Appendix 8

Levelling the Playing Field:
Fair Partnership for Local Development to Improve the Forest Sustainability in Southeast Asia

Progress Report of MAS Modelling

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Progress Report of MAS Modelling

1. Introduction

Levelling the Playing Field (LPF) project has been working in Barangay San Rafael, Tanabag, and Concepcion (Puerto Princesa City, Palawan) since early 2004. The site was selected because the management of its renewable resources, as in many other places, is characterized by multiple stakeholders who have different and competing interests, objectives and motives. The community groups and government and non-government institutions also have different position of power that makes collaborative management difficult. LPF project aims to facilitate these different stakeholders in communicating and negotiating their different interests, learning about the consequences of their strategies, which hopefully can help them in coming up with an agreed common vision and management plan for their resources.

One of the approaches applied in LPF project is the Companion Modeling (ComMod) approach. This report presents the progress of the approach application and the different activities carried out within the period of one and a half years in Palawan site, using ComMod. The LPF team has been focusing on the processes to facilitate learning and empowerment of the stakeholders, especially those of stakeholders who have little influence in the management of renewable resources. This is done by developing and using tools for learning about the natural resources management (NRM) system and for negotiation of management strategies. The development of these tools will be done by the community, other relevant stakeholders, and the researchers.

2. Objectives

The objectives of this study are to:

1) Characterize the existing NRM system thru institutional analysis and MAS modeling;
2) Identify areas of intervention where learning and negotiation tools can be used to initiate change;
3) Use existing tools or develop new tools for learning and for facilitating negotiations using the ComMod approach. The tools, methods and artifacts that would be developed and/or used includes, but are not limited to, Pro-Active Conciliation Tool (PACT), a Multi-Agent System (MAS) simulation platforms, role-playing games (RPG), and Geographic Information Systems (GIS) products;
4) Assess the effectiveness of the ComMod approach in addressing the concerns of this research thru the use of criteria and indicators-based analysis and institutional analysis; and
5) Improve existing framework in the implementation of the ComMod approach in resource management.

3. Overview on Multi-Agent Systems and Companion Modelling

A Multi-Agent System or MAS is a representation of a complex system, such as NRM, and is composed of: (1) a space, called the environment, (2) objects that are situated in the environment, (3) a special type of object, called agents that would represent the active entities in the system, (4) relations that link these objects, and consequently the agents, and the agents with their common environment, (5) a set of operations that could be performed by the agents to interact, transform or manipulate other objects in the environment, and (6) operators that represent the results when these operations are performed (Ferber 1999 *in* Bousquet and Le Page 2004). Each agent has its own characteristics, goals, knowledge and certain, but limited perception of the system and is also able to communicate with other agents. Figure 1 is a visual representation of these components of a MAS model. In the case of an NRM system, humans or stakeholders are usually represented as agents in a MAS model. However, these agents could also be animals, which also have a stake in the system. Bio-physical processes, such as soil erosion and resource growth functions, occurring in the environment could also be integrated into the MAS model using the principles of cellular automata.

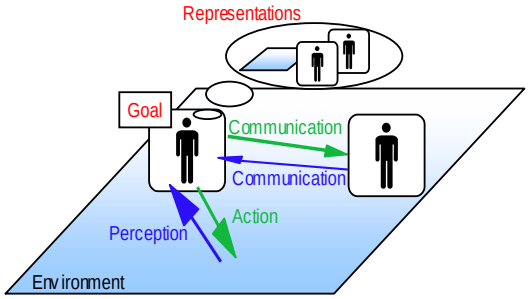


Figure 1. Multi-agent system (Ferber 1999 *in* Bousquet and Le Page 2004).

