FIMS functions and forest information were introduced to senior officers and general officers.	The letter was issued in response to this workshop

Timber volume of forest is the most important information for sustainable forest management; it needs to be updated as it changes with harvesting and growth. Since SolGeo-FIMS has FMU-based timber volume data, technical assistance was provided for updating the data. For this update work, it is necessary to input and share appropriate logging management information. Therefore, a workshop was held on information sharing, including confirmation of workflow and a technical training. This is a follow-up to 1: Information sharing and 2: Updating timber volume data in “Circular Notice: Improvement for Forest Management Operation in the Ministry”, issued in May 2022, and is also a follow-up to Training for SolGeo-FIMS utilization mentioned above.

(1) Technical training on registration of applications for timber rights acquisition

How to update logging data was discussed with the technical service section of Forest Resource Management and Technical Service Division (FRMTSD) on 17 and 20 June 2022. The results were followed with a training session on 22 June 2022.

Table 2-20 Training for logging application

Theme	Date	Number of participants	Main content
Logging application	22 June 2022	3	How to confirm the location of the logging application area and estimate the allowable logging volume

Since the information registered in SolGeo-FIMS can be read by QGIS, a QGIS project file was created to display information on the base maps, including a dataset to check the CoLP, with a single click. The project file was copied to PCs in the technical service section. This is so that the CoLP can

be checked during the digitizing of the logging application area. The project file was introduced through the training and it was confirmed that the project file must be used in the work. The accuracy of digitizing the logging application area might vary from officer to officer, so the practice was on using the tracing function in QGIS to trace existing features such as river lines to maintain accuracy. All officers in the technical service section have mastered this function.

A training was held to calculate estimates of harvest timber volume in the logging application area using FMU timber volume data. In doing so, participants visually confirmed the extent to which the environment allowed for tree harvesting within the application area while confirming the slope, elevation, rivers, and other information related to the CoLP. For the estimation of harvest timber volume, the FMUs were clipped in the application area and the timber volume of the FMUs included was summed up. Where the boundaries of the FMUs and the application area did not coincide, the timber volume included in the application area was calculated by area proration. This process was automated in QGIS so that it could be handled with a single click. However, the timber volume data used in this process was not limited to commercial volume. Therefore, it was noted that this could make it appear as if the area could still be logged, even though it had been logged once. For convenience, in order to estimate commercial volume, it was assumed to be 50% of timber volume in the process. The digitized application area and estimate commercial volume were mapped on SolGeo-FIMS and shared with the Licensing section, Marketing section, the commissioner, and other executives. This enabled all related officers to make decisions based on the shared information. It was pointed out within the MOFR that the timber volume data prepared in the past deviated from reality, making it impossible to calculate the allowable amount of harvesting. This training was made possible by new timber volume data developed through the Project. This enabled the relevant sections to make the necessary decisions based on spatial information regarding logging applications

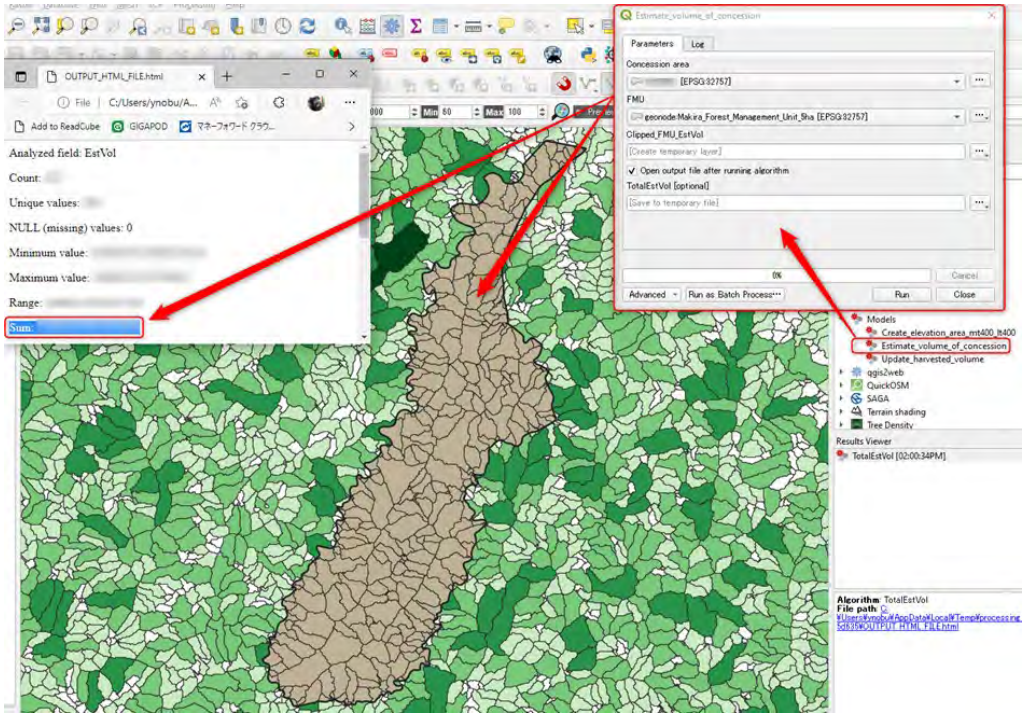


Figure 2-22 Automated logging volume calculations in QGIS

(2) Technical training on updating FMU volume information

On the same day as the above activities, using QGIS, technical training was provided to the technical service section on updating the timber volume information registered in the FMU. For this training, section staff practiced updating the timber volume information based on the assumption that the License Division would provide the status of the concessions (active, inactive, etc.) and the Marketing Division would provide the log volume removed from each concession area. The basic equation is as follows.

Initial Timber Volume next year = Initial Timber Volume current year – Harvested Timber Volume based on log volume of current year + growing volume current year

The initial value of the timber volume is the 2019 timber volume currently registered in the FMUs. Extracted tree volume per concession is distributed and subtracted according to the area of the FMUs intersecting the concession. For the growth volume, the above-mentioned growth volume (9.2 m^3/ha/year) was used for convenience. Subsequently, the forest timber volume data specification and update manual (Annex 2) was developed to prevent calculation errors.

(3) Workshop on data sharing

Information sharing is essential for sustainable forest management, including updating timber volume. For this reason, the staff of the technical service section was asked to demonstrate to executives and other staff information sharing on a logging application form using SolGeo-FIMS to

form a concrete image of information sharing using SolGeo-FIMS. This time, with the participation of the Licensing section, Marketing section, and other divisions, as well as the commissioner and other executives, the participants discussed information to be shared within each division/section, information to be shared among divisions/sections, information needed by executives, and information for which accuracy needs to be improved. Through the workshop, for the proper update of timber volume information, it was confirmed that it is necessary to share the necessary information by e-mail and SolGeo-FIMS among the License Division, Marketing Division, the technical service section, and the commissioner and other executives. The other divisions confirmed in detail the information that they would like to share/would like to be shared proactively. It was also confirmed the creation of electronic copies such as PDFs regarding information sharing will proceed.

A system will not be utilized unless officers feel the need to accurately record and share information. This workshop confirmed such needs to each other and contributed to the system's establishment. Regarding information related to logging applications, the needs were identified and SolGeo-FIMS made it easier to share information. The periodic exchange of opinions like this one would be meaningful in promoting appropriate forest administration, as it would allow for checking procedures for information sharing, and improving work methods, including systems.

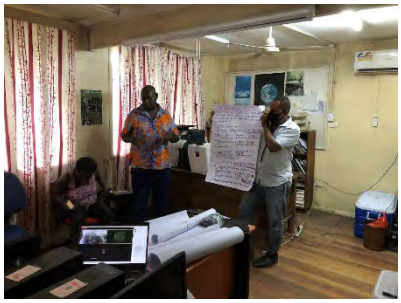
	
The training to estimate/update timber volume	Executives confirmed timber volume infromation on SolGeo-FIMS and how to share it using Mr. Gus Grendy’s PC.
	
A logging area was confirmed by operation staff and technical service section staff with the topographic data on SolGeo-FIMS.	Information sharing workshops

Figure 2-23 Confirmation of logging information management flow with SolGeo-FIMS

2.2 Activities for Output 3

Logging companies has been main actors of logging through the concession scheme in Solomon Islands and over logging by them was a main driver of depletion of forest resources. Against the background, communities are expected to conduct sustainable forest resource management by themselves. Output 3 was set as follows: "SFRM Pilot Activities, initiated by the communities and supported/facilitated by MOFR, are implemented" to cope with the challenge. In order to achieve the output, the following activities were carried out. (i) implement the community profile surveys in the pilot sites, (ii) make land use plans and SFRM implementation plans, including the livelihood improvement activity plans contributing to the realization of SFRM, (iii) support the implementation of the plans by MOFR, and (iv) implement monitoring and evaluation. Moreover, (v) abstract lessons learned through the implementation of pilot activities.

Through these pilot activities, good practices of community-based SFRM and livelihood activities contributing the realization of SFMR including agroforestry were developed, and lessons for promotion of these community-based SFRM and livelihood improvement activities to other communities across the country.

2.2.1 Conduct Community Profiling in Collaboration with Community Members and Socioeconomic Analysis in/around the Pilot Sites

The main purpose of the community profiling and socio-economic analysis at the pilot site is to collect information for formulating more effective pilot activity implementation plans. It was implemented with consideration given to matters such as community initiative and ownership, socio-economic diversity, and gender issues. In addition, to facilitate the C/P's full understanding of the importance of the above issues, the process of planning and implementing community profiling and socio-economic analysis was utilized as an OJT opportunity in this regard.

(1) Plan the survey for community profiling including methodologies, scope, schedule etc.

The following nine items were identified as data and information to be collected for community profiling: i) general information (location, tribe, etc.); ii) traditional governing system; iii) population; iv) community infrastructure; v) economic activities; vi) occupation/employment; vii) financial services; viii) community-based organization; and ix) record of activities/projects related to natural resources. In addition, as a method of collecting information, Participatory Rural Appraisal (PRA) was applied and some of its tools (mapping and seasonal calendars) were used for facilitating community members' aggregation of information and ideas, and for the extraction of the information necessary for profiling.

(2) Conduct community profiling in collaboration with community members.

Based on the plan described in the previous section, surveys were conducted to prepare community profiles in a participatory manner in each community.

(3) Plan the survey for socioeconomic analysis including methodologies, scope, schedule etc.

This survey was planned by mainly examining directionality, consensus building with the target communities, content and the implementation system. Regarding content, the following items were identified for the social aspects: i) leadership/decision-making process; ii) land ownership and use; and iii) gender situations. For the economic aspects: i) income and ii) expenditures.

(4) Conduct the survey for socioeconomic analysis in/around the Pilot Sites.

When the results of the socio-economic surveys were organized and analysed, it was confirmed that there was a limit to the collection of economic-related information and data. In order to cope with this constraint, a method of "wealth ranking[16]" was applied to supplement the information and data.

(5) Analyze the outputs of the surveys, and develop strategies to support community people to develop Pilot Activity Implementation Plans.

The results of the above three activities of the community profiling, socio-economic analysis and wealth ranking were analysed. The major results of the analysis are indicated in the table below:

Table 2-21 Major results of analysis of community profiling, socio-economic analysis and wealth ranking

Activity	Item	Major results of analysis
Community profiling	Social aspects	● The community chief represents the community in both communities. ● Komuniboli community has its own tribal chief and paramount chief who are at the higher rank than the community chief, while Falake has no tribal chief or paramount chief. ● Both communities are equipped with minimum necessary infrastructure such as community halls and prep schools.

[16] This is a method of classifying and ranking households based on general livelihood criteria that local residents can perceive, such as means of livelihood, income, possessions, level of education and skills, etc..

		● In Falake community, there is a local organisation called ADO Rural Farmers Association, which mainly encourage farmers to plan trees for promoting sustainable forest management.
	Economic aspects	● Agriculture is the main industry in both communities, but in Falake, forestry (incl. commercial tree plantation, timber milling, etc.) is recognized as a driver for economic development.
Socio-economic analysis	Social aspects	● Komuniboli community chief is inherited through the female bloodline of the chief's family. Important decisions are made through discussions between the chief and the community elders. Meanwhile, it was revealed that there are four clans in Falake and the representatives of these four clans called elders, have a strong influence on decision-making in the community. ● In Komuniboli, it is recognised that all the community land including forests are tribally owned, not indivudually owned, regarless of gender. When a community member wish to use land or forests, s/he need to consult with the community chief and elders. On the other hand, in Falake, there are no clear rules and system for allocation of land, however, it is recognised that anyone who wants to use a patch of land must inform the elders and others. ● Women's rights to attend, speak, and make decisions in public are severely restricted in both communities. As a reason, it was pointed out that in addition to culture and customs, there was also the problem of language (pidgin). There was a strong interest in this project, and some expressed a desire to be involved in the decision-making process as well.
	Economic aspects	● Coconuts (mainly for copra), cocoa and vegetables are the main agricultural products and cash income sources in Komuniboli, whilst cocoa, betel nut and kava in Falake. ● Both communities spend a large amount of money on their children's education (especially at secondary school and above), except for regular goods.
Wealth ranking	—	● As a result of participatory discussions on indicators (mainly qualitative indicators) for classifying all households in each community into three levels (rich,

		middle class, and poor/below average) from an economic perspective, the main items were identified as cash and saving, housing (quality and size), kinds of crops cultivated, plantations, livestock (pigs, chickens), education level of household heads and children, and means of communication (mobile phone) although they slightly differ between the communities. This practice helped understanding the community members' awareness and concerns about their livelihood. ● In Komuniboli, the ratios of the rich, middle class and poor/below average were 4%, 46% and 50% respectively, while in Falake the results were 8%, 47% and 45%. It was found that in both communities, only a limited number of households are considered wealthy, and about half of the households are poor.

As a result of discussions with the Long-Term Experts, it was agreed that the report would be compiled in a way to integrate the four survey results of community profiling, the socio-economic analysis, wealth ranking, and gender analysis, and that the title of the report would be modified to "Community Profiling and Socio-economic and Gender Analysis Report".

The significant findings and the results of the analysis obtained through the surveys and practices stated above were effectively utilized for developing the Pilot Activity Implementation Plans. In particular, issues related to the decision-making process and women's participation within each community were used as a reference when considering the approach and management method of the workshop for the pilot activity implementation planning. The results of economic aspects were utilized in the consideration of the content of livelihood improvement activities.

(6) Improve the knowledge of MOFR staff by conducting a literature review on the growing areas and production methods of high value-added forest products in the Solomon Islands.

In order to promote sustainable forest resource management, it is essential to sustainably conserve forests while improving the livelihoods of local people through timber and non-timber forest products, and the production and processing of forest products is the responsibility of the MOFR. However, compared to other Pacific countries, Solomon Islands lags far behind in the production and manufacture of high value-added forest products. Therefore, with reference to the pioneering examples of neighboring countries, the following forest products have potential for commercialization in Solomon Islands and have particularly high value: sandalwood oil (*Sandalwood album*), tamanu oil (*Calophyllum inophyllum*), vanilla bean (*Vanilla planifolia*), ylang-ylang (*Cananga odorata*) and ebony (*Diospyros*

spp.), a desktop review was conducted as an additional activity to the market/value chain analysis. A report was compiled for each of the above-mentioned items, with items such as growing areas, growing techniques, commercialization and market information (Annex 14). The reports prepared were shared within the MOFR and a survey of the actual situation in the pilot sites was conducted mainly by TSC members. It was meaningful to improve the knowledge of officers by understanding the actual situation.

(7) Conduct of a Gender Analysis Survey Drawing from the Cases of the Pilot Sites (2 villages)

Under the Si-SFRM, a survey team consisting of a Japanese gender expert and a local consultant conducted a gender analysis survey, drawing from the cases of the pilot sites of two villages. This survey was focused on men and women's access to and control over forest resources, the roles of men and women in forest resource management, and the decision-making power of men and women inside and outside the home, in the pilot sites. In the survey, the team also analyzed what extent to which a gender perspective was incorporated into the pilot activities of the SI-SFRM. Based on the results of these analyses, the Japanese gender expert examined effective approaches to promote women's participation in the decision-making processes, their economic empowerment through livelihood improvement activities, and their leadership, and created a report (refer to Annex 4). Furthermore, she conducted a gender training program, consisting of two-day lecture-based training in Honiara and one-day field work of participatory gender analysis workshops in the pilot sites. This program targeted mainly for the officers of the MOFR and aimed to improve their understanding of how to conduct gender analysis.

The gender analysis survey at the pilot sites was conducted by the survey team from February to April 2021. For this survey, the team adapted qualitative research methods, such as key informant interviews, focus groups interviews, and in-depth interviews. This was because the survey team aimed to increase the accuracy and reliability of information collected through the interviews by combining multiple interview methods.

