Participatory Mapping at Kommuniboli and Falake Pilot Sites in Solomon Islands

Rakuno Gakuen University, 2021

Preface

Participatory mapping has gained its importance in many countries, especially developing countries since the 1970s for various purposes such as land rights reclamation, decision making, local community empowerment, local knowledge recording, environmental management etc. Because participatory mapping engages and involves local communities from the start to plan and collect data, and to the end, to make decisions and conduct projects in achieving the communities' objectives, participatory mapping provides diverse benefits to communities, local governments, and relevant stakeholders.

This report is written as part of the Project on Capacity Development for Sustainable Forest Resource Management (SFRM) in Solomon Islands, cooperated between Japan International Cooperation Agency (JICA) and Ministry of Forestry and Research (MOFR). The report aims to increase the capacity of MOFR to coordinate and facilitate participatory mapping projects which empower and support the community to identify their current resources, plan for their future land use, and initiate pilot activities to achieve their plan.

This report is divided into six sections. Section 1 provides a simple explanation of what participatory mapping is, its applications and tools used. Section 2 provides the summary of 11 study cases extracted from 10 different journals/ reports as examples of how participatory mapping is being manipulated and applied in other countries for various purposes. Section 3 provides advantages and importance of participatory mapping while Section 4 provides disadvantages and challenges of participatory mapping. Section 5 reports the participatory mapping activities the JICA team has conducted at two pilot sites in Solomon Islands up to year 2020, namely the Komuniboli community in Guadalcanal province and Falake community in Malaita province. Section 6, the last section of this report, is the recommendation of a participatory mapping process for Solomon Islands from the beginning to the end, extracted and adapted from a few references.

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1: What is Participatory Mapping?

Participatory mapping, which is known as GPS Transect Walk in the Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands, literally means involving people to create map(s). It usually aims to gather, record, analyze, and visualize local knowledge shared or provided by the active community members (de Paiva, 2017), such as the local community, NGOs, private companies, the governments and other relevant stakeholders. It is a bottom-up approach to collect both attribute and spatial data, and is particularly important in areas, where data are scarce.

It emerged in the 1970s to support indigenous communities claiming their rights over traditional ancestral and customary land legally. The purposes of participatory mapping are gradually expanded to include the local community and stakeholders in decision-making process, planning and monitoring (IFAD, 2009; Kingsolver, Boissière, Padmanaba, Sadjunin, & Balasundaram, 2017), empowering local people (Di Gessa, 2008; Gilmore & Young, 2012; Corbett & Keller, 2006; Herlihy & Knapp, 2003), recording local knowledge (Gilmore & Young, 2012; Corbett & Keller, 2006), improving environmental management (Gilmore & Young, 2012; Mapedza, Wright, & Fawcett, 2003; Damastuti & de Groot, 2019; Bernard, Barbosa, & Carvalho, 2010), and etc.

Participatory mapping utilizes a diverse of tools such as ground sketching, paper sketching, scale-mapping, 3D model, GIS and/or multimedia and internet, and techniques such as interview, group discussion, workshop and transect walk to collect, analyze and communicate community information (IFAD, 2009; Damastuti & de Groot, 2019). A decade later in the 1980s, it had been widely spread to empower communities worldwide for it emphasizes transparency and inclusiveness of community members (IFAD, 2010).

2: Case Studies

This section provides summaries of 11 case studies from journals and reports. All summaries were extracted directly from the study (except the Tip for MOFR) to provide you a clearer understanding about the application of participatory mapping. Please find the source and details of the study from the link stated towards the end of every summary.

Case 1 - The Cultural Mapping Project of the Heritage City of Vigan

Author: (Zerrudo, 2008)

Objective: To create a framework for heritage conservation and sustainable development

Location: Vigan City, Philippines

Method:

Framework of heritage conservation and sustainable development involved four stages, namely ① awareness, ② appreciation, ③ protection, and ④ utilization.

① Heritage Awareness

- First step to development is to identify the availability of resources such as topographical, manpower, financial, technical and entrepreneurial.
- Participatory Cultural Mapping was a way to identify natural, movable, intangible, and built heritage resources of a community - against their intrinsic and associative attributes to capture their meaning.

Also provided a six months training program to relevant consultants, faculty and students from a local university, local government officials, architects, homeowners, and businessmen in the community

② Heritage Appreciation

- Development emphasize on involving public in cultural heritage activities to assure sustainability because heritage belongs to the people, not to governments.
- Could conduct community organizing, which brings about unity, targeting a broader group of people and capacity building, which impart technical skills, targeting focus groups. These community organizing and capacity building aim to mold and build the locals towards common visions, goals and interests.
- Conservation professionals shall initiate heritage appreciation by conducting multi-disciplinary activities and educational sharing to deepen and heighten the interest of the community.

③ Heritage Protection

- Sustainable development is assured by resource identification, community participation, and value generation.
- Heritage protection can be done based on conservation guidelines (a set of technical standards developed by experts and legislators), heritage charter (an agreed set of conservation concept, policies, and practices), legislation and ordinance.
- Cultural mapping project provides information for the development/ amendment of conservation guidelines and legislation.

④ Heritage Utilization

- Development is to transform goods and services to improve man's life quality.
- Utilize identified heritage to generate revenue, either educational or economic, via tourism, healthcare, education, and culinary arts.

Natural Heritage Mapping Templates For Plants And Animals			
Classification		Picture	Description
Common Name	Scientific Name		
Habitat	Conservation Status ○ Endangered ○ Not Endangered	Source	
Threat		Actual Picture in Site	Key Map
Visibility ☐ Seasonal National ☐ Months ☐ Perenial	Significance ☐ World ☐ Regional	☐ ☐ Local	
Connectivity	Uses		
Oral Tradition	Related Literature		
Documentation Name: Affiliation:			

Figure above shows the data collection form for plants and animals

4

Results/ Output:

MATRIX OF CONCEPTUAL FRAMEWORK FOR HERITAGE CONSERVATION AND SUSTAINABLE DEVELOPMENT
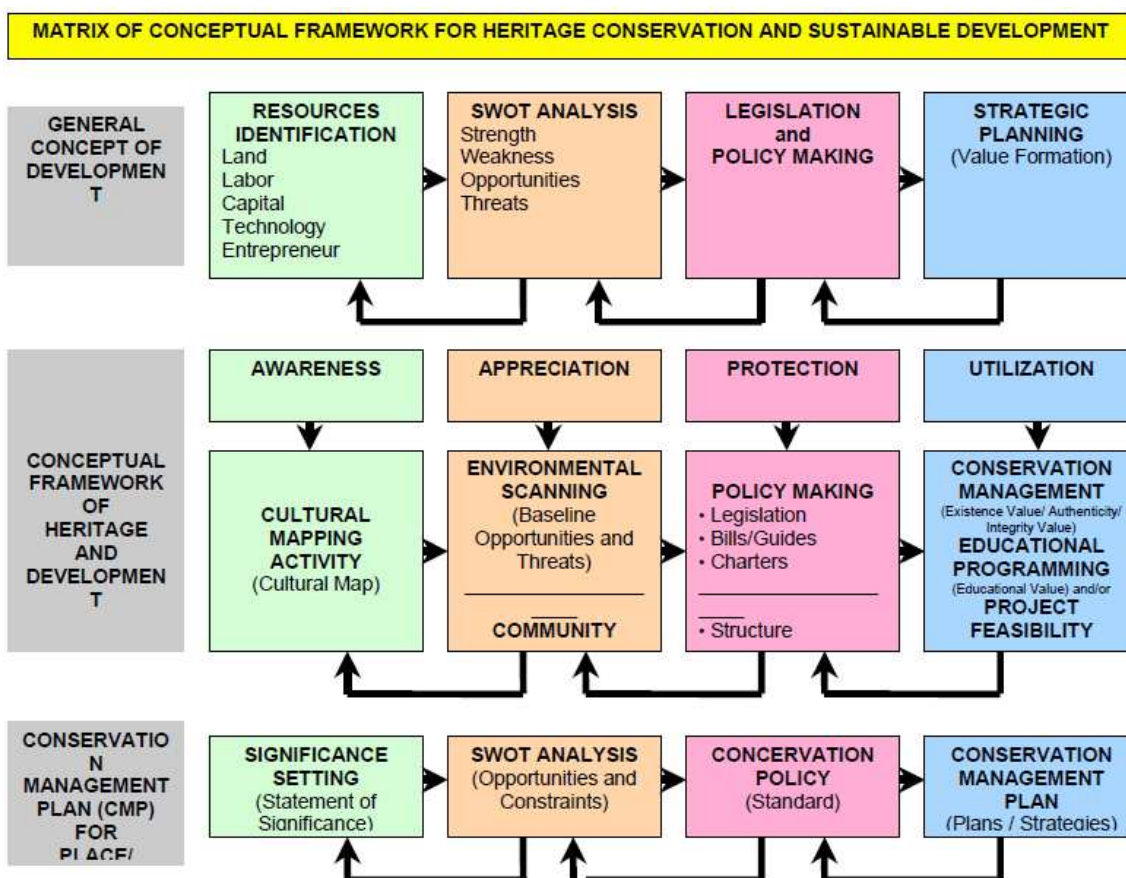
Results/ Output - Advantages:

- Taking Vigan city as an example, the report elucidated a relatively comprehensive way of sustainable development and that participatory cultural mapping is the foundation before one can achieve sustainable development.
- Involving the public ensures active participation and a sense of ownership among them, hence, ensuring the sustainability of the project.

Results/ Output - Disadvantages and challenges:

To achieve heritage conservation and sustainable development, it takes a lot of resources in terms of knowledge, finance, human and etc.**Tip for MOFR:**

Sustainable development is ensured by resource identification (awareness), community participation (in all four stages) and value generation (utilization).

Case 2 - The Use of Participatory Mapping in Ethnobiological Research, Biocultural Conservation, and Community Empowerment: A Case Study from the Peruvian Amazon

Author: (Gilmore & Young, 2012)

Objectives:

1. To examine the important role that participatory mapping can play in ethnobiological studies.

2. To examine the rich and diverse range of data that this methodology can generate, ultimately shedding light on how indigenous and local communities use, perceive, and interact with their environment and resources.

3. To explore the use of participatory mapping in biocultural conservation and community empowerment.

Location: Maijuna communities in Peruvian Amazon

Method:

1. Explained the project's objectives, methods, pros and cons with examples to obtain an informed consent from the villagers.

2. Villagers drew their village basemap by including key geographical and hydrological features of the watershed, such as rivers, streams, and lakes, on a large sheet of easel paper.

3. Each community added more detailed information on the basemap about important biological and cultural sites with symbology that represent each category of areas.

4. While mapping, the research team used semi-structured interviewing techniques to collect and document traditional cultural knowledge related to those sites and resources the participants had added onto the maps.

5. Conducted ground-truthing to collect GPS points with the villagers specialized in their various expertise and knowledge with additional interviews to document their ethnohistory, traditional stories and songs, place names, resources use and management using cameras, voice recorders, and video cameras.

6. Provided stipends to compensate villagers' time.

Note:

- Depending on overall project objectives, budget and schedule, participatory mapping can be done on a different scale and with different degrees of participation
- It is not a must to use GIS and GPS in participatory mapping depending on the time and financial resources allocated.

Results/ Output:
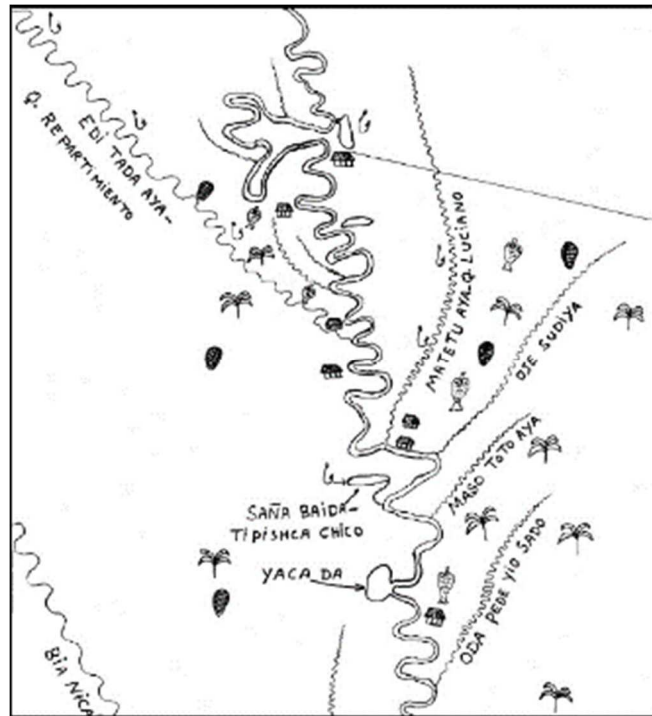
A small portion of hand-drawn map

Symbology

Results/ Output - Advantages:

Researchers/ outsiders:
- can understand how the community perceive and connect with their environment on a daily, seasonal or historical scale;
- may learn about the community traditional resources management system, past and present threats and challenges;
- may locate endangered species;
- may obtains new/ different insights by comparing the data collected in the project with other data sources.
- Can visualize the data which cannot be achieved merely by conducting interview
- Political empowerment
- Reduce cost of data collection

Community:
- is empowered through project facilitation, and technological capacity building
- is able to convey and share their knowledge within the community, to the younger generation and various stakeholders via maps to protect their rights and plan.
- can keep their oral traditions such as stories, songs and oral histories from being lost.
- Can develop a sense of pride
- Can value their traditional knowledge
- Cultural and community cohesion can be strengthened

Results/ Output - Disadvantages and Challenges:

- The resulting maps may conceal and manipulate essential information, maintaining existing problems and even creating additional problems.
- The usage of collected data and the prevention of data being exploited

Should be more accountable to the needs, challenges, and priorities of targeted communities.**Tip for MOFR**: Participatory mapping allows MOFR to empower the local communities to document traditional knowledge of the community in utilizing and managing their natural resources. When MOFR learns the threats and challenges the local communities have in managing their natural resources, and helps them to solve their issues , MOFR is indirectly achieving the mission statement of MOFR, ie. to utilize,

conserve, and manage the forest resources for the continuing benefit to the environment and the people of Solomon Islands.

Source: (free source)

Case 3 - Cultural and Participatory Mapping

Authors: (Kingsolver, Boissière, Padmanaba, Sadjunin, & Balasundaram, 2017)

Objective: To involve local in land use planning

Location: six villages of Mamberamo Raya Regency, Indonesia

Method:

1. Used the same scale of 1:50,000, which is the scale used in official maps for easier comparing.

2. Provided a base map which showed the main rivers and tributaries, the positions of villages, roads and other features visible on satellite image.

3. Most participants were literate and their local Indonesian language was used.

4. Had two groups (men and women) understood the map by recognizing, add and correct rivers' name on the maps, usually starting from the tributaries closest to their village before expanding to further region.

5. After all names of the rivers were added or corrected, participants added important sites (eg. gardens, cemeteries, sacred places, and former village site) and ten most important resources area for their local livelihood (eg. plants and animals) onto two different maps, which were later combined into one map.

6. Ground truth survey using GPS under the guidance from villagers, usually the representatives from the landowner clan.

7. The sketched maps were corrected based on the GPS data in the village before provided to the community.

8. Discussed and created current land use map and then the future land use, and villagers' expectation in terms of development, conservation and governance. This process was participated by mostly land decision-makers such as the village head, customary leaders, clan heads, women and men elders.

9. Collected boundary data only upon request (usually for negotiation with logging company)

10. Obtained consent for sharing map data by explaining its pros and cons. The map was shared in a final workshop involving villagers, NGO, government and private sectors for land use planning discussion and collaboration.

11. Next step: to replicate the methods in other villages

Participatory mapping in 2012

Result/ Output:

- Women knew the landscape near the village and gardens better while men knew distant places better.
- The final printed maps were given back to the community.

- Maps were used in the discussion.
- It was powerful to use maps of the same scale to negotiate land use planning, development strategies and collaboration between the government and villagers. For example, the villagers could share and convince the government to use certain area for enlarging a navigable channel in the mangroves for the Yoke village with least environmental impacts.

Result/ Output - Advantages:

Community:
- is empowered through project facilitation, technological capacity building;
- is able to communicate their knowledge to various stakeholders via maps to share their plan and collaborate with them.

Government:
- has the opportunity to be inclusive in development while understanding the underlying issues of the villagers.
- can also reduce cost for long field visitation.

Tip for MOFR: This is quite similar to what the JICA team was doing in the two pilot sites as the JICA team also facilitated the community members to create current land use map and future land use map.

When the government of Solomon Islands has no power over the land of local communities (the customary land), yet the government wishes to develop Solomon Islands, participatory mapping is an effective way to involve local communities in land use planning. And when MOFR learns the intention of the local communities on forest resources management, MOFR may serve the local communities by providing legal consultation, knowledge, and equipment to sustainably manage their resources. Hence, achieving MOFR's vision and mission. Moreover, participatory mapping can be replicated to be applied in other regions.

Source: (non-free source)
https://link.springer.com/chapter/10.1007%2F978-94-024-1011-2_15

Case 4 - Participatory Mapping in a Developing Country Context: Lessons from South Africa

Authors: (Weyer, Bezerra, & De Vos, 2019)

Location: Eastern Cape Province of South Africa

Case Study 1 - Likhayalethu

Objective: To help the Likhayalethu community to create a heritage map

Method:

Preparation Stage:

1. Learned about the area, historical background, and power dynamics within the targeted community.
2. Considered the accessibility of the venue, availability of electricity and WIFI, and the language barrier.
3. Prepared equipment such as generators, extensions, projector, white sheets to cover windows, etc.

Mapping Stage:

1. Introduced the team and project.
2. Gained trust and be transparent by discussing expectations, ethical implications, and dismantled misperceptions that may occur as a result of the past.
3. Familiarized the participants with the technology (Google Earth Pro) by using pictures embedded on map to aid visualization, and layman terms so that everyone can understand.
4. Interviewed the participants and directly plot the shared information onto a digital map, the Google Earth Pro (known as Direct to Digital (D2D) mapping approach).
5. Allayed fears/ concern among the participants towards the use of technology to share their knowledge and information.

(Note: literacy level of the community presents a major challenge.)

Wrapping-up Stage:

1. Analyzed data before providing useful feedback to the participants.
2. Provided contact information with the participants.
3. Stored raw data according to the ethical guidelines and/or provided them the accessible format according to their literacy level and available resources (eg. computers).

Results/ Output:

Results/ Output - Advantage:

- Digital participatory mapping allows knowledge sharing across generations.
- Government/ outsiders could identify the social inequalities

Results/ Output - Disadvantage/ Challenge:

- Older generation unfamiliar with the technology.
- The community can be easily exploited for their knowledge because they did not have concerns about sharing their knowledge, though it was mostly due to the injustice Apartheid governments' policies.
- Literacy level of the community was low.

Case Study 2 – Tsitsa Project

Objectives: To build understanding around locals' interaction with their environment, how this has changed over time, and how this might impact the future of the area, and the proposed large-scale projects.**Method:**

1. Used D2D method to identify key resource areas of value to the locals, and understand how much the communities are relying on the natural environment for their livelihoods.

Advantage: Can bridge inter- and intra-cultural divides if the correct environment is created for knowledge sharing and trust building

Disadvantages/ Challenges: Socio-politically complex region with history of discrimination and conflict require sensitivity and understanding local power dynamics and managing expectations between parties involved.

Practical Recommendation for a facilitator/ researcher

1. Build trust through clear and transparency
2. Exercise patience and sensitivity when working with people from different cultural backgrounds.
3. Explain ethical principles and informed consent to participants
4. Take extreme care to explain all risks and processes, from participation to dissemination in understandable language without jargon
5. Dismantle misperceptions such as visiting researchers may be linked to a better life
6. A thorough understanding of the local context, and building relationship within a community

Consider:

1. Logistic: location may link to power dynamics (setting the venue in the house of village chief may cause members uncomfortable to join), electricity and internet
2. Finance: pay for what is used
3. Conduct digital mapping offline, requiring the use of cached imager

Tip for MOFR: Digital mapping approach allows easier sharing of knowledge. When Google Earth Pro is connected to the internet, the staff of MOFR working with the targeted local community can share collected data (ie. placemarks, area, tours) to the headquarter in Honiara almost instantly.
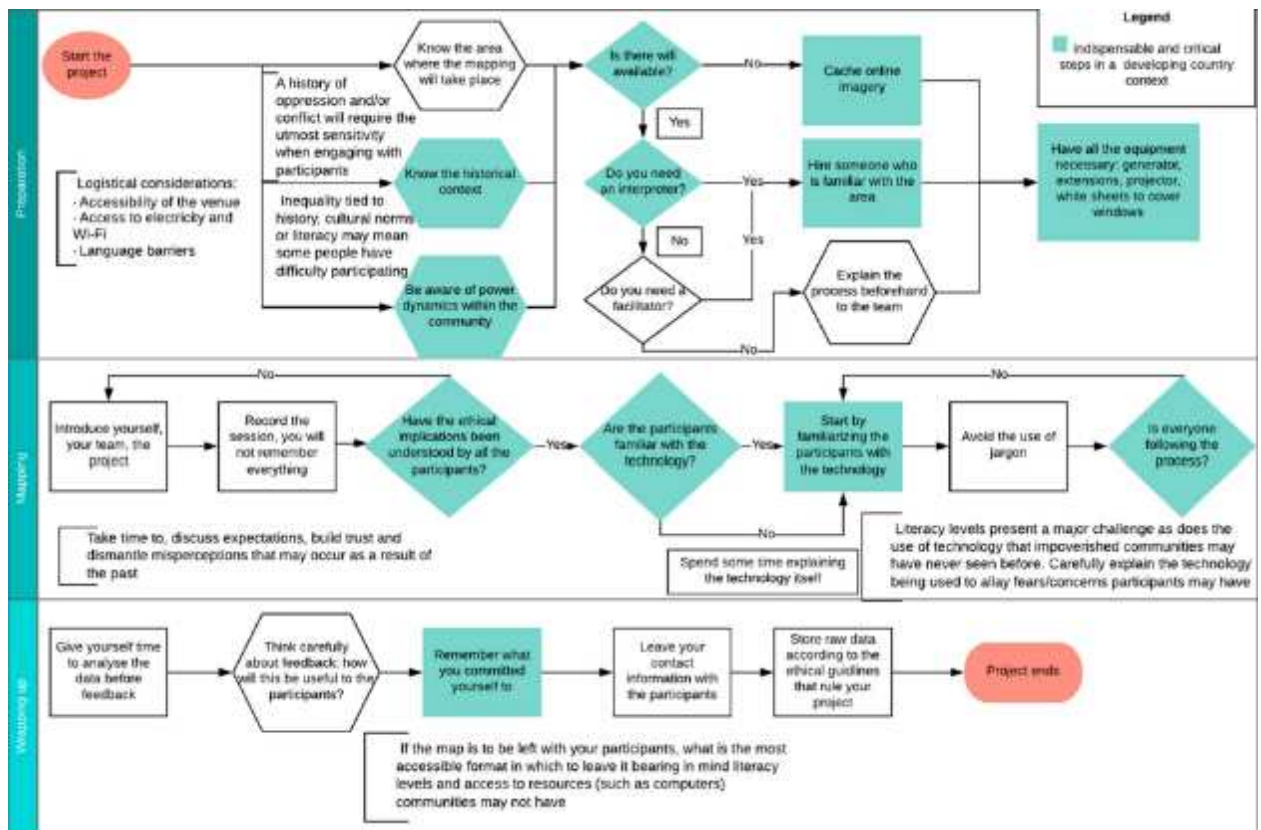
Flow diagram for suggested decision-making process when conducting digital participatory mapping in a developing country context

Source: (free source) https://www.mdpi.com/2073-445X/8/9/134

Case 5 - An Investigation of Land Cover Change in Mafungautsi Forest, Zimbabwe, Using GIS and Participatory Mapping

Authors: (Mapedza, Wright, & Fawcett, 2003)

Objective: Investigates the processes governing land cover change in and around the Mafungautsi Forest Reserve in Zimbabwe

Location: Gokwe South District in the Midlands Province of Zimbabwe

Method: Identified the land cover change, perceived change and its causes via,

1. Participatory rural appraisal (PRA) through group discussion up to 10 people to explore different forest uses and perceived change over time and sketched local natural resources on map with timelines.

2. Types of change interviewed:

    - Wildlife change
    - Vegetation change (eg. tree cover, gum trees' number)
    - Land use change, ie. cattle numbers and grazing, tree plantings
    - Change in fire, its effects
    - Observed changes in land use drivers
        - Strictness of enforcement
        - Climate and hydrology
        - Population changes
        - Soil fertility change

3. Semi-structured interviews via workshop and the respondents were asked to draw land cover changes, local natural resources and fire frequency on acetates fixed over the aerial photographs.

4. Collected data were scanned, digitized, and georeferenced for analysis with historical aerial photographs and secondary data such as rainfall, crop yields, and arrests while cross-check interview findings.

5. Follow-up interviews with Forestry Commission staff and groups of youths, women, and the elderly

Result/ Output:
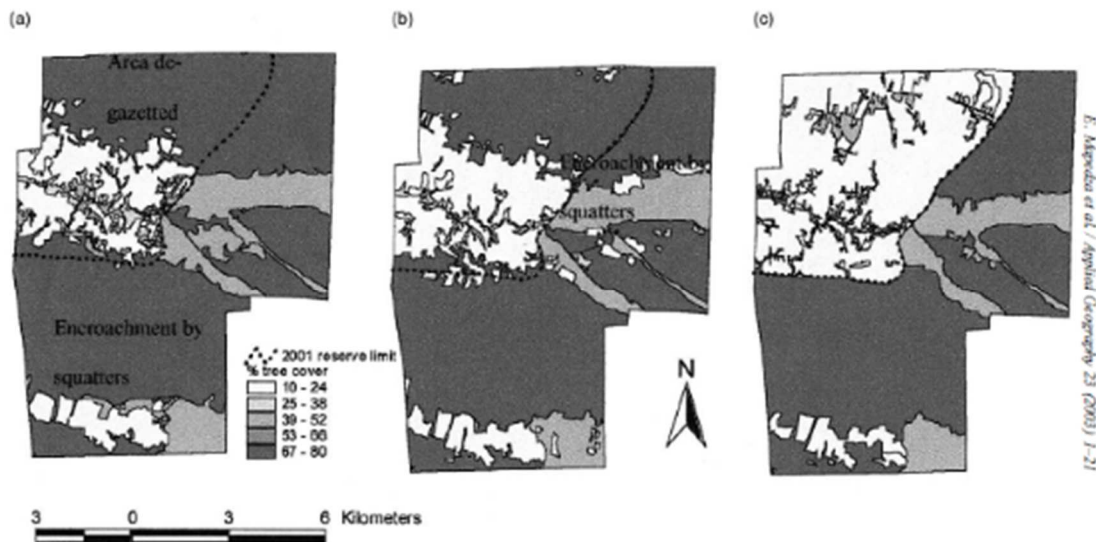
Fig. 2. Tree cover in the Batanai area of Mafungautsi and Gokwe communal area in (a) 1976/7; (b) 1984; and (c) 1996 (based on aerial photography).

The Figure above was the result of aerial photography analysis for the Batanai area. It supported the observation of farmers that tree cover had increased while FPU guard felt that tree cover remained unchanged. Probably due to the women role in firewood collection and the need to walk further as fuel wood became scarcer, the women were more aware of the reduction in tree cover than the male farmers' group.
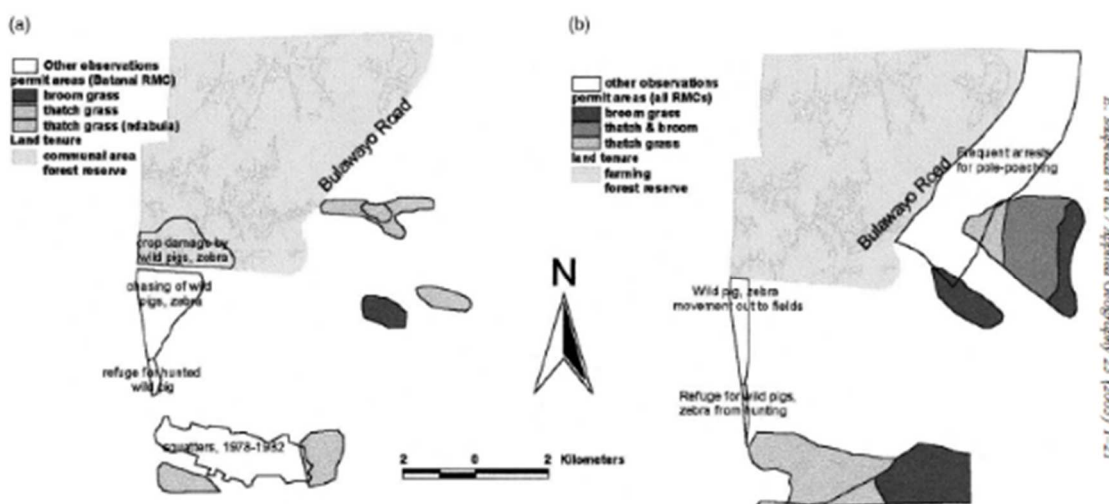
Fig. 3. Patterns of land uses in the Batanai area of Mafungautsi reserve as described: (a) by smallholder farmers; (b) by the Forest Protection Unit (FPU).

The figure above shows that the perceptions of smallholder farmers and the Forest Protection Unit about the land use in the batanai area of Mafungautsi Forest reserved are different.

Result/ Output - Advantages:

- Combining semi-structured interviews with participatory mapping and GIS using photo-mosaic yielded land use maps that could be easily geo-referenced and related to remote sensing data.
- Combining semi-structured interviews would generate unexpected information.
- Participatory mapping can identify the differences in perception between the Forest Protection Unit (FPU) and the local community, as well as among various groups in the community. For instance, women were more aware of a reduction in vegetation cover and knew more uses of tree species than men.

- The participatory mapping and semi-structured interviews helped identifying the underlying causes of declining tree cover, hence act as the foundation to counteract effectively.

Result/ Output - Disadvantages/ Challenges:

- The composition of the respondents is limited by the geographical location.
- FPU interpreted land cover changes differently than the Batanai farmer could be due to the needs of FPU to maintain their status that the forest cover remains unchanged because of their efforts.

Tips for MOFR: What you think is not what others think. We may think that we have the best plan for the local communities to manage their natural resources, but is it really so? Participatory mapping and photo-based interviews with several relevant groups allows MOFR to identify the local communities' real overall perception.

Source: (non-free source)
https://www.sciencedirect.com/science/article/abs/pii/S014362280200070X

Case 6 - Participatory Ecosystem Service Mapping to Enhance Community-Based Mangrove Rehabilitation and Management in Demak, Indonesia

Authors: (Damastuti & de Groot, 2019)

Objectives:

1. How has the overall mangrove landscape and locally important mangrove ecosystem services changed since the 1980s?

2. What are the factors influencing the ecosystem services (ES)?

3. How can the mapping processes and results contribute to enhance local mangrove management?

Locations: Two coastal villages, Bedono and Timbulsloko, in Sayung sub-district, Central Java, Indonesia

Method:

1. Used participatory resource mapping (PRM) approach by combining different tools (sketch and scale mapping) and techniques (focus group discussion, workshop and transect walk) to gain consensual qualitative information of ES based on local collective memories and perception. The communities were involved from the beginning in method selection, application, evaluation and verification.

2. Built good relationship with the villagers and local authorities by living with the local communities to learn about their local lifestyle learning for better communication and cooperation.

3. Cooperated with the village officers and some villagers to prepare for the mapping activities, such as meeting setup, participants' selection, venue and equipment preparation.

4. Participants were selected based on purposive sampling, in which the researchers relied on their own judgement (ie. the information from their observations and informal communication with villagers) when selecting participants. The number of participants were determined based on the number of sub-villages and the number of community associations involved in mangrove rehabilitation and management. The additional criteria were gender, age, and occupation to ensure a balance community groups.

5. Discussed the village conditions, and introduced the project in details, including mangrove ecosystem, importance of maps to manage the village and mangrove, mapping tools and techniques.

6. Engaged villagers in choosing the suitable methods for mapping, discussed attributes and determined the legends.

7. Started sketching in groups based on sub-villages to map the past condition first, and then describe the subsequent environmental change to map present conditions. Additional information was added with points and sticky notes.

8. Provided GPS training for the participants before the ground-truthing, and discussed the technical preparation needed, eg. strategic time, transportation, and person in charge.

9. During ground truthing, each group was accompanied by two facilitators to ensure the role of each participant such as marking, recording the coordinates and other attributes determined earlier were conducted.

10. Processed collected data with GIS and verified with the community and relevant stakeholders. Repeated as necessary.

11. Held a meeting involving multiple stakeholders to discuss ways to improve mangrove management, and sent the digital maps to relevant stakeholders.

12. Provided financial compensation and ensured that the activities were held only in weekend and was voluntary

Result/ Output:
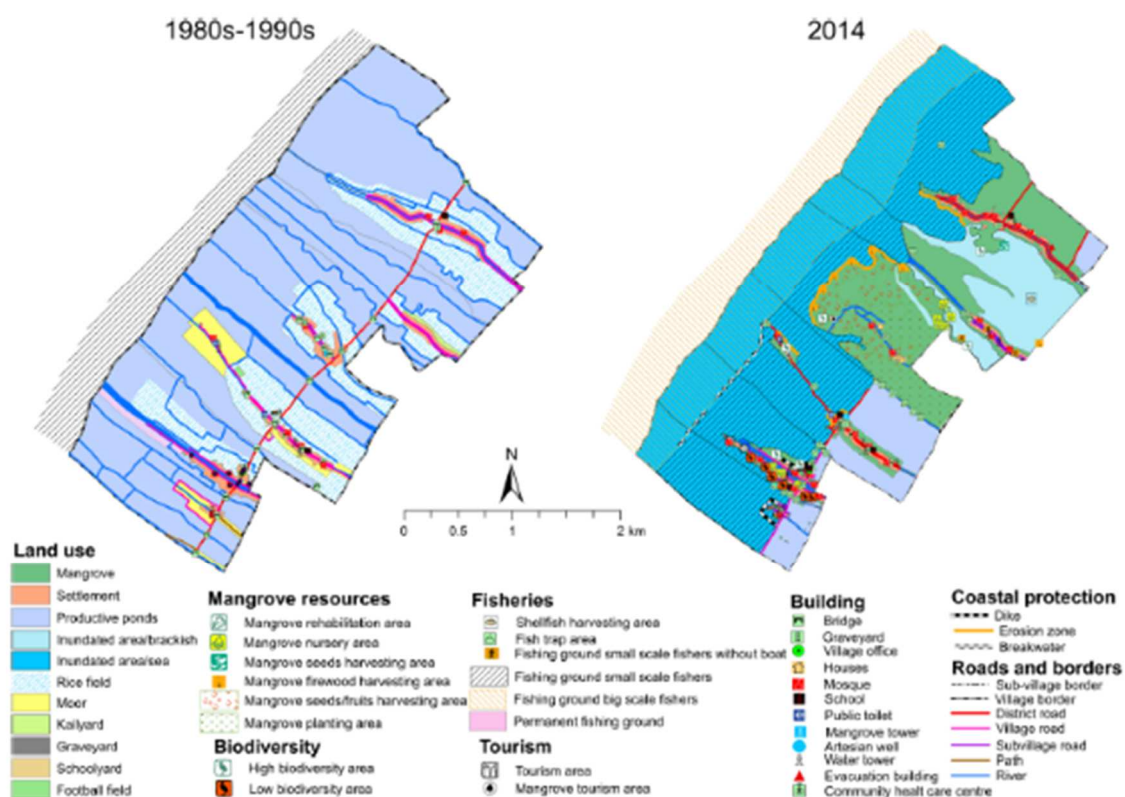
Fig. 2 (left) Historical map (1980s to 1990s) and (right) present map (2014) of Bedono

The villagers of Bedono village confirmed that the mangrove area has been decreasing since 1980s due to the land conversion to aquaculture and excessive of mangroves for firewood. The farmers also convert their fields into fish ponds in the 1990s because of salinization. Intensive coastal erosion in the mid-1990s destroyed lots of fish ponds nearby, forcing many villagers had to change their jobs, and evacuate. Therefore, various efforts were taken to protect the village from further erosion.

1980s-1990s

2014

N

0 0.25 0.5   1 km

Land use
- Mangrove
- Settlement
- Rice field
- Moor
- Kailyard
- Football field
- Productive ponds
- Abandoned ponds
- Inundated area/brackish
- Inundated area/sea

Buildings
- Bridge
- Graveyard
- Village office
- Village hall
- School
- Mosque
- Public toilet
- Mangrove tower
- Sluice
- Artesian well
- Water filtration
- Clean water supply lines
- Water tower
- Community health care centre

Fisheries
- Fishing recreation area
- Fish trap area
- Fishing ground small scale fishers without boat
- Fishing ground small scale fishers

Mangrove resources and biodiversity
- High biodiversity
- Mangrove seeds/fruits harvesting zone
- Newly rehabilitated area
- Pond dikes with mangrove/firewood extraction area

Coastal protection
- Erosion zone
- Concreate breakwater
- Concrete Sea belt
- Dike
- Hybrid breakwater
- Tire breakwater

Roads and borders
- Coastline
- Village border
- Sub-village border
- Village road
- Sub-village road
- Path
- River

Fig. 3 (left) Historical map (1980s to 1990s) and (right) present map (2014) of Timbulsloko

In Timbulsloko village, the mangrove gradually disappeared since 1990s because of the coastal erosion. In 2014, most of the vegetable gardens, rice fields and moors have been replaced by aquaculture or inundated. Similarly, more than 50% of the ponds were flooded and abandoned by the owners.

Major mangrove ES

Provisioning services
- Fisheries
- Food from mangrove fruits/seeds
- Firewood
- Fishing gear
- Construction material
- Seedling nursery

Regulating services
- Protection from storm and wave

Habitat services
- Nursery habitat

Cultural & amenity services
- Mangrove tourism/recreation

PRM Bedono

PRM Timbulsloko

→ Past 1980s to 1990s   → Present (2014)

Fig. 4 Major ES identified by PRM participants

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The figure above shows the major mangrove ecosystem services from the perception of the participants. Because the benefits of mangrove providing food and firewood were not as significant as converting mangrove to aquaculture ponds. This was due to the lack of knowledge about the importance of mangrove. When mangrove was rehabilitated, the increasing market price of mud-crab became one of the income source of the local community instead of only for household uses. Also because of the inundated farms, the farmers began small-scale business such as extracting fishing gear and seedling nursery from the mangrove.
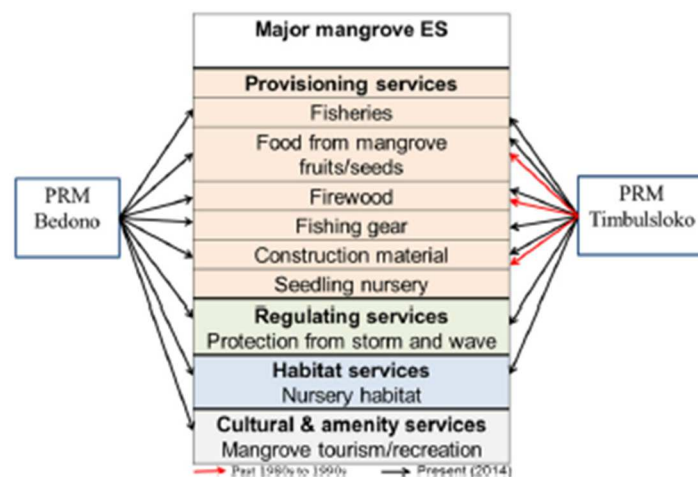
Result/ Output - Advantages:

Community:
- able to gain new insights on the village potential such as fishery and tourism;
- facilitated learning and knowledge exchange;
- became more confident in communicating their ideas, opinions and management plan to the government and NGO (bottom-up communication) for the first time.
- The participatory ES mapping can facilitate social learning, provide the foundation for the creation of social capital, and equip the community with sufficient spatial information to improve local mangrove management.
- PRM also provided detailed information on the causes of the changes which are important for effective management.

Result/ Output - Disadvantages/ Challenges: PRM is affected by existing rules and norms, participants' experience, conflicting interests, and facilitators' skills in facilitation.

Tip for MOFR: Mapping the change over time would create new insights on the village potential. Involving the community members in the participatory mapping process is empowering the local community to improve local resources management.

Source: (free source) https://link.springer.com/article/10.1007/s10113-018-1378-7

Case 7 - Enabling Participatory Planning with GIS: A Case Study of Settlement Mapping in Cuttack, India

Authors: (Livengood & Kunte, 2012)

Objectives:

1. To set a precedent for a community-based implementation of RAY (a new national housing programme)

2. To empower the urban poor with new knowledge and tools to help them articulate their needs and demands using digital media

Location: Cuttack, India

Method:

1. Requested permission to survey with leaders and residents to fill a profile form which include settlement location, boundaries, population, number of houses, roads condition, number of community and individual toilets, access to water, risk of flooding and other natural resources.

2. Explained to the leaders the needs of boundaries, how to collect boundary data with GPS and the resulting map.

3. Collected GPS points every 3-5 meters. Marked the points inside and outside of the settlement if any barriers for correction with GIS later.

Note: GPS data is essential because many boundary lines aren't able to be collected via remote sensing. Besides, by looking at aerial imagery, the adjacent but separate slum community could not be differentiated.

Result/ Output - Advantages:

- Requesting permission was a chance to explain the project purpose, and how GPS works, which made engaging the community participation and decision-making stage easier.
- Involving community leaders ensured better accuracy and higher degree of community participation.

- It enabled the mapping team to verify the condition of the slum.

Result/ Output - Disadvantages/ Challenges:

- The use of GIS for planning applications can create confusion about facts and interpretation if failed to prove the source and method of data collection, and why certain data were selected for analysis.
- Elders were generally uncomfortable with the new technology, some residents may feel insecure for sharing information, and the scalability of the project to be applied in other cities.

Tip for MOFR: This study was mainly conducted by the government and supported by some community members interested to help, to collect data about the slums communities in India. Therefore, this is another suggestion for MOFR to collect required data while helping the communities.

Link: (free source) https://journals.sagepub.com/doi/full/10.1177/0956247811434360

Case 8 - Group Tierra: GPS Supported Community Mapping in Nicaragua

(From the book, Participatory Mapping as a tool for empowerment: Experiences and lessons learned from the ILC network)
Author: (Di Gessa, 2008)

Objective: To have a better knowledge of the community's territorial assets

Location: Nicaragua

Method:

1. Organized an inclusive meeting with the local community

2. The participants familiarized and understood the map by identifying the location of the participants' villages

3. The participants began adding information on the map by discussing what to show, and how to show on the map in groups

4. Each group presented their map for validation before digitizing.

5. Used GPS to measure the parcels sizes with villagers familiar with the area

6. Handed resulting maps to the community

Result/ Output - Advantages:

- Allowed the identification, resolution and conflicts prevention over land and natural resources.
- The methodology helped the community to further develop their capacity to communicate with other stakeholders such as the government.
- Resulted in better land and natural resources management, and sustainable territorial planning.
- Sustained the empowerment of local communities.

Result/ Output – Disadvantages/ Challenges: Nil

Source: (free source)
https://www.participatorymethods.org/sites/participatorymethods.org/files/particpatory%20mapping%20as%20a%20tool%20for%20empowerment.pdf

Case 9 - HARDI: Citizen's Cadastre in Madagascar Using Satellite Imagery

(From the book, Participatory Mapping as a tool for empowerment: Experiences and lessons learned from the ILC network)
Author: (Di Gessa, 2008)

Objective: To create a citizen's cadastre to enhance land tenure security, take farmers into consideration and respect the juridical framework

Location: Madagascar

Method:

1. Prepared via discussions

2. Informed the community via pamphlets and radio

3. Gathered the community for discussion facilitated by an agent of the land office and a representative of HARDI.

4. Examined one plot after another. Plot with multiple owners initiated a conflict resolution process. Then, the neighbor validated the position of markers. If failed, initiated further conflict resolution.

5. Land committee and land office officials identified and recognized land rights based on official documents. The owner answered questionnaires to record land situations, and to compare administrative law with customary rights before signing a certificate of recognition before the community.

6. The owner also demarcated land on the tracing paper stick on satellite image before the neighbors who validate the result before digitization to create.

Result/ Output - Advantages:

- Localized land registration and reduced government workload.
- Could prevent conflicts by identifying and recognizing local farmers' land rights and enhance their land tenure security.
- Strengthened community cohesion when the community worked together in solving conflicts.

Result/ Output – Disadvantages/ Challenges: Nil

Source: (free source)
https://www.participatorymethods.org/sites/participatorymethods.org/files/particpatory%20mapping%20as%20a%20tool%20for%20empowerment.pdf

Case 10 - Using Community Information Systems (CIS) to Express Traditional Knowledge Embedded in the Landscape

Authors: (Corbett & Keller, 2006)

Objectives:

1. To examines alternatives to typical GIS

2. To support indigenous communities in expressing, documenting, visualizing and communicating their traditional and contemporary land related knowledge using geographic ICTs

Locations: Two neighboring Benuaq Dayak villages in West Kutai in the province of East Kalimantan, Indonesia: ① Benung ② Tepulang

Method:

1. Introduced the project to the community.

2. The community determined the information they wanted to collect and its usage, the person in charge of information collection and the use of video, camera and computer equipment, the knowledge sharer, the accessibility of information, and the storage and maintenance of equipment.

3. Capacity building by training selected community operators and villagers to use camera, video, and computer equipment.

4. The community started gathering information, editing and managing.

5. The researchers obtained the community feedback of CIS Content informally

Result/ Output:

- Uses of CIS: recording of cultural information, documentaries (eg. Promises made by a timber buyer to community leaders), political information (eg. Video of the local community explaining to the government officers on why they should be

allowed to harvest timber) and commercial information (eg. Selling of documentation of some traditional ceremonies).

Result/ Output - Advantages:

- The CIS, which was used to record cultural information and documentaries might be useful for communication with outsiders or as evidence in the future.
- Recorded political information helped the community to gain political support and create alliances with more powerful stakeholders.
- The community generated innovative ways by commercializing their skills and cultural information and documentaries to outsiders using VCDs.

Result/ Output - Disadvantages/ Challenges: The sustainability of the project was relying on the pre-existing authority condition which may cause conflicts, the maturity of the operators, the leadership capability of the village leaders, and the commitment of the villagers.

Source: (free source)
https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.606.2397&rep=rep1&type=pdf

Case 11 - Participatory GIS in a Sustainable Use Reserve in Brazilian Amazonia: Implications for Management and Conservation

Authors: (Bernard, Barbosa, & Carvalho, 2010)

Objectives: To perform Participatory GIS in sustainable use reserve and discuss its implications for the management and conservation of the area.

Location: Maués State Forest, Brazil

Method:

1. Research team consisted of 2 geographers, 1 forester, 1 agronomic engineer, and 2 biologists with experience in semi-structured interviews.

2. Sent invitations to the villages' representatives via radio or letters which included a short explanation of the purpose and request to participate because those villages were located too far away and were accessible by boat only.

3. Meeting started with introduction and clarification of basic information (eg. the reserve system and categories adopted in Brazil, land tenure rights, the use of natural resources, and the dos and don'ts of the environmental legislation)

4. Mapping started with explanation and practices to locate places on satellite imagery they were familiar with (eg. main rivers, their communities, houses etc).

5. They were asked to stick colored stickers (color-coded system), which represent different attributes (ie. yellow for houses, orange for agricultural area, red for hunting, deep blue for fishing, green for natural resources, light blue for livestock farming on the printed and laminated satellite images with the size of A3 or A2.

6. Additional information were refined via semi-structured interviews to define the diversity of plant species in their plantations, the animal raised, hunted and fished, and natural resources their extracted.

7. Ground truthing to validate the data collected with GPS accompanied by a villager.

8. Maps and data analyses using ArcView 3.2 software. Color-coded system was maintained, and GPS coordinates were added. 2-km radius circular buffers around each identified point to estimate the areas residents were using.

9. Resulting map was printed, laminated and sent back to the villages. Data were also made available to the *Agência de Florestas e Negócios Sustentáveis do Amazonas* (AFLORAM) for Maués State Forest (MSF)'s management planning and zoning.

Result/ Output:
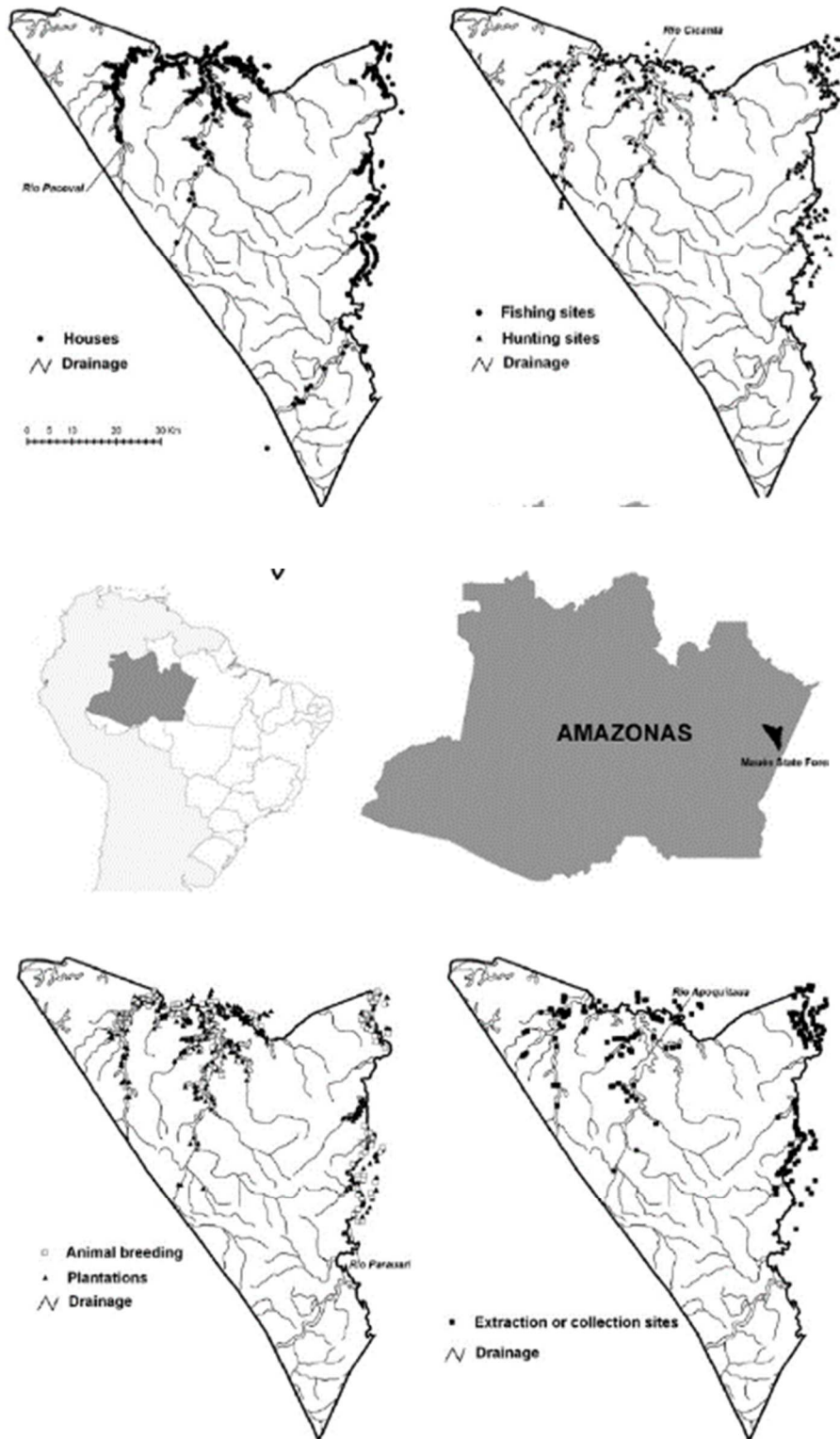
Location of houses, plantations, hunting, fishing, collections and other sites of interests.
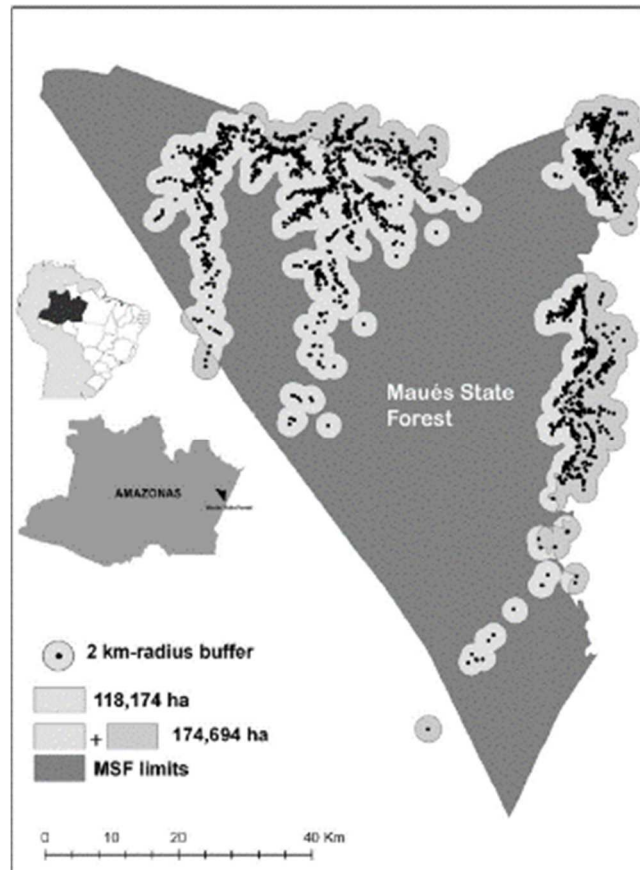
Buffers around each identified points of houses, plantations, hunting, fishing, collections and other sites of interests allowed an estimation of the area used by the communities.

Result/ Output - Advantages:

- Data collection could be done with 15 communities and 415 families in less than 20 days, and at an affordable cost of less than US$ 10,000 (transportation cost was the highest) on how local communities used natural resources in a sustainable use reserve (SUR) in Brazilian Amazonia.
- The methodology allowed the visualization of hotspots, areas and resources under stronger pressures or heavy usage.
- Semi-structured interviewing method also provided more information such as the practices of the communities (eg. slash-and burn technique for agriculture), the underlying causes of certain action take n by the communities (eg. the communities plant perennial or semi-perennial species such as cassava, banana, and guarana around their residential area and they also plant cyclic crops such

as beans, corn, watermelon and sugarcane because of the area have better soils), and the uses of certain natural resources (eg. timber, which was the most important, was used for construction of houses, storage houses or boats; turtle eggs, was the second most important extractive products).

- Digital data allowed the calculation of the total area use by the communities for their livelihood.
- The data were used by AFLORAM as a baseline for MSF's management plan, including a tentative zoning of the area

Result/ Output – Disadvantages/ Challenges: Nil

Tip for MOFR: If well planned, participatory mapping may help MOFR to collect data in a shortest time and lowest cost.

Source: (non-free source)
https://www.sciencedirect.com/science/article/abs/pii/S0143622810001621

3: Advantages and Importance of Participatory Mapping

3.1 Effective and Efficient Data Collection

The participatory mapping which usually gathers a small to large group of people for a focus discussion and semi-structured interview at once, will help to shorten the project length and cost. Therefore, when the organization, municipal, and regional governments organize and execute the participatory planning process in a well-conceived manner, data collection can be done with low costing and time consumption (Valencia-Sandoval, Flanders, & Kozak, 2010). According to Bernard and his team (2010), transportation was the most expensive expense, particularly traveling from one place to another to validate data during ground truthing because most governmental departments or NGOs would already have technological items such as GPS and laptops. They also said the local communities were good at mapping once they knew how to read the map and their accuracy rate was very high.

3.2 Data Collection for Sustainable Development

Sustainable development means developing without taking away the right of our future generations to enjoy the same resources that we are enjoying today. It is assured by identifying available resources by engaging the community to generate values (Zerrudo, 2008). In other words, we need data not only from government database, but also the community before we could identify the value of resources and utilize sustainably the resources for development.

According to Zerrudo (2008), there are four stages to develop sustainably: ① awareness through resources identification, ② appreciation through community organizing and capacity building, ③ protection and conservation, and ④ sustainable utilization. For example, when the community of Vigan City in the Philippines can identify the cultural heritage resources that they have, they can organize various cultural activities such as tours, training, seminars and competition to mold individual local

members towards a common vision, goal and interest. This would induce a momentum which eventually forced the government in formulating policies to better preserving and conserving the heritage resources. Moreover, the locals can utilize the heritage resources to generate income in areas such as tourism, arts, food and beverages, health, etc, which would eventually develop the area.

3.3 Identify the Real Needs of People

Participatory mapping provides opportunity for the local community to present their needs and priorities in development (Kingsolver, Boissière, Padmanaba, Sadjunin, & Balasundaram, 2017; Townsley, 1996; IFAD, 2010). The stakeholders such as government, NGOs, and researchers can identify the underlying issues and be more certain that the responses mean the community's real needs, hence, are able to cater to them better.

3.4 Ensure Project Sustainability

Participatory mapping which aims to involve the local community in planning, data collecting, data analyzing, and solution designing, especially about their priority issues, give them a sense of ownership to the project. A sense of ownership encourages the community to commit themselves in the management and implementation of the project, and eventually be self-reliant. Townsley (1996) said when a community does not have a sense of responsibility and feel being exploited by a community project run by outsiders, they will usually have problems of mismanagement and theft.

3.5 The Establishment of a Better Resources Management Plan

3.5.1 Without compromising local community needs

A lot of time when government designates a protected area, the government uses top down governance approach, which usually resulted in conflicts with local indigenous community, particularly on the use of land (Voo, Mohammed, & Inoue, 2016; Gilmore &

Young, 2012; Mapedza, Wright, & Fawcett, 2003). Participatory mapping which aims to understand the local community's perception by integrating them into natural resource management such as forest management and decision-making, could identify the community use area, and their trails and resource extraction routes. These information allow the government to designate protected area with zoning, reduce illegal encroaching and harvesting of forest by the outsiders (Voo, Mohammed, & Inoue, 2016; Bernard, Barbosa, & Carvalho, 2010), as well as to include as many biologically and culturally significant sites identified by the local community as possible (Gilmore & Young, 2012).

3.5.2 Effectively mitigating environmental effect

Involving the local community participants may help them to engage with government officers to effectively mitigating environmental effects (Kingsolver, Boissière, Padmanaba, Sadjunin, & Balasundaram, 2017), or defend their village from ill-conceived development (Gilmore & Young, 2012). It also support forest conservation through discussions that involve the local community and relevant stakeholders and spatial analysis by producing zoning maps that led to designation of the community conservation area (Ioki, et al., 2019)

3.6. Generate New Insights Which May Lead to Innovation

None in this world know all things. Even every individuals in a family or a community has different types of knowledge (Gilmore & Young, 2012). For example, a crab gatherer can provides critical information about where and how to catch crab in the mangrove area, which other hunter, cook, and planter cannot. Besides, no one knows better than the community themselves in where they have been living for generations. With the inputs of their local knowledge, known or previously unknown cultural and natural assets, both tangible and intangible, can be identified.

Once identified, it is easier to plan for development via the identified gaps and opportunities and the linking of assets to enhance experience (Ferguson, 2017). Such a process usually generate innovative ideas and plan that would empower communities and create partnerships under a common cause. For instance, the community of Benung village in Indonesia managed to come out with an innovative idea to package and sell

the recorded video for the project in VCDs on traditional carving methods and traditional ceremonies (Corbett & Keller, 2006).

3.7. Local Community Empowerment and Capacity Building

Participatory mapping which encourages the involvement of the local community usually leads to the empowerment of local people towards a more equitable society. It also empowers weak groups in access to, and control over resources, as well as to promote people' initiative, local control and ownership. The two main capacity building are the facilitation and mapping technologies (McCall, 2004).

3.7.1 Capacity building - facilitation

Facilitation skills is one of the essentials in leadership. It enables a leader (or the village's head) to better handle and deal with his/ her team (or villagers), stakeholders, or collaborators of any kind (eg. improving and developing the village). In general, a good facilitator can create an optimal environment for people to think critically and cooperate.

A participatory mapping project usually needs a facilitator, especially a local who has basic knowledge of the area, the ability to listen, and communicate clearly. It provides an opportunity for the local community members, who fully participated in all mapping sessions, to learn about the project and the facilitation techniques from the organizer by helping to lead and facilitate (Gilmore & Young, 2012; Kingsolver, Boissière, Padmanaba, Sadjunin, & Balasundaram, 2017).

3.7.2 Capacity building - Mapping Technologies

Participatory mapping can also be known as Participatory Geographical Information System (PGIS) if the activities include the use of spatial information technologies such as Geographical Information System (GIS), Global Positioning Systems (GPS), and remote sensing. Depending on the project's purposes, some mapping activities provide training to the local community members on how to use electronic devices such as smart phone and tablet, video recorder, voice recorder, digital camera, computer, video and

photographs editing and GIS software, usually with the aim to ensure the sustainability of the project (Corbett & Keller, 2006; Gilmore & Young, 2012). Transferring these technologies to developing countries provide them the opportunities to advance in communicating domestically and internationally (Kyem, 1999).

3.8 Increase Successful Rate through a Shared Ownership

Participatory mapping emphasizes on the word, 'participatory'. Involving the local communities and relevant stakeholders throughout the project by enabling them to have full control over the visualization, utilization, dissemination, and management of data creates a sense of shared ownership. Hence increasing the successful rate of the project's implementation (Thomas & Middleton, Oct. 2003; Gilmore & Young, 2012; Griebel, 2013).

3.9. Record Local Knowledge before Losing Them

Rapid economic, political and cultural changes in the world, including the local level hasten the loss of local traditional knowledge (Corbett & Keller, 2006). For this reason, the indigenous communities are in need of a way to record and preserve their knowledge, especially the oral traditions such as stories, songs, dances, oral histories, myths, rituals, community laws, local taxonomy, agricultural practices, traditional biological, ecological and geographical knowledge within the community and between generations (Corbett & Keller, 2006; Gilmore & Young, 2012; IFAD, 2010).

The inclusive nature of participatory mapping, which engages as many community members as possible, including the elderly, adults, youth and even children of both genders, allows the sharing of knowledge among individuals in a community and also between the elder generation and the young generation (Gilmore & Young, 2012). Though the participants might come from the same community, different social groups would have different concerns. For instance, Corbett and Keller (2006) stated that younger and middle-age men were usually concerned about the economy and politics

while the elders and women about the sustenance of traditional knowledge, especially in history, culture and customary laws. Meanwhile, Mapedza and his colleagues discovered that (2003) women were more aware of a reduction in vegetation cover and knew more uses of tree species than men.

Nevertheless, the local community should take note that maps only record spatial and time data, hence unable to record all data perfectly (IFAD, 2010). For this reason, multiple methods and techniques such as embed multimedia information (video, audio and text files) in a map shall be utilized together (IFAD, 2010; Corbett & Keller, 2006). And one of the comprehensive and powerful tools is the Story Map from Esri, which harnesses the power of maps to tell stories that matter.

4. Disadvantages and Challenges

4.1 The Difficulty in Adopting New Technology

Though the use of technology such as GPS, GIS and remote sensing provide higher

quality and accuracy datasets during acquisition, they are something challenging to be used by all levels of people because of a few reasons below:

4.1.1 The barriers of senior citizens

Health conditions such as vision loss, difficult to focus, lack of knowledge and confidence, as well as skepticism and fear of the unknown were the major barriers that made it harder for the senior citizens to learn to use technologies (Vaportzis, Clausen, & Gow, 2017). Therefore, many of them would have a hard time in participating and using mapping technologies (Weyer, Bezerra, & De Vos, 2019; Livengood & Kunte, 2012).

4.1.2 The poverty

Developing countries, especially the least developed countries such as Solomon Islands, Cambodia, and Madagascar have high poverty rates. Poverty is a trap that is difficult for those countries and communities to detach from with their own strength (Chowdhury, 1995). Because of poverty, school dropout rate and illiteracy rate are high and basic services and essential facilities such as electricity, clean water, proper sanitization and sewage are lacking (CEDT, Unknown; Chowdhury, 1995; Weyer, Bezerra, & De Vos, 2019). Therefore, most participatory mapping projects with the community required the assistance of external organization(s) in terms of knowledge transfer, equipment sponsorship, and financial support.