In order to build the MAS model, the companion modelling approach would be used to ensure the active participation of the stakeholders in the development of the model. Companion modeling or ComMod (Barreteau *et al*. 2003) is an iterative approach in developing system models, in this case a MAS model, and simulation tools when dealing with complex systems, wherein fieldwork and system modelling are closely related and complementary activities. In this approach there is constant interaction between the researchers and stakeholders in the iterative process (see Figure 2), such that the model will undergo modifications resulting from these interactions or a come up with a totally different model altogether. In ComMod, the quality of process of building the MAS model is paramount such that the stakeholders should be able to accept the results of the modelling process. The process of validating the MAS model is a series of back-and-forth steps from the field (reality) to the model to take into account the different perceptions of the stakeholders and properly represent them in the model using tools such as simulation model and/or an RPG as platforms for discussion. A simulation model is an implementation of the MAS model into a computer that simulates a system thru the passage of time. On the other hand, RPG is an implementation of a MAS model using a game, but having humans, such as

stakeholders, playing the roles of agents of the MAS model. Although these two tools (simulation model and RPG) could be used individually in the development of the MAS model, together, they complement each other depending on the purpose of the MAS modeling exercise. An example of this complementary relationship of RPG and simulation model is the case wherein the RPG is used as a facilitation tool to explain the MAS model, especially if the model is too complex and is difficult to explain thru traditional methods. However, an RPG played with the stakeholders is limited in the number of steps or iterations that can be played and in the number of interactions that can be represented; the simulation model could be used to show the outcomes of the RPG should the game be continued for a longer period or include more features and complex interactions that were not represented in the RPG. Other tools could also be used to support the modelling process such as tools and artifacts developed using participatory GIS and participatory land-use planning tools, etc.

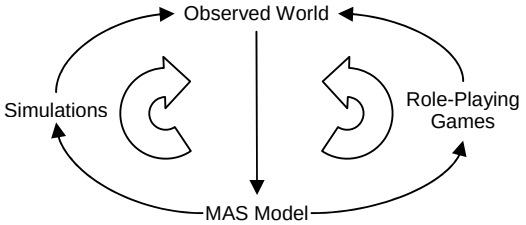


Figure 2. The companion modelling approach (Barreteau *et al.* 2001).

4. Steps of the MAS modelling activity

The general steps of this activity are outlined in Figure 3. However, modelling process is not a straight-forward process and some of the steps require going back and forth in through some of the steps. A more detailed implementation of the modelling process is shown in Figure 4.

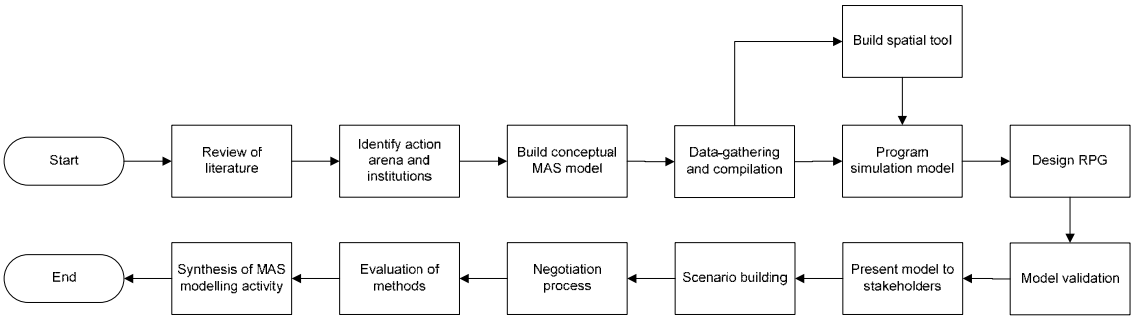


Figure 3. General process of implementation.