There are two main points of findings from the gender analysis survey. First, the survey results revealed that one pilot site of Komuniboli Village is a matrilineal society, while another pilot site of Falake Village is a patrilineal society, and despite such a critical difference, in both villages, men have exclusively made decisions on how to distribute and use customary (common) land, such as forests and farmlands. This is based on the gender norms rooted in the Solomon Islands, which state that "decision-making over land is the role of men." Another key finding point was that in both villages, there is a clear division of gender roles in productive and reproductive work. In terms of productive work, women mainly engage in slash-and-burn farming for household consumption and sell surplus crops. In addition, women are almost exclusively responsible for reproductive work, such as fetching water and collecting firewood, as well as household chores and childcare. On the other hand, while men help women in a part of slash-and-burn farming processes, they are mainly engaged in managing high-market timber, as well as growing and selling high-market plantation crops. These differences in crops and tree species that men and women are responsible for have resulted in a gender disparity in cash income earned from selling them. This gender disparity has determined the degree of decision-making power men and women have within the household, that is, the power relationship between men and women within the household.

In the pilot activities of the SI-SFRM, both Japanese experts and local staff members actively facilitated people in the sites from a gender perspective and encouraged women to participate in decision-making processes. However, it did not necessarily lead to the transformation of unequal gender roles and gender relations rooted in both pilot sites. First, in order to make the village decision-making system more democratic, which had been done only by some men until the intervention of SI-SFRM, local staff members encouraged villagers in each of the pilot sites to establish several thematic committees and suggested them to also select women as committee members. Among the five committees established in each of two villages, however, only the "Women and Development" committee was chaired by a woman, and the other committees were all chaired by a man and mainly composed of men.

Secondly, not only were men but also women invited for the meetings, where they were facilitated to decide pilot activities in order to improve their livelihoods. Although women participated in meetings, they lacked self-confidence and hesitated to speak out due to gender norms. Therefore, the Japanese experts divided participants in the meetings into small groups to make it easier for women, in particular, to speak out, and then they facilitated each group to discuss preferable pilot activities. After discussing in the small groups, opinions raised from each group were discussed as a whole. Thirdly, some training programs were conducted for income generating activities where both men and women were invited. However, some women with low educational levels said that it was difficult for them to understand. Finally, in the livelihood activities of agroforestry and pig farming, both user groups' members decided that work and profit sharing should be done on a household basis, not individual basis. Therefore, there was a risk that women would not always enjoy distributed benefits within the household that were commensurate with the amount of work they did.

Based on the analyses of key findings, including the above, the Japanese gender expert of the survey team made some recommendations for the SI-SFRM and future similar projects from a gender perspective in the report. The recommendations were made based on gender needs at the grassroots, project, and policy levels necessary to promote women's participation in decision-making processes, their economic empowerment, and their leadership development (refer to table below).

Table 2-22 Gender Needs and Measures Analyzed for the SI-SFRM and Future Similar Projects

Level	Critical problems faced by women in the pilot sites	Possible measures for solving the problems
Grassroots	Many women did not have self-confidence and hesitated to participate in meetings. Even if they did participate, they did not speak out actively.	➢ Conduct sensitization workshops to change the attitude and ideas of men and women towards gender roles based on gender biases and stereotypes ➢ Conduct communication-skill training
	Some women had a low level of education and were not able to understand the content of the training.	➢ Provide uneducated villagers with literacy classes ➢ Conduct preparatory training before actual training ➢ Even in actual training, use as few words as possible and use pictures and diagrams as much as possible to make the contents of training modules understandable even for illiterate people
	Both men and women lacked	➢ Improve access to financial services for

	seed money (access to financial services) with which they could start business or income generating activities for livelihood improvement.	women in particular
Project	A gender analysis survey was not conducted prior to project designing, and guidelines for "Gender Equality and Social Inclusion (GESI)" were not created.	➢ For future similar projects, conduct a gender analysis survey at the planning stage and make a project design based on the results of the gender analysis. ➢ Enable all project staff members to facilitate women and youth's active participation in decision-making processes, activities, and training based on GESI guidelines
Policy	The integration of a gender perspective into the National Forest Policy is limited to capacity building and the policy is not fully gender-mainstreamed.	➢ Revise the National Forest Policy to focus on strategies to promote women's participation in decision-making processes, leadership, and economic empowerment beyond women's capacity building
	The MOFR and SI-SFRM did not establish a gender-disaggregated data collection system for gender statistics. As a result, there was no way to measure the effects and impacts of SI-SFRM interventions on the promotion for gender equality and women's empowerment.	➢ Establish gender-disaggregated data collection system

2.2.2 Support and Facilitation for Pilot Site Communities to Develop Pilot Activity Implementation Plans

(1) Design and conduct preparatory surveys (e.g. boundary survey, forest inventory) for the Pilot Activity Implementation Plans at the Pilot Sites

In order to establish the boundaries of the Pilot Sites, a GPS survey was conducted. The acquired data were processed and analysed to determine the extent and area of the Pilot Sites. The GPS survey was led by a Long-Term Expert, accompanied by MOFR staff and community members. The survey was carried out in March and May 2019 in Komuniboli and in March 2019 in Falake. For Komuniboli, two additional surveys were conducted. The results showed that the areas of the Pilot Sites were 348.2 ha in Komuniboli and 302.6 ha in Falake. Drone surveys were also conducted and aerial photographs were taken within the boundaries of both Pilot Sites. The boundary data and aerial photographs were used as basic data for the Land Use Plan of the Pilot Sites and for determining the extent of the Pilot Sites, as described below. GPS data was acquired by multiple groups, so it was necessary to combine the data. There were also incorrect positions due to the weak GPS signal, which needed to be

modified. MOFR officers were taught how to process these data, which they subsequently did with support (Annex 27 and Annex 28).

After the boundaries were decided, forest inventory surveys for estimating timber volume were conducted with MOFR staff led by a Long-Term Expert, in cooperation with a GIZ expert who supported MOFR. Standard plot surveys based on a gridded plot were conducted in August 2019 in Komuniboli and in September 2019 in Falake. Inaccessible plots were excluded. Komuniboli was ultimately surveyed for 17 plots and Falake for 12 plots. With the results, in October 2020, an online training was conducted on estimating timber volume. Due to time restrictions, the method to estimate timber volume was introduced in Komuniboli as the target site. First, a forest type map was created by tracing the aerial photographs taken by a drone. Second, comparing the results of the sampling survey with forest type, timber volume was estimated. The average timber volume in Komuniboli was estimated to be around 99,644.7 m^3. If sago palms and other species without enough commercial value were subtracted, it was estimated to be around 26139.5 m^3. The same estimation for Falake is currently underway.

Before the drafting of the Land Use Plan ((4) 1)) described later, in June 2019, a resource survey (GPS Transect Walk) using GPS and tablets was planned to grasp the resource locations accurately within the Pilot Sites. A Long-Term Expert was asked to implement it in cooperation with MOFR staff and community members. After training on how to use GPS and tablets for both Komuniboli and Falake community members, they were divided into four groups based on gender and age. They recorded the locations of important resources and geotagged photos for their communities. The locations of such things as wetlands, water sources, taboo sites, plantations, and kitchen gardens were collected and mapped onto a satellite image of their communities. The maps were printed on paper of A0 to 1 size and given as feedback to both communities in September 2019 (Floor maps used are Annex 29 and Annex 30). After that, the maps were used for a workshop to confirm the current land use and to formulate the future Land Use Plans(Annex 31 and Annex 32 are the current Land Use Maps and future Land Use Plan Maps created by this activity. Annex 33 and Annex 34 are laid out for printing in order to be introduced to the communities,). A manual on this method is being created, including the introduction of other case studies (Annex 16 and Annex 17).

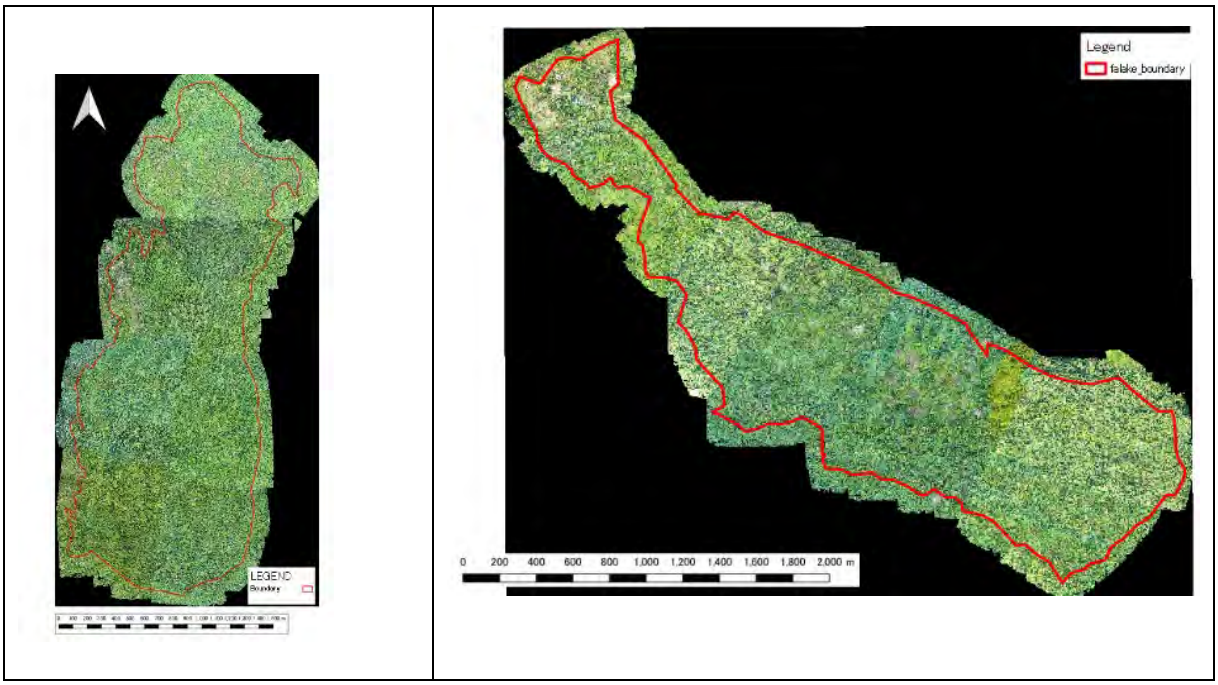


Figure 2-24 Boundaries of Pilot Site communities and aerial photos taken by drone
(Left: Komuniboli; right: Falake)

(2) Design and conduct marketing surveys for value chain analysis on agroforestry / NTFP / wood products

In order to clarify the potential of markets and value chain of agroforestry products, including trees, crops, NTFPs, and wood products, a market survey and value chain analysis of the products were conducted from July 2019 to September 2019. The survey was conducted in two phases as follows.

During Phase 1, the information on a production system of main products in the communities was collected at each Pilot Site in order to narrow down high potential products. As a result, the following nine products were identified: cacao (*Theobroma cacao*), coconut (*Cocos nucifera*), kava (*Piper methysticum*), sawn timber and furniture, horticulture, ngali nuts (*Canarium indicum*), betel nuts (*Areca catechu*), loya cane (*Calamus* spp.), and straw mushrooms (*Volvariella volvacea*). These nine products were analysed using four criteria for value chain selection: competitive potential, impact potential, cross-cutting issues, and industry leadership. As a result of the analysis, lumber, timber and furniture were selected as the highest potential commodities at both sites. In addition, cacao was selected as the second highest potential product at Falake.

During Phase 2, the domestic market survey and value chain analysis were conducted targeting the products identified during Phase 1. Lumber, timber, and furniture market analysis was carried out through interviews with 13 companies (10 in Honiara and three in Auki). Regarding cacao, three cacao export agents out of five agents existing in Malaita were interviewed. The value chain analysis was conducted in workshops in each community with around 70 participants of from each community. Analytical tools, namely value chain mapping, Business Enabling Environment (BEE), and SWOT analysis were applied in the workshops.

	
Timber value chain	Value chain mapping by community members

Figure 2-25 Value chain analysis (Komuniboli)

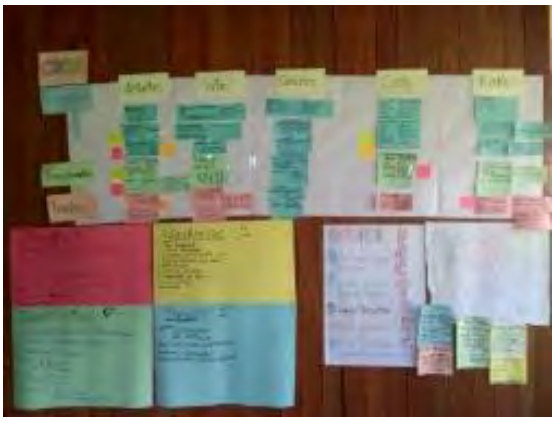
	
Timber value chain	Cacao value chain

Figure 2-26 Value chain analysis (Falake)

(3) Analyze the outputs of the surveys for activity planning

The main results of the market survey conducted in Phase 2 are shown in the table below. See the following attached reports for details: “Market and Value Chain Analysis Final Report, Part I” (Annex 20) and “Market and Value Chain Analysis Final Report, Part II” (Annex 21).

Table 2-23 Main Results of Analysis of the Market Survey

Product	Main Results of Analysis	Challenges
Timber	・Timber tree species in high demand are vitex (*Vitex cofassus*), akwa (*Pometia pinnata*), rosewood (*Pterocarpus indicus*), and kwila	・Competition with illegally logged timber. ・The price was kept low due to

	(*Intsia bijuga*). The timber companies interviewed did not show interest in exotic trees species such as teak and mahogany due to the lack of markets. ・Demand exceeds supply for vitex. ・The purchase price varies depending on the company. Value Added Timber Association (VATA) offered the best price among the timber companies interviewed.	high competition. ・Lack of diversity of products. ・Domestic markets are undeveloped. ・Employment of skilful labourers was difficult.
Cacao	・In the Solomon Islands, 20,000～25,000 small scale farmers produced cacao, cultivating and selling it individually. ・Most cacao was exported as cacao beans without value addition. ・The purchase price of cacao beans from farmers was SBD 3.0/kg before fermentation and SBD 10.5 - 11/kg after fermentation. ・The purchase price was controlled by a several export agents.	・Low quality due to lack of equipment and skills. ・Lack of management skills for cacao plantations. ・Some processed products such as cacao nibs and chocolate drinks may be able to be produced by local communities, but demand-stimulation campaigns and market development are necessary. ・Establishment of relationships with chocolate makers is essential for selling as high quality cacao beans.

(4) Conduct participatory planning activities for Land Use Plan and Community-based SFRM Activities (Pilot Activities) Implementation Plan

1) Formulation of Land Use Plan

In order to implement and realize community-based SFRM, a land use plan of the pilot site needed to be made from the viewpoint how the entire pilot site including forests would be used and/or conserved. Since about 90% of the land in Solomon Islands belongs to tribes, it is important that communities themselves make a land use plan. Thus, based on the results of community mapping conducted in 2.2.2 (1). Support and Facilitation for Pilot Site Communities to Develop Pilot Activity Implementation Plans, a current land use map was prepared with community members at each Pilot Site. Following this, a Land Use Plan map showing which parts of the Pilot Sites would be used and the purposes for which they would be used in the future, was developed in each community with support from the Project. The current land use maps and the Land Use Plan maps for each community are shown below.