4.2 The Difficulty to be Inclusive

Being inclusive is a foundation of participatory mapping. Most participatory mapping would try to involve as many groups such as youth, women, and elders as possible. However, in some cases, it is very difficult to be inclusive for the reasons stated below:

4.2.1 Social Status Issue

Though obtaining the assistance from the village leaders and the elites may make organizing the meetings and workshops easier, there is a tendency whereby they would dominate the discussion, which somehow restricts the participation of other participants (Weyer, Bezerra, & De Vos, 2019). Also, the average community members may feel uncomfortable or dare not voice out their opinions with the presence of people with high

authority.

4.2.3 Geographical barrier

Participatory mapping projects which take place in the rural areas of developing countries usually are underdeveloped without proper facilities such as roads. It becomes even more difficult if the project includes a few communities because the participants have to travel some distance to attend the program on an allocated day (Mapedza, Wright, & Fawcett, 2003).

4.2.4 Methods Applied

Some methods such as the use of GPS and GIS, though provide higher accuracy, they indirectly excluded some members in a community, especially those elderly and illiterates (Livengood & Kunte, 2012; Weyer, Bezerra, & De Vos, 2019). Such conditions might further intensify existing injustices, and isolate the already isolated community (Weyer, Bezerra, & De Vos, 2019).

4.3 The Differences in the Facilitators' Capability

Facilitator is the key person who conducts the entire mapping process. He/ she has to understand the local context, build relationship within a community, provide thorough explanations, uses and limitations of maps, GPS and software used during the process, and create an encouraging environment to help participants feel comfortable and confident in the process (NOAA, 2015; Weyer, Bezerra, & De Vos, 2019). A facilitator also has to deal with conflicts, dominating and offensive individuals, and maintain positive group dynamics. Because of various roles a facilitator has, having different levels of facilitation skills would also generate different results even though they are using similar tools (Damastuti & de Groot, 2019)

4.4 The Possibility of Inaccurate Information

Information may be or become incorrect during the data collection phase, or data analysis and interpretation phase (de Paiva, 2017):

During the data collection phase, the participation of key knowledge holders of the areas can influence the precision of the mapping process (Bernard, Barbosa, & Carvalho, 2010). Some local community members, especially those in authority position may choose to withhold information because they lost trust in external powers due to the reasons that they may have heard of other community or have personally experienced being taken advantage of by certain group of organization and authorities (Weyer, Bezerra, & De Vos, 2019). On the other hand, those in authorities or the government staff who may be involved in the participatory mapping process may provide information which are different from the local community to maintain their status and/or ensure their personal gain (Mapedza, Wright, & Fawcett, 2003).

During the data analysis and interpretation phase, the facilitator and the technician who edited and visualized the data, may cause a divergence of data from its original meaning because they may have a different understanding of collected data (de Paiva, 2017).

4.5 The Potential of a Community Being Exploited

According to Weyer and his colleagues (2019), locals may be inclined to maintain submission to outsiders who appear to be richer and advanced than they are. Another reason may be due to the community's historical background of being tyrannized unjustly for a long period of time. They would accept directly everything given and requested by outsiders without any further questions. Moreover, when the data and maps are accessible to the outsiders, the community may become vulnerable to exploitation (Damastuti & de Groot, 2019), and in face of legal action against their traditional practice which has now violated the law.

4.6 Raising Unrealizable Expectations

Because Participatory Mapping activities generally encourage the local participants to voice out their needs and issues, and brainstorm for solutions, the participants may have certain expectations, which may not be fulfilled (Damastuti & de Groot, 2019). This can be due to the discouraging political situation, the local power and social structure or bureaucratic issues in institutions (Townsley, 1996; IFAD, 2010). If the community is

having unrealistic targets and without tangible results, they may be burned out with a series of activities (Gabriel, 2016). Such condition would reduce the trustworthiness of the project team which eventually resulted in the project failure.

4.7 Taking People' Time

The participatory mapping projects can be lengthy and required lots of time from participants. The participants may be busy earning a living from activities such as agriculture, hunting and natural resources extraction (IFAD, 2010). Sometimes because of the hospitality nature of the locals, they will still host the participatory mapping team by sacrificing their time. Therefore, it is important to understand their busy period and refrain from conducting participatory mapping activities during those periods, as well as compensate their time with a considerable amount of stipends (IFAD, 2010; Damastuti & de Groot, 2019).

4.8 Maps created for project purpose may be valuable to the project team only

The project team may have decided their own purposes of the project without involving the community at an early stage. Therefore, the maps produced at later stages neither address the community's needs nor represent the entire community's perception and interests (IFAD, 2010; Griebel, 2013). In this case, giving back the map to the community is often meaningless because the community does not know what to do with the maps and would not feel that they are the owners of the map. They want to be the owner who has full control on how the information is represented, used, disseminated, and preserved (Griebel, 2013). Otherwise, the community and other communities might be unwilling to join in future similar projects.

5: Participatory Mapping in Komuniboli and Falake of Solomon

Islands

5.1 Title

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

5.2 Objectives

The project has three objectives or outputs stated in the above figure. However, this section only focuses on the output 3, which is the SFRM Pilot Activities, initiated by the communities and supported/ facilitated by MOFR, were implemented.

In other words, the main objective of the participatory mapping in this section is to empower local communities in initiating Sustainable Forest Resources Management (SFRM) pilot activities. And there are six(6) sub-objectives listed below:

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

Sub-objective 2 & 3 in bold above are the main focus in this section.

5.3 Location

① Komuniboli community in Guadalcanal province & ② Falake community in Malaita province.
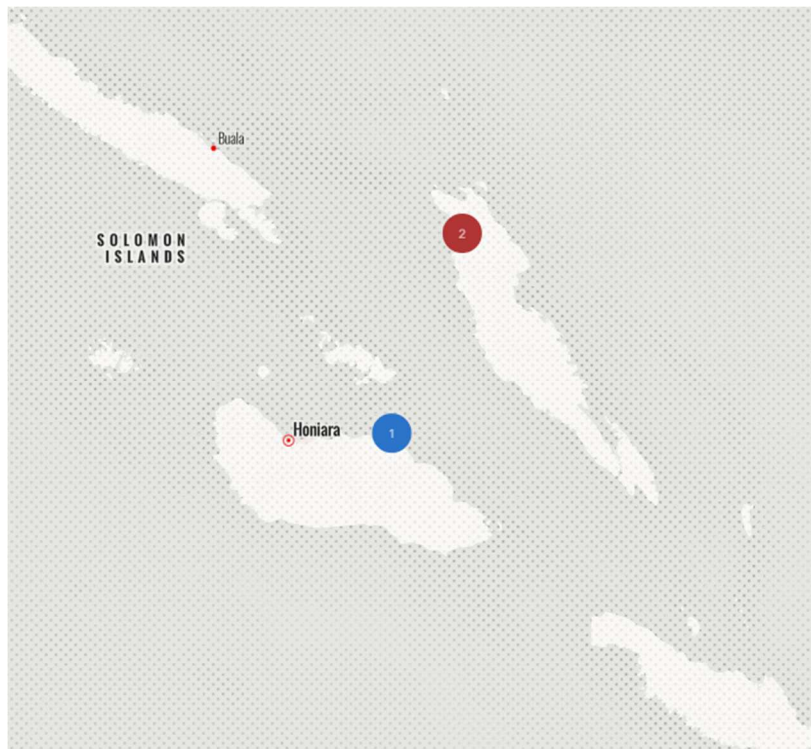
5.4 Method

To achieve sub-objective 2 and 3, there are many methods and one of them is participatory mapping. Participatory mapping, which include groups of community members (ie. youth and women) in planning since the beginning of the project, cultivate a sense of ownership among the participating community members, hence ensuring a higher chance of achieving a sustainable forest resources management activity. For this reason, it is the main method depicted in this section.

The figure below shows a chart of how MOFR, while receiving technical support and training from JICA Team, can collaborate with the community to collect and create a database of natural resources through participatory mapping, which eventually assist the community to initiate community-based Sustainable Forest Resources Management (SFRM) Activities. However, because this project has yet to be finished, this section only depicts how MOFR can collaborate with the community members through participatory mapping to collect data for community profiling (5.4.1 to 5.4.4), and to develop community-based Pilot Activities (5.4.4 to 5.4.9 and to be continued).
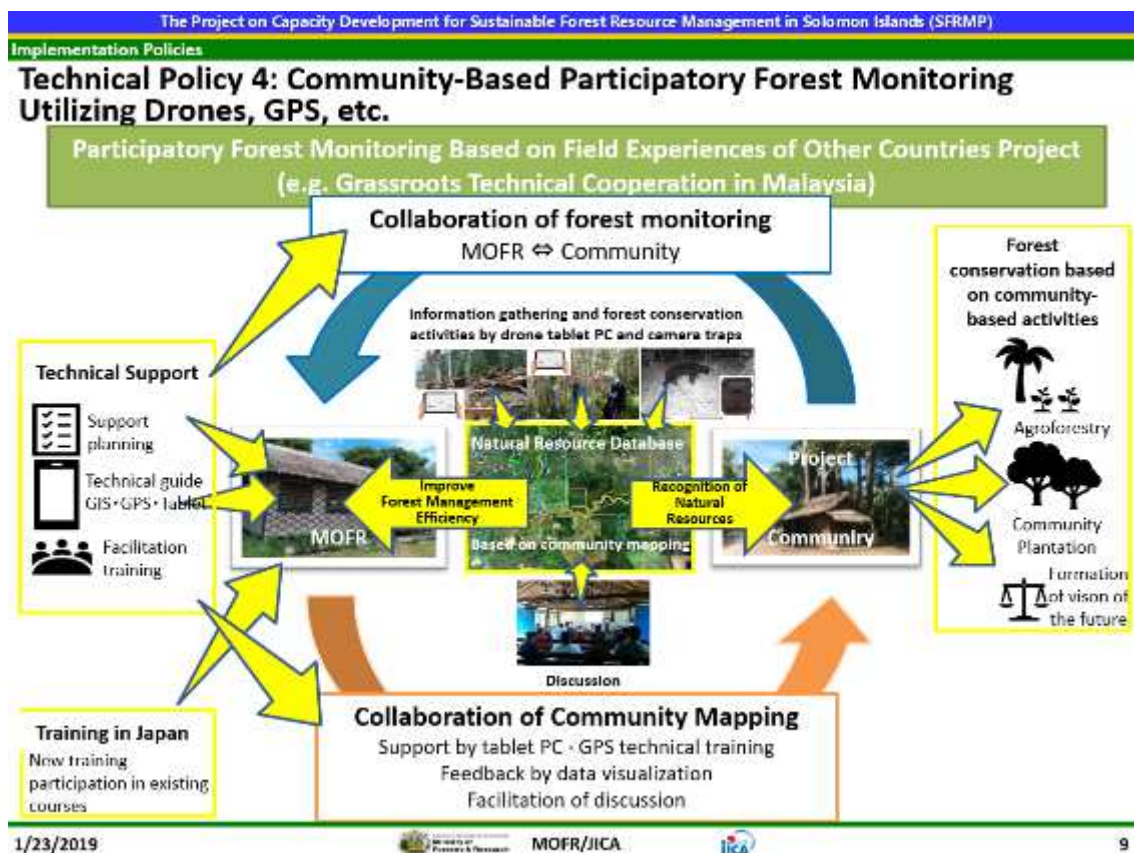
5.4.1 Got to know the community and obtained the informed consent

1. The introduction of relevant stakeholders, in this case the Ministry of Forest and Resources (MOFR) and project staff (the JICA team), the community, and Ado Rural Farmer Association (ARGA, the local forest cooperative)

2. The community leaders introduced the community to the outsiders (the project staff and MOFR)

3. Expert from the JICA team explained the project, the concept of sustainable forest resource management activities with community participation (pilot activities) and Memorandum of Understanding (MoU) details

4. Obtained consent forms from each household in the community

5.4.2 Data collection & training

5. Conducted a GPS training through lecture and practical for a boundary survey.
   (a) The survey divided participants into three groups to survey three different areas (hilly areas, flat areas, and along the rivers). Each group consisted of MOFR staff and community members, and their responsibilities were to record GPS data, take photographs and mark the boundary (usually painted light colour on trees).

6. Community members sketched and mapped their available resources, including high social, cultural, and conservation value sites. The following sites were identified as high conservation values (HCV) sites, which should be taken into account when planning forest management:

   (a) The First Settlement Area is where the ancestors first settled and is considered a sacred place.
   (b) Marshy area, known in Christianity as the Devil, where the goddess of water lives. However, we did not identify the area because it is a taboo to be shown on the map.

(c) A custom site called Sabo Popo or Wooden Bowls, which is no longer an object of worship due to the heavy Christian influence, but continues to be recognized as a sacred place.

(d) Warriors' baths (no longer in used but is still recognized as a respective sacred place, where no logging is allowed in the area)

(e) A small pond in the forest that serves as a fishing spot, where there is a tradition related to snakes.

7. Semi-structured interview was also conducted.

8. Conducted a training on how to use Avenza app installed in tablets for ground truthing.

(a) Ground truth (transect walk) with GPS and tablets which contained the Avenza app. Also taught the interested community members on how to use GPS and tablets.

(b) Conducted semi-structured interviews during ground truth (transect walk).

MOFR members were signing the MoU with the Falake community

MOFR members were introducing themselves to the Falake community members

A trial GPS transect walk in the forest, using GPS and Avenza Map installed in a tablet.

GPS Training

Boundary Marking

The location and access load of the resource obtained on the Avenza Map.

5.4.3 Collected data transcribed onto new maps

9. The JICA team transcribed collected data, boundary data and ground truth data, onto new maps, and printed out.

5.4.4 Current and Future land use plan

10. With boundary data, the JICA team also prepared a scaled satellite imagery map of the two communities' villages, printed out on a large sheet of paper and laminated with fluorine film that allowed the community members to draw with whiteboard markers and erase with a duster.

11. Conducted a Land use (LU) planning session with the community by creating two maps, namely the current LU map and future LU map.

5.4.4.1 Created current land use plan

12. The community members were divided into women and men groups so that the women can voice out their views without men interfering. This is particularly important if the community was patriarchal. Of course, depending on the community size and the availability of facilitators and time, more groups (eg. youth, elderly, and kids) can be formed.

13. For each group, the facilitators

   (a) Explained the objective: To help the community to understand their resources spatially.

   (b) Explained the expected outputs: Current land/ resources use map created.

   (c) Taught how to read standard maps, by letting the community members to identify the location of their houses, and the rough distance from point A to point B. When some, especially women, could not understand, additional examples/ practices in their local language were given.

   (d) Had the community members to check and compare the resulting maps from steps 8 & 9 above.

      i. Asked if they remember the Avenza Map that they have used to collect data? Asked who was involved?

      ii. Showed them their map (if possible, make them feel excited to see their work)

      iii. Asked if they can remember the location of the pictures? Explained to them by comparing to the map showing their entire region so that they can understand and read maps.

      iv. Also, explained what maps can do, eg. to show location of their resources which enable discussion with outsiders such as the government.

      v. Gave them some time to check and compare with other maps.

(e) Invited the community members to add data on the map with different color of whiteboard marker and sticky note for different groups in creating a current LU map.

(f) Encouraged more discussions, and brainstorming by utilizing his/her understanding about the community culture and lifestyle to ask some questions such as 'where do you get the vegetables that we ate yesterday?', 'where do you get that crab?', etc. Some other examples were the customary site, spiritual site, geographic of the region, land cover, land use, agriculture/plantation/poultry site, historical site, etc.

(g) Also some other questions about ethnobotany could be asked. Eg. What do they get from the forest or their surroundings? What do they use the resources for? Do they know the location of the resources? Any taboo or practice they have to do before taking any products from the region?

(h) Needed to talk and remind the community members about data privacy, the MoU they signed from time to time that the data they shared would be shared among the community, MOFR, and the JICA team only. This is because some community members felt naked and threatened by the sharing of their knowledge.

14. Each group was called to present their results and then discussed to reach a consensus.

15. The community members were asked to share their thoughts about their map, and information related to the land use situation to access the needs, policies, ideas, and land-related issues.

16. Presented a video on a successful participatory mapping project in Batu Puteh Village in Sabah State of Malaysia.

The women of Komuniboli were trying to check the maps created based on the data they collected with Avenza Map app (GPS Transect Walk) while trying to understand how to read maps.

The men group of the Komuniboli was trying to plot the current LU map on the large sized fluorine-film laminated satellite imagery.

Presentation from each group (men and women) with the aim to reach a consensus of the current LU map in Komuniboli

The women group was trying to plan for their future LU map

The result of GPS Transect Walk in the Falake village

The women group of the Falake was trying to plot the current LU map on the large sized fluorine-film laminated satellite imagery.

Presentation from each group (men and women) with the aim to reach a consensus of the current LU map in Falake

The current LU map created by the community members in Falake

5.4.4.2 Discussed and created future land use map

17. The facilitators:

    (a) Explained the objectives: To make future land use plans with map (Not final).

    (b) Explained the expected outputs: Future land/resources use map drafted for the first time.

    (c) Explained how to make future land use plan stated as below:

In planning, we usually require to create more than three maps for various focuses such as conservation, economy, development and/or a mixture of all. Nonetheless, we did only two maps focusing on conservation and economy due to resources (ie. only two A0 size fluorine film laminated satellite images we had) and time constraints.

Even though conservation-focus maps focus on conservation, it still has other land use areas such as economic and agriculture areas and vice versa. Economic map means the area/ location designated for activities to raise money or make provision. Examples are agriculture, logging and other types of harvesting.

18. Invited experts of forest management laws, Mr. Eric from the Ministry of Forest and Resources to explain relevant laws and regulations to the community members. Below is what he had stated:

Must designate a buffer zone of 40 m at both sides of rivers and streams. Neither logging activities nor residential areas are allowed in the buffer zone.

No logging is allowed in areas where the steepness is larger than 30 degrees.

19. Divided the villagers into two groups (conservation-focus & economic development focus) and started planning.

    (a) For the conservation-focus map, the planning started with designating the conservation area and then the rest. Meanwhile, the economic development focus map focused on the development of the village, such as timber logging and farming expansion. Undecided areas can be left as white/ blank areas whereby villagers can decide later.

    (b) Might need to ask some questions to assist the villages when they do the planning. For example, we asked, "What's this?" while pointing at something on the map; and also asked questions based on the lifestyle, culture or the current land use map they created.

20. Conducted a comparative analysis of two land use planning proposals by discussing with the community members the differences between the two maps to identify the agenda to be considered and the details.

21. Reminded the community members that the two land use planning maps they created were not final because they could alternate accordingly based on their internal discussion, inputs from members who did not attend our workshop, and other information they obtained.

5.4.5 Digitized both current and future land use maps

22. The JICA team digitalized both the current LU map and future LU map and printed out.

5.4.6 Reviewed & finalized the current and future land use maps

23. While explaining the information plotted on the current LU map, the facilitators checked by comparing them to the topographic map and GPS location information confirmed during the GPS transect walk, revised the land use map, confirmed the accuracy of the information, and finalized it.

24. Based on the findings of the finalized current LU map, we asked the community members to finalize the land use plan by integrating the two future maps (Conservation Focus and Development Focus) they had prepared in advance.
    At that time, the facilitators:

    (a) Explained the uses of the topographic maps, ie. to identify the riparian buffer zones, steep slopes, and catchment areas of water sources which had not been given special consideration in the current land use situation.

    (b) Explained the potential environmental impact of deforestation and other activities in these areas on water sources and soil.

    (c) Encouraged them to consider the size and scope of the area allocated as a conservation area based on the topographical map.

25. The community members presented their final LU map planning while the facilitators verified again with the community members with some questions listed below:

    (a) What is/are the use of an area that does not belong to any use zone in the land use plan?

(b) Is the land use plan following the policies and approaches for delineating the boundaries of a core conservation area (a totally protected area), and a buffer area which allows a certain amount of logging and collection of secondary forest products under strict rules?

(c) Is the location information on the map accurate?

(d) What is the scale of pilot sites allocated for agroforestry-related activities?

(e) What are the approaches to activities in areas where deforestation is allowed, which are catchment areas for streams, creeks, gullys, etc?

Reviewing and finalizing current and future LU maps with the Komuniboli community

The group photo taken with the finalized LU map in Komuniboli

Reviewing and finalizing the current LU map with the Falake community

The group photo taken with the finalized LU map in Falake

5.4.7 Community members determined the objectives of their land use planning

26. The facilitators also assisted the community members to determine their objectives of their land use planning:

    (a) Conducted a brainstorming session to engage the community members in identifying keywords they are concerned about.
    Examples of keywords obtained from the Komuniboli community: next generation, forest conservation, securing and protecting wildlife, sustainable timber supply, livelihood and livelihood improvement, water source conservation and improvement of water supply, soil conservation, and food security.

    (b) Categorized those keywords into groups. Examples obtained from the Komuniboli community: "sustainable forest conservation and forest resource use," "conservation of forest ecosystem services and biodiversity," and "food security and livelihood improvement.

    (c) Determined main objectives. Examples obtained from the Komuniboli community: sustainable forest conservation and use of forest resources, conservation of forest ecosystem services and biodiversity, and food security and livelihood improvement.
    Examples obtained from the Falake community: self-help and self-reliance through livelihood improvement, healthy living (water, sanitation, and housing), food security, and rule-based resource management.

Note: If the community plans to convert a certain land use type to another type in near future (like the case in Falake community), please determine the feasible scope during the project period, and then consider the action plan to achieve it. Also, it is necessary for the parties concerned to reach a firm consensus.

5.4.8 Clarification of the roles of MOFR and JICA team

27. When the community members learned to create their plan, they might request something out of the project scope. If we try to fulfill their request as much as

possible, they might become too dependent on external resources and help, especially from the MOFR and JICA team. For this reason, the project may not last long once the support period ends. Therefore, the facilitators explained the principles and scope of the project listed below:

(a) The work must be under the jurisdiction of MOFR;

(b) The field and content should be related to the project's objectives;

(c) The activities should be within the areas and scopes whereby the Ministry of Forestry and Research and the project staff have expertise;

(d) The amount of activities should be handleable by the local community in terms of manpower, who are the main implementers of the activities;

(e) The amount of activity must be within the time allotted to the local community, and must be feasible to implement within the two-year project support period;

(f) The activity must have the minimum basic infrastructure required to implement the activity;

(g) The activities must be feasible even without allocating the budget for personnel and other necessary expenses to the local community, and the content and amount of activities must be within the budgetary limits of the Ministry of Forestry and Research and the project.

Note: Because the community members felt upset and argued that they have no budget to implement their planning, and that MOFR should have the responsibility to sponsor. The facilitator added some explanation as below:

i. The future LU planning is to be decided and implemented by the local community themselves. MOFR and JICA team are in the position to support them.

ii. Of the expenses required to implement activities, MOFR and JICA team cannot allocate personnel expenses for activities conducted by the local community themselves, but MOFR and JICA will continue to provide support for the procurement of the minimum necessary materials and equipment for implementation. In other words, although they would not receive financial support, they would receive benefits and support such as provision of materials and equipment necessary for the activities and training to strengthen their skills.

iii. It is important to ensure the sustainability of their own planned activities to achieve their own land use plans and objectives. However, it would be difficult to ensure the sustainability of their planned activities after the end of MOFR and JICA team's support if they are overly dependent on external funding and support (importance of ensuring the ownership and initiative of residents and ensuring sustainability).

Responsibility of Key Players

Community: Planner, Implementer, Owner

Provision for Pilot Activity
1) Time
2) Manpower
3) Resources
4) Skills and Knowledge
5) Materials, Equipment
6) Infrastructure

MOFR Pilot Activity Technical Support Committee: Technical Supporter

Provision for Pilot Activity
1) Technical Support
2) Legal Advice
3) Necessary Materials
4) Monitoring & Evaluation

Project Experts & Staff: Facilitator, Trainer, Advisor

Provision for Pilot Activity
1) Technical Advice (Evidence-based)
2) Capacity Development Trainings
3) Materials, Equipment & Instruments

5.4.9 Detailed planning of pilot activities (to be completed and continued)

28. Brainstorming: To list activity ideas for each land use zone

    (a) Divided men and women into small groups.

    (b) Asked them to come up with ideas at various levels (ranging from specific activity names to types of trees and vegetables they would like to plant) in each LU area.

    (c) Broke down the ideas into the smaller activities necessary to realize each activity.

29. Detailed planning of the pilot activities (especially the forest management plan), including the framework, policies, how to develop the plan, and the schedule for developing the plan will be carried forward to year 2021.

The community members of Komuniboli were brainstorming for list of activities to be conducted to achieve their objectives decided earlier.

List of activities for each LU zone.

The community members of Falake were trying to figure out their objectives of their future plan

The man of the Falake community was explaining and sharing the objectives and list of activities they brainstormed.

5.5 Result/ Output:

Komuniboli Current Land Use	Hectare
Conservation	96.0
Ecotourism	0.5
Garden	0.9
Settlement	10.5
NTFP	0.5
Other Tribe Area	3.7
Plantation	6.2
Pond Buffer 1	2.2
Pond Buffer2	2.2
Pond (Core Area)	0.9
Production (Eg. Timber Harvesting etc)	178.5
Swamp Area	43.6
Tamboo Site	2.4
Water Source	0.3
Total	**348.2**

Komuniboli Future Land Use	Hectare
Buffer Conservation Area	67.8
Core Conservation Area	28.2
Ecotourism	0.5
Garden and Settlement	7.9
Agroforestry	5.6
NTFP	0.2
Other Tribe Area	3.7
Plantation	5.4
Pond Buffer 1	2.2
Pond Buffer2	2.2
Pond (Core Area)	0.9
Production Area	122.2
Swamp Area	73.0
Tamboo Site	2.4
Water Source	0.3
Spiritual Site	25.7
Total	**348.2**

(Left): The area of each current land use area in Komuniboli village; (Right): The area of each future land use area in Komuniboli village.

Falake Current Land Use	Hectare
Conservation	76.9
Production	143.3
Plantation	19.8
Reforestation	10.0
Settlement	5.2
Tamboo Site	7.4
Water Source	2.9
Garden	37.1
Total	**302.6**

Falake Future Land Use	Hectare
Conservation	73.9
Sustainable Production	30.8
Coconut Plantation	3.3
Rehabilitation	10.0
Settlement	15.5
Kindergarten	0.2
Church	0.1
Research Facility	0.4
Tamboo Site	7.4
Water Source	2.9
Agroforestry	143.4
Ado Rural Farmer Association	1.7
Enrichment	2.5
Medicinal Plants	0.7
River Buffer	9.7
Total	**302.6**

(Left): The area of each current land use area in Falake village; (Right): The area of each future land use area in Falake village.

5.5.1 Result/ Output - Advantages

The use of aerial photographs and satellite images, particularly the drone ortho-mosaic images with high resolution, provided the opportunity for the community members to view their villages from another dimension, ie. from the sky. Such a bird-eye view is very different from the view the local community have in their daily lives, ie. on land.

1. Since the discussion was based on the location information collected by the local community members themselves, it encouraged them to understand the land use situation in a realistic and concrete manner based on evidence, rather than abstract understanding and thinking of each individual.

2. The consensus reached through discussion helped community members to understand each other and to reconcile their ideas. This will promote the sharing of information between men and women and between generations, which had been restricted in the past, and will foster a "common understanding" that will serve as the basis for making land use plans and activity plans.

3. When the community members, who are the owners and users of the land and resources, learned about their current land and resources status, they will be able to develop a sense of ownership of the pilot activities to sustainably manage and use the land and forest resources.

4. The contribution of women to the development of forest land and resources, which had been limited so far, was significant especially in the patriarchal Falake community.

5. Being inclusive could identify the differences of roles and responsibilities between women and men in their respective communities. For example, the influence of male leaders on decision-making was stronger than women in the Komuniboli community even though the women have inheritance rights to the land and resources. Meanwhile, the men in Falake hold the ownership of land and resources while women, particularly those who join the community through marriage, are not allowed to participate in decision-making processes.

6. The use of semi-structured interviews during participatory mapping process, including mapping and ground truth enabled the JICA team to learn more about their traditional custom (eg. the men in the Komuniboli community shared that

they conserve and protect water resources because fishing sites are also their custom where they fish not only for food but also practice their ancestor's lifestyle who used to be partially fishermen by the sea.), gender-based high priority resources (eg. in Komuniboli community, women mainly are responsible to agricultural crops such as fruit trees and cash crops, and poultry and pig farms in the vicinity of their daily access settlements. They are also responsible to collect resources from sago palm plantations and giant taro from cultivation areas. Men, on the other hand, are responsible for the water sources such as springs and small streams, small-scale selective logging sites, fishing grounds in the forest, and mushrooms grown on sago palm beds. In the Falake community, women are mainly responsible for crops such as fruit trees, cash crops, pig farms in the vicinity of the settlement, and leaves for Motu cooking during traditional events. Men are responsible to their plantations, ornamental plants used in traditional ceremonies, water sources and rivers, bamboo, and cash crops such as betel nuts (bottle wax) and hippopotamuses), as well as underlying issues (eg. the Falake community has started to focus on ginger cultivation because of a rumour that the price is high but they have no idea about the real market price at all.)

7. In Solomon Islands, where detailed topographic maps and watershed information are not available, the participatory mapping project allowed the community members to: 1) create a highly accurate land use map, 2) improve their three-dimensional spatial understanding of the forest land for the pilot activities, 3) communicate with each other about land and resources, 4) develop a common understanding of the location and use of land and resources by sharing information among themselves.

8. Participatory mapping conducted in the Komuniboli community and Falake community showed their differences and similarities in needs, plan, and natural resources management.

9. Maps they created through the participatory mapping process, gave them the confidence to present their LU plan. Hence, it was obvious that participatory mapping had successfully fostered the ownership over the maps and initiative.

5.5.2 Result/ Output - Disadvantages & Challenges

1. The equipment such as computer hardware, tablets, GPS, and fluorine film-laminated maps are expensive.

2. The inability of some external experts (from overseas) to stay with the community members for a long period of time because of budget constraints, hence causing some difficulty during the facilitation of participatory mapping.

3. The needs of a non-community facilitator to learn different knowledge and culture of each community because each community has their own culture although they are under the governance of the same government of Solomon Islands.

4. The difficulty for the community members to comprehend the scaled-satellite imagery maps because most of them saw their villages from the sky for the first time.

5. The ability of the community members to have a better understanding of the project depends largely on their education level and their experience about forest degradation and forest loss. For example, the Falake community understand the project conducted in their village better than the Komuniboli community because they are better educated and have experienced forest degradation and loss due to continuous deforestation.

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Participatory Mapping at Kommuniboli and Falake Pilot Sites in Solomon Islands

- Guidance -

Rakuno Gakuen University, 2021

Table of Contents

We referred some articles such as IFAD(2010) and re-edited them for Solomon Islands.

Participatory Mapping Guidance for Solomon Islands

Through the MOFR-JICA's Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands, we found out some issues below:

1. MOFR does have a database about the natural resources and forest in its country but are quite outdated, especially in customary land, where the government has no power over these lands (Williams, 2011). And customary lands actually make up 90% of the total country area!

2. MOFR intends to update the data but updating data is time-consuming and expensive.

3. More than 80% of Solomon Islanders live in rural and remote areas without access to basic services such as electricity and tap water supply. And Solomon Islanders are in extensive poverty with 56.7% living on less than US$3.10 per person per day (World Bank Group, 2017).

In short, MOFR needs to collect and update data with less time and lower cost. But because the communities in Solomon Islands are too poor to enjoy basic services, let alone knowing how to plan and manage their natural resources with technology. According to the UNESCO Institute of Statistic (2021), fortunately, the literacy rate of adults of both genders aged 15 years old and older in 2009 is quite high, at 76.6%. Hence MOFR can empower them to be the stewards of their respective natural resources, while providing data to MOFR.

For the above reason, we intend to suggest MOFR to apply participatory mapping as a tool to manage forest and natural resources by empowering those literate Solomon Islanders throughout the country to do the job. Yes, it is an exchange between MOFR and Solomon Islanders. MOFR will provide knowledge, training and even lending some equipment needed to the community members so that they can collect data for MOFR. Of course, it is best if MOFR can help solve some of their problems, particularly in sustainable resources management in return so that the community would be excited to continue, and may cause a ripple effect through the word of mouth.

Summary Chart

① Project Design	② Pre-mapping	③ Mapping	④ Map Use & Decision Making	⑤ Evaluation
Assign roles & responsibilities Set goals Allocate budget & resources I • Budget for get to know community • Transport • Food • Accommodation Know the communities • Build trust • Political situation • Culture • Lifestyle • Literacy • vulnerable group • Needs and issues	Community meeting I: Prepare community • Build trust • Learn the What, Why, How, Examples of participatory mapping • Discuss issues & risks • Obtain consent/ agreement Decide purpose Discuss & confirm mapping tools Identify implementers & training needs	Community meeting II: Determine legend Collect data: • Sketch mapping/ scale mapping • 3D mapping (optional) • Ground truth with GPS or other GPS enabled devices Transcript data Community meeting III	Community meeting IV: Support natural resources management with maps and discussion • Know resources location • Become aware of problems, challenges & potentials Facilitator may need to assist the discussion, and ensure no legal, management & safety issues Maps as tools of communication	Community level Community meeting IV or V: • Self-assessment* • Obtain feedback AND/OR Communities meeting: • Self-assessment* • Exchange ideas & values • Obtain feedback * Benefits of participatory mapping, failures and next steps needed MOFR level

• Participatory mapping effectiveness ⬇ Identify collaborators ⬇ Allocate budget & resources II • Budget for entire plan • Purchase equipment • Trainings • Transport • Food • Accommodation • Community members' stipends ⬇ Identify indicators/ criteria for monitoring change (direct/indirect to the project)	Provide training • Participatory mapping • Equality and inclusiveness • Tools • Facilitation (within community/ communities) ⬇ Purchase & prepare equipment	Analyze & evaluate new maps ⬇ Correct & Finalize map	• Must discuss about data authority Influence planning Other Uses	• Monitoring system with feedback mechanism to reflect & evaluate the achievement • Ensure community regularly consult project officers Government level • Contribute to policy development at district, regional or national levels ⬇ Post-project mapping

Note: May refer to (IFAD, 2010) for the suggested project checklist.

The Five Stages of Participatory Mapping

Each participatory mapping project is unique depending on the aim, the country's political environment and structure, the community's culture, history, politics, needs, issues and attitudes, to name a few. For these reasons, MOFR should be flexible in adapting the methodology of participatory mapping to the needs and requirements of each community. Therefore, MOFR may freely alternate, add or remove some of the steps below based

on the situation (Chapin, Lamb, & Threlkeld, 2005; IFAD, 2009; IFAD, 2010; Zerrudo, 2008).

Stage 1 is the stage if MOFR has to start the project from nothing. It was the planning stage whereby the JICA team had done before the project commenced (Section 5). Up to year 2020, the activities that the JICA team has done in Komuniboli and Falake were only at around Stage 2 and 3 and has not conducted both Stage 4 and 5 yet. Also, as you read, you may find out that we did not follow all the steps, and we did even remove, modify, add and even repeat some steps according to the needs. Thus, the steps below are for MOFR guidance only.

If you notice, Section 5 started with stating the objectives of the project, and the sub-objective 1 was to select the Pilot Sites in accordance with the Pilot Sites selection criteria, which could be considered as (S1.2) analyze the community situation. After determining the pilot sites, the JICA team and MOFR conducted a session of getting to know the two communities, Komuniboli and Falake, and signed a memorandum of understanding with the two communities (S2.1). Then, the JICA team directly provided training on GPS to collect boundary data (S2.5) so that a scaled satellite image map could be printed out for the scaled mapping. The JICA team conducted both sketch mapping and scaled satellite image mapping (S3.2) before providing another training on how to use Avenza Map installed in tablet devices for a more accurate data collection (S3.3). Of course (S2.6) was also being conducted but mostly by JICA Team from Japan. Then, the JICA team was responsible to transcribe field data onto new maps (S3.4). The printed maps were shown to the community members for validating and checking (S3.5), as well as acting as the foundation for the community members to learn how to read maps.

To achieve sub-objective 3, ie. to support and facilitate the Pilot Sites communities to develop Pilot Activities and implementation plans on SFRM, the community members were requested to create current land use (LU) map on the scaled satellite images while comparing with the maps they created with GPS and Avenza Map, and topography map for better accuracy. Then, based on the current LU map created, the community members started drawing, planning and zoning their future LU map before they determined their objectives and brainstormed for a list of activities to be conducted to achieve their objectives for each LU zone (S4.1).

Note: If you have no idea about the participatory mapping that we did in Komuniboli and Falake, please read Section 5.

Stage 1. Project Design

This is the stage which starts from the moment MOFR decided to conduct a participatory mapping until the start of formal project activities. In this stage, MOFR shall (S1.1) establish a working group to plan and design the project, (S1.2) analyze the community situation, (S1.3) identify collaborators/ partners, (S1.4) assign resources, and (S1.5) define monitoring mechanisms.

(S1.1) Establish a working group

The working group shall have a leader, secretary, treasurer, public relations officer, facilitator and a few committee members. It is better that everyone in the working group has experiences in participatory mapping for they would have to work with community members to collect data, which is not only useful for MOFR but also potentially useful for the community members. Although it is best to have one person assigned for each role, if there is a shortage of staff, MOFR can assign these roles to a few members only.

A leader oversees the entire project, assists other members in the working group, communicates with and even convince other government officers of higher status and local authorities, sponsors, and collaborators about the benefits and effectiveness of the project. The leader must also be able to work with the community members, communicate and negotiate with other relevant stakeholders. A secretary records meeting minutes, produce and keep required documentation and letters; a treasurer manages the account of the project, and make sure that money are enough for the entire project; a public relations officer assist the leader and the working group to deal with government officers, sponsors, collaborators, community, and even the publicity of the project; the facilitator mainly work with the targeted community by facilitating their meeting, though it would be best if the facilitator is capable in training new facilitators selected by the community; and the number of committee members depends on the size of the project for they are responsible to help the leader, secretary, treasurer, public relation officer, and the facilitator.

(S1.2) Analyze the community situation

This is the stage for MOFR to create awareness about the project among the community members as well. MOFR may first visit their local government officers such as the village leaders to learn about the targeted community. If possible, it is best that the facilitator or your team members live with the community members for some time to build trust and

personal relationships especially when none of your team is a member of the community itself or is familiar with the community to analyze the situation of the community. (Weyer, Bezerra, & De Vos, 2019; Damastuti & de Groot, 2019; de Paiva, 2017).

MOFR can assess the community preliminarily to identify suitable participatory mapping tools for the community based on the condition in the community (e.g., literacy rate and facilities available). At the same time, MOFR may informally interviewing the community members to better understand the community culture and lifestyle, internal politics to avoid potential conflicts, identify vulnerable members within the targeted community, community needs and issues, as well as whether participatory mapping can help (de Paiva, 2017; IFAD, 2010). MOFR may explain the objectives and importance of mapping work to them especially if they ask. This analysis allows MOFR to identify the main purpose of participatory mapping activities, potential mapping tools and methodology for cost calculation. However, please try to include as many community groups (e.g., youth, women, and elders) as possible.

If possible, MOFR may arrange so that your team visits the neighboring communities as well to understand their situation and identify their underlying issues too. If MOFR happen to find out that the neighboring communities are similar or are also having similar problems, MOFR may possibly think of integrating those communities into the project to save cost. Of course, depending on the purpose, some studies are able to include multiple groups within a community, and even multiple communities in a location at one time (Valencia-Sandoval, Flanders, & Kozak, 2010).

(S1.3) Identify collaborators/ partners

When you have analyzed and understood the situation, you can start identifying collaborators and partners from the local government, NGOs, consultant, and university, as well as fostering a good relationship with them.

(S1.4) Allocate resources

Although participatory mapping can cost less by involving more communities in the project at one time, financial planning is still a must. MOFR shall plan the budget at least twice throughout the project. The first directly after establishing a working group, mainly for the use of visiting the community to analyze the community condition and the second, after analyzing the community condition.

The project leader, especially the treasurer has to plan for the project budget.

Besides allocating resources for the staffs (general, technical and professional), community members (stipend or compensation), logistics (for project staffs to go to the project site and also traveling during ground truthing with the community members), accommodation, equipment (e.g. GPS, tablet, camera, etc.), food, training (for the staff, facilitators, and community members), evaluation (please refer to Stage 5), etc. (IFAD, 2010), the treasurer has to allocate a small amount of money for the 'rainy day', the unexpected costing and absolute emergency.

(S1.5) Define monitoring mechanism

Monitoring mechanism is a set of tangible baseline criteria and indicators which allows MOFR to measure the project impacts and changes qualitatively and quantitatively from the beginning to ensure the project is proceeding towards its goals. Qualitative indicators capture the changes perceived (e.g., how much a poor community is empowered) while quantitative indicators use numbers to measure. (e.g., the percentage of community members participating in the project). Both types of indicators can be combined to provide a more comprehensive understanding of the changes being assessed. Example is to use Likert Scale which allows individuals to express their attitude, whether they agree on a particular matter by measuring the intensity of their attitude on a continuum from strongly agree to strongly disagree.

The indicators shall be related to the community and overall project goals and shall involve three levels of stakeholders: the community, project's collaborators, and MOFR (Note: more explanation in Evaluation Stage). For examples (IFAD, 2010), the changes within individuals (e.g., skills and knowledge learned through the project enabled individuals to take up new roles in the community); changes within communities (e.g. a community now has cohesive, consensus-based management or a communication plan to guide future resource-related negotiation; and changes in a community's role in influencing a broader region (e.g. a map produced was used to influence the decision-making process of government for the community's advantage)

The possibility of a community/ tribe with a strong political background to successfully utilize maps for resources and influence is higher than those that are weak (IFAD, 2010) (the political background should have been identified in Stage 1.2, when the communities' situation was analyzed). Also, the indicators to measure the efficiency of the participatory mapping project must not focus on the outcomes or product but the process, such as the change in community cohesiveness, community building and

empowerment.

Note: It is similar to the Sustainable Development Goals (SDGs) developed and formulated by the United Nations (UN). For each goal, the UN provided a set of indicators as a guideline and measurement of success. Various organizations around the globe can identify the activities they can do to achieve their goals, and at the same time achieve the UN's SDGs, which can be measured through a set of indicators.

(Please refer to Stage 5 for more explanation.)

Stage 2. Pre-mapping

This is the stage before the real mapping work started. In this stage, MOFR shall hold the first inclusive community meeting or workshop to (S2.1) prepare the community, (S2.2) decide the mapping purpose, (S2.3) discuss and confirm mapping tools, (S2.4) identify participatory mapping implementers and provide required trainings. The (S2.5) purchase equipment can be done before the first meeting, partly before the first meeting and then after the meeting or when required.

Note:
- Engage the community members in the early stage so that they would have a sense of ownership over the project, hence, have a higher possibility to sustain the project for a longer term.
- Make sure to arrange the time period that is not overlapping with sowing and harvesting seasons or when they would be busy working for their livelihood.
- Compensate the local community members as much as possible.

(S2.1) Prepare the community
Gather the community members in a community meeting. MOFR may get the help from the local government and community elders, which have already identified in the S1.1 - 1.3. Do take note of the inclusiveness of the community group because being inclusive creates maps that represent the entire community views and interests better.

- In the meeting, provide the community sufficient information about participatory mapping (what are maps, how to create and use maps?) (Corbett & Keller, 2006)

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- , the range of tools available (Refer to Stage 2.3 for more information), process to create map (time, effort and resources required) and the maps' potential uses (Corbett & Keller, 2006) (and whether the uses part of a larger project strategy of MOFR). MOFR may also share to the community the background or basic information of the study. For instance, if the project is about sustainable timber logging, MOFR may share about the importance of sustainable logging, and even the latest laws and policies of Solomon Islands.

Building trust is important to ensure the successfulness of the entire project. If the facilitator(s) has yet to visit the community during Stage 1.2 analyze the community situation, this meeting is a good opportunity for facilitator(s) to build rapport with the community members (IFAD, 2010).

The facilitator(s) and all stakeholders must identify and enunciate the potential risks relevant to this mapping project and engage the community members to discuss these issues. This is to prevent potential negative consequences such as the infringement of law because of the recorded community's traditional logging practice.

When the community understands both the opportunities and risks enough, they can decide whether they are willing to invest required time and energy into the project (IFAD, 2010). MOFR shall allow them to question and even argue about the project. Then, obtain their consent at this point, by having a black-and-white agreement.

Note: The community members may not have their own thoughts for they have no knowledge or experience in participatory mapping. Therefore, the facilitator plays an important role to engage the community members without bias.

(S2.2) Decide the mapping purpose

Although MOFR may have the purposes of the mapping project set, the community members may think that those purposes are not theirs, and may not even solve their present issues. Therefore, it is good to tell them that this is their project, and lead them to answers some of the questions below: (Source from Flavelle, 2002 in (IFAD, 2009)

- Why do we want to make a map?
- Who do we want to show it to?
- What are some of our most important land-related issues?
- What can we use the map for in the short term?

- What can we use the map for in the long term?
- Is there a predefined reason for creating the map?

Note: You may carry out this step in the same meeting as above, S2.1.

(S2.3) Discuss and confirm mapping tools

To ensure the community ownership of the project is taken care of, engage the community members in the discussion to confirm the type of tools to be used in the project. Of course, MOFR has to first select the type of tools to be used first based on the project fund, the skills and the ability of MOFR. Then, allow the community members to select the type of tools they wish to use based on their ability, ie. time and literacy rate. The various tools available are A) ground map, B) sketch map, C) scaled map with images, D) 3D model, E) GIS, F) Multimedia & Internet Map G) GPS and other data collection devices.

Note: You may carry out this step in the same meeting as above, S2.1 – 2.3. You may also find out the methods on how to use these tools in Stage 3.

A) Ground Map

Community involved in ground mapping activity in International Fund for Agricultural Development (IFAD) Mount Kenya East Pilot Project (MKEPP) @ MKEPP (IFAD, 2009)

Use Difficulty: Very simple

Equipment: Pebbles, stones, sticks, branches from nature

Cost: Very cheap/ no cost

Strengths:

- Non-literate people can join
- Results can be seen quickly and provide tangible outcome
- Best to start discussion

Weaknesses:

- Maps not geo-referenced
- Cannot provide quantitative information (eg. distance & direction)
- Created map may be destroyed easily by the nature (eg. wind and rain)

B) Sketch Map

@ B. Codispoti/ILC (IFAD, 2009)

Use Difficulty: Simple

Equipment: Large sized white paper (such as Mahjong paper), colored marker pens, pens, and sticky notes

Cost: Very cheap

Strengths:

- Results can be seen quickly and provide tangible outcome
- Best to start discussion

Weaknesses:

- Some non-literate people are excluded
- Maps not geo-referenced
- Cannot provide quantitative information (eg. distance & direction)

C) Scaled Map with Images

Scale-map mapping in Solomon Islands. @Khew E.H.

Use Difficulty: Simple

Cost: Cheap to expensive

Equipment: May need to purchase satellite images, computer with ArcGIS Pro (commercial version) or QGIS (free version) to create the scaled map, printer to print out, laminator to laminate or even fluorine film laminate, colored marker pens, sticky notes, and pens

Strengths:

- Easy for people who cannot read topography map
- Information can be incorporated into GIS easily
- Can provide quantitative information

Weaknesses:

- Need considerable time and energy to create
- May be difficult to access accurate and up-to-date scale map

D) 3D Model

Community 3D Mapping, Vietnam @G. Rambaldi/CTA (IFAD, 2009)

Use Difficulty: Difficult

Cost: Moderately expensive

Equipment: elevation data, white cement, cardboard, cutter, glue, foam board, marker, paint brush and colored paints.

Strengths:
- Easy to understand
- Time spend can encourage discussion of important spatial knowledge

Weaknesses:
- More effective for area with huge elevation difference
- Labor intensive
- Time consuming
- Difficult for storage and transportation

Using GIS software, Sabah, Malaysia @Rosli Jukrana

Use Difficulty: Difficult

Cost: Expensive (especially hardware)

Equipment: Computer (laptop or desktop) with ArcGIS Pro (commercial version) or QGIS (free version) installed.

Strengths:
- Can store, retrieve, analyze and present spatial information
- Result maps look more professional
- Easier to influence land-related decision making

Weaknesses:
- Require continual updating of software and re-training
- Require long-term operating cost
- Technician must keep explaining what he/she is doing
- May not have electricity to support in some area

F) Multimedia & Internet Map (Crowd-sourcing)
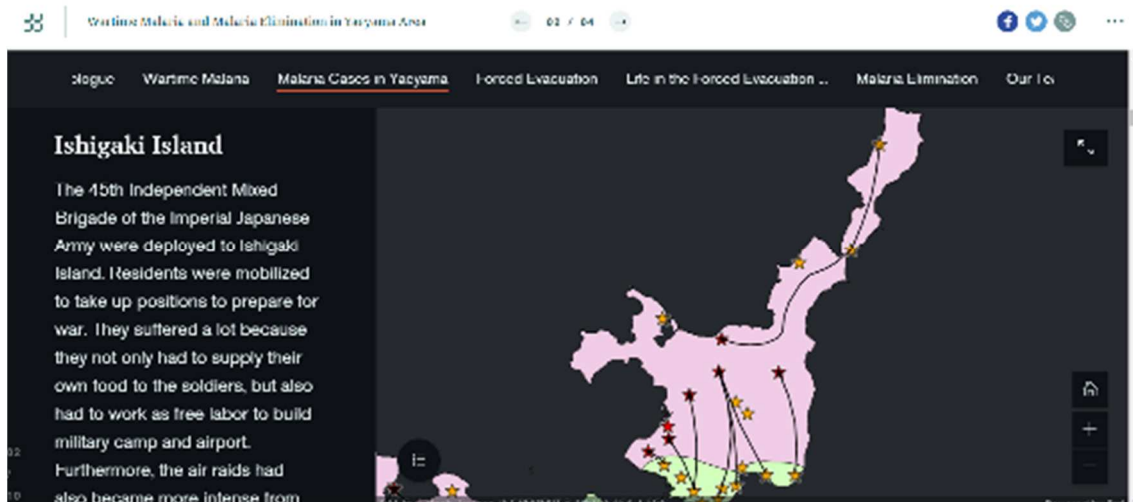
History of Wartime Malaria in Yaeyama, Okinawa

https://arcg.is/1y0qHC

Use Difficulty: Moderate

Cost: Expensive

Equipment: Computer with stable internet connection,

Strengths:

- More comprehensive documentation because it can combine various of medias such as text, video, audio and images
- Allow communicating local knowledge in engaging format
- Certain online applications can be used for data crowd-sourcing

Weaknesses:

- Need knowledge of computer, video production, photographic editing and file management
- May not have electricity/ internet connection to support
- May not accessible for non-literate

G) GPS and other Data Collection Devices
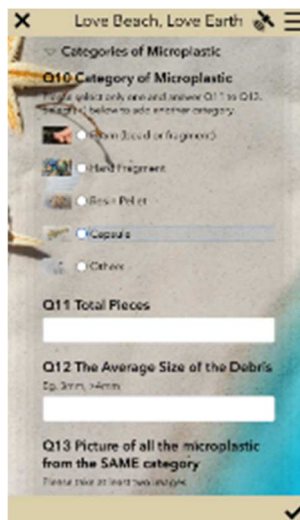
Garmin GPS   Smartphone - Survey123

Use Difficulty: Moderate to Difficult

Cost: Cheap to expensive

Strengths:
- Information can be incorporated into GIS easily
- Can provide quantitative information

Weaknesses:
- Need knowledge of computer, GPS
- May not have electricity/ internet connection to support
- May not accessible for non-literate

(S2.4) Identify participatory mapping implementers and provide required trainings

MOFR shall get the community members to select a few persons-in-charge (or leaders) for the purpose(s) and tools decided in the first meeting. The selected people shall be at least knowledgeable about topics such as fishing, natural resources harvesting, and farming that they are responsible for. The facilitator should make the community aware of gender equality because women usually may provide knowledge and information different from men. If MOFR wishes that the project is sustainable in the selected villages, MOFR can have the community members to select one or two members within the community to act as their facilitators in the first community meeting. Of course, facilitators can also be identified from NGOs, local government officers, and/or other relevant stakeholders.

The selected facilitator should be able to (Weyer, Bezerra, & De Vos, 2019):

- Build trust by being clear and transparent
- Exercise patience and sensitivity when working with people from different cultural backgrounds.
- Explain ethical principles and informed consent to participants
- Take extreme care to explain all risks and processes, from participation to results dissemination in understandable language without jargon
- Dismantle misperceptions such as visiting researchers may be linked to a better life
- Have a thorough understanding of the local context, and building relationship within a community

(S2.5) Provide Training

Training for the persons-in-charge (or leaders) shall be based on their responsibilities. For instance, if the person-in-charge is responsible to collect data via GPS, GPS training shall be provided. As for the selected facilitator(s), training about participatory mapping and monitoring activities, tools and techniques, inclusive facilitation, negotiation and conflict management shall be provided. For both types of training, MOFR shall include a gender awareness component because participatory mapping is best to involve as wider groups as possible, including the vulnerable groups such as women.

It would be best if MOFR has an experienced facilitator to be part of the working group to lead, connect, facilitate, and supervise all the facilitators so that they could stay on path to the project goals. The facilitator shall also ensure all persons-in-charge and leaders report their work progress from time to time and provide them with support whenever issues arise.

MOFR can provide the same training for all of the community members together if they are willing to learn and if budget allows. To save training costs, MOFR can provide training for facilitators and persons-in-charge together, and/ or provide training to a few communities and villages simultaneously. Nevertheless, if budget permits, MOFR shall provide training periodically to sharpen present facilitators' skills, and allow them to interact, exchange experience and discuss issues they have in their respective communities. Periodical training is particularly important if the participating organization(s)'s staff turnover rate is high.

(S2.6) Purchase and prepare equipment

To save time, MOFR can purchase and prepare part of the equipment required for S2.1 to 2.4 above and perhaps also equipment for ground mapping, and sketch mapping tools such as large sized white paper, marker pens and sticky notes. Because MOFR has the computers with internet connection, MOFR can consider downloading satellite images, and print out for scale mapping too. The other equipment such as GPS can be purchased later after the first meeting with the community members if MOFR will go (Stage 3.3) ground truthing to verify and collect more accurate location data with GPS the other time.

Stage 3. Mapping

Mapping is the stage whereby MOHR begins to collect and verify data together with the community members to complete the final maps and achieve goals. Based on S2.3, there are many tools that can be used, and this is the stage whereby we will look into those tools in detail. A participatory mapping usually utilizes more than one tool to be more inclusive in achieving their goals.

A participatory mapping usually starts with (S3.1) identifying and determining legend, before carrying out (S3.2) sketch mapping or scaled mapping to have the community members to write and draw out their neighborhood, knowledge, experience, etc. Then, together with the experienced and knowledgeable community members selected by the community, the facilitator(s) and surveyors will go out to the site(s) to (S3.3) verify and collect more accurate location data with GPS. These GPS data will be (S3.4) transcribed onto new maps by the community members, MOFR, and/or external organizations such as the JICA team. The maps created will be printed out for (S3.5) the community members to analyze and evaluate before (S3.6) correction of the digital data to be made to finalize the map.

Note: Stage 3 is the stage whereby a good facilitator is highly required because the facilitator has to generate diverse views, reach a consensus on areas of contradiction and promote creativity and innovation (IFAD, 2010)). A recorder is also needed to record the conversation and discussions of the community.

(S3.1) Identify and determine legend

Identifying and determining legend is to create a list of symbols which represent and

describe the various features shown on the map. It also makes the process of sketch and scaled mapping easier because the community members can use the determined symbols to show some complicated and sophisticated stuff.

Considering some community members may not have idea about the use of legends, MOFR can provide some examples to initiate the discussion of identifying appropriate symbols such as forest (resources extraction sites, ie. timber, plants, animals), river (source of water, fishes, prawns), houses (community hall, elders' houses, school), farm (swine, chicken, goat, cows), religious site (taboo site, church), etc.

Example of legend in multi-languages (Gilmore & Young, 2012).

(S3.2) Ground Mapping, Sketch Mapping, Scaled-Mapping and 3D Modeling
At least a facilitator and a recorder are needed to conduct this step because the facilitator has too many things to oversee and handle, hence may be unable to recall all things during documentation.

The facilitator will have to create a conducive environment to encourage the participating community members to share and discuss their opinions, knowledge and experience. The facilitator may need to provide some ideas through questioning so that the participants know what to share. For examples, the facilitator may have to ask questions such as 'where do you usually get your food supply?', 'where do you usually fish?' etc.

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Meanwhile, the recorder records the entire process, problems, and even discussion during the mapping process. The recorded information is important for the facilitator and MOFR to further improve the participatory mapping process, and even the entire project. The recorded information may be needed for reports and documentation too.

A participatory mapping usually selects only one tool out of the four tools below as the first step to start a discussion which may be helpful for data collection. Depending on the project's purpose, some may skip or repeat S3.3 and 3.4.

- **Ground mapping**
  - Use if there are many illiterate community members.
  - The facilitator ought to take note that the symbols used in legend shall not be too complicated because of the materials used are usually large in size, ie. pebbles, branches, etc.
  - The participants usually draw the map on a sandy ground with a stick or finger, and put pebbles and branches on the ground to represent certain features such as houses, farms, pools, and etc.
  - After the ground map is done, a recorder has to draw the ground map on a piece of paper or take a picture of the ground map so that the information created on the ground would not be lost.

- **Sketch mapping**
  - Better than ground mapping because it can be done indoors, hence, not affected by the weather.
  - Because it does not occupy too much space like that of ground mapping, the facilitator can consider to divide the community into groups (eg. woman, man, youth, and elders) so that the members will feel more freedom in sharing their knowledge and experience.
  - The participants usually draw the map on a large piece of paper (eg. mahjong paper) with colored marker pens. They can start by drawing a basemap, ie. the topography features such as river, land cover such as forest area, farm area, and residential area before adding points features such as school, houses, house of worship. They can also include the predetermined symbols in S3.1 in their map(s).
  - But to ensure the information given by each group is correct, each group has to

present their results so that a final sketch map which everyone agrees upon, can be produced.

- **Scaled-mapping**
  - ➢ MOFR has to first prepare the basemap. MOFR can download free or paid satellite images of the targeted area, create grids to scale the satellite image, and print out.
  - ➢ MOFR can print a large size map such as A0 by splitting the page across multiple sheets of A4 paper with the tiling option of Adobe Reader 10 and later or with other software. Then, MOFR can combine/ stick the A4 papers together into A0 sizes.
  - ➢ To repeatedly use the printed basemap, MOFR may fix acetate transparency film on the basemap so that the community members only draw and write on the acetate film.
  - ➢ The participants usually draw on the basemap with colored marker pens. They can start by drawing a basemap, ie. the topography features such as river, land cover such as forest area, farm area, and residential area before adding points features such as school, houses, house of worship. They can also include the predetermined symbols in S3.1 in their map(s).
  - ➢ But to ensure the information given by each group is correct, each group has to present their results so that a final sketch map which everyone agrees upon, can be produced.

- **3D modeling** (Corbett & Keller, 2006)
  - ➢ Looks good and suitable only if the topography is hilly.
  - ➢ It is time-consuming and rather complicated to use.
  - ➢ MOFR has to download the elevation data (contour) of the region, and increase the vertical exaggeration (Z scale) value to make the model look nicer.
  - ➢ Then, the facilitator will have to guide the community members (usually the young generation is more interested) to cut cardboard in the shape of the contour lines and pasted on top of each other to create a 3D model. Other features such as river basins will have to use slightly different techniques. Lastly, the participants can paint or use colored cement and add some accessories to make the model look real.
  - ➢ After setting up the model, the facilitator can facilitate community members' discussion and make them pointed out locations by using pushpins (for points),

colored string (for lines) and paint (for areas).

➢ This 3D model can be used to encourage the re-discovery and visualization of local community knowledge, as well as intergenerational dialogue. Because more man-power and longer time are needed, it can help build a greater sense of community cohesion.

➢ When the discussion is done, a recorder ought to record the final 3D modeling mapping for digitization.

• Note: MOFR may conduct a GPS Transect Walk to collect boundary data to identify the area of a village easier if needed when preparing satellite imagery basemap for scale-mapping and contour data for 3D modeling.

(S3.3) Verify and collect more accurate location data with GPS

This step can be known as GPS Transect Walk too. It is the use of GPS to collect more accurate point data of the boundary and location of the resources pointed out on the sketch map or scaled-map drawn by the community members. Therefore, the information on the map can be verified by going to the field together with the selected community's person-in-charge and experts.

Other than GPS, MOFR can consider to use field data collection apps for Android or iPhone, which can also collect location data, such as Avenza Map (Android & iOS), and Open Data Kit (Android). Using these tools not only allows the collection of location data but also other data such as images and attribute data (the width, height, length, characteristics, etc).

Depending on the location of the targeted site, MOFR staff may need to hike, drive into remote area or take a boat, and the period of time needed may be either short or long. Hence, MOFR will have to arrange for transportation and perhaps accommodation. Because the time taken may be long, it would be better that MOFR compensate the participating community members with some stipends, food and even accommodation if needed.

Note: The community members joining this field trip should have had training during the S2.5. However, if they are yet to be trained, MOFR should provide a simple training before the field work to ensure the data collected are consistent and highly accurate. It would be best to allow them to verify and collect the data on their own as a means of

community empowerment.

(S3.4) Transcribe field data onto new maps

This is the step whereby we think it is difficult to be carried out by the local community members unless they have electricity supplies, and relatively good quality computers in their villages. Therefore, we think that MOFR has to take over this step.

MOFR has to digitize data collected from S3.2 and transcribed field data collected from S3.3 onto new maps with GIS software such as QGIS. Please ensure that the maps created includes standard features such as title, north arrow, scale, grids, source of data and legend, which was determined by the community in S3.1. Of course, if possible, it is best to teach the young generation from the communities about GIS so that the project can last longer and enhance the sense of ownership.

(S3.5) Analyze and evaluate information on the new maps

After the new maps are created, please print out and take the maps back to the community members for verification. The facilitator has to lead the community to discuss the overall quality and completeness of the mapped data and examine their accuracy and relevance (IFAD, 2010)). During the discussion, some community members who doubted the project may be willing to share more when they see the resulting maps.

In this step, all community members of the targeted community, including those who are not directly involved in the map making process (Stage 2 and S3.1 – S3.4), should have the rights to add, remove or modify any information shown on the map (IFAD, 2010)). The community members should check and evaluate information on the new maps because this project is partially done by outsiders and/or MOFR during S3.4. Besides, it is also important if the community members or MOFR intends to share the map with outsiders or if the information on the map was provided by only one community group (eg. the youth).

(S3.6) Correct the digital data again and finalize the map

If there is no correction nor additional information from the community members, MOFR may give the maps and data in a usable format directly to the community members. However, if there is any correction or additional information, please re-edit the maps with GIS before printing.

If possible, MOFR shall repeat S3.5 to ensure that all information on the map are 100% accurate before returning the maps for them.

Note: If the community has the ability to use computer and GIS software, please do send them the editable softcopy or database. Else, it would be good enough just to send them the hardcopy.

Stage 4. Map Use & Decision Making

(S4.1) Use maps to support communities' natural resources management initiatives

Participatory mapping activities provide the community with a way to determine the location of the resources available (e.g., a map of the current land use plan), and to become aware of the problems (IFAD, 2010), challenges and potentials of their community especially when they try to figure out their future plan by determining their objectives and formulating a future land use plan. After all, maps can be used for decision-making and to prioritize the plan that ensures sustainable use of resources.

When MOFR provides training, facilitates the participatory mapping activities, provides support and even lends the communities some equipment such as GPS to help the communities to conduct the communities initiated activities in solving problems and/ or achieving their objectives, they will be empowered and thus becoming better equipped to manage their local natural resources.

However, MOFR should not assume that the local community can come out with effective solutions and plans even though they know what they need and the issues that they have better than outsiders. It is probably because of their low educational level and limited exposure to other ideas and experience, hence they have restricted understanding of the causes to develop effective solutions. Besides, when the solution and plan are proposed by the powerful elites in the community, there is a risk of biased solutions which do not regard the interests of minorities within the community.

Therefore, facilitators can assist by introducing new ideas for discussion, providing information on strategies that have worked elsewhere, introducing others who can provide expert advice, besides ensuring that legal, management and safety issues are properly considered (IFAD, 2010). (Refer to the case studies in section 2 may provide

some ideas and information). To reduce biased solutions, the facilitators can try to engage and listen to more groups of people by dividing them into groups during mapping and brainstorming sessions so that they would feel more comfortable to share in their respective groups.

Note: It is important for the community members to see that their efforts are put to use and that the completed maps serve their purposes so that they would be encouraged to sustain the project. When the community members have a clearer idea of how the maps might be used, they might innovate and come out with new applications of maps (IFAD, 2010).