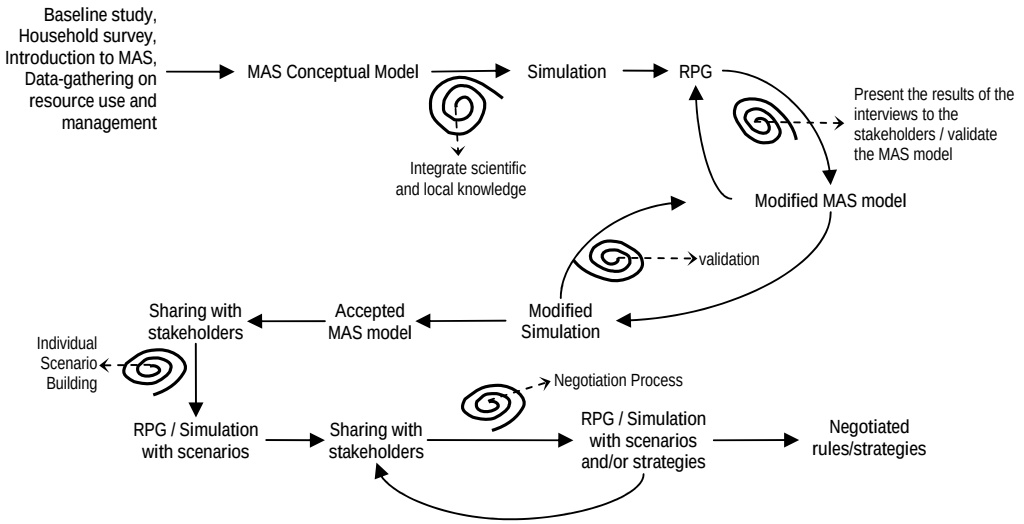


Figure 4. Implementation of the ComMod approach.

In Figure 4, the concept of the ComMod approach is elaborated to accommodate different activities for model validation and specific learning activities with the stakeholders. It is important to note that it is only upon the acceptance of the stakeholders that the model represents their reality would the MAS model be used for scenario-building and negotiations. To study the different possible scenarios and management strategies, we again go back to the stakeholders and let them identify their concerns and interests. We would then try to reflect their points of views into the simulation model by using different indicators and view the results of the simulation as thematic maps, charts, graphs, etc. The rules of management may also be negotiated thru the use of RPGs.

5. Activities conducted

The activities that have been conducted for MAS modelling so far were related to data and information gathering that is needed to build the conceptual MAS model for the NRM system of the three barangays in the study site. These activities were also used as a way to prepare the stakeholders so that they could participate in the succeeding MAS modelling activities in their area.

5.1 Introducing the concept of MAS modelling

Objectives

This step is done to formally introduce the stakeholders to the MAS modelling concept, the objectives of the study, and the different tools and methods to be applied in the process.

Methods

Three 1-day workshops were conducted with different types of stakeholders in each of the workshops. The following workshops were conducted with the following participants:

1) Provincial steering committee (PrSC) composed of leaders from government organizations, NGOs and the communities;
2) Representatives from government and non-government organizations;
3) Community members coming from the 3 barangays.

Table 1 shows the schedule of those workshops and the number of participants.

Table 1. Schedule of the workshops and number of participants.

Date	Group	No. of participants
29 March 2005	PrSC	12
30 March 2005	GOs and NGOs	15
31 March 2005	Community	20
3-4 August 2005	Bataks	12

The activities conducted in the workshops were the following:

1) A short presentation about MAS modeling;
2) Presentation of examples of tools that could be developed in the modelling process;
3) Chering game with four scenarios and a debriefing of the game;
4) Discussions with the stakeholders about the MAS modelling process wherein they were asked three discussion questions: i) How can MAS modelling be of help to you and/or your organization?; ii) What are the lessons you have learned from this workshop?; iii) What would you like to see in the model?

The Chering game was developed by researchers from CIRAD and was designed as a generic role-playing game that could be played with any type of stakeholder. The Chering game deals with a resource-gathering situation and the players of the game act as resource gatherers. In the game, a map of plots of land containing different amounts of "Ing," is presented to the players. The term "Ing", coined by the CIRAD researchers, refers to generic resources, i.e. forest, lowland, coastal resources, or others. For each round of the game, each player chooses a single plot from which he or she is going to gather "Ing". Their choices are submitted all at the same time and at the end of each round, the number of "Ing" gathered by a player is computed based on the available 'Ing' of the plot he or she has chosen and the number of players that were on the same plot. The available "Ing" of a plot after the round is then computed based on the number of "Ing" gathered and a growth function of "Ing". The resulting map is then used for the next round. The game is played for 5 rounds in total.