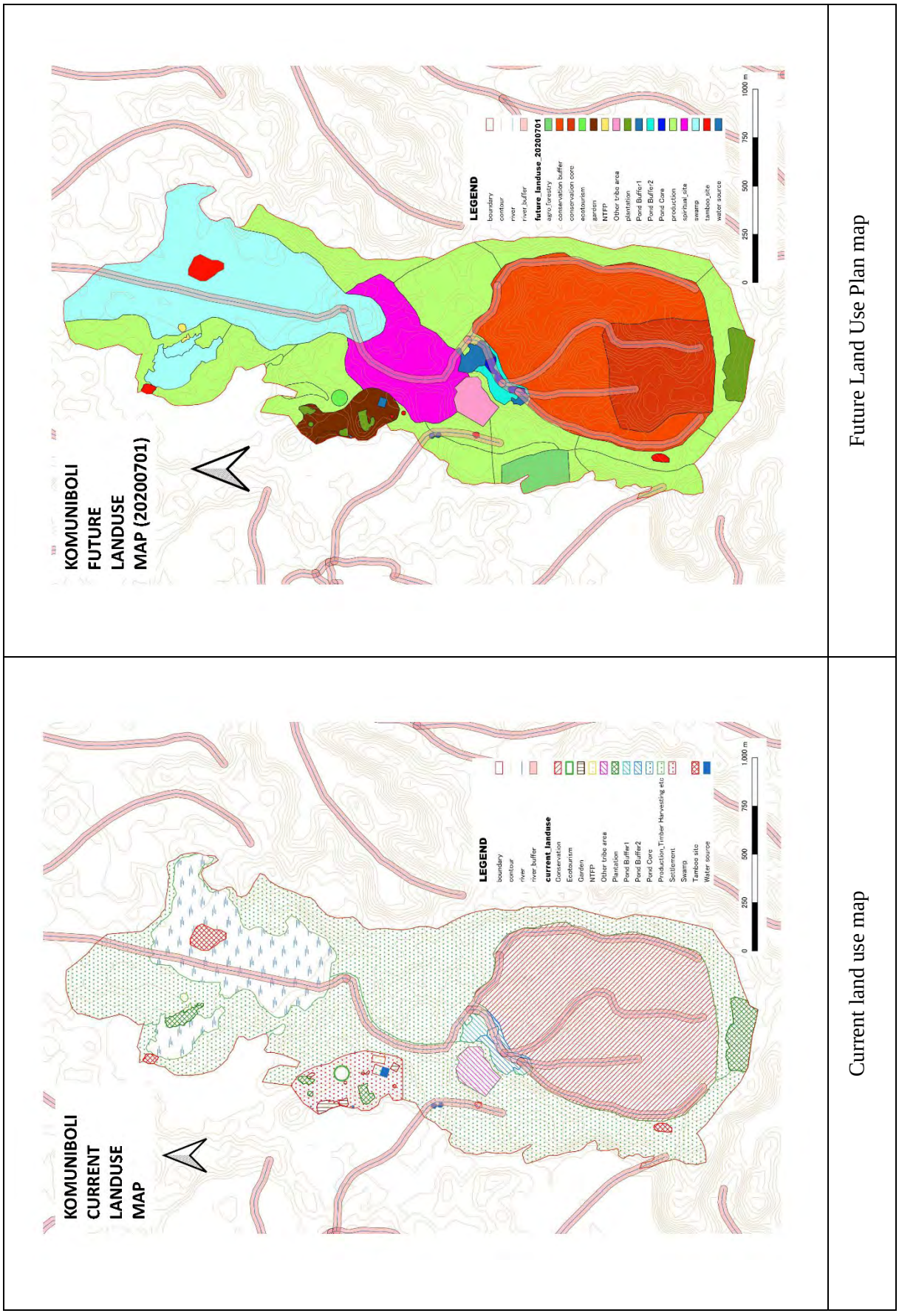
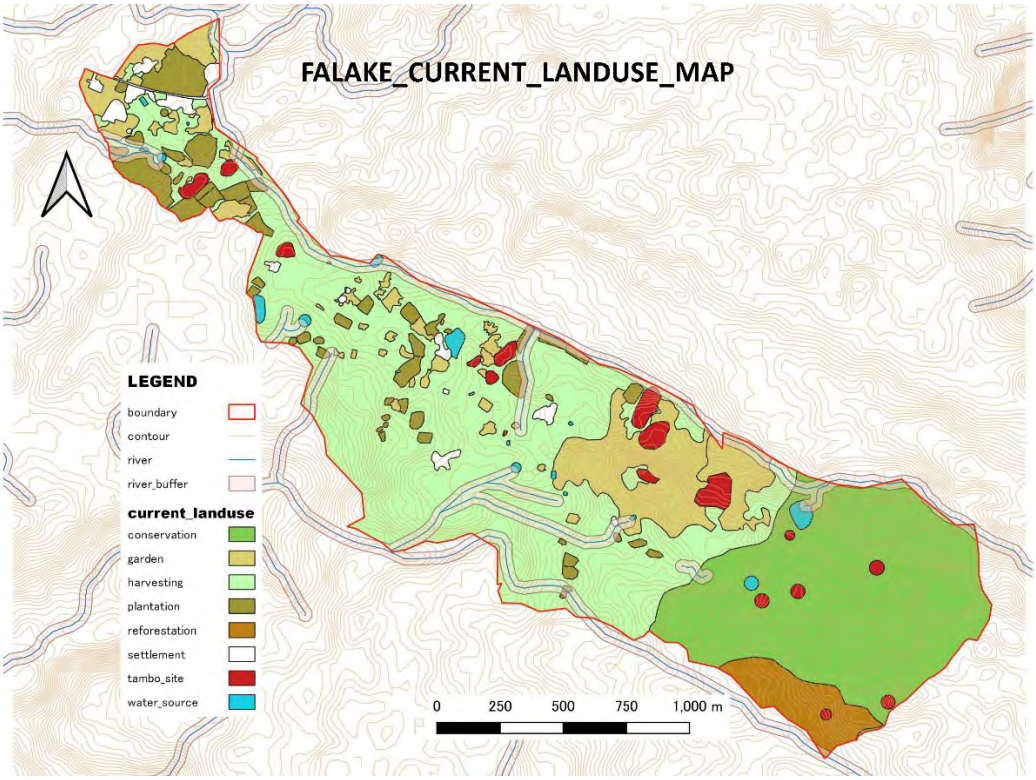
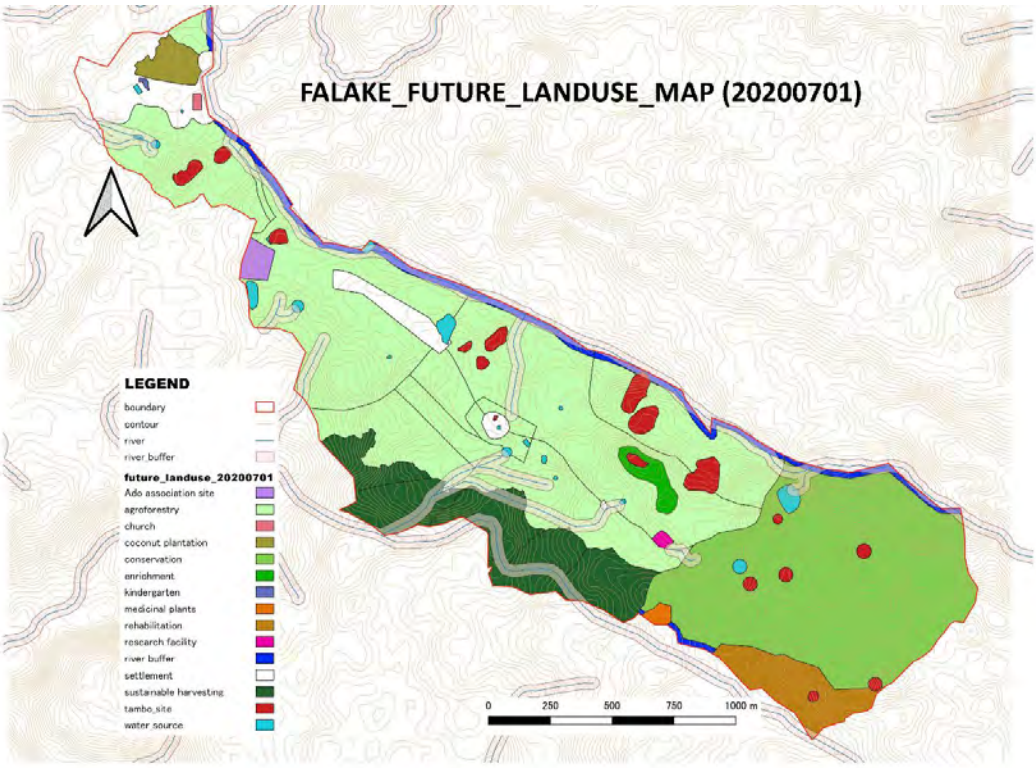


Figure 2-27 Land use maps (Komuniboli)



Current land use map



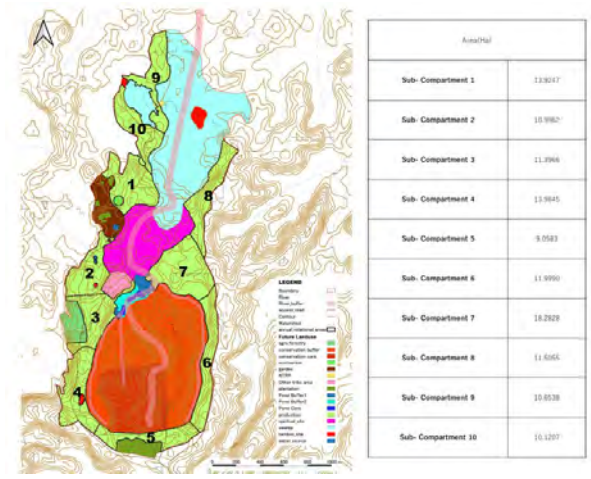
Future Land Use Plan map

Figure 2-28 Land use maps (Falake)

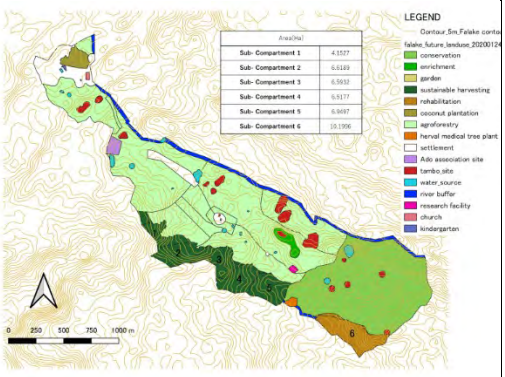
In formulating the Land Use Plan maps, community members discussed the purposes of use in the Pilot Sites, and identified land use and activities to meet these purposes for each community. In addition, they demarcated areas for forest resource management activities in which timber production plays a central part, for the implementation of agroforestry and rehabilitation for the protection of water sources. As the details are shown in Figure 2-28 and Figure 2-29, the timber production area is shown by yellow green and the agroforestry area is shown by dark green in the land use map of Komuniboli. In the land use map of Falake, the timber production area is shown by dark green, the agroforestry area shown by blight green, and the conservation area is shown by green at the right side.

2) Formulation of Sustainable Forest Resource Management Plan

An SFRM plan was formulated at the initiative of the Long-Term Expert at each Pilot Site. The area for implementing SFRM on the Land Use Plan maps was divided into 10 sub-components in Komuniboli and six sub-components in Falake. It was planned that forest resource management activities would be conducted rotationally at each sub-component each year. The future land use maps, with sub-components at each site, are shown below (page 3 on Annex 31 and Annex 32).



Future land use map with 10 sub-components in Komuniboli



Future land use map with six sub-components in Falake

Figure 2-29 Land use maps with sub-components in Pilot Sites

In natural forests at both sites, timber tree species such as *Vitex cofassus* and *Pometia pinata* will be harvested with 20-30 year rotations. It was decided that mahogany, teak, and eucalyptus in existing plantations will be harvested with 12 – 30 year rotations while applying thinning.

3) Formulation of Livelihood Improvement Detailed Activity Implementation Plan

The Livelihood Improvement Detailed Activity Implementation Plan consists of two sections: agroforestry and other livelihood improvement activities. An Implementation Plan for each section was formulated separately. The main points of each section's plan are described below.

(i) Formulation of Agroforestry Implementation Plan

The Agroforestry Implementation Plan was developed following the process shown in the figure below from November 2019 to March 2020 through discussions in workshops with community members. From the viewpoint of the capacity development of the C/Ps from both MOFR headquarters, Guadalcanal Province Office and the Auki Regional Office, the C/Ps were encouraged to attend the workshops as much as possible and, as OJT, to facilitate both overall and group discussions under the guidance of the Short-Term Expert Team.

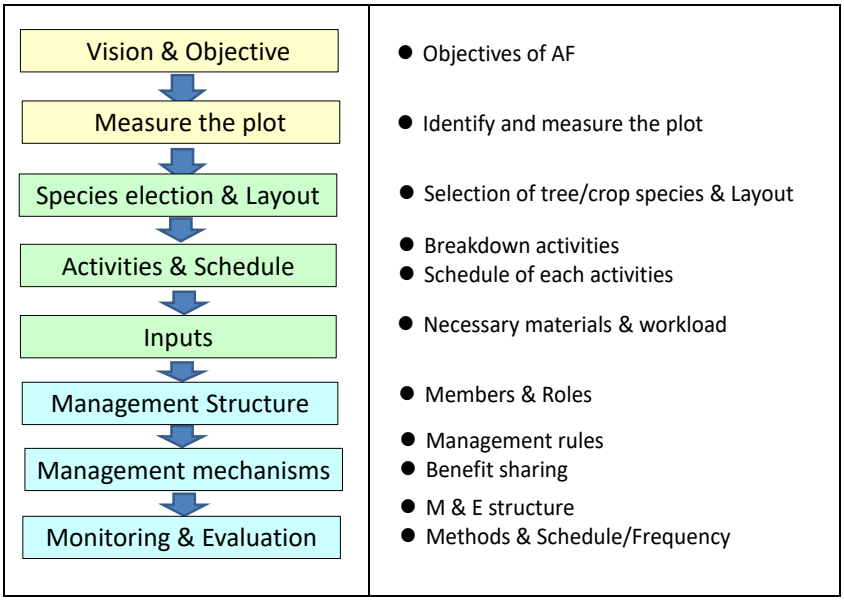


Figure 2-30 Process of formulation of Agroforestry Implementation Plan

■ **Komuniboli**

As it was estimated that it would be difficult to cover the whole area for agroforestry identified on the land use map, through discussion among community members and through field investigation, a plot was identified from the area for the agroforestry Pilot Activity for the first year. It was agreed that the plot would be used for agroforestry training; hence, it was named the Agroforestry Training Plot.

The plot identified is indicated by the yellow line in the figure below. It is 0.25 ha (50 m by 50 m) (Figure 2-31). The red line indicates the whole area for agroforestry identified in planning future land use.

Figure 2-31 Entire agroforestry area (left) and Agroforestry Training Plot (right)

*An updated version of the land use map is provided on page 4 of both Annex 31 and Annex 32.

After identifying and measuring the plot on the ground, community members selected tree species and kinds of crops to plant on the Agroforestry Training Plot. Prior to this, the Project had suggested that community members should take the following points into consideration: the effective use of space; the combination of short-, medium-, and long-term benefits; the introduction of legume species which have the function of nitrogen fixation; and the availability of saplings to plant. Taking these points into consideration, community members selected tree species and agricultural crops to be planted on the plot. In conclusion, they selected pencil cedar (*Juniperus virginiana*), teak (*Tectona grandis*), and mahogany(*Swietenia macrophylla*) as timber tree species, and rambutan (*Nephelium lappaceum*), guava (*Psidium guajava*), and tangerine (*Citrus reticulata*) as fruit trees. In addition, they selected agricultural crops including sweet potato (*Ipomoea batatas*), pana, taro (*Colocasia esculenta*), cucumber (*Cucumis sativus*), pineapple (*Ananas comosus*), banana (*Musa* spp.), maize (*Zea mays*), peanut (*Arachis hypogaea*), and beans (*Phaseolus vulgaris*). After that, they developed a layout of the agroforestry plot that showed which tree species or kinds of crops would be planted in which part of the plot, taking into consideration ground conditions such as topography and soil conditions (Figure 2-32).

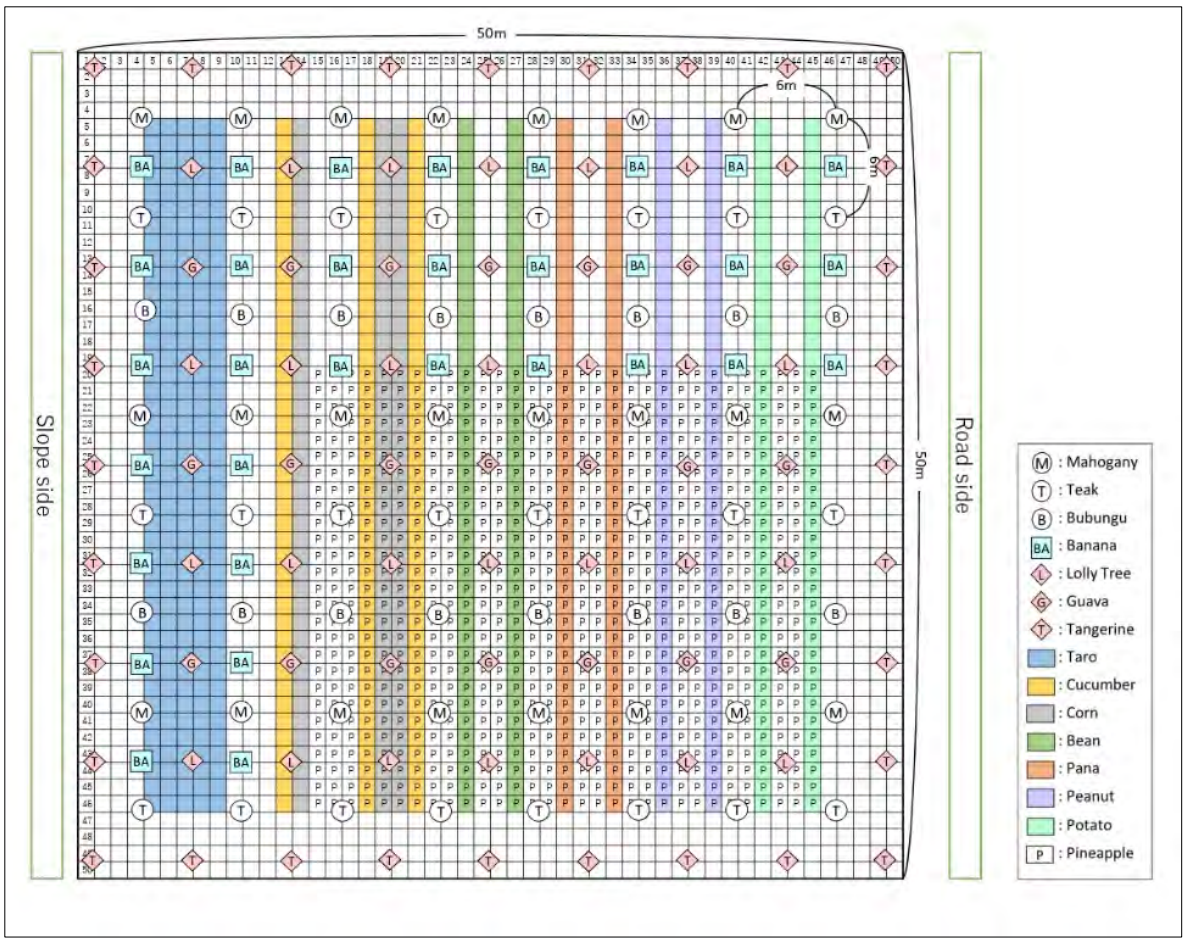


Figure 2-32 Layout of the Agroforestry Training Plot

Moreover, community members discussed an annual work plan, a medium- long-term plan, an input plan, management structure, risk management, and benefit sharing. Finally, they developed the Agroforestry Implementation Plan, including these items. See “Livelihood Improvement Detailed Activity Implementation Plan Komuniboli (Version 2)” for details (Annex 12).