(S4.2) Communicate mapping information to stakeholders

Maps are a powerful visual and communication tool for the community members to communicate mapping information to stakeholders and outsiders because the maps are created based on international standards (map with title, north arrow, scale, legend, source, and copyright). MOFR can also organize a workshop, which also involves relevant stakeholders such as governmental organizations, NGOs, private companies and local universities, to provide an opportunity for the community members to present their plan and suggestions. When the community members have the sense of ownership over the maps they have created, they can usually present their thoughts and ideas with pride and confidence.

Nevertheless, the facilitator needs to discuss with the community members about the maps and data' ownership issues so that the community members are clear about who will use the final map, and who authorizes its use (Corbett & Keller, 2006). It is best to develop a set of regulations that control how the maps are used and distributed to prevent the local knowledge from being manipulated and used for matters that would probably put the community at disadvantage, in danger and/or infringement of the law.

(S4.3) Influence planning

The resulting maps can influence the planning process especially when the project intermediaries represent government or non-governmental organizations. Therefore, when MOFR, the main organizer, is a governmental organization, the maps created may be used more effectively in achieving the goals of the community as well as MOFR's. MOFR can utilize the maps to make decisions in developing policies and management plan, and even generating more effective and efficient solutions to the environmental

issues.

(S4.4) Other uses of participatory mapping

- Evaluate projects (IFAD, 2010)
- Plan the land use (Kingsolver, Boissière, Padmanaba, Sadjunin, & Balasundaram, 2017)
- Predict future environmental impacts based on current and past interaction between the local and their environment (Weyer, Bezerra, & De Vos, 2019)
- Investigate land cover change (Mapedza, Wright, & Fawcett, 2003)
- Enhance local mangrove rehabilitation and management (Damastuti & de Groot, 2019)
- Empower the urban poor with new knowledge and tools to help them articulate their needs and demands using digital media, hence achieving national government goals (Livengood & Kunte, 2012)
- Provides basic facilities support to the community (CEDT, Unknown)
- Enhance land tenure security (Di Gessa, 2008)
- Document, visualize and communicate indigenous communities' traditional and contemporary knowledge (Corbett & Keller, 2006)

Note: Please refer to the case studies in part 2 for more detailed uses of participatory mapping

Stage 5. Evaluation

Evaluation stage is mainly to assess the impacts and changes of the participatory mapping project. MOFR should evaluate all three levels: the community, project intermediaries and the government (local, district and national) (IFAD, 2010).

(S5.1) Communities evaluation

The facilitator shall lead the community to do a self-assessment from time to time on their progress, achievement, challenges, improvement, and solutions by asking the correct questions such as 'how well the project has progressed?', 'how much the community has achieved?', 'what are the challenges and how can the community improve?', etc. The facilitator shall act like a coach, who asks the correct questions but without giving any answers so that the community members can reflect and discuss among themselves to provide their own answers.

MOFR can also combine a few communities together to conduct the self-assessments simultaneously. Such an opportunity would allow a discussion and exchange of thoughts on their mapping experience, challenges and solutions. Such an activity is known as the horizontal exchange activity (IFAD, 2010). Based on the results of community self-assessment, MOFR can refine and scale up the mapping process.

However, these activities require further training of facilitators in areas such as facilitation skills, session planning, interview techniques and coaching techniques. And MOFR shall allocate resources to this activity at the beginning of the project (S1.4).

(S5.2) MOFR evaluation

Ideally, MOFR should have a monitoring system which include a feedback mechanism to reflect and evaluate what has been achieved at the start of participatory mapping activities.

MOFR can assign one or a few committee member from the working group to be the project officers taking care of a few communities. The project officer should ensure that all communities' person-in-charge and facilitators regularly report their progress or consult for advices and support.

MOFR should also share the monitoring-and-evaluation criteria and indicators developed in S1.5 so that they can evaluate the results and impact achieved. Then, the communities should be able to identify potential opportunities, issues or risks, and propose necessary adjustment.

(S5.3) Administrative evaluation of overall policy change and decision-making

This step is to evaluate the contribution of mapping activities to the development of policy and strategies for local development at district, regional or national levels. Examples of indicators are the actual changes in legislation, government decision-making, and policy implementation (IFAD, 2010).

(S5.4) Post-project mapping

This step examines whether the expected changes and impacts persisted, hence occurring at the end or even after the completion of the MOFR project. MOFR can conduct another participatory mapping project to evaluate the impact of the project and compare it to the maps created at Stage 3.

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ODK collect カスタマイズ
簡易マニュアル

1.0 版

2021 年 3 月 5 日

目次

はじめに

　本書は、JICA 技術協力事業「ソロモン国における持続的森林資源管理能力強化プロジェクト」におけるオフライン調査ツールとして、Apache 2 ライセンスのオープンソース ODK collect にカスタマイズ開発を加え、オフライン対応等の機能を追加したアプリケーションについて説明する簡易マニュアルです。

　カスタマイズ開発には、主に次の機能が含まれています。

- 収集データのローカルファイル出力機能
- 位置情報の地図データ形式変換機能
- ナビゲーション地図ビューアーの追加

本書の作成にあたり使用した Android 端末は、次の通りです。

- SONY XPERIA（SOV39）
  Android バージョン 10

1 インストールと全般設定

ODK collect アプリケーションのインストール方法と全般設定について説明します。

1.1　ODK collect アプリのインストール

　任意の方法で ODK collect アプリの APK ファイルをインストールします。ここでは指定の Web サイト※からダウンロードしてインストールするものとします。

※Web サイトの URL は別途確認してください。

APK ファイルのリンクをクリックしてファイルをダウンロードします。
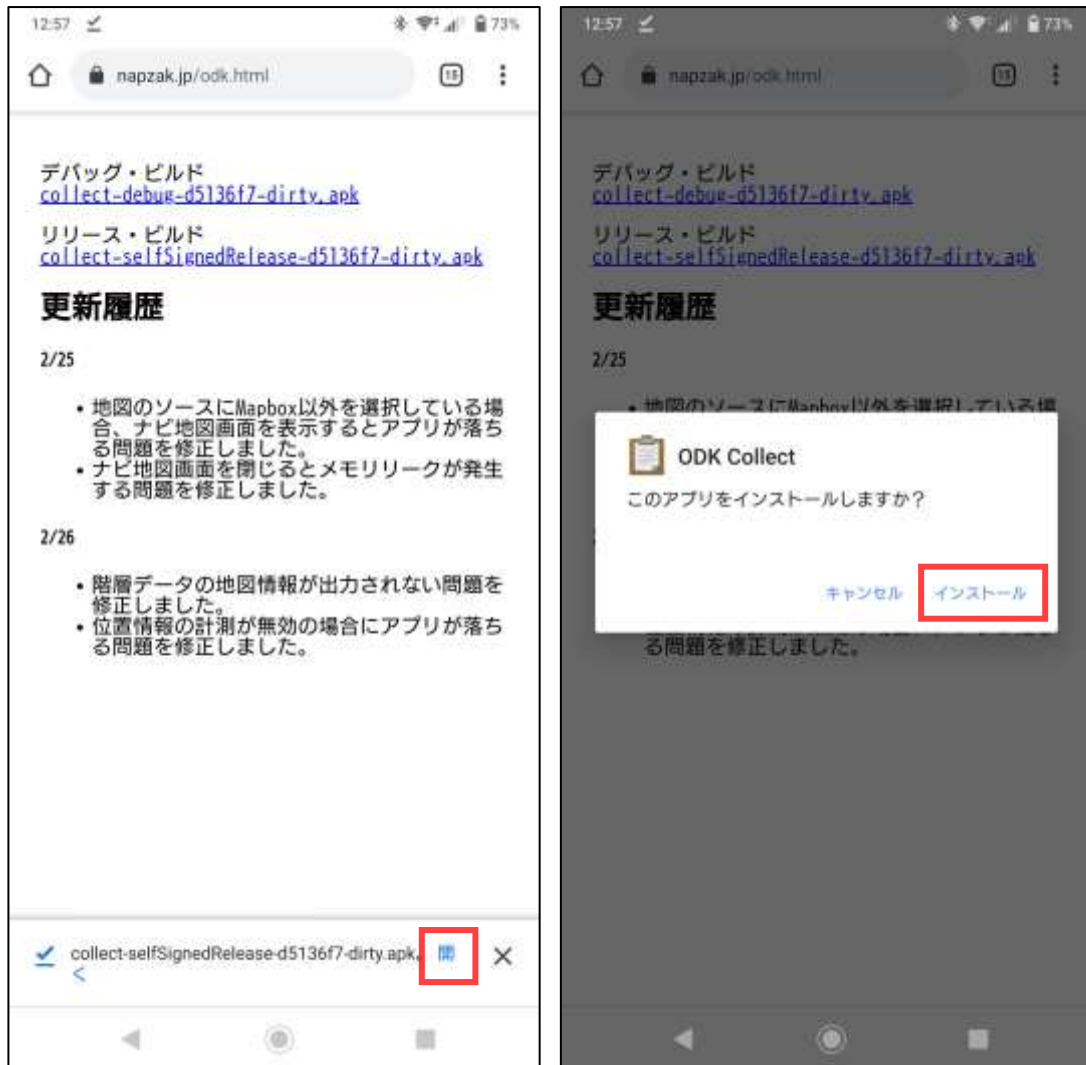
ダウンロードの完了後、「開く」をクリックします。

インストールの確認ダイアログで「インストール」をクリックします。

ダウンロードの完了後、「開く」をクリックします。

メディアへのアクセス許可を確認するメッセージが表示されますので、「許可」をクリックします。

1.2　データ移行作業

　　ODK collect のバージョンによってはプライベートストレージの移行作業が要求されます。その場合は次の手順で移行を行ってください。

　　「詳細と移行について」をクリック後、「続行」をクリックします。

1.3　全般設定

ODK collect の基本機能と拡張機能の利用に必要な設定を適宜、行ってください。
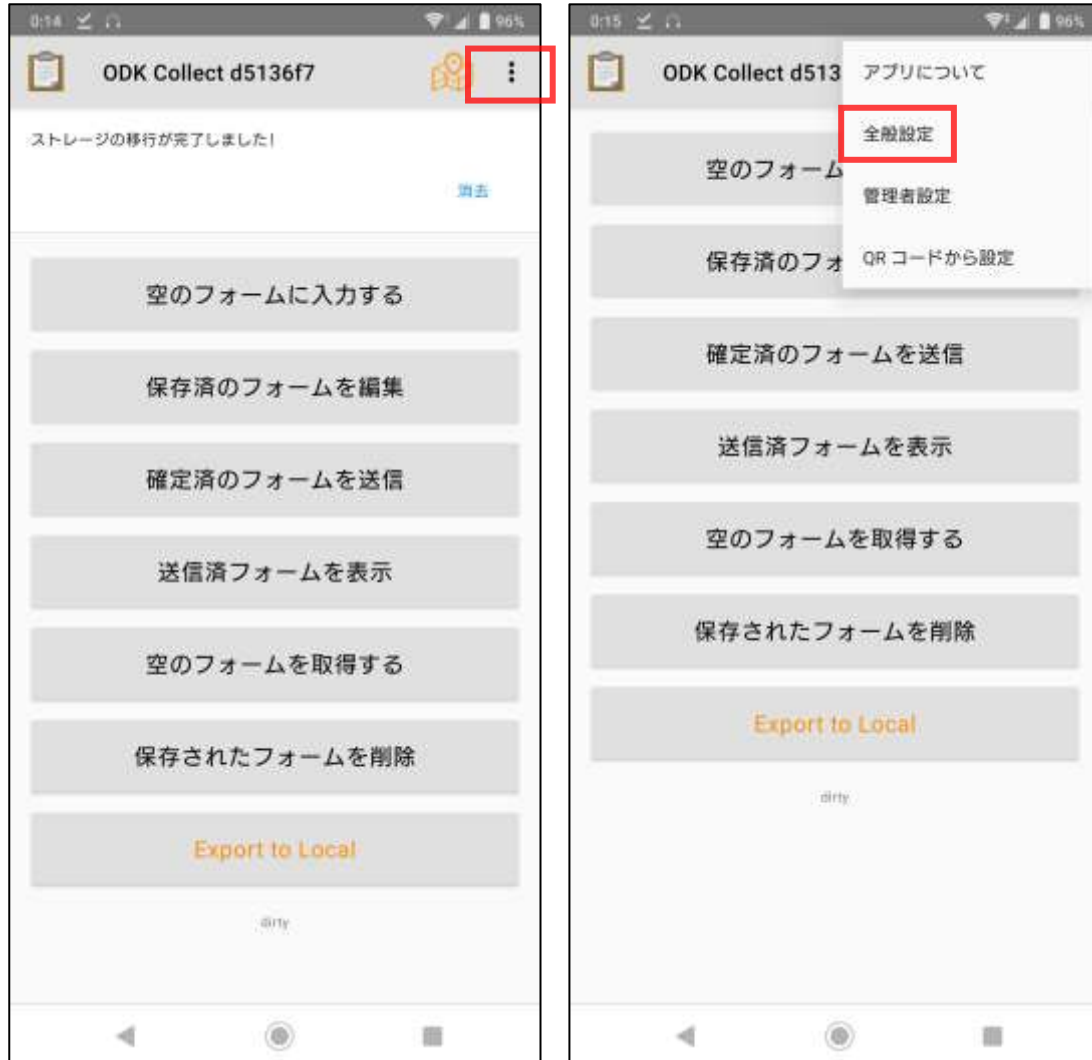
画面右上のメニューを開き、「全般設定」を選択します。
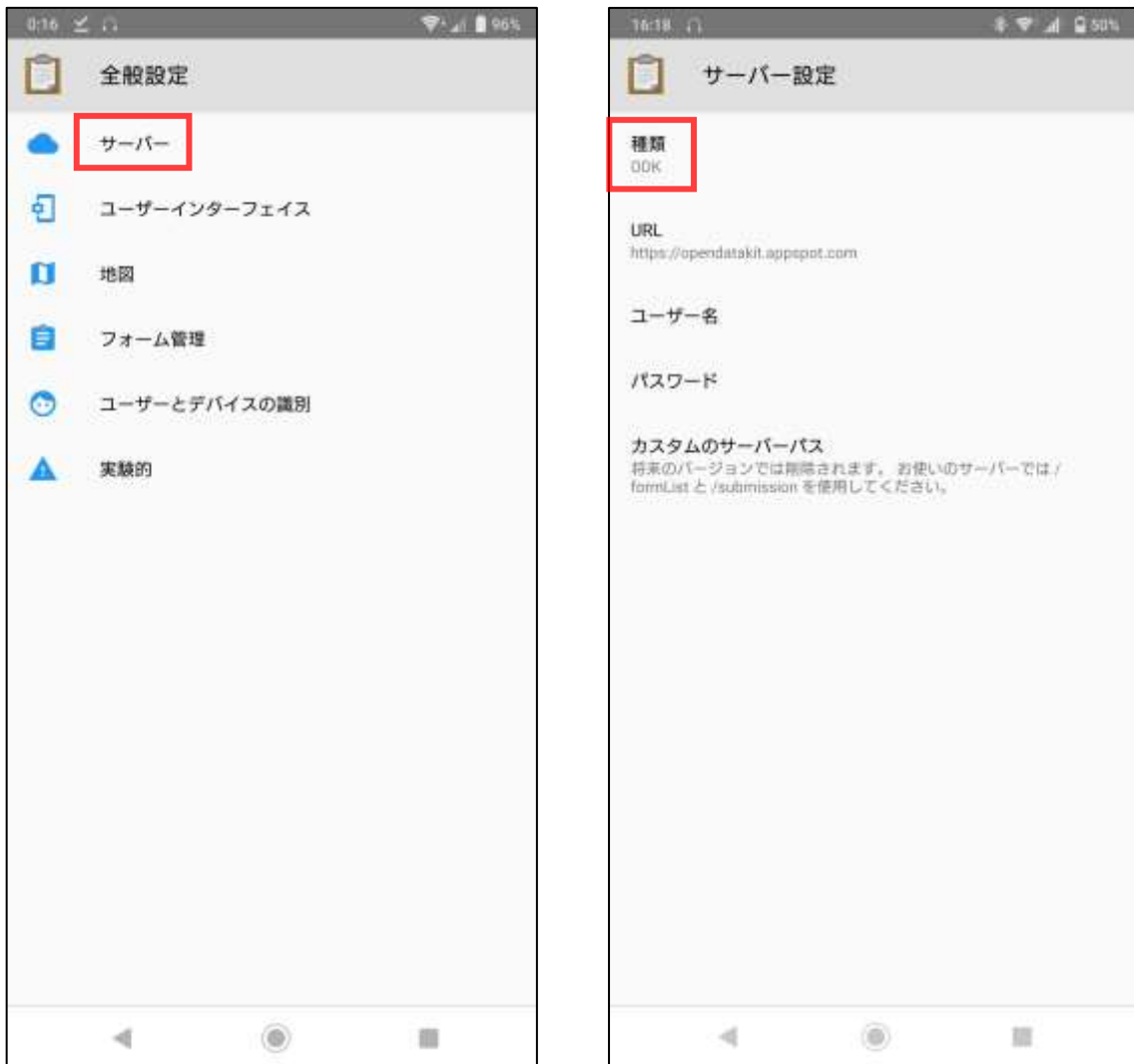
「サーバー」を選択し、サーバー設定画面を開きます。

「種類」は次の二種類から選択できます。適宜、種類を切り替えてください。
- ● ODK
- ● Google ドライブ，Google スプレッドシート

ユーザー名やパスワードなど、必要に応じて設定してください。

本書では ODK サーバーにサンプルとして格納されている「All widgets」フォームを使って説明します。

全般設定画面で「地図」を選択し、地図画面を開きます。

「ソース」を適宜、切り替えてください。

本書ではソースに「Mapbox」を使って説明します。

その他の設定も必要に応じて設定してください。

2 入力データのファイル出力

フォームに入力したデータをローカルファイルに出力する方法について説明します。

2.1　空のフォームの取得

データの入力を開始する前に、空のフォームを取得する手順です。

メイン画面（アプリ起動直後の画面）で「空のフォームを取得する」を選択します。

ここではサーバーの種類に「ODK」を設定しているものとします。

一覧の中からODKサーバーにサンプルとして格納されている「All widgets」にチェックを付け、「選択を取得」をクリックします。

2.2　空のフォームに入力

空のフォームに新たにデータを入力する手順です。
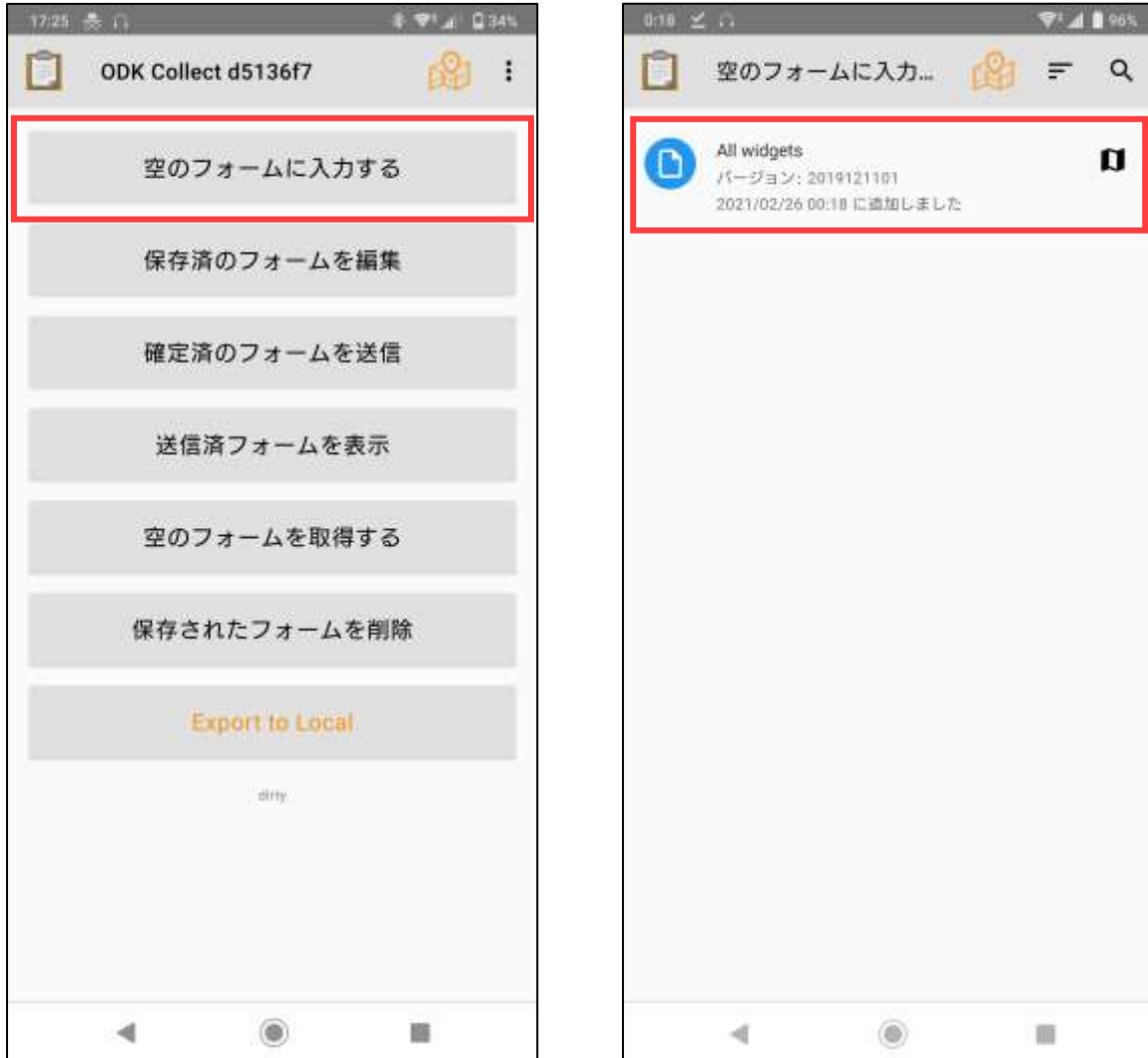
メイン画面（アプリ起動直後の画面）で「空のフォームに入力する」を選択します。

一覧の中から先ほど取得した「All widgets」フォームを選択します。
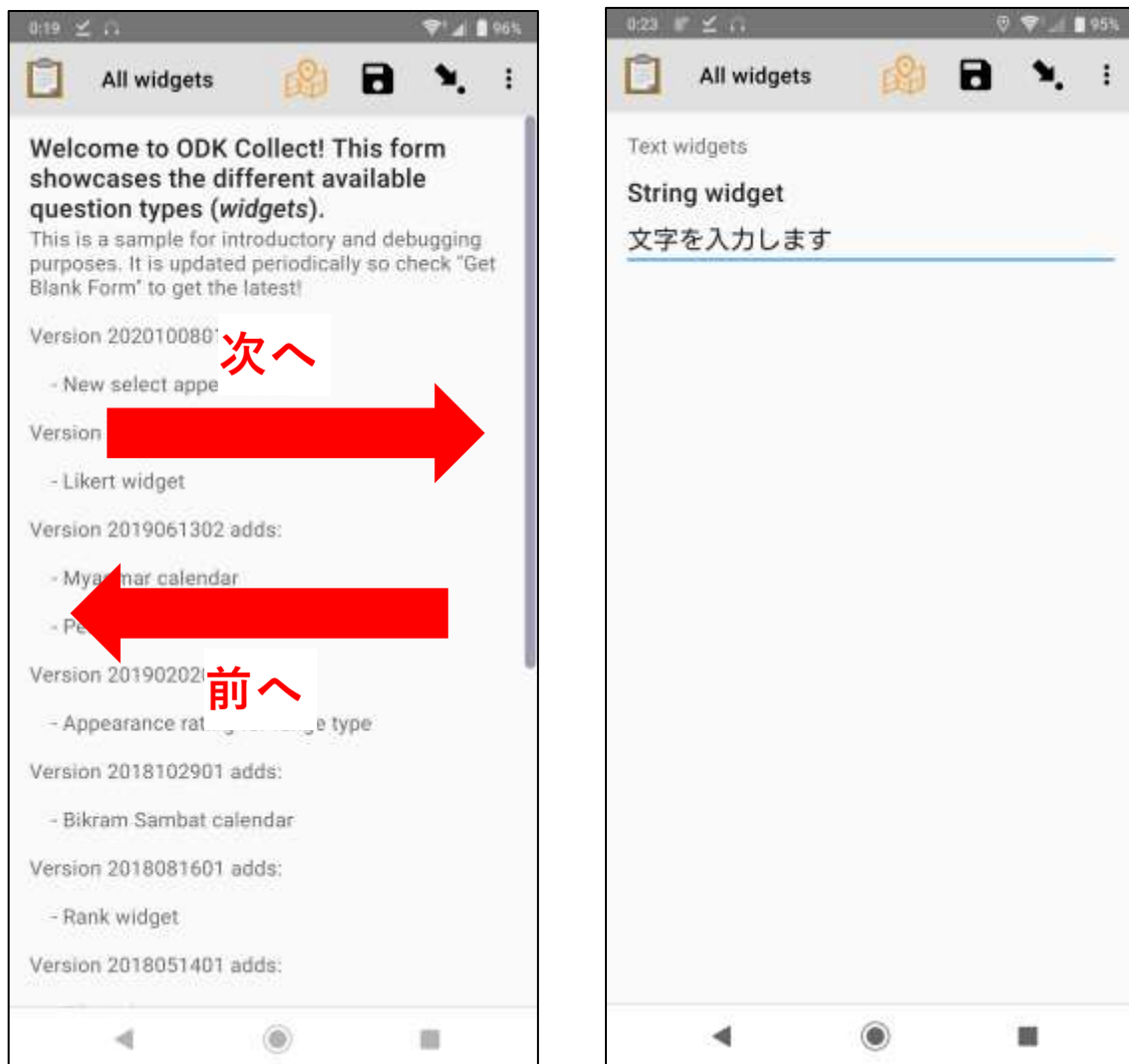
フォームに値を入力していきます。

次のフォームへ進むには右方向にスワイプ、前のフォームに戻るには左方向にスワイプします。（この操作方法は「全般設定」の設定内容によって変わります。）

2.3　ローカルファイルに出力

フォームの入力データをローカルファイルに出力する手順です。
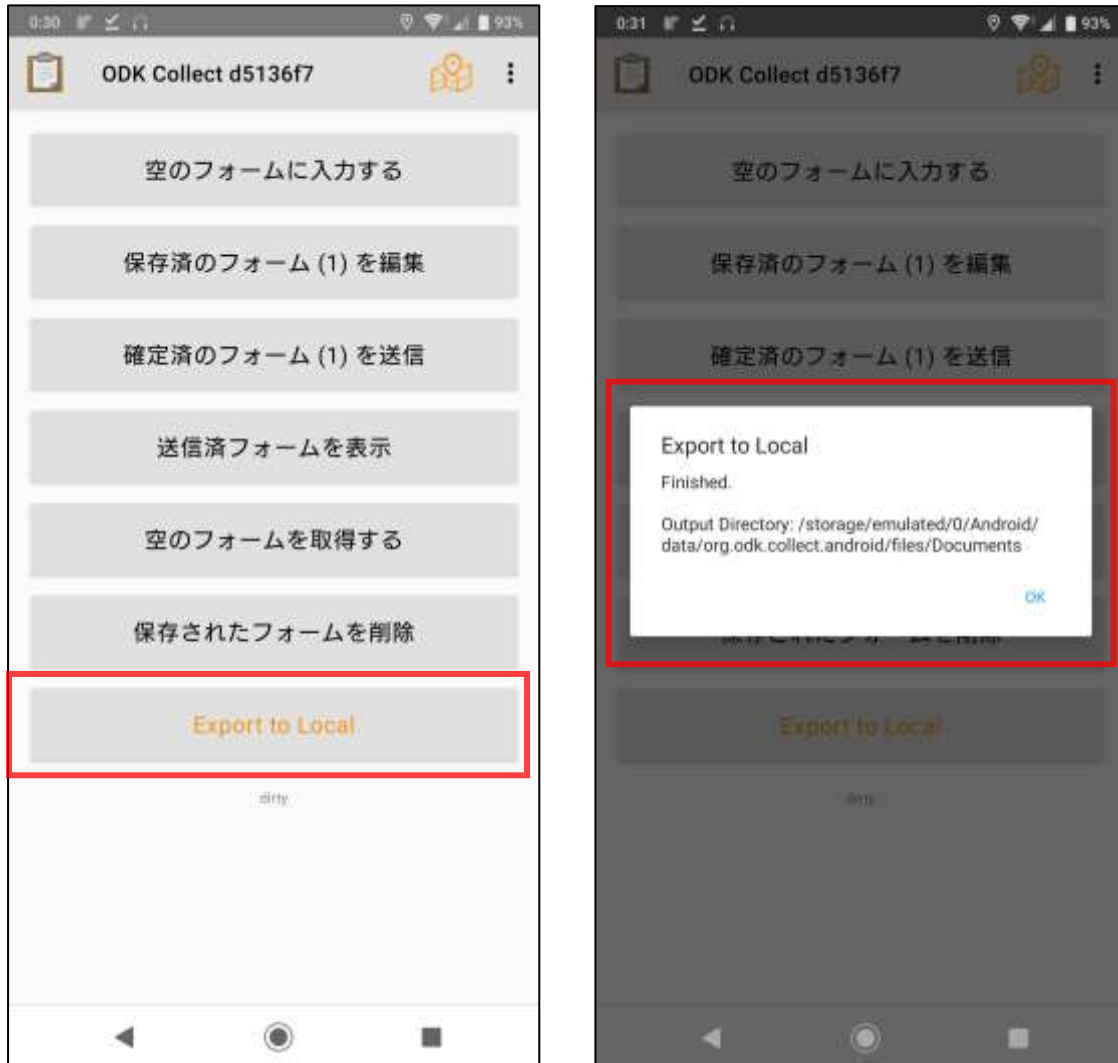
入力を終えた後、メイン画面で「Export to Local」を選択します。

フォームへの入力データに未入力の項目があっても出力できます。

出力処理が完了すると、ファイルの出力先パスを記したダイアログが表示されます。

2.4　出力ファイルをパソコンへ転送

出力ファイルをパソコンへ転送する手順です。
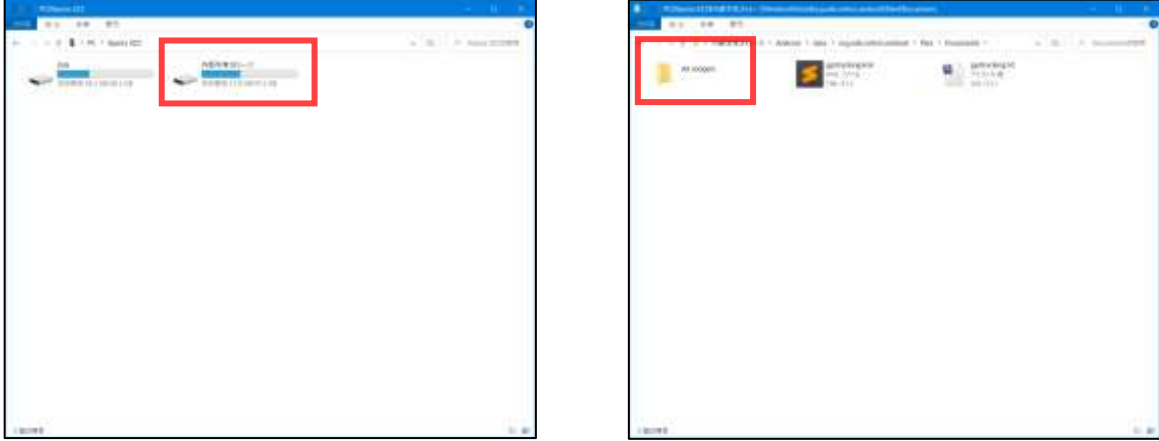
Android 端末とパソコンを USB ケーブルで接続します。

パソコンから Android 端末のディレクトリ／ファイルにアクセスできるよう、USB の接続モードを選択します。（※一般的には「ファイル転送」を選択します。）

パソコンのエクスプローラーに Android 端末のディレクトリが表示されましたら、「2.3 ローカルファイルに出力」の出力完了時に表示されたパスを開きます。
フォーム毎にそのフォーム名のディレクトリが作成されていますので、それらのディレクトリをパソコンにコピー（または移動）します。

（※一般的には次のパスになります。）

```
/＜端末名＞
 /内部共有ストレージ
  /Android
   /data
    /org.odk.collect.android
     /files
      /Documents
       /＜フォーム名＞
            ：
```

2.5　出力ファイルの内容

出力ファイルには次の内容が格納されています。

```
＜フォーム名＞
├ maps                              ・・・①
│   ├ ＜位置情報の項目名＞.kmz
│   ├          :
│   └          :
│
├ photos                           ・・・②
│   ├ ＜メディアファイル（JPEG など）＞
│   ├          :
│   └          :
│
├ sheet1.csv                       ・・・③
├ ＜各グループの項目名＞.csv          ・・・④
├          :
└          :
```

① フォームのデータ項目のなかで、位置情報に関するデータを kmz ファイルに変換したファイルです。kmz ファイルの中には相対パスでメディアファイルを格納し、description タグに HTML の IMG タグで画像ファイル（jpeg, png, gif）を記述しています。

② フォームのデータ項目のなかで、写真や動画などのメディアに関するデータを格納します。ファイル名は ODK collect が割り当てた一意な ID になっており、③④の CSV ファイル内のデータと関連付けられています。

③ ODK collect がサーバーに格納するスプレッドシートの先頭シート（sheet1）の内容を出力します。

④ ODK collect がサーバーに格納するスプレッドシートの 2 番目以降の内容を出力します。シート名をファイルの名称にして格納しています。グループ項目の内容が出力されることになります。

2.6　位置情報データを GIS ソフトで確認

　出力ファイルのなかの位置情報に関するデータを GIS ソフトで確認する手順です。ここではウェブ版の Google Earth を使って説明します。

ウェブ版の Google Earth を開き、メニューから「プロジェクト」を選択します。

「開く」から「パソコンから KML ファイルをインポート」を選択し、出力した KMZ ファイルを選択します。
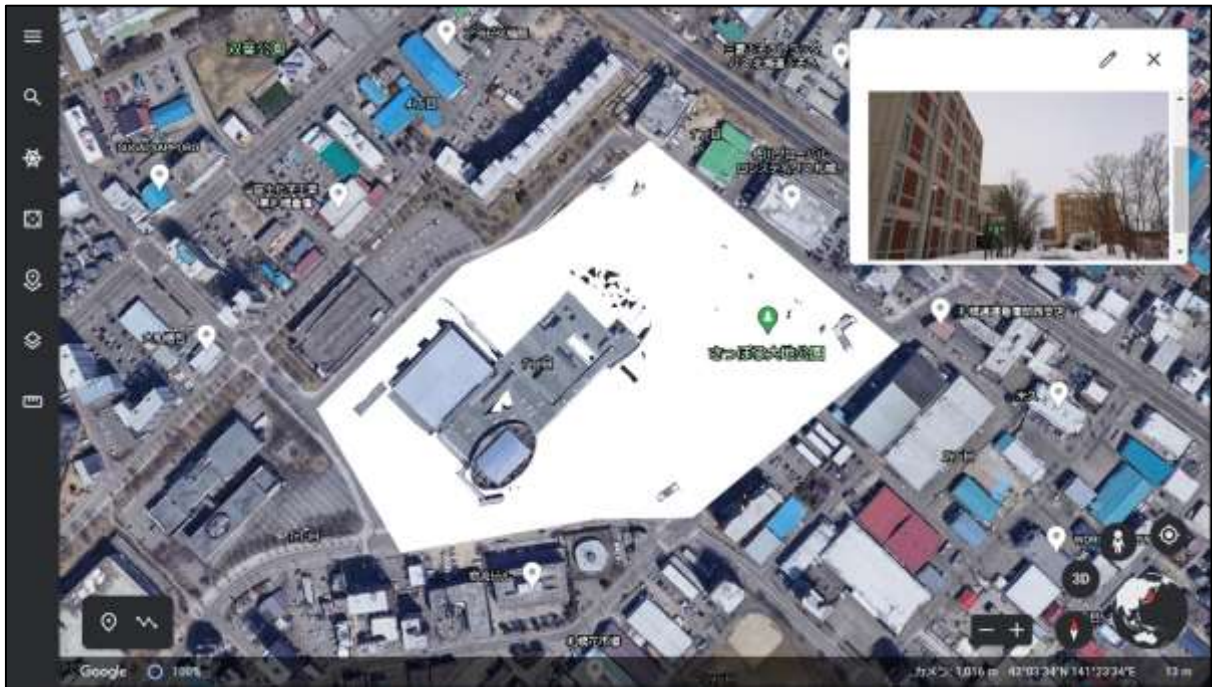
Google Earth では地図上のマーカーやポリゴンをクリックすると、ポップアップウィンドウを表示します。入力データの中に画像ファイルがある場合は、その画像が表示されます。

3 ナビゲーション地図

ナビゲーション地図について説明します。

3.1　ナビゲーション地図を開く

ナビゲーション地図の表示方法です。

各画面のタイトルバーにある地図アイコンをクリックします。

地図の操作方法は ODK collect の地図と同じです。

3.2　オフライン地図を表示する

ナビゲーション地図にオフライン地図を表示する方法です。
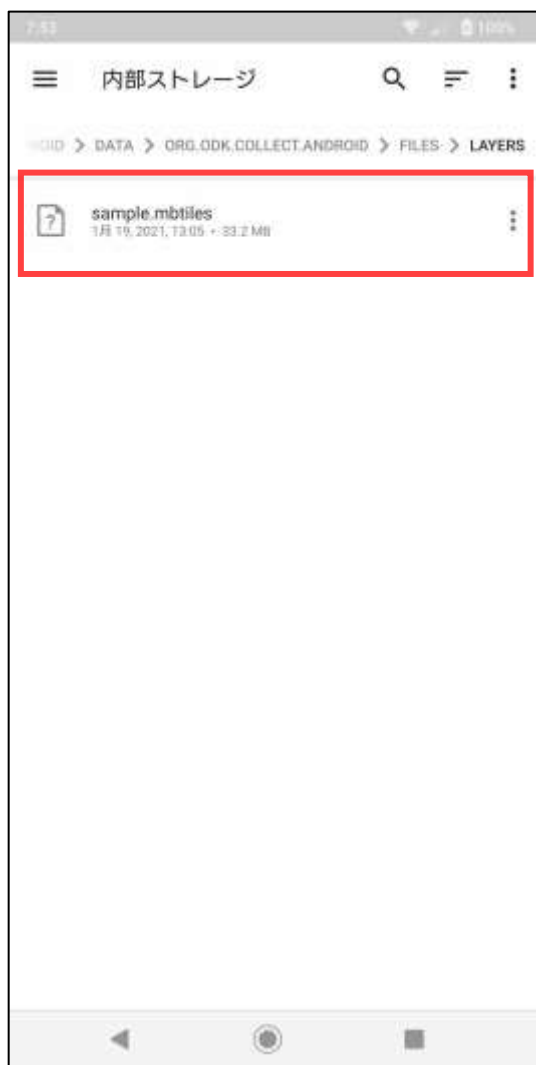
ODK collect の Mapbox の手順に沿って、オフライン地図の mbtiles ファイルを用意し、所定のディレクトリに格納します。（mbtiles ファイルの作成方法については、巻末の補足説明で紹介しています。）

mbtiles ファイルの格納先は、一般的に次のパスとなります。

```
/＜端末名＞/内部共有ストレージ/Android/data
                     /org.odk.collect.android/files/layers
```
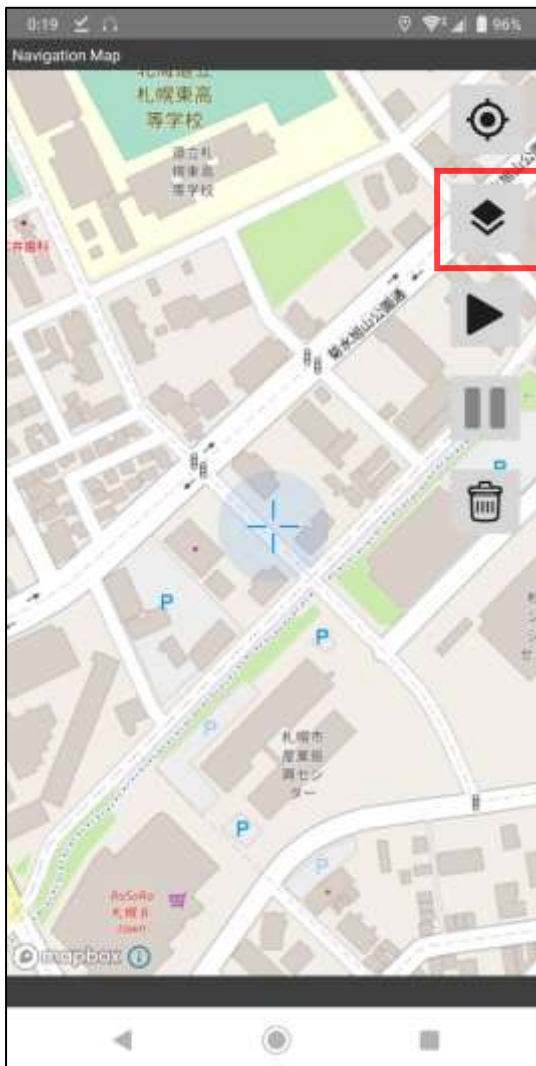
地図上のレイヤーアイコンをクリックします。

所定のディレクトリに格納した mbtiles ファイルが一覧表示されますので、オフライン地図に使用する背景地図を選択します。

3.3　現在地をトラッキングする

現在地の位置情報をログに記録し、地図上に軌跡を表示する方法です。
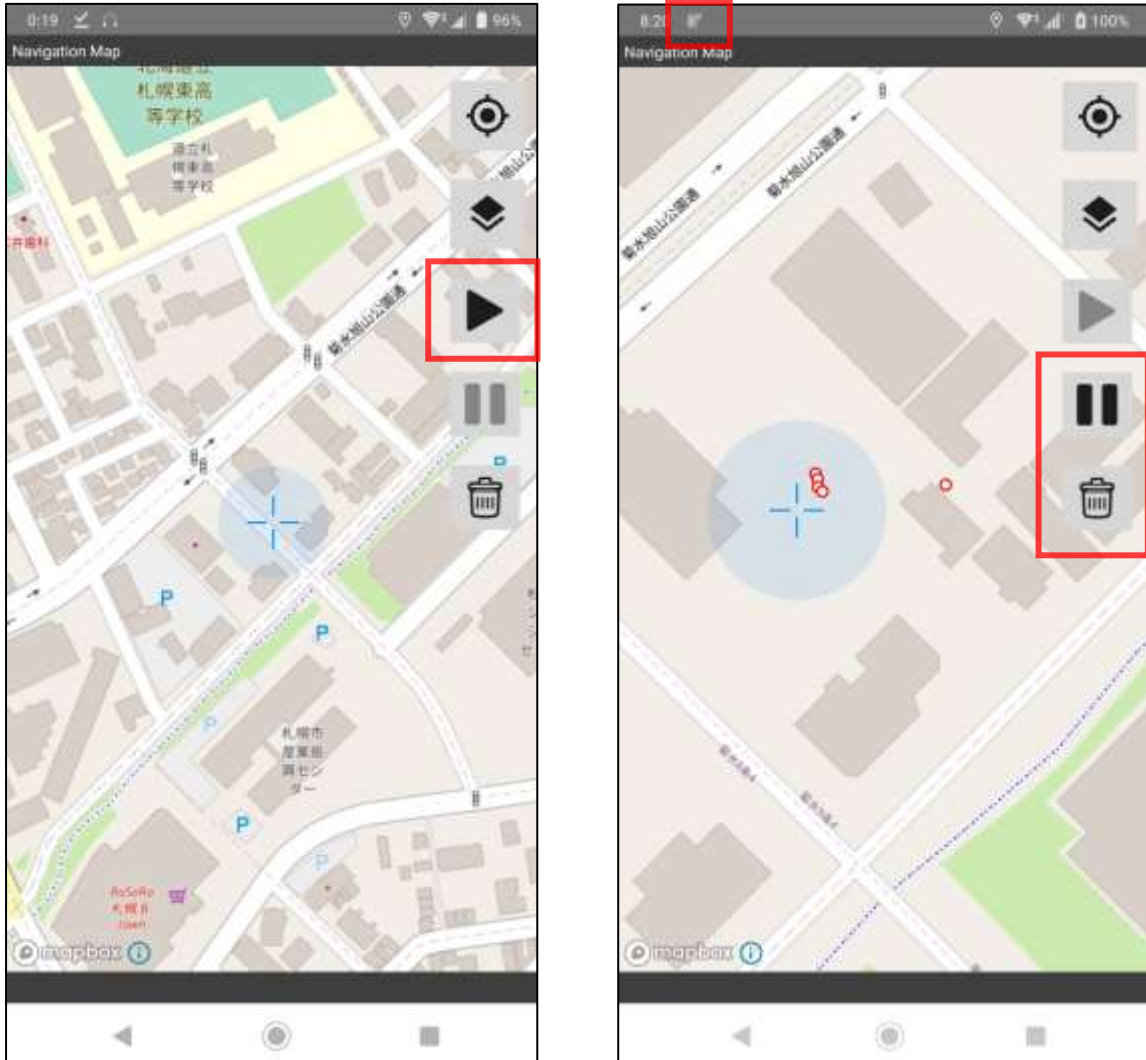
地図上の再生アイコンをクリックすると、現在地のロギングを開始します。

ロギング中はステータスバーに人型アイコンを表示します。ロギングはアプリの切り替えやスリープ状態でも継続します。

地図上の一時停止アイコンをクリックすると、ロギングを停止します。またゴミ箱アイコンをクリックすると、ログデータを削除します。

ロギングは 15 秒間隔で 1m 以上の移動を確認し、移動がある場合はログを残します。（Android API 標準の機能を利用していますので、ログが記録される条件や精度は OS や端末に依存します。）

3.4　現在地の位置情報ログを出力する

現在地の位置情報ログを KML ファイルに出力する方法です。
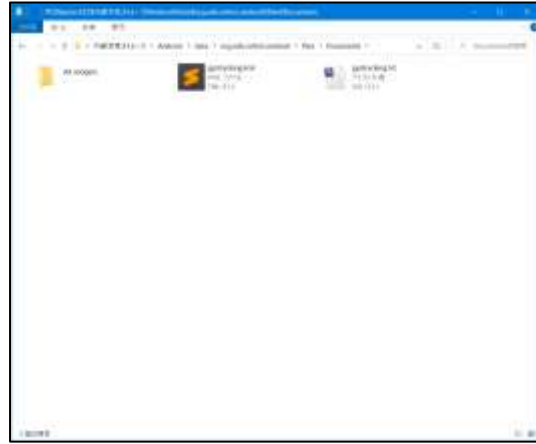
「2.3 ローカルファイルに出力」の「Export to Local」を選択すると、位置情報ログも KML ファイルに変換し、入力データのローカルファイル出力と同じパスに格納します。

出力先は一般的に次のパスとなります。

```
/＜端末名＞/内部共有ストレージ/Android/data
                    /org.odk.collect.android/Documents/gpstracking.kml
```

3.5　保存済みフォームの位置情報データを表示

保存済みフォームの位置情報データは、ナビゲーション地図に表示できます。
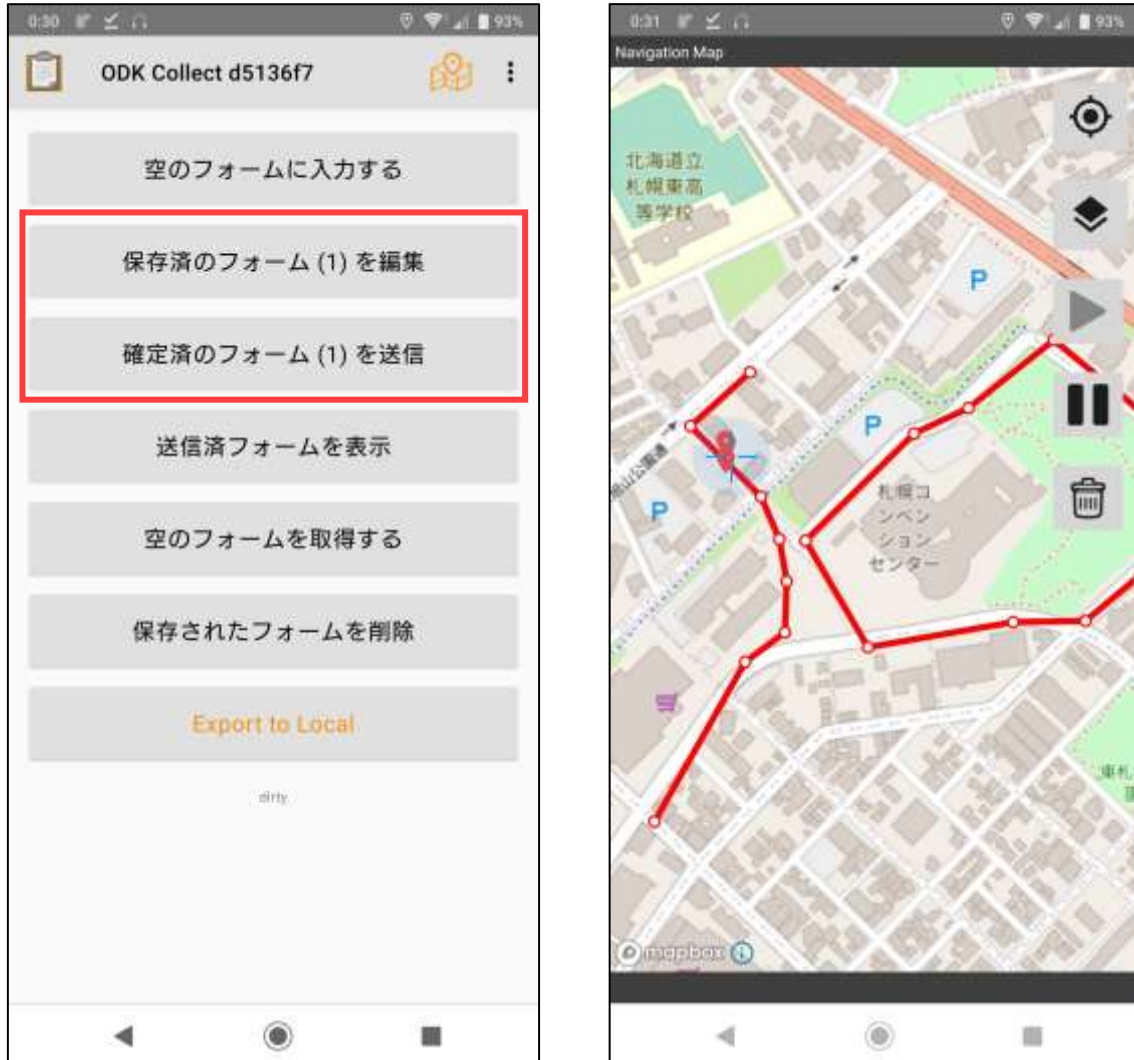
保存済みや確定済みのフォームを開き、編集画面からタイトルバーの地図アイコンをクリックしてナビゲーション地図を表示します。

そのフォームの入力データに位置情報データがある場合は、それぞれマーカーやライン、ポリゴンで入力データを地図上に表示します。

4　補足説明

ODK collect に関する補足説明です。

4.1　オフライン地図データの作成

Mapbox の背景地図として利用できるオフライン地図データの作成方法を説明します。
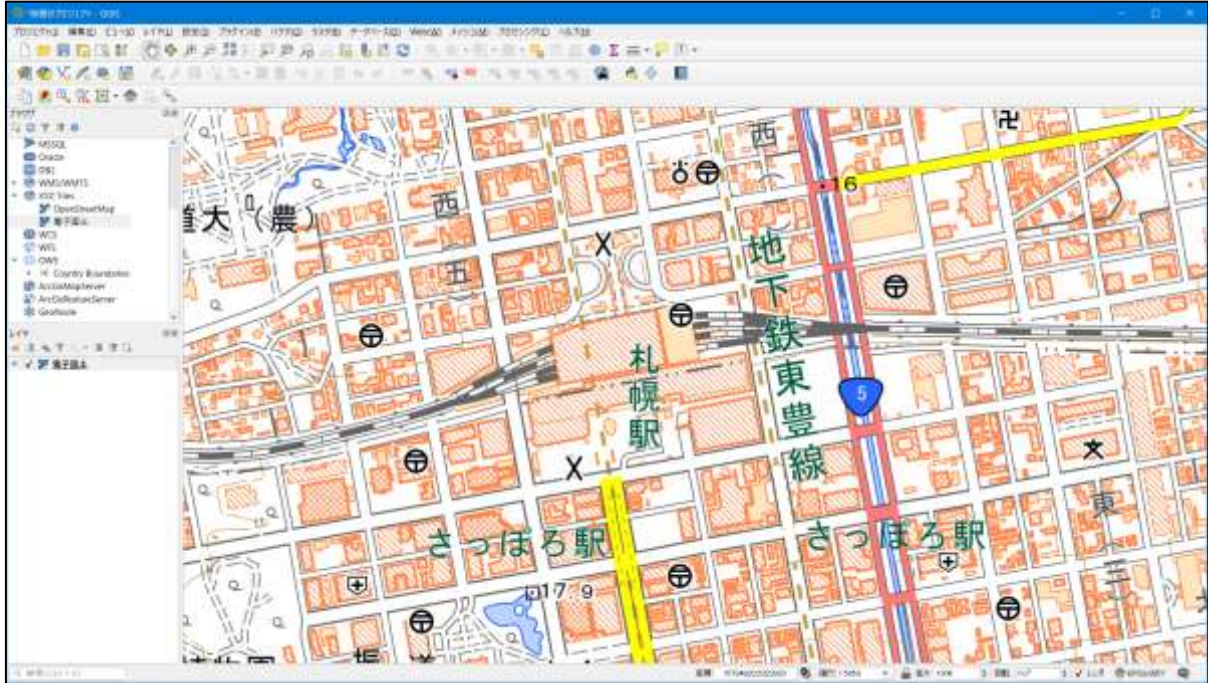
QGIS を開き、任意の背景地図を表示します。ここでは QGIS3.10 で説明します。

[プラグイン]-[プラグインの管理とインストール]を開きます。

検索フォームに「QMetaTiles」を入力して QMetaTiles プラグインを検索し、このプラグインをインストールします。

QMetaTiles プラグインを開き、mbtiles ファイルの出力先、タイルの出力内容をそれぞれ設定して OK ボタンをクリックすると、mbtiles ファイルが作成されます。

ODK BUILD

Mini-tutorial

Furukawa　Flavio

Contents
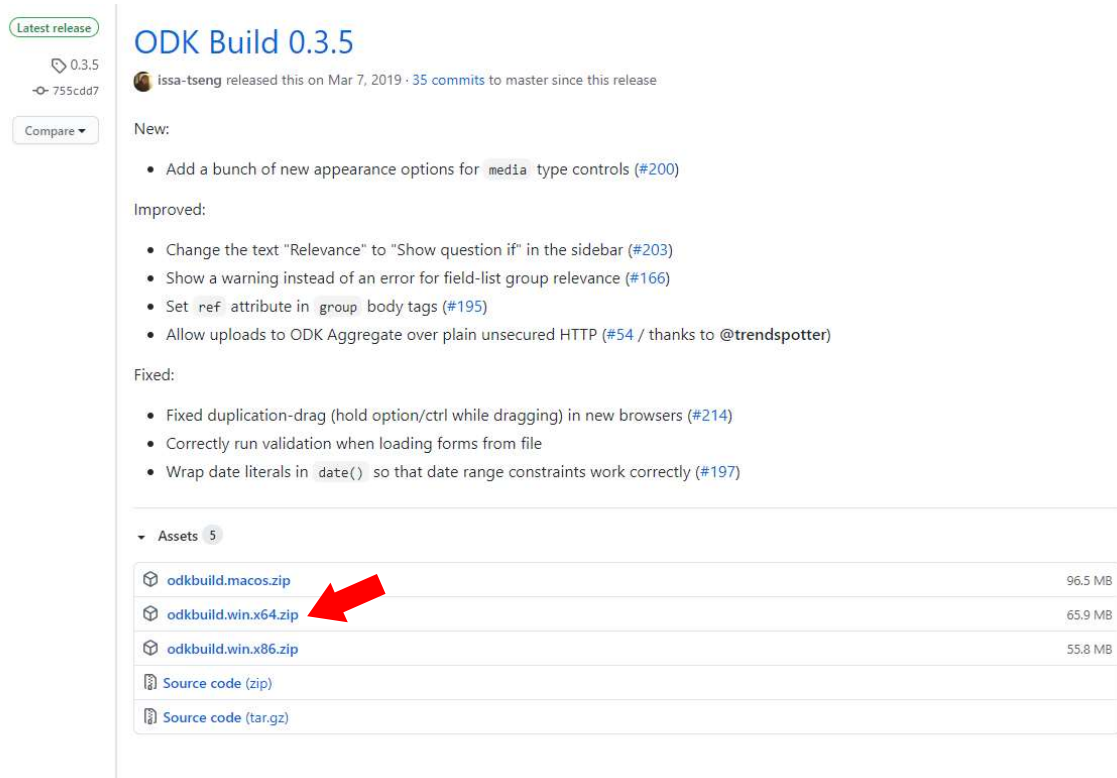
1. Installation

Before using ODK build, we need to download the software. We are going to use the standalone version, in which no installation is needed, you just download the data, unzip it and launch it.

To start, go to this website: https://github.com/getodk/build/releases/tag/0.3.5 and download the file according to your computer operating system.

Since I am using a Windows computer, I am downloading the odkbuild.win.x64.zip, which probably you have the same system.

After download it, you need to unzip it. Right-click on the file and click on "Extract All…"
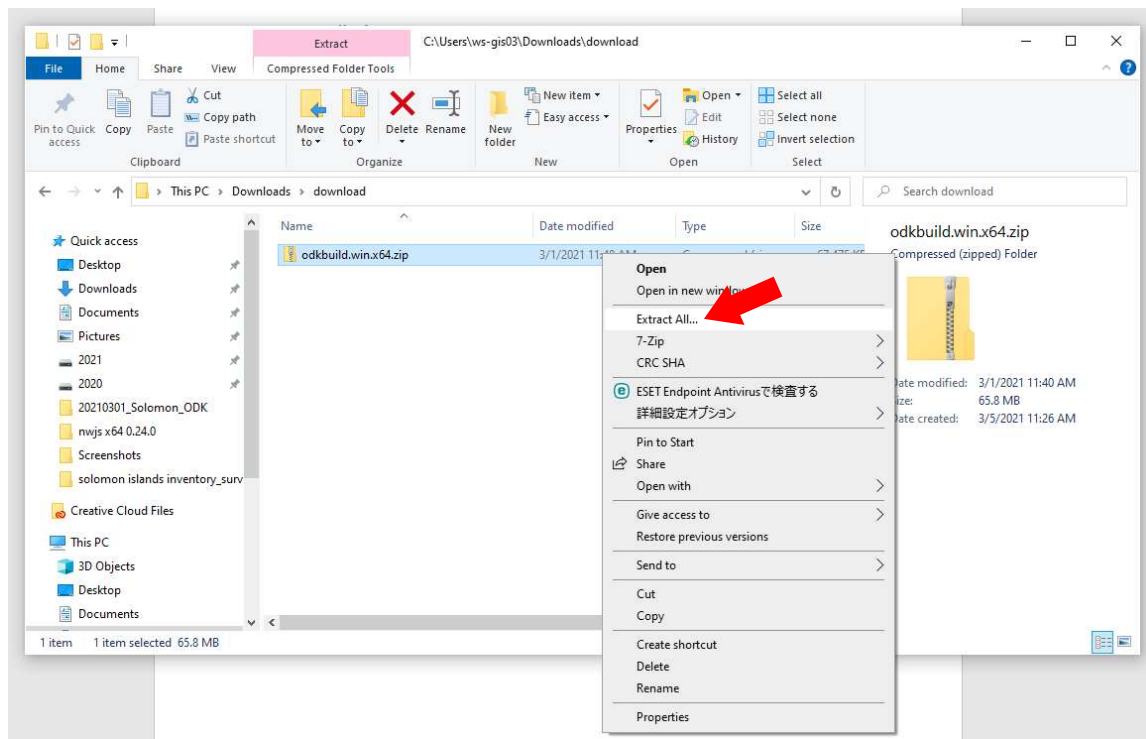
After extracting, you can launch the ODK build application by clicking on the odkbuild.exe icon
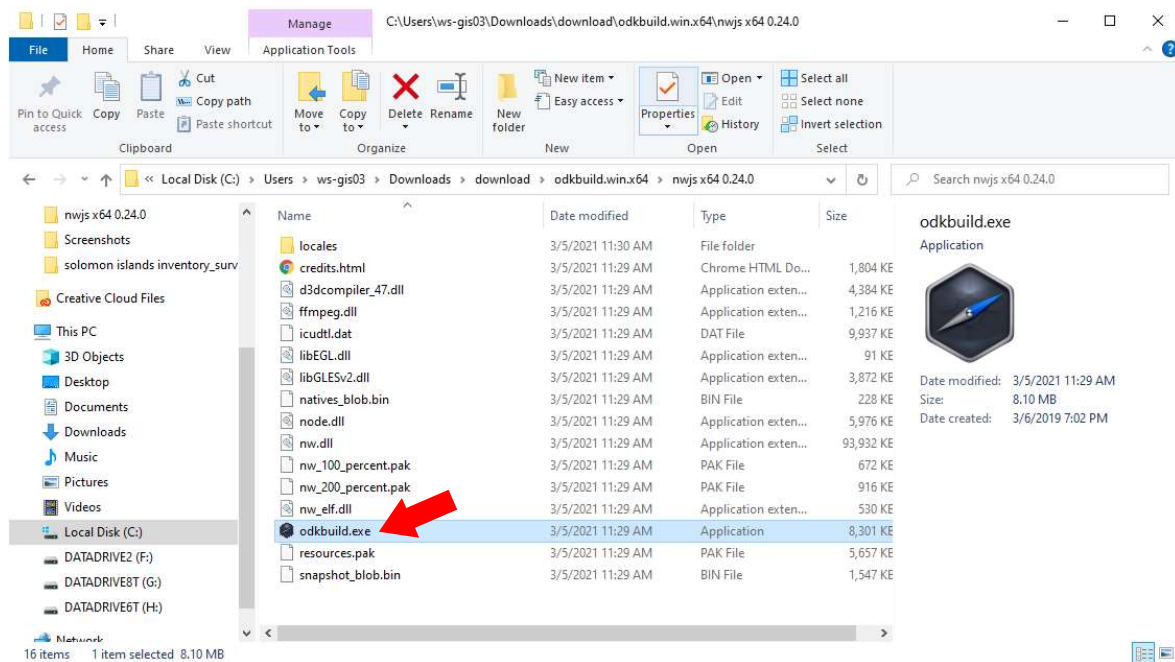
Good! Now you can use the ODK Build!