The game itself was designed to have four scenarios wherein rules of the game, i.e. the rules on interaction between players, are slightly changed. The scenarios played in the Chering game are as follows:

1) Each player makes his own decision in gathering the resource;

2) The players were grouped randomly and they were allowed to discuss a strategy for the game within the group;
3) Aside from being able to discuss their group strategies within the group, they were also allowed to discuss with the other groups;
4) Almost the same as the 3rd scenario, but there is a moratorium in the gathering of resources in the game. The total number of resources that could be gathered for each round was limited to a specific number.

The results of the Chering game, thru the use of graphs and maps, were shown to the participants and were discussed after the four scenarios.

The responses to the discussion questions are found in Annex 1 of this report.

In workshop for the community, unfortunately, there were no representatives coming from the indigenous people sector, more specifically, the invited Bataks from Sitio Kalakuasan in Brgy. Tanabag. Realizing the importance of introducing the process to this group, another activity at a later time was conducted solely with the Bataks. Due to weather and site conditions, however, only the Chering game and a short debriefing of the game were conducted with them.

5.2 Gathering information on people's perceptions about their use of renewable resources

Objective

This activity tried to determine the perception of the community members in terms of how they use their resources in their community. More specifically, it tries to determine whether they perceive themselves as having specific main source of living or occupation based on their livelihood activities (i.e. as farmers, fishermen, etc.) or whether they see themselves as general resource users.

Methods

Key Informant Interviews were conducted by a team member one-on-one with community members who use renewable resources in the area as a part of their livelihood activities. The questions asked during the interviews were partly drawn from Pro-Active Conciliation Tool (PACT). It was planned that an interviewee would be chosen based on his or her livelihood activity/activities, and that at least two people for each major livelihood activity per barangay would be interviewed. However, there was some difficulty in finding interviewees for some of the livelihood activities. For example, in Barangay, Tanabag, the team was unable to interview any fishermen in the area.

A total of 29 community members were interviewed: 9 coming from Barangay San Rafael, 12 from Barangay Tanabag and 8 from Brgy. Concepcion. Four out of the 12 interviewees from Barangay Tanabag were Bataks from Sitio Kalakuasan. The results of the interviews were used to determine the next activity for the MAS modelling process.

5.3 Gathering Information on Community's Resource Use and Decision Making Processes

Objectives

To determine the activities of the communities in terms of natural resource use and livelihood, as well as the decisions they make in performing these activities.

More specifically, this activity would determine the following:
1) How each resource-use activity is done in detail;
2) Decision-making processes involved in conducting each activity;
3) Decision-making process involved when an individual changes from one activity to another;
4) Major variations on how a resource-use activity is conducted, if any.

Methods

For Barangays San Rafael and Tanabag, a total of three Focus Group Discussions (FGDs) were conducted with a maximum of 15 participants per session. The duration of the session was half a day each. The participants of each FGD were organized in such a way that each group would have the following composition:
1) those performing livelihood activities in the upland and lowland areas;
2) those performing livelihood activities in lowland and coastal areas;
3) those performing livelihood activities in the entire landscape.

These groupings were made with the goal of capturing the decision-making processes of those community members who do more than one livelihood activity at different landscapes.

A list of FGD questions was also prepared having these questions:
1) What are the major resource-use activities that are performed within the community?
2) What are the sub-activities that make-up or are related to perform this activity? What is the order or sequence of these sub-activities? What is the frequency, duration, distance (from starting point, what is the starting point?), extent (boundaries) and at what period are these sub-activities performed? (need maps)
3) What is the frequency, duration, distance, extent and at what period that the activity is performed? What are the costs involved when performing this activity (e.g. materials, equipment (whether bought or rented), additional labor, rent of land)?
4) What are the decisions that you have to make while performing this activity? What are the factors that you consider when making this decision? How important are these factors?
5) Who are the people that could influence your decisions? How and how much do they affect your decisions?
6) Are there existing rules or guidelines that affect your decisions or actions when performing this activity? What are they and how do they affect your decisions?
7) Is there any person or group of persons that you encounter while performing this activity? Who are they? Do they affect your actions and decisions? How?