- **Falake**

In the same manner as Komuniboli, in Falake the agroforestry area identified on the future Land Use Plan map was huge and seemed difficult to cover as Project Pilot Activities. Hence, two plots, around 0.01 ha (30 m by 30 m) each, were selected from the area as agroforestry plots where Pilot Activities would be conducted. Plot 1 was formerly used as a garden, and Plot 2 was used as a mahogany plantation.

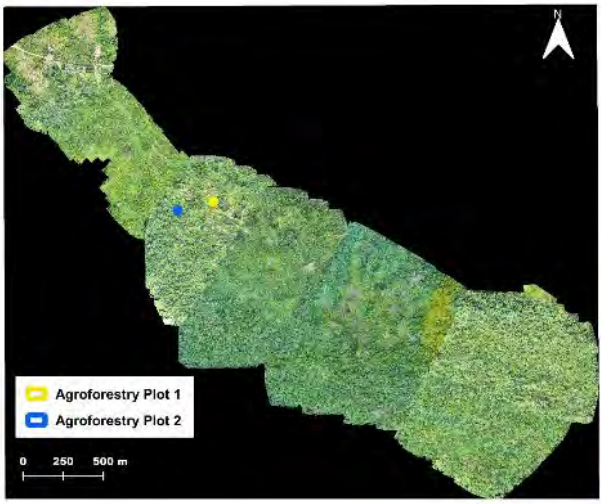


Figure 2-33 Locations of Agroforestry Plot 1 and Plot 2

Agroforestry Plot 1

Agroforestry Plot 2

Figure 2-34 Agroforestry Plot 1 and Agroforestry Plot 2

After demarcating and measuring the plots, community members selected tree species and kinds of crops to be planted on each plot and developed layouts of the plots based on suggestions from the Project (Figure 2-35 and Figure 2-36).

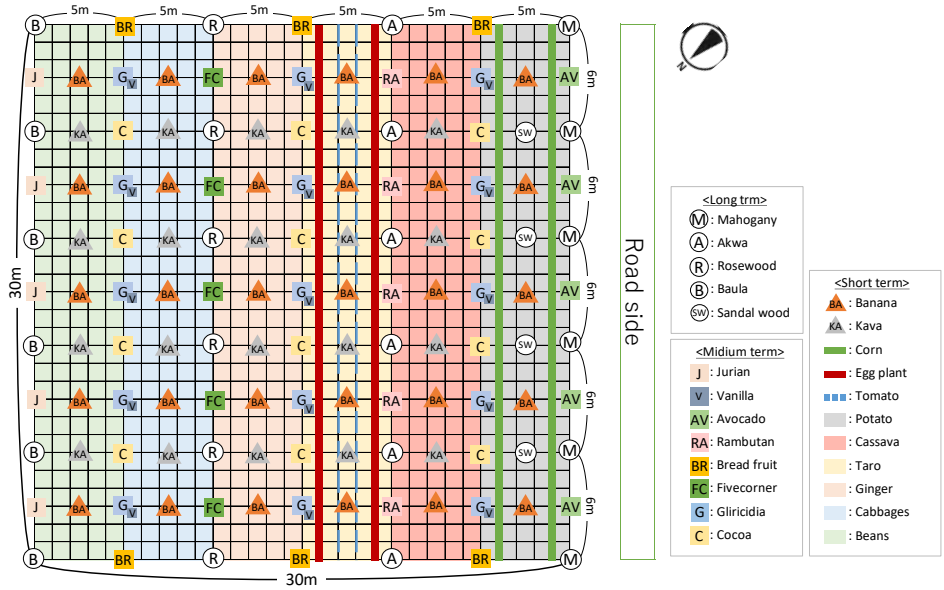


Figure 2-35 Layout of Agroforestry Plot 1

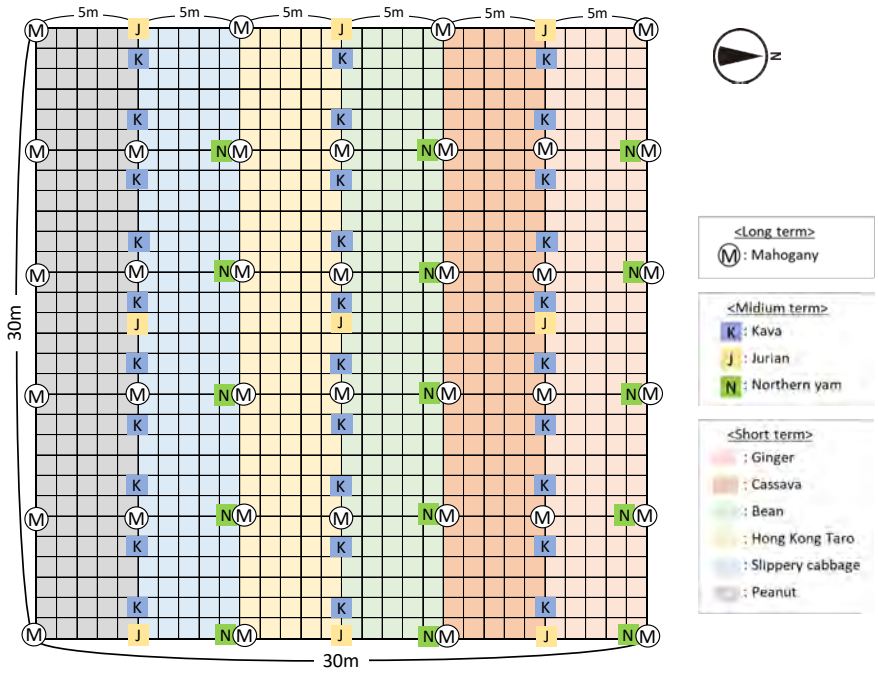


Figure 2-36 Layout of Agroforestry Plot 2

In addition, community members discussed an annual work plan, a medium- and long-term plan, an input plan, management structure, risk management, and benefit sharing for each plot. Finally, they developed the Agroforestry Implementation Plan, including these items. See “Livelihood Improvement Detailed Activity Implementation Plan Falake (Version 2)” for details (Annex 13).

(ii) Formulation of other livelihood Activity Implementation Plans

The Activity Implementation Plans for livelihood improvement activities other than agroforestry (hereinafter referred to as the "Other Livelihood Improvement Activities") were developed between February 2020 and July 2020 through a series of workshops with community members. As with the activity planning for the Agroforestry Sub-component, from the viewpoint of capacity development of the C/Ps from MOFR, the C/Ps both from MOFR's headquarters and the Auki Regional Office were encouraged to participate in the workshops and, as OJT, to facilitate both overall and group discussions under the guidance of the Short-Term Expert Team.

For the first step of the process, various issues were confirmed and agreed to with community members. These were: i) the objectives of the Pilot Activities and the Land Use Plan; and ii) the Project policies and principles for developing the Pilot Activities, which had been discussed in October 2019 amongst the Project's stakeholders, including the pilot communities and the Project staff. Furthermore, the results and findings of the market survey and value chain analysis mentioned in the section 2.2.2 (2) were also reviewed.

Based upon the above processes, potential activities were enumerated at the initiative of community members and later summarized in a long list of potential activities in each community. For the next step, a rapid assessment of the long-listed potential activities was carried out according to seven criteria: i) technical, ii) economic/financial, iii) social/cultural, iv) institutional, v) environmental, vi) gender, and vii) other (risks, etc.). Based on the results of the assessment, activities with low priority and those which seemed difficult for the Project to support were dropped, and short lists were prepared. Consequently, the number of the activities for Komuniboli was narrowed down to seven. For Falake, on the other hand, all 11 activities listed on the long list remained on the short list.

The Project then supported the communities in discussing and assessing the short-listed potential activities by adopting a format, the Pilot Activity Profile, prepared by the Project. Items included in this format include person/group responsible, technical resources, objectives, target (area, number of households), detailed sub-activities, inputs (item, cost), schedule, monitoring and review, problems/constraints, and so forth.

Finally, the Pilot Activity Profiles described in the previous paragraph were reviewed in each community and activities were prioritized (Table 2-24).

Table 2-24 Potential Activities for Other Livelihood Improvement Activities (with Priority)

KOMUNIBOLI	FALAKE
1. Water supply and sanitation improvement	1. Housing improvement
2. Pig farming	2. Road improvement (Community center – conservation area)
3. Improvement of Women Saving Group activities	3. Sewing
4. Kava farming	4. Pig farming
5. Fish farming (freshwater)	5. Hydropower development

6. Tourism development	6. Kava farming
7. Butterfly farming	7. Post aid (simple clinic) construction
	8. Cacao farming
	9. Tourism development
	10. Floral farming
	11. Coconut farming

Detailed formulation processes of the Activity Plans mentioned above are described in the "Livelihood Improvement Detailed Activity Implementation Plan Komuniboli (Version 2)" and the "Livelihood Improvement Detailed Activity Implementation Plan Falake (Version 2)".

Due to the impact of the COVID-19 pandemic and other factors, the actual selection of activities did not follow the priority given in the table above, and the Project decided to support pig farming and chicken farming. See 2.2.3 for details.

(5) Obtain community's endorsement for Land Use Plan and SFRM Activity Implementation Plan

The Land Use Plan (first version) developed by community members mentioned above in section 1) was ultimately prepared as a large size digital map. It was officially handed over to the both communities at a handover ceremony held in March 2020. Prior to the hand over, the final plan was explained to all four clans existing in Falake and their consent was obtained.

The first version of the Sustainable Forest Resource Management Implementation Plan was endorsed by both communities, with the signatures of the community committee chairpersons in May 2020. However, the implementation schedule was revised due to COVID-19 and a revised plan was endorsed with signatures in August 2020.

Furthermore, the first version of the Livelihood Improvement Activity Detailed Implementation Plan, which consisted mainly of the Agroforestry Implementation Plan, was finalized in June 2020 and endorsed in Komuniboli in July 2020 with the signature of the communtiy commmittee chairperson. Regarding Falake, the first version of the plan was finalized and endorsed by the community in July 2020. After that, second versions of the plans, which included Other Livelihood Improvement Activities and a provision that the communities be responsible for conducting all of the livelihood improvement activties, was prepared for Komuniboli in August 2020 and for Falake in September 2020. These second versions of the plans were endorsed by both communities in September 2020.

(6) Facilitate formation and enhancement of community organization.

As stated in the "Community Profiling and Socio-economic and Gender Analysis Report", with the implementation of the socio-economic analysis survey by this project, the momentum for the formation of a management organization for the entire community, including the implementation structure for this

project, has increased in each community, and by the beginning of 2020, the community committees and sub-committees were organized in each community with the commitment of the Project. Despite the fact that there is a slight difference by community, the committees consist of i) a chairperson ii) vice chairperson, iii) secretary, iv) vice secretary, v) treasurer, vi) vice treasurer, and vii) committee members (seven persons in Komuniboli only).

Meanwhile, the sub-committees were organized as follows: in Komuniboli, i) Works, ii) Accommodation, iii) Stock, and iv) Village Management; and in Falake, i) Planted Forest, ii) Natural Forest, iii) Agroforestry, and iv) Livelihood.

However, with the Leadership Training conducted in October 2020, the composition of sub-committees was reviewed and modified in each community. The most significant modification is that the former sub-committees (sectors) were replaced by six new ones: i) Social Services, ii) Culture and Law Enforcement, iii) Faith, iv) Youth, v) Women, and vi) Economic Development. The three components/sub-components of the Project — Forest Management, Agroforestry, and Other Livelihood Improvement Activities — are to be placed under the Economic Development Sub-component. This new composition was applied in both communities despite slight differences between them. The selection of the community committee and sub-committee members took place, with the roles and responsibilities of each sub-committee and their members also determined. Progress reports summarising the above processes are indicated in Annex 22 and Annex 23.

2.2.3 Support and Facilitate the Implementation of the Plans by the Communities

(1) Provide technical guidance and training for strengthening the management of the community organization.

As part of community organization strengthening and in preparation for full-scale Pilot Activities, leadership-focused training was conducted at both Pilot Sites with the participation of MOFR staff. The main training was conducted by discussion style, and lessons for the future were learned in the actual review of community organizational structures, as well as the improvement of financial skills.

Table 2-25 Overview of Training

Theme	Date	Number of participants	Main content	Remarks
Leadership (Komuniboli)	14-15 October 2020	Around 20	Leadership and facilitation of organization	MOFR 8 officers Lecturer was commissioned by Solomon Islands Development Trust
			Organization's risk diversification	
			Accounting management, such as cost sharing, revenue distribution and community stock fund	

Leadership (Falake)	19-21 October 2020	Around 20	Leadership and facilitation of organization	MOFR 8 officers Lecturer was commissioned by APSD Rural Training Centre
			Organization's risk diversification	
			Accounting management, such as cost sharing, revenue distribution and community stock fund	

(2) Provide technical guidance and training for forest management.

In order for communities to voluntarily manage their forests, it is essential to improve logging and milling techniques to add value to the timber in order to take it to the market. For this reason, training in logging and lumber technology was conducted at both Pilot Sites with the participation of MOFR staff. Additionally, a training course on safety management in forestry was also conducted to raise awareness of safety, considering that the lumber industry has a high rate of industrial accidents. The training will help improve the efficient felling skills of community residents and, safety equipment was procured for each community for safety management.

Table 2-26 Overview of Training

Theme	Date	Number of participants	Main content	Remarks
Logging and Lumbering Technology (Komuniboli)	5-8 October 2020	Around 20	Administrative procedures utilization for felling permission, useful and allowed tree species	MOFR: 7 officers Lecturer was commissioned by Solomon Islands Timber Processors and Exporters Association (VATA)
			Safe felling methods and logging exercises	
			Safe saw milling work	
			Efficient lumbering method for timber markets, timber drying and shipment	
Logging and Lumbering Technology (Falake)	2-6 November 2020	Around 20	Administrative procedures utilization for felling permission, useful and allowed tree species	MOFR: 4 officers Lecturer was commissioned by Solomon Islands Timber Processors and Exporters
			Safe felling methods and logging exercises	
			Safe saw milling work	

			Efficient lumbering method for timber markets, timber drying and shipment	Association (VATA)

(3) Provide technical guidance and training for agroforestry.

Technical guidance and training related to agroforestry during the Project period are shown in Table 2-28. Technical guidance and training provided not only for the implementation of the Agroforestry Implementation Plan, but also for the preparation for the plan, are shown in the table. In addition to training for the communities, training conducted for MOFR officers who are in a position to provide technical guidance to communities is also included in Table 2-27.