2. The layout

The layout of the application is very simple, let's take a look at it
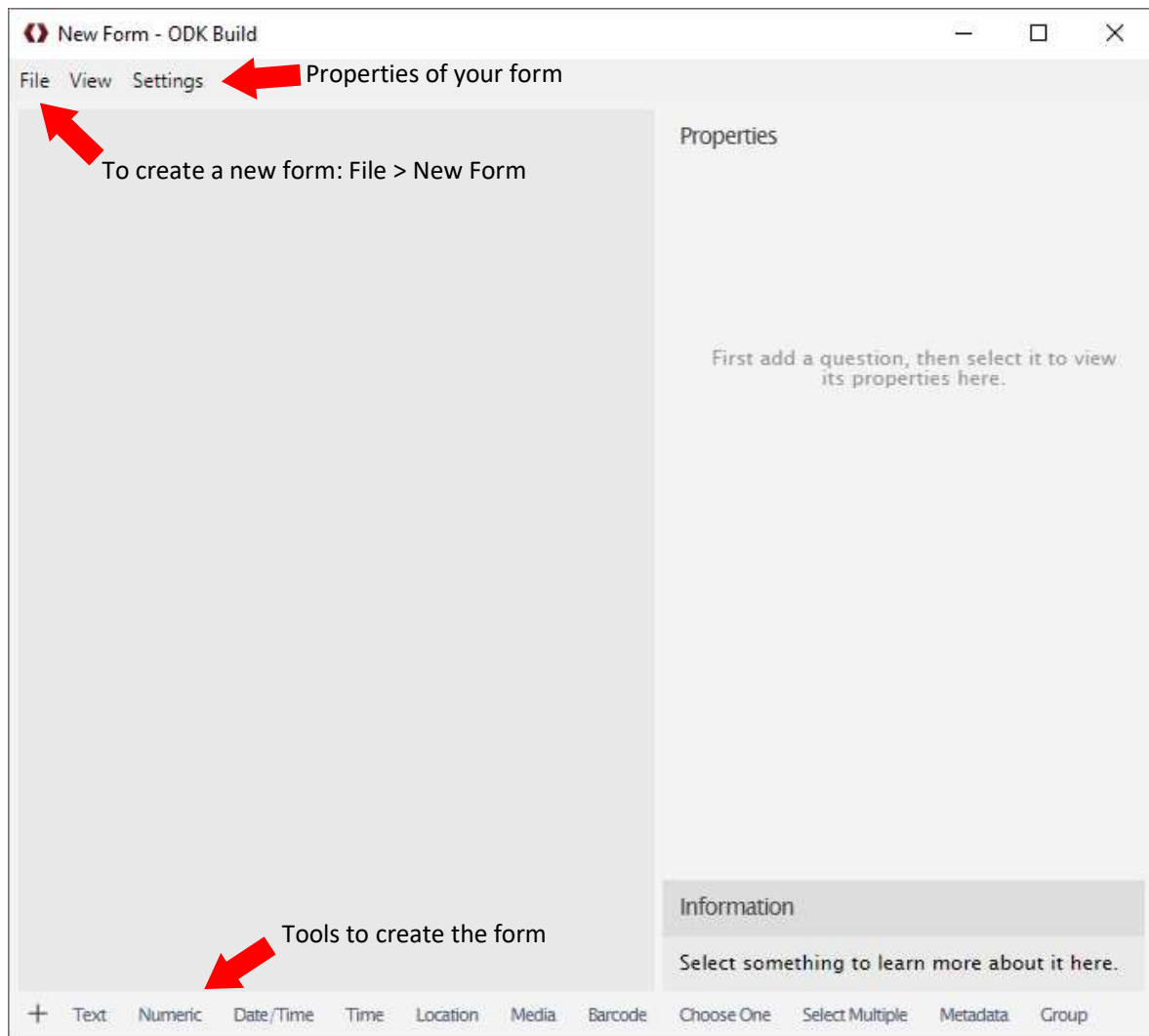
The main tools we are going to use in this mini-tutorial are displayed on the upper figure.

On "File" you can create your new forms, "properties" you can edit your survey name and which spreadsheet you want to use, and the tools on the bottom bar allow you to create your custom survey.

For more information in how to proper setup the form, please look at the ODK server tutorial

So, let's start creating a new form. **Click on File > New Form**

3. Creating a form

Now you have your new form! You can **add an element by dragging the elements from the bottom of the screen into the canvas**

| + Text | Numeric | Date/Time | Time | Location | Media | Barcode | Choose One | Select Multiple | Metadata | Group |
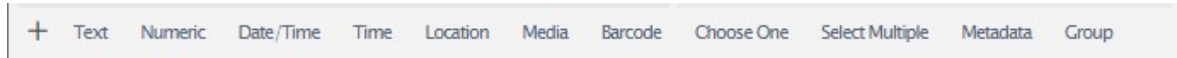
The elements are divided into data types:

- Text: you can input text data (e.g. Surveyor name, field name, etc.)
- Numeric: you can input numeric data (e.g. DBH, height, etc.)
- Date/Time: you can input the date and time (e.g. March 31st, 2021, 1:00 PM)
- Time: you can input time data (e.g. 1:20 PM)
- Location: you can input your GPS location data (e.g. lat, long)
- Media: you can input media (e.g. Image, selfie, audio, video, draw, signature)
- Barcode: you can input barcode information (e.g. barcode of products)
- Choose one: you can give many options and the surveyor need to choose only one option
- Select Multiple: is very similar to "Choose one" but instead of choosing only one, you can choose multiple options
- Metadata: you can input the metadata of your device (e.g. serial number, user, phone number, etc.)
- Group: you can create a group to create a loop (e.g. Many trees in a sample plot, and you need to insert all trees. You can create a group to ask what kind of tree is each until you finish input all of them)

All these elements can be placed in any order you want. **You can change the order by dragging. To remove an element, you just need to click on the X icon.**

Good! Now you can create a form, so let's take a look into the properties of some elements!

4. Element properties

There are many types of elements, text, number, time, date, multiple-choice, GPS location, and media. You can choose according to your necessity.


Let's go through some of the important fields:

- Data name: This is the name that goes into the spreadsheet, you cannot use space between letters
- Label: This is the name that will appear on the application
- When creating a question with multiple options you can create different next questions for each type of answer, for example:
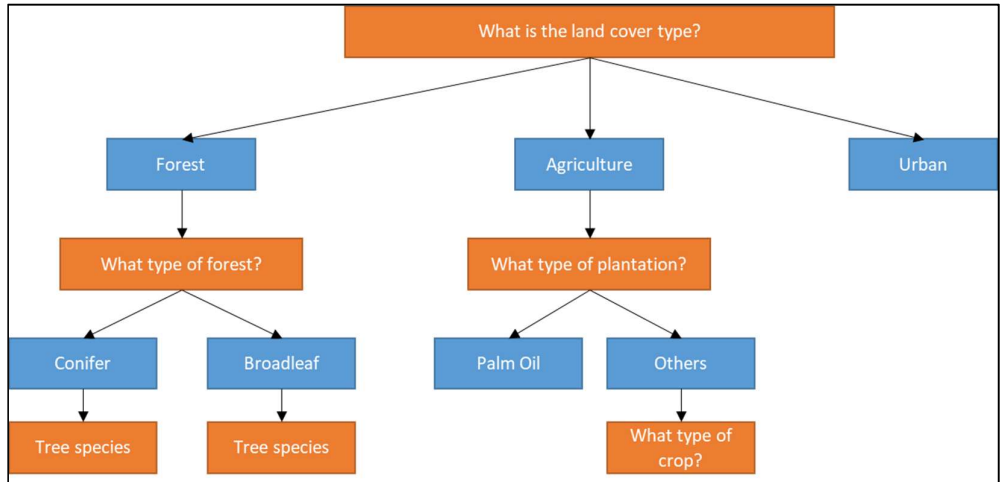
The orange boxes show the questions, while the blue boxes the answers available

So, if you choose a forest, you can select what type of forest, and so on. Otherwise, if you choose agriculture, the next question would be what type of plantation. You can use this function by checking the "Follow up question" box, you select which answer leads to another question.

Note that in the bottom part of the right panel, you have information explaining each field
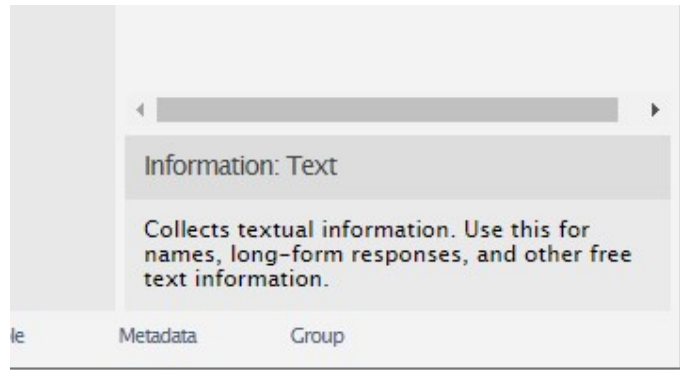
5. Example

Now, let's create a full form following the 5W1H (What, who, where, when, how, and why) questioning method (in this case we are going to use the ones that apply to the survey).

So for this example we are creating the following questions:

- Who? > Who is the surveyor? (Surveyor name)
- When? > When the survey was made? (Date/Time)
- What? > What is the land use type? (Land use type)
- What? > What is the tree type? (Tree type)
- What? > What is the DBH? (DBH Value)
- What? > What is the tree height? (Tree height)
- Where? > Where is it located? (Geolocation)
- What? > What does it look like? (Photo)

Surveyor's name

Click on "text" button on the bottom bar and fill the properties according to the image below:

Date

Click on "Date/Time" button on the bottom bar and fill the properties according to the image below:

Step 2 – insert the data name (it will be displayed on the spreadsheet)

Step 3 – Insert the question that will be displayed on the mobile device

Step 3 – Add a hint to help the surveyor to answer

Step 4 – Select what time of time you want the surveyor to take. In this case we are asking for full date (YY/MM/DD) and time

Step 1- click on the "Date/Time"button

Landuse type

Click on "Choose One" button on the bottom bar and fill the properties according to the image below:

Tree type

Click on "Choose One" button on the bottom bar and fill the properties according to the image below:

DBH in cm

Click on "Numeric" button on the bottom bar and fill the properties according to the image below:

Step 2 – follows the same rule from other questions

Step – 3 The style you can change as slider or pick up value, in this case we choose textbox where the surveyor can type the values

Step 4 - Since we are working with centimeters, we do not need decimal values

Step 1- click on the "Numeric" button

Tree height

Click on "Numeric" button on the bottom bar and fill the properties according to the image below:

Step 2 – follows the same rule from other questions

Step 3 - The style you can change as slider or pick up value, in this case we choose slider where the surveyor can slide the values

Step 4 – Here you can select the range of your slide (min and max)

Step 5 – here you can select the step between choices. Since we are working in meters, we are using 0.1m between the choices

Step 1- click on the "Numeric" button

GPS location

Click on "Location" button on the bottom bar and fill the properties according to the image below:

Add photo

Click on "Media" button on the bottom bar and fill the properties according to the image below:

6. Groups

With Groups you can create a loop of questions, but what does it mean?

For example, if you have a plot with many trees, you can input each tree according to each species, and you can do it until you finish put all trees from the same plot
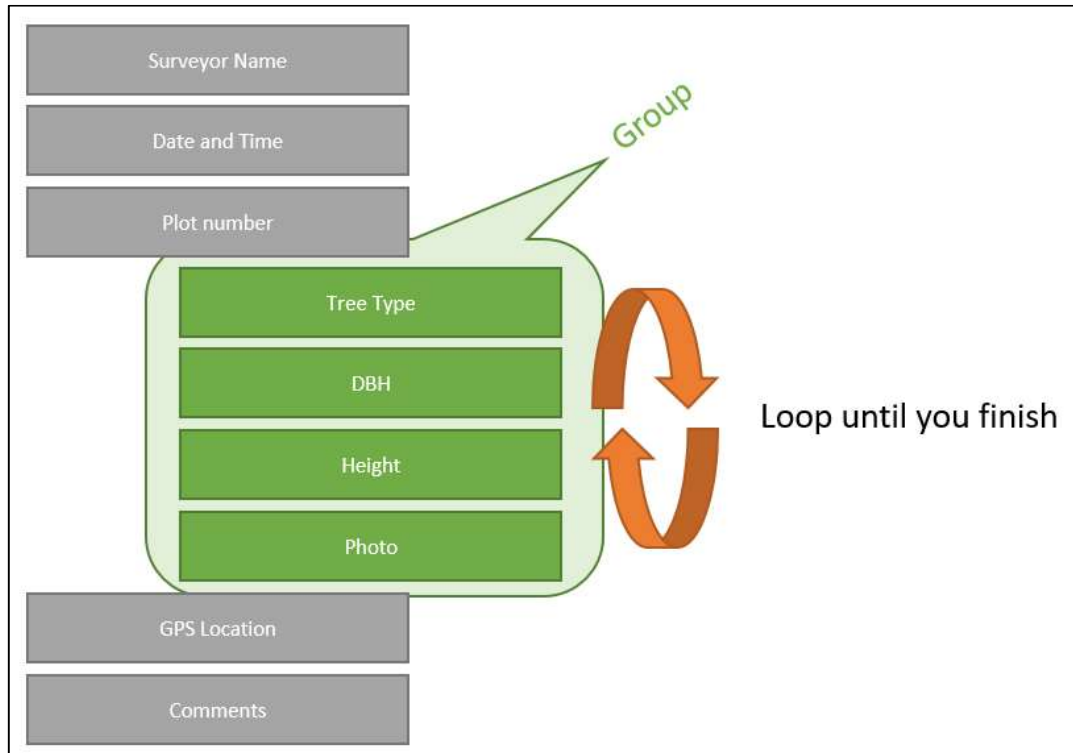
Let's see how to create that on ODK Build:

- Click the group button
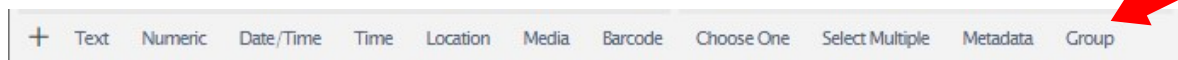
- When you create a group, you can put any amount of elements
- On the mobile of the application, at the end of the group, it is going to ask if you want to add a new tree or finish
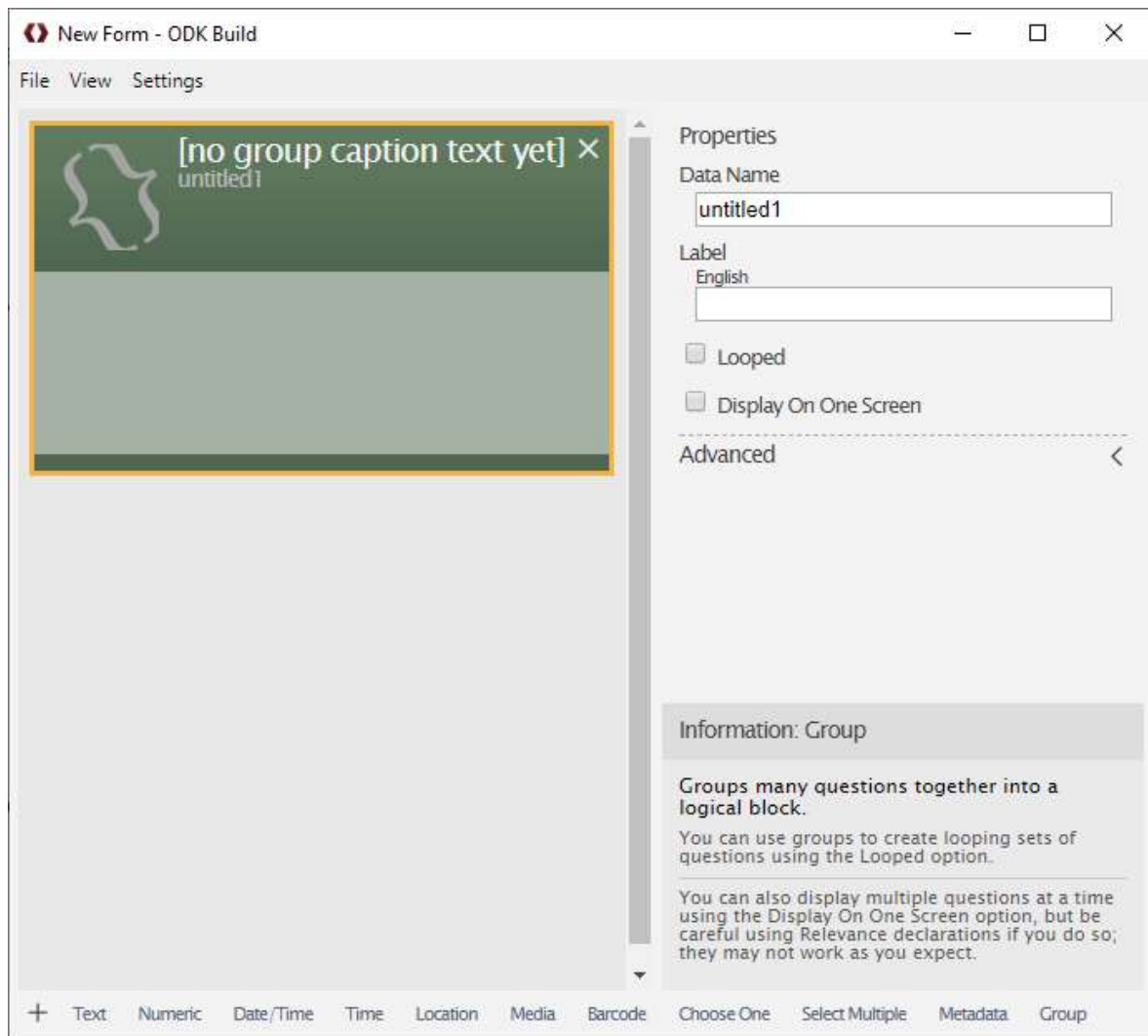
The group can be seen as a form inside a form.

So, let's create a group using to obtain these information: tree type, DBH, and tree height

First, click on "Group" on the bottom bar
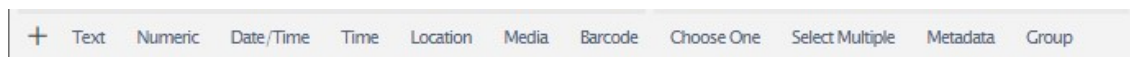
You are going to see a green block, everything you put in this block it will be part of the group, you can rename it according to your needs. In this case we are calling it "Tree info"

Let's add Tree type. Click on "Choose one" button on the bottom bar, drag it into the green block, and fill the properties according to the image below:

Next, let's add the DBH values. Click on "Numeric" button on the bottom bar, drag it into the green block, and fill the properties according to the image below:

The last one is going to be the tree height. Click on "Numeric" button on the bottom bar, drag it into the green block, and fill the properties according to the image below:

So after you finishing filling up your group, click again on the green part and you have 2 choices

Looped: it will loop the questions as we mentioned before

Display On One Screen: all questions will be displayed in only one screen

In this case, let's display it in only one screen. Good now you are able to create groups!

7. Save and Export

To save the form to edit later, click on File > Save form. You will save with the .odbuild extension. You can open this file to edit your form.
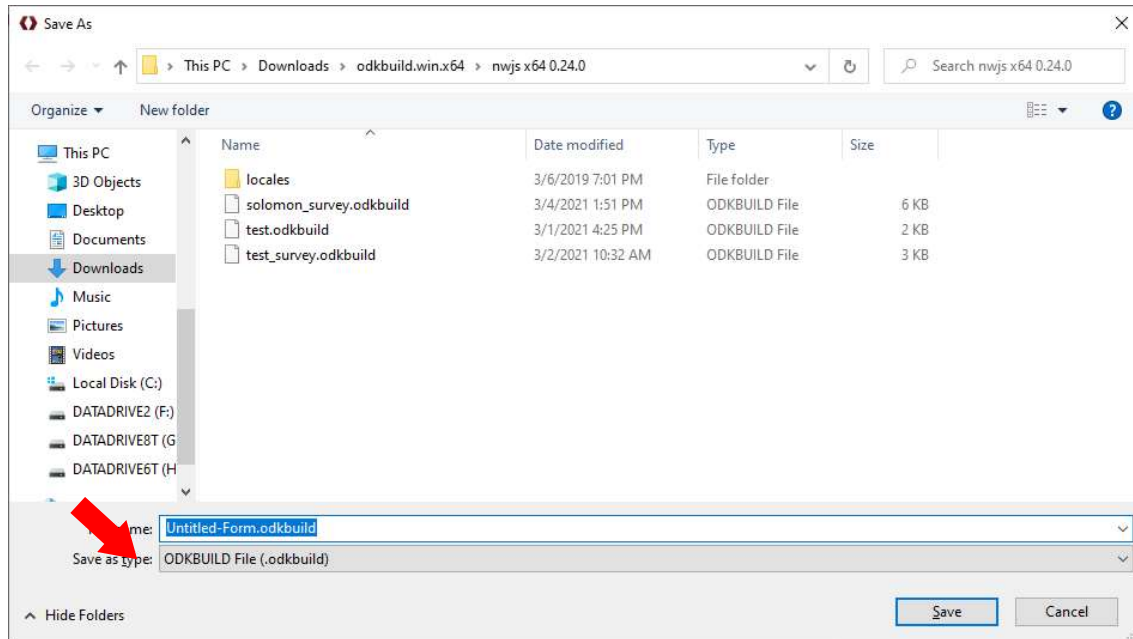
To export into your device, you need to go to File > Export XML. This will create a XML file that you can upload into Google Drive
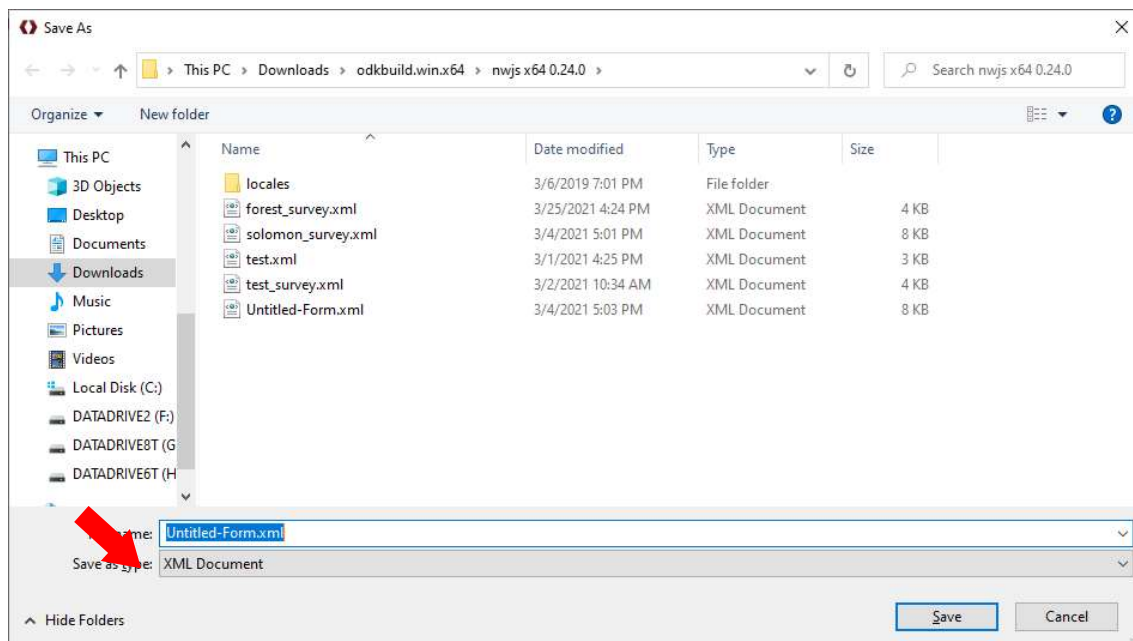
For more information in how to export, please look at the ODK server tutorial

8. Conclusions

This is a mini-tutorial on how to create a form using ODK build, we went through the installation process until creating a full form.

To use this form on your mobile device, ask your technical staff how to set up it to the server and you can use it right away

One point that should be highlighted, is to create relevant data for your inventory management. "With crap ingredients, you cannot have a good meal"

For further information, you can access https://docs.getodk.org/build-intro/, where the whole tutorial is available

Japan International Cooperation Agency

Ministry of Forestry and Research
Solomon Islands

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

(SFRM Project)

Market and Value Chain Analysis

Output 3, Activity 3-3

Final Report

Part I

November 2019

Ministry of Forestry and Research, Solomon Islands
Japan International Cooperation Agency

Contents

List of Figures

Background

This document is Part I of the final report under Output 3, Activity 3-3, of the Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands. Activity 3-3 has the objective to select potential commodities for each pilot area and analyze their value chains and markets, with focus on the potential opportunities for the communities.

The study was conducted from July to September 2019, with guidance from the project work plan, internal reports (eg: community profile report of the project) as well as technical inputs provided from the Project management team.

A set of three internal reports were delivered during the development of this activity, providing intermediate products to support discussions and decision-making by the Project management team and community members:

- ✓ Internal Report No.1- Rapid Appraisal for Market and Value Chain Analysis: Gathering information on Komuniboli community profile and production systems.

- ✓ Internal Report No.2 - Rapid Appraisal for Market and Value Chain Analysis: Gathering information on Falake community profile and production systems.

- ✓ Internal Report N3 – Rapid Appraisal for Market and Value Chain Analysis of a short list of 9 commodities: Cocoa (*Theobroma cacao*), Coconut (*Cocos nucifera*), Kava (*Piper methysticum*), Sawn Timber and Furniture, Horticulture, Ngali nut (*Canarium indicum*), Betel nut (*Areca catechu*), Loya Cane (*Calamus spp*.) and Straw mushrooms (*Volvariella volvacea*).

Structure of the final report

Part I of the final report provides detailed information on the methodology used to select the commodities 'timber' and 'cocoa', and the methodology to assess the value chain and market data.

Part II presents the results of the assessment and analysis, to understand the opportunities and challenges of the selected value chains and provides the base line information to support Output 3 of the project workplan.

Part I - Methodology

The market and value chain analysis was developed in two phases. Phase 1 has as objective to gather information of the community profile and their major production systems to support the selection of a maximum of 2 commodities for analysis of the market and value chain(s) under Activity 3-3.

Phase 2 aims to assess detailed information of the selected value chains and analyzes the information with for each community in the pilot areas. The results of Phase 2 are presented in Part II of this report.

1 Selection of the Value Chain

The information gathered during phase 1 (internal Report N1) guided the pre-selection of a short list of 9 commodities, target products for the rapid market appraisal:

– Cocoa (*Theobroma cacao*),
– Coconut (*Cocos nucifera*),
– Kava (*Piper methysticum*),
– Sawn Timber and Furniture,
– Horticulture,
– Ngali nut (*Canarium indicum*),
– Betel nut (*Areca catechu*),
– Loya Cane (*Calamus* spp*.*),
– Straw mushrooms (*Volvariella volvacea*).

The market information of the all 9 commodities was analyzed for each community, applying 4 criteria for value chain selection[1]: Competitiveness potential, impact potential, cross-cutting issues and industry leadership. The analysis subsidized the discussion among the Project' team members and facilitated the community consultation.

Logs, timber and furniture was the first commodity selected due to its direct relation to the Project's goals and outcomes.

The second commodity was selected after community consultations in Falake and in Komuniboli. Through the consultation, the members of both communities[2] had the opportunity to learn about market information of the 9 commodities, to understand the criteria for the value chain and express their opinions and questions.

The consultation was carried out through an informative presentation made using printed materials and charts designed for each community (Figure 1 and Figure 2).

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[1] Details on the criteria provided in annex 1. Summary of results provided in Report N3
[2] Participant list presented in annex 2.
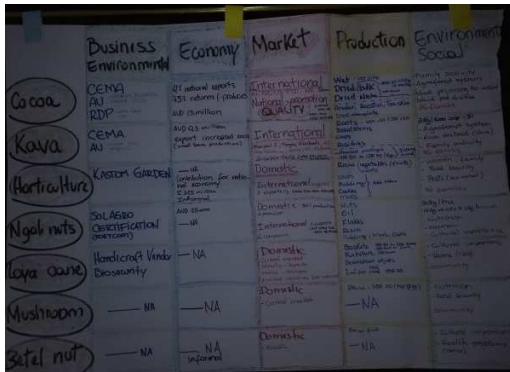
Figure 1: Summary of rapid market appraisal results in Falake

Figure 2: Presentation of Rapid market appraisal results in Komuniboli

The presentations were held in English and translated to Pijin and the local language. The participants had the chance to ask open questions and to join an interactive consultation, when they were invited to express their views on market information and selected commodities that had interest to understand the value chain and learn more about the markets (エラー! 参照元が見つかりません。, エラー! 参照元が見つかりません。 and Figure 5).

Figure 3: Community consultation and discussion in Falake
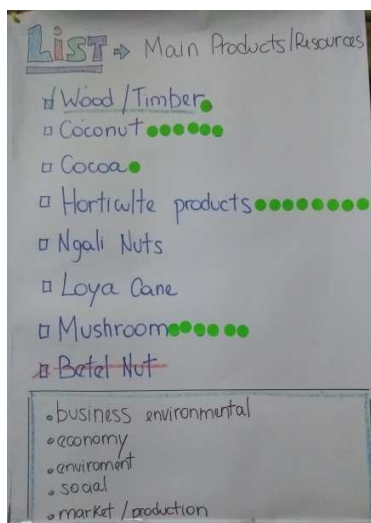
Figure 4: Community consultation in Komuniboli
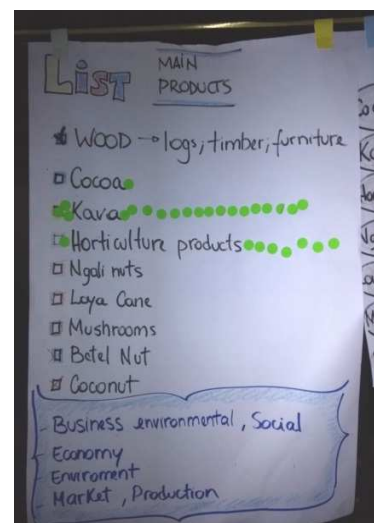
Figure 5: Community consultation in Falake

The Communities Development Committees used the results of the consultation to support the selection of the second commodity for value chain analysis.

Although Falake community consultation revealed a high interest in Kava, the final decision from the Committee was to select Cocoa due to its direct relation with forest sustainability, number of families engaged in this production system and the constancy of the cocoa beans production (at least 2 seasons per year).

Komuniboli community didn't select a second commodity due their high interest in to focus in the timber market.

2   Value Chain and Market Framework

The framework applied in the market and value chain analysis was adapted from the methodology proposed in the "Agricultural Value Chain Guide for the Pacific Islands" (CTA, 2014), as well as considered the recommendations from "A Guide to Rapid Market Appraisal (RMA) for Agricultural Products "(HELVETAS Swiss Intercooperation and CRS, 2012) and the concepts of value chain proposed by Marketlinks (USAID, 2019).

Value chain analysis consists of two inter-linked components:

- End market buyer analysis: Opportunities for competing in current and potential markets;
- Chain analysis: Using information from actors to map the value chain, understanding the business enabling environment (BEE) and analyzing constraints in the chain for competing in a potential market.

A Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was carried out and incorporated to the framework to enable the assessment of additional elements that might interfere in the development and implementation of the Project activity plan.

2.1   End Markets Analysis [3]

End market buyers are important sources of information on supply and demand, can transmit Knowledge, and in some cases will invest in firms further down the chain. They determine the characteristics—including price, quality, quantity and timing—of a successful product.

End-market analysis assesses the opportunities on the domestic market through interviews with current and potential buyers of the selected commodities (1. Logs, timbers and furniture and 2. Cocoa beans), taking into consideration trends, prospective competitors and other dynamic factors. Through the analysis the information was gathered to identify needs that may guide the upgrading of the value chain (innovation to increase added value) at the community level.

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[3] https://www.marketlinks.org/good-practice-center/value-chain-wiki/end-markets-overview

2.1.1 Logs, timber and furniture market analysis

The Logs, timbers and furniture market analysis was carried out trough interviews with 13 companies (10 in Honiara and 3 in Auki, see annex 3). The participating companies were indicated by the Ministry of Forestry and Research (MOFR) and the Solomon Islands Chamber of Commerce and Industry (SICCI) based on their participation in the SITPEA (Solomon Islands Timber Processors and Exporters Association) working group and the relevance of those companies for the forest sector. Invitation letters were sent in advanced to schedule the meeting and the interviews were performed with participation of a MOFR officer. The interviews were conducted from 07 to 13/09, using a questionnaire as a guideline (annex 4). The figures 6 to 14 present some pictures from timber yards in Auki and Honiara.

Figure 6: Timber retailer in Auki

Figure 7: Milling industry, in Auki

Figure 8: Furniture maker, in Auki

Figure 9 Furniture maker, in Honiara

Figure 10: Timber kiln, in Honiara

Figure 11: Dressed timber, in Honiara

Figure 12: Rough-sawn timber packed for exportation

Figure 13: Dressed timber

The data collected during the interviews was recorded on a printed form and then entered into spreadsheet software for further analysis. The date was organized in tree spreadsheets: 1: supply; 2: transformation and trading; 3: Value chain and SWOT. The analysis of the data and main results are provided in the Final Report, Part II.

2.1.2 Cocoa

The cocoa sector in Solomon Islands is well understood due to several previous analyses on value chain and market systems. In addition, many analytical studies have been developed between the Solomon Islands Government and partners, most importantly the "Market System Analysis and Sector Strategy" and the "Investment Options for Value Added Cocoa Products in the Solomon Islands" developed by Australian Aid through the Strongim Bisnis initiative. The market analysis for cocoa beans comprises the information obtained from primary data assessed in Auki, and secondary information from the above-mentioned studies.

There are 5 cocoa exporter agents in Malaita, of which 3 were interviewed during this assessment: ST Cocoa Exporter, Arania (Figures 14 to 17), and an individual trader working for C-Corps. The interviews were conducted using a questionnaire as a guideline (annex 4) and the data recorded on a printed form for further analysis. The analysis and main results s are provided in the Final Report, Part II.

Figure 14: St Exporter office, in Auki

Figure 15: Cocoa bean bags at St Exporter office, in Auki

Figure 16: Arania office, in Auki
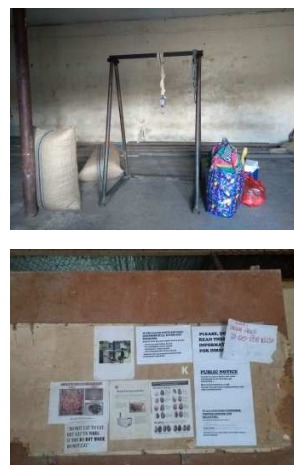
Figure 17: Weight system and quality requirements

2.2   Value Chain analysis

The value chain analysis was developed in 3 steps:

1- Desktop research about the commodity and sketch of the value chain map;
2- Verification and Validation of the value chain map, business enabling environment and SWOT Analysis through community workshops;
3- Final analysis of the findings and preparation of recommendations

The community workshop to analyze the Log, timber and furniture value chain was carried out on 05th of September in Falake (with 28 community members) and 17th of September in Komuniboli, with 25 members (annex 5). The cocoa value chain analysis in Falake was carried out on 25th September, with 19 participants (annex 6).

2.2.1 Value Chain Map

An important part of value chain analysis is the identification of weakness in the elements of the chain and missing vertical linkages. Vertical linkages are the relations between actors at different levels of the value chain. They are critical for moving a product or service to the end market. Vertical cooperation determines the quality of relationships among actors up and down the value chain. It facilitates the delivery of benefits, embedded services and transfer of skills and information between the actors. It also often defines the benefit distribution along the chain and creates incentives or constrains for upgrading (innovation to increase added value).

The sketch of the value chain was designed based on secondary data and validated through community consultation. Information such as actors, activities, costs, services and risks were gathered for the selected commodities in each community.

The figures 18 to 23 present the value chain mapping activities in Falale and Komuniboli. Figure 24 presents the framework applied to guide the value chain map.

Figure 18: Group work activity to build the Timber value chain, Falake

Figure 19: Timber value chain map prepared by Falake community

Figure 20: Group activity in to build the Timber value chain, Komuniboli

Figure 21: Timber value chain map prepared in Komuniboli community

Figure 22: Group activity in to build the Cocoa chain in Falake

Figure 23: Cocoa value chain map prepared in Falake community
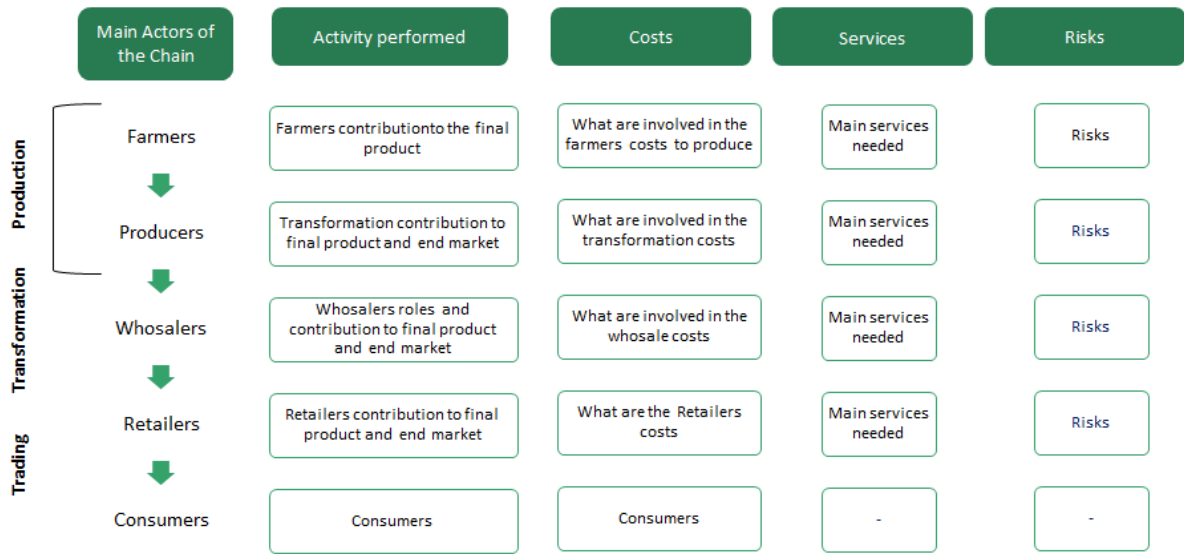
Figure 24: Framework for value chain analysis

2.3 Business Enabling Environment (BEE)

The information on the BEE aims to help understand how local norms and customs, regulations, policies, trade agreements and infrastructure affect the performance of the value chain. When potential improvements are identified, they can be incorporated into the design of the activity plan. The figures 25 to 27 present the community discussions on the BEE in Falake and Komuniboli.

Figure 25: BEE community activity for Timber value chain, Falake
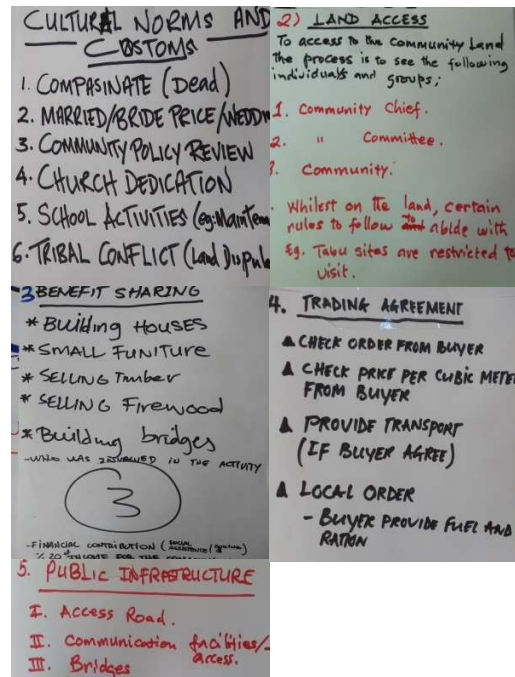
Figure 26: BEE community activity for Timber value chain, Komuniboli
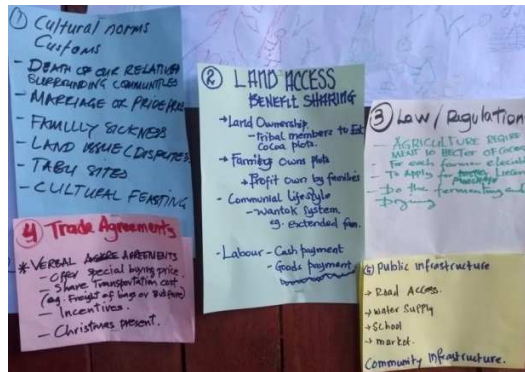
Figure 27: BEE community activity for Cocoa, Falake

2.4   SWOT Analysis: Strengths, Weaknesses, Opportunities, Threats

The SWOT analysis aims to identify a range of internal strengths and weaknesses, and external opportunities and threats that should be considered to guide the activity plan.

The framework below was used to guide the discussions on the elements of the SWOT analysis. The information and results are provided in the Final Report Part II.

Figure 28: Framework for SOWT analysis

	POSITIVE	NEGATIVE
INTERNAL	**Strengths**	**Weaknesses**
	Internal to your community—things that you have some control over and can change.	
EXTERNAL	**Opportunities**	**Threats**
	Things that are going on outside your community , which you can't control	
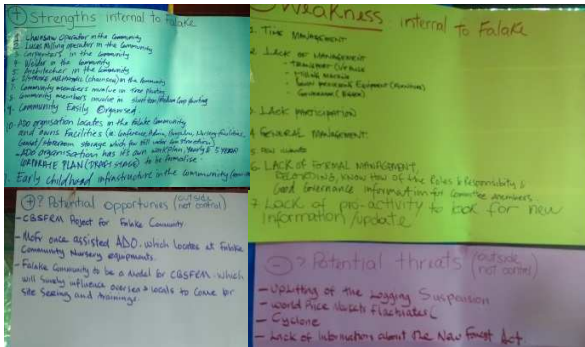
Figure 29: SWOT analysis in Falake, for logs, timber and furniture.

Figure 30: SWOT analysis in Komuniboli, for logs, timber and furniture.
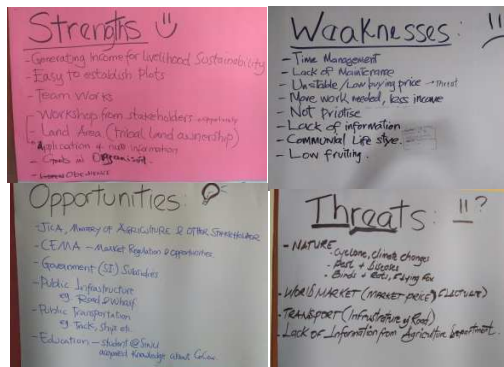
Figure 31: SWOT analysis in Falake, for Cocoa.

Annex

Annex 1: Intermediate results to select the value chain

There are five criteria recommended for the value chain selection: competitiveness potential, impact potential, cross-cutting issues and industry leadership. The concept and guidance on how those criteria were applied are described below, followed by the analysis of the 9 commodities for each community.

- **Criteria 1- Competitiveness potential:** The potential for competitiveness is the ability to achieve and maintain a competitive edge over market rivals through an optimal combination of efficiency, product differentiation and access to new or niche markets. When a sector and its industry are growing it brings opportunity for competitiveness, which in turn brings significant and sustainable increases in income and employment (when formal MSE (Micro Small Enterprise) are put in place).

    The assumption for the pilot areas is that as soon a community can generate more income through competitive sustainable production systems, less forest conversion and unsustainable activities will happen over the native forest.

- **Criteria 2- Impact potential:** The number of farmers and families involved in the productive system – and the potential to increase and formalize as MSE, Association or Cooperative – would optimize the positive impacts of the improvement in the value chain and market access. Also the potential of increased revenue invested in local initiatives and economy is an important element of impact.

- **Criteria 3 - Cross-cutting issues:** Set of objectives to consider when determining how and where to allocate resources in the project to both improve livelihood of the communities as well as affect other cross-cutting issues, like the MOFR and JICA objectives in this project. Sustainable forest management is one the main objectives of the project, thus the commodity selected shall directly or indirectly support the community to improve sustainable forest management and livelihood activities.

- **Criteria 4- Industry leadership**: The concept of industry leadership refers to the willingness of one or more lead firms to invest time and resources (including non-economic resources such as political and social influence, intellectual contributions, etc.) to increase value chain competitiveness in a way that enhances benefits to MSE (Association or Cooperative) producers and the farmers. Lead firms are typically larger, financially stronger or more innovative firms, but industry leadership can also come from a public-sector association or even a well-organized, skilled group of producers.

Falake commodities	Competitiveness potential	Impact potential	Cross-cutting issues	Industry leadership
☑ **Cocoa (*Theobroma cacao*)**	The organic production system in Falake holds potential for competitiveness and differentiation in the cocoa niche market. Potential for volume and constancy), as all of the 36 families have cocoa plantations. The total planted area, number of trees and average productivity needs to be investigated. The community profile of collective actions and leadership also holds potential for implementation of good practices and upscaling to new technologies to improve the quality and raise competitiveness.	All families in Falake have cocoa plantations. The association (ADO) could support the improvement/professionalization of the productive system and assist with the reinvestment of part of the funds into benefits for the community.	Cocoa production is based on organic and agroforestry systems, which matches with the project objectives with regards to promoting sustainable livelihood activities (cash crops intercropping with food crops).	There is leadership at the community level (ADO, in the past was willing to purchase the beans from farmers) and potential buyers on the domestic market .Buyers and local leaders have participated in the IWG (Industry Working Group), investing in technology, extension, as well as in the political discussions.
☒ **Coconut (*Cocos nucifera*)**	No competitiveness potential as only 7 families produce coconut in a market with 27% of the product unused.	No potential impact	No direct cross cutting alignment	-
☑ **Kava**	Although there is a lack of information about the quality of kava produced in Falake, it is expected that this commodities has competitive potential. Some farmers in Malaita are already trading their kava on a market with high demand. Potential differentiation for Falake could come from quality control and organic production. The production volume needs to be investigated.	All families in Falake grow kava crops, potentially delivering positive impacts for all householders.	Kava grows well in agroforestry systems, in which it can be produced together with others cash- and food crops. Promotion of Agroforestry systems corresponds with the sustainable forest management objective of the Project.	Solomon Islands has only 3 kava exporters . One of them has been working in this sector since 2004. At present there isn't any working group in this sector, which makes the business enabling environment more difficult. Despite those constraints, PHAMA Plus are interested in investigating this sector and the government is committed to release a guideline for exporters.

Falake commodities	Competitiveness potential	Impact potential	Cross-cutting issues	Industry leadership
☑ **Sawn Timber and Furniture**	The competitive potential for sawn timber and furniture in the communities will become more understandable when the results data from forest resource inventory is available. It is expected however, that the species and volume will meet the demand. Forest management and/or chain of custody certification could differentiate the timber products on the domestic and international markets. The potential competitiveness of the furniture will need to be investigated, especially in Falake, as the Malaita demand is unknown and to get into Honiara market they would face the transportation costs. The competitiveness also depends on the communities' capacity to produce furniture and to compete on the domestic market (quality, design, constancy of supply).	Sustainable forest management has the potential positive impact for all the community, assuming that the benefit sharing and job opportunity will follow the principles of transparency, equality and equity. It is expected that ADO will have a important role to administrate and reinvest the revenue properly, thereby driving livelihood improvements for all members of the community.	Legal, sustainable and high quality sawn timber and furniture production correspond with the project objectives. The sustainable production would drive the community to implement good practices of long term forest management, reducing the risks of forest conversion, deforestation, reducing the damages over the futures commercial trees, and as consequence, reducing the forest degradation.	The sawn timber industry has established the industry working groups SITPEA and VATA, which mainly look after the export sector but also discuss the domestic market, as generally the milling companies are trading in both markets.
☑ **Horticulture**	Farmers in Falake are producing horticulture fruits and vegetables in organic systems, which could hold potential for organic certification and competitiveness in the international markets.	All families are engaged in organic horticulture production, increasing the potential positive impact. ADO also is a potential channel to up scale the positive investments in the community.	Horticulture activity is indirect related to forest sustainable management. The products provide cash and food security, reducing the pressure over the forest resources. Also the production is organic and herefore free from pesticides. Some crops are produced in agroforestry systems.	The leadership in this sector is provided by the NGO Kastom Gardem, which provides assistance to their members for organic production and has a networking of trainers in all provinces. A farm / business called Za Na Tina also provides leadership in this sector related to organic certification systems.
☒ **Ngali nut (*Canarium Indicum*)**	None of the community members emphasized Ngali nut collection as their cultural activity or a significant source of income. Also this species was not mentioned to occur in abundance in the forest and gardens. The potential would depend on increasing the abundance and the farmer's interest to get involved in this production system. For Falake added potential would come from the organic production.	The potential would depend on increasing the species abundance and the farmer's interest into get involved in this production system.	The ngali nut as a NTFP and/or agroforestry product corresponds with the project's objectives.	There are 2 leading industries in Solomon Islands which could be potential partners to exchange experience. Phama plus also intends to investigate the economic potential.
☒ **Betel nut (*Areca catechu*)**	No competitiveness potential as the betelnut market it is an informal market not supported by the national policy.	Potential impact, as all families produce and trade betel nut as a cash crop, however this is a informal market without any market base line.	Betel nut chewing is against health recommendations and the product is not supported by the national policy	Informal market, noformal governance

Falake commodities	Competitiveness potential	Impact potential	Cross-cutting issues	Industry leadership
☒ **Loya / lawyer Cane (or rattan) (*Calamus spp*)**	No database about market and production (collection), however it is considered a potential high income commodity through value added products such as woven baskets and furniture. The Loya cane as a raw product doesn't indicate competitiveness; however when combined with furniture made from timber it has a potential to create a value added and differentiated product.	Loya cane is considered a common resource, which grows abundantly in the natural forest. There is potential positive impact in the benefit sharing and engagement of the community in the collection, and processing for manufacture of furniture.	As an NTFP, Loya cane corresponds qwith the objective to add value to sustainable forest management.	There are no known industries and initiatives leading in this sector (a part from some small business that would need to be further investigated). However the loya cane production could be merged with the 'timber/furniture' activity, thereby building a more stable business environment.
☒ **Straw Mushrooms (*Volvariella volvacea*)**	No data available about market and production (collection). Low value and low income. It would require a specific study to investigate the demand and potential for value added products.	Low value and low income. It would require a specific study to investigate the demand and potential for value added products.	As an NTFP and common resources for the community members, this commodity would meet the project's objectives.	No market governance structure, no industries and market leader

Komuniboli commodities	Competitiveness potential	Impact potential	Cross-cutting issues	Industry leadership
☒ **Cocoa (*Theobroma cacao*)**	Only 10 (50%) of the community families are engaged in cocoa production. The competitiveness will depend on potential niche markets, which would depend on volume, constancy and potential for organic production (during the field activity it was mentioned however, that all plantations /crops are produced using insecticides).	Only 10 (50%) of the community families are engaged in cocoa production, which reduces the potential positive impact. There isn't an active association (or collective initiative) to upscale the impact in the short/medium term.	Cocoa production is based on agroforestry systems and plantations. Part of the cocoa plantations is located outside of the pilot area established by the Project.	No leader in the cocoa production was mentioned; however this item would need to be assessed in the second phase if this value chain is selected.
☑ **Coconut (*Cocos nucifera*)**	All families have coconut plantations in Komuniboli, however copra, green and dried coconut products don't indicate potential for competitiveness as it would be very difficult to add value to those products. Alternatively, potentially competitive products could be investigated on the emerging market of coconut charcoal and wood.	Although there isn't any active association (or collective initiative) all farmers own coconut plantation and in the short term they will need to take action against the invasive Rhinoceros beetle (cutting down the coconut trees). Instead of burning and disposing of the trunks, the coconut timber wood could be processed into different sub products of added value and generate alternative income.	The coconut timber processing corresponds with the projects objectives in terms of timber processing and sustainable management. It would support the community to face the environmental threats posed by the rhinoceros beetle which could compromise their food security. Reduced food security could drive forest conversion to access cash form tree harvesting and to expand the agricultural area.	Additional to the IWG of the coconut sector the Coconut Technology Centre (which is a non-profit branch of the company of Kokonut Pacific) has been leading the research and manufacture of new products made of coconut wood. Potential partnerships shall be investigated if this commodity is selected for phase 2.
☒ **Kava**	Kava is not produced by the community.	Kava is not produced by the community.	Kava is not produced by the community.	Kava is not produced by the community.

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☑ **Sawn Timber and Furniture**	The competitive potential for sawn timber and furniture will become known when the results from forest resource inventory analysis are available. It Is expected that the species and volumes will meet the demand and that potential forest and/or chain of custody certification may differentiate the timber on the domestic and international market. The potential competitiveness of the furniture will need to be investigated, as it strongly depends on the community's capacity to produce furniture and to compete in this market (quality, design, and constancy).	Sustainable forest management has a potential positive impact for all of the community, assuming that the benefit sharing and job opportunity will follow the principles of transparency, equality and equity. As Komuniboli doesn't have a formal association (or cooperative, MSE) it is assumed that the community will establish transparent agreements to administer and reinvest the revenues properly, driving livelihood improvements for all members of the community.	Legal, sustainable and high quality sawn timber and furniture production correspond with the project objectives. The sustainable timber production would drive the community to implement long-term forest management practice , reducing the risks of forest conversion, deforestation, damage to future crop trees, and as consequence, reducing the forest degradation.	The sawn timber industry has established the industry working group SITPEA and VATA, which mainly looks after the export sector but also discusses the domestic market, as generally the milling companies are trading in both markets.
☒ **Horticulture**	Komuniboli farmers are using insecticides and mineral fertilizer for horticulture production, limiting their participation in the organic market. The potential competitiveness is to add value to horticulture products through food processing. Another alternative for out of season crops would need further investigation to evaluate the potential competitiveness.	Positive impact would depend on how many families would be able to engage in the food manufacture and out season production.	Horticulture activity is indirectly related to sustainable forest management. The products provide cash and food security, which reduces the pressure under natural forest resources.	-
☒ **Ngali nut (*Canarium Indicum*)**	None of the communities emphasized the Ngali nut collection as their cultural activity or as a significant source of income. Also, this species was not mentioned to occur in abundance in the forest and gardens. The potential would depend on increasing the abundance and the farmers interest into get involved in this production system	The potential would depend on the increasing the abundance and the farmer's interest into get involved in this production system.	The Ngali nut as a NTFP and/or agroforestry production corresponds with the project's objectives.	There are 2 leading industries in Solomon Islands which would be potential partners to exchange experience. The Phama plus project also intends to investigate the economic potential
☒ **Betel nut (*Areca catechu*)**	No competitiveness potential as the betel nut market is an informal market not supported by the national policy.	Significant potential impact, as all families produce and trade betel nuts as cash crops, however this is a informal market without any market base line.	Betel nut chewing is against health recommendations and the product is not supported by the national policy	Informal market, without formal governance

☒ **Loya / lawyer Cane (or rattan) (*Calamus spp*)**	No data available about market and production (collection), however it is considered a high income commodity through value added products, such as woven baskets and furniture**.** The Loya cane as a raw product doesn't indicate competitiveness; however when combined with furniture made from timber it has a potential for value added and differentiated products.	Loya cane is considered a common resource, which grows abundantly in the natural forest. There is potential positive impact in the benefit sharing and engagement of the community in the collection, and processing for manufacture of furniture.	As an NTFP, Loya cane corresponds with the objective to add value to sustainable forest management.	There are no known industries and initiatives leading in this sector (a part from some small business that would need to be further investigated). However the loya cane production could be merged with the 'timber/furniture' activity, thereby building a more stable business environment.
☒ **Mushroom (*Volvariella volvacea)***	No data available on market and production (collection). Low value and low income. It would require a specific study to investigate the demand and potential for value added products.	Low value and low income. It would require a specific study to investigate the demand and potential for value added products.	As an NTFP and common resources for the community members, this commodity would meet the project's objectives.	No market governance structure, no industries and market leader

Annex 2: Participant list of the Community Consultation

Falake: Community consultation

Komuniboli: Community consultation

Annex 3: List of assessed companies in the forest sector

No_	Company name	Venue for the interview	Contacts
1	Lagoon Eco Timbers	Lagoon Eco office, Ranadi	Robert Mesa - 7639538
2	Hatanga Timber	Hatanga Timber Yard, Ranadi	Raphael - 7196059
3	Homeland Timber Milling (HTM)	Kukum	Leslie Mani - 7495753
4	Goodwood (SI) Ltd	Goodwood office, Ranadi	Elsa - 7473390
5	Pacific Export Alliance Ltd	Pacific Alliance Timbers, Henderson	Beryl -
6	Fairtrade	SOL- Pacific Ltd, Ranadi	John Bailey - 38399
7	TGA Timbers	TGA office, Ranadi	Ricky Fou
8	SA Holdings Ltd	SA Holdings Office	Stanley Allen – 7494911/30606
9	Top Timber	Top Timber office	Priyan - 8972411
10	VATA	VATA office	Gordon - 7482328
11	Malta Timber Enterprise	Auki	Billy Iro - 7523213
12	Kwaibala Furniture	Auki	James - 7479242
13	EKD Hardware	Auki	Dang Wen Zheng - 7561835
14	South Pacific Group	Henderson Mini Industrial, Honiara	Harry – 7629775 southpacificgrouplimited@gmail.com

Annex 4: Questionnaires

Log, timber and furniture

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

Survey questionnaire for Solomon Islands Timber Producers
Domestic Market

Forest Sector:	Round logs, Sawn Timber and Furniture
Phase 2:	Market and Value Chain Analysis

Company:	
Representative:	
Contact:	

Part 1: Wood Supply

1. Which kind wood products do you buy?

    ☐   Round logs (to process at your industry)

    ☐   Pre-processed timber (for re-sawing, planing, drying at your industry)

    ☐   Fully processed timber

    ☐   Furniture

    ☐   Other wood products:

2.   What are the desirable species?

Species	Round logs	Pre-processed timber	Fully processed timber	Furniture	Specifications
Burckella					
Calophyllum					

Cordia				
Dillenia				
Eugenia				
Kwila				
White beech				
Rosewood				
Taun				
Tubi				
Vitex				
Akwa				

Others:
Average volume purchase per year:
% volume for domestic market:

3. What are the product specifications (dimensions) that you need and quality requirements?

4. What are the purchase prices? (ex: species x dimensions x quality,)

Products/Species	Specifications	Purchase prices

5. What type of commercial terms (ex: sold on FOB) do you use when buying wood? Do you perform any additional service to purchase wood? (ex: transportation, loading)
6. Do you require any legality verification/certification? Do you need any license?
7. How many suppliers do you have (from where/ province?)
8. How is the constancy in the timber supply? Are the suppliers reliable or is it difficult to meet your demand?
9. What could improve in the timber supply ?

Part 2: Transformation and Trading: Domestic market

10. What are the main products that your company produces for the domestic and international market, specifications, main uses and sales price?

Domestic Market			
Products	Specifications	Main uses	Sales prices

Total volume/ year:

11. What are the main products that your company produces for the international market, specifications, main uses and sales price?

International Market			
Products	Specifications	Main uses	Sales price

Total volume/ year:

12. Have your costumers requested timber legality verification?
    Domestic Market : ☐ Yes   ☐ No
    International Market: ☐ Yes   ☐ No

13. What are the main factors that influence your decision to sell in the domestic or in the international market?

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14. How many companies are working in the same activity as you (producing similar products / competitors)?
15. What are the main challenges to trade in the domestic market?

Part 3: Value chain map

Value chain- Vertical

1. What are the main activities that your company performs?
2. What are the main costs involved?
3. What are the main risks?

Value chain- Horizontal (Governance)

1. Is your company member of any group of companies/industries (ex: association)?
2. What are the positive and negative aspects of participating in these kind of initiatives?

Value Chain - Services:

1. What are the main services that your company needs to have a good performance?

Business Enabling Environment

1. Does any one of those factors below interfere in the wood supply for your company?

Commodities	Cultural norms and customs	Land access/benefit sharing	Laws, Regulations, Licensing, policies	Trade agreements	Public infrastructure
☑ Round Logs					
☑ Sawn Timber					
☑ Furniture					
others					

Part 4: Potential improvements- SWOT

Internal to your company—things that you have some control over and can change.	**Strengths**	**Weaknesses**
Things that are going on outside your company, which you can't control.	**Opportunities**	**Threats**

Cocoa

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

Survey questionnaire for Solomon Islands Cocoa beans: Domestic Market

Agriculture Sector:	Cocoa beans
Phase 2:	Market and Value Chain Analysis
Company:	
Representative:	Contact:

Part 1: Cocoa beans Supply

1.   Which kind beans do you buy?
- ☐ Fruits   ☐ dry
- ☐ fruit pulp   ☐ Other cocoa products:
- ☐ wet

2.   What are the product specifications and quality requirements?
3.   How do you check the quality?
4.   How is the pricing system (per kg, bag…) and how much do pay for the products?
5.   Do you perform any service to purchase it? (ex: pick up in the farm, re-packing, transport, storage, …)
6.   What type of commercial terms do you use when buying cocoa? (ex: pre-order, deduction of the cost for the services above, pay immediately or pay after trading,..…)
7.   Do you require any legality verification/certification from your seller? Do you need any license to trade cocoa bean?
8.   How many suppliers do you have (from where/ province?)

9.   How is the constancy in the cocoa beans supply? Are the suppliers reliable or is it difficult to meet your demand?
10.   What is the average volume/quantity of cocoa beans you buy (per month, quarter, semester or year)?
11.   What could improve in the cocoa supply?

Part 2: Transformation and Trading: Domestic market
1.   What are the main activities performed by your company?
2.   What are the specifications and quality of the final products that you trade?
3.   How do you check the quality of your final product?
4.   Have your clients/costumer requested any certification or license (eg: biosecurity, organic, origin certification..)?
5.   What type of commercial terms is established with your client/costumer? (pre-order , who pay the transport, insurance, etc)
6.   What is the sale's price of your product and how the price is decided (eg: in accordance to the quality, volume..) ?
7.   How many companies are working in the same activity as you (producing similar products / competitors)?
8.   What are the main challenges to trade (to sell) coca beans in the domestic/international market?

Part 3: Value chain map

Value chain- Vertical
1.   What are the main activities that your company performs? (UP
2.   What are the main services that you need?
What are the main costs involved?
3.   What are the main risks?

ACTIVITY	SERVICES	COSTS	RISKS

Value chain- Horizontal (Governance)

1.   Is your company a member of any group of companies/industries (ex: association)?
2.   What are positive and negative aspects of participating in these kind of initiatives?
Business Enabling Environment

1.   Does any one of those factors below interfere in the cocoa beans supply for your company?

Commodities	Cultural norms and customs	Land access/benefit sharing	Laws, Regulations, Licensing, policies	Trade agreements	Public infrastructure
Wet beans					
Dry beans					

Part 4: Potential improvements- SWOT

Internal to your company—things that you have some control over and can change.	Strengths	Weaknesses
Things that are going on outside your company, which you can't control.	Opportunities	Threats

Annex 5: List of Participants in the Log, Timber and Furniture Community Activity

Falake

Komuniboli

Value Chain Analysis : Timber

Participants for Komuniboli Community members,
North East Guadalcanal, Guadalcanal Province.

Date: 17/09/2019

Name	Address	Signature
1. ANDREW	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
2. Junior	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
3. Mary P	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
4. Mary T	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
5. Ireen N	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
6. Rutmela B	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
7. Mank Sukul	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
8. Sylvester M.	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
9. Brian M	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
10. Augustine A Gove	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
11. Elizabeth	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
12. Ivin Man	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
13. Susan Boru	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
14. Luisa Sabu	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	

15. Salome	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
16. Brenda G.	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
17. Julian SamSan	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
18. Tina Sabu	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
19. Linet. SA	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
20. Catherin Lela	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
21. Sosimo	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
22. Seto .V	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
23. John Viavi	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
24. Eremina Suba	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
25. Madyn. I.	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
26.	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
27.	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
28.	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
29.	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
30.	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	

Annex 6: List of Participants in the Cocoa beans Community Activity

Falake

Value Chain Analysis of Cocoa beans
Community activity- Falake, Malaita

Date: 27/09/2019

	Name	Address	Signature
1.	Margaet	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
2.	MARY TUA	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
3.	Lorencia	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
4.	Fox Ade	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
5.	Hellen Asi	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
6.	Salome	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
7.	Nicelyn	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
8.	Cleva·K	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
9.	KEITY ARURU	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
10.	Jerry·L	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
11.	CONSTANTINE GIN	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
12.	CHARLES Lofasia	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
13.	Blaise Kofosiu	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
14.	Alphonse'ko	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
15.	Joachim	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	

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	Name	Address	Signature
16.	ANDREW N	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	A N
17.	JOHN BOSCO KWASU	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
18.	CECILIA Kaetaeya	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
19.	Else Rii	Komuniboli community, North East Guadalcanal, Guadalcanal Province.	Rii
20.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
21.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
22.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
23.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
24.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
25.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
26.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
27.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
28.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
29.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	
30.		Komuniboli community, North East Guadalcanal, Guadalcanal Province.	

Japan International Cooperation Agency

Ministry of Forestry and Research
Solomon Islands

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

(SFRM Project)

Market and Value Chain Analysis

Output 3, Activity 3-3

Final Report

Part II

November 2019

**Ministry of Forestry and Research, Solomon Islands
Japan International Cooperation Agency**

Contents

List of Tables

Abbreviations

Background

This document is part II of the final report under Output 3, Activity 3-3, of the Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands. Activity 3-3 had as the objective to select potential commodities for each pilot area and analyze its value chains and markets, with focus on the potential opportunities for the communities.

The study was conducted from July to September 2019, with guidance from the project work plan, internal reports (eg: community profile report)of the project as well as technical inputs provided from the Project team.

A set of three internal reports were delivered during the development of this activity, providing intermediate products to support discussions and decision-making by the Project's management team and community members:

✓ Internal Report No.1- Rapid Appraisal for Market and Value Chain Analysis: Gathering information on Komuniboli community profile and production systems.

✓ Internal Report No.2 - Rapid Appraisal for Market and Value Chain Analysis: Gathering information on Falake community profile and production systems.

✓ Internal Report N3 – Rapid Appraisal for Market and Value Chain Analysis of a short list of 9 commodities: Cocoa (*Theobroma cacao*), Coconut (*Cocos nucifera*), Kava (*Piper methysticum*), Sawn Timber and Furniture, Horticulture, Ngali nut (*Canarium indicum*), Betel nut (*Areca catechu*), Loya Cane (*Calamus spp.*) and Straw mushrooms (*Volvariella volvacea*).