8) What are the problems that you have encountered when performing this activity? Are there any people involved? Who are they? How do you cope or deal with the situation and what is the usual result of this?
9) Aside from seasonal changes, when or how else do you decide to change the activity you are usually performing? What are the factors that determine whether you stay or change your activity? How much is the importance of each factor? Are your actions, decisions or activities affected by special occasions or events? What are these occasions or events and how do they affect you?
10) How do you choose which activity you would like to perform? What are the activities you usually go into? Why?

These questions were asked in the Filipino language. Questions 2 to 8 were asked for each livelihood activity, while questions 1, 9 and 10 were asked for the entire session. Some of the questions were related and were grouped together during the FGD. From the first two FGDs that were conducted, it appeared that it took quite sometime to answer the first question. Therefore, the 1st FGD question was removed from the succeeding FGD sessions. Also, initially it was planned that the same set of questions were asked in all three barangays for the combined landscapes (as mentioned above). However, since the discussions took too long to complete, it was not possible to do this. Consequently, each discussion session focused on main livelihood activities undertaken by the majority of the participants. This means the activities discussed in Brgy. San Rafael were different from the activities from Brgy. Tanabag.

Learning from the experience in Barangay San Rafael and Tanabag, we decided to revise the FGD design for Brgy. Concepcion and Sitio Kalakuasan. In the case of Brgy. Concepcion, the FGD sessions were organized with a maximum of 8 participants for a specific landscape, as follows:
1) those performing livelihood activities in lowland areas;
2) those performing livelihood activities in upland areas;
3) those performing livelihood activities in coastal areas.

The discussions were now more focused due to the number and homogeneity of the participants. This also allowed us to validate the information generated earlier from different barangays for the same livelihood. No more clarification questions were asked after the FGD sessions in Brgy. Concepcion.

In the case of Kalakuasan, due to weather, site situations, and the nature of the Bataks, the discussions were less structured and the FGD questions were used only as a guide for the team. We made use of the results of Multi-stakeholder Landscape Assessment (MLA) activity for the LPF project that took place in the same area, to avoid asking people the same questions. This made the discussion more free-flowing. From time to time, specific questions as per original set of FGD questions, were asked.

Table 2 shows the schedule of the FGDs for each barangay as well as the activities that were discussed in each session.

Table 2. Livelihood activities discussed per FGD session.

Date	Barangay	Livelihood activities discussed
2 May 2005 AM	San Rafael	Upland and lowland farming
2 May 2005 PM	San Rafael	Seaweed farming
3 May 2005 AM	San Rafael	Fishing and milkfish fry gathering
4 May 2005 AM	Tanabag	Kaingin/Swidden farming and charcoal-making
4 May 2005 PM	Tanabag	Nipa/coconut shingles making and hog raising
5 May 2005 AM	Tanabag	Copra-making, hunting, and resin gathering
5 August 2005 AM	Concepcion	Copra-making, coconut shingles making, vinegar making, animal raising and gardening (vegetable and ornamental plants)
5 August 2005 PM	Concepcion	Upland farming, honey, rattan and resin collection
7 August 2005 AM	Concepcion	Fishing (including octopus and squid, gathering of shells and crabs, fish pen operation
4 August 2005 AM	Kalakuasan	Honey, rattan and resin collection

Some of the interesting findings:

1) Most of the community's livelihood activities were seasonal; an individual engaged and carried out more than one livelihood activity in a year. Because of this, some community members did not perceive themselves as having one main source of living (farmers, fishermen, etc). Rather, they perceived themselves as resource users.
2) Most activities, programs or projects funded by government and non-government agencies, sprang from the proposals submitted by community members themselves. This indicates the need to strengthen the capability of community members in producing sound proposals.
3) Farming and fishing activities were done mostly for subsistence or food security. However, for those engaged in fishing, they were more likely to sell their catch given the opportunity. For those engaged in farming, they would sell some of their harvest if there was an immediate need for money. Livelihood activities such as copra production, roof shingles-making, nito-weaving, ornamental and flower plants gardening, charcoal-making, bangus fry catching and animal-raising were usually done for commercial purposes. Most of these activities were done with other members of the household.
4) Gathering of non-timber forest products (NTFP) such as almaciga resin and rattan is viewed by community members as a reliable source of income because these NTFP are viewed to be always available and there is an available market for such products within and outside the community. However, due to difficulties in carrying out such a task, only men are able to perform such an activity. Furthermore, current restrictions in gathering NTFP, have made this activity more difficult to do. This have more implications on the Bataks who rely mostly on forest resources for their survival.
5) A livelihood activity is prioritized in terms of the needed investments or capital, how quick one could earn money, and the amount of money that could be earned.
6) Products were sold thru middle-men who were also members of the same community. Those engaged in ornamental plants had regular clients in the city