Table 2-27 Technical Guidance and Training Related to Agroforestry for MOFR Officers

Theme	Date	Number of participants	Main content	Remarks
Basic Agroforestry	18 September 2019	5	• Basic knowledge of agroforestry • Agroforestry practices supported by donor agencies • Current practices and perception of agroforestry in the pilot communities	PPT presentation (Annex 48)
Development of Agroforestry Implementation Plan	18 March 2020	6	• Steps for developing the plan • Items and content of the plan	PPT presentation (Annex 49)
Recordkeeping Related to Agroforestry	28 August 2020	9	• Recordkeeping methods to calculate and analyse cost and revenue	Online training PPT presentation (Annex 50)
Effect of Burning in Site Preparation	9 December 2020	12	• Effects of burning above-ground biomass in site preparation	Online training PPT presentation (Annex 51)
Monitoring & Evaluation Plan (including other livelihood improvement activities)	21 August 2021	10	• Concept of monitoring and evaluation • Items and methods of monitoring and evaluation	Online training PPT presentation (Annex 61)
Agroforestry Monitoring	24, 27 May 2022	2	• Practice and facilitation of agroforestry monitoring and evaluation	OJT

Table 2-28 Technical Guidance and Training Related to Agroforestry for the Communities

Theme	Venue	Date	Number. of participants	Content	Remarks
Basic Agroforestry	Komunibo li	5 September 2019	Around 30	• Basic concept of agroforestry • Examples of agroforestry practices in the Solomon Islands • Benefits of agroforestry	
	Falake	6 September 2019	Around 20		
Baseline Survey on Agroforetsry	Komunibo li	11 September 2019	Around 20	• Concept of baseline surveys • Practice in implementation of surveys	
	Falake	13 September 2019	Aruond 15		
Development of Agroforestry Implementation Plan	Komunibo li	3-4 March 2020	Around 20	• Process of development of implementation plan • Site selection and measurement • Tree and crop selection • Development of layouts • Management structure • Benefit sharing methods • Risk management	
	Falake	11-12 March 2020	Around 20		
Timber Harvesting and Milling	Komunibo li	5-8 October 2020	Around 20	• Harvesting methods for useful timber tree species • Milling methods	Conducted as the Timber Utilization Training
	Falake	2-6 November 2020	Around 20		
Agroforestry Record Keeping	Komunibo li	2020/10/15 -15	Around 20	• Agroforestry recordkeeping	Conducted by C/Ps and local staff
	Falake	2020/10/21 -22	Aruond 20		
Effects of Burning in Site Preparation	Komunibo li	13 November 2020	Around 20	• Effects of burning above-ground biomass in site preparation	Conducted by local staff
Pest & Disease Control	Komunibo li	15 April 2021	Around 20	• Major pests and diseases in Solomon Islands • Biosecurity and trade	Conducted in collaboration with the Ministry of Agriculture and Livestock (MOAL). Two MOFR officials
	Falake	4-5 May 2021	Around 20		

					attended the training in Komuniboli and four in Falake.
Pruning and Grafting of Fruit Trees	Komuniboli	21-22 October 2021	Around 20	• Pruning guava and cacao trees • Theory and practice of grafting	Conducted in collaboration with MOAL.
Agroforestry Monitoring	Komuniboli	25 May 2022	Around 20	• Implementation of monitoring • How to use monitoring results for future planning	One MOFR official attended the training in Komuniboli and two in Falake.
	Falake	30-31 may 2022	Around 30		
Follow up of Financial Record Keeping	Komuniboli	25-26 May 2022, 8 June 2022	2 AF Sub-committee members	• Checking and revising recording methods	
Accounting Training	Falake	8 July 2022	Around 20	• Basics of accounting • Financial recordkeeping methods	
	Komuniboli	12 July 2022	Around 20		
Agroforestry Evaluation	Falake	21-22 July 2022	Around 20	• Implementation of evaluation	One MOFR official attended the training in Komuniboli and two in Falake.
	Komuniboli	25-26 July 2022	Around 20		

(4) Provide technical guidance and training for wood product and NTFP

Technical guidance and training related to wood products and NTFPs during the Project period are shown in Table 2-29 and Table 2-30.

Table 2-29 Technical Guidance and Training Related to Wood Products and NTFPs (for MOFR)

Theme	Date	Number of participants	Main content	Remarks
Promotion of NTFPs and Value Added Forest Products	27 January 2021	4	• Capacity development of Technical Support Committee (TSC) members on NTFPs and value added forest products • Preparation for field survey on NTFP and value	PPT presentation
	28 January 2021	5		

			added forest products	
	15-16, 18-20 February 2021	3	• Field survey	PPT presentation

Table 2-30 Technical Guidance and Training Related to Wood Products and NTFPs (for Communities)

Theme	Venue	Date	Number. of participants	Content	Remarks
Production of NTFPs and value added forest products	Komunibo li	15-16 January 2021	Around 20	• Field survey to study NTFPs and value added forest products	
	Falake	18-20 January 2021	Around 20		

(5) Provide technical guidance and training for other livelihood activities.

1) Pig farming

Under the circumstances of COVID-19, the Project proposed that pig farming be prioritized in both communities as the first activity from the potential activities compiled in the Pilot Activity Implementation Plans, and obtained consent of the Project's Technical Support Committee (TSC) members as well as the communities. The reasons for this proposal were as follows:

i) It had high priority in both communities (Komuniboli: 2nd; Falake: 4th);
ii) Many beneficiaries are expected (almost all households wish to participate);
iii) The activity can be initiated at relatively low cost;
iv) A quick profit can be expected (in six to nine months) (thus contributing to increasing or maintaining the motivation of community members);
v) The technical limitations are low, as most households have experience in pig farming — although many items need to be improved;
vi) There are no problems in the pork market (self-consumption is also possible);
vii) The accumulation of experience and institutional development regarding various aspects are greatly expected (e.g. collaboration with external organizations, training implementation, interest/activity group organization, procurement of materials and equipment, technical follow-up/farmer-to-farmer dissemination, revolving fund establishment and management, marketing, monitoring, and review/ evaluation).

From the perspective of future sustainable management of activities, the item of 'vii)' above was the most important reason for selection among the above seven points.

For the preparation of the pig farming training, two staff members from Livestock Production and Veterinary Services Department, Ministry of Agriculture and Livestock (MOAL), were contracted to be trainers. The training content was developed with assistance from the trainers.

Table 2-31 Technical Training Related to Pig Farming (for Communities)

Theme	Venue	Date	Number. of participants	Content	Remarks
Pig farming	Komuniboli	23-27 November 2020	Around 20	1. Lecture ● Animal and community, animal welfare, introduction and history of pig keeping in the Solomon Islands ● Pig husbandry, system of pig keeping, breeds types, general welfare and care, housing design, farrowing management ● Nutrition, feed formulation, farm records, disease and parasites of pigs 2. Field practice ● Animal handling, restraining, castration, how to treat pigs against both internal and external parasites, slaughtering	PPT presentation
	Falake	30 November - 3 December 2020	Around 20		

The Project also coordinated the participation of the C/Ps in the training (the cumulative total number of C/Ps was 10) and they were given opportunities for learning on training management, approaches to the local people, participatory methods, and technical dissemination. The presentation files introduced in the training are attached in Annexes 54-58.

2) Chicken farming

As the second activity for the Other Livelihood Improvement Activities Sub-component, support for chicken farming was provided to each Pilot Site. As background, the youth group (Youth Development Sector) in Komuniboli and the women's group (Women Development Sector) in Falake play a central role. Further, after each group started construction of chicken houses through their own efforts for the purpose of creating a platform for collective activities and a source of income for each group, the groups made requests to the Project for the support of necessary materials. The Project decided to support the activity by judging its appropriateness and superiority from the following points:

i) For those who plan to participate in the activity, chicken farming is not a new activity, but rather is a livelihood activity that until now has been customarily carried out, and so there is some foundation for knowledge;
ii) A quick profit can be expected (seven weeks for broiler chickens, four months for layer chickens);
iii) There are no problems with the market [within the communities, neighbouring communities, Auki (Falake), Honiara (Komuniboli), etc.];
iv) The activity can be activated and diversified and high profits can be expected through value additions such as the processing of chicken meat and eggs;
v) The activity can benefit almost all of the households in the communities;
vi) Many processes are included from the viewpoint of strengthening the organizational capacities of the communities (e.g. planning, training implementation, interest group (IG) organization, the procurement of materials and equipment, infrastructure development (chicken house construction), activity implementation, and monitoring/review);
vii) Supporting the autonomous activities of youth and women's groups will not only improve the capacity of each group, but also have a positive impact on the empowerment of the entire community. Moreover, it is considered to be very significant not only from the viewpoint of the pilot activities but also from the perspective of ensuring the sustainability and further development of sustainable forest resource management after the completion of the project.

As in the case of pig farming, the items of 'vi)' and 'vii)' above were the most important reasons for selection from the perspective of achieving the goals of the pilot activities in addition to the perspective of future sustainable management of the activity.

As with the pig farming training, the chicken farming training was delivered by a staff member of the MOAL's Livestock Production and Veterinary Services Department. Participants in the training were not limited to members of the youth and women's groups, but included all community members and households interested in chicken farming, so there were a number of participants in both communities.

Table 2-32 Technical Training Related to Chicken Farming (for Communities)

Theme	Venue	Date	Number. of participants	Content	Remarks
Chicken farming	Komuniboli	27-28 April 2022	Around 30	1. Lecture ● Planning of chicken farming, raising techniques, feeding, management, etc. 2. Field practice ● Chicken house construction 3. Preparation of list for necessary items, etc.	PPT presentation
	Falake	16-17 May 2022	Around 45		

The materials used in the training are as shown in Annex 59 and Annex 60.

2.2.4 Monitor and Evaluate the Pilot Activities from the Viewpoint of Their Contribution to SFRM

Out of the pilot activities, the SFRM activity was managed by the Long-Term Experts and the livelihood improvement activities including agroforestry were managed by the Short-Term Experts. Hence, only the monitoring and evaluation of agroforestry and other livelihood improvement activities were reported below.

(1) Develop a M&E Implementation Plan for the monitoring and evaluation of Pilot Activities.

1) Develop an M&E Implementation Plan for Agroforestry

Regarding the agroforestry Pilot Activity, it was planned that the monitoring and evaluation would be conducted by members of the pilot communities with facilitation by MOFR. A basic idea of the monitoring was to check the progress of activities in comparison to the Agroforestry Implementation Plan. Therefore, the main monitoring items were the mostly same as those of the plan, as shown in the table below. In addition, four types of monitoring forms (Figure 2-37 to 43) were developed to compile monitoring results as indicated in the remarks column in the table below.

Table 2-33 Monitoring Items and Monitoring Forms

Item	Data	Means/Tool	Remarks
Site selection	Location, boundary	• Drone • GPS	Conducted as part of forest management monitoring

Layout	Species of trees/fruit trees, species-wise number of plants planted, survival rate, growing conditions	• Field observation • (Tablet)	Monitoring Form-1
Work plan	Status and timing of activities conducted	• Discussion • Checking records • (Table)	Monitoring Form-2
Input	Cost for establishment and management	• Checking records • Discussion	Monitoring Form-4
Management	Challenges and issues on management	• Discussion	Monitoring Form-3
Benefit sharing	Harvest, sales, usage of profits, rate of benefit sharing	• Checking records • Discussion	Monitoring Form-4

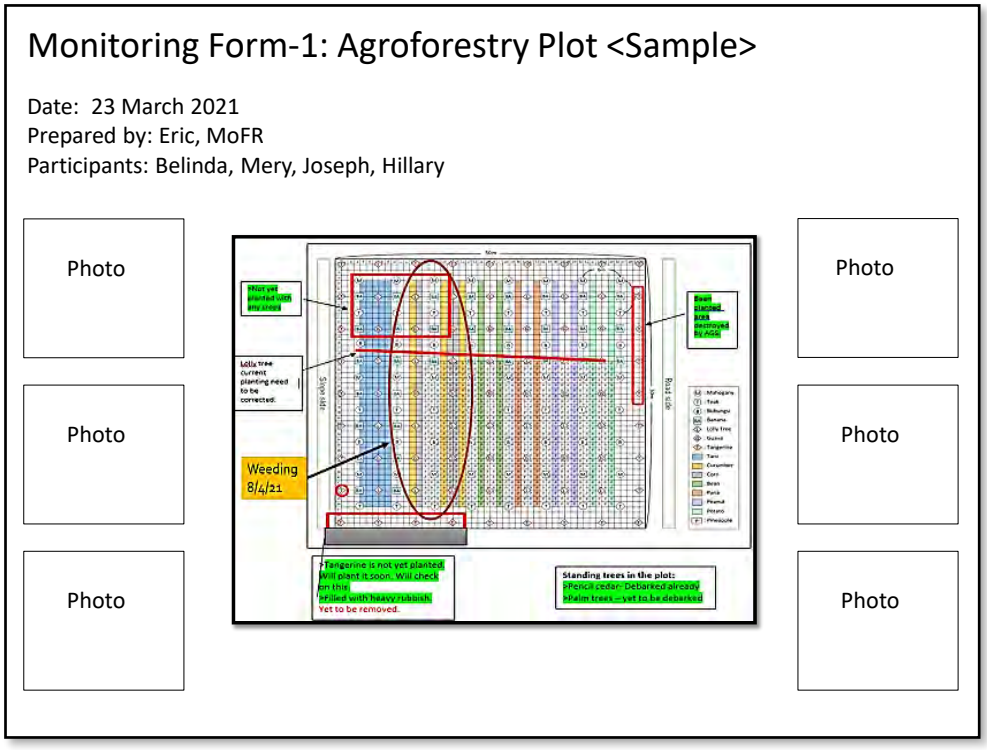


Figure 2-37 Monitoring Form-1 (Sample)

Monitoring Form-2: Progress & Condition <Sample>

Date: 23 March 2021
Prepared by: Eric, MoFR
Participants: Belinda, Mery, Joseph, Hillary

Crop/ Tree	Plan (23/4/2021)	Actual (Activities & Condition)	Remarks (Reasons for gap/ Findings)	Way forward
Cucumber	- Planting and weeding in April	- Weeding done on Apr 8 - Planting not yet		- Planting within April
Taro	- Weeding - Harvesting in June	- Weeding done on Apr 8		- Continue weeding until harvesting in June
Guava	- Weeding - Pruning in May	- Weeding done on Apr 4		- Pursue accessing secateurs in Apr and do pruning in May
Teak	- Beating up in Apr	- Yet to collect seedling for beating up		- Belinda will get a seedling from GPPOL nursery on Apr 20

Figure 2-38 Monitoring Form-2 (Sample)

Monitoring Form-3: Major Challenges <Sample>

Date: 23 March 2021
Prepared by: Eric, MoFR
Participants: Belinda, Mery, and about 20 community members

Topic	Challenges	Measurements
Participation	• Youth members have not participated AF activities. • Youth members highlighted that schedule was not exposed or advertised to community members.	• AF sub-committee will draw a schedule and advertise, and share during community gathering.
Record keeping	• Record keeping is still inconsistent. • Community members still depend on AF sub-committee chairlady.	
Pest & Animal attack	• The threat of GAS was extreme in the AF plot. Particularly, cucumber, peanut, and potato were severely damaged. • Wild pig destroyed 24 mounds of potato.	• Blitzem (pesticide) provided by the project will be applied. • Replace with resistant crops against GAS

Figure 2-39 Monitoring Form-3 (Sample)

Monitoring Form-4: Cost & Benefit <Sample>

Monitoring Period: 27/10/2020 – 21/1/2021

■ Production Cost & Sales (Financial input & output)

Item		Cash In	Cash Out	Balance	Remarks
Production Cost	Material Cost		1,071		Tool, Petrol, Transportation
	Labor Cost		1,096		Food for work in AF plot
	Total		**2,167**		
Sales	Timber	500			@$10 x 50 pieces (6"x1")
	Crop	135			Bean: @$5 x 20, Corn:@$35x1
	Total	**635**			
Balance (Sales - Production Cost)				**-1,532**	
Borrowed from Fund		1,937		405	Cash in hand

■ Materials & Domestic Use (Material input & output)

Item	Description	Remarks
Materials	• 3 tangerine seedlings for beating up • Chicken manure and charcoal for soil improvement	
Harvest for domestic use	• 3 pieces of timber for community hall renovation • 5 bundles of firewood shared among community members	

Figure 2-40 Monitoring Form-4 (Sample)

It was planned for agroforestry to be evaluated from the aspects of whether the agroforestry Pilot Activity was worth conducting and the strong and weak points of agroforestry compared with gardens and tree plantations. Five evaluation criteria developed by the Development Assistant Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD) were adopted and specific evaluation items and questions were developed, as shown in table below. The table was also developed as an evaluation form.

Table 2-34 Agroforestry Evaluation Items and Evaluation Form

Criteria	Evaluation Question	Description	Evaluation*
Relevance	• To what extent have the objectives of AF training plot indicated in the AF Implementation Plan achieved? • To what extent may AF contribute to realization of SFRM?		
Efficiency	• Does input and out put balance in terms of cost, time, and labor?		
	• Comparing with garden/tree plantation, does AF require much input in terms of cost, time, and labor?		
Effectiveness	• Comparing with garden/tree plantation, what kind of strengthen and weakness does AF have in terms of land use, product, productivity, pest problems, etc.?		
Impact	• What kind of positive impact has AF bought?		
	• What kind of negative impact has AF brought?		
Sustainability	• Do you want to expand the AF plot or develop a new AF plot?		
	• Do you have any plan to apply AF practice on your garden or forest plantation?		

Note: In the “Evaluation” column, the level of achievement, i.e. “high”, “medium”, or “low” is indicated.

2) Develop an M&E Implementation Plan of the Other Livelihood Improvement Activities

Monitoring of pig farming, the first activity under Other Livelihood Improvement Activities, was planned to be carried out by the community under the facilitation of C/Ps from MOFR and Project staff. In addition, the staff of the MOAL’s Livestock Production and Veterinary Services Department is also to be invited to the monitoring every two to three months to provide the Pilot Sites with technical follow-up.

In formulating a detailed monitoring plan, consideration was given to developing a simple system by minimizing the number of monitoring items as much as possible on the premise that monitoring will be carried out by the interest group (IG) members. The monitoring items are as shown in the table below:

Table 2-35 Monitoring Items and Forms for Pig Farming

Item	Data	Means/Tool	Remarks
No. of pigs	• Current number	• Observation	Monitoring Form-2.