Structure of the final report

Part I of the final report provides detailed information on the methodology used to select the commodities 'timber' and 'cocoa', and the methodology to assess the value chain and market data base.

Part II presents the results of the assessment and analysis, to understand the opportunities and challenges of the selected value chains and provide base line information to support Output 3 of the Project workplan

1   Logs, Timber and Furniture

1.1   Assessing the market

The forest sector contributes to Solomon Islands economy through timber sales on the domestic and international markets. This study focuses on understanding the domestic market for logs, timber and furniture, in Honiara (Guadalcanal) and Auki (Malaita) due to the project pilot area locations in these two provinces.

13 companies in the forest sector were assessed (3 companies in Auki and 10 in Honiara), thereby gathering information about their needs for logs, timber and furniture and elements in the value chain to support the project with material to assist development of community activity plans for sustainable forest resource management and livelihood improvement.

1.1.1   Domestic Market for Logs, Timber and Furniture

From the 13 companies, 7 have interest in the supply of round logs, 11 industries are buying rough sawn timber and only 1 looks for fully processed timber, which is a timber retailer located in Malaita (Table 1). None of the interviewed parties has any interest in buying furniture for further re-processing or resale. The Table 1 shows tree species that the industries are looking for logs and rough sawn timber.

Table 1: Supply of logs and timber

Species	% of companies interest	Interest in the supply of
Vitex/ Vasa (*Vitex cofassus*)	100%	Log, Rough sawn timber, Fully processed
Akwa/ Taun (*Pometia pinnata*)	92%	Log, Rough sawn timber, Fully processed
Rosewood (*Pterocarpus indicus*)	69%	Log, Rough sawn timber
Kwila (*Intsia bijuga*)	69%	Log, Rough sawn timber
Calophyllum/ Baula (*Calophyllum* spp.)	31%	Log, Rough sawn timber, Fully processed
Dillenia/Mudu (*Dillenia* spp.)	15%	Log, Rough sawn timber
White beech (*Gmelina moluccana*)	8%	Log, Rough sawn timber

The species Rosewood, Kwila and Vitex are protected under the Forest Resources and Timber Utilization Act (Protected Species; Amendment; Regulations 2012), which means that they can only be exported as sawn timber. The timber products from these species are highly sought after on the domestic and international markets.

Among the industries interviewed no one are interested in the supply of exotic species such as teak and mahogany. Only one retailer mentioned to have stock of teak and mahogany sawn timber, but without a meaning of to have new suppliers. The main reason for low interest in those woods is the lack of domestic market. However a company called "South Pacific Group" has recently published a purchasing notice informing they interest in to buy teak. Details about price and requirements are available in the following table.

- **Requirements for quality and price**

The specifications for log's quality are: no hollow, no rot, no twists, no knots. The payment is issued after the quality checking, when the price can be negotiates if need (Table 2).

Table 2: Specifications for quality and prices to purchase logs

Logs (species)	Specifications	Purchase prices- minimal (SBD/log)	
Calophyllum	DBH* 50cm	500	
	DBH 60cm	1000	
	6m length		
Dillenia/Mudu	DBH 50 cm	500	
		1000	
Vitex	DBH 50 cm	500	
	DBH 60 cm	1000	
	DBH 80cm	1500	
Akwa	DBH 50 cm	500	
	DBH 60 cm	500	
	DBH 80 cm	1000	
	15 m length		
Kwila	DBH 80cm	1200	
	15 m length	2000	
Rosewood	DBH 60cm	1500	
	6m length		
Teak	(14 years minimal age)	(stand up trees)	(at the company timber yard)
	DBH 20-24 cm	300 SBD/m3	650 SBD/m3
	DBH 25-29 cm	450 SBD/m3	800 SBD/m3
	DBH 30 cm up	600 SBD /m3	900 SBD /m3

*Diameter at Breast Height

The quality requirements for rough sawn timber follow the same criteria as for logs, with additional restrictions regarding the sawing quality, seasoning defects and biological defects: miscut, oversize, undersize, wane, sapwood, pith, end splits, twist, spring, bow, beetles, fungi, termites and marine borers.

The dimensions follow the required sizes that generally are informed in advance by the timber companies (the buyer), while the timber is processed with small portable saw mills usually have higher prices in the market due the better quality.

Commonly the payment is issued after grading, in accordance to the final volume and quality. Sometimes the buyers can deduct the payment from the shipment, transport, licensing and loading costs when they agree to meet those costs in advance.

Table 3 summarizes the specifications for timber and the average price that is paid in the domestic market.

Table 3: Quality specifications for timber and average minimal and maximum price on the domestic market

Timber dimension specifications	SBD min.	SBD max
Akwa	**500**	**2600**
Timber: 4 inch x 1inch to 8 inch x 2 inch; length 10 feet up	-	1800
Timber: 4 inch x 2 inch; 8 inch x 2 inch; 8 inch x 2 inch	1600	1800
Timber: 5 inch x 2 inch; up to 8 inch x 8 inch	-	2000
Timber: 6 inch x 2 inch; 6 inch x 3 inch; 8 inch x 2 inch; 8 inch x 3 inch;	-	2600
Timber: 6 inch x 2 inch, length 2m up	1700	2000
Calophyllum	**-**	**-**
Timber: 6 inch x 1 inch up; min 3,5 m length	-	-
Kwila	**2000**	**4000**
Timber: 6 inch x 2 inch; 6 inch x 3 inch; 8 inch x 2 inch; 8 inch x 3 inch;	2000	4000
Rosewood	**3000**	**5500**
Timber: 6 inch x 2 inch; 8 inch x 2 inch ; length 1.8m to 5.7m	-	4500
Timber: 5 inch x 2 inch; up to 8 inch x 8 inch	-	3000
Timber: 6 inch x 2 inch; 6 inch x 3 inch; 8 inch x 2 inch; 8 inch x 3 inch	-	5500
Timber: 6 inch x 2 inch, length 1.4 m up to 1.8 m	3500	4000
Timber: 6 inch x 2 inch, length 2,1 m up	-	4500
Vitex	**1800**	**3400**
Timber: 4 inch x 1 inch to 8 inch x 2 inch; length 10 feet up	-	2000
Timber: 4 inch x 2 inch; 8 inch x 2 inch; 8 inch x 2 inch length3m up	2650	3000
Timber: 5 inch x 2 inch; up to 8 inch x 8 inch	-	2500
Timber: 6 inch x 2 inch; 6 inch x 3 inch; 8 inch x 2 inch; 8 inch x 3 inch;	-	3400
Timber: 10 inch x 8 inch	2500	-
Timber: 6 inch x 2 inch, length 1.4 m up to 1.8 m	1800	3200
Timber: 6 inch x 2 inch, length 2 m up	3000	3300
Timber: 6 inch x 2 inch; 6 inch x 1 inch, length 1.8m to 5.7m	-	3000

Another system to trade timber is the minimal value of SBD 30 to SBD 80 for any species with minimal dimensions of 3 inch x 1 inch up to 8 inch x 2 inch and 12 feet to 14 feet length.

Annex 1 shows the list of companies interviewed and Annex2 shows purchasing prices payed for log and sawn timber that the time of this report. The results show that VATA (Value Added Timber Association) has been offering the best market price for timber, followed by Hatanga and Lagoon Ecotimber. The VATA is a charitable organization assisted by MOFR to export sawn timber for resource owners. The organization facilitates the resource owners access to the government to subsidize sea freight of timber.

- **Origin of Timber**

The origin of the timber presented above is Malaita, Guadalcanal, Isabel, Makira, Choiseul, Rennel, Temotu and Western Province. Three companies have their own forest areas established through

agreement with communities, to manage and process timber for their own supply. This was considered a strategy to guarantee the required volume and quality. The number of suppliers among the others industries varies from 1-2 supplier, to up to 200 suppliers.

10 of 13 timber industries mentioned to have a stable timber supply and 4 companies declared to even have an excess supply of wood, 3 of them being located in Malaita.

Although most part of the companies are satisfied with the timber supply, some mention difficulties to maintain the timber flow due to high competition between industries and challenges to make the suppliers meet the-agreements. For Vitex specifically it was stated as a difficulty to be able to obtain the required volumes.

- **Legality, Forest Certification and Chain of Custody Certification (CoC) of wood supply**

As part of timber legality assurance, most of the industries require the existence of milling licenses from their suppliers (9) and only 3 industries also verify the existence of felling licenses. Four companies usually buy timber without verifying the timber legality. For Teak the growers need to have special permit from MOFR in order to enable the trade.

Regarding certification, none company requires both Forest Management and CoC certification from their suppliers. However, the SITPEA[1] members (Annex 3), with support of PHAMA Plus program, are preparing for NEPcon Coc certification. Only one member of SITPEA was not informed about the association's efforts with regards to preparing the forest industries for CoC audits.

- **Challenges in the timber supply**

The main challenges that need to be overcome to improve the log and timber supply are:

- **Price:** High competition; high prices of the timber; lack in a standard or agreements for minimum/maximum prices , lack of capital to buy timber; difficulties to access financial services.
- **Transport:** High shipment costs and inconstancy in the services; lack of support to enable the communities to transport timber; lack of roads infrastructure and wharfs, communities dependency from logging companies for transport.
- **Trading:** Seasonal changes in timber demand (eg: December is a low season for trading, which reduces the need for supply. The suppliers need to plan in advance but this is hampered by lack in communication with landowners and suppliers.
- **Forest management**: Lack in the management of forest resources put the future timber supply at risk; lack of support to develop small scale sustainable community forestry projects ; risk and difficulties to transport the timber to the roads; lack of big sizes and good quality timber.

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[1] SITPEA- Solomon Islands Timber Processors and Exporters Association

- **Legality:** there is lots of illegal timber yards selling timber without a license; It is common to mix timbers from different origins; lack of provincial offices to facilitate the access to the land owners and to improve the legality of the chain of custody.
- **Technology:** Lack of equipment and machinery (portable sawn mill) to enable the communities to process their wood and reduce their dependence on logging companies; lack of new machines and technology witch could increase the production and improve the supply;

1.1.2   End Market

From the 13 companies, 2 mentioned to trade 5% to 10% of their products in the domestic market; 4 trade around 50% to 75% inside Solomon Islands; 6 depend 100% on the domestic market and 1 is part of a group of companies, providing timber exclusively to the corporation.

The reasons for selling in the domestic or international market vary between the interviewed parties. Most would prefer to sell to the international market because of the higher prices, trade volumes, large amounts negotiated, financial return and possibility to plan the annual cash flow. However, the producers acknowledge the importance of the domestic market, which provides an opportunity to keep the cash flow when the international market is not favorable (eg: when they find difficulties to find a buyer, can't meet the required volumes or can't meet restrictions on quality or legality).

The main products sold on the domestic market are the second grade rough sawn timber (sold per 'linear meter'), rough sawn timber (sold per 'linear meter' or m^3) and dressed timber (sold per m^3) (Table 4). The construction sector is the main end market, followed by direct sales to the final consumer, without involving retailers.

Table 4: Final products sold in the domestic market

Products	Specifications (inch)	Sales prices
Akwa rough sawn timber	2x2up to 8x2	SBD 4500/m^3
Akwa rough sawn timber	6x3	SBD 333/m3
Akwa rough sawn timber	1x1 up to 12x4	SBD 3.82 to SBD 185.95 linear meter
Akwa rough sawn timber	1x1 up to 10x4	SBD3.15 to SBD 125 linear meter
Akwa dressed timber	1x1 up to 12x4	SBD4.05 to SBD195.25 linear meter
Akwa dressed sawn timber	1x1 up to 8x1	SBD7.7 to SBD36 linear meter
Kwila rough sawn timber	4x2 up to 8x2	per linear meter: SBD 18 (4 mx1)
Kwila rough sawn timber	Diversified sizes	per linear meter: SBD 24 (6 m) to SBD 144 (6m)
Rosewood rough sawn timber	4x2 up to 8x2	per linear meter: SBD 18 (4 mx1)
Vitex rough sawn timber	4x2 up to 8x2	per linear meter: SBD 10 (4 mx1)
Vitex rough sawn timber	Diversified sizes	per linear meter: SBD 27 (1 m) to SBD 162 (6m)
Vitex rough sawn timber	1x1 up to 12x4	SBD5.22 to SBD260.3 linear meter
Vitex rough sawn timber	1x1 up to 10x4	SBD3.19 to SBD155 linear meter
Vitex dressed timber	1x1 up to 12x4	SBD5.05 to SBD273.3 linear meter

| Vitex rough sawn timber | NA | SBD 4000/m3 |
| Vitex dressed sawn timber | 4x1 up to 6x1 | SBD19.5 to SBD30 linear meter |

Only one company produces furniture in Malaita, whereas 4 industries manufacture furniture in Honiara. The view and expectations about the furniture's market in Honiara is positive. The producers acknowledge this market as a good opportunity for diversification and utilization of recovery timber.

In Malaita, the sentiment regarding the potential of furniture markets is the opposite. Due the low purchasing power of the local population and high transportation costs to Honiara both furniture and timber markets suffer economic restrictions. The end market for furniture mainly consists of orders from public bidding and local businesses, while the small industries and retailers in the timber sector have small constructions projects and independent consumers as their end markets. The main complaint is the unfair competition with illegal timber producers or temporary (amateur) rough timber, as those competitors don't pay for business licenses and other fees.

- **Market Competition and Challenges**

From the 10 industries interviewed in Honiara, 4 don't know how many companies compete for the same market. The other 6 interviewed state the number to be between 10 to 24 competitors. The MOFR doesn't' have data about the domestic market, while the information of companies registered in the Company Haus[2] is not consistent, as it doesn't advise if the company still active or the specific sector it operates in.

In Malaita 7 business operate in the timber industry, 3 are retailers selling timber in l and only one produces timber through forest management.

The main challenges that the companies face in the domestic market are:

- Competition with illegal wood or free lance (temporary) timber providers which sell for lower prices.
- Low sales prices due too many competitors.
- Timber substitute products: new constructions and buildings are increasingly being replaced by concrete and steel, reducing the market for timber.
- Low timber recovery and product diversification to reach new costumers.
- Low purchasing power of the domestic market
- Difficulty to employ and to keep skilled labor.

1.2 Map of the Value Chain

The value chain of logs, timber and furniture consists of four phases and five activities – planning, log extraction, timber pre-processing, timber re-processing and final trade. The general value

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[2] Registry of companies in side of Ministry of Commerce, Industry, Labour and Immigration.

chain maps with its phases, activities, actors, functions and products are presented in the table below. The map gives a holistic overview over the timber value chain, and facilitates understanding the detailed map developed with both communities (Falake and Komuniboli), which are presented in the follow sub-items.

Table 5: Map of log, timber and furniture value chain

Phase	Value Chain Activity	Actor	Function	Products for trading
Preparation	**Planning**	Resource owners	Agreement on the area to be managed and tree selection	Standing trees
		Logging companies	Tree selection, forest management plan, felling licensing	-
		Milling companies		-
Production	**Log extraction**	Resource owners	Small scale timber harvesting: felling, log preparation for pre-processing	Logs
		Logging companies	Large scale harvesting: road construction, felling, harvesting, skidding, log transport, shipment	Logs
		Milling companies	Large scale harvesting: skid trail construction, felling, log preparation, harvesting, log transport	
Transformation	**Timber pre-processing**	Resource owners	Timber sawing (rough sawn timber), timber transport	Rough sawn timber
		Milling companies	Timber sawing (rough sawn timber) and transport	Rough sawn timber
	Timber re-processing	Resource owners	Timber grading and transport, or furniture production	Graded rough sawn timber and furniture
		Milling companies	Timber grading and re-processing	Graded rough sawn timber, dressed timber and furniture
Trade	**Final trade**	Milling companies	Domestic trade for construction sector, milling companies, individual consumers; and export	Graded rough timber, dressed timber and furniture
		Resource owners	Domestic trade for construction sector, milling companies, individual consumers	Rough sawn timber, graded rough sawn timber and furniture
		Furniture marker	Domestic trade	Furniture

Phase 1: Preparation

The preparation is an important phase of the log, timber and furniture value chain, as it covers the planning of the forest management. The actors engaged in this activity are the **resource/land owners** –which have interest in the area to be managed and to select the trees for harvesting by logging companies and milling companies.

When the communities have the capacity (capital, machinery, equipment and skills) to carry out the timber harvesting, the value chain may move straight to the production phase without participation of any other actor. However, commonly the resource owners don't have this capacity (capital, machinery, equipment and/or skills) to handle the timber harvesting by themselves. These restrictions drive the community to enter into commercial agreements and dependencies with logging companies and milling companies.

The commercial agreements are based on the estimated volume of standing trees. The price depends on the species and the benefits provided by the company to the community. In this business arrangement, the company is generally responsible for all forest activities and the timber transport. Usually the agreement provides the employment of the community members and the payment method may include delivery of processed timber and improvements to the community infra-structure (house, roads, etc) and cash.

The system for payment can vary. The following case describes a typical example of a business arrangement: *"The quantity of 2 logs belongs to the company and 1 log belongs to the community. The company has to support the community infrastructure and the company has to meet all the forest operational costs, up to the pre-processing activity. In some cases the company buys standing trees from the community through cash payment (as summarized below) or the company buys timber per cubic meter after pre-processing".*

The value for **standing trees** can vary as showed below:

Table 6: Purchase prices for stand up trees

Species*	Specifications	Purchase prices-minimal (SBD/tree)	Quality	Payment
Calophyllum	Tree: Minimum DBH 60cm; 6m minimum height	500/tree	Not hollow, no rot, no twists, no knots	Quality check after felling and negotiate the price if necessary
Vitex		1500/tree		
Akwa		500/tree		

*The others species were not mentioned by the buyers.

Phase 2: Production

The production phase comprises the timber harvesting, which includes tree felling and the preparation of logs for processing either directly in the bush or after skidding (pulling the logs using bulldozers) to the timber yard. The actors engaged in the production phase are the same as in the preparation phase.

The value chain moves to the *transformation phase* without interference of any other actor apart from the community where the producers own the machinery, equipment and possess the skills to execute the timber processing.

When the resource owners don't have such capacity, the community may execute only the tree felling to sell logs to the milling companies. The milling company pre-processes the timber inside the bush or after skidding the logs to the timber yard.

The trade of logs follows the same rationale as described in the preparation phase with the possibility to deduct additional costs when the company performs the skidding to the timber yard.

The following case describes a typical example of the business arrangement in the production phase: *"The company carries out the skidding of the logs to the timber yard, performs the timber pre-processing with a portable sawn mill, and negotiates: 1 log to cover the fuel cost, 2 logs as payment to the resource owner, 2 logs as payment to the milling company. When the community wants to sell their logs to the company, the price follows the value per species and per cubic meter of timber."*

Phase 3: Transformation

The transformation phase includes the activities timber pre-processing and re-processing. The main actors involved in these activities are the resource owners and the milling companies.

The communities are able to do the pre-processing when they have skills and equipment, such as chain saws and/or portable sawn mills. In this situation they are the only actors in the value chain. The resource owners may produce rough sawn timber and move up the value chain straight to the trading. The pre-process generally happens inside the forest and there is the need to carry the timber to the closest road or timber yard for further transport. Commonly this is done manually, which demands great labor force.

The second activity of this phase is timber re-processing. At the community level the re-processing comprises: i) grading of the timber to the final dimensions as informed by the buyer; and ii) furniture. The capacity to perform the timber re-processing depends on the community's skills, machinery and infra-structure for the production.

The milling companies participate in the value chain when the communities don't have the capacity to execute the activities for timber transformation themselves. The milling companies may: i) rent the equipment to the communities; ii) carry out the pre-processing; iii) carry out the re-processing: grading, dressing and furniture.

The chapter end market presents detailed information about the prices for the main species and timber dimensions on the domestic and international market.

Phase 4: Trading

The three actors in the trading phase are: the milling companies, the resource owners and the furniture makers.

The milling companies perform an important function in the value chain, as they are the main end market for the rough sawn and graded timber produced by the communities, within their size- and quality requirements. The milling companies also play an important role in accessing domestic and international markets, improving the quality of the final products, meeting the buyer's requirements and complying with the national and international trading legislation. In addition, some milling companies are producing furniture with the hope to increase their profits, reduce timber waste and optimize the use of the recovery timber ("second grade") to add value to their final products. The milling companies are connected directly to the consumer, excluding the intermediate 'retailer' as an actor in the value chain.

The furniture producers are a small group of actors, which are directly connected to the consumer and milling companies. They work exclusively for the domestic market and produce customized pieces for their clients. In Auki there is only one furniture maker, while it is unknown how many producers there are in Honiara.

Most part of the resources owners sell rough sawn and graded timber to the milling companies. Even when the trading is not based on a formal contract or any pre-agreement between producers and buyers, the companies provide previous information about the required sizes and other timber specification. This practice facilitates the trading and reduces the risk of loss. Resources owners also trade directly with consumers, specially in the rural area where there is demand for processed timber to build houses. To a more limited extend, some communities also produce furniture, for buyers such as schools or churches.

1.3 Assessing the Logs, Timber and Furniture value chain in FALAKE

The detailed value chain of logs, timber and furniture developed with Falake community in Malaita is presented in the table below.

Table 7: Value chain of logs, timber and furniture in Falake/Malaita

Activities	Actors	Services needed	Costs	Risks
Phase: Preparation				
Planning: • Gathering market information, • Operational cost estimative, • Operational plan: time and job allocation, • Initial survey: brushing, tree selection, tabu areas, site for milling ('bush yard').	Community Development Committee	• Transport • Labor services • Communication (phone) • Fuel supply • Medical supplies	truck hire for transport	• Miss information about the market requirements (sawn timber sizes) increase the risk of wrong product dimension and risk of buyer refusal. • Health and injuries risks during the activities.
Phase: Production				
Log harvesting: • Camp site establishment; • Transport of machinery, equipment and materials; • Tree feeling • Log preparation /bedding (following the buyer requirements: dimensions and quantity) • Rehabilitation	Community members with skills; Youths; Women (food preparation); Community member with disabilities.	• Transport • Labor services • Communication (phone) • Fuel supply • Machinery and mechanic services • Medical supplies	• Camping infrastructure (tent, light/torch, solar panel, kitchen material); • Food ; • Transportation: drop off labor/equipment: SBD 300/load • Labor: chain operator, lucas milling operator, assistants/carriers, security, family obligation; • Machinery hire: Chain sawn: SBD 300/day (ADO);. • Chain block; • Milling machine: SBD 2000/day (machine, labor, crew); • Fuel: Chainsaw- 2 gallon-(10L) SBD120/day Milling saw- 4 galloon (20L)- SBD200/day) • Communications (SBD 100 / varies) • Medical services – SBD 100 • Bank – SBD 100	• Accidents and injuries; • Mistakes in the calculation/estimative of the volume; • Faulty machinery adjustments.

Phase: Transformation- Community level				
Timber pre-process: **Transformation 1: on the bush yard** • Machinery adjustment/setting; • Timber extraction • Timber sorting (at bush yard) • Timber transport to the road • Timber loading and offloading • Transport to the village **Transformation 2: in the community** • Timber processing: pieces, cubes for building structure. **Timber re-processing:** **Transformation 3: in the community** • Timber sorting and grading in accordance to the product requirements • Furniture preparation (planing, sculpting, fitting, gluing, sanding, varnishing, sorting, storage)	Community members with skills;	Truck Transport Labor services Machinery Work supplies (tools and materials)		• Timber theft; • Flaws in the timber and quality loss through damage (when loading and unloading); • Accidents and injuries; • Timber loss from cracking, twisting and breaking while processing due limited technical knowledge.
Phase: Trade- Community level				
Final Trade: • Sorting of the products (timber / furniture) • Transport and delivery • Storage • Administrative activities: buyer contact, promotion, expenses calculation, cash transaction.	Community Development Committee ADO	Transport to Auki Bank services		• Lack or delay in the payment; • Lower price for the products; • Lack of commitment from the buyer; • Lack of communication between buyer and producer; • Lack of financial management.

1.3.1   Business Enabling Environment (BEE) in Falake

The performance of the timber value chain in Falake is interfered by the following constraints to the BEE[3]:

Table 8: Business Enabling Environmental in Falake

BEE	BEE in Falake
Cultural norms and customs	– Restriced "Tabu" areas (forbidden for timber extraction) Loss of the wood if the tree is felled into Tabu area by accident ; – Frequent and unpredictable compassionate leave of workers (3 days to 2 weeks); – Leave due to commitment to 'brideprice' (wedding event)
Land access/benefit sharing	– Restricted access to tabu areas ; – No proper procedures are in place ; – No proper equal sharing of funds procedures are in place.
Laws, Regulations, Licensing, policies	– Cost of Milling license and ADO association; – The community will need the felling license, as the wood extraction will have commercial purpose.
Trade agreements	– Only verbal agreements with buyers; – Verbal information about the desirable sizes guides the felling and sawn milling activities.
Community Infrastructure	– ADO infrastructure (nursery, office and storage); – ADO has one chain saw; – No portable sawmill available ; – Area for furniture production in side the village.
Public infrastructure (roads, electricity, water, etc.)	– No road access to the felling site; – Need lots of fuel for generator to produce furniture; – Road condition at this moment is good.

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[3] The BEE information aims to understand whether local norms and customs, regulations, policies, trade agreements and infrastructure might facilitates or hinders performance of the value chain. When potential improvements are identified, it can be considered when the design of the activity plan.

1.3.2   SWOT Analysis in Falake

Falake community acknowledged a range of internal strengths and weakness, and external opportunities and threats that may lever actions or can become barriers for the implementation of activity plans, as showed below:

Table 9: SWOT analysis in Falake

	POSITIVE	NEGATIVE
INTERNAL	**Strengths** – Available chain sawn operator in the community – Available portable sawmill operator in the community – Available carpenters in the community – Welder in the community – Architect in the community – Chain sawn mechanic in the community – Community members are involved in tree planting and crop planting – Community well organized – ADO organization and ADO facilities (nursery, bungalow, storage and room) located in the community – ADO work plan (5 years) and corporate plan under preparation – Early childhood infrastructure in the community.	**Weakness** – Time management – delay and lack of commitment to follow schedules – Lack of management of the resources (eg: transport /vehicle, milling machine, bowl processing equipment for furniture, generator); – Lack of community participation – Weak general management (decisions, financial, business) – Lack of formal management: record information, understanding of the roles & responsibilities, good governance, and information for community members – Lack of proactivity to look for updated information. – Lack of safety procedures, which can lead to accidents in the logging operations
EXTERNAL	**Opportunities** – SFRM Project in Falake – Continuation of MOFR support, which assisted Falake with the community nursery equipment in the past. – Falake community to become a model for CBSFRM (sharing knowledge, influencing overseas and locals to visit Falake for trainings)	**Threats** – Markets price fluctuation – Cyclones – Lack of information about chances in the forest legislation and policies.

1.4 Assessing the Logs, Timber and Furniture value chain in Komuniboli

Table 10: Value chain of logs, timber and furniture in Kominiboli/Guadalcanal

Activities	Actors	Services	Costs	Risks
Phase: Preparation				
• Gathering market information and selection of the buyer, • Operational cost estimation: material, labor, transport and material. • Field survey for tree selection	Community members; Selected representatives (Moses, Abraham)	• Transport	Transport: SBD 100	• Selection of the best buyer (sizes and value) • Availability of operators to work in the forest
Phase: Production				
• Camp site establishment; • Tree feeling • Cross cutting/bedding (following the buyer requirements: dimensions and quantity) • Log positioning/preparation	Chain sawn operator 4 operators; 2 chain saws	• Labor services: chain sawn operator • Chain saw hire: spare parts, oil, fuel • Catering	Camping infrastructure (tent, kitchen material): SBD 500; Solar panel: SBD 600 Food (5 people) SBD 2000/week; Labor: Chain saw operator: SBD 100/day Chain sawn assistant: SBD 50/day Fuel+oil for 2 Chain saws: SBD 1560/week	• Accidents, hazards and injuries (in special while carrying the wood); • Vulnerability to diseases (eg: Malaria); • Lack of safety gear; • Mistake in the preparation of the fuel and oil mix

Activities	Actors	Services	Costs	Risks
Transformation- at Community level				
Transformation 1: at the bush yard • Machinery adjustment/setting; • Timber extraction in accordance with the buyer sizes • Timber grading (at bush yard)	Chain saw expert and operator Portable saw mill operator	• Truck transport • Labor services: Chain saw operator; Assistants; Portable sawmill operator. • Machinery • Work supplies (tools and materials)	• Fuel+oil for portable sawmill SBD 1200/week • Portable sawmill hire: SBD 1000/day • Portable sawmill spare parts: SBD 1000 • Chain saw spare parts: SBD 250 • Labor: Chain saw operator: SBD 100/day Chain saw assistant: SBD 50/day • Mechanical costs: SBD 250	• Mistakes in the machinery adjustments due lack of knowledge; • Accidents and injuries ; • Lack of safety gear;
Phase: Trade- Community level				
• Carrying Timber to the road • Timber loading and unloading • Transport and delivery in Honiara • Administrative activities: expenses calculations; equal distribution of the revenue.	Community members, Group leader	Transport to Honiara	Transport cost: SBD 1650 (1 truck; 25m^3) Transport (minibus SBD 200)	• Transport accidents due the bad road conditions and truck overloading ; • Accidents during loading and unloading the truck; • Lack of commitment from the buyer (refuse to buy); • Delay in the payment ; • Delay in receiving the payment increase vulnerability to be target of thieves and people asking for money.

1.4.1 Business Enabling Environment (BEE) in Komuniboli

The performance of the timber value chain in Komuniboli is interfered by the follow constraints to the BEE:

Table 11: Business Enabling Environmental in Komuniboli

BEE	BEE in Komuniboli
Cultural norms and customs	− Frequent and unpredictable compassionate leave (3 days to 2 weeks); − Leave due to commitment to 'brideprice' (weeding event) − Community policy review − Dedication to church activities − School activities demand dedication and absent from work − Tribal conflicts (land dispute)
Land access/benefit sharing	− Restricted access to tabu areas ; − Process to access the land: 1- community chief shall be consulted; 2- community committee shall be consulted; 3- whilst on the land, follow the customary rules (eg: tabu) − Financial contribution of 20% of the income for the community.
Laws, Regulations, Licensing, policies	− Need milling license; − Felling license for commercial purpose.
Trade agreements	− Practices of to check requirements from the buyer ; − Practices of to check the price per cubic meter; − Practices of to check the transport; − Verbal agreement with buyers; − Other agreements: buyer provides fuel and ration
Community Infrastructure	− No portable sawmill − No chain sawn − No area to produce furniture
Public infrastructure (roads, electricity, water, etc.)	− Road access (needs improvement); − Communication is limited; − Road and bridge condition are essential to transport the products.

1.4.2 SWOT Analysis in Komuniboli

Komuniboli community acknowledged a range of internal strengths and weakness, and external opportunities and threats that may lever actions or can become barriers for the implementation of activity plans, as showed below:

Table 12: SWOT analysis in Komuniboli

	POSITIVE	NEGATIVE
INTERNAL	**Strengths** – Chain sawn operator and portable sawmill operator present in the community; – Knowledge of tree selection, felling and tree positioning; – Transport infrastructure ; – Community mobilization for activities.	**Weakness** – Lack of chain saw and portable sawmill expert and mechanic to maintain and fix the machines; – Need to improve the timber grading process; – Road access is difficult; – Lack of cooperation among community members – Lack of management skills: business, financial, administration; – Lack of start capital ; – Lack of transparency (financial, reporting and no feedback to the community); – Lack of furniture infrastructure; – Weak community governance and guidance.
EXTERNAL	**Opportunities** – Rural Development Program and improvements in the infrastructure; – Member of Parliament supports with materials and house; – Previous trainings provided by different organizations: SIDT, Red Cross, MOFR, JICA, GIZ; – Improvements in the infra-structure (eg: generator, water tanks); – Revenue from timber can be reinvested in activities that aim to improve community livelihood.	**Threats** – Unstable timber prices on the market – Extreme weather condition – Tribal conflict (boundaries) – Access to the road – blocks due to disputes, conflict; – Illegal logging and tree felling – Bridge condition (in the past the village was isolated due damages to the bridge).

1.5 Need for improvement of the value chain at the community level

Some potential improvements in the value chain at the community level for Falake and Komuniboli are highlighted below.

Subject	Comments	F	K
Phase 1: Preparation			
Communication	Improve the communication between producers and potential buyers is important to guide the forest operational plan, avoid mistakes in the	x	x

Subject	Comments	F	K
	production system (eg: wrong timber dimensions and species) and to ensure that the final product meets the end markets requirements.		
	Strengthen the communication among community committee members, as well as among others members of the community.	x	x
Business plan	The costs inherent to the activities in the preparation phase especially the field assessment shall be anticipated in the business plan.	x	x
	The budget should include the costs of safety gear.	x	x
	An economic feasibility assessment shall guide the business plan, indicating the costs of machinery and equipment, including a comparison of different business scenarios (e.g. purchase vs. rental of such infrastructure).	x	x
	The feasibility study should support the financial plan to guide the start capital, costs deduction, investments and distribution of profits.	x	x
	The cost for logistics and transport of the final products should be predicted, especially for Falake community.	x	
Management plan	The management plan shall clearly indicate the total forest area to be managed, long term timeline and the rules and the community agreement about land access and benefit sharing to avoid future disputes and conflicts.	x	
Operational plan	The operational planning shall specify the boundaries of the Tabu areas and indicate the felling direction of bordering trees to avoid trespassing, and unnecessary timber loss and forest degradation.	x	
Legislation	Timber harvesting for commercial purposes has to follow the legal licensing process. Equally, the milling activity also has to comply with the milling licensing process.	x	x
Subject	**Comments**	**F**	**K**
Phase 2: Production		
Business plan	The economic feasibility study and management plan can support the informed decision making about the best options for investments in infrastructure, production and trading system.	x	x
	The business plan should include the detailed costs of machinery maintenance	x	x
Training	Business and financial management skills are essential to enable the community to administrate the forest resources for long term sustainability.	x	x
	Capacity building to improve the field survey and timber volume estimates is important to optimize the production and to reduce losses.	x	x
	Capacity building about machinery maintenance and basic mechanic can improve the quality and productivity of forest operations.		x
	Updating the knowledge on safety procedures and felling techniques can reduce the risk of accidents and the impact inside of tabu areas.	x	x
Operational plan	The operational plan and the harvesting schedule should anticipate potential delays due to cultural events that have priority for community members and can pose a challenge to strict time management.	x	x
Subject	**Comments**	**F**	**K**
Phase 3: Transformation- Community level		
Training	Training on machinery adjustment, timber sawing and timber grading to improve the quality, reduce costs and to optimize the productivity.	x	x
	Training on technologies, carpenter technics, design and creation.	x	x
Communication	Strengthen the communication with potential buyers to guarantee that the final products correspond to the end market needs.	x	
Products	Although the end market has a short list of products, it would be strategic to investigate alternatives to develop low-cost products made with second grade timber.	x	x

Business plan	An economic feasibility study shall guide the business plan, indicating the costs of machinery and equipment for transformation under different scenarios (e.g. purchase or to rent of such infrastructure).	x	x
	The business plan should anticipate the costs for infrastructure and carpentry.	x	x
Subject	**Comments**	**F**	**K**
Trade: Community level			
Training	Training in Business and financial to improve the community skills to trade and to administrate the cash flow.	x	x
Communication	The communication with potential buyers and market information should support the decision making about the final buyer and determine the trade agreements (eg: transport and logistic cost).	x	x
Business plan	The trade outcome should meet the income and profit anticipated in the financial plan.	x	x
	The financial plan and community agreements should guide the labor payment, benefit sharing, costs deduction and investments	x	x

1.5.1   Identifying Actions for Activity plan

A summary of recommendations for the activity plan in the pilot areas and potential partners to improve business practice, the forest management and timber processing at the community level are described in the Table 13.

Table 13: Recommendations for the activity plan and potential partners to improve the timber value chain at the community level

Business Practice	Potential support
Develop (or review) procedures and agreements for land and resources use, and profit sharing, highlighting the functions of existing initiatives(eg: associations) in the community forest management and timber processing;	Community activity with assistance from the Project. Ps: Komuniboli mentioned to have community procedures (to check and review); Falake need to develop procedures.
Develop economic feasibility models (each community) and promote capacity building to support informed decision-making about investments in tools and machinery; Eg: based on forest management plan and potential volume per year, to plan the need for machinery and cost *x* benefit to purchase or to rent such equipment. Consider the rules for ownership, cost for maintenance, and possibility to generate additional income to the community through rental and/or to provide services for other communities nearby.	Training institutions: Solomon Islands Small Business Enterprise Centre (SISBEC); MASE Business Services Centre; Solomon Islands Women in Business Association (SIWIBA), Youth at Work (description in the Annex 4) Financial institutions and services (Annex 5)
Capacity building to develop a simplified community business and financial management plan;	Training institutions: (Annex 4) Financial institutions (Annex 5)

Eg: based on forest management plan and potential volume per year, estimate the costs, potential income, profits and investments. Develop a simplified business and financial plan describing basic issues related to accountability, licenses, cash flow etc.	
Capacity building to develop a community market and trade strategy, especially in Falake due to the narrow market Auki and expensive costs for transport to Honiara; Eg: simplified strategy describing the community leaders responsible for market assessment, list of main buyers and contact, desirable species, routine for up dating the market price, trade agreements, access to subsides, etc.	Training institutions (Annex 4), Strongin Busines (advising from the BEE Program)
Assist Falake community to access the sea freight subsidy to reduce transportation costs.	MOFR and VATA

Forest Management	
Development of the forest management plan and annual operational plan;	MOFR, JICA, SIDT (Annex 5)
Capacity building for the development of annual operational plans;	MOFR, JICA, SIDT (Annex 5)
Review and up date the Licensing of felling and milling activities;	MOFR
Develop a simplified timber traceability system, which may be a differential to establish trade agreements buyers ;	VATA, PHAMA Plus (DFAT)
Refreshment training about safety and felling techniques.	MOFR, SIDT (Annex 5)
Capacity building for nursery and rehabilitation after exploration (Kominiboli).	Knowledge exchange between pilot areas;

Timber Processing	
Capacity building for timber survey, volume calculation and sawing techniques;	MOFR, VATA
Refreshment training for timber grading;	VATA, buyers
Refreshment training for machinery maintenance and mechanics	Knowledge exchange between pilot areas, VATA, SIDT.
Capacity building to improve their knowledge of carpenters and to develop skills to produce new wood products.	Knowledge exchange between pilot areas; San Isidro (Catholic Church) (Annex 5)
Investigate new products to add value to second grade timber and/or to utilize different tree species. Eg: toys, kitchenware, decoration	San Isidro (Catholic Church), Coconut Technology Centre (which is a the non-profit side of Kokonut Pacific), Youth at Work (Annex 5), Strongim Bisnis (DFAT)
Investigate the potential domestic market for teak, mahogany and alternative timber from native species.	Potential support from: Project, SITPEA, VATA and South Pacific Group, Strongim Bisnis (DFAT)

2   Cocoa

The cocoa sector in Solomon Islands is well understood due to several analyses about its value chain and market system. In addition, many projects have been developed between the Solomon Islands Government and partners, such as Australian Aid and World Bank. This report comprises the results obtained from primary data assessed in Falake and Auki, as well as compiling information from existing studies.

2.1   Context of cocoa sector

It is estimated that around 20-25000 smallholder farmers are engaged in cocoa production. The plantation sites vary from 1 to 3 hectares (smallholders with less than 3000 trees), 3-10 hectares (medium-size holdings with 3000-10000 trees) and larger plantations with more than 10 hectares.

The coca production contributes approximately 5,4% to the Solomon Islands gross domestic product. A great effort has been made to promote the domestic market through local processing and consumption of cocoa, however the export markets are still the main markets for cocoa beans as very little value-adding processing takes place in Solomon Islands(a small volume of cocoa nibs, coca powder and finished chocolate made by ADRA[4] and Diana Chan).

Although many farmers are involved in cocoa production they are losing interest due the challenges such high transport costs, high input cost, lack of infrastructure and hard labor coupled with low earnings.

From 2012 to 2018 the country's annual cocoa production has stagnated between 4000 – 5000 MT (CEMA, 2018) which is largely due to: fluctuating prices dis-incentivizing pod harvest; ageing trees resulting in lower yield; climatic issues; and a lack of new plantings (Strogim Bisinis, 2019 b).

Cocoa production is also not seen as a 'full time' job but more as a means to quickly access cash when needed. This means that in times when cash is not needed or prices are poor, cocoa trees are not tended and this ends to poorly managed plantations and low yields (Strogim Bisinis, 2019 b).

The challenges in the cocoa supply directly impact the sector, putting in risk the cocoa industry Solomon Islands.

2.1.1   Relation of international market and domestic market

According to the Market System Analysis and Sector Strategy developed by Australian Aid trough the initiative Strongim Bisinis (Strogim Bisinis, 2019 b), the export market in fact masks a monopoly. Seven of the country's 18 registered Exporters are agents for an Australian trading

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[4] The Soul Cocoa project from ADRA- Adventist Development and Relief Agency - provides practical training to local farmers to improve the quality of their cocoa beans. The next phase of this project is the establishment of a social enterprise to produce and sell high quality cocoa to overseas chocolate makers. (ADRA, 2019).

house called Holland Commodities (Strogim Bisinis, 2019 b). In 2018, 78% of the production was traded to the international market by Holland Commodities International Ltd, followed by **Commodity Exports (**C-Corps), with 20% (CEMA, 2018). The Annex 6 shows the exporter list with a description of exporter contact and niche of products (bulk or special quality/boutique).

Holland Commodities act as a final trader in the domestic value chain. They have a technical and financial advantage over their domestic competitors. Physically the company has a warehouse in a key location on the wharf and has strategically locked many exporters into a pre-financing relationship which assures they receive the maximum volume of cocoa possible. The company has agents in Honiara to act on its behalf. Holland Commodities sells most of their cocoa on to Barry Callebaut, who owns a number of grinding facilities in Asia and is one of the largest buyers in the region. (Strogim Bisinis, 2019 b).

C-Corps has two functions in the market system: they act as exporter (domestic market) and chocolate maker through the brand "Solomon Gold" manufactured in New Zealand. The company has 20% market share (CEMA, 2018), being a consistent market leader in the Solomon Islands and one of the only exporters of significant size that is not owned by or in partnership with Holland Commodities. Recently they have established a price incentive scheme to reward farmers for quality cocoa. C-Corp is motivated by profit and also a desire to promote the Solomon Islands as a boutique chocolate origin through their Solomon Gold brand. In 2017 the company purchased 15 Mt of high quality cocoa at a premium price, hoping to scale up the volume (Strogim Bisinis, 2019 b).

Malaita is the second main producer of cocoa beans in Solomon Islands (21%) after Guadalcanal (57%) (CEMA, 2018). There is the total of 5 coca exporter agents in Malaita. During this assessment 3 exporter agents were interviewed: ST Cocoa Exporter, Arania, and an individual trader working for C-Corps (mentioned above).

ST Cocoa Exporters is a company working as an agent for Holland Commodities. They have 15% market share from 2017 to date. ST Cocoa Exporters is usually one of the major market shareholders, an active member of the industry working group and a well-established business which follows established regulations (Strogim Bisinis, 2019 b)

Arania is another company working as an agent for Holland Commodities. They have a 7% market share from 2017 to date. Arania's manager is an active member of the industry working group and the company is a well-established business following established regulations and industry expectations. Arania buys most of their cocoa from Malaita and have invested in the farmers there through their RDP project (Strogim Bisinis, 2019 b). The RDP project contract started in 2016 and involves two major farmer association in the province: Aimela (in ward 2, C/Kwaraáe) and Faalau (in N/Malaita). Currently Arania are working with 3800 farmers under the two cocoa farmers associations (AIMELA and FAALAU), with a total of 15 drying facilities already set up for these two associations. There is a high demand for membership and participation under the RDP project. The community group (or farmers association) have to apply for membership to the Ministry of

Agriculture under the RDP project and through the agriculture provincial office. The applicants must be a registered body and become regular clients of Arania, in order to be included as new farmers under RDP.

The PHAMA Program has introduced three new players into the Solomon Islands cocoa market: Island Cacao (UK), Pump Street Chocolate (UK) and Zokoko (Australia). All of them are **chocolate makers** looking for high quality of cocoa beans and increased supply.

The Islands Cacao buys between 15 Mt -20Mt per year from smallholder farmers and handles their shipment using the PHAMA funded warehouse in Honiara (managed by Diana Yates). Pump Street Chocolate buys only 1 Mt, but the owner is well known in the UK/EU for high quality and unique chocolate making and maintains very close relations with their suppliers (Strogim Bisinis, 2019 b).

2.1.2   Domestic market for cocoa beans

In Malaita, there is a market for wet beans and dry beans. Wet beans are purchased by dealers directly from the farmers, while the dry beans are purchased by export agents.

According to the export agents there is a high competition for cocoa beans. For this reason it is essential for the business to maintain a good relationship with their suppliers, as the farmers always are looking for better prices.

Agents and dealers sometimes provide some facilities or services, such as picking up beans, providing bags, and offering premium prices for fidelity. Arania, under RDP project, also supports the farmers with tools and equipment (eg. drying facilities), and technical training. Training are facilitated by the provincial agriculture extension office.

There isn't any pre-ordering system between the dealers and agent to the farmers. The farmers communicate with the agents by mobile phone to check the prices and volume before delivering the beans. The payment is made by cash or cheque.

The agents, in turn, receive pre-orders from the exporters, which provide financial support to enable the agents to buy the beans from the farmers (or dealers) and to meet other costs.

- **Quality Requirements**

In terms of quality, the exporters are looking for both high quality cocoa (known as boutique cocoa) and ordinary cocoa, generally classified as 'low quality' and sold as bulk cocoa.

Good quality in dried cocoa beans is reached through a good fermentation and drying process, without leaving a smoky smell and flavor. The exporter agents check the quality through the organoleptic characteristics which are taste, color, smell, and touch. Arania and the C-Corp agent also use equipment to measure the equilibrium moisture content.

CEMA has the mandate to inspect and grade all cocoa exports. Its role is to regulate quality and export volumes for the cocoa industry. CEMA inspects all consignments of cocoa products for: 1)

physical appearance (colour, mould); 2) and moisture. All shipments have to meet CEMA's requirements (published in the regulation), or meet the buyer specifications before it is approved for export (Strogim Bisinis, 2019 b).

Although CEMA has the role to inspect and test all cocoa, exporters are not able to *rely* on them for quality testing (Strogim Bisinis, 2019 b) due some specific restrictions that can be different from each buyer. As a result exporters are required to send samples overseas for pre-shipment testing by buyers or third parties.

Market System Analysis and sector strategy identified an increase of Pacific supply into the boutique market, the reasons for which are twofold: Firstly, there have been concentrated efforts to improve the international reputation and visibility of Pacific cocoa origins. Secondly, the popularity of Pacific chocolates is partly driven by a new flavour profile in the market and consumers wanting to try something new and different. This trend is also evident in Solomon Islands.

Solomon Islands has built a name in the last two years as a new potential origin for boutique cocoa, shifting from 0 Mt of boutique cocoa exports in 2015 to over 30 Mt in 2017. While this is increasing visibility of the country on the international stage, the reality will always be that boutique exports can only support a limited number of suppliers and production volume, at most 2-3% of the country's crop (Strogim Bisinis, 2019 b).

• **Market price**

In September of 2019 the market price payed by the agents to the farmers in Malaita were:

Agent/Company	Wet beans	Dry beans
C-Corp agent	SBD 3,00/kg	SBD 10,50/kg
ST Exporter	-	SBD 11,00/kg
Arania	-	SBD 11,00/ kg

The main activities performed by the agents are scaling the bags, goods storage, preparing the documentation (quality and other data), and arranging the shipment.

Dry bean dealers (which buy wet beans to dry and to sell to exporters) beans often have no choice but to accept the price offered to them, while farmers depend on prices dictated from exporters, which have very little real influence in the industry. The exporters are pressured by manufacturers, who can source cheaper origins. However the manufacturers have less power than many imagine, as the largest profit margins in the industry are achieved by the retailers of finished products (adapted from Strogim Bisinis, 2019 b) .

Boutique chocolate makers have a strong influence on the quality of production via the exporter, as they only buy high quality beans and also provide price incentives for higher quality.

As neither farmers, dry dealers or exporters can control the price, the alternatives are to reduce the production costs (through technology, tools, improvement in the variety and efficiency), to increase local processing and added value, and to increase the final consumption on the domestic market. These approaches are being addressed by the RDP Program, PHAMA plus and Strogim Bisnis.

- **Value Added Cocoa Products**

The financial analysis provided in the study "Investment Options for Value Added Cocoa Products in the Solomon Islands (Strongim Bisnis, 2019 a) indicates that there are two potentially viable investment options for value-added processing of cocoa in the Solomon Islands: 1. Cocoa Nibs[5]; 2. Drinking Chocolate with untempered chocolate.

The study shows that both can be produced using either low technology, essentially unmechanized production techniques, or by the use of a range of mechanized techniques with varying output capacities and capital investment requirements. The costs for equipment and processing can be very low, thereby allowing production at the household level, and the financial projections demonstrate profitability.

However, it must be noted that neither of these products are currently established in the market and a consumer awareness campaign may be necessary to establish enough demand for these products to warrant investment in mechanized production facilities (Strongim Bisnis, 2019 a).

Recently the Strogim Bisnis (Cocoa Program) release the book "Cooking with cocoa in the Solomon Islands" (available at https://strongimbisnis.com.sb/programs/cocoa). The book inform how to making cocoa products at home and recipes.

- **Certification and Organic Cocoa**

Mainstream certification has overall become less important for Pacific cocoa producers as the major buyers have established their own traceability/certification systems (i.e. Cocoa Life from Mondelez). The small, boutique buyers do not require certification as they often have established relationships with their suppliers, visiting their cocoa blocks once or twice a year.

There is, however, a definite increasing regional demand for organic produce which is deemed healthier by for consumers. There has been ongoing demand for Solomon Islands organic cocoa, however organic certification can be expensive to establish, and growers do not receive a set premium price in return.

Organic Pasifika in partnership with Pacific Organic and Ethical Trade Community (POETCom) developed the Participatory Guarantee System (PGS) to reduce the price for certification and

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[5] Cacao nibs are small pieces of crushed cocoa beans that have a bitter chocolatey flavor.

adapt the conventional certification schemes to the Pacific community scale. Additional information about certification schemes for cocoa production are available in the Annex 7.

- **Challenges in the cocoa supply and market:**

The main challenges of cocoa supply and market is summarized below:

- **Price:** Despite the high competition for cocoa beans on the domestic market, the price is controlled by few players on the international market, which demotivates the farmers to produce cocoa beans.
- **Quality:** Lack of infrastructure and lack of good practices in the fermentation and drying processes reduces de quality of cocoa beans, leading to a bad reputation for the whole Solomon Islands cocoa sector.
- **Cocoa farm management**: Lack in the management of cocoa plantation plots leads to decreasing productivity and quality.
- **Land ownership and production system:** Many smallholders that produce different varieties, use different management systems, produce small quantities with high costs and sell individually.
- **Added Value:** Potential added value through local processing of cocoa Nibs and chocolate drinking, however will depend on a market and a consumer awareness campaign to establish enough demand.
- **Boutique Cocoa:** some potential to add value through boutique cocoa, with challenges in maintaining consistent quality and in establishing strong relationship and trade systems directly with the chocolate makers and/or their agents.

2.2 Map of the Value Chain

The value chain of cocoa in the domestic market consists of three phases and 3 main activities: cocoa production, cocoa bean preparation and final trade. The general value chain map with its phases, activities, actors, functions and products are presented below. The map gives a holistic overview over the value chain, and facilitates understanding the detailed map developed with Falake community members.

Table 14: Cocoa value chain map

Phase	Value Chain Activity	Actor	Function	Products for trading
Production	Cocoa production	Farmers	Nursery of cacao seedlings, plantation, maintenance, pod harvesting and packing of wet beans	Wet beans
Transformation	Cocoa bean preparation	Dry bean dealer *(member of the community or external buyer)*	Transportation of wet beans, purchasing of wet beans from a specific region, fermentation, drying, packing	Dry beans
Trade	Final trade (domestic market)	Dry bean dealer	Purchasing of more dry beans and packing, Transportation to the exporter (or its agent) by road or ship	Dry beans
		Exporter agent	Purchasing of dry beans, packing, storage, transport to the exporter	Dry beans
		Exporter	Re-dry, blend, grade, packing, storage, export or reselling to a trader	Bulk dry beans Boutique cocoa
		Trader	Act as a middle man in the international market, trading the dry beans to manufacturers or chocolate makers	Bulk dry beans Boutique cocoa

Production:

The farmers are the only actors engaged in the production of cocoa beans. The farmers can establish the plantation on their own land (like in Falake), or in some cases they can lease an area from another landowner. In Falake, it is estimated that the sum of all smallholder's cocoa plantations exceeds 10 hectares.

The cocoa seedlings can be purchased from a nursery or can be produced by the farmers. In Falake, the ADO has its own nursery unit, providing infrastructure for the community and members.

The production activities (plantation, maintenance, pod harvesting and packing of wet beans) are manly performed by men, while youths and women are engaged only occasionally as their main role is looking after other crops produced inside family gardens.

From the production phase, the first marketable product is obtained: wet beans (raw cocoa, covered in mucilage). The majority of smallholders sell wet cocoa beans to a "dry bean dealer", which is another farmer from the community or an external buyer. The reason for selling wet

beans is that many smallholders have too few trees to produce the minimal volume of beans required for a good fermentation (300 kg) or don't build fermenting boxes and drying infrastructure due to a lack of capital (Strogim Bisnis, 2019). The technical specialists recommend that the cocoa pods should be broken on the day that they are harvested and the beans transferred as soon as possible into the fermenting box (Strogim Bisnis, 2019), as the beans begin to germinate as soon as the fruit has been picked (Wild Mountain Chocolate, 2019).If germination is allowed to progress too far, the result is bitter beans that cannot be improved with further processing (Wild Mountain Chocolate, 2019).

In most cases the external "dry bean dealer" owns a truck and drives around a specific region in a specific week-day purchasing with cash the wet beans sold along the road. In Falake there are 9 external dry bean dealers and in the past, there were 3 farmers purchasing wet beans for fermentation and drying.

Transformation:

The transformation comprises the activities: fermentation, drying, packing and transport to an exporter or its agent. The minimal amount of 300kg of wet beans is recommended to guarantee a good fermentation, which takes six to seven days to complete.

The process of fermentation breaks down the sugars and starches into acids or alcohol. The yeasts, bacteria, and enzymes ferment the juicy white pulp that surrounds the cacao beans. The beans endure the heat, acid, and enzyme effects from the fermentation of the pulp and are transformed, both internally and externally, as a result.

Fermenting helps developing the natural flavours of the bean, witch significantly impacts the quality of chocolate. The consistency in this process is key: There is an art and attention to detail that is fundamental to the process to ensure that the beans aren't experiencing too much, or too little, fermentation (Wild Mountain Chocolate, 2019).

There are different methods of fermentation, from simply digging a small hole (or using a basket) to place the beans in, and then covering it with banana leaves to trap the heat generated by fermentation, to well designed boxes stacked in tiers to be easily tipped and poured into the lower – for a natural turning of the beans.

After fermentation, the cocoa beans are dried in order to reduce the moisture content from about 60% to about 7.5%. Drying must be carried out carefully to ensure that off-flavours are not developed. Drying should take place slowly. If the beans are dried too quickly, some of the chemical reactions started in the fermentation process are not allowed to complete their work and the beans become acidic with a bitter flavour. However, if the drying is too slow, moulds and off-flavours can develop too. Various research studies indicate that bean temperatures during drying should not exceed 65°C (ICCO, 2000).

There are two methods for drying beans - sun drying and artificial drying.

For sun drying, the beans are spread out on mats, trays or on wooden or concrete floors in the sun. The beans are normally turned or raked to ensure uniformity of drying and the beans need to be covered when it rains (ICCO, 2000).

Artificial drying may be resorted where there is a lack of pronounced dry periods after harvesting and fermentation. Artificially dried with fire wood can be of poor quality due to contamination from the smoke of fires or because the cocoa is dried too quickly. The simplest forms of artificial driers are convection driers or "Samoan driers" which consists of a simple flue in a plenum chamber and a permeable drying platform above. Air inlets must be provided in order to allow the convection current to flow without allowing smoke to taint the beans. These driers are simple to construct and have been used in Solomon Islands (ICCO, 2000). Also new technologies like the "bubble drier"(introduced by Phama Plus and Strogin Bisinis (Cocoa Program)) have been used in Solomon Islands and are a good option to improve the consistency and quality.

The final product obtained from the transformation phase is the dried cocoa beans. The beans are stored in bags (approximately 70 kg) and transported straight to the exporter or its agent.The storage also is important to guarantee the long term quality. Traditionally cotton bags are use to store the grains, however it isn't efficient to protect the beans against humidity for long term. The new technology of ultra-hermetic bag was (also introduced by Phama Plus and Strogin Bisinis (Cocoa Program)) and demonstrate to be very effective to preserve the quality of the grains. The Annex 8 present the local price for bubble drier and hermetic bags sold at Honiara Hardware.

Trade

The final phase that takes place on the domestic market comprises the trading between the dry bean dealer, agents and exporter. In Malaita, the dry bean dealer and agents have the function to aggregate the production, store and to send the total volume to the exporter located in Honiara.

Depending on the quality, the exporter may have to winnow, re-dry or blend the cocoa prior to export. The exporters grade and store the beans usually for a period of no more than three months (Strongin Bisinis, 2019). Exporters can either sell their cocoa to trading houses, manufactures (factories) or chocolate makers.

Boutique cocoa exporters often aggregate dried beans in order to reach the minimal volume (12-15 Mt) to be able to fill a 20-foot container, as it is not possible to export less-than-container-load (LCD). The storage need to occur in a clean warehouse away from any potential sources of flavor contamination. In Honiara, Mrs Diana Chan built a boutique cocoa warehouse with support from PHAMA Program (Strogim Bisnis, 2019).

2.3   Cocoa Value Chain in FALAKE

Table 15: Value chain of Coca beans in Falake

Activities	Actors	Services needed	Costs	Risks
Phase: Production				
Nursery: • Varieties selection • Poly bags preparation • Seed selection • Planting **Plantation**: • Brushing • Lines measurement • Digging • Transplanting (plantation) • Maintenance and pruning **Harvesting**: • Cocoa fruits harvesting • Ripening of cocoa pods • Wheel barrow transport • Cocoa seed extraction • Filling bags • Transport by wheel barrow of the bags to roadside (selling point)	**Farmer** Obs 1: Most production activities are performed by men. Obs 2: Women and youths support: polybag preparation, brushing and transplanting and sometimes also help in the harvesting	**Input supplies:** poly bags, nets, spade; knife, chainsaw, pruning saw, bush knife, tape measure, wheel barrow, loops secator. **Labor**	• Polybag: SBD 50/pkt (100 units) • Rubber boot: SBD 200 • Nursery net: SBD 500/roll • Spade: SBD 120 • File (lime): SBD: 20 • Raincoat: SBD 150 • Handglove: SBD 25 • Axe: SBD 240 • Tape measure: SBD 35 • Wheel barrow: SBD 1000 • Pruning saw: SBD 75 • Chain saw hire: SBD 300/day • Labor: SBD 50/day	**Nursery:** Infertile soil, lack of bean selection, pest, diseases, lack of watering. **Plantation:** Poor selection of plantation lots, rocky soil, lack of log clearing, lack of labor **Maintenance**: Lack of tools, lack of pruning, brushing, injuries, lack of management **Natural events:** Heavy rain, predation from animals (birds, rats, bat), diseases (black pod)
Phase: Transformation				
Beans preparation: to sell wet or dried • Wet beans transportation by the buyer(dry bean dealers) ; or Wet beans transportation by the farmer • Fermentation (close to the plantation, in the village, or carried out by the dealer • Drying • Packing	**Farmer** Obs 1: Most transformation activities are performed by men. **Buyer** (approx. 9 buyers/drier dealers)	**Input supplies:** Tools, shovel, sacks, box, chainsaw, bush knife **Wood** **Labor** **Transport provider**	• Labor: SBD 50/day • Shovel: SBD 70 • Sacks: 20 • Chain saw hire: SBD 300/day • Transport: SBD 300/ load • Nails (box): SBD 500/kg • Nets (mesh for drier) SBD 50/m • Empty drum: SBD 100/drum	• Mistakes in the fermentation time, • Lack of tools • Unripe pods • Predation from animals (rats)

Activities	Actors	Services needed	Costs	Risks
Phase: Trade				
Wet beans: • Contacting the buyers (or waiting on the road) • Weighing the wet beans (SBD 2,50/kg) **Dry beans:** • Transport to Auki • Weighing the beans (SBD 10,50/kg)	**Farmer** (family- wet beans) **Buyer/ Agent Exporter**	**Wet beans:** • Transportation • Labor • Scale and wheel barrow **Dry beans:** • Transportation • Communication	• Transport to Auki: SBD20/bag • Transport fare: SBD 50/person • Market price (September): Wet bean: SBD 2,5/kg Dry bean: SBD 10,50/kg	• Market price fluctuation • Low quality of the beans (Uncooked beans or burned) • Difficulty to meet with buyers • Delay in the payment • Accidents in the transport • Lack of communication for trade agreement

2.3.1 Cocoa plots in Falake

• **Time Line of Cocoa activity in Falake:**
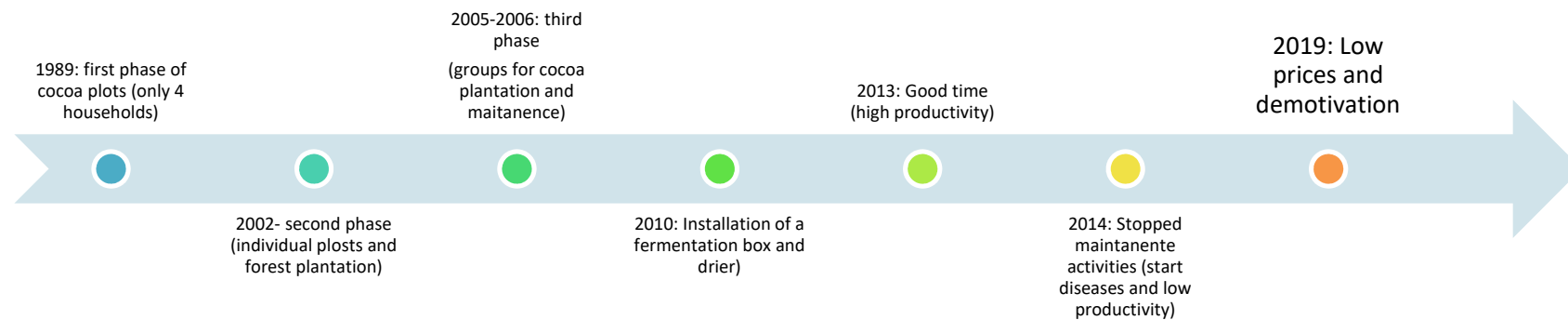
- **Cocoa plots and productivity:**
- Plantation line: 3m x 3m = 1111 tree/ha
- Productivity: 100 trees produce around 20 kg of dry beans ≈ 222 kg/ha (considered low productivity compared with an average yield of around 550 Kg/ha in 2011 for three largest cocoa producing countries (Vadnjal and Pelomo, 2013).
- Operational activities: 100 trees/ 2 work days / 2 people ≈ 22 work day/ha

2.3.2 Business Enabling Environment (BEE) in Falake

The performance of the cocoa chain in Falake is interfered by the following constraints to the BEE[6]:

Table 16: Business Enabling Environmental in Falake

BEE	BEE in Falake
Cultural norms and customs	– Restricted "Tabu" areas (forbidden for cocoa plantation) ; – Frequent and unpredictable compassionate leave of workers (3 days to 2 weeks); – Leave due to commitment to 'brideprice' (wedding event) – Leave due family sickness – Land issue disputes – Cultural festivity g
Land access/benefit sharing	– Land ownership: tribal members to plot cocoa plantation; – Family owns cocoa plots: profit owned by families; – Communal lifestyle: Wantok (relatives) system allows extended family to access the plantation (difficult to control the access to the pods) – Payment for labor services with cash or goods. – Members of ADO can access subsidies (tools, spade, wheelbarrow, nets…).Approximately. 20 farmers produce cocoa, but not all of them are members of ADO.
Laws, Regulations, Licensing, policies	– Plantations ≥ 10 ha are eligible to access license and benefits from Ministry of Agriculture (MAL) (need to investigate)
Trade agreements	– Only verbal agreements with buyers; – Premium prices for long term relationship with producer; – Shared transportation costs with buyers (bus fare or freight of bags) – Christmas present from the buyer
Community Infrastructure	– ADO infrastructure (nursery, office and storage); – No infrastructure for fermentation and drying – Old tools and equipment
Public infrastructure (roads, electricity, water, etc.)	– Road condition at this moment is good. – No energy – Water supply – Local market close to the community – Schools close to the community

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[6] The BEE information aims to understand how local norms and customs, regulations, policies, trade agreements and infrastructure affect the performance of the value chain. When potential improvements are identified, they can be incorporated into the design of the activity plan.