but they also sold them at the local markets or to buyers that passed by their gardens (which were normally located at the road side).

5.4 Gathering Information on Stakeholders' Resource Management Activities

Objectives

The purpose of this activity was similar to that of the FGDs conducted with the community, but we conducted this activity with the GOs and NGOs which were considered as major stakeholders in the area.

Methods

The interviews were conducted with 1 or 2 representatives from each identified major stakeholder, with each interview lasting for about one to one and a half hours. A list of guide questions was prepared earlier and was used during the interview.

The guide questions used for the interview were as follows:

1) How or what does you office contribute to the management of natural resources in the study area?
2) What are the specific activities that you perform with regards to NRM? What is the duration, frequency, distance and extent are these activities performed?
3) How are these activities planned, implemented, monitored and revised? Who are the people/institutions involved in these processes? What is or what is the extent of their involvement?
4) How is coordination performed when other people/institutions are involved? Who communicates what? Who or what institution makes the final decisions?
5) Is your organization following a specific law, objective or strategy when performing these activities? What are they? Who formulated them? How are they formulated? How much of it are followed?

The highlights of the interviews for each GO and NGO are attached in Annex 3 of this report.

5.5 Developing Activity Diagrams and Validation

The information gathered from FGD sessions were then translated into activity diagrams. The diagrams produced for barangay San Rafael and Tanabag can be found in Annex 2. We then validated these activity diagrams by formulating clarification questions and asked them in the interviews. These interviews were conducted in August 2005 with some of the previous FGD participants and other community members of Barangay San Rafael and Tanabag. During validation sessions, we also clarified some matters and filled-up the gaps in the activity diagrams. The clarification questions were more on the marketing of the products, such as to whom the products are sold to. Other questions asked in the interviews can be found in Annex 4 of this report.

The results of the FGD sessions with Brgy. Concepcion and Sitio Kalakuasan still need to be interpreted and translated into activity diagrams.

6. Next Steps

The field work to identify the stakeholders' activities and interactions in terms of resource use and management at the study site has been completed. However, the data on community resource-gathering and use activities from the last fieldwork still need to be interpreted and integrated with the previous data. The data gathered from the interviews with the GOs and NGOs also need to be analyzed. After interpreting the latest information gathered from the field, we will develop the conceptual MAS model and identify the relevant bio-physical processes needed in the model. This should be followed by data collection to model these biophysical processes. After all the necessary information has been gathered and conceptual model has been completed, the next step of the process will be the programming of the simulation model and the development of the RPG based on this simulation model.

The RPG and the simulation model(s) will be used in scenario building and negotiation process among relevant stakeholders. Several scenarios have already been identified during the Palawan Steering Committee meeting and the first activity conducted with the community members. These include the scenario on the effect of the implementation of the zoning to the renewable resources and people's conditions in the three barangays. Another scenario being considered, and is of big concern to the community members, is the possibility of landslides occurring in their area. Similar landslides occurred in the province of Quezon, Philippines, in mid-December of 2004, mainly attributed to logging activities.

7. References

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Annex 1. Responses from the Workshop discussion

Palawan Steering Committee

Q1. How can MAS modelling be of help to you and/or your organization?

- To better explain reality/processes
- Tool for decision makers
- To make stakeholders be aware of the various factors affecting decision makers
- As a visual tool, it can be used to explain processes to communities
- As a guide for decision makers
- It gives room for wider views because different stakeholders are present
- Tool for conflict resolution – to simplify explanations
- Problem: lack of technology of computers in the barangay, also power/electricity
- To be used to convince stakeholders to do the right thing
- For "leveling-off" – open up minds – Tagalog can be used [to explain]
- To show/study different strategies
- To help/assist policy makers

Q2. What are the lessons you have learned from this workshop?