	• Numbers that changed by reason (gained, eaten, given to others, sold, death, missing)	• Record check / interviews	
Growth conditions	• Body size (length) • Body size (heart girth)	• Measurement	• The data for each pig shall be recorded on the Monitoring Form-1. • The averaged data shall be recorded on the Monitoring Form-2. • The data are used to estimate the body weight
Use	• Amount of meat (consumed, given to others, sold) (kg) • Income gained from sales	• Record check / interviews	Monitoring Form-2
Cost	• Feed • Medication • Others	• Record check / interviews	Monitoring Form-2
Problems / challenges	• Problems • Challenges • Remarks	• Record check / interviews • Discussion	Monitoring Form-2

In accordance with the monitoring items listed above, monitoring forms on which each monitoring result shall be recorded were developed (Figure 2-41 to 44). The content of the monitoring forms and method of how to record the data/information were explained to the IG members, with the forms handed to the representatives of the IGs.

Monitoring Form for Pig Farming - 1

Community: _____ Purpose: Fattening / Breeding

Pig No.	Aug 21		Sep 21		Oct 21		Nov 21		Dec 21		Jan 22		Feb 22		Mar 22	
	Length (cm)	Heart girth (cm)	Length (cm)	Heart girth (cm)	Length (cm)	Heart girth (cm)	Length (cm)	Heart girth (cm)	Length (cm)	Heart girth (cm)	Length (cm)	Heart girth (cm)	Length (cm)	Heart girth (cm)	Length (cm)	Heart girth (cm)
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
Ave.																
Ave. weight																

Figure 2-41 Monitoring Form for Pig Farming - 1

Monitoring Form for Pig Farming - 2

Community: _____ Purpose: Fattening / Breeding

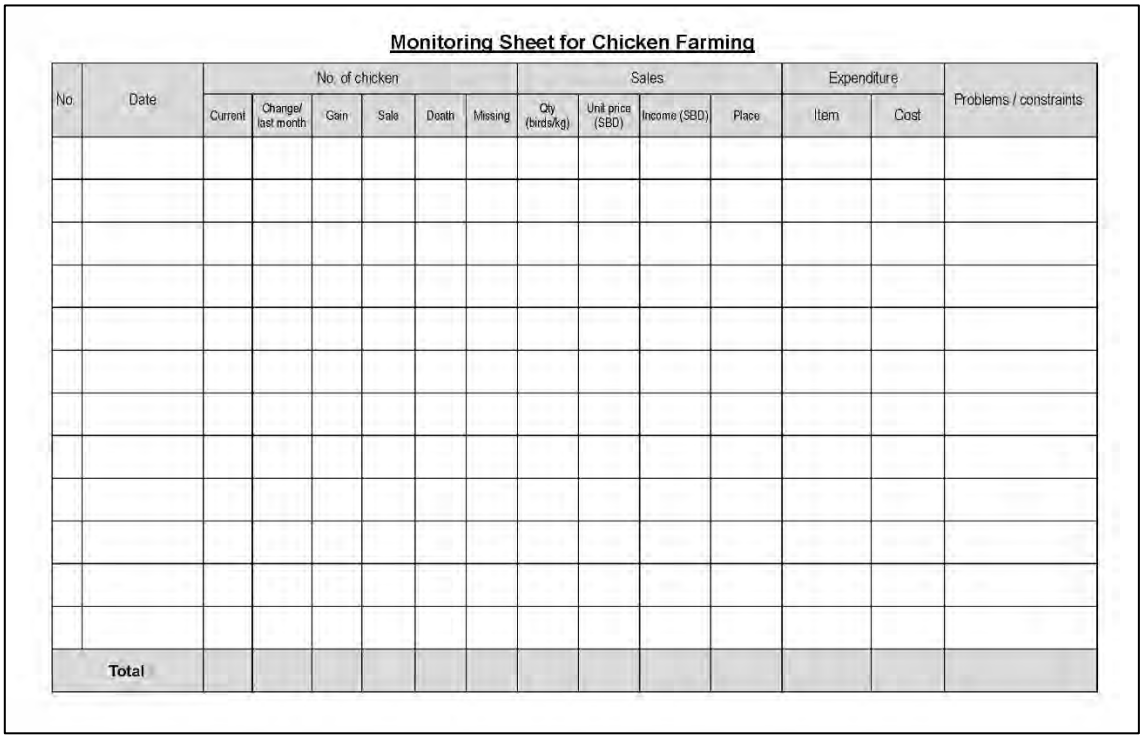
Date	No. of pigs							Body weight (Ave.) (kg)	Use				Cost (SBD)			Problems / challenges & Remarks
	Current	Gain	Eat	Give	Sale	Death	Missing		Home consumption (kg)	Give (kg)	Sale (kg)	Income (SBD) (in case of sale)	Feed	Medication	Others	
Total																

Figure 2-42 Monitoring Form for Pig Farming - 2

On the other hand, it was determined that the monitoring of chicken farming, would be carried out on the initiative of the IGs, as in the case of pig farming. The monitoring items are indicated in the table below. Regarding the monitoring form, when a simple monitoring format was designed based on the same viewpoint as pig farming, only the form shown in Figure 2-43 was developed.

Table 2-36 Monitoring Items and Monitoring Forms for Chicken Farming

Item	Data	Means/Tool	Remarks
No. of birds	• Current number • Numbers that changed by reason (gained, eaten, given to others, sold, death, missing)	• Observation • Record check / interviews	Monitoring Form
Use	• Amount (no. of birds or kg) • Unit price for sales • Income gained by sales • Sales location	• Record check / interviews	Monitoring Form
Cost	• Item • Cost	• Record check / interviews	Monitoring Form
Problems / challenges	• Problems • Challenges • Remarks	• Record check / interviews • Discussion	Monitoring Form



Monitoring Sheet for Chicken Farming

No.	Date	No. of chicken						Sales				Expenditure		Problems / constraints
		Current	Change/ last month	Gain	Sale	Death	Missing	Qty (birds/kg)	Unit price (SBD)	Income (SBD)	Place	Item	Cost	
Total														

Figure 2-43 Monitoring Form for Chicken Farming

Regarding the assessment, since the actual pig farming activity (pig house construction) was initiated in June 2021 about one year before the end of the Project, the term “review” was applied because it focused on assessing the progress of the activity rather than drawing out the recommendations and lessons learned, which were the original purposes of the “evaluation”.

Therefore, the criteria of the review are not the five items of the DAC evaluation system. Rather, three out of the five items — relevance, effectiveness and efficiency (cost-effectiveness) — and three items from the perspective of assessing the implementation process — objectives, performance, and external factors — were selected for the review. The review form in the table below was formulated by setting the minimum necessary questions according to each criterion.

Regarding chicken farming, it was decided to conduct only monitoring in consideration of the period from the start of the activity to the end of the Project. It was not a subject of the review.

Table 2-37 Review Form for Pig Farming

Criterion for assessment		Question	Level			Description/ Explanation
			A	B	C	
1	Objectives	What were the original/primary objectives of this activity?	NA			
		Are the primary objectives still appropriate? Are there other objectives?				
		What do you expect by participating in this activity?	NA			
		What should the future objectives be?				
2	Relevance	Is the activity appropriate to achieve the objectives?				
		If not, what are the alternative options?	NA			
3	Performance	Are the time allocation and schedule for the activity efficient?				
		Are the methods (tools, approaches, etc.) applied for implementation of the activity appropriate?				
		Is the activity carried out according to principles of good practices (equity, culture, gender, etc.) in the community?				
		To what extent have the information sharing/ exchanges been made amongst the local participants, and between the IG members and other villagers?				
		What problems/constraints have arisen?	NA			
		How were the problems/constraints dealt with/ overcome?	NA			
		What improvements should be made to the performance of the activity in the future?	NA			
4	Effectiveness	To what extent have expected outputs been achieved? If there is no output achieved, what are the reasons?				
		How satisfactory was the training for the stakeholders?				
		Is there any more training necessary for the participants to make the activity more effective? If yes, what kind of training areas?	NA			
5	Efficiency (Cost-effectiveness)	Was the cost of the activity reasonable for what it achieved?				
		Would it be possible to achieve the same outputs at less cost? If yes, what should be done?	NA			
		How realistic would it be to replicate the work, incorporate it in government projects/programs or make it self-financing?	NA			

6	External factors	Are there government/or policy changes?	NA	
		Are there economic and social changes?	NA	
		Are there changes in the policy and practice of the donor (JICA)?	NA	

Note: Level A: high/outstanding; B: intermediate; C: low/abysmal

The review was planned to be conducted in a participatory manner by the concerned stakeholders including the IG members, who are the main actors of the activity, the C/Ps from MOFR, Project staff, and the staff of the MOAL's Livestock Production and Veterinary Services Department.

3) Develop an M&E Implementation plan for the Land Use Plan

Land use change related to agroforestry and sustainable forest management were to be documented using drones to capture and record the situation. A review of land use was planned using a poster on land use change. The poster showed the updated land use map, the latest satellite imagery, and the drone time series images described above to understand current land conditions and land use changes against the future Land Use Plan.

(2) Support periodic monitoring and evaluation of MOFR

1) Agroforestry

The progress of agroforestry Pilot Activities, including preparation for planting materials, has been monitored in comparison to the Agroforestry Detail Implementation Plan since the beginning of plan implementation. After the development of the M&E Implementation Plan mentioned above, MOFR was given guidance on the concept and importance of monitoring and evaluation, and the items and implementation methods thereof, through the online training and OJT. Subsequently, according to the M&E Implementation Plan, monitoring and evaluation were conducted from May 2022 to July 2022 on the initiative of MOFR and the pilot communities.

2) Other Livelihood Improvement Activities

In the Other Livelihood Improvement Activities, as in the case of agroforestry, after the M&E Implementation Plan was developed, MOFR staff members were given guidance on how to carry out monitoring and evaluation (review). Actual onsite monitoring has been carried out almost monthly by the C/Ps from MOFR and Project staff, except during times when access to the community was restricted due to the spread of COVID-19 infections. A staff member (the Deputy Director) of the MOAL's Livestock Production and Veterinary Services Department, who was in charge of technical training, was also commissioned to participate about once every three months, and conducted follow-up training to promote the establishment of technology transfer.

The review was conducted jointly with the IG members of each Pilot Site from June to July 2022, with Project staff supporting the C/Ps from MOFR based on the M&E Implementation Plan. The Deputy Director of the MOAL's Livestock Production and Veterinary Services Department also participated in the review at Komuniboli.[17]

(3) Analyze the results of monitoring and evaluation

1) Agroforestry

The results of the monitoring conducted at each Pilot Site since the formulation of the Agroforestry Detail Implementation Plans were compiled in monitoring formats developed in the M&E Implementation Plan and analysed. The main points of the results of the analysis are shown in Table 2-38.

Table 2-38 Main Points of Agroforestry Monitoring

Pilot Site	Main Point of Analysis of Monitoring Results
Komuniboli	• The agroforestry plot was very well-established and maintained. • Trees and fruit trees were surviving in accordance with the plan and grew well, except for tangerine. • Short-term crops have been changed in terms of items and planting locations in accordance with ground conditions. • The community had been facing various natural and social challenges, including damage by insects and wild animals such as the giant African snail and wild pigs. In addition, participation was stagnant. However, in each case the community has addressed the problems with support from the Project and MOAL. • Agricultural crops harvested from the agroforestry plot were sold within the community and at the central market in Honiara. Some portion of the sales was used to establish a canteen. According to the monitoring results as of May 2022, total revenue was SBD 6,188 and total expenditures were SBD 4,607. (However, these included borrowing from the community fund and a loan to the canteen.) • Some crops harvested from the plot were supplied to community members who participated in agroforestry activities and religious events. The economic value of these crops was SBD 825 (according to records from August 2020

[17] Although the Project requested that he participate in the review at the Falake Pilot Site, he could not do so due to another engagement.

	to April 2022). Community members realized that this is one of the benefits of agroforestry, since each household needed to offer crops to religious events in the past.
Falake	• Although the number of trees and fruit trees was less than that indicated in the implementation plan, both plots were well established and maintained overall. • In Agroforestry Plot 1, the survival rate of trees was about 80% and that of fruit trees was about 60%. Growing conditions varied depending on the plant. • In Agroforestry Plot 2, 72% of mahogany trees were thinned and only one durian tree out of nine planted was surviving. • Regarding short-term crops, the crop type and location of each crop type have changed in accordance with plot conditions. As a result, the layouts of short-terms crops in both plots were simpler than the originally planned. • Although the community has encountered various natural and social challenges, such as water-logging, the existence of rocks and stones, inappropriate behaviour (such as stepping on crops), community members discussed the challenges among themselves and took measures against them. • Crops harvested from the plots were sold within the community only. Some crops were consumed by community members who participated in agroforestry activities.

In addition to the aforementioned results of the monitoring conducted on the initiative of community members in each Pilot Site, the results of a questionnaire survey conducted on the initiative of the Long-Term Expert and from information provided by community members were compiled and analysed. The main point of the analysis are shown in the table below. Detail results of agroforestry evaluation at each community are shown in Annex 62 and Annex 63.

Table 2-39 Results of Agroforestry Evaluation

Criteria	Evaluation Question	Achievement Level	Description
Relevance	• To what extent were the objectives indicated in the	High	• The objectives of the agroforestry Pilot Activities identified by Komuniboli community were as follows: (i) income generation;

	Agroforestry Implementation Plan achieved? • To what extent may agroforestry contribute to the realization of sustainable forest resource management?		(ii) improvement of food security; (iii) improvement of knowledge and skills on agroforestry; and (iv) learn and practice effective land use methods to maximize benefits. The achievement of these were high except for (ii), in which case the achievement level was intermediate. • The objectives of the agroforestry Pilot Activities identified by Falake community were as follows: (i) trial of a alternative means for slash and burn agriculture; (ii) trial of a new method of planting trees and crops on the same land; (iii) income generation throughout the year; (iv) obtain long-, medium-, and short-term benefits; (v) save labor through agroforestry practice; (vi) produce timber without putting pressure on natural forests; (vii) create shade to protect crops and humans from strong sunlight; (viii) protect crops from strong winds that occur due to climate change; (ix) systematic tree and crop planting and maintenance, including recordkeeping of inputs and outputs; (x) study crops suitable for shade under trees; and (xi) examine effectiveness of soil improvement, including nitrogen fixation. The achievement of (i) – (iii) was recognized as “high”. Regarding (iv) – (x), the community recognized the

			advantages of agroforestry. Thus, the achievement of these objectives seems to be high overall. (However, regarding the objective (ix), recordkeeping has not been conducted sufficiently. The achievement of (xi) has not been confirmed.) • In contrast to slash and burn agriculture, agroforestry can be conducted continuously on the same land without moving from one place to another, producing valuable timber tree species without putting any pressure on natural forests. Thus, agroforestry can contribute to SFRM. • The depletion of valuable timber tree species was a concern in Solomon Islands, but seedling production methods and afforestation techniques on these species have not been developed. On the agroforestry plots managed by the communities, valuable timber tree species, such as akwa (*Pometia pinnata*) and baula (*Calophyllum* sp.), were planted using wild seedlings. This might contribute to the recovery of resources of indigenous valuable timber tree species.
Efficiency	• In contrast to garden or tree plantation, was agroforestry efficient in terms of time, labor, and cost?	Medium	• Both communities emphasised that agroforestry contributed to time saving, since they could maintain trees and crops at the same time without moving from one place to another. • Community members were

			unaware of any disadvantages to agroforestry, such as trees becoming an obstacle to weeding. • Since the agroforestry plots were established and managed collaboratively by community members, it was difficult to compare with gardens and tree plantations that were established and managed by individuals. • Records on production, income and expenditure were not kept well. Hence, the productivity and cost of agroforestry could not be analysed sufficiently. It was revealed, on the other hand, that it was difficult to ascertain the productivity of a plot over a specific period, since the types of short-term crops and the number of trees planted on the plot changed successively. Moreover, there were no data on the productivity of gardens or tree plantations only, so they could not be compared. From the aforementioned, it was concluded that it was difficult to grasp and assess quantitatively the "efficiency" of agroforestry.
Effectiveness	• What kind of advantages and disadvantages did agroforestry provide in contrast to garden or tree plantation (in terms of land	Medium	• In slash and burn agriculture, the land became degraded and unproductive for several years after harvesting crops. In agroforestry, on the other hand, it was possible to use the same land continuously. • Damages by pests like the giant African snail were observed in

	use, productivity, etc.)?		gardens at the same level as the agroforestry plot. • A member of Falake community, who individually began to practice agroforestry on his own plot, recognized that agroforestry had fewer pests and diseases, higher productivity, and better plant growth.
Impact	• What kind of positive and negative impacts did agroforestry provide?	High	• Community members improved their agricultural skills through the agroforestry Pilot Activities. • In Komuniboli, a canteen was opened using a portion of the sales of agroforestry crops, improving the convenience with which community members could procure commodities. • Komuniboli community members could obtain food from the agroforestry plot while their riverside gardens could not be used due to flooding. • Through the implementation of the agroforestry Pilot Activities, the communities improved their capacity to plan, implement collaborative work, and keep records to promote community activities. • Some members of Falake community individually established backyard gardens by using the knowledge acquired through the implementation of agroforestry activities and dung generated from piggery.
Sustainability	• Does the community have	High	• Komuniboli community began to establish a new plot and

	intention to enlarge the current agroforestry plot(s) or establish a new plot?		discussions were ongoing in Falake community about establishing a new plot. • Though only one member of Falake community individually established his own agroforestry plots, some members introduced an element of agroforestry into their own gardens. Moreover, community leaders intend to practice agroforestry on their own land. • Komuniboli community preferred to establish and manage agroforestry plots collaboratively, since households have not yet acquired sufficient skills for the individual establishment and management of agroforestry plots. • Sustainability was quite high since the communities established and managed their plots through their own effort, with little financial and material supports from the Project. • Komuniboli community obtained material support, including agricultural tools and materials, from the Guadalcanal provincial government. This implied that the community had the capacity of obtaining support from outside agencies.