2.3.3 SWOT Analysis for Cocoa production in Falake

Falake community acknowledged a range of internal strengths and weaknesses, and external opportunities and threats that should be considered to guide the activity plan, as showed below:

Table 17: SWOT Analysis for Cocoa production in Falake

	POSITIVE	NEGATIVE
INTERNAL	**Strengths** – Easy to establish the plots due to good knowledge and experience – Good team work, organization and – Good implementation and application of new information and knowledge – Ownership of the land – Income generation for livelihood sustainability	**Weaknesses** – Time management – delay and lack of commitment to follow schedules – Lack of management /maintenance of cocoa plantation – Lack of commitment (prioritization) with cocoa plantation – Lack of information (diseases, technical, quality improvement) – Low fruit production – Difficulty to control the access and interference of the relatives (wantoks) to the plantations (uncontrolled harvesting)
EXTERNAL	**Opportunities** – Workshop and training from stakeholders (partners): JICA, MAL – CEMA: market regulation and information – Subsidies from SIG – Education: student at SINU can acquired knowledge about Cocoa – Public transportation (available services for truck and ship) – Public infrastructure: good condition of the road at this time, wharf	**Threats** – Markets price fluctuation – More work needed for less income – Extreme weather patterns: cyclones and heavy rains – Pest, diseases and predators (birds, rats. flying foxes) – Lack of information from MAL – Unstable road conditions

2.4 Need for improvement of the value chain at the community level

Some potential improvements in the cocoa value chain at the community level for Falake are highlighted below.

Table 18: Potential improvements in the cocoa value chain in Falake

Subject	Comments
Production	
Cocoa bean variety	Investigate what are the cocoa varieties in Falake plantation and whether need improvement in the genetic base.
	Establish a nursery of good variety (adapted to the region, good productivity and quality)
Cocoa plots/plantation	Investigate the total area, number of farmers, productivity and need for silvicultural activities and/or renovation (replanting) of the cocoa trees.

	Promote refreshment training about silviculture and good practices of cocoa production, cocoa diseases e maintenance.
Business plan	Establish a framework for cocoa plantation management and maintenance (individual activity, community work group, etc)
	Develop management and operational plan to coordinate the production and activities to improve the timing management for the maintenance of the cocoa plots.
	Improve the materials and equipment for cocoa plantation maintenance and establish agreement over the material (individual, collective, owned by association, etc)
	Establish agreement for cooperation and work group in the cocoa plots to improve the commitment and maintenance of the coca plots
	Establish agreement with wantoks to improve the control over the cocoa production.
Phase 3: Transformation- Community level	
Business plan	Define a goal for cocoa plantation: boutique cocoa, bulk cocoa, wet cocoa
	Establish agreement for cocoa transformation (individual, community, association, etc) , members engaged in the activities and ownership of the infrastructure.
	Improve the infrastructure for transformation (fermentation, drier, pack, storage and transport)
	Investigate possibilities for subsidies to reduce the costs of cocoa production for all farmers; also to reduce the costs of transformation and/or potential programs or associations to participate.
	Investigate potential value add products to generate alternative income.
Training	Capacity building about cocoa beans transformation and quality
	Capacity building value add products to cocoa beans
	Capacity building about business and financial management
Subject	**Comments**
Trade: Community level	
Business plan	Establish a framework for trade the cocoa beans (individual trade or community trade)
	Investigate potential formal partners for trading and establishment of trade relationship (program, association, buyers, agents)
Market	Investigate potential initiatives from the cocoa sector to participate (association, working group, programs, etc) and to follow the news from the cocoa sector in Solomon Islands.
	Increase the value added products for cocoa beans.

2.4.1   Identifying actions for activity plan

A summary of recommendations for the activity plan in the pilot area and potential partners to improve the cocoa production at the community level are described in the Table 19.

Table 19: Recommendations for activity plan

Economic feasibility	Potential support
• Survey of cocoa production to understand numbers of producers, plantation area and productivity, need for silvicultural activities and/or renovation (replanting) of the cocoa trees.	MAL, Kastom garden (Malaiata extension farmers), extension with other local initiatives (ex: Arania).

• Investigate the potential subsidies from SIG or partners; and design a framework to arrange the production system, transformation and trading. (Eg: Compare feasibility scenarios for: individual production and trade; collective system through local association; collective trade to external association,..etc).	MAL, buyers (Arania, ST exporter, etc), Strogin Bisisnes (AusAid), financial institutions (annex 5); financial and technical training (annex 4)
• Elaborate a production strategy and economic model for cocoa plantations (Eg: maintenance and/or improvement of the same planted area, enrichment with other species in an agroforestry system, gradual replacement of cocoa with other production system, etc…)	Project, MAL, Kastom Garden (annex 4)
• Link the community to partners and buyers in the domestic market (bulk cocoa or boutique cocoa) and (whether is possible) international market	Potential partner: Cocoa working group, buyers, PHAMA Plus
Production system	**Potential partners**
• Define a goal for cocoa plantation: boutique cocoa, bulk cocoa, wet cocoa	Community, Project
• Based on the Production Strategy, elaborate a management system for cocoa plantations. (Eg: silviculture and tending techniques to increase the productivity and reduce costs, calendar of operational activities, collective plan for cocoa harvest, replanting etc).	Potential partner: Project, MAL, buyer, financial and technical training (annex 4)
• Preparation of a business plan for cocoa bean plantation, transformation (ferment, dry, quality control, pack, store) and improvement of the infrastructure. (Eg: investments in infrastructure and materials, operational cost, potential income, potential profits, benefit sharing system, agreements for internal/community trading system, etc).	MAL, CEMA, buyers, financial and technical training (annex 4),), financial institutions (annex 5)
• Capacity building on cocoa plantation management system, fermentation techniques, dry, packing and storage, quality control.	MAL, buyers (Arania, ST exporter, etc) , financial and technical training (annex 4).
Business	**Potential partners**

• Establish agreements addressing the community decision over the framework for management of cocoa plantation, transformation and business management as a all.	Community, Project
• Capacity building on financial management, accounting, marketing and trading.	Financial and technical training (annex 4).
• Capacity building activities about value added products for cocoa beans	Solomon Islands Association of Rural Training Centres (SIARTC) (Annex 4), Strogin Bisiniss (Cocoa Program)
• Assess the potential income generation through service provided for: cocoa nursery, transformation, quality control.	Project, Strogin Bisiniss (Cocoa Program), Financial and technical training (annex 4).
• Assess potential and feasibility of traceability system and feasibility of organic certification schemes	Kastom gardem, buyers

Annex

Annex 1: List of assessed companies in the forest sector

No_	Company name	Venue for the interview	Contacts
1	Lagoon Eco Timbers	Lagoon Eco office, Ranadi	Robert Mesa - 7639538
2	Hatanga Timber	Hatanga Timber Yard, Ranadi	Raphael - 7196059
3	Homeland Timber Milling (HTM)	Kukum	Leslie Mani - 7495753
4	Goodwood (SI) Ltd	Goodwood office, Ranadi	Elsa - 7473390
5	Pacific Export Alliance Ltd	Pacific Alliance Timbers, Henderson	Beryl -
6	Fairtrade	SOL- Pacific Ltd, Ranadi	John Bailey - 38399
7	TGA Timbers	TGA office, Ranadi	Ricky Fouu
8	SA Holdings Ltd	SA Holdings Office	Stanley Allen – 7494911/30606
9	Top Timber	Top Timber office	Priyan - 8972411
10	VATA	VATA office	Gordon - 7482328
11	Malta Timber Enterprise	Auki	Billy Iro - 7523213
12	Kwaibala Furniture	Auki	James - 7479242
13	EKD HArdware	Auki	Dang Wen Zheng - 7561835
14	South Pacific Group	Henderson Mini Industrial, Honiara	Harry – 7629775 southpacificgrouplimited@gmail.com

Annex 2: Purchasing prices for logs and timber, per company

Species	Specifications	Purchase prices-minimal (SBD/m3)	Purchase prices-maximum (SBD/m3)	Quality	Payment	Location	Company
Akwa	Tree: DBH 60cm min; 6m minimum height	500/tree	-	No hollow, no rot, no twists, no knots	Check the quality after felling and negociate the price	Honiara	Homeland
Akwa	Timber: 6 inch x 2 inch; 6 inch x 3 inch; 8 inch x 2 inch; 8 inch x 3 inch;	-	2600	Has to meet the requirements for quality and size.	Pay after reducing the costs of the services: grading, loading, export documentation, shipment	Honiara	Vata
Akwa	Timber	1800	2200	Higher price for timber processed with portable saw mill delivered in Honiara.	After grading	Honiara	Lagoon Ecotimber
Akwa	Timber: 6 inch x 2 inch x 2m up	1700	2000	chain saw / portable saw mill	Final volume after grading	Honiara	Hatanga
Akwa	Timber: 5 inch x 2 inch; up to 8 inch x 8 inch	-	2000		Final volume after grading	Honiara	Fair Trade
Akwa	Timber	-	2000			Honiara	PEA
Akwa	Timber: 4 inch x 2 inch; 8 inch x 2 inch; 8 inch x 2 inch	1600	1800		Final volume after grading	Honiara	SA Holding
Akwa	Timber: 4 inch x 1 inch to 8 inch x 2 inch; 10 feet up		1800			Auki	Malta Timber
Akwa	Log: DBH 50cm min	500	1000	Size, long logs, straight, no knots		Auki	Malta Timber
Akwa	-	500				Honiara	Top Timber
Akwa	Timber	1600		Lower price when bought in the Province.	After grading	Honiara	Lagoon Ecotimber
Calophyllum	Log: DBH 60cm min; 6m minimum height	500/tree	-	No hollow, no rot, no twists, no knots	Check the quality after felling and negotiate the price	Honiara	Homeland
Calophyllum	Timber: 6 inch x 1 inch up; min 3,5 m length		2000/m3			Auki	EKD

Calophyllum/Baula	Log: DBH 50cm min	500	1000	Size, long logs, straight, no knots		Auki	Malta Timber
Dillenia/Mudu	Log: DBH 50cm min	500	1000	Size, long logs		Auki	Malta Timber
Kwila	Timber: 6 inch x 2 inch; 6 inch x 3 inch; 8 inch x 2 inch; 8 inch x 3 inch;	-	4000	Hs to meet the requirements for quality and size.	Pay after reducing the costs of the services: grading, loading, export documentation, shipment	Honiara	Vata
Kwila	Timber	2000	3400	Higher price for timber processed with portable sawmill , delivered in Honiara. Lower price bought in the Province	After grading	Honiara	Lagoon Ecotimber
Kwila	Timber	-	3000			International	PEA
Kwila	Log: small and medium size	1000	1200	No knots, splits, bows, grub, sapwood	Delivered in Honiara	International	Good wood
Mahogany	-	-	2000	-	-	Domestic (Auki)	EKD
Rosewood	Timber: 6 inch x 2 inch; 6 inch x 3 inch; 8 inch x 2 inch; 8 inch x 3 inch;	-	5500	Has to meet the requirements for quality and size.	Final volume after grading	Honiara	Vata
Rosewood	Timber: 6 inch x 2 inch x 2,1up	-	4500		Final volume after grading	Honiara	Hatanga
Rosewood	Timber: 6 inch x 2 inch; 8 inch x 2 inch; 1.8m to 5.7m	-	4500			Honiara	PEA
Rosewood	Timber: 6 inch x 2 inch x 1.4 m up to 1.8 m	3500	4000	Higher price for timber processed with portable sawmill , delivered in Honiara.	After grading	Honiara	Lagoon Ecotimber
Rosewood	-		4000			Honiara	Top Timber
Rosewood	Timber: 5 inch x 2 inch; up to 8 inch x 8 inch	-	3000		Final volume after grading	Honiara	Fair Trade

Rosewood	Timber	-	3000	Lower price when bought in the Province.	After grading	Honiara	Lagoon Ecotimber
Rosewood	Tree: DBH 60cm min; 6m height min	-	1500	No hollow, no rot, no twists, no knots	Check the quality after felling and negotiate the price	Honiara	Homeland
Rosewood	Log: Medium size	-	1400	No knots, splits, bows, grub, sapwood	Delivered in Honiara	Honiara	Good wood
Teak	-	-	2000	-	-	Auki	EKD
Vitex/Vasa	Timber: 10 inch x 8 inch	2500	-			Honiara	Good wood
Vitex/Vasa	Timber: 6 inch x 2 inch; 6 inch x 3 inch; 8 inch x 2 inch; 8 inch x 3 inch;	-	3400	Has to meet the requirements for quality and size.	Pay after reducing the costs of the services: grading, loading, export documentation, shipment	Honiara	Vata
Vitex/Vasa	Timber: 6 inch x 2 inch x 2m up	3000	3300	Higher price for timber processed with portable sawmill .	Final volume after grading	Honiara	Hatanga
Vitex/Vasa	Timber: 6 inch x 2 inch x 1.4 m up to 1.8 m	1800	3200	Higher price for timber processed with portable sawmill , delivered in Honiara.		Honiara	Lagoon Ecotimber
Vitex	Timber: 6 inch x 2 inch; 6 inch x 1 inch; 1.8m to 5.7m	-	3000			Honiara	PEA
Vitex	Timber: 4 inch x 2 inch; 8 inch x 2 inch; 8 inch x 2 inch; 3m up	2650	3000		Final volume after grading	Honiara	SA Holding
Vitex	Timber: 5 inch x 2 inch; up to 8 inch x 8 inch	-	2500		Final volume after grading	Honiara	Fair Trade
Vitex	Timber: 4 inch x 1 inch to 8 inch x 2 inch; 10 feet up	-	2000			Auki	Malta Timber
Teak	Logs 14 years min.age DBH 20-24 cm DBH 25-29 cm DBH 30 cm up	(stand up trees) 300 450 600	(timber yard) 650 800 900			Honiara	South Pacific Group

Annex 3: List of SITPEA members

Company	Contact	Address	Phone number	Email address	Date joined
Hatanga Hardwood	Adam Bartlett	Hatanga Ltd P.O Box 1619, Honiara, Solomon Islands	(+677) 30401/7495220	a.bartlett@hatanga.com	out/15
Top Timber	Terry Wu	Top Timber Co, P.O Box 1836, Honiara	(+677) 28038/7483166	ttcsolomon@hotmail.com	out/15
Goodwood (SI) Ltd	David Ling	Goodwood (solomons) Ltd, P.O Box R89, Honiara	(+677) 39481/7707208	davidlingsc@yahoo.com	out/15
Lagood Eco Timber	Robert Mesa	Lagoon Eco Timber, P.O Box 1524, Honiara	(+677) 39994/7639538		out/15
Pacific Export Alliance Limited	Steve Wong	Pacific Exporters Alliance Group, P.O Box R299, Honiara	(+677) 20161/7670623	pacificexportalliance@gmail.com	out/15
Value Added Timber Enterprise (VATA)	Gordon Makamwane	VATA Office, Henderson, Honiara	(+677) 7482328	gordonmwakamwane@gmail.com	out/15
TGA Timbers Ltd	Ricky Fouu	TGA, Ranadi, Honiara		rfuoo@tgab.com.sb	jun/19
Fairtrade	John Bailey	Fairtrade Co Ltd P.O Box 1106, Honiara	(+677) 38399	fairtrade@solomon.com.sb	out/15
Zuapa Piko	Washington Rove	Zuapa Piko P.O Box 1686, Honiara	(+677) 7320359	ocksi@hotmail.com	mai/18
Advanced Technologies	Hadley Wakio	Advanced Technologies P.O Box 2098, Honiara	(+677) 21922	hwakio@advancedtech.com.sb	jul/18
Agro LBS Limited	Lemuel Siosi	Agro LBS Limited, Honiara	(+677) 7496225/23105	lemuel.siosi@lbs.com.sb	jul/18
SA Holdings Limited	Stanley Allan	P.O.Box 400, Honiara	(+677) 7494911/30606	saholdings16@gmail.com	31-Aug-18
Big International Timber	Linda Nuala-Brown	P.O.Box C77	7998035		17/jan/19
Makavore Landowners Association	Nannette Panda		7728680	npandahite2015@gmail.com	31/jan/19

Annex 4: Business, Financial and Technical Training

Business and Financial training:

Youth@Work Program: is supported by Secretariat of the Pacific Community (SPC), DFAT, and the Queens Young Leaders. Youth@Work is a youth employment and youth advocacy program, which provides training, internships, a resource centre, mentoring and an entrepreneurship program.

Solomon Islands Women in Business Association (SIWIBA): is a non-profit whose goal is to build business opportunities for Solomon Islands women to participate at all levels. SIWIBA is discussing business and other skill training programs for women in Malaita

MASE Business Services Centre: The Centre aims to provide various business management and accounting services, practical business training and research development skills to urban and rural Solomon Islanders to enable them successfully establish, manage and maintain their own businesses.

Solomon Islands Small Business Enterprise Centre (SISBEC): Mission is to be a catalyst for the development of successful businesses in Solomon Islands by designing and delivering quality and relevant courses and providing advisory and mentoring support to both new and existing business owners and managers. It offers a range of short business training courses including but not limited to; basic bookkeeping through to advanced financial skills, Sales & Marketing and Start your Own Business; and can build custom courses for larger customers.

Technical training:

San Isidro Care Centre: The San Isidro Centre rural training centre is located at Aruligo outside Honiara, educates disabled young people from the ages of 14 and over, over a duration of three years. Courses offered are English, Maths, Business, Sign Language, Agriculture, Life Skills, Carpentry, Woodwork, and Practical Trade and Skills

Solomon Islands Development Trust (SIDT) is an indigenous non-government organization aiming to improve the lives of village people in the Solomon Islands. Over the past 30 years the Solomon Islands Development Trust has worked on a great number of campaigns and programs. In the past SIDT has focused on programs such as the Eco-Forestry Unit, which concentrated on teaching chainsaw-milling and forest management.

Live and Learn: · Live and Learn is motivated by sustainable agricultural practices and has developed training material for cocoa farmers .

World Vision: World Vision has a livelihood component to their funding for which cocoa is a small component. World Vision is motivated by Christian charity. Religion and the church are very powerful influencers in Solomon Islands. World Vision is a small player in the industry but an

active member of the industry working group. They also run very successful cocoa programs in PNG and Vanuatu

Solomon Islands Association of Rural Training Centres (SIARTC)   is the umbrella body for **Rural Vocational Training Centres (RTCs),** non-formal educational institutions for young men and women. Between in May /2019, Strongim Bisnis helped 17—mostly female—trainers from Solomon Islands Rural Training Centres and non-government organisations learn how to make drinking chocolate, face cream, tea and nibs from Solomon Islands cocoa beans. The objective of the training was to give Solomon Islands trainers new skills to process cocoa so they could then teach their own agriculture, tourism or hospitality students in the provinces how to produce drinking chocolate and cocao nibs using household equipment such as wooden mortars, rolling pins, a pan and Ziplock bags.

Kastom Gaden Association (KGA) is an indigenous registered non profit organization. Their goal is to strengthen village-based food security in Solomon Islands using participatory, practical, grass-roots approaches that enable village people to examine, understand and develop their own solutions to improving household food security and village-based agriculture economy. The KGA Provides assistance to their members for organic production and has a networking of trainers in all Provinces.

Annex 5: Financial institutions and services

The information below is compiled from Australian Government initiative Strongim Bisnis, from the document **"Cocoa Market system Analysis and Sector Strategy**

Banks: Banks provide banking and other financial services to businesses and individual customers throughout the country. To reach customers outside of Honiara and main urban centres, banks are increasingly focusing on digital money or branchless banking.

All banks are foreign owned except POB, which is locally incorporated (ANZ=Australia and New Zealand, BSP=Papua New Guinea, BRED=France).

- **BSP** is largest individual account holder, and has a new product for SME business loans (unsecured, require account with history, 10%). BSP has branchless (agent) banking, but it is not functioning well due to limited agent liquidity and activity.
- **ANZ** products for individuals and smaller businesses is limited. ANZ only provides finance to a number of sectors, does not provide start-up loans and has high requirements for commercial loans. ANZ has mobile money services.
- **POB's** main purpose is to support the logging industry. However, individual account fees are relatively low and the number of savings accounts are increasing.
- **BRED Bank** has just starting operations (will be fully operational in 2018). It will focus on commercial/corporate customers in Honiara.

Microfinance: Micro finance is available to women from South Pacific Business Development (SPBD) at an average rate of 25%. SPBD only covers two provinces.

Five Organisations (potentially more) organizing savings groups:
- World Vision
- The Anglican Church
- WWF
- Ministry of Women
- Live and Learn

Four donor and government programs increasing access to finance:

- **PFIP**: Pacific Financial Inclusion Programme : While not providing finance directly, PFIP, managed by UNCDF, provides support for digital finance solutions, savings groups, financial literacy, and is working with the Solomon Islands National Provident Fund (SINPF) to expand access to savings for the informal sector.

- **ASEF**: Agricultural Supplementary Equity Facility aims to stimulate agribusiness activities in rural areas. It addresses the equity part of a bank loan by providing a grant of 20% of the 40% equity required for each project. The loan is still subject to normal commercial banks terms, conditions and interest rates. ASEF is managed by the RDP programme.

- **Pacific RISE:** Pacific RISE is a regional DFAT-funded program which aims to develop an impact investment market in the Pacific. Pacific RISE works through intermediaries to identify investment opportunities in Pacific social enterprises and match them with impact investment (typically debt or equity). Three intermediaries, Spark Strategy, Good Return and Akina Foundation, are scoping opportunities for impact investment in Solomon Islands, with the latter two covering a wide range of industries.

- **Central Bank**: Central Bank Loan Guarantee has a loan guarantee scheme for entrepreneurs (90%) to reduce bank's risk for lending.

Annex 6: Exporter list of Cocoa beans in Solomon Islands

The information below is compiled from Australian Government initiative Strongim Bisnis, from the document **"Cocoa Market system Analysis and Sector Strategy**.

No.	EXPORTER	REG. No	ADDRESS	PHONE	CONTACT PERSON	Remarks
1	AJF Enterprises	HOCOA -20	P.O.Box 1023 Honiara	7494062	Mr. Albert Fono	Bulk Market
2	JEMS Cocoa Enterprises	HOCOA- 19	P.O.Box 1567 Honiara	38407 / 7478084	Mr. Solomon Sedo	Bulk Market
3	Arania Enterprises Ltd	HOCOA-21	P.O.Box 796 Honiara	38510, 7472040	Mr. Francis Fono	Bulk Market
4	SK & Brothers Enterprises	HOCOA- 17	Horokiki, North Guadalcanal	8952051	Mr. Samson Kenali	Bulk Market
5	Pinihimae & Associates Group	HOCOA-03	P.O.Box 1603 Honiara	7469440	Mr. Alick Pinihimae	Bulk Market Specialty Market
6	Tradecom Ltd	HOCOA- 18	P.O.Box 855 Honiara.	25118 8494853	Mr. Sajeewa Lyanage	Bulk Market
7	CATHLIRO Commodities Dev. Co. Ltd	HOCOA-06	C/-P.O.Box 4 Honiara	21608	Ms. Diana Yates	Specialty Market
8	OBO Exports Agents	HOCOA- 12	P. O. Box 1501 Honiara	7422992 7799315	Mr. Joseph Tapalia	Bulk Market
9	ST Exporter	HOCOA -08	P. O Box 1554 Honiara	7487232 7641282	Mr. Silas Tome	Bulk Market
10	Tupaghotua Cocoa Plantation	HOCOA- 22	P.O.Box 1201 Honiara	7882093	Ms. Agnes Pilopaso	Bulk Market Specialty Market
11	Solomon Commodity Export Ltd	HOCOA-05	P.O.Box 1513. Honiara	23525/ 7555300	Mr. John Bimana	Bulk Market Specialty Market
12	Chan Wing Motors Ltd	HOCOA-29	P.O.Box 4 Honiara	21608	Mr. Thomas Chan	Bulk Market
13	Korri Enterprises	HOCOA- 23	P.O.Box 1332 Honiara	7496756 7491320	Lerric Tito	Bulk Market
14	P-Tech & Professional Services	HOCOA- 24	P.O.Box 2242, Honiara	38304 8853460	Polycarp Hauhaneia	Bulk Market
15	Totogi Enterprises	HOCOA- 25	P.O.Box 393 Honiara	8505020	Max Totogi	Bulk Market
16	Jamcop Co. Ltd	HOCOA- 26	P.O.Box 1925 Honiara	7458157	Walter Koelau	Bulk Market
17	Lukasco Group	HOCOA- 30	C/- Kira Kira Post Office	7486604 7819148	Lucy Kasimwane	Specialty Market
18	DKFCAC	HOCOA -31	Bethsaida Village North Guadalcanal	7666105	David Kebu Jnr	Specialty Market

Annex 7: Certifications for cocoa products

The information below is compiled from Australian Government initiative Strongim Bisnis, document **"Cocoa Market system Analysis and Sector Strategy"**.

Hazard Analysis Critical Control Point (HACCP):

HACCP is a tool to help businesses identify and control food safety hazards. HACCP Certification recognizes that a business has developed and implemented systems and procedures in accordance with HACCP. Certification is granted by an external certification authority. Most HACCP Certifiers come from Australia.

HACCP Australia (Fiji) Limited has a branch in Fiji which is dedicated to the Fijian marketplace, which may be a future option for Solomon Islands processors. PHAMA has provided support directly to exporters on food safety accreditation (HACCP certification) and organic certification with select businesses.

Organic certification:

NASAA/NCO, **BFA**, **BioGrow**, **EcoCer**t are some of the certifiers that are known to be operating in the region.

NCO is Australia's leading organic certifier – focused on providing quality, cost efficient organic certification services. In addition to domestic accreditation, NCO also holds accreditation under US National Organic Program and Japanese Agricultural Standard. It is not clear if other exporters are using NCO or other organic certification agencies.

Pacific Organic and Ethical Trade Community (Poetcom), developed the 'Pacific Organic Standard' (POS), for the Pacific Region which as of 2011 was seeking equivalence with the European Union's (EU) organic standard, the Australian Organic Standard (AOS), US National Organic Program (NOP-USDA) and Japanese Agricultural Standard (JAS).

Annex 8: Bubble drier and hermetic bags for cocoa beans

Quotation

HONIARA HARDWARE SUPPLIES LTD

P O BOX 174
HONIARA
SOLOMON ISLANDS

Quotation

Number:	162679
Date:	03/10/2019
Ref.#:	
Terms:	
Salesperson	George
Page:	1 / 1

Client

JICA
HONIARA

SOLOMON ISLAND

Delivery

Part Number	Item Details	Qty	Amount $	Total $
SBD Solar-25-1	Bubble Drier SBD25 with Battery	1.00	27000.00	27,000.00
SBD Solar-50-1	Bubble Drier SBD50 with Battery	1.00	35000.00	35,000.00
GrainSafeBag-1.0	GS iii-1, GrainSafe Bag iii For Bagged Grain, 120x120x190cm	1.00	4400.00	4,400.00

Hermetic bag- Grai Pro® advirtise:

Images of the Bubble drier (Cocoa farm- Guadalcanal)

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Japan International Cooperation Agency

Ministry of Forestry and Research
Solomon Islands

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

(SFRM Project)

**Progress Report
on
Community's Organizational Enhancement
for
Komuniboli Community**

August 2021

**Ministry of Forestry and Research, Solomon Islands
Japan International Cooperation Agency**

Table of Contents

List of Abbreviations and Acronyms

C/P	Counterpart personnel
JICA	Japan International Cooperation Agency
MoFR	Ministry of Forestry and Research, Solomon Islands
SFRM	Sustainable Forest Resource Management
SIDT	Solomon Islands Development Trust

1. Introduction

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRM), funded by the Japan International Cooperation Agency (JICA), was initiated in September 2017 in collaboration with the Ministry of Forestry and Research (MoFR) of the Solomon Islands. One of the SFRM Project's pillars is Community-based SFRM Activities (Pilot Activities) that target two communities; i.e. Komuniboli Community of Guadalcanal Province and Falake Community of Malaita Province. In each community, various kinds of activities have been implemented under the two major components of the Forest Management and the Livelihood Improvement (Agroforestry and Other Livelihood Activities sub-components).

During the course of the activity implementation, a need of strengthening the communities' capacity was identified both by the communities and the SFRM Project, and the Project has facilitated the enhancement. This document illustrates the process and progress of the activities carried out so far, therefore in case further achievements are made in future, another version or document shall be compiled.

2. Progress

2.1. Community's organizational structure

As stated in the Community Profiling and Socio-economic Analysis Report compiled by the SFRM Project in July 2020, Komuniboli Community had already formed a community governing system when the socio-economic survey conducted in September 2019. During the survey period, some community members proposed to re-organize the system and a new system called Komuniboli Community Committee was formed to serve as the decision-making and management body of the Project-related issues and activities. The Committee was composed of the Executive Team (6 persons) and Non-executive Committee Members (7 persons) (**Table 1**). At the same time, four sub-committees (Works, Accommodation, Stock, Village Management) were also organized (**Table 2**) although it did not necessarily mean that the Sub-committees shall only deal with the Project related issues. Regarding the selection of the members of the Community Committee and sub-committees, it was assessed that more or less all family groups inside the Community were represented in the current Committee in a balanced manner.

Table 1　List of Community Committee members

Post	Name
Chairperson[1]	Joseph Manengelea
Vice Chairperson	Abraham Manegaua
Treasurer	Mary Tangithia
Vice Treasurer	Elizabeth Mane
Secretary	Philemon Bosamete
Vice Secretary	Belinda Aba
Member	Augustine Geve
Ditto	Moses Pegoa
Ditto	Desmond Tangithia
Ditto	James Tapalia
Ditto	Julia Sam
Ditto	Batistina Saburua
Ditto	Mark Sukulu

Table 2　List of Community Sub-committee members

Sub-committee	Responsible person
Works	Desmond Tangithia, Augustine Geve
Accommodation	Mark Sukulu, Sosimo Kuki (Jr)
Stock	Abraham Manegaua, James Tapalia
Village Management	Moses Pegoa, Joseph Votakema

Another turning point was marked in October 2020 when training on leadership took place upon a request by the community prior to the initiation of the Pilot Activities. The event was organized by the SFRM Project in collaboration with the Solomon Islands Development Trust (SIDT) that dispatched the trainers. During the training, ideal community's organizational structure was discussed by groups such as elderly men, elderly women and youth[2].

After the event, the community and the SFRM Project reviewed the training and had a series of discussions, particularly on the organizational structure. The comments and ideas raised by the community members include:

- The current organizational structure is fragile and does not function effectively;
- The sub-sectors/sub-committees should be well organized;

---

[1] The Chairman of the Committee is the Community Chief.

[2] The training also covered a module on financial management such as cost sharing, revenue distribution and community stock fund.

- A new structure is needed to be organized so that it can more focus on the SFRM Project activities.

Based on the above points, the SFRM Project and MoFR staff facilitated the development of the new organization structure with the representatives of sections such as the Community Committee, sectors, and components (**Figure 1**).

As indicated in the figure, the two components of the SFRM Project are placed under the 'Economic Development Sector'. In case the community will be involved in another project in future, the project activities might be managed under the 'Economic Development Sector'. It should be noted that the scope of the SFRM Project should be limited in the two components (Forest Management and Livelihood Improvement) but not cover another project nor any other activities under the 'Economic Development Sector' as well as the other sectors.

Community Committee

C: Joseph Manengelea
VC: Andrew Thugea
S: Brian A Kali Rengi
T: Abraham Manegaua

Stakeholders

• Government ministries
• NGOs
• Private organizations
• Others

Social Services Sector

C: Mark Sukulu
S: Brian Mane
T: Joseph Evan
M: Coldina Brian
M: Moses Pegoa

Culture and Law Enforcement Sector

C: Joseph Manengelea
S: Moses Thogole
T: Salome Mangengelea
M: Sosimo Junior

Faith Sector

C: James Tapalia
S: Julian Samson
T: Luisa Saburu
M: Eremina Suba
M: Ella Thogole

Economic Development Sector

C: Desmond Tangithia
S: Philemon Bosamete
T: Mary Tangithia
M: Belinda Aba

Women Development Sector

C: Elizabeth Mane
S: Mary Raphaela
T: Tina Saburua
M: Caroline Moses

Youth Development Sector

C: Augustine Geve
S: Alex Moses
T: Loreen Pete
M: Irish Leua
M: Samson Taganepari

JICA SFRM PROJECT

Livelihood Improvement Component

Other Livelihood Improvement Sub-component

C: Philemon Bosamete
S: Loreen Ghaoka
T: Isaiah Paeni

Agroforestry Sub-component

C: Belinda Aba
S: Mary Tangithia
T: Joseph Evan

Forest Management Component

C: Abraham Manegaua
S: Brian Mane
T: Mary Raphaela

Other projects

(*Members are to be determined according to activities*)

COMMUNITY MEMBERS

Figure1: Community organisational structure in Komuniboli

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2.2. Functions of Community Committee, sectors and components

After the re-organization of the community's structure, functions of each section such as Community Committee, sectors and components were also identified and agreed by the community members as below:

Table 3: Functions of Community Committee, sectors and components

Unit			Functions
Community Committee			● Overall responsibilities of issues affecting community ● Find ways to address issues and discipline ● Plan development aspirations of community ● Follow up on community's development plans
	Social Services		● Education ● Health ● Infrastructure ● Communication ● Others
	Culture and Law Enforcement		● Cultural norms ● Historical recording (boundary, genealogy, taboo sites, understanding, etc.) ● Discipline, training, etc.
	Faith		● Faith related issues ● Strengthening activities ● Formal days for church respect
	Economic Development		● Planning ● Procurement ● Implementation ● Management ● Marketing ● Benefit sharing
		Forest Management	● Sustainable harvesting plan ● Conservation ● Plantation
		Livelihood Improvement	
		Agroforestry	● Forest and agricultural crop management
		Other Livelihood	● Activities according to priorities noted
	Women Development		● Women related issues ● Plan formulation
	Youth Development		● Youth related issues ● Plan formulation

2.3. Roles and responsibilities of representatives of Community Committee, sectors and components

Roles and responsibilities of the representatives of the Community Committee, sectors and components were also discussed and agreed by the community members as indicated in the following table:

Table 4: Roles and responsibilities of representatives of Community Committee, sectors and components

Representative	Roles and responsibilities
Chairperson	● Provide coordination, guidance and leadership to smooth running of the Community Committee, sectors or components ● Represent the Community Committee, sectors or components in public spaces ● Ensure administrative tasks are carried out **[Specifically during meetings]** ● Ensure agenda is followed ● Ensure quorum is present for decision making ● Maintain order ● Make sure all members are given opportunity ● Others
Vice chairperson	● Support chairperson ● In case of chairperson's absence, replace the chairperson's roles and responsibilities
Secretary	● Keep record ● Prepare minutes of meetings ● Receive incoming mails ● Write outwards letters/correspondence ● Work with chairperson to arrange meetings ● Others
Treasurer	● Maintain bank account in the name of the Community Committee, sectors or components ● Record and receive banking money ● Pay accounts as authorized by the Community Committee, sectors or components ● Keep invoices, receipts, cheque book, bank statements, etc. ● Report to the Community Committee, sectors or components ● Prepare annual reports ● Sign to bank account
Ordinary members	● Participate actively in activities and meetings ● Look after facilities, carry out plans and prepare reports for activities carried out ● Attend meetings and be part of decision making ● Bring any issues to the Community Committee, sectors or components

Japan International Cooperation Agency

Ministry of Forestry and Research
Solomon Islands

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

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Progress Report
on
Community's Organizational Enhancement
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Falake Community

December 2021

Ministry of Forestry and Research, Solomon Islands
Japan International Cooperation Agency

Table of Contents

List of Abbreviations and Acronyms

APSD RTC	Asia Pacific Sustainable Development Rural Training Centre
C/P	Counterpart personnel
JICA	Japan International Cooperation Agency
MoFR	Ministry of Forestry and Research, Solomon Islands
NGO	Non-governmental organization
SFRM	Sustainable Forest Resource Management

1. Introduction

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRM), funded by the Japan International Cooperation Agency (JICA), was initiated in September 2017 in collaboration with the Ministry of Forestry and Research (MoFR) of the Solomon Islands. One of the SFRM Project's pillars is Community-based SFRM Activities (Pilot Activities) that target two communities; i.e. Komuniboli Community of Guadalcanal Province and Falake Community of Malaita Province. In each community, various kinds of activities have been planned and implemented under the two major components of the Forest Management and the Livelihood Improvement (Agroforestry and Other Livelihood Activities sub-components).

During the course of the activity implementation, a need of strengthening the communities' capacity was identified both by the communities and the SFRM Project, and the Project has facilitated the enhancement. This document illustrates the processes and progress of the activities carried out so far in Falake Community in much the same fashion as done in Komuniboli Community in August 2021, therefore in case further achievements are made in future, another version or document shall be compiled.

2. Progress

2.1. Community's organizational structure

As stated in the Community Profiling and Socio-economic Analysis Report compiled by the SFRM Project in July 2020, Falake Community did not have a distinct organizational structure when the socio-economic survey was initiated in the community in September 2019. At the end of the socio-economic survey, the community members agreed to form Falake Community Committee which would have a decision-making authority for the SFRM Project related issues. The proposed members of the Community Committee included i) Clan representatives (male and female from all four clans), ii) Executives of ADO Rural Farmers' Association[1], iii) Clan chiefs, iv) Church representative(s), v) Women's representative(s), vi) Other representatives including youth and education representatives. The Committee was finally composed of six persons (**Table 1**) and, at the same time, four sub-committees (i.e. Planted Forest, Natural Forest, Agroforestry, Livelihood) were also organized with a total of 22 persons (**Table 2**). All the above-mentioned proposed members were included in the Committee and Sub-committees structure.

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[1] As ADO Rural Farmers' Association is an influential organization in the community, the outline is depicted in **Appendix 1**.

Table 1   List of Community Committee members

Post	Name
Chairperson	Constantine Etemani
Vice Chairperson	Maria Annie
Secretary	Joachim Lamusi
Vice Secretary	Jerry Loft Itea
Treasurer	Nelly Urufaka
Vice Treasurer	Hendry Kwateana

Table 2   List of Community Sub-committee members

Sub-committee	Post	Name
Planted Forest	Chairperson	Gabriel Kalafiu
	Vice Chairperson	Casper Suru
	Secretary	Alda Kofasia
	Treasurer	Loveness Itea
	Vice Treasurer	Godrick Malagela
Natural Forest	Chairperson	Raymond Kalafiu
	Vice Chairperson	Ambrose Ometa
	Secretary	Hellina Lodo
	Treasurer	Freda Kwaiorea
	Member	Patrick Agote'emae
	Member	Nicholas Maeoa
Agroforestry	Chairperson	Charles Kofasia
	Vice Chairperson	Benjamin Arurumae
	Secretary	John Bosco Kwasu
	Treasurer	Cathy Tahelia
	Vice Treasurer	Ferdinal Kwaifi
Livelihood	Chairperson	Stanley Kwaifi
	Secretary	Pius Itea
	Treasurer	Elsie Kofasia
	Member	Stanley Gae
	Member	Jacinto Ramo
	Member	Blaise Kofasia

Another turning point was marked in October 2020 when training on leadership took place upon a request by the community prior to the initiation of the Pilot Activities. The event was organized by the SFRM Project in collaboration with the Asia Pacific Sustainable Development

Rural Training Centre (APSD RTC), Malaita Province that dispatched the trainer. During the training, ideal community's organizational structure was discussed by groups such as elderly men, elderly women and youth[2].

After the event, the community and the SFRM Project reviewed the training and had a series of discussions, particularly on the organizational structure. The comments and ideas raised by the community members included:

- The current organizational structure is fragile and does not function effectively;
- The sub-sectors/sub-committees should be well organized;
- A new structure is needed to be organized so that it can more focus on the SFRM Project activities.

Based on the above points, the SFRM Project and MoFR staff facilitated the development of the new organizational structure with the representatives of sections such as the Community Committee, sectors, and components (**Figure 1**).

As indicated in the figure, the two components of the SFRM Project are placed under the 'Economic Development Sector'. In case the community will be involved in other projects in future, the project activities might be managed by the 'Economic Development Sector'. It should be noted that the scope of the SFRM Project should be limited in the two components (Forest Management and Livelihood Improvement) but not cover any other projects nor any other activities under the 'Economic Development Sector' as well as the other sectors.

---

[2] The training also covered a module on financial management such as cost sharing, revenue distribution and community stock fund.

Community Committee

C: Constantine Etemani
VC: Jerry Loft Itea
S: John Bosco Kwasu
VS: Faustina Lome
T: Joachim Lamusi
VT: Maria Annie

Stakeholders

• Government ministries
• NGOs
• Private organizations
• Others

Social Services Development Sector

C: Rocksy Kalafiu
S: Blaise Kofasia
T: Jenny Asi
M: Paul Kwateana
M: Faustina Lome
M: Martin Belo

Culture and Law Enforcement Sector

C: Hendry Kwateana
S: Raymond Kalafiu
T: Peter Kwaiorea
M: Ambrose Ometa

Faith Sector

C: Charles Kofasia
S: Augustine Adomea
T: Russel Lome

Economic Development Sector

C: Benjamin Arurumae
S: Pius Itea
T: Nicholas Maeoa
M: Gabriel Kalafiu

Women Development Sector

C: Elsie Kofasia
S: Hellina Lodo
T: Freda Kwaiorea
M: Rose Itea
M: Flory Kwateana
M: Happilyn Kobira

Youth Development Sector

C: Clinton Adomea
S: Wilson Futaburi
T: Brenda Kalafiu

JICA SFRM PROJECT

Livelihood Improvement Component

Forest Management Component

Other projects

(*Members are to be determined according to activities*)

Other Livelihood Improvement Sub-component

C: Stanley Kwaifi
S: Pius Itea
T: Elsie Kofasia
M: Stanley Gae
M: Jacinta Ramo

Agroforestry Sub-component

C: Charles Kofasia
VC: Benjamin Arurumae
S: John Bosco Kwasu
T: Cathy Tahelia
VT: Ferdinal Kwaifi

Planted Forest Sub-component

C: Gabriel Kalafiu
VC: Casper Suru
S: Alda Kofasia
T: Loveness Itea
VT: Godrick Malagela

Natural Forest Sub-component

C: Raymond Kalafiu
VC: Ambrose Ometa
S: Hellina Lodo
T: Freda Kwaiorea
VT: Nicholas Maeoa

COMMUNITY MEMBERS

Figure1: Community organizational structure in Falake

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2.2. Functions of Community Committee, sectors and components

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	Faith		● Faith related issues ● Strengthening activities ● Formal days for church respect
	Economic Development		● Planning ● Procurement ● Implementation ● Management ● Marketing ● Benefit sharing ● Evaluation
		Forest Management	● Sustainable harvesting plan ● Conservation ● Plantation
		Livelihood Improvement	
		Agroforestry	● Forestry and agricultural crop management
		Other Livelihood	● Activities according to priorities noted
	Women Development		● Women related issues ● Plan formulation
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Vice chairperson	● Support chairperson ● In case of chairperson's absence, replace the chairperson's roles and responsibilities
Secretary	● Keep record ● Prepare minutes of meetings ● Receive incoming mails ● Write outwards letters/correspondence ● Work with chairperson to arrange meetings ● Others
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Ordinary members	● Participate actively in activities and meetings ● Look after facilities, carry out plans and prepare reports for activities carried out ● Attend meetings and be part of decision making ● Bring any issues to the Community Committee, sectors or components

2.4. Review of community organizational structure related issues

During the course of the implementation, the community faced challenges such as low participation ratio in the project activities and misunderstanding of functions of the sectional representatives and so forth. To cope with the situations, the SFRM Project suggested review of organizational structure related issues including functions of sections, and roles and responsibilities of sectional representatives. The review sessions were conducted from November 2021 to December 2021 and the outcomes are summarised as below:

Results

Group discussions

Appendix 1   Outline of ADO Rural Farmers' Association

1 Foundation

In 2013, Mr Ronnie Aiwewe, the current Chief Forest Officer of Malaita Forestry Office (MoFR), supported community members to form an organization by a workshop and then it was formally registered.

2 Organizational structure

1) Executive Committee structure

- Chairman: Pius Itea (Gae Clan)
- Vice-Chairman: Charles Kofasia (Anita'a Clan, Community's catechista)
- Secretary: Martin Kalafiu (Gae Clan)
- Treasurer: Nicholas (Arurumae Clan)
- Committee member: Andrew Itea (Arurumae Clan)

Note: Since the start of ADO, no change except for Andrew Itea's participation in the Committee's members in 2018.

2) Executive Committee meeting

- The Executive Committee members meet once a month.
- No particular meeting set for other members.

3) Membership

- As of September 2019, a total number of membership is 45.
- Any person who planted 100[3] or more trees of any kind (with membership payment) is accepted as a member.

3 Activities

1) Tree planting

Voluntary-based tree planting.

2) Nursery

Members and non-members can purchase from the nursery. Seeds are provided by MoFR (free of charge, as ADO is a registered association). ADO sells the seedlings for SBD 2/seedling.

3) Furniture making

This activity was initiated in 2014 and the members has produced some kinds of furniture such as chairs, dining tables, food shelf and so on but it has not been very profitable.
Furniture making training was delivered by the SFRM Project in July 2021 in order to revitalize the activity[4].

4) Saving

Saving service was set off in 2020 under the scheme of UNITRUST. A credit service has yet to be delivered.

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[3] According to the Gender Analysis Survey conducted by the SFRM Project, the number of trees is reportedly 1,000 so this number should be double-checked later.

[4] The participants of the training and actual furniture making activity might include non-members of ADO.

添付資料 24 養豚のレビュー結果

	レビュー項目	設問	回答・コメント等 コミュニぶり	回答・コメント等 フィラケ
1	目的	当活動の当初の目的は何か？	●収入の創出 ●雇用の創出 ●改良品種の飼育、豚舎、給餌等に係る知見の習得 ●高品質豚肉のコミュニティ及び市場への供給 ●アグロフォレストリーサイトへの肥料の供給及び土壌肥沃度の向上（土壌改良） ●同じ豚舎での肥育豚及び繁殖豚の飼育（一貫経営） ●儀式（結納、葬式、補償）のための豚肉生産 ●社会的地位の維持（饗宴等） ●自家消費 ●コミュニティの財産 ●ガダルカナル州の養豚振興への貢献	●収入の創出 ●食肉の供給 ●改良品種へのアクセス ●学校中退者への雇用の提供 ●農業への肥料の共有 ●アグロフォレストリーサイトへの肥料の供給 ●商業アプローチによる養豚のための能力向上 ●世帯への子豚の供給 ●回転基金の創設 ●利益の分配 ●森林資源利用への圧力の軽減
		当初の目的は現在でも適切か？その他の目的があるか？	●マーケティング手法（収穫後処理及び加工技術） ●回転基金の創設	●コミュニティの子供達への活動から「見て学ぶ」機会の提供 ●コミュニティのキャッシュフローの創出／増大 ●女性への活動に参加・関与する手段を提供 ●これまで実践されたことのなかった協働の環境の醸成 ●コミュニティ内のメンバー間の結束強化及び近隣コミュニティとの関係強化 ●活動を通じてのジェンダー平等に関する教育の機会の提供
		当活動の将来の目的はどのようなものか？	●バイオガス開発、バイオ炭開発、養殖開発	●バイオガス開発 ●近隣のコミュニティへの養豚の普及に貢献するための研修目的の施設を農業・畜産省と共同で設立
2	妥当性	当活動は、目的を達成するために適切であるか？	●適切	●適切
		もしそうでなければ、その他の適切な活動があるか？	●（特に意見なし）	●（特に意見なし）
3	成果	活動の時間配分及び工程は効率的であったか？	●その他の活動時間（家庭、学校関連行事、信教、その他プロジェクト活動等）との重複が重荷になった。	●活動時間の配分は適切だった。
		活動の実施に係る手法（ツール、アプローチ等）は適切であったか？	●概ね適切	●研修は適切だったが、安全管理に係る用具類が不足している。また、現在の施設（畜舎）は、白色品種には適していない（病気の蔓延を防止するため、豚

No.	項目	質問	調査結果	所見
		活動はコミュニティのベストプラクティス（平等性、文化、ジェンダー等）の原則によって実施されたか？	●コミュニティ内の老若男女、健常者・障がい者を問わず活動に参加できている。	舎の壁は木材ではなく、金属製であるべき） ●
		活動に係る情報は、参加者内、またIGメンバーとその他のコミュニティ間でどの程度共有／交換されたか？	●活動のことを聞きつけ、他コミュニティから訪問した人々と情報の共有を行った経験がある。 ●コミュニティ内においても、子供を含め、技術の共有が行われた。	●
		どのような問題点や制約要因が生じたか？	●晴天が続いた際の水不足 ●安全用具の不足 ●豚の世話当番の欠席 ●豚舎拡張の遅れ（床打設、仕切り壁等） ●掛け売りによる売り上げ回収の不徹底 ●給餌スケジュールの不徹底 ●飼料不足 ●害獣（ネズミ）・害虫（ゾウムシ）による飼料の食害	●豚の世話当番の無断欠席 ●飼料の配合割合を把握していないIGメンバーの存在 ●給餌スケジュールの不徹底 ●豚の死亡による士気の低下
		問題点や制約要因に対してどのように対処・解決したか？	●井戸からの水の運搬 ●手足の洗浄 ●監督者による当番の調整 ●豚肉代未払い者の告知及び森林管理の資金からの未回収代金の補填 ●代替飼料の活用 ●害獣・害虫の物理的駆除、毒餌の使用、罠の設置	●監督者による世話当番の調整・肩代わり ●監督者による飼料配合の肩代わり ●給餌スケジュールの重要性の啓発 ●見張り小屋の健設
		将来的に活動の成果を上げるために、どのような改善点が必要か？	●水供給システムの刷新（太陽光、或いは発電機の電源を活用したポンプの設置） ●安全用具の購入（長靴、手袋、作業着） ●雑菌剤・防腐剤、洗浄ブラシ等） ●管理規約の遵守 ●豚舎拡張工事への呼び掛け及び養豚資金の活用 ●掛け売りの禁止（管理規約にも記載） ●飼料の事前注文 ●ネズミ耐性の独立した飼料保管倉庫の建設	●IGメンバーと監督者との連携 ●管理規約の遵守
		期待された成果はどの程度達成されたか？もし達成されていない場合、その理由は何か？	●活動の実施期間が短かったため、目的の達成には更に2、3年が必要。	●ある程度の成果は達成 ●目的の達成には、最低でも2、3年が必要
4	有効性	活動参加者に対する研修はどの程度成果が上がったか？	●十分な成果あり	●十分な成果あり

No.	評価項目	評価設問		
		活動を更に効果的にするために、必要な研修はあるか？もしあるなら、どのような研修分野か？	●会計 ●統合的農耕システム ●バイオガス ●養殖 ●食肉解体・加工 ●家畜栄養学 ●排泄物処理	●排泄物処理 ●食肉加工 ●バイオガス ●マネジメント ●飼料製造（ローカルの材料使用）
		活動に係る費用は、達成された成果に対して適切なレベルだったか？	●豚舎建設用の金物、子豚、飼料等をプロジェクトから供与したものの、これらの資材費が高騰していることから、費用対効果について高いとは言えない。	●IGメンバーの参加や貢献（自己負担）があったため、ある程度の費用対効果があった。
5	効率性（費用対効果）	より低コストで、同じ成果を達成することが可能であるか？もしそうであれば、何がなされるべきか？	●（特に意見なし）	●資材価格が変動するため不可能
		政府のプロジェクト／プログラムを利用したり、独自の予算で実施するなどして、活動を再現することは現実的か？	●仮に政府のプロジェクトがあれば、基準を満たすことで再現することは可能。 ●独自の予算で再現することも可能。	●政府のプロジェクト等の仕組み／優先度は、コミュニティの素質を超えているため、活動を再現できる見込みは低い。 ●他コミュニティへの活動の普及に関心を持っているが、能力が不足している。 ●農業・畜産省との正式な合意に基づき、活動を再現することは可能。
		ソロモン政府の政策等に変化があったか？	●情報を持ち合わせていない	●情報を持ち合わせていない
6	外部要因	社会経済的な変化が生じたか？	●Covid-19による社会経済的分断 ●豪雨及び洪水による道路・橋梁の被害 ●不安定なコミュニケーション手段（携帯電話）	●Covid-19による影響（技術研修、資材調達、その他活動に係る日程及びマーケティング）
		ドナー（JICA）の政策・実行方式に変化があったか？	●情報を持ち合わせていない	●情報を持ち合わせていない

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

Management Rules and Regulations
on
Pig Farming
in
Komuniboli Community

July 2022

Komuniboli Community, Aola Ward, East Central Guadalcanal Constituency,
Guadalcanal Province

MANAGEMENT RULES AND REGULATIONS
ON
PIG FARMING IN KOMUNIBOLI COMMUNITY

This Management Rules and Regulation on Pig Farming were developed through series of discussions amongst the stakeholders such as the Pig Farming Interest Group (IG) representatives and members, and the staff members of the JICA's Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRM Project), and were agreed by all the Pig Farming IG members of Komuniboli Community.

1. BACKGROUND

In August 2020, pig farming was selected as the first activity under the sub-component of the Other Livelihood Activities by the mutual consent between Komuniboli Community and the SFRM Project, with the aim to contribute to the promotion of sustainable forest resource management. Technical training was delivered in November 2020 in collaboration with the Livestock Production and Veterinary Services Department, Ministry of Agriculture and Livestock (MOAL), followed by organisation of the IG with all the 25 households in the community. The Project provided the IG with construction materials for pig house in September and October 2021, and 11 heads of pigs (one boar and ten piglets) and feed in October 2021 (**Appendix 1**).

In April 2022, as the Project was approaching to its end of August 2022, the Project proposed preparing this management rules and regulation so that this activity of pig farming should be managed in a sustainable way by the initiatives of the IG members. Several meetings were organised between the IG members and the Project staff, and various issues were discussed. The results of the discussions were summarised as the management rules and regulations stated below:

2. MANAGEMENT STRUCTURE

The Pig Farming IG committee was newly established. The representatives and their roles and responsibilities are determined as follows:

	Post	Name	Role and responsibility
1)	Chairperson	Mr. Philemon Bosamete	● Provide coordination, guidance and leadership to smooth running of the Pig Farming IG committee. ● Represent the Pig Farming IG committee in public spaces. ● Ensure administrative tasks are carried out. ● Monitoring **[Specifically during meetings]** ● Ensure agenda is followed ● Ensure quorum is present for decision making ● Maintain order ● Make sure all members are given opportunity ● Reporting to the main Community Committee and Pig Farm IG.
2)	Secretary	Mr. Peter Mods	● Keep record ● Prepare minutes of meetings ● Receive incoming mails ● Write outwards letters/correspondence ● Work with chairperson to arrange meetings

3)	Treasurer	Ms. Elizabeth Mane	- Maintain bank account in the name of the Pig Farming IG committee to be opened in the future. - Do banking (deposits, withdrawals, reconciling) as and when necessary. - Pay accounts as authorized by the Pig Farming IG committee and Pig Farming IG. - Keep invoices, receipts, cheque book, bank statements, etc. - Report to the Community Committee, sectors or components in meetings. - Prepare monthly and annual financial reports. - Sign to bank account as one of the signatories. - Responsible for petty cash according to the directive from the Pig Farming IG committee.
4)	Ordinary members	All the Pig Farming IG members	- Participate actively in activities and meetings. - Look after facilities and carry out activity plans. - Attend meetings and be part of decision making. - Bring any issues to the Pig Farming IG committee and Pig Farming IG members.

The term of the Pig Farming IG committee members is 2 years. After the 2 years term, review and evaluation of the current IG committee members shall be carried out. Based on performance, new IG committee members shall be selected and nominated by the agreement of all the IG members. In case that any IG committee member needs to resign or to be replaced during the term, a plenary meeting with all the IG members shall be organised to discuss and agree with the replacement. A formal resignation letter must be forwarded to the Community Committee Chairman.

3. NEW MEMBERSHIP FOR IG MEMBER

The criteria may come in different cases e.g. a daughter of an IG member get married and form a new household or a returning family member who decide to return to the community.
Other Livelihood Improvement Sub-component Committee prepare a questionnaire to assess a new member.

4. DAY-TO-DAY MANAGEMENT OF PIG FARMING

As far as pig farming is practised collectively by all the Pig Farming IG members or households, the daily management should properly be shared by all the Pig Farming IG members as follows:

1) Monthly schedule preparation
The chairperson of Pig Farming IG is to create participation monthly schedule by the third week of the previous month.

2) Notification on absence
Pig Farming IG member have to make prior arrangement two days before absence from scheduled activities or commitment. In case of any emergency absence, the IG member has to immediately inform the IG chairperson or IG member in charge.

3) Actual work
The IG members should faithfully perform the following expected activities:
- Feeding of all the pigs available in the IG pig house.
- Cleaning in and around the pig house.
- Making sure clean water is available at all times.
- Observe and follow scheduled time.

- Properly dispose Pig manure/waste at right place.
- Wash hand and feet before and after feeding and handling of pigs.
- Wear safety and protective gears (e.g. overall, gum boot, hand gloves, etc.) and when necessary disinfect the pig house.
- Monitor feedstock and report to Pig Farming IG committee.
- Provide security for pigs and when necessary e.g. during farrowing or delivery of piglets.
- Report any situation that threatens the health, quality, condition and quantity of pigs to the Chairperson or any appointed IG member by the Chairperson of Pig Farming IG members.

4) Disciplinary measures

In case a Pig Farming IG member fails to perform the day-to-day activities;
- For the first time, the chairperson must advice the member.
- For the second time, ask the member if she/he is still interested or not.
  - ➤ If she/he is still interested, the chairperson must strongly advice.
  - ➤ If she/he is no longer interested, the IG member self terminates.
- For the third time, there should be a mutual consultation between IG member and Pig Farming IG committee, the IG member self terminates.

5. BUSINESS PLAN

A business plan should be prepared in order to make a policy on business development of pig farming clear as well as to secure transparency of the policy.

1) Contents

The business plan includes actions, schedule per action, income, expenditure and balance. The latest Business Plan (**Appendix 2**) was developed and agreed upon the mutual discussions by all the Pig Farming IG members.

2) Review and modification

The business plan should be reviewed and modified every 3 months. In case that any issues arise and modification of the business plan is needed before the regular review and modification, the IG chairperson can call an IG plenary meeting to discuss the issues.

6. SALES

Sales should strictly be made following the management plan. Sale on credit should never be applied for whatever reason.

7. REVOLVING FUND

Although there is no specific plan of introducing a revolving system for pig farming, the Pig Farming IG members share potential of developing the system in future so that all the IG members can practise pig farming by each household and make benefit from the activity.

The detailed plan for the revolving system as well as the revolving fund should be determined under the mutual discussions among the IG members.

8. MONITORING AND GENERAL IG MEETINGS

1) Monitoring

Monitoring of pig farming and its management will be conducted with the following two major purposes:

- To check progress of the activities through periodical and continual data collection; and
- To correct the plan through examination of constraints and taking countermeasures to proceed with the activities effectively.

Monitoring on production will be conducted in terms of day-to-day activities, weight gain (fortnightly) and mating (breeding plans/schedules) by the IG members on duty and overseen by the chairperson. Meanwhile the financial status will be monitored each day when any transaction takes place by the Chairperson of the Pig Farming IG committee. The existing monitoring formats for some items should be used but for those no existing format available shall be developed by the Chairperson of the committee. The results of the monitoring should be recorded and sorted out by the Secretary of the IG committee for reporting purposes.

2) General IG meetings

Reporting will be conducted in a way to organise general IG meetings every 3 months. The Chairperson and the Secretary of the IG committee organise the general IG meetings.
In the meetings, the following agenda will be discussed:
- Review of the minutes of the last general IG meetings
- Monitoring results;
- Review of business plan;
- Auditing in income, expenditure and balance; and
- Any other business (AOB)

9. MODIFICATION OF RULES AND REGULATIONS

The current Management Rules and Regulations can only be modified with the following procedures:

i) The Chairperson of the Pig Farming IG committee call a co-ordination meeting;
ii) Participation (quorum) ratio of the Pig Farming IG members to the co-ordination meeting should be more than 80%;
iii) The draft of the modification plan should be agreed with more than 80% of the participating Pig Farming IG members of the co-ordination meeting;
iv) The revised version of the Management Rules and Regulations should be prepared within two weeks by the responsibility of the Chairperson and should be confirmed by all the Pig Farming IG members at the next general IG meeting.

10. TERMINATION OF PIG FARMING

In case the pig farming activity faces difficulties and challenges due to management, marketing, rising costs and other uncontrolled reasons and situation, and/or the another potential activity is identified, then the activity can be terminated following these procedures:
- The chairperson of the Pig Farming IG committee calls for a general IG meeting. Participation (quorum) ratio of the Pig Farming IG members should be more than 80%;
- The chairperson raises the issue for the termination and the Pig Farming IG members thoroughly discuss and come to a common agreement.
- In case a common agreement is not reached, an open voting will be conducted to reach a common agreement.

- Once a common agreement is reached, the information will be shared to the Other Livelihood Improvement sub-component, all the sectors, the community committee and other authorities related.