- Communication, coordination, and cooperation are very important in NRM
- Unity also helps
- Broad participation of stakeholders is also needed
- Involvement of each [stakeholder] is also needed
- Everybody/all stakeholders are important
- [Role-playing] games are enjoyable. Reality can be explained in an enjoyable way. Reality can be simplified if every stakeholder helps
- Planning should be based on some framework

Q3. What would you like to see in the model?

- The actual situation, like what is happening our community
- A picture of an individual or something that could identify a person
- Watershed and environment unit to model with all the resources in it
- The resources, decision makers, the options available and the results of these options
- Priority problems
- Should be comparable to other parts of Palawan, SE Asia
- Scenarios like those that happened in Ormoc and Quezon Province. (land slides)

GOs and NGOs

Q1. How can MAS modelling be of help to you and/or your organization?

- Planning/strategize the use of resources
- Information dissemination tool
- To appreciate data/information on the area
- Use to teach communities on effects of [resource] utilization/gathering

- Planning tool – clear representation of present and projected situation
- Projection of trends
- Information dissemination of rules, quotas, procedures
- To get the views/sides of other/all stakeholders
- For consultation work – for planning, monitoring, coordination
- For enforcement of laws
- To consider various views of stakeholders
- Research
- How to use resources
- For preservation of natural resources
- To show consequences
- To convince stakeholders to plan
- For training to convince stakeholders to properly use natural resources
- Management and decision-making tool
- Data bank/updated information
- Help In policy-making
- IEC Tool
- Proposal preparations

Q2. What are the lessons you have learned from this workshop?

- Resource use has to be controlled
- Stakeholders have to be consulted
- Coordination/participation needed in solving NRM problems
- Scenarios should be studied to get better decisions
- NRM is give and take through consultation
- Information very important to stakeholders
- Lack of consultation will result to inequality which may lead to more problems
- Lack of regulation will lead to depletion of resources
- Weak penalties make laws “bungi” (incomplete)
- Close coordination among stakeholders
- Strategies should continuously improve
- Make efforts to improve strategies for NRM

Q3. What would you like to see in the model?

- Resource assessment, value of damage, when to replenish
- Accompanied with a user’s manual
- Frequency (trends/probability) of an “action” like cutting of trees
- Factors/attributes of agents that will lead them to do an action
- Database management system that can generate reports for NRM
- Land cover – potential use – actual use
- Existing land-use, vegetation and zones
- Land (use) and other resources
- Livelihood activities
- Effects on coastal resources
- Be able to use for planning livelihood program

Community (excluding the Bataks)

Q1. How can MAS modelling be of help to you and/or your organization?

- To know how to approach a problem
- To monitor the current situation
- Use for decision-making
- If there is a goal, it can be reached with the help of this system
- To easily respond to community problems
- For communication, negotiation and coordination for everyone in the community
- To increase the knowledge in natural resources
- To know how to properly use natural resources
- To control the use of natural resources
- Can help organizations
- Means of communicating matters regarding NRM
- There is freedom to communicate
- As a guide
- Can be a tool for unity for organizations
- Linkage with other associations/organizations
- To facilitate communication and coordination
- Results can be easily disseminated
- To easily solve problems related to the environment

Q2. What are the lessons you have learned from this workshop?

- If there is no communication, there is improper use of natural resources
- If there is lack of knowledge, there is improper use of natural resources
- Knowledge could be improved
- The proper use of natural resources – not to overuse, but also not to "don't use"
- Coordination with different agencies/stakeholders
- With the improper use of natural resources, in the end, we will also end up with nothing
- Balanced use of natural resources
- An "agent" may also be animals and not only humans
- Wonder of computer
- Get what is needed
- Laws should be studied carefully
- Increased knowledge
- Increased knowledge in making livelihood grow
- Can help in the ways of finding solutions to address problems
- Can give appreciation to natural resources
- Under or no utilization of resources is not also good
- Things should be studied before making decisions