2) Other Livelihood Improvement Activities

i) Pig farming

For monitoring of pig farming, in addition to the forms supported by the Project, another form was used, distributed by the staff of the MOAL's Livestock Production and Veterinary Services Department and related mainly to mating and farrowing. In reality, however, it is hard to say that the data and information have been collected properly and recorded according to these forms. However, it was confirmed that the IG representatives in charge of monitoring modified the monitoring forms and used their own notebooks to record the minimum data and information necessary for the daily management and examination of business plans. A summary of the monitoring results is shown in the table below:

Table 2-40 Summary of Pig Farming Monitoring Results

	Komuniboli	Falake
IG formulation	● An IG was formulated with members/households from all of the households (25) of the community. ● The committee members of the Other Livelihood Improvement Activities Sub-component, which is a higher-level organization, have been in charge of the management and operation of the Pig Farming IG. ● In June 2022, the decision was made to form the Pig Farming IG Committee and to nominate the committee members to revitalize activities. This arrangement was made because it had been indicated by the IG members that some of the current Other Livelihood Improvement Activities Sub-component committee members rarely participate in pig farming activities.	● An IG was formulated with members/households from all of the households (48) of the community. ● The committee members of the Other Livelihood Improvement Activities Sub-component, which is a higher-level organization, have been in charge of the management and operation of the Pig Farming IG. ● Since some IG members/households do not participate in the activities, membership will be scrutinized in the future.
Material procurement	● The Project provided the IG with materials (other than timber) for pig house construction, materials for the water supply system, piglets, and feed, among other things, from June to October 2021. ● Timber was procured from the forests managed by the Forest Management Component in each pilot site.	
Raising and management system	● A form of collective management was adopted in which each IG member/ household manages farming on a daily basis.	● A form of collective management was adopted in which each IG member/ household manages farming on a daily basis. ● A supervisor is appointed weekly to supervise the work of the IG member/ household in charge of daily activities.
Growth situation / raising and	● One pig died in February 2022 due to a suspected illness. ● First pregnancies of four sows were	● Six pigs died in December 2021. In these cases, an incident was suspected in which there was a high possibility of

management situation	confirmed, one of which farrowed in August 2022 and gave birth to 10 piglets. The remaining three sows are due to give birth in September.	food poisoning. As a measure to prevent a recurrence, strengthening night patrols and construction of a lookout hut-cum-warehouse are being promoted as part of a "hard" approach. Meanwhile, in the future, in order to prevent damage due to jealousy, etc., a "soft" approach, such as the creation of a dissemination base in collaboration with MOAL is also being considered to benefit the neighbouring communities. ● Two sows farrowed in August 2022 and gave birth to 19 piglets (two of which died postnatally).
Income and expenditure	● So far, three pigs have been sold for meat. Receivables were generated for SBD 6,485 due to credit sales, but there is no apparent loss due to compensation for the loss from the community fund (Forest Management Component). ● Income so far is SBD 9,842, expenditure is SBD 4,753, and the balance is SBD 5,089 (as of the end of June 2022).	● So far, two pigs have been sold for meat. ● Income so far is SBD 6,010, expenditure is SBD 3,390, and the balance is SBD 2,620 (as of the end of June 2022).
Future management policy	● Although the IG will continue collective management for the time being for the purpose of strengthening the business base and to keep focusing on breeding, at the same time fattening on a small scale will also be developed. ● Adoption of a revolving fund will be discussed in the future.	● The IG will continue collective management for the time being for the purpose of strengthening the business base and to keep focusing on breeding rather than fattening. ● Adoption of a revolving fund will be discussed in the future.
Balance outlook	● About 70% of the piglets that are born will be sold after lactation. ● By the end of this year (2022), the balance of funds will reach SBD 20,390, and it is expected that cash on hand will increase considerably.	● All the piglets that are born will be sold after lactation. ● By the end of this year (2022), the balance of funds will reach SBD 28,400, and it is expected that cash on hand will increase considerably.
Management rules and regulations	● Management rules and regulations, including the above management policy or business plans, have already been developed on the initiatives of the IG members (Annex 25 and Annex 26). The management rules and regulations cover: i) background; ii) management structure; iii) new membership for IG members; iv) day-to-day management; v) business plan; vi) sales; vii) revolving fund; viii) monitoring and IG meetings; ix) modification of rules and regulations; and x) termination of pig farming.	
	● Based on past experience, it is clearly stated in the sales section that credit sales are prohibited in all cases.	● To enjoy the benefits of being an IG member/household, an article clarified that if a pig is slaughtered and the meat is sold in the community, IG members can make a purchase by paying 10% of the pork price as a deposit and settling the balance will be settled within one week.

As mentioned earlier, the review of pig farming was conducted at each Pilot Site mainly by the IG members, with facilitation by the C/Ps from MOFR and Project staff. The Deputy Director of the MOAL's Livestock Production and Veterinary Services Department was also invited to participate in the review in Komuniboli. A summary of the review results is shown in the table below. For details on the review results at each Pilot Site, refer to Annex 24.

Table 2-41 Summary of Pig Farming Review Results

Criterion for assessment		Question	Level			Answer and/or comment
			A	B	C	
1	Objectives	What were the original/ primary objectives of this activity?	—			● There were more objectives mentioned than expected. In addition to the expected objectives of generating income and employment, providing quality meat, gaining knowledge and techniques, creating a revolving fund, and reducing pressure on use of forest resources, also mentioned were the provision of manure for agriculture and agroforestry and social status (feasting), among other things.
		Are the primary objectives still appropriate? Are there other objectives?	✓			● The primary objectives are still recognised as appropriate as of now. ● Other objectives include educating children through the use of "look-and-learn" in the activities, creating/increasing the cash flow of the community, creating an avenue for women to participate in such activities, creating an environment for working together, enhancing unity among community members and relationships with other communities.
		What should the future objectives be?				● Develop biogas and fish farming; produce processed meat; create facility for training purposes with MOAL, etc.
2	Relevance	Are the pig farming activities appropriate to achieve the objectives?	✓			● Pig farming is as of now still recognised as an appropriate measure to achieve the above objectives.
		If not, what are the alternative options?	—			● No particular ideas offered.
3	Performance	Are the time allocation and schedule for the activity efficient?	✓ (F)	✓ (K)		● Time allocation has been assessed as appropriate in Falake, while overlap with other activities (household work, community participation in schools, religion, other project activities) was pointed out in Komuniboli.
		Are the methods (tools, materials, approaches, etc.) applied for implementation of the activity appropriate?	✓ (K)	✓ (F)		● Methods have been mostly appropriate, while it was pointed out that safely tools had been lacking in order to carry out pig farming activities in Falake.

		Are the activities carried out according to principles of good practices (equity, culture, gender, etc.) in the community?	✓			● Most of the IG members in Komuniboli recognise that the activity have been carried out according to the principles of good practices. ● The IG members in Komuniboli greatly appreciate that all members (men, women, boys, girls, children, persons with physical challenges, the elderly) could participate in the activities.
		To what extent have the information sharing/ exchanges been made amongst the local participants, and between the IG members and other villagers?	✓			● In Komuniboli, the level of information sharing/exchanges was assessed as rather high. ● Komuniboli has experience in sharing information with people from outside of the community who have visited the community. ● Within Komuniboli community, even children have knowledge about how to use scales, the construction of pig houses, etc.
		What problems/ constraints have arisen regarding performance?	—			● Problems/constraints in Komuniboli include water shortages; no safety gear; participation (absences or delays in reporting); delays in pig house extension work; delays in collecting sales proceeds from credit sales; feed shortages; and pest attacks on feedstock. Countermeasures that have been taken so far include carrying water from wells; washing hands and legs; supervisors taking responsibility or duty member swapping/making arrangements with another; pinning up the names of those on credit on the notice board; use of whatever feed is available in stock; and the physical control of pests. ● In Falake, problems/constraints identified include absence from daily tending without informing the supervisor; insufficient management of breeding; and the death of pigs. Countermeasures included the substitution of tending by the supervisors and the construction of a security house.
		How were the problems/ constraints dealt with/ overcome?	—			
		What improvements should be made to the performance of the activities in the future?	—			● Ideas for improvement in activities in Komuniboli include upgrading the water supply system (a borehole with a pump using solar energy or electricity); the purchase of safety, protective, and other appropriate equipment/tools, e.g. gum boots, hand gloves, overalls, disinfectants and antiseptics, and scrubbing brush; following the management rules and regulations related to participation and scheduling; the use of pig farming funds to facilitate pig house expansion activity; following the management rules and regulations related to credit sales; ordering feed in advance; and building a separate rat-proof warehouse for feed storage. ● In Falake, consultation between individual

						IG members and supervisors on participation and abiding by the management rules and regulations were mentioned.
4	Effectiveness	To what extent have expected objectives been achieved? If there are no objectives achieved, what are the reasons?		✓		● The level of achievement of the expected objectives was assessed as intermediate. ● Due to the short period of activity implementation, it will take another two to three years to achieve the objectives.
		How satisfactory was the training for the stakeholders?	✓			● Outstanding outcomes were achieved.
		Is there any more training necessary for the participants to make the activity more effective? If yes, what kind of training areas?	—			● Training needs are diverse, and the following are listed as requests: financial literacy, an integrated farming system, biogas, fish farming, slaughtering and processing, animal nutrition, waste management, and feed production.
5	Cost-effectiveness	Was the cost of the activity reasonable for what it achieved?	✓ (F)	✓ (K)		● In Komuniboli, due to price increases for hardware materials, stocks, and feed that were provided by the Project, the cost-effectiveness was assessed as rather low. ● In contrast, in Falake, the cost-effectiveness was rather high due to community participation and community contribution.
		Would it be possible to achieve the same outputs at less cost? If yes, what should be done?	—			● Komuniboli IG members are unclear on this. ● Falake IG members consider it impossible, as the prices of materials always change.
		How realistic would it be to replicate the work, incorporate it in government projects/ programs or make it self-financing?	—			● In Komuniboli, IG members think that the activity can be replicated inside the community by raising the activity to a standard (meet the criteria) that the government projects can assist (financing, training, the provision of materials). ● In Falake, they consider it almost impossible because the government's structure/priorities are beyond the capacity of the community. It was also revealed that the community is willing to extend/replicate the activities to other communities, but does not have the capacity.
6	External factors	Are there government/ or policy changes?	—			● Neither community has any information or is clear on this.
		Are there economic and social changes?	—			● COVID-19 affects the scheduling of training, material procurement, and other activities necessary for pig farming production as well as marketing.
		Are there changes in the policy and practice of the donor (JICA)?	—			● Both communities have neither information nor idea.

Note: 1) Level A: high/outstanding; B: intermediate; C: low/abysmal
2) K: Komuniboli, F: Falake. Comments that do not specify the Pilot Site name are common to both Pilot Sites.

ii) Chicken farming

A monitoring form has been developed and handed to the IGs. In reality, however, there are few items to be recorded thus far, so data and information are collected through interviews with IG members when monitoring. Monitoring results are summarised as shown in the table below:

Table 2-42 Summary of Chicken Farming Monitoring Results

	Komuniboli	Falake
IG formulation	● An IG was formulated by the youth group.	● An IG was formulated by the women's group with assistance from youth.
Material procurement	● The Project provided the IGs with materials (other than timber) for chicken house construction in May 2022. ● Timber was procured from the forests managed by the Forest Management Component in each pilot site. ● Sawdust generated from the milling of timber produced by the Forest Management Component is used as litter. ● 100 chicks, feed, and other materials were provided by the Project in June 2022.	
Raising and management system	● A form of collective management was adopted, in which each IG member manages daily farming on a monthly basis.	● A form of collective management was adopted, in which each IG member manages daily farming on a batch (six to seven weeks) basis.
Growth situation / raising and management situation	● One chick died during transportation from the provider to the community. ● The growth situation has been good. ● 94 out of 99 chickens have been sold. Each chicken was sold for SBD 100, with a total income of SBD 9,400. ● In late July, 100 chicks and feed were procured for the second batch of fattening.	● Three chickens died during the tending period. ● The growth situation has been good. ● All the 97 chickens were sold. Each chicken was sold for SBD 100, with a total income of SBD 9,700. ● In mid-August, 100 chicks and feed were procured for the second batch of fattening.
Future management policy	● The policy is to continue the raising of broiler chicks by repeatedly purchasing broiler chicks and feed with the profits from the sales of broilers.	● The policy, for the time being, is to continue the raising of broiler chicks by repeatedly purchasing broiler chicks and feed with the profits from the sales of broilers. ● When layer chicks are available, the IG plans to shift to a system of raising both broilers and layers at the same time.
Management rules and regulations	Management rules and regulations including the above management policy or business plans were prepared on the initiatives of the IG members, with reference to the pig farming management rules and regulations (Annex 36 and Annex 37).	

(4) Report the results of monitoring/evaluation to MOFR and community

1) Agroforestry

The monitoring results were occasionally shared with MOFR officials at TSC meetings when monitoring was conducted. In addition to these, the compiled and summarized monitoring results on the monitoring forms indicated in the M&E Plan were reported to MOFR and the pilot communities, Komuniboli and Falake, at the end of the Project in May and June 2022.

The communities showed great interest in the monitoring results, especially in changes to crop-wise situations from the procurement of planting materials to the growth conditions at time of the latest monitoring. They were also interested in the results of cost- benefit analysis. One of the Falake community members pointed out that such kinds of financial monitoring should be conducted not only in the agroforestry Pilot Activities but also in other Pilot Activities. Furthermore, he commented that it could be adapted to financial management at the household level. Details on the monitoring report to each community and MOFR are shown in Annex 62 and Annex 63.

Regarding evaluation, it was conducted in July 2022 with MOFR and the communities, while confirming and sharing the results of each item of evaluation.

2) Other Livelihood Improvement Activities

As with the case of agroforestry, the results of previous monitoring have been reported to MOFR from time to time at the TSC meetings. At the end of the Project, the summarised results of the monitoring conducted thus far, together with the review results, were shared with the C/Ps from MOFR at the TSC meeting held in July 2022 (Annex 65).

Since the monitoring has been conducted with the full engagement of the IG members and the review was organized with their participation, a special opportunity to report these results to the community was not arranged.

3) Land use in contrast with the Land Use Plan

Agroforestry activities have been reported as described above. Information on activities related to sustainable forest management has also been shared with MOFR and the community, mainly by the Long-Term Experts. At the end of the Project, a poster showing current land use conditions in contrast with the Land Use Plan developed in 2019 was created integrating previously acquired drone images and the latest satellite images. MOFR staff were informed of the results of land use change during the TSC meeting on 21 June 2022, and about the monitoring tool training on 27 June 2022. Komuniboli community was informed on 28 June through the land use monitoring workshop. Falake community was informed by phone by Project staff after the aforementioned TSC meeting.

Members of both communities were asked to confirm that current land use is compatible with the Land Use Plan by adding their experiences to the information on the poster. In Komuniboli, MOFR

staff reported on the status (regeneration, etc.) of post-logging in a sustainable forest management area. No discrepancies such as logging or other activities in the conservation area were identified. However, a young resident asked if the conservation area should not be logged at all. When it was explained that it was for the conservation of water resources, he was convinced. The importance of periodically checking and continuing discussions on all land use, including the reasons for zoning, was confirmed. As for Falake, a small-scale bare land-like garden was identified within the conservation area. After checking the situation with the community, the chairperson reported that outsiders had developed it in the conservation area, and that some community members had developed gardens near the conservation area.