Signatory

Date: 19th July 2022

Pig Farming IG Committee

Mr. Philemon Bosamete Chairperson	Mr. Peter Mods Secretary	Ms. Elizabeth Mane Treasurer

Sector representative   *Community representative*

Mr. Desmond Tangithia Chairperson Economic Development Sector	Mr. Joseph Manengelea Chairperson Community Committee

Witness   *Witness*

Mr. Eric Kwaria Chairperson, Technical Support Committee (TSC), SFRM Project (Chief Forest Officer, Reforestation Division, MOFR)	Mr. Hearley Atupule Deputy Director Dep't of Livestock Production and Veterinary Services MOAL

Agreement by IG members

	Name		Signature
	Head of HH	Signer	
1			
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Appendix 1: List of materials provided by the SFRM Project

Category	Item	Unit cost	Qty	Sub-total
Pig house construction	Pig nipple drinker	$69.50	12	$834.00
	Tee: Nylon Olive (Brass)	$66.50	5	$332.50
	Brass female threaded elbow	$30.50	1	$30.50
	Coupling: Dux (10mm)	$47.00	1	$47.00
	Cone ring and nut: Dux (10mm)	$29.50	10	$295.00
	Cement	$79.00	30	$2,370.00
	30m Black plastic (4m wide)	$17.50	30	$525.00
	4' x 24 gauge zinc flat iron (3' wide)	$82.00	7	$574.00
	Jolt head nail (5')	$18.00	10	$180.00
	Jolt head nail (4')	$18.00	10	$180.00
	Jolt head nail (3')	$18.00	10	$180.00
	kg 1' x galvanised flat jolt head nail	$29.00	1	$29.00
	20L plastic container	$155.00	6	$930.00
	External bracket	$26.00	20	$520.00
Water supply system	Poly Met Tee 16mm PE	$60.00	1	$60.00
	Poly Pipe 16mm coil 1m	$7.00	15	$105.00
	White sealing tape 12mm x10m	$8.00	1	$8.00
	POLY MET TEE PEFI 16 x16mm	$80.00	7	$560.00
	POLY MET ENDCON PEFI 16 x16mm	$40.00	5	$200.00
	Pressure Pipe 15mm SI PN15 SCJ	$30.00	1	$30.00
	Stop Tap Brass T-Head 15MM MIXFI	$130.00	1	$130.00
	PVC Cement Glue for Pipe (Type P) 250M	$90.00	1	$90.00
	Priming Fluid 250ML Clear A6015 PROTEK	$60.00	1	$60.00
	CAT18 FAUCET SOCKET 15mm	$10.00	1	$10.00
	Pressure Pipe 80mm S1 PN12 SCJ	$440.00	4	$1,760.00
	STORMCLOUD GUTTER 5m	$700.00	4	$2,800.00
	ERA RAIN GUTTER JOINER	$10.00	2	$20.00
	ERA RAIN GUTTER END CAP	$10.00	4	$40.00
	ERA RAINGUTTER TEE OUTLET W/RUB GAS	$40.00	2	$80.00
	Plastic Container White 20L	$155.00	6	$930.00
	External Bracket (for gutter)	$26.00	20	$520.00
Pig feed	Millrun (40kg)	$120.00	42	$5,040.00
	Copra mill (20kg)	$55.00	34	$1,870.00
	Fish mill (25kg)	$187.00	11	$2,057.00
	Premix growaid (1.75kg)	$200.00	1	$200.00
	Premix breeder (1.75gk)	$200.00	1	$200.00
Pigs	Piglets	$1,200.00	10	$12,000.00
	Boar	$1,500.00	1	$1,500.00
Transport hire	2-ton truck	$800.00	1	$800.00
	3-ton truck	$1,200.00	1	$1,200.00
				$39,297.00

Appendix 2: Business Plan

#	Action	Person in charge	4 (1)	4 (2)	4 (3)	4 (4)	5 (1)	5 (2)	5 (3)	5 (4)	6 (1)	6 (2)	6 (3)	6 (4)	7 (1)	7 (2)	7 (3)	7 (4)	8 (1)	8 (2)	8 (3)	8 (4)	9 (1)	9 (2)	9 (3)	9 (4)	10 (1)	10 (2)	10 (3)	10 (4)	11 (1)	11 (2)	11 (3)	11 (4)	12 (1)	12 (2)	12 (3)	12 (4)
1	Mating sow (#883) with boar (#881)				20																																	
2	Mating sow (#884) with boar (#881)							8																														
3	Mating sow (#885) with boar (#881)							13																														
4	Mating sow (#xxx) with boar (#881)									24																												
5	Confirmation of pregnancy of sow (#883)						11																															
6	Confirmation of pregnancy of sow (#884)											20																										
7	Confirmation of pregnancy of sow (#885)										3																											
8	Confirmation of pregnancy of sow (#xxx)											13																										
9	Gestation of sow (#883)				█	█	█	█	█	█	█	█	█	█	█	█	█	█	9																			
10	Gestation of sow (#884)						█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	20														
11	Gestation of sow (#885)							█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	2															
12	Gestation of sow (#XXX)									█	█	█	█	█	█	█	█	█	█	█	█	█	█	14														
13	Construction of farrowing pen														█	█	█	█																				
14	Lactation of sow (#883)																		█	█	█	█																
15	Lactation of sow (#884)																					█	█	█	█													
16	Lactation of sow (#885)																					█	█	█														
17	Lactation of sow (#XXX)																						█	█	█													
18	Market Research for Piglet sales	Elizabeth J and Belinda A													█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█								
19	Sell half of litter (8) of sow (#883)																											█	█									
20	Sell half of litter (8) of sow (#884)																															█	█					
21	Sell all 8 piglets of sow (#885)																														█	█						
22	Sell 6 of litter (8) of sow (#xxx)																															█	█					
23	Market research for 1 gilt	Elizabeth J and Belinda A														█	█	█																				
24	Sales of 1 gilt															█	█	█																				
25	Purchase of feed for 10 weaners and 6 adult pigs																							█	█							█	█					
26	Fattening of 10 weaners																										█	█	█	█	█	█	█	█	█	█	█	█
27																																						
28																																						
29																																						
30																																						

		4	5	6	7	8	9	10	11	12
Income	Amt				4,500.0			8,400	7,800	
	Item							12 piglets	10 piglets	
Expenditure	Amt						2000	0	400	3000
	Item						Feed		Transport and Allowance	Feed
Balance	Amt			5,089.50	9,589.50		7,589.5	15,990	23,390	20,390

8

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

Management Rules and Regulations
on
Pig Farming
in
Falake Community

July 2022

Falake Community, Ward 4, West Kwara'ae, Malaita Province,
Solomon Islands.

MANAGEMENT RULES AND REGULATIONS
ON
PIG FARMING IN FALAKE COMMUNITY

This Management Rules and Regulation on of Pig Farming were developed through series of discussions amongst the stakeholders such as the Pig Farming Interest Group (IG) representatives and members, and the staff members of the JICA's Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRM Project), and were agreed by all the Pig Farming IG members of Falake Community.

1. BACKGROUND

In August 2020, pig farming was selected as the first activity under the sub-component of the Other Livelihood Activities by the mutual consent between Falake Community and the SFRM Project, with the aim to contribute to the promotion of sustainable forest resource management. Technical training was delivered in November and December 2020 in collaboration with the Department of Livestock Production and Veterinary Services, Ministry of Agriculture and Livestock (MOAL), followed by organisation of the IG with all the 49 households in the community. The Project provided the IG with construction materials for pig house in June 2021; and materials for water supply system and 12 heads of pigs (one boar and 11 piglets) and feed in August 2021 (**Appendix 1**).

In April 2022, as the Project was approaching to its end of August 2022, the Project proposed preparing this management rules and regulation so that this activity of pig farming should be managed in a sustainable way by the initiatives of the IG members. Several meetings were organised between the IG members and the Project staff, and various issues were discussed. The results of the discussions were summarised as the management rules and regulations stated below:

2. MANAGEMENT STRUCTURE

The Pig Farming IG belongs to the Other Livelihood Activities Sub-component so its committee members should be responsible to manage all the activities. Their roles and responsibilities particularly for pig farming are determined as follows:

	Post	Name	Role and responsibility
1)	Chairperson	Mr. Stanley Kwaifi'i	● Provide coordination, guidance and leadership to smooth running of the Community Committee, sectors or components ● Represent the Community Committee, sectors or components in public spaces ● Ensure administrative tasks are carried out ● Monthly reporting **[Specifically during meetings]** ● Ensure agenda is followed ● Ensure quorum is present for decision making ● Maintain order ● Make sure all members are given opportunity
2)	Secretary	Mr. Pius Itea	● Keep record ● Prepare minutes of meetings ● Receive incoming mails ● Write outwards letters/correspondence

			• Work with chairperson to arrange meeting • Organise monthly monitoring report.
3)	Treasurer	Mrs. Elsie Kofasia	• Maintain bank account in the name of the pig farming IG that will be opened in the future. • Make deposits to and withdrawals from pig farming account • Sign to bank account • Prepare and sign any payments voucher authorized by the chairman of the Other Livelihood Improvement sub-component and Community Committee • Keep invoices, receipts, cheque books, petty cash, bank statements and bank reconciliation statements. • Report to the pig farming IG members, chairman of the Other Livelihood Improvement sub-component and Community Committee. • Prepare monthly, quarterly and annual financial reports.
4)	Member	Mr. Gerard Gale	• Prepare daily duty roster for IG members and assignment of weekly supervisors. • Monitoring of the participation and performance of the IG members and weekly supervisors.
5)	Member	Mr. Jacinto Ramo	• Look after facilities, carry out monitoring of plans and prepare reports for activities carried out. • Attend meetings and be part of decision making. • Bring any issues to the Community Committee, sectors, components and sub-components.

In order to facilitate more effective management of pig farming, the IG members are planning to organise its own committee and the representatives of the current management structure might be changed. Only IG members will be eligible to be IG committee members.

The term of the pig farming IG committee members is two years. After the term, new IG committee members shall be selected and nominated by the agreement of all the IG members or not less than 80% of all the IG members. The IG members shall nominate, vote and finalise new IG committee members two month before the two years term laps. In case that any IG committee member needs to resign or to be replaced during the term, a plenary meeting with all the IG members shall be organised to discuss and agree with the replacement.

3. NEW MEMBERSHIP FOR IG MEMBER

For the community members who are inactive or return to the community from other areas and decide to become an IG member will take three years. This gives time for the intended IG member to involve in and familiarize with the community activities.

4. DAY-TO-DAY MANAGEMENT OF PIG FARMING

As far as pig farming is practised collectively by all the IG members or households, the daily management should properly be shared by all the IG members as below:

1) Preparation of daily duty roster

The committee members of Pig Farming IG committee is to create weekly daily duty roster.

2) Notification on absence

The IG members have to make prior arrangement one week before absence from scheduled activities. In case of any sudden event or incident (death and marriage) that may arise concerning the household

of the IG member, the IG member must inform the weekly supervisor responsible two days earlier. The IG member is also responsible to arrange for an IG member to the current weekly daily duty roster for his/her replacement.

3) Actual duty

The IG members who are on the daily duty roster should faithfully perform the following expected activities:

- Feed the piglets;
- Clean in and around the fence;
- Make sure of water is available at all times;
- Observe scheduled time;
- Properly dispose pig manure/waste at right place;
- Wash hands and feet with detergent before entering into the pig house and feeding pigs;
- Wear safety gear (e.g. gum boot, hand gloves, etc.);
- Report any situation that threatens the health, quality, condition, quantity of pigs to the weekly supervisor; and
- Make sure that the other community members and outsiders who are not on the daily duty roster should not enter into the pig house unless authorized by the Other Livelihood Improvement sub-component chairperson.

4) Disciplinary measures

In case any IG members fails to perform the above activities,

- And/or is absent for the first time, the IG member is given a verbal warning by the weekly supervisor;
- And/or is absent for the second time, the IG member is given a written warning by the weekly supervisor and the record shall be noted in the supervisor's weekly report;
- And/or is absent for the third time, the IG member will be terminated from pig farming IG membership. This decision will be made by the Other Livelihood Improvement sub-component and the main community committees; and
- The IG member must comply through participation in community activities for one year to be reinstated as an IG member.

5. BUSINESS PLAN

A business plan should be prepared in order to make a policy on business development of pig farming clear as well as to secure transparency of the policy.

1) Contents

The business plan includes actions, schedule per action, income, expenditure and balance. The latest Business Plan (**Appendix 2**) was developed and agreed upon the mutual discussions by all the IG members.

2) Review and modification

The business plan should be reviewed and modified at the IG member meetings every three months. In case that any issues arise and modification of the business plan is needed before the regular review and modification, the IG chairperson can call an IG member meeting to discuss the issues.

6. SALES

- Sales should strictly be made following the management plan;
- Sale on credit should never be applied for whatever reason to non IG members; and
- In case IG members wish to buy on credit, the person must deposit 10% of the total cost and will be given one week to settle the payment. If the person on credit does not abide by the timeframe, he/she is liable to pay 10% of the total cost as interest every week.

7. REVOLVING FUND

Although there is no specific plan of introducing a revolving system for pig farming, the IG members share potential of developing the system in future so that all the IG members can practise pig farming by each household and make benefit from the activity. The detailed plan for the revolving system as well as the revolving fund should be determined under the mutual discussions among the IG members.

8. MONITORING AND REPORTING

1) Monitoring

Monitoring of pig farming and its management will be conducted with the following two major purposes:

- To check progress of the activities through periodical and continual data collection; and
- To correct the plan through examination of constraints and taking countermeasures to proceed with the activities effectively.

The Secretary and members of the IG committee organise the monitoring. Actual monitoring will be conducted both weekly and monthly by the weekly supervisors with two kinds of monitoring formats (weekly and monthly). The results of the monitoring should be recorded and sorted out by the Secretary of the IG committee and report to the Chairman of the IG committee.

2) Reporting

Reporting will be conducted in a way to organise monthly IG committee meetings and quarterly IG member meetings. The Chairperson and the Secretary of the IG committee organise the meetings. In the meetings, the following agenda will mainly be discussed:

- Monitoring results;
- Review of business plan;
- Auditing in income and expenditure; and
- Any other business (AOB)

9. MODIFICATION OF RULES AND REGULATIONS

The current Management Rules and Regulations can only be modified with the following procedures:

i) The Chairperson and the Secretary of the IG committee calls all the IG members to a co-ordination meeting. Non IG members are not allowed to attend nor participate in any co-ordination meetings and IG member meetings;
ii) Participation ratio of the IG members to the co-ordination meeting should be more than 80%;
iii) The draft of the modification plan should be agreed with more than 80% of the participating IG members of the co-ordination meeting; and
iv) The revised version of the Management Rules and Regulations should be prepared within two weeks by the responsibility of the Chairperson and the Secretary and should be confirmed by all the IG members at the next IG member meeting.

10. TERMINATION OF PIG FARMING IG

- The IG committee management shall meet immediately about the issue for termination. During this meeting, the IG committee will not strike any decision yet;
- The IG committee shall meet with the Economic Development Sector committee and Community Committee where the IG committee aware these two committees of the situation but without striking any decision yet;
- If more than 80% of the IG members/committee including the Falake Community Committee attend to this meeting then a decision can be made. During the meeting, financial report and asset valuation report must be presented before the IG members/committee including the Falake Community Committee; and
- All minutes of the meetings must be compiled.

Signatory

Date: 8th July 2022

Other Livelihood Improvement sub-component

Mr. Stanley Kwaifi'i
Chairperson

Mr. Pius Itea
Secretary

Mrs. Elsie Kofasia
Treasurer

Mr. Gerard Gale
Member

Mr. Jacinto Ramo
Member

Sector representative

Community representative

Mr. Benjamin Arurumae
Chairperson
Economic Development Sector

Mr. Constantine Etemani
Chairperson
Community Committee

Witness

Witness

Mr. Ronnie Aiwewe
Counterpart
SFRM Project
(Chief Forest Officer,
Malaita Forestry Office, MOFR)

Mr. Hearley Atupule
Deputy Director
Dep't of Livestock Production
and Veterinary Services
MOAL

Agreement by IG members

	Name		Signature
	Head of HH / IG member	Signer	
1			
2			
3			
4			
5			
6			
7			
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19			
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21			
22			
23			
24			
25			

	Name		Signature
	Head of HH / IG member	Signer	
26			
27			
28			
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49			
50			

Appendix 1: List of materials provided by the SFRM Project

Item	Unit cost	Qty	Sub-total
Mixed timbers for pig cage	$250.00	1	$250.00
Nail for pig cage	$20.00	3	$60.00
Sago palm leaves	$800.00	1	$800.00
Transport for sago palm leaves to Falake	$200.00	1	$200.00
PVC Pressure Pipe 25mm x 5.8m	$99.00	25	$2,475.00
Transport charge for get materials from Island enterprise and Tongs and drop off at Tongs	$300.00	1	$300.00
POLY MET TEE 16MM PE	$60.00	1	$60.00
POLY MET ELBOW PEFI 16x15mm	$50.00	2	$100.00
POLY PIPE 16mm coil 1m	$7.00	15	$105.00
White Sealing Tape 12mmx10m(redwheel)	$8.00	1	$8.00
POLY MET TEE PEFI 16x16MM	$80.00	7	$560.00
PIG NIPPLE BRACKET 1/2 INCH	$110.00	4	$440.00
PIG NIPPLE DRINKER 1/2 INCH	$80.00	4	$320.00
POLY MET ENDCON PEMI 16x16mm PC	$20.00	5	$100.00
Pressure Pipe 15mm SI PN15 SCJ	$30.00	1	$30.00
STOP TAP BRASS T HEAD 15mm MXM	$130.00	1	$130.00
PVC Cement Glue for Pipe (Type P) 250M	$80.00	1	$80.00
Priming Fluid 250ml clear A6015 Protek	$60.00	1	$60.00
Garden Hose 12mm x 15 Fitted	$140.00	1	$140.00
CAT18 FAUCET SOCKET 15mm	$10.00	1	$10.00
Freight charge (shipped pipes and some plumbing materials to Falake via Pelican)			$150.00
Freight charge of all piggery materials Honiara to Auki-piglets, feeds etc			$3,000.00
Millrun (40kg)	$120.00	44	$5,280.00
Copra mill (20kg)	$55.00	44	$2,420.00
Fish mill (25kg)	$180.00	12	$2,160.00
Premix growaid (1.75kg)	$200.00	1	$200.00
Premix breeder (1.75kg)	$200.00	1	$200.00
Piglets	$1,000.00	11	$11,000.00
Boar	$2,000.00	1	$2,000.00
3-ton truck (around Honiara to wharf)	$1,000.00	1	$1,000.00
Transport hire (Auki to Falake- transporting of piggery materials)	$1,200.00	3	$3,600.00
TOTAL			$37,238.00

Appendix 2: Business Plan

#	Action	Year																										
		Month 6				Month 7				Month 8				Month 9				Month 10				Month 11				Month 12			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Extention of pig house					▓	▓																						
2	Security house/storage construction					▓	▓	▓																					
3	Purchase gilt and boar feeds				▓																								
4	Information gathering on compost making							▓																					
5	White boar mating business								▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
6	Construction of compost shed							▓	▓																				
7	Birth (Tag# xxxx) 10 piglets								▓	▓																			
8	Birth (Tag# xxxx) 10 piglets								▓	▓																			
9	Purchase creep feed								▓	▓																			
10	Weaing period									▓	▓	▓																	
11	Sales of compost										▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
12	Sales of 20 piglets										▓	▓	▓																
13	2nd mating (Tag# xxxx)												▓	▓															
14	2nd mating (Tag# xxxx)												▓	▓															
15																													

		Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Income	Amt		$500	$800	$20,800	$800	$800	$800
	Item		White boar mating income	mating income/compost income	20 piglets/mating income/compost income	mating income/compost income	mating income/compost income	mating income/compost income
Expenditure	Amt		$950	$150				
	Item		Feeds $800/Creep feed $150	Creep feed				
Balance	Amt	$5,000	$4,550	$5,200	$26,000	$26,800	$27,600	$28,400

KOMUNIBOLI DRONE MAP
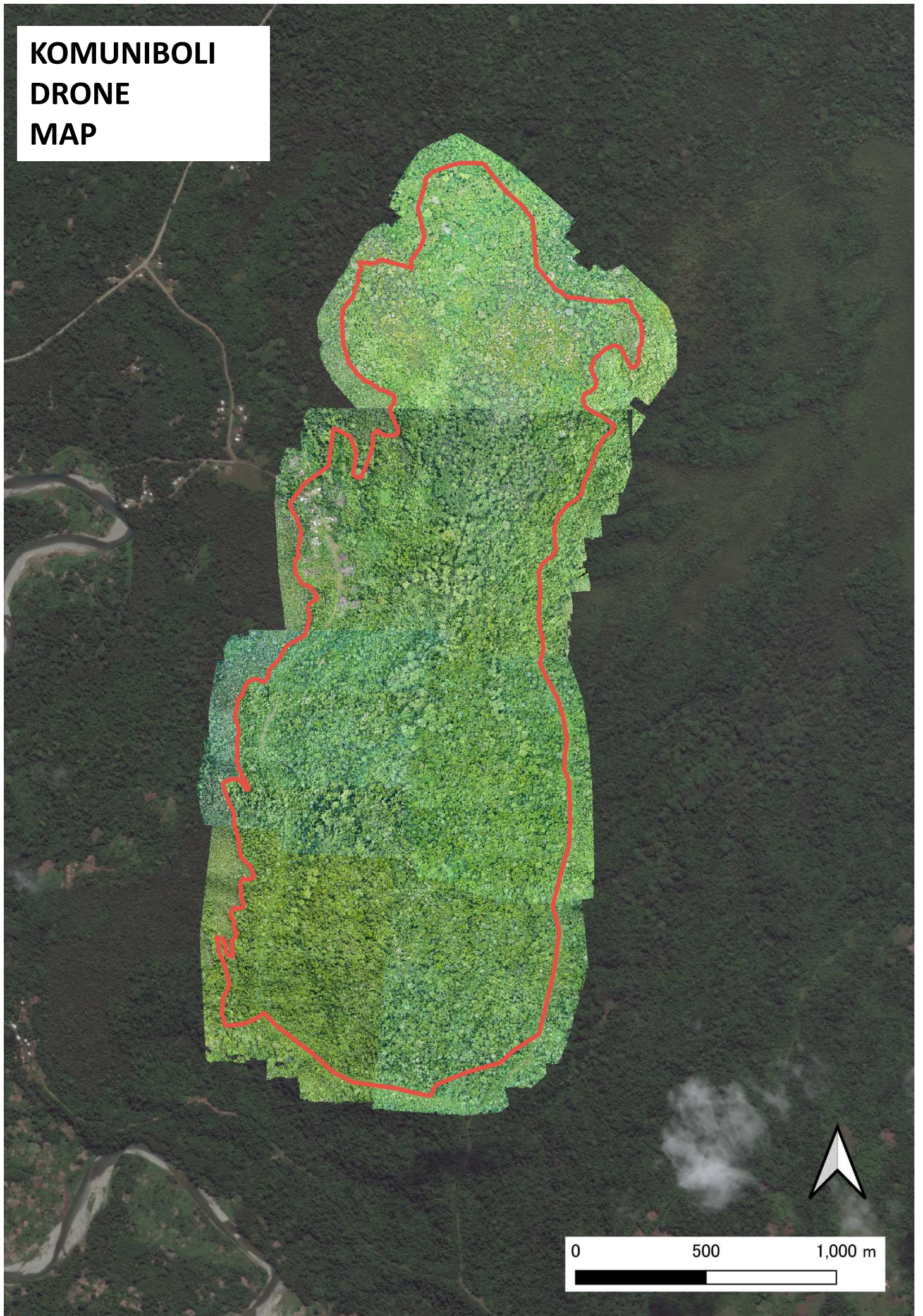
0 500 1,000 m

FALAKE_DRONE_MAP
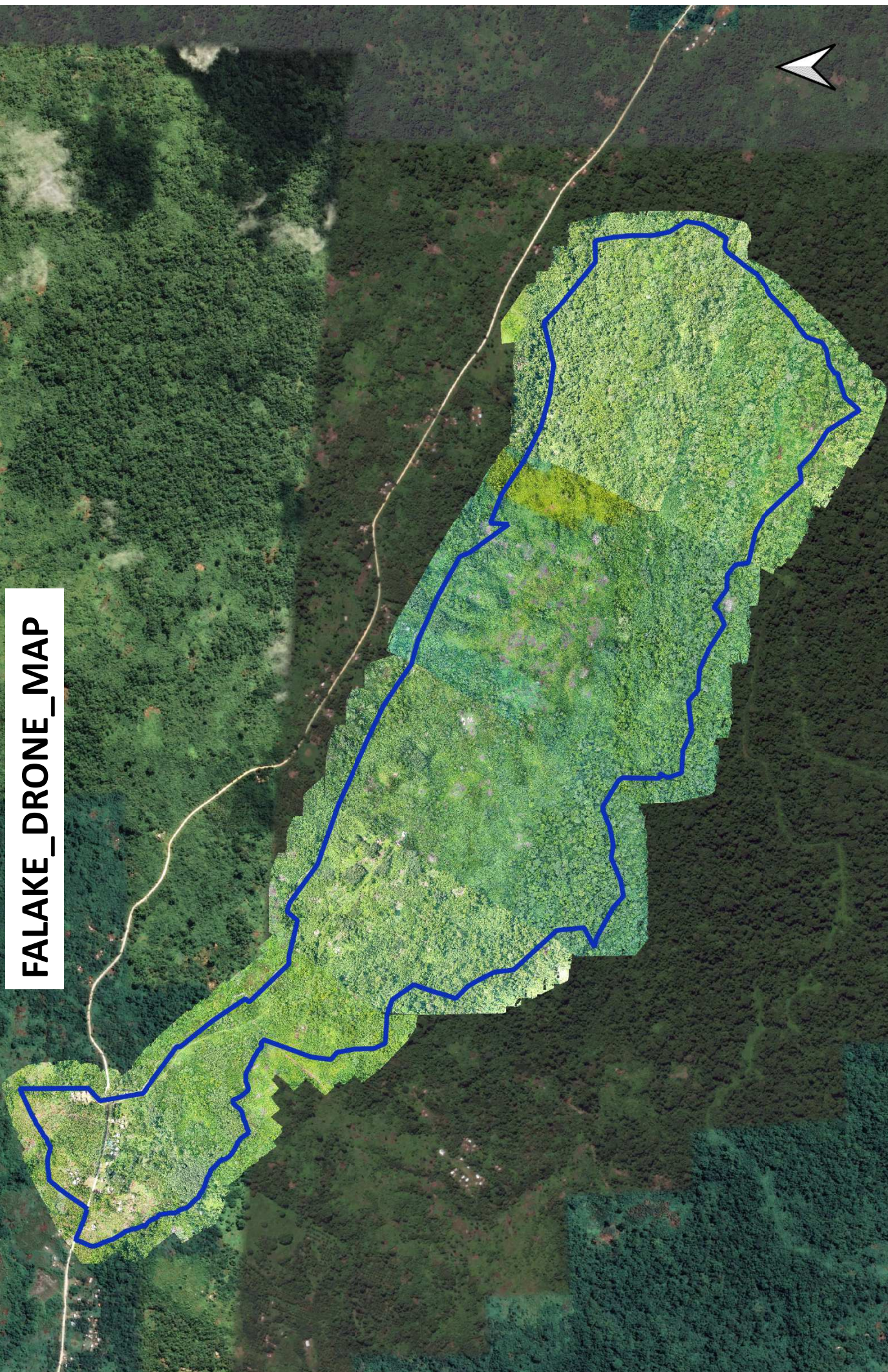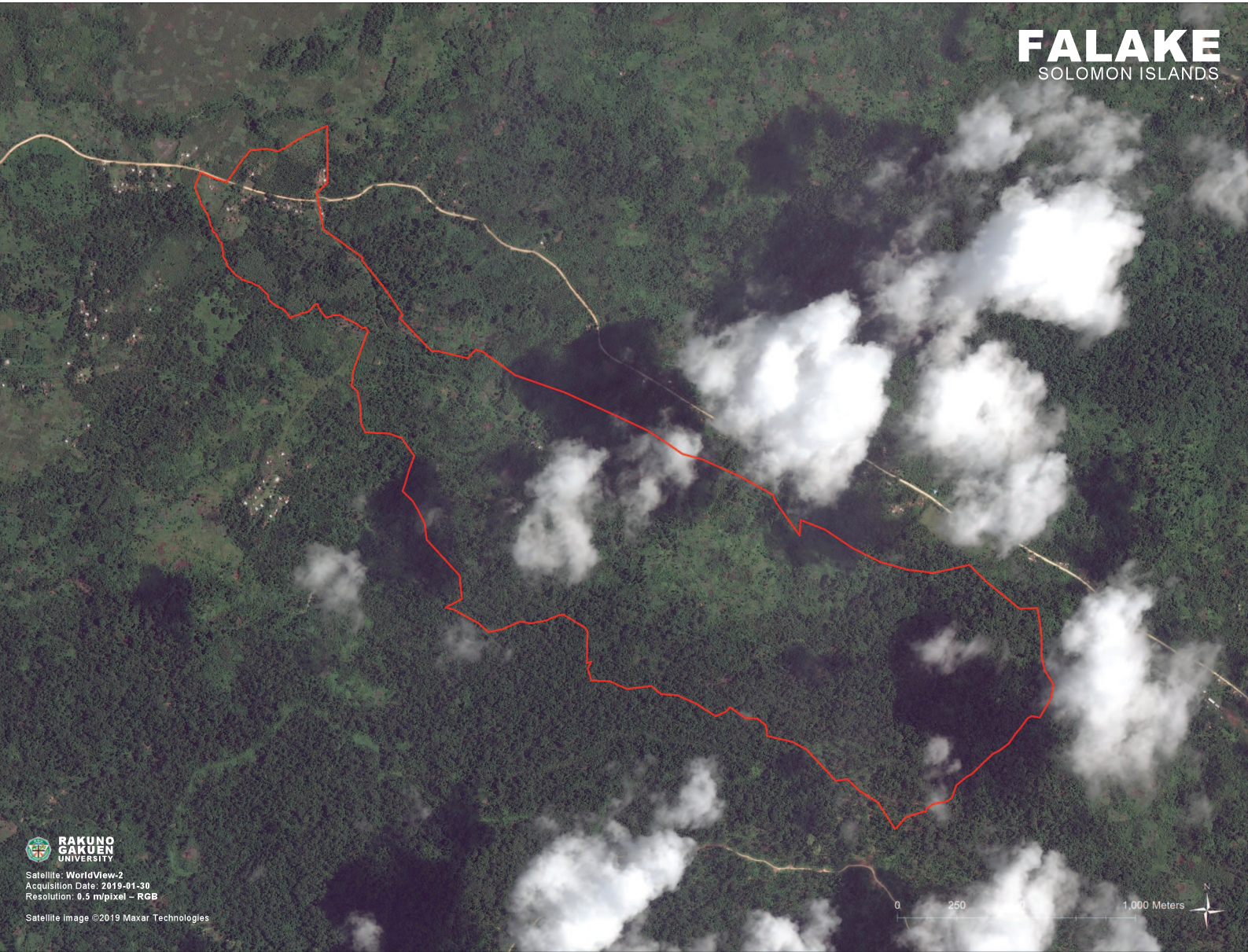
RAKUNO
GAKUEN
UNIVERSITY

Satellite: WorldView-2
Acquisition Date: 2018-09-02
Resolution: 0.5 m/pixel – RGB
Satellite image ©2019 Maxar Technologies

FALAKE
SOLOMON ISLANDS

0   250   1,000 Meters

KOMUNIBOLI
CURRENT
LANDUSE
MAP
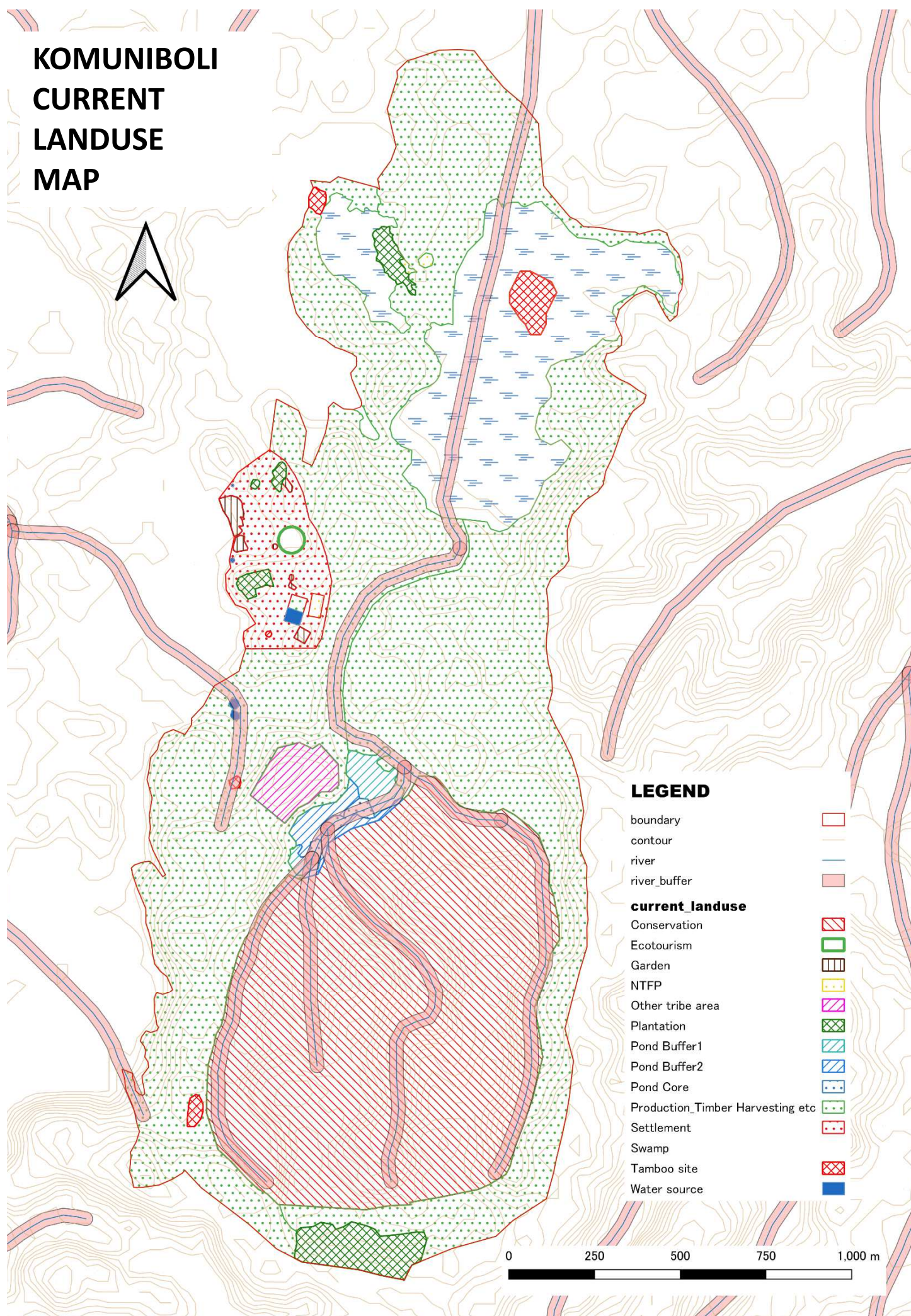
LEGEND

boundary	
contour	
river	
river_buffer	

current_landuse

Conservation	
Ecotourism	
Garden	
NTFP	
Other tribe area	
Plantation	
Pond Buffer1	
Pond Buffer2	
Pond Core	
Production_Timber Harvesting etc	
Settlement	
Swamp	
Tamboo site	
Water source	

0	250	500	750	1,000 m

KOMUNIBOLI
FUTURE
LANDUSE
MAP (20200701)
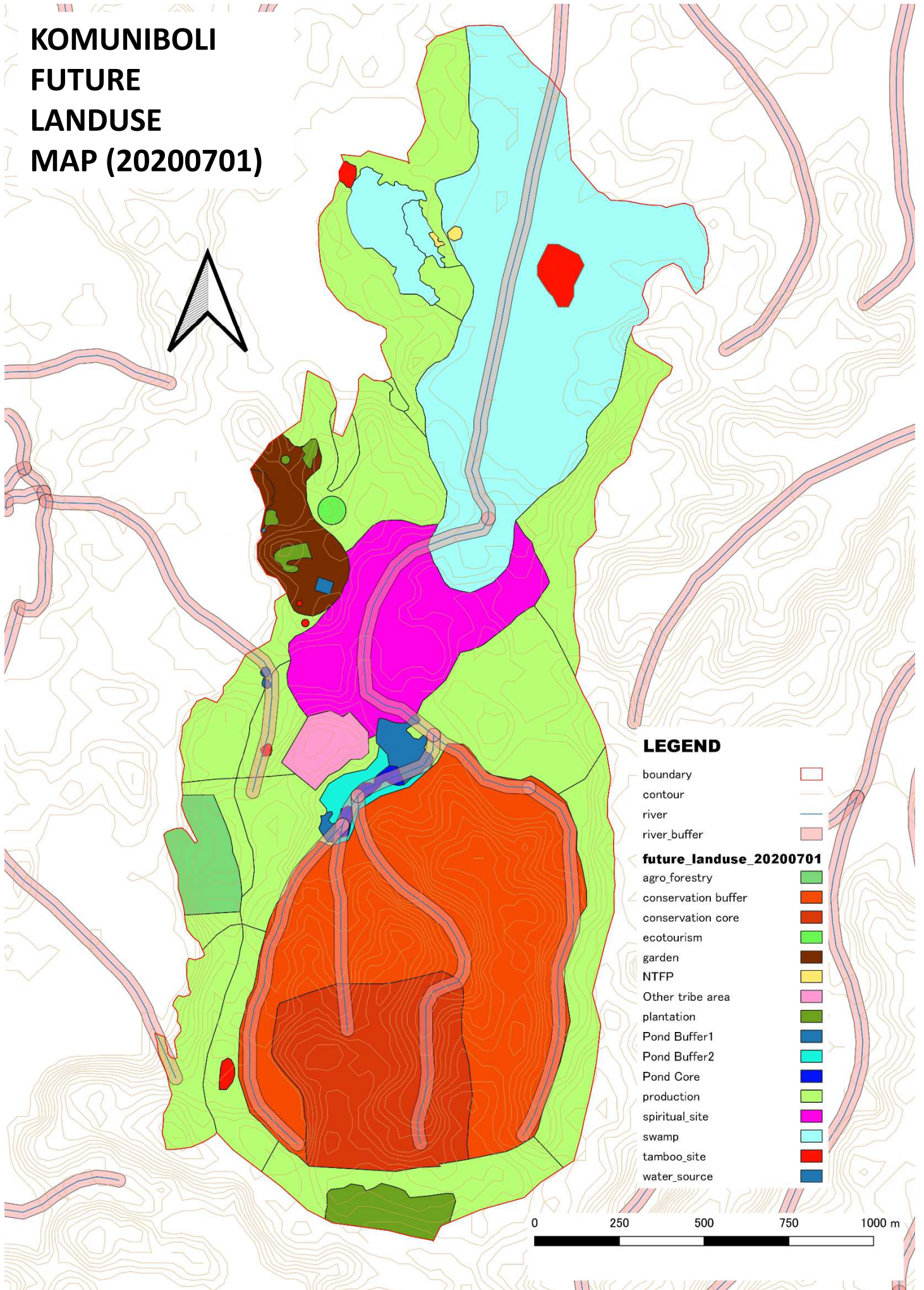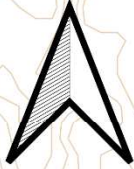
LEGEND

boundary	
contour	
river	
river_buffer	

future_landuse_20200701

agro_forestry	
conservation buffer	
conservation core	
ecotourism	
garden	
NTFP	
Other tribe area	
plantation	
Pond Buffer1	
Pond Buffer2	
Pond Core	
production	
spiritual_site	
swamp	
tamboo_site	
water_source	

0	250	500	750	1000 m

KOMUNIBOLI FOREST COMPARTMENT MAP

Area(Ha)	
Sub- Compartment 1	13.9247
Sub- Compartment 2	10.9962
Sub- Compartment 3	11.3966
Sub- Compartment 4	13.9845
Sub- Compartment 5	9.0583
Sub- Compartment 6	11.9990
Sub- Compartment 7	18.2828
Sub- Compartment 8	11.5055
Sub- Compartment 9	10.6538
Sub- Compartment 10	10.1207

LEGEND

boundary
contour
river
river_buffer

future_landuse

agro_forestry
conservation buffer
conservation core
ecotourism
garden
NTFP
Other tribe area
plantation
Pond Buffer1
Pond Buffer2
Pond Core
production
spiritual_site
swamp
tamboo_site
water_source
forest_compartment

0   250   500   750   1,000 m
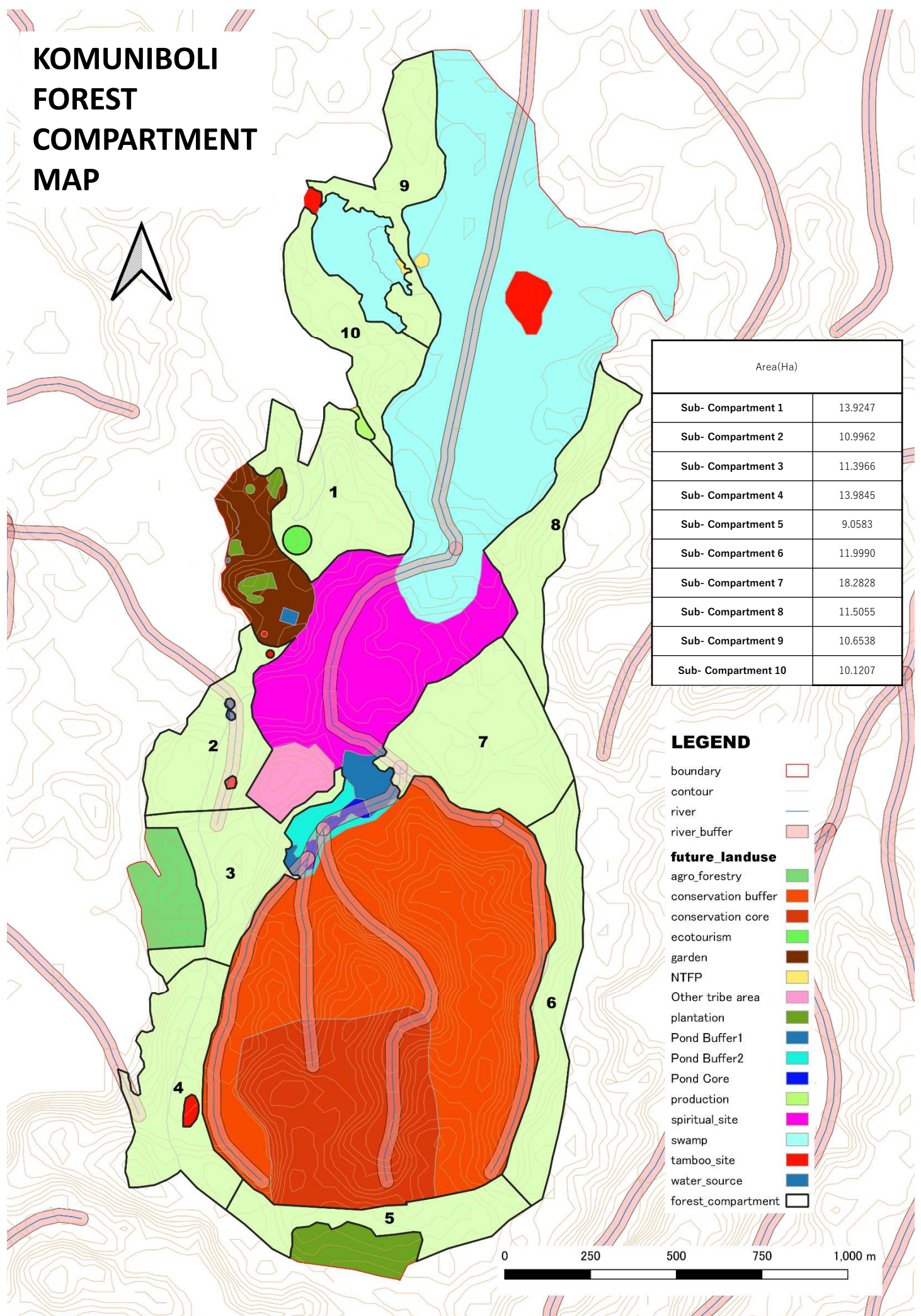
KOMUNIBOLI
AGROFORESTRY MAP
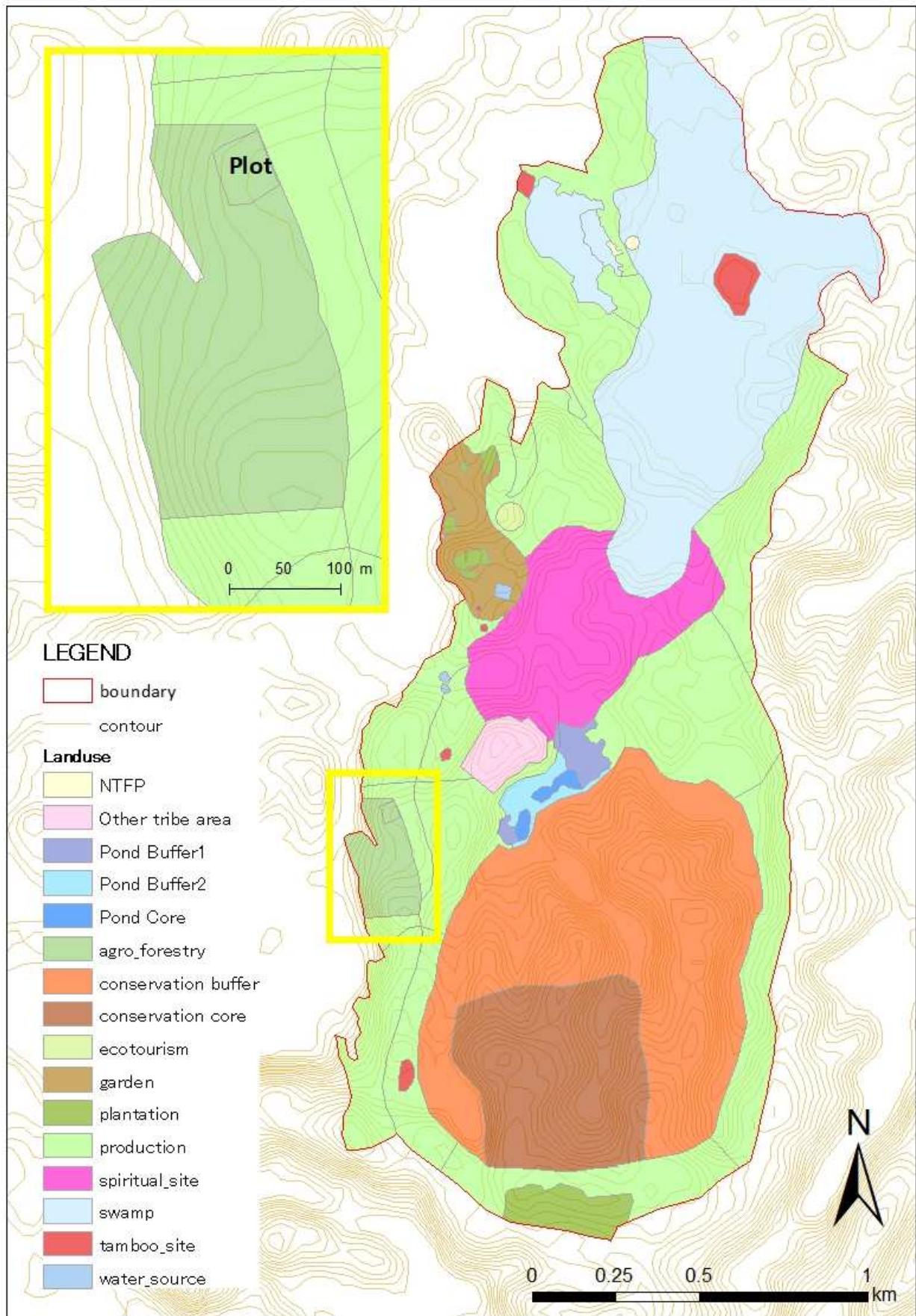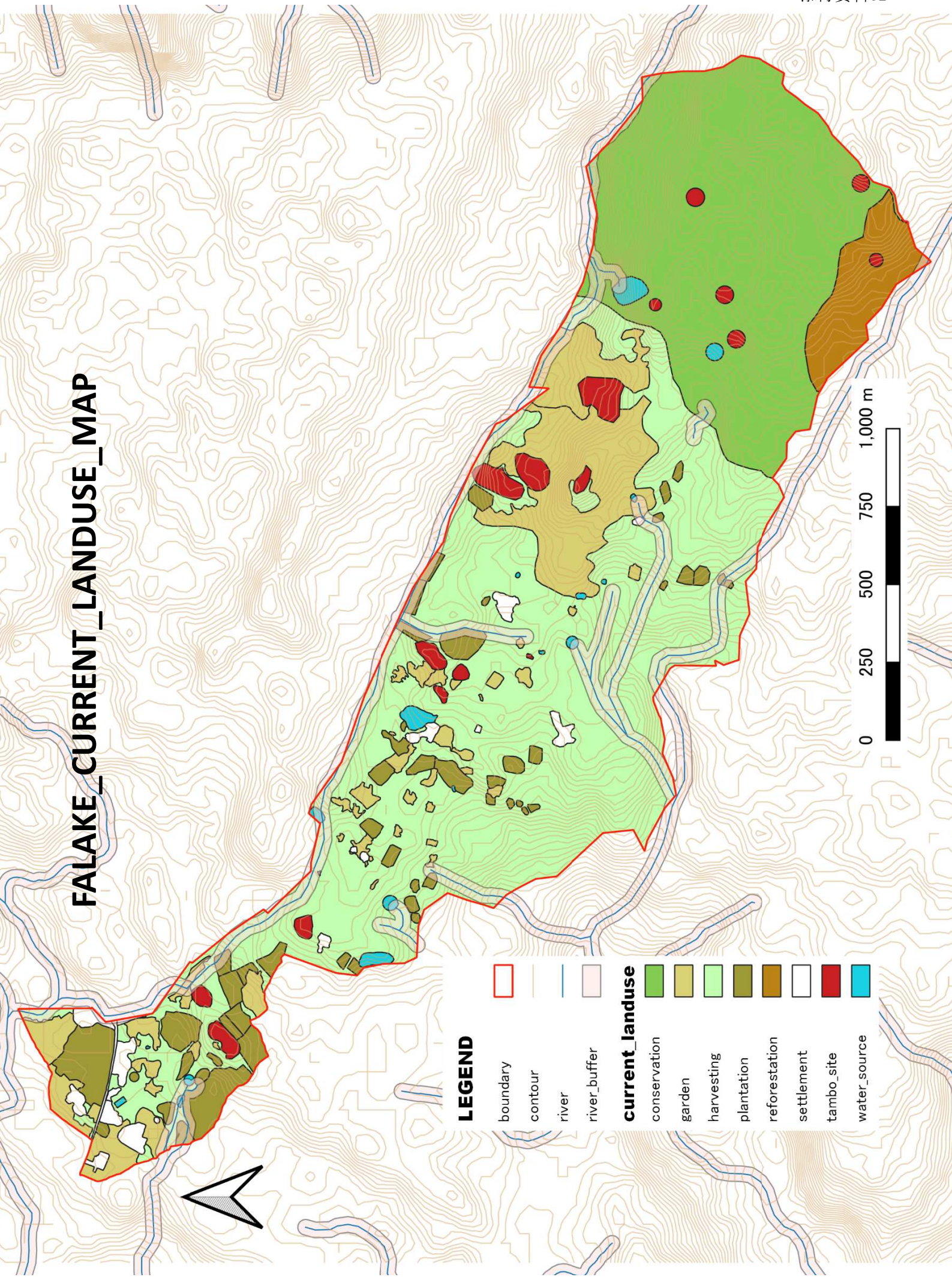
Plot

0   50   100 m

LEGEND

☐ boundary

contour

Landuse

NTFP

Other tribe area

Pond Buffer1

Pond Buffer2

Pond Core

agro_forestry

conservation buffer

conservation core

ecotourism

garden

plantation

production

spiritual_site

swamp

tamboo_site

water_source

N

0   0.25   0.5   1 km

FALAKE_CURRENT_LANDUSE_MAP

LEGEND

- boundary
- contour
- river
- river_buffer

current_landuse

- conservation
- garden
- harvesting
- plantation
- reforestation
- settlement
- tambo_site
- water_source

0 250 500 750 1,000 m

FALAKE_FUTURE_LANDUSE_MAP (20200701)
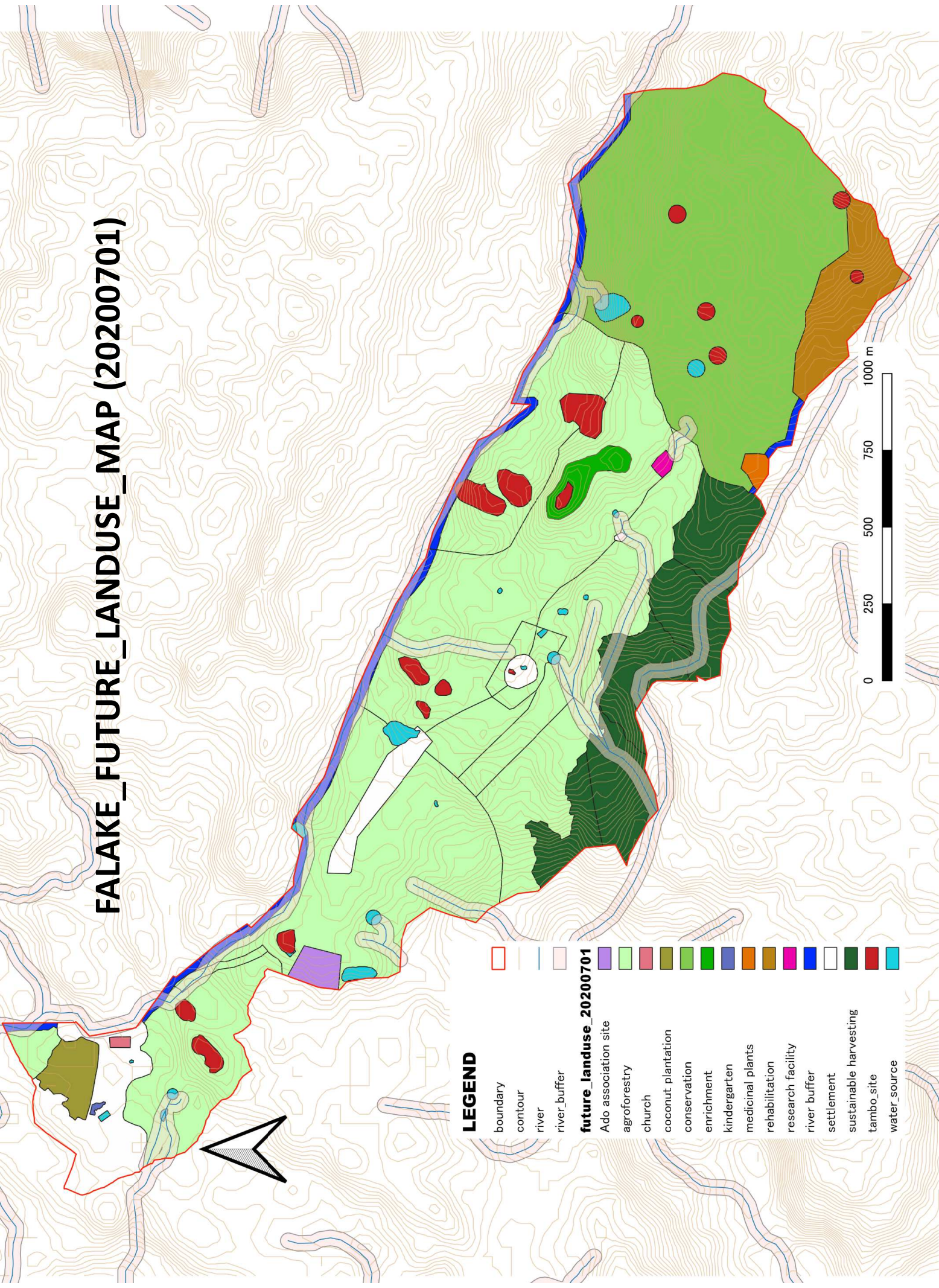
LEGEND

boundary
contour
river
river_buffer

future_landuse_20200701

Ado association site
agroforestry
church
coconut plantation
conservation
enrichment
kindergarten
medicinal plants
rehabilitation
research facility
river buffer
settlement
sustainable harvesting
tambo_site
water_source

0   250   500   750   1000 m

FALAKE_FOREST_COMPARTMENT_MAP

	Area(Ha)
Sub- Compartment 1	4.1527
Sub- Compartment 2	6.6189
Sub- Compartment 3	6.5932
Sub- Compartment 4	6.5177
Sub- Compartment 5	6.9497
Sub- Compartment 6	10.1996

0   250   500   750   1,000 m
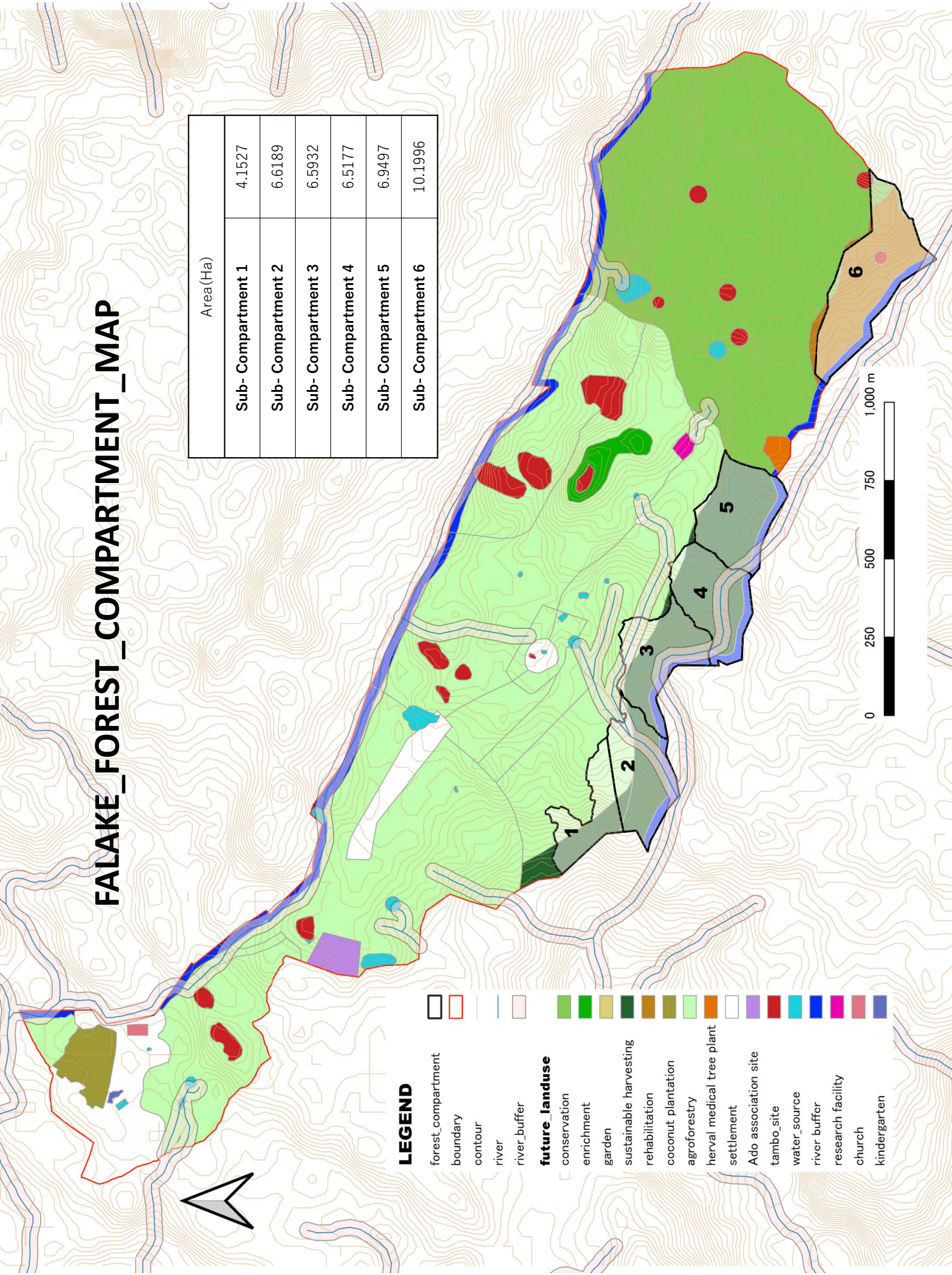
LEGEND

forest_compartment
boundary
contour
river
river_buffer

future_landuse

conservation
enrichment
garden
sustainable harvesting
rehabilitation
coconut plantation
agroforestry
herval medical tree plant
settlement
Ado association site
tambo_site
water_source
river buffer
research facility
church
kindergarten

**FALAKE
AGROFORESTRY MAP**

LEGEND

- falake_boundary
- contour

landuse

- Ado association site
- agroforestry
- church
- coconut plantation
- conservation
- enrichment
- kindergarten
- medicinal plants
- rehabilitation
- research facility
- river buffer
- settlement
- sustainable harvesting
- tambo_site
- water_source

plot1

plot2

N

0   25   50   m

0   0.25   0.5   1   km

KOMUNIBOLI
CURRENT LANDUSE - 2019

LEGEND

Boundary
River
access_road
Contour
Watershed

LEGEND

Boundary
River
River_buffer
access_road
Contour
Watershed
Current Landuse
Conservation
Ecotourism
Garden
NTFP
Other tribe area
Plantation
Pond Buffer1
Pond Buffer2
Pond Core
Production,Timber Harvesting etc
Settlement
Swamp
Tamboo site
Water source

Ministry of Forestry & Research

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JICA

RAKUNO GAKUEN UNIVERSITY

KOMUNIBOLI
FUTURE LANDUSE

LEGEND

Boundary
River
River_buffer
access_road
Contour
Watershed

Future Landuse

agro_forestry
conservation buffer
conservation core
ecotourism
garden
NTFP
Other tribe area
plantation
Pond Buffer1
Pond Buffer2
Pond Core
production
spiritual_site
swamp
tamboo_site
water_source

0   200   400   600   800   1000 m

Solomon Islands Government
Ministry of
Forestry & Research

JICA

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GAKUEN
UNIVERSITY

FALAKE

CURRENT LANDUSE - 2019

添付資料34

Legend
- access_road
- falake_boundary
- Contour3m

Current Landuse
- conservation
- garden
- harvesting
- plantation
- reforestation
- settlement
- tambo_site
- water_source

Scale: 0 200 400 600 800 1000 1200 1400 1600 1800 2000 m

Legend
- access_road
- falake_boundary
- Contour3m

添付資料34

Scale: 0 200 400 600 800 1000 1200 1400 1600 1800 2000 m

Solomon Islands Government
Ministry of Forestry & Research
Japan Asia Group
JICA
KOKUSAI KOGYO CO.,LTD.
RAKUNO GAKUEN UNIVERSITY
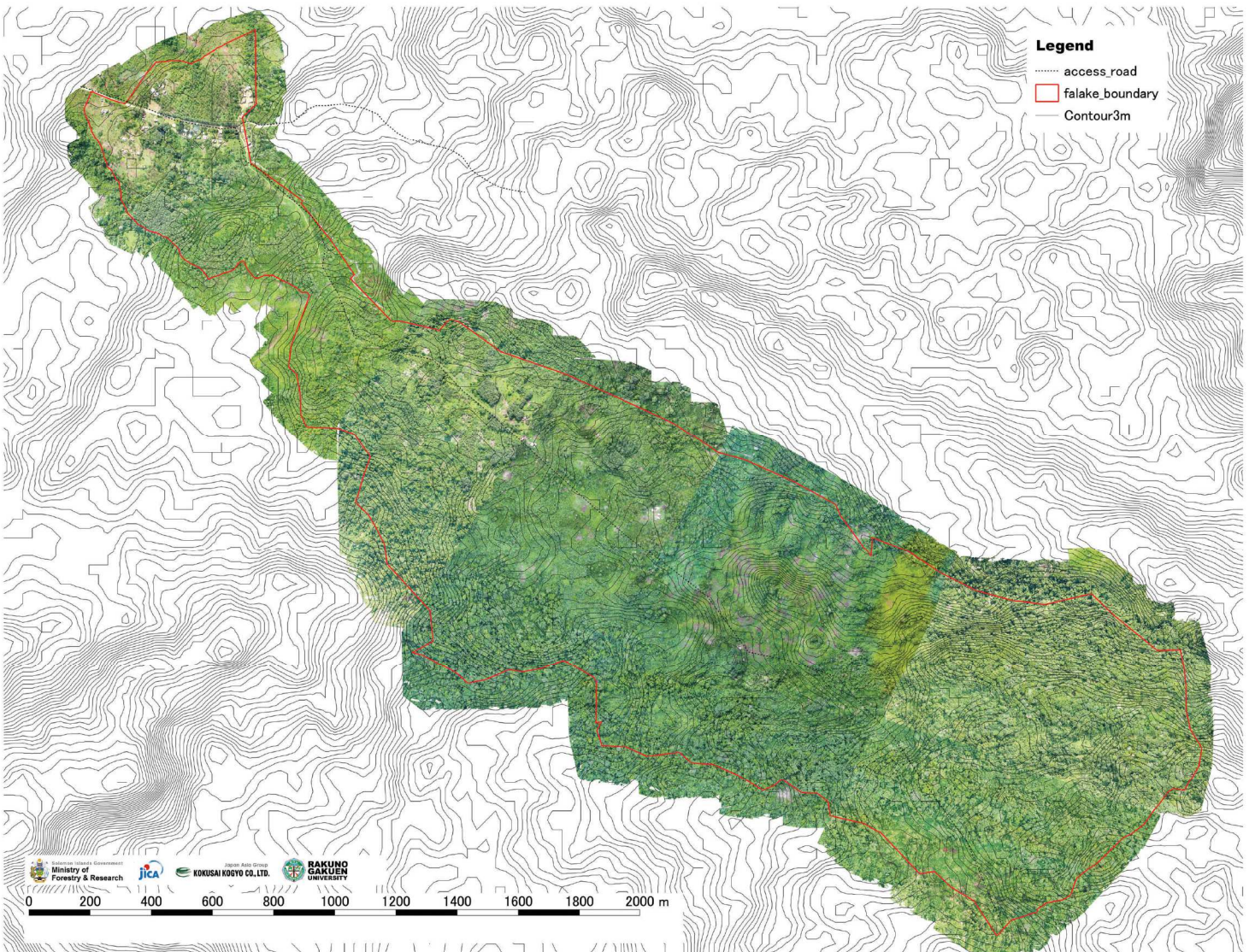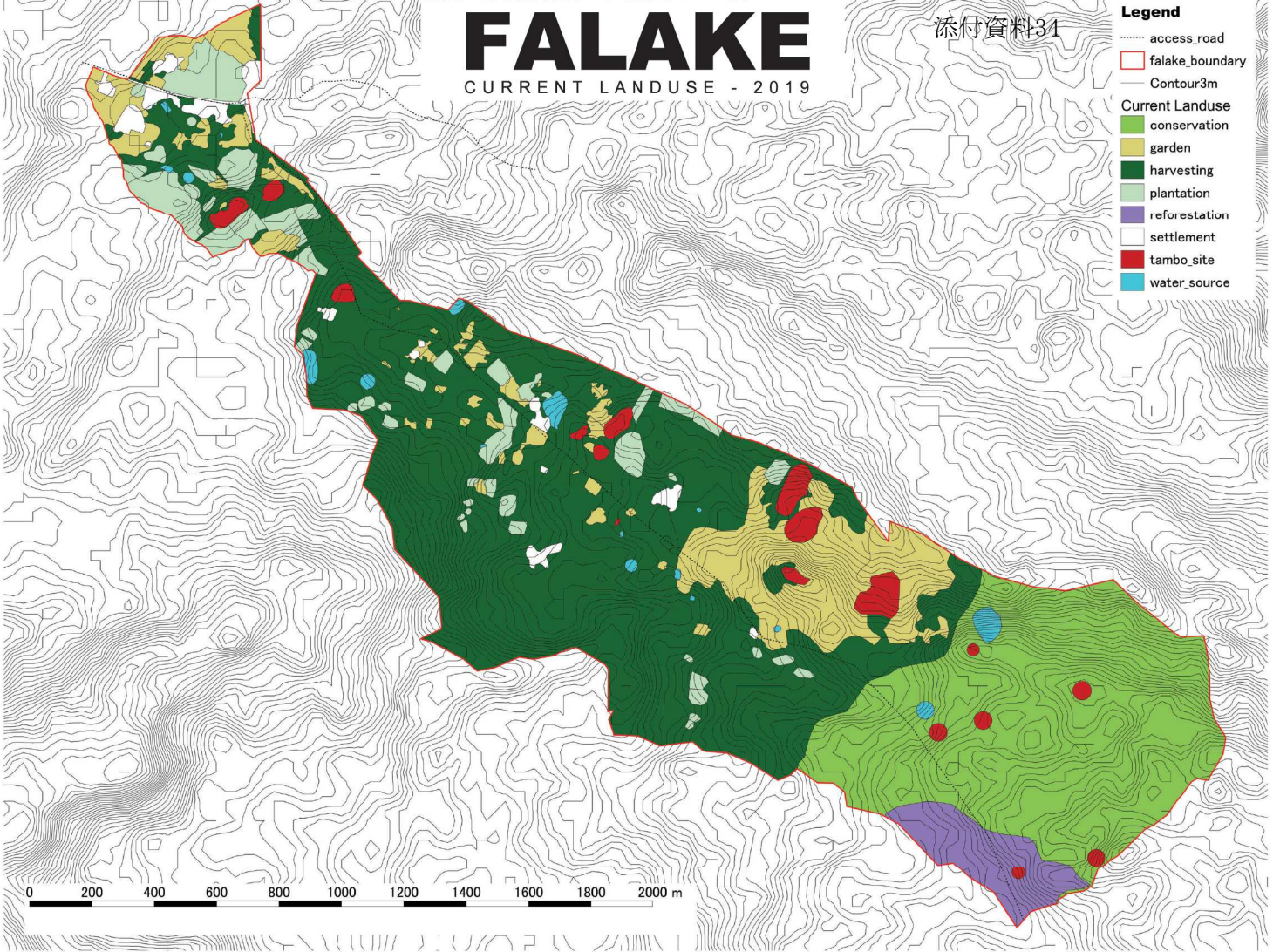
FALAKE

FUTURE LANDUSE

Legend

- access_road
- falake_boundary
- Contour3m

Future Landuse
- conservation
- enrichment
- sustainable harvesting
- rehabilitation
- coconut plantation
- agroforestry
- herval medical tree plant
- settlement
- Ado association site
- tambo_site
- water_source
- river buffer
- research facility
- church
- kindergarten

0   200   400   600   800   1000   1200   1400   1600   1800   2000 m

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Forestry & Research

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添付資料35
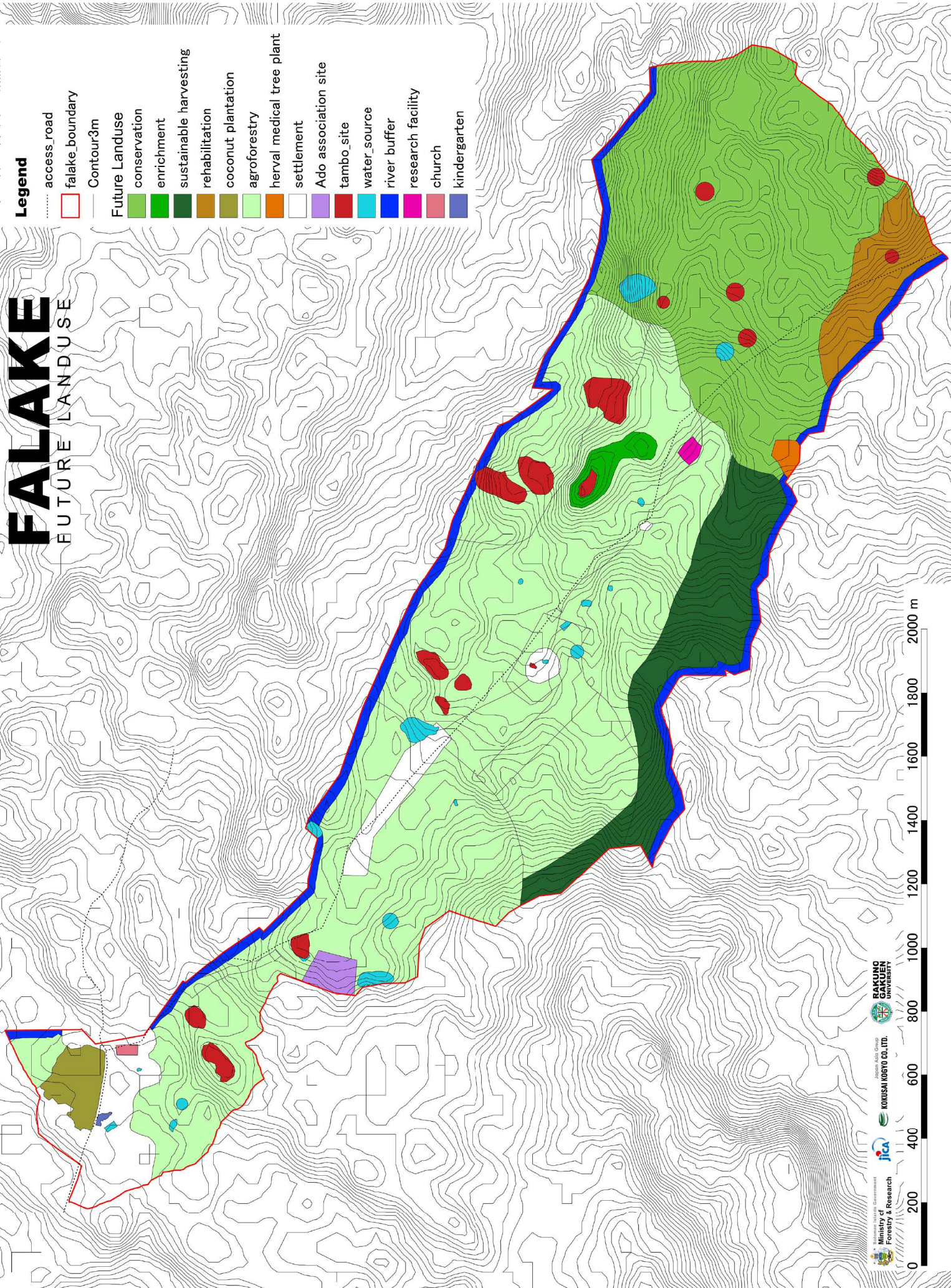
Community-based Agroforestry Implementation Manual (Draft)

August, 2022

Hiromi YAMAUCHI

MOFR/JICA

Contents

1. Introduction

2. Basic concept of agroforestry

3. Development of Agroforestry Implementation Plan

4. Implementation of the plan

5. Monitoring and Evaluation

1. Introduction

1.1 Use of the Manual

- This manual was prepared basically for MOFR officials and community members to promote the implementation of community-based agroforestry.