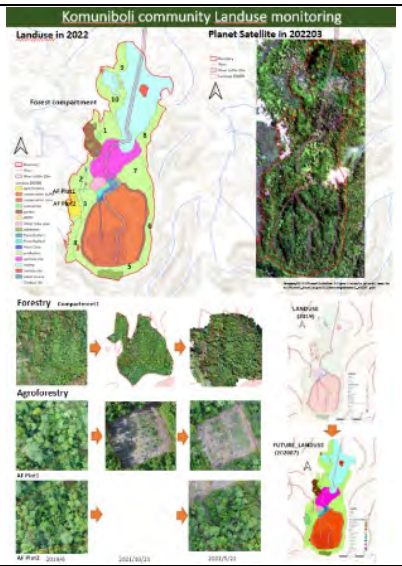
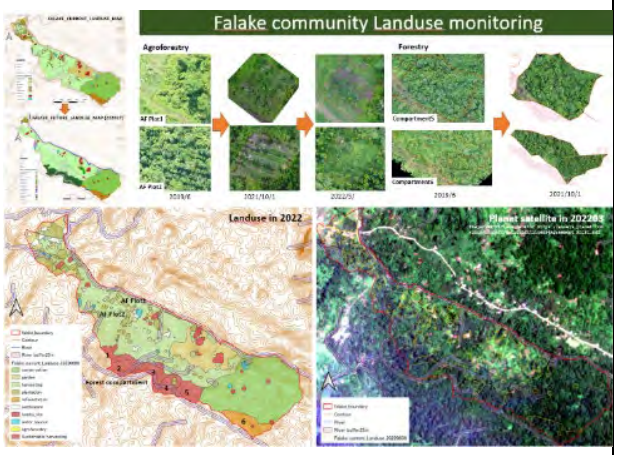
<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Community members of Komuniboli confirming their Pilot Activities and current land use</td><td>Community members joining a workshop in Komuniboli</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Land use review poster (Komuniboli)</td><td>Land use review poster (Falake)</td></tr>
</table>

Figure 2-44 Land use review contrasted with the Land Use Plan

2.2.5 Analyse and Compile Lessons Learned from the Pilot Activities

The results and issues obtained through the pilot activities were analysed and compiled into the "Compilation of Lessons Learned from Community-based Participatory Forest Management (Annex

1)". Of the pilot activities, the Forest Management Component was conducted by the Long-Term Experts, while the team of Short-Term Experts was in charge of the Livelihood Improvement Component (including agroforestry). Therefore, this compilation of lessons learned is limited to the areas of agroforestry and the other livelihood improvement activities. A summary is provided in the table below:

Table 2-43 Summary of Compilation of Lessons Learned from Community-based Participatory Forest Management

Item	Summary of Lessons Learned
1. Agroforestry	
1.1 Agroforestry plot establishment and maintenance	
	Site should be selected based on ground conditions
	Development of agroforestry layout by community itself
	Tree selection taking into consideration availability of planting materials and marketing
	Pest and disease control minimizing adverse impact on ecosystem and human being
1.2 Management of agroforestry activity (as community collective work)	
	Ensuring transparency and accountability by financial record keeping
	Improving record keeping, simplifying the record system, and examining digitization
	Improvement of monitoring tool
	Management with consensus of community members
1.3 Promotion of agroforestry in future	
	Accumulation and dissemination of knowledge and lessons acquired through field activities
	Development of long-term management methods
	Clarifying importance of agroforestry in terms of food security
2. Other Livelihood Improvement Activities	
2.1 Approaches	
	Enhancement of spirit of self-help efforts and ownership
	Setting the appropriate quantity of support activities
2.2 Activity management	
	Activity implementation through collective management
	Ensuring sustainability of activities by formulating activity management rules and regulations
2.3 Organisational capacity development	
	Selection of activities that contribute to community's capacity development
	Impact of support for establishing community's overall organisational structure

Chapter 3. Lessons Learned and Recommendations

3.1 Lessons Learned in Project Management

3.1.1 Countermeasure to COVID-19

SIG declared a state of emergency (SOE) on 27 March 2020 (provisionally until 26 July 2020) following the WHO's designation of COVID-19 as a pandemic on 11 March 2020, extending it several times in consideration of the infection situation in Solomon Islands and abroad. The SOE was finally extended to 24 July 2022. The specific measures were to drastically reduce the influx of foreigners, impose restrictions on domestic movement, and establish a medical system for COVID-19 in Solomon Islands during this period. However, after 18 March 2020, travel restrictions made it difficult for Project personnel to travel to the Pilot Sites. Some of Short-Term Experts was rescheduled to return to Japan on 18 March, the Long-Term Expert (Project coordinator) on 22 March, and the chief advisor (Long-Term Expert) on 26 April. In response to these circumstances, the following actions were taken to make progress on the Project from within Japan.

(1) Web meetings were held (initially bi-weekly), inviting C/Ps with a focus on local staff and addressing each theme at the time of the meeting, to share the progress and schedule of the Project. These meetings were later integrated with the TSC meetings.

(2) Work was facilitate by utilizing local staff when it was difficult to communicate directly with C/Ps.

(3) To implement the activities at the Pilot Sites, a plan was made in Japan by the Japanese experts to continue the Pilot Activities and follow-up with the Pilot Site communities by using local staff.

(4) Working groups on the Forest Information Tool and website were continued and progress was made using the web meeting system.

Since 2021, travel has been allowed, albeit with conditions, and the Long-Term Experts returned to Solomon Islands in February 2022. On the other hand, strict entry restrictions were imposed, requiring multiple PCR tests prior to departure and a long quarantine period upon entry, and full-scale resumption of travel was not possible until 2022 onward, when entry restrictions were gradually eased.

On the other hand, in order to make progress even in the absence of Japanese experts, active communication took place with the local people via e-mail and the web meeting system. In some cases, however, it took more time to prepare materials and there was some miscommunication compared to actual onsite activities. While it is usually better to have regular travel, this problem was prevented by having regular opportunities to talk directly with local staff online or on the phone, rather than just via e-mail, thus promoting our work.

3.1.2 Dissemination of results: Publication

(1) Factsheet Series and Newsletter series

In response to requests from MOFR to share forest resource information in SolGeo-FIMS and requests from projects related to the forest sector in Solomon Islands to share the Project's outputs, including land use maps, the Project decided to compile a series of Factsheets to provide explanatory materials (e.g., development methods, specifications, progress, and effects) on the outputs developed. And in order to publicize the Project's activities during the year, a summary of the activities posted on the JICA website was reorganized and published as a newsletter on MOFR's website starting with the 2018 edition (details are provided in 1.4.4). The compilation of these documents has enabled the project team to reorganize and share the results and progress of activities within the project, and has also provided a tool for explaining project activities in detail to those outside the project who have inquired about them through the Fact Sheet.

3.1.3 Promotion and Implementation of Activities Utilizing Local Staff

For the Project, the local staff members listed in the table below were hired to manage the Project due to the need for continuous communication in Solomon Pidgin with the pilot site communities, and for the efficiency and smooth implementation of other tasks. In addition, due to travel restrictions caused by the COVID-19 outbreak at the end of 2019, the Short-Term Expert Team was restricted from traveling, and the Long-Term Experts were forced to temporarily return to Japan. However, the Project was promoted by implementing local activities remotely and closely through local staff. The local staff has contributed greatly to the implementation of the Project, and MOFR is considering the continued employment of a GIS/RS support officer and proposes their continued employment in other related projects.

Table 3-1 List of Local Staff

Survey/Activity	Content and main items	Term
Administration and Logistic Officer/Assistant Coordinator	・ General administration and accounting ・ Secretarial and preperatory work ・ Coordination of activities and networking ・ Information gathering and analysis related to the Project	From June 2019 38 months
Forest Resource Management Promoter/Driver	・ Assist in the design, promotion, and operation of community-based forest resource management activities and livelihood enhancement activities in the pilot sites. ・ Secretariat and preperatory work	From April 2020 29 months *Before the start of the COVID-19 pandemic, operated as staff for a Long-Term Expert.

	・ Coordination and networking ・ Information gathering and analysis related to the Project	
Technical Coordinator for Livelihood Improvement	・ Promotion of Pilot Activities (mainly the livelihood component). ・ Secretariat and preperatory work ・ Coordination and networking ・ Information gathering and analysis related to the Project	From November 2020 22 months
GIS/RS Support Officer 2 (Data Creation and Management)	・ Support for remote sensing vegetation classification and data quality control ・ Support for HCV mapping and watershed delineation (multiple scale levels) ・ Support in establishing Forest Management and Monitoring Units (FMUs)	From February 2020 30 months
ICT Support for MOFR 1	・ Updating and managing MOFR's website, YouTube, Facebook, Twitter ・ Technical support for GeoNode installation and upgrades ・ Technical support for GeoServer enhancements	From December 2019 33 months
ICT Support for MOFR 2	・ Technical support for GeoNode installation and upgrades ・ Technical support for GeoServer enhancements ・ Technical support for the use of drones and tablet-type data collection tools	From December 2019 33 months
Gender Analysis	・ Survey on gender dynamics and inequality ・ Qualitative field research in the two Pilot Sites	From December 2020 2 months

3.1.4 Contribution to the Development of Forest Information in Collaboration with Other Donors

In the preparation of the land cover maps implemented in the Project, the Project will collaborate with the Integrated Forest Management Project (SI-IFMP), funded by GEF5 and with implementation supported by the FAO. Further, in the early stages of the Short-Term Expert Team's activities (22 March 2019), two RS experts of the Project also participated in the Open Foris SEPAL implementation training organized by SI-IFMP and the FAO in MOFR to share the technology, and then provided RS practical training to the C/Ps during the July training in Japan. For the actual semi-

automatic land cover map classification at the national level using RS in the Project, the FAO-developed cloud-based RS tool, Open Foris SEPAL, was used.

The inventory information used in the preparation of timber volume data and other forest resource data was estimated using the inventory survey design as part of GIZ's support for REDD+ activities and the results of the survey training of MOFR staff in 2019 at the two pilot sites of the Project, Komuniboli and Falake.

3.2 Recommendations on MOFR in the Future

3.2.1 Data Updates and System Management

In order to operate SolGeo-FIMS, it is essential to update the data. In particular, for forest management data such as concession maps, it is necessary to continuously update forest resource quantities based on FMUs. First, it is recommended that the relevant divisions work on the following items to improve the current forest management operations within MOFR.

1) The concession dataset on SolGeo-FIMS lacks information such as license periods. This information should be properly provided from the Licensing Section to the Technical Services Section for appropriate information sharing as concession management on SolGeo-FIMS. Inactive concessions/licenses are concessions that ceased operations before the end of the five-year license period due to a reduction in concession area or for other reasons. This information should be updated in the concession map on SolGeo-FIMS. The updated concession map should be shared appropriately with the relevant divisions.

2) The input of harvest quotas has been suspended due to discrepancies between existing volume information and the current situation, but is expected to be resumed now that new forest resource volume information is in place. The input of timber volume is expected to be calculated using concession maps and FMUs. In order for the Technical Services Section (Mapping Unit) to maintain adequate resource volume information for the FMUs, the harvested volume for each concession will be deducted annually from the estimated commercial timber volume for the FMUs. Further, the Marketing Section will need to provide log export data for each concession to the Mapping Unit.

3) If the boundary of a new concession overlaps with an existing valid concession, the overlap must be removed for approval (this work is in progress). In addition, when the Mapping Unit eliminates the duplication in the data, it is necessary to keep appropriate records.

4) It is important that plantation operators submit timber volume information so that MOFR can better manage forests in Solomon Islands. The Forest Plantation Development and Reforestation Division (FPDRD) will work to negotiate with major plantation companies to have them submit relevant data annually.

The continuous collection, sharing, and updating of specific data as described above will make it possible to make administrative decisions based on the latest data in MOFR.

3.2.2 Establishment of Community-based Forest Resource Management Support Unit

In order to realize sustainable forest resource management in Solomon Islands, it is essential in the future to promote community-based forest management using the results of the Project in parallel with sustainable forest management by logging companies. Community-based forest resource management is a cross-division issue of MOFR and it has been supported by the TSC, consisting of members from each division of MOFR during the Project period. However, communication among the members and the implementation of support activities were not always conducted smoothly because the members belonged to different divisions. In addition, until now the Reforestation Division has been played the role of disseminating tree planting by local people. However, it was revealed through the Project that not only tree planting but also natural forest management, agroforestry, and community capacity development through livelihood improvement activities need to be supported from a wider viewpoint to realize the community-based sustainable forest resource management. Therefore, it is recommended that a new unit to comprehensively support community-based forest resource management be newly established in MOFR. Considering the importance of supporting community-based forest resource management, it is more desirable to create not a unit but a division. However, that may not be feasible since a plan to establish a “Research Division”, which has been indicated in the Corporate Plans more than seven years ago, has not been attained. Thus, the creation of a unit in which fewer staff members work flexibly may be more feasible than the creation of a division.

3.2.3 Dissemination of SFRM Pilot Activity Model

As one of the outcomes of the Project implementation, a synergistic effect of the SFRM pilot activity model, which is the combination of forest management and livelihood improvement activities, is gradually evolving. In particular, livelihood improvement activities such as agroforestry, pig farming, and chicken farming have contributed to raising and maintaining the communities’ concern for SFRM in a way that generates short-term income as well as enhances the communities’ organizational capacity. Thus, it is critical for MOFR to continue to support the Pilot Activities and ensure the establishment of the SFRM pilot activity model. In the future, it is recommended that the model be disseminated to communities where SFRM initiatives are required.

3.2.4 Dissemination of Community-based Agroforestry Implementation Model

Through the implementation of Pilot Activities, a procedure and methods for the implementation of community-based agroforestry (from the development of an Agroforestry Implementation Plan,

including layout design based on natural and social conditions, to the implementation of monitoring) have been developed. This may be called the "community-based agroforestry implementation model".[18] The model is expected to be highly sustainable and adaptable to other communities in Solomon Islands, as it needs little financial and material support from the government and donor agencies. It is recommended that the model should be clearly mentioned in MOFR's Corporate Plan and disseminated across the country.

The model does not cover long-term maintenance methods for agroforestry plots, since agroforestry field practices have been conducted for about two and half years in the Project. Thus, it is recommended that MOFR continue to monitor the implementation of agroforestry by the pilot communities and develop long-term maintenance methods for 15 - 20 years, until the forest crown closes and trees reach harvest time.

When agroforestry practices are disseminated in Solomon Islands according to the model, lessons learned through the implementation of agroforestry by each community should be compiled by MOFR and shared with stakeholders, including other communities, governmental organizations, and donor agencies, so that other communities can avoid similar failures or deal with similar challenges efficiently and effectively. The Project developed information tools related to forestry management, but there was limited development of information tools related to livelihood improvement activities, including agroforestry. It is recommended that a system to collect data and information on agroforestry practice in each community and shares these with other communities and stakeholders be developed for effective and efficient promotion of agroforestry in Solomon Islands.

3.2.5 Enhancement of MOFR's Facilitation Skills

In order to disseminate the "community-based agroforestry implementation model", the enhancement of MOFR officials' facilitation skills is essential. Although the Project has tried to develop their facilitation skills through OJT in the implementation of the Pilot Activities, there is still much room for improvement of their skills, since the dispatch of the Short-Term Expert Team was delayed from the initial schedule and their trips to Solomon Islands were restricted for a while due to COVID-19.

In addition, it was revealed that OJT conducted sporadically was not enough to develop their facilitation skills, since the MOFR officials taking the OJT changed from time to time. Therefore, it is recommended that intensive support focusing on facilitation skill development should be provided to MOFR officials in the future.

[18] The "community-based agroforestry implementation model" illustrates a series of agroforestry processes and provides instruction to communities. Thus, communities themselves develop a layout of an agroforestry plot in the model. The model is different from the so-called "agroforestry model" that depicts a layout (i.e. what kind of crops are planted where) only.

3.2.6 Dissemination of Livelihood Improvement Activities and Establishment of Communities' Overall Organizational Structure as a Measure for Community Organizational Capacity Development

It is suggested that the activity models developed under the Other Livelihood Improvement Activities Sub-component, such as pig farming and chicken farming, as well as support for establishing communities' overall organizational structures, should be disseminated to communities which are interested in SFRM as a tool of organizational capacity development.

Livelihood improvement activities that will be supported should not necessarily be limited to pig farming or chicken farming. Rather, they should include other various activities for which the experience and know-how of the Pilot Activities can be utilized. For example, IG organization, coordination of the implementation of technical training events, equipment and material procurement for implementation, day-to-day activity management, monitoring and review/evaluation, and marketing should be targeted. On the other hand, it is also extremely important to review the communities' organizational structure as a whole and create one that broadens the scope of decision-making, which has so far been made mostly only by chiefs and elderly men, not only in terms of revitalizing livelihood improvement activities but also in terms of improving the communities' organizational capacities. Furthermore, it is ideal if a community-to-community dissemination system could be introduced as part of the dissemination process so that the above-mentioned processes can be conducted in a more practical and effective manner.

3.2.7 Collaboration with Other Organizations to Promote SFRM Pilot Activities

In terms of the effective and efficient use of local resources, collaboration with relevant institutions should be given more focus, particularly when promoting livelihood improvement activities. In fact, the Project has collaborated with several organizations during the Pilot Activity implementation. These include the Agriculture Research and Development Department of the Ministry of Agriculture and Livestock (MOAL) for agroforestry, and MOAL's Livestock Production and Veterinary Services Department for pig farming and chicken farming. In particular, as the results of the review clearly show, the collaboration with the Livestock Production and Veterinary Services Department has had a significant impact on the effective promotion of activities.

Meanwhile, it is also a fact that the Project contributed to providing those institutions with opportunities to deliver their services to citizens, which is part of their missions. Therefore, this way of collaboration with the other institutions can be regarded as the creation of win-win relationships amongst the different institutions.