- However, most elements of the manual are adoptable for agroforestry practices conducted by individuals.

- In case that agroforestry is implemented by an individual on his/her land, the instructions described in the manual will be modified upon necessity.

1.2 Policies related to Agroforestry (AF) in Solomon Islands

■ **National Development Strategies 2016-2035**

➤ NDS Objective One: The productive and resource sectors (agriculture, livestock, agro-forestry, aquaculture, ,,,, forestry and reforestation,,,,) need reinvigorating to increase value added and export earning to achieve sustained growth.

■ **Solomon Islands National Forest Policy**

➤ Objective 6.1 Promote gender inclusive technical capacity building in forest management, reforestation and sustainable agroforestry.

➤ Expected Result of objective 7.2 (Promote national and international market access for forest products): Access to forest sector markets for processed wood, community forest products, agroforestry products, etc., improving the local economy.

➤ Objective 7.3: Establish sustainable rural Micro Small Medium Enterprises (MSME) and associations to promote alternative economies and local business in the forest sector (e.g.: community forest plantations, local timber processing, agroforestry systems).

➤ Objective 10.7 Encourage the production of Non timber forest products (NTFP), medicinal plants and agroforestry products.

➤ Objective 13.3 Develop a forest management guideline for community forest management (agroforestry, plantations and natural forest).

1.2 Policies related to AF in Solomon Islands

■ **Solomon Islands Agriculture and Livestock Sector Policy 2015-2019**

➤ Objective: To reduce the impact of climate, disaster and environmental risks and enhance sustainability and resilience with MAL staff and farmers

➤ Policy Statement/Focusing Activities under the objective:

3. Encourage use of conservation farming techniques such as ago-forestry, fallow, cover crops, intercrop and contour planting

6. Promote agro-forestry with the use of intercropping to reduce vulnerability to natural disaster, soil degradation and erosion and improve farm productivity.

2. Basic Concept of Agroforestry

2.1 What is Agroforestry?

Agriculture	Forestry
Crops/livestock only	Trees only

Agroforestry

Crops/livestock and trees planted and managed together on the same unit of land or temporal sequence
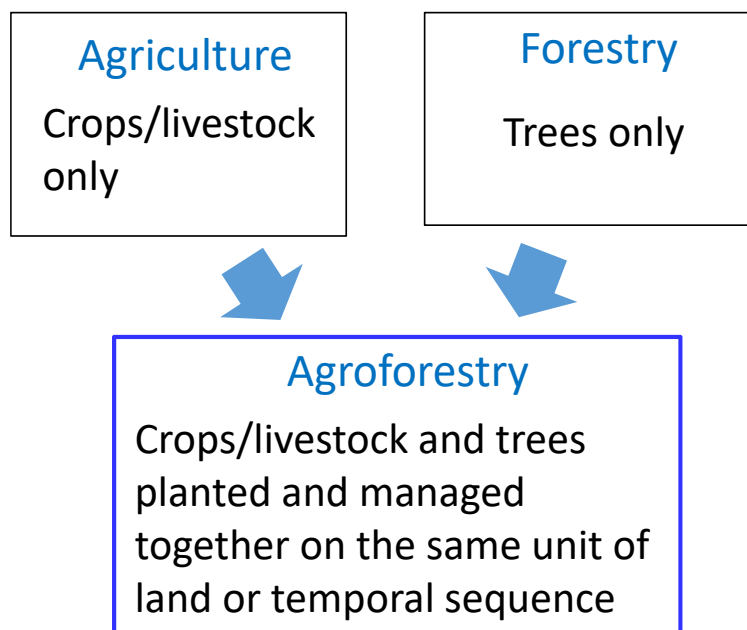
2.2 Definition of Agroforestry

■ **World Agroforestry Center (ICRAF)**
  ➢ Agroforestry is defined as 'agriculture with trees'.
  ➢ Agroforestry is the interaction of agriculture and trees, including the agricultural use of trees.

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

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

2.3 Mechanism of Agroforestry
- Interaction between Trees and Crops
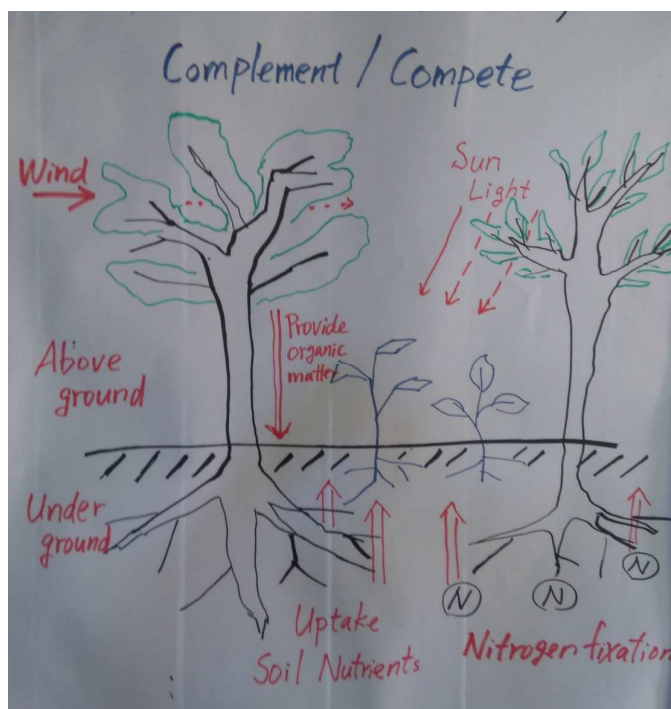
➢ Effective use of above and under ground space and growth resources such as sun light, water and soil nutrient.

➢ Trees uptake water & soil nutrients from deep soil to surface ground and crops use them.

➢ Trees provide organic matters through litterfall and some trees, especially legume tree species fix nitrogen.

➢ Trees provide better microclimate.

➢ Crops suppress weed growth.

2.4 Type of Agroforestry

- **Agrisilvicultural system**
  - Combination of crops and trees
  - e.g. Alley cropping, Home garden

- **Silvopastoral system**
  - Combination of forestry and grazing

- **Aquasilviculture system**
  - Combination of forestry and aquaculture

2.5 Benefits of Agroforestry

- Diversification of products including food, fodder, fuelwood and timber for both domestic use and commercial purposes
- Generation of long, medium, and short-term crops and revenue
- Effective and efficient use of land, sunlight, and soil nutrients
- Improvement and/or maintenance of soil fertility and structure through provision of organic matters, nitrogen fixation, and increase in water infiltration by roots and shared created by tree crown, which helps control of soil erosion and runoff
- Creation better microclimate through provision of shade and performance of windbreak (and creation of mild wind) by trees and shrub
- Suppression of weed growth by crops and trees, which contributes to reduce workload for weeding
- Enable efficient work by managing trees and crops on the same plot (no need to move from place to place)
- Increase in biodiversity

2.6 Difference between Agroforestry and Slash-and-Burn

- Slash-and-burn agriculture releases a large portion of nutrients stored in the above-ground biomass into soil. However, a significant portion of mineral nutrients released from burning may be lost either through erosion and runoff.
- Slash-and-burn needs large land because it is conducted by rotation. A unit of land used for slash-and-burn becomes unproductive after harvesting crops and the land cannot be used during fallow period. This means areas for slash-and-burn will be expanded when the population grows.
- In contrast, agroforestry can be continuously conducted at the same unit of land for crop production as well as tree planting.
- In agroforestry, community members can maintain crops and trees at the same unit of land without moving from place to place. They can save time.

---

3. Development of Agroforestry Implementation Plan

3.1 Contents and Steps of AF Implementation Plan

Objective	● Objectives of Agroforestry
↓	
Identify &Measure the plot	● Identify and measure the plot
↓	
Species selection & Layout	● Selection of tree/crop species & Layout
↓	
Work Plan	● Annual work plan ● Medium & Long-term plan
↓	
Inputs	● Procurement of planting materials
↓	
Management Structure & Rules	● Roles and responsibility ● Risk management ● Benefit sharing
↓	
Monitoring & Evaluation	● Monitoring & Evaluation items ● Methods & Schedule/Frequency

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3.2 Objectives

- Community members discuss and determine specific objectives of implementation of agroforestry.

- This is important for them to have common understanding and agreement why they try agroforestry practice.

3.3 Identify and Measure a Plot

- Based on a future land use plan, which is developed by a community in prior to the implementation of agroforestry, community members discuss and identify a site for agroforestry.

- Within the site, the community members discuss and identified a few candidate plots for implementation of agroforestry on the future land use map.

- The community members visit the candidate plots and examine their ground conditions whether the plots are appropriate for the agroforestry implementation. If a plot has an obstacle, such as a water-logged or stony area, it should be removed from the candidates.

- Finally, a plot for agroforestry implementation is decided with consensus of all community members, including those who live outside the community.

➢ Note: If a community has difficulty of preparing a future land use map, just skip that step.

3.3 Identify and Measure a Plot

- The size of a plot depends on availability of land and labour. But, according to the experience of pilot activities of the Sustainable Forest Resource Management Project, it is recommended that a plot be 0.09 hectare (30m by 30m) ~ 0.25 hectare (50m by 50m).

- If possible, the boundary of the plot is demarcated and measured by GPS with support by MOFR.

The 1st Agroforestry (AF) plot (50m by 50m)

AF site identified on the future land use map
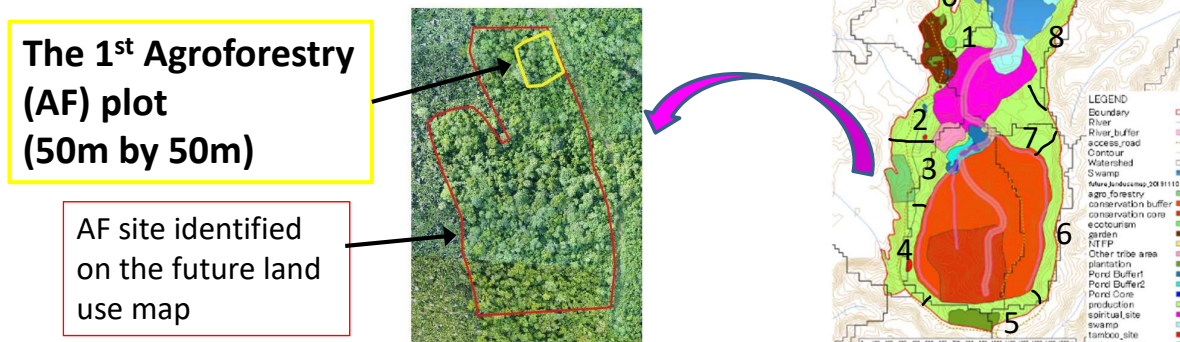
Example of future land use map and AF plot/site in Komuniboli community

3.4 Species Selection and Layout

- Tree and fruit tree species and crop types are selected through discussion by the community members taking into consideration the following aspect.

  ✓ Achievement of the specific objectives
  ✓ Procurement (availability) of planting materials such as seeds and seedlings
  ✓ Combination of long, medium, and short-term benefits
  ✓ Compatibility of trees and crops
  ✓ Improvement of soil conditions, especially in crease in the level of nitrogen in the soil
  ✓ Ground conditions including humidity, sunshine, and slope
  ✓ Effective land/space use
  ✓ Availability of market of trees and crops, especially market for exotic timber tree species such as teak and mahogany
  ✓ Availability of labour

3.4 Species Selection and Layout

Example: Tree and crop selection and its reason

Category	Species/Type	Reasons for selection
Timber tree	Pencilcedar Teak Mahogany	• Fast-growing timber tree species • Pencilcedar will grow taller than teak and mahogany and will not require pruning. • Seedlings of pencil cedar can be collected from a natural forest.
Fruit tree	Lolley tree Guava Tangerine	• Suitable for the soil in the community. • Seeds/seedlings are available in the community.
Crop	Sweet Potato Taro Pineapple Banana Peanut Beans	• Sweet potato leaves cover a wide area of ground which curbs weeds growth. • Taro is suitable for the ground condition at the bottom of the slop. • Propagation of pineapple and banana are easy. • Peanut and beans are expected to improve the level of nitrogen in the soil.

3.4 Species Selection and Layout

- After the species selection, a layout of agroforestry plot, including spacing and planting spot of each tree/fruit tree species and crops, is developed through discussion by community members with advice from MOFR. If a community prefers to develop a layout while selecting species, that will be fine.

- In case of the pilot communities, timber tree species were basically planted by 6 meter by 6 meter and fruit trees were planted by 3 meter by 3 meter. Crops were planted between the trees and fruit trees.
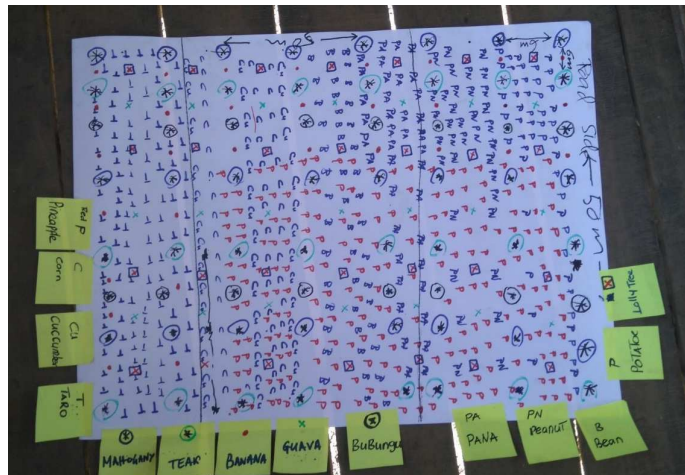
Agroforestry Layout developed by a community

3.5 Work Plan
■ Annual Work Plan

- An annual work plan for the first year, which shows activities to be conducted each month plant-wise, is prepared.

Example: Annual Work Plan

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

■ Medium & Long-Term Plan

- A medium and long-term plan is prepared in order to have a long-term vision.

Example: Medium and Long-term Plan

		2021	2022	2023	2024	2025	2026	2027	2028	2029	Beyond 2030
Timber tree	Pencil Cedar	Planting and maintenance including beating up and weeding			→ (2024–2029)						Harvest in 2040
	Maho-gany				Pruning						Harvest in 2040
Fruit tree	Guava		Harvest		→ (2024–2029)						
	Lolley tree	Planting and maintenance			Harvest	→ (2025–2029)					
Crop	Taro Potato Peanut	Planting, Harvesting, Sell			Replace with shade tolerant crops						
	Pineapple	Harvest & sell									

3.6 Input

- Necessary input, especially planting materials for the agroforestry plot establishment should be identified. The sources and person in charge are also determined.

Example: Planting materials

	Species	Planting materials	From Where	No./ Price	Person in charge
Tree	Pencil cedar	Seedlings	Collected from mother tree in forest	24	Mark
	Mahogany	Seedling	Nursery supervised by the provincial forest officer	16	Philip
Fruit tree	Lolley trees	Seedling	Community	30	Jerry
	Guava	seedling	Moses	25	Moses
Crop	Sweet potato	Vine, Stick, Fruit	Community		Karoline Stephany
	Taro				
	Peanut	Seeds	Honiara central market, Chinese shops, Community	$20/pkt	Mary
	Bean			$15/pkt	

3.7 Management Structure & Rules
■ Management structure

- It is suggested that Agroforestry Sub-committee be established under Community Committee.
- Proposed roles and responsibility of each organization and members are shown in the table below.

Example: Role and Responsibility

Category	Role & Responsibility
Agroforestry Sub-committee	• Make a work schedule and share it with community members • Supervise community members' work • Keep records and share them with community members • Share benefits among community members
Community Committee	• Supervise the Agroforestry Sub-committee • Call a meeting • Supervise benefit sharing • Check the financial records
Community members	• Carry out activities

3.7 Management Structure & Rules
■ Risk management

- Potential risks should be identified and possible countermeasures against them should be identified in advance in order to deal with challenges immediately and efficiently when they happen.

Example: Potential risk and possible countermeasure

Potential risk	Possible countermeasure	Remarks
Insects to fruit trees	Apply *farmacorn* (chemical pesticide)	• $10/pkt at Island Enterprise
African snail	Apply *Blitzem* (chemical pesticide)	• $60/bag
Wild pig/birds	Trap, hunting, fencing	
Draught	Watering (tank)	

3.7 Management Structure & Rules
■ Benefit sharing

- Methods of benefit sharing should be discussed and decided through discussion by community members in advance.
- Transparency, equitability, and sustainability should be ensured.
- It is recommended that some portion of financial benefit should be saved for future agroforestry and other community activities.

Example: Benefit sharing method

Product	Benefit sharing method
Crops	<Domestic Use> • Share among all households in accordance with work load. <Commercial Use> • 10% tithing • 30% community account • 60% shared among households in accordance with work load.
Fruit	
Timber produced from trees planted	
Timber produced by site clearing	• The sales will be used for purchase necessary materials for establishment of the agroforestry plot.

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4. Implementation of the Agroforestry Implementation Plan

4.1 Support for Community in Implementation

- Ministry of Forest and Research (MOFR) officials are expected to visit agroforestry plots managed by communities periodically and provide necessary support as follows:

  - ✓ Check the progress of field activities

  - ✓ Delivery technical advice and useful information

  - ✓ Help community members identify and address to challenges

  - ✓ Facilitate discussion among community members to solve conflicts

  - ✓ Facilitate communication with Ministry of Agriculture and Livestock (MoAL) to obtain technical advice on crop and/or livestock management

  - ✓ Help community members keep records, especially financial records

  - ✓ Check the records and provide necessary advise to improve record keeping

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4.2 Activities Conducted by Community Members

- Community members carry out activities according to the plan with initiatives of the Agroforestry sub-committee. Main activities are as follows:

  - ✓ Site preparation/site clearing

  - ✓ Cut existing useful timber tree species

  - ✓ Plant seedlings/stick/sucker and other forms of planting materials of crops, fruit trees, and trees according to the layout

  - ✓ Conduct maintenance activities including weeding and beating-up

  - ✓ Identify and address to pest & diseases

  - ✓ Harvest crops and replant short-terms crops

  - ✓ Keep financial records (revenue (cash in) and cost (cash out)) and production records (quantity of yield)

5. Monitoring & Evaluation (M&E)

5.1 Outline of Monitoring & Evaluation (M&E)

- **Purpose of M&E**
  - To check the progress according to the AF Implementation Plan
  - To clarify problems/difficulties/challenges and seek solutions
  - To understand significance of agroforestry comparing with garden and/or tree plantation
  - To improve agroforestry activities in future

- **M&E structure**
  - M&E should be conducted by community members with support by MOFR officials

- **M&E method**
  - Keeping and checking records, field inspection, discussion
  - Drone imaginary

- **M&E schedule/frequency (proposed)**
  - Monitoring: Quarterly
  - Evaluation: Once every two years

5.2 Monitoring

■ Objectives

> To assess whether AF activities progress according to the AF implementation plan

> To identify challenges and issues related to AF activities and take measurements against them

> To revise the AF implementation plan based on the results of monitoring to conduct AF activities more effectively and efficiently

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■ Monitoring item

Item	Data	Means/Tool	Remarks
Site selection	Location, Boundary	• Drone • GPS	Conducted in FM monitoring
Layout (AF plot establishment)	Species, Number of each species, Survival, Growing conditions	• Field observation	Monitoring Form-1
Work plan	Activities, Timing	• Discussion • Record checking	Monitoring Form-2
Input	Planting materials, Labor	• Record checking	Monitoring Form-4
Management	Management structure, Management rules	• Discussion	Monitoring Form-3
Benefit sharing	Harvest, Sales, Usage of benefit, Ratio of benefit sharing	• Record checking • Discussion	Monitoring Form-4

■ Monitoring Form-1: Agroforestry Plot
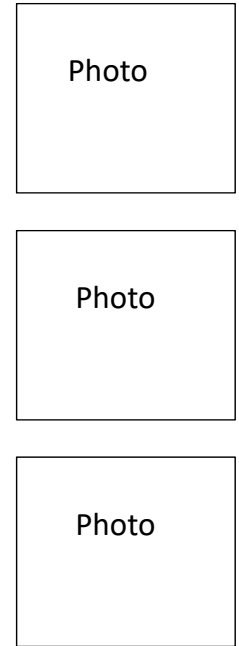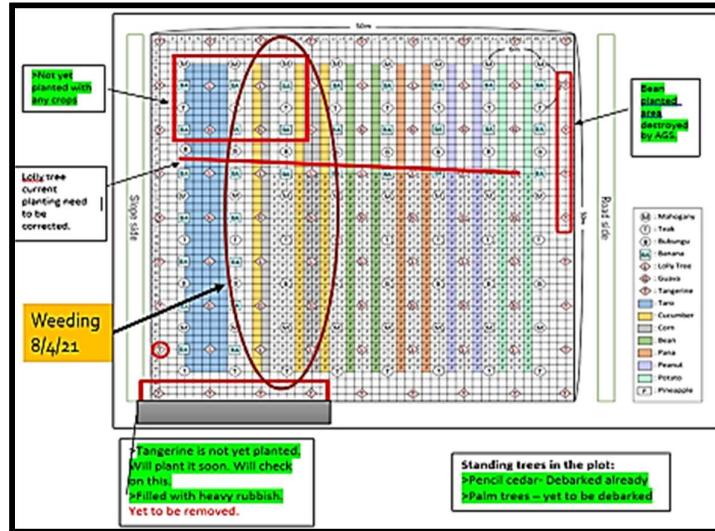
■ Monitoring Form-1: Agroforestry Plot <Sample>
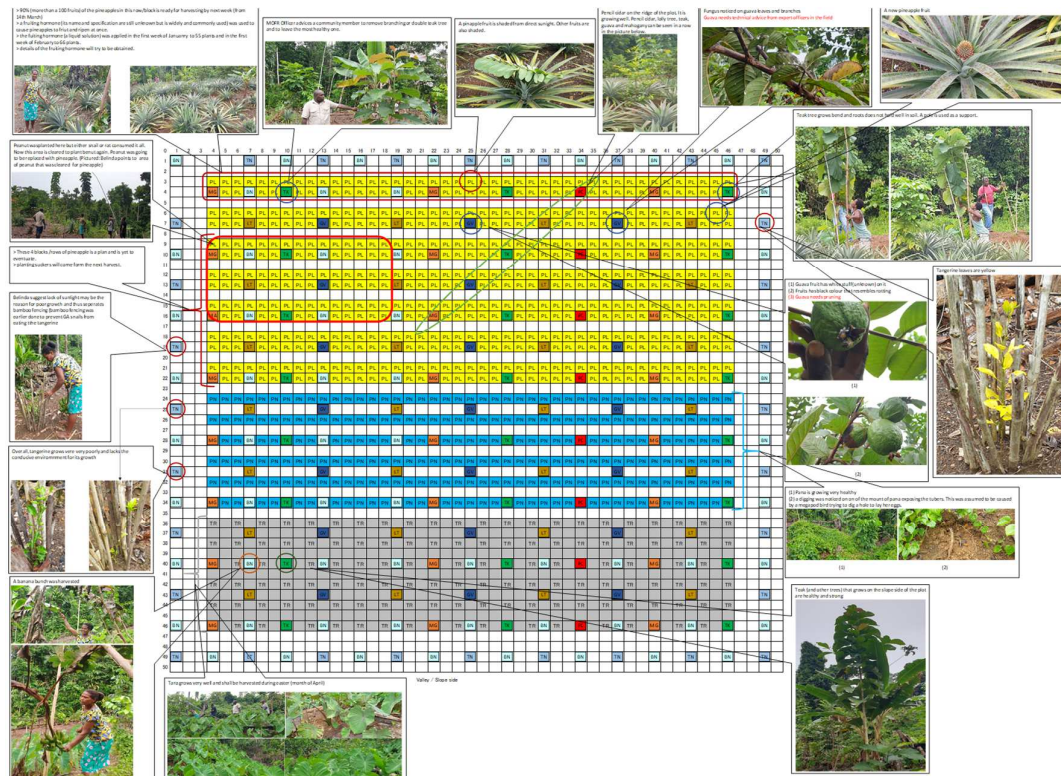
Form-2: Progress & Condition (Plant-wise)

Crop/ Tree	Plan (Day/Month/ Year)	Actual (Activity &Condition)	Remarks (Reasons for gap/Findings)	Way forward

Form-2: Progress & Condition (Plant-wise) <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

Form-3: Major Findings & Challenges

Topic	Findings/Challenges	Lessons/Measurements

Form-3: Major Findings & Challenges <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

Form-4: Cost & Benefit

☐ Production Cost & Sales (Financial input & output)

Item		Cash In	Cash Out	Balance	Remarks
Production Cost	Material Cost				
	Labor Cost				
	Total				
Sales	Timber				
	Crop				
	Total				
Balance (Sales - Production Cost)					
Borrowed from Fund					

☐ Materials & Harvest for Domestic Use (Material input & output)

Item	Description	Remarks
Materials	• Item (e.g. planting materials, charcoal) • Number/volume • Usage	
Harvest for domestic use	• Item (crop, fruit, timber) • Volume of yield/use • Usage	

Form-4: Cost & Benefit <Sample>

☐ 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	• 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	

5.3 Evaluation

■ Purpose

- To assess agroforestry activities overall from wider point of views.

- To identify advantages (strength) and disadvantages (weakness) of AF comparing with garden (slush-and-burn) and/or tree plantation

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■ Evaluation Question & Form

Item	Question	Achievement*	Comment
Achievement of objectives	• To what extent have the objectives of AF training plot indicated in the AF Implementation Plan achieved?		
Strength and Weakness of Agroforestry	• What kind of strength and weakness does the AF have comparing with garden and/or tree plantation?		
Contribution to SFFM/ SLU	• Does the AF contribute to realization of sustainable forest resource management (SFRM) and/or sustainable land use (SLU)?		
Improvement of Livelihood	• How does the AF contribute to improvement of livelihoods?		
Capacity Development	• What kind of knowledge and skills have you learned through the AF activity?		
	• What kind of institutional capacity has the community developed? (e.g. planning, record keeping, implementing community work, etc.)		

*Achievement: A: High, B: Medium, C: Low

Note: Evaluation items and questions were revised by reflecting lessons learnt through the pilot activity conducted by JICA SFRM Project.

■ Steps & Method

1. Explain the purposes and criteria of evaluation to community members.

2. Explain evaluation questions to community members and instruct how to assess the level of achievement. For example, if an aspect of the AF activity has been highly achieved, "High" or "A" is given.

3. Facilitate discussion among community members to assess their agroforestry activities following the evaluation questions.

4. If community members prefer to discuss with small number, they will be divided into groups, like men's group, women's group, and youth group. Then, each group discuss the topics.

5. After the group discussion, each group presents its discussion results. Then, it should be discussed and agreed by the whole community.

Solomon Islands Government
Ministry of
Forestry & Research

JICA

Let's try and enjoy agroforestry!

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

Management Rules and Regulations
on
Chicken Farming
in
Komuniboli Community

August 2022

Komuniboli Community, Aola Ward, East Central Guadalcanal Constituency,
Guadalcanal Province

MANAGEMENT RULES AND REGULATIONS
ON
CHICKEN FARMING IN KOMUNIBOLI COMMUNITY

These Management Rules and Regulations on Chicken Farming were developed through series of discussions amongst the stakeholders such as the Chicken Farming Interest Group (IG) representatives and members, and the staff members of the JICA's Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRM Project), and were agreed by all the Chicken Farming IG members of Komuniboli Community.

1. BACKGROUND

In May 2022, chicken farming was selected as the second activity under the sub-component of the Other Livelihood Improvement Activities by the mutual consent between Komuniboli Community and the SFRM Project, with the aim to contribute to the promotion of sustainable forest resource management. Technical training was delivered on 27th and 28th of April 2022 in collaboration with the Livestock Production and Veterinary Services Department, Ministry of Agriculture and Livestock (MOAL), followed by organization of the IG with youth members within the 25 households in the community.

The community agreed that the chicken farming will be managed by the youth of the community referred to as the Chicken Farming IG and the IG should represent all the 25 households in the community. The Project provided the Chicken Farming IG members with construction materials for a chicken house in May 2022 and 100 birds and feeds in June 2022 (**Appendix 1**).

In July 2022, as the Project was approaching its end in August 2022, the Project proposed preparing these management rules and regulations so that this activity of chicken farming should be managed in a sustainable way by the initiatives of the IG members. Several meetings were held between the IG members and the Project staff, and various issues were discussed. The results of the discussions were summarised as the management rules and regulations stated below:

2. MANAGEMENT STRUCTURE

The Chicken Farming IG Committee was newly established. The representatives, and their roles and responsibilities are determined as follows:

	Post	Name	Role and responsibility
1)	Chairperson	Mr. Andrew Mane	● Provide co-ordination, guidance and leadership to smooth running of the Chicken Farming IG Committee ● Represent the IG Committee in public spaces ● Ensure administrative tasks are carried out ● Monitoring **[Specifically during meetings]** ● Ensure agenda is followed ● Ensure quorum is present for decision making ● Maintain order ● Make sure all members are given opportunity ● Reporting to the main Community Committee and Chicken Farming IG.

2)	Vice Chairperson	Mr. John Viani	● In the absence of the chairperson, the vice chairperson will carry out the duties and responsibilities of the chairperson.
3)	Secretary	Mr. Alex Moses	● Keep record ● Prepare minutes of meetings ● Receive incoming mails ● Write outwards letters/correspondence ● Work with chairperson to arrange meetings
4)	Treasurer	Mr. Irish Ngelea	● Maintain bank account in the name of the Chicken Farming IG Committee to be opened in the future. ● Do banking (deposits, withdrawals, reconciling) as and when necessary. ● Pay accounts as authorized by the IG Committee and IG members. ● Keep invoices, receipts, cheque book, bank statements, etc. ● Report to the Community Committee, sectors or components in meetings. ● Prepare monthly and annual financial reports. ● Sign to bank account as one of the signatories. ● Responsible for petty cash according to the directive from the IG Committee. ● Responsible for cash sales of birds from chicken farm.
5)	Members	Mr. Fredrick Thungea Mrs. Bridget Mods Ms. Marinta Manengelea Mr. Augustine Geve	● Attend Chicken Farming IG committee meetings ● Participate actively in chicken committee meetings and the implementation of its activity plans.
6)	Ordinary members	All youth members	● Participate actively in activities and chicken IG meetings. ● Look after facilities and carry out activity plans. ● Attend meetings and be part of decision making. ● Bring any issues to the IG Committee and members.

The term of the Chicken Farming IG Committee members is two years. After the two years term, review and evaluation of the current IG Committee members shall be carried out. Based on the performance, new IG Committee members shall be selected and nominated by the agreement of all the IG members. In case that any IG Committee member needs to resign or to be replaced during the term, a plenary meeting with all the IG members shall be organised to discuss and agree with the replacement. A formal resignation letter must be forwarded to the Community Committee Chairperson.

3. NEW MEMBERSHIP FOR A CHICKEN IG MEMBER

The criteria for a new member are:

● Must be a member of the community's 25 households;
● Must participate in chicken farming activities; and
● Must attend meetings.

Chicken IG Committee will prepare a questionnaire to assess a new member.

4. DAY-TO-DAY MANAGEMENT OF CHICKEN FARMING

As far as chicken farming is practised collectively by all the Chicken Farming IG members, the daily management should properly be shared by all the IG members as follows:

1) Monthly schedule preparation
The chairperson of the Chicken Farming IG is to create monthly participation schedule by the third week of the previous month.

2) Notification on absence
The IG members have to make prior arrangement two days before absence from scheduled activities or commitment. In case of any emergency absence, the IG member has to immediately inform the IG Chairperson or the IG member in charge.

3) Actual work
The IG members should faithfully perform the following expected activities:

- Feeding of all the birds available in the chicken house;
- Cleaning in and around the chicken house;
- Making sure clean water is available at all times;
- Observe and follow scheduled time;
- Properly dispose chicken manure/waste at right place;
- Wash hands and feet before entering and after exiting the chicken house;
- Wear safety and protective gears (e.g. overall, gum boot, hand gloves, etc.) and when necessary disinfect the chicken house;
- Monitor feedstock and report to the IG Committee;
- Provide security for the chickens at all times;
- Report any situation that threatens the health, quality, condition and quantity of the birds to the Chairperson or any appointed IG member by the Chairperson of the IG Committee;
- Do not disturb the birds during their resting times; i.e. 10:00AM – 11:00AM and 10:00PM – 5:00AM; and
- Maintain that the lights for starter period must be turned on throughout the night until morning (the whole night); and for grower to finisher stages the lights must be turned off by 10:00PM, every day.

4) Disciplinary measures
In case an IG member fails to perform the day-to-day activities:

- For the first time, the Chairperson must advice the member;
- For the second time, ask the member if she/he is still interested in the activity or not;
  - ➤ If she/he is still interested, the Chairperson must strongly advice.
  - ➤ If she/he is no longer interested, the IG member self terminates himself or herself.
- For the third time, there should be a mutual consultation between the IG member and the IG Committee that the IG member self terminates.

5. BUSINESS PLAN

A business plan should be prepared in order to make a policy on business development of chicken farming clear as well as to secure transparency of the policy.

1) Contents

The business plan includes actions, schedule per action, income, expenditure and balance. The latest Business Plan was developed and agreed upon the mutual discussions by all the IG members (**Appendix 2**).

2) Review and modification

The business plan should be reviewed and modified every three months. In case that any issues arise and modification of the business plan is needed before the regular review and modification, the IG Chairperson can call an IG plenary meeting to discuss the issues.

6. SALES

Sales should strictly be made following the management plan. Credit sales should never be applied for whatever reason.

Only an IG member authorised by the IG committee will be responsible to receive cash sales of birds from the chicken farm if the treasurer is not available.

7. REVOLVING FUND

Although there is no specific plan of introducing a revolving system for chicken farming, the IG members share potential of developing the system in future so that all the IG members can practise chicken farming by each household and make benefit from the activity. The detailed plan for the revolving system as well as the revolving fund should be determined under the mutual discussions among the IG members.

8. MONITORING AND GENERAL CHICKEN IG MEETINGS

1) Monitoring

Monitoring of chicken farming and its management will be conducted with the following two major purposes:

- To check progress of the activities through periodical and continual data collection; and
- To correct the plan through examination of constraints and taking countermeasures to proceed with the activities effectively.

Monitoring on production will be conducted in terms of day-to-day activities, weight gain (fortnightly) by the IG members on duty and overseen by the Chairperson. Meanwhile the financial status will be monitored each day when any transaction takes place by the IG Committee. The existing monitoring formats for some items should be used but for those existing formats are not available shall be developed by the Chairperson of the IG Committee. The results of the monitoring should be recorded and sorted out by the Secretary of the IG Committee for reporting purposes.

2) General Chicken Farming IG meetings

Reporting will be conducted in a way to organise general Chicken Farming IG meetings every three months. The Chairperson and the Secretary of the IG Committee organise the meetings. In the meetings, the following agenda will be discussed:

- Review of the minutes of the last general Chicken Farming IG meeting;
- Monitoring results;
- Review of business plan;
- Auditing of income, expenditure and balance; and
- Any other business (AOB).

9. MODIFICATION OF RULES AND REGULATIONS

The current Management Rules and Regulations can only be modified with the following procedures:

i)   The Chairperson of the Chicken Farming IG Committee call a co-ordination meeting;

ii) Participation (quorum) ratio of the IG members to the co-ordination meeting should be more than 80%;

iii) The draft of the modification plan should be agreed with more than 80% of the participating IG members of the co-ordination meeting;

iv) The revised version of the Management Rules and Regulations should be prepared within two weeks by the responsibility of the Chairperson and should be confirmed by all the IG members at the next general IG meeting.

10. TERMINATION OF CHICKEN FARMING

In case the pig farming activity faces difficulties and challenges due to management, marketing, rising costs and other uncontrolled reasons and situation, and/or the another potential activity is identified, then the activity can be terminated following these procedures:

- The chairperson of the Chicken Farming IG Committee calls for a general Chicken Farming IG meeting. Participation (quorum) ratio of the IG members should be more than 80%;
- The Chairperson raises the issue for the termination and the IG members thoroughly discuss and come to a common agreement;
- In case a common agreement is not reached, an open voting will be conducted to reach a common agreement; and
- Once a common agreement is reached, the information will be shared to the Other Livelihood Improvement Sub-component, all the sectors, the Community Committee and the other authorities related.

Signatory

Date: 9 August 2022

Pig Farming IG Committee members

Mr. Andrew Mane	Mr. John Viani	Mr. Alex Moses
Chairperson	Vice Chairperson	Secretary
Mr. Irish Ngelea	Mr. Fredrick Thungea	Mrs. Bridget Mods
Treasurer	Member	Member

Ms. Marinta Manengelea	Mr. Augustine Geve
Member	Member
Sector representative	*Community representative*

Mr. Desmond Tangithia	Mr. Joseph Manengelea
Chairperson	Chairperson
Economic Development Sector	Community Committee
Witness	*Witness*

Mr. Eric Kwaria	Mr. Hearley Atupule
Chairperson, Technical Support	Deputy Director
Committee (TSC), SFRM Project	Dep't of Livestock Production
(Chief Forest Officer,	and Veterinary Services
Reforestation Division, MOFR)	MOAL

Agreement by IG members

	Name		Signature
	Head of HH	Signer	
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Appendix 1: List of materials provided by the SFRM Project

	Item	Unit cost	Quantity	Sub-total
Materials	Galv Chick/Bird wire ½ 90cmx30cm Roll	$465.00	1	$465.00
	Staple nail 2.11mmx19mm per kg	$48.00	2	$96.00
	Bright Jolt Head Nail Q235 2inc - KG	$30.00	3	$90.00
	Bright Jolt Head Nail Q235 3inc - KG	$30.00	5	$150.00
	Bright Jolt Head Nail Q235 4inc - KG	$30.00	5	$150.00
	Leaf Rake 26 TNS Black head White Wood	$60.00	1	$60.00
	Spade White (Square Head) 300x190x1060mm	$95.00	1	$95.00
	Roofing Iron Zincalume, 24G, 0.55x938 G300 AZ150 Corrugated; 8 Sheets of 8ft @$25.50/ft	$25.50	16	$1,631.87
	Roofing Nail Galv Twisted 75x3.75mm/kg	$38.00	2	$76.00
	Galv Cocoa/Chili Wire 6x6x1mm 90cmx30cm/R Hop Dip Galvanized before weaving	$1,400.00	2	$2,800.00
	Aqua Tank 2100L Stackable with Tank Fitting 1" (1600x1160x2080mm: [Top x Bottom x Height]) Outlet 25mm Thickness 6mm Weight 53KG	$3,200.00	1	$3,200.00
	Shovel Square Mouth Cushion Grip with Long Fiberglass Shaft 105CM (41.5")	$140.00	1	$140.00
	Brass Hose Cock L/Brass TH MI	$110.00	1	$110.00
	Feeder (large)	$95.00	4	$380.00
	Feeder (small)	$55.00	4	$220.00
	Drinker (large)	$95.00	4	$380.00
	Drinker (small)	$55.00	4	$220.00
	Kerosene lamp	$60.00	3	$180.00
	Safe box to transport chicks	$25.00	1	$25.00
	Kerosene fuel (1.5L per bottle for 13 bottles)	$20.00	13	$260.00
	Marine esky/cooler (80L blue)	$1,900.00	1	$1,900.00
	Set 10W solar	$1,190.00	1	$1,190.00
	Plastic Container White 20L	$155.00	6	$930.00
	External Bracket (for gutter)	$26.00	20	$520.00
Transport	2-ton truck	$600.00	1	$600.00
	Abraham Bus Transport Service	$1,000.00	1	$1,000.00
Chickens	Chicks	$19.50	100	$1,950.00
Feed	Broiler starter (20kg per bag)	$165.00	4	$660.00
	Broiler grower (20kg per bag)	$155.00	10	$1,550.00
	Broiler finisher (40kg per bag)	$345.00	7	$2,415.00
Total				**$23,443.87**

Appendix 2: Business Plan

#	Action	7-1	7-2	7-3	7-4	8-1	8-2	8-3	8-4	9-1	9-2	9-3	9-4	10-1	10-2	10-3	10-4	11-1	11-2	11-3	11-4	12-1	12-2	12-3	12-4	1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4
	(Year / Month / Week)																																				
1	Order and purchase of chicks			▦Y	▦Y																																
2	Purchase of feed			▦G	▦G																																
3	Pick up of chicks and feed					▦R	▦R																														
4	Feeding until slaughter							▦P	▦P	▦P	▦P	▦P	▦P																								
5	Sales of broiler													▦B	▦B																						
6	Order and purchase of chicks							▦Y	▦Y																												
7	Purchase of feed							▦G	▦G																												
8	Pick up of chicks and feed									▦R	▦R																										
9	Feeding until slaughter											▦P	▦P	▦P	▦P	▦P	▦P																				
10	Sales of broiler																	▦B	▦B																		
11	Order and purchase of chicks											▦Y	▦Y																								
12	Purchase of feed											▦G	▦G																								
13	Pick up of chicks and feed													▦R	▦R																						
14	Feeding until slaughter															▦P	▦P	▦P	▦P	▦P	▦P																
15	Sales of broiler																					▦B	▦B														
16	Order and purchase of chicks															▦Y	▦Y																				
17	Purchase of feed															▦G	▦G																				
18	Pick up of chicks and feed																	▦R	▦R																		
19	Feeding until slaughter																			▦P	▦P	▦P	▦P	▦P	▦P												
20	Sales of broiler																									▦B	▦B										
21																																					
22																																					

Color key: Y = yellow, G = green, R = red, P = purple, B = blue.

		2022 – 7	2022 – 8	2022 – 9	2022 – 10	2022 – 11	2022 – 12
Income	Amt	$9,700	$0	$10,000	$10,000	$10,000	$10,000
	Item	Chicken sales	Chicken sales	Chicken sales	Chicken sales	Chicken sales	Chicken sales
Expenditure	Amt	$0	$6,500	$6,550	$6,600	$6,650	$6,700
	Item		Chicks/feeds/freight	Chicks/feeds/freight	Chicks/feeds/freight	Chicks/feeds/freight	Chicks/feeds/freight
Balance	Amt	$9,700	$3,200	$6,650	$10,050	$13,400	$16,700

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

**Management Rules and Regulations
on
Chicken Farming
in
Falake Community**

August 2022

Falake Community, West Kwara'ae, Malaita Province,
Solomon Islands.

MANAGEMENT RULES AND REGULATIONS
ON
CHICKEN FARMING IN FALAKE COMMUNITY

These Management Rules and Regulations on Chicken Farming were developed through series of discussions amongst the stakeholders such as the Chicken Farming Interest Group (IG) representatives and members, and the staff members of the JICA's Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands (SFRM Project), and were agreed by all the Chicken Farming IG members of Falake Community.

1. BACKGROUND

In May 2022, chicken farming was selected as the second activity under the sub-component of the Other Livelihood Improvement Activities by the mutual consent between Falake Community and the SFRM Project, with the aim to contribute to the promotion of sustainable forest resource management. Technical training was delivered in May 2022 in collaboration with the Livestock Production and Veterinary Services Department, Ministry of Agriculture and Livestock (MAL), followed by organisation of the IG with the initial establishment of the activity by 20 women and 20 youths, and in the future more members of women and youth are welcome to involve in the activity. The Project provided the IG with construction materials for chicken house, chicks and feed from May to June 2022 (**Appendix 1**).

In July 2022, as the Project was approaching to its end of August 2022, the Project proposed preparing these management rules and regulation so that this activity of chicken farming should be managed in a sustainable way by the initiatives of the IG members. Several meetings were organised between the IG members and the Project staff, and various issues were discussed. The results of the discussions were summarised as the management rules and regulations stated below:

2. MANAGEMENT STRUCTURE

The Chicken Farming IG Committee was newly formed, and its members and their roles and responsibilities are determined as follows:

	Post	Name	Role and responsibility
1)	Chairperson	Mrs. Sally Gale	● Provide coordination, guidance and leadership to smooth running of Chicken Farming IG Committee ● Represent the Chicken Farming IG Committee in public spaces ● Ensure administrative tasks are carried out ● Monitoring **[Specifically during meetings]** ● Ensure agenda is followed ● Ensure quorum is present for decision making (80% of Chicken Farming IG Committee members) ● Maintain order ● Make sure all members are given opportunity ● Reporting ● Others
2	Vice Chairperson	Mr. Clinton Adomea	● Assist Chairperson ● In absent of the Chairperson, the Vice Chairperson will carry out the role and responsibility of the Chairperson.

			● Monitoring
3)	Secretary	Mr. Wilson Futaburi	● Keep record ● Prepare minutes of meetings ● Receive incoming mails ● Write outwards letters/correspondence ● Work with the Chairperson to arrange meetings or the Vice Chairperson in the absent of the Chairperson
4)	Vice Secretary	Mrs. Helina Lodo	● Assist the Secretary ● In the absence of the Secretary, the Vice Secretary will carry out the role and responsibility of the Secretary
5)	Treasurer	Mrs. Freda Kwaiorea	● Maintain bank account in the name of the Community Committee, sectors or components ● Record and receive banking money ● Pay accounts as authorized by the Community Committee, sectors or components ● Keep invoices, receipts, cheque books, bank statements, etc. ● Report to the Community Committee, sectors or components ● Prepare annual reports ● Sign to bank account ● Keep cash
6)	Vice Treasurer	Mr. Alphonse Kofasia	● Assist the Treasurer ● In the absence of the Treasurer, the Vice Treasurer will carry out the role and responsibility of the Treasurer
7)	Member	Ms. Francina Kea	● Participate actively in activities and meetings ● Look after facilities, carry out plans and prepare reports for activities carried out ● Attend meetings and be part of decision making ● Bring any issues to the Community Committee, sectors or components
8)	Member	Mrs. Esther Ramo	
9)	Member	Mr. Rodrick Gale	
10)	Member	Mrs. Loveness Itea	

The term of the IG committee members is one (1) year. After the term, new IG committee members shall be selected and nominated by the agreement of 80% of the IG members. In case that any IG committee member needs to resign or to be replaced during the term, a plenary meeting with 80% attendance by the IG members shall be organised to discuss and agree with the replacement.

3. DAY-TO-DAY MANAGEMENT OF CHICKEN FARMING

As far as chicken farming is practised collectively by all the IG members, the daily management should properly be shared by all the IG members as below:

1) Weekly schedule preparation
The Chairperson and Secretary of the Chicken Farming IG are to create weekly duty roster schedule per batch for all Chicken Farming IG members.

2) Notification on absence
The IG members have to make prior arrangement for replacement two days before absence from scheduled activities. In case of an emergency (illness and attend funeral), the supervisor must be notified immediately either by the IG member or through another IG member.

3) Actual work

The IG members should faithfully perform the following expected activities per batch:

- Brooder preparation;
  - ➢ Collection of saw dust (wood shaving)
  - ➢ Kerosene with lamp for warmth and lighting
  - ➢ Feeder and drinker
  - ➢ Feed and water
- Collection of wood shaving for the whole shed;
- Feeding of the birds;
- Cleaning in and around the fence;
- Making sure of water is available at all times;
- Observing scheduled time;
- Wash hands and feet before and after feeding birds;
- Use safety gear (e.g. gum boot, face mask, hand glove, etc.);
- Slaughtering and marketing of chicken;
- Report any situation that threatens the health, quality, condition, quantity of birds to the Chairperson; and
- Cleaning and disinfection of the shed before the arrival of the next batch.

4) Disciplinary measure

In case any IG members fail to perform his/her specific duties mentioned in the weekly duty roster excluding community participation activities:

- The daily supervisor gives a first verbal reminder;
- If the IG member still fails to perform his/her duties, the supervisor gives a second verbal reminder and inform the Chicken Farming IG Committee; and
- If the IG member still fails to perform his/her duties the third time, the supervisor gives a third verbal reminder and the IG Committee Chairperson to inform the main community committee to make a final decision.

4. BUSINESS PLAN

A business plan should be prepared in order to make a policy on business development of chicken farming clear as well as to secure transparency of the policy.

1) Contents

The business plan includes actions, schedule per action, income, expenditure and balance. The latest business plan was developed and agreed upon the mutual discussions by all the IG members (**Appendix 2**).

2) Review and modification

The business plan should be reviewed and modified every three months by the Chicken Farming IG members. In case that any issues arise and modification of the business plan is needed before the regular review and modification, the IG Chairperson can call an IG meeting to discuss the issues.

5. SALES

- Sales should strictly be made following the management plan;
- Sales on credit should never be applied for non IG members;
- Sales on credit can be applied for the IG members with deposit of 50% of the selling price. Reimbursement should be made within two weeks time.

6. REVOLVING FUND

Although there is no specific plan of introducing a revolving system for chicken farming, the IG members share potential of developing the system in future so that all the IG members can practise chicken farming by each IG member and make benefit from the activity. The detailed plan for the revolving system as well as the management should be determined under the mutual discussions among the IG members.

7. MONITORING AND REPORTING

1) Monitoring

Monitoring of chicken farming and its management will be conducted with the following two major purposes:

- To check progress of the activities through periodical and continual data collection; and
- To correct the plan through examination of constraints and taking countermeasures to proceed with the activities effectively.

Monitoring will be conducted daily by the supervisor using a daily checklist format (see **Appendix 3**). The Chairperson and Vice Chairperson of the IG committee organise the monitoring. The results of the monitoring should be recorded and sorted out by the Secretary of the IG Committee.

2) Reporting

Reporting will be conducted in a way to organise regular report meetings, every three months. The Chairperson and Secretary of the IG committee organise the report meetings. In the meetings, the following agenda will be discussed:

- Monitoring results;
- Review of business plan;
- Auditing in income and expenditure; and
- Any other business (AOB).

8. MODIFICATION OF RULES AND REGULATIONS

The current Management Rules and Regulations can only be modified with the following procedures:

i) The Chairperson of the IG committee call a co-ordination meeting;
ii) Participation ratio of the IG members to the co-ordination meeting should be more than 80%;
iii) The draft of the modification plan should be agreed with more than 80% of the participating IG members of the co-ordination meeting; and
iv) The revised version of the Management Rules and Regulations should be prepared within two weeks by the responsibility of the Chairperson and Secretary and should be confirmed by all the IG members at the next report meeting.

9. TERMINATION OF CHICKEN FARMING

- The IG Committee members shall meet immediately about the issue for termination. During this meeting, the IG Committee will not strike any decision yet;
- The IG Committee members shall meet with the Economic Development Sector Committee and the Community Committee where the IG Committee aware these two committees of the situation but without striking any decision yet;
- If more than 80% of the IG members including the Other Livelihood Improvement Sub-committee, the Economic Development Sector Committee and Falake Community Committee attend to this meeting

then a decision can be made. During the meeting, financial report and asset valuation report must be presented before the IG members/committee including the Falake Community Committee; and

● All minutes of the meetings must be compiled.

Signatory

Date: 16 August 2022

Chicken Farming IG Committee

_____
Mrs. Sally Gale
Chairperson

_____
Mr. Clinton Adomea
Vice Chairman

_____
Mr. Wilson Futaburi
Secretary

_____
Mrs. Helina Lodo
Vice Secretary

_____
Mrs. Freda Kwaiorea
Treasurer

_____
Mr. Alphonse Kofasia
Vice Treasurer

_____
Ms. Francina Kea
Member

_____
Mrs. Esther Ramo
Member

_____
Mr. Rodrick Gale
Member

_____
Mrs. Loveness Itea
Member

Sector representative

Community representative

_____
Mr. Benjamin Arurumae
Chairperson
Economic Development Sector

_____
Mr. Constantine Etemani
Chairperson
Community Committee

Witness

Witness

_____
Mr. Ronnie Aiwewe
Counterpart
SFRM Project
(Chief Forest Officer,
Malaita Forestry Office, MOFR)

_____
Mr. Hearley Atupule
Deputy Director
Department of Livestock Production
and Veterinary Services
MAL

Agreement by IG members

	Name		Signature
	IG Member	Signer	
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	Name		Signature
	IG Member	Signer	
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Appendix 1: List of materials provided by the SFRM Project

	Item	Unit cost	Quantity	Sub-total
Materials	3 Roll chicken wire	$480.00	3	$1,440.00
	10 Pieces mess wire	$450.00	10	$4,500.00
	8 KG 2 inch nail	$24.00	8	$192.00
	8 KG 3 inch nail	$24.00	8	$192.00
	10 KG 4 inch nail	$24.00	10	$240.00
	10 KG staple nail	$30.00	10	$300.00
	2 Roll black plastic	$1,300.00	2	$2,600.00
	1 Water tank (400 gallon)	$5,400.00	1	$5,400.00
	1 Tap (20mm)	$100.00	1	$100.00
	Feeder (large)	$95.00	4	$380.00
	Feeder (small)	$55.00	4	$220.00
	Drinker (large)	$95.00	4	$380.00
	Drinker (small)	$55.00	4	$220.00
	Kerosene lamp	$60.00	4	$240.00
	Kerosene fuel (4 gallons)	$60.00	4	$240.00
	Freight charges for 4 broiler grower/starter feeds	$50.00	4	$200.00
	Safe box to transport chicks	$25.00	1	$25.00
	Starter feeds to feed chicks over night before transportation from Honiara to Auki	$15.00	1	$15.00
	Kerosene fuel (1.5L bottle) to warm chicks over night before transportation from Honiara to Auki	$20.00	1	$20.00
	Marine esky/cooler (80L blue)	$1,900.00	1	$1,900.00
	Sago Palm leaves	$8.00	100	$800.00
Transport	3-ton truck to transport sago palm leaves to Falake	$1,000.00	1	$1,000.00
	Truck hire for transport of finisher feeds from Vuvula to wharf	$200.00	1	$200.00
	Freight charges for finisher feeds via MV. Taimareho	$20.00	14	$280.00
	Freight charges for esky/cooler (80L)	$20.00	1	$20.00
	Fuel for project cruiser to transport finisher feeds from Auki wharf to Falake community @$75 per gallon for 4 gallons)	$75.00	4	$300.00
Chickens	Chicks	$19.50	100	$1,950.00
Feed	Broiler starter/grower (40kg per bag)	$325.00	4	$1,300.00
	Broiler finisher (20kg per bag)	$160.00	14	$2,240.00
Total				**$26,894.00**

Appendix 2: Business plan

#	Action
1	Purchase of 100 DOC (day old chicks) for Batch 2
2	Purchase of starter & grower feed (7 bags 40kg bags)
3	Kerosene (2 gallon @$70 per gallon)
4	Collect DOC
5	Feeding and management
6	Purchase of finisher feed (7 bags 40kg/14 bags 20kg)
7	Feeding and management continue until sales
8	Sales of Batch 2 chickens @$120
9	Total fare
10	Sales of chicken manure (@$40 x 15 millrun bag)
11	Purchase of 100 DOC for Batch 3
12	Purchase of starter & grower feed (7 bags 40kg bags)
13	Kerosene (2 gallon @$70 per gallon)
14	Collect DOC
15	Feeding and management
16	Purchase of finisher feed (7 bags 40kg/14 bags 20kg)
17	Feeding and management continue until sales
18	Sales of Batch 3 chickens @$120
19	Total fare
20	Sales of chicken manure (@$40 x 15 millrun bag)
21	Purchase of 100 DOC for Batch 4
22	Purchase of starter & grower feed (7 bags 40kg bags)
23	Kerosene (2 gallon @$70 per gallon)
24	Collect DOC
25	Feeding and management
26	Purchase of finisher feed (7 bags 40kg/14 bags 20kg)
27	Feeding and management continue until sale
28	Sales of Batch 4 chickens @$120
29	Total fare
30	Sales of chicken manure (@$40 x 15 millrun bag)
31	

Timeline (Year 2022: months 7–12; Year 2023: months 1–3; each month divided into weeks 1–4).

	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Income Amt	$9,700	$0	$12,600	$0	$12,600	$12,600
Income Item	Sales (100 birds)		Sales (100 birds) & manure		Sales (100 birds) & manure	Sales (100 birds) & manure
Expenditure Amt	$1,875	$6,275	$1,875	$6,775	$8,650	
Expenditure Item	DOC & casing	Feed, freight, kerosene, fare	DOC, casing	DOC, Feed, freight, kerosene, fare	DOC, Feed, freight, kerosene, fare	
Balance Amt	$7,825	$1,550	$12,275	$5,500	$9,450	$22,050

Appendix 3: Daily checklist format

MONITORING FORM 1

IG TYPE: POULTRY FARMING
IG MEMBERS: WOMENS AND YOUTH DEVELOPMENT SECTORS

Daily duty roster IG name   _____   Date: _____
Time: _____ *(on arrival)*
Duty roster Checklist

Time	Actual Work done	Performance rating		
		Very Good	Good	Need improvement
Morning	Feeding			
	Fresh water			
	cleanliness			
	Supplementary feed			
	Wood shaving			
	General observation on birds			
Lunch	Feeding			
	Fresh water			
	cleanliness			
	Supplementary feed			
	Wood shaving			
	General observation on birds			
Dinner	Feeding			
	Fresh water			
	cleanliness			
	Supplementary feed			
	Wood shaving			
	General observation on birds			

Daily Supervisor: _____ *(name)*

*Comment/recommendation*_____

_____

_____

Daily Duty Roster IG Member _____   Daily Supervisor: _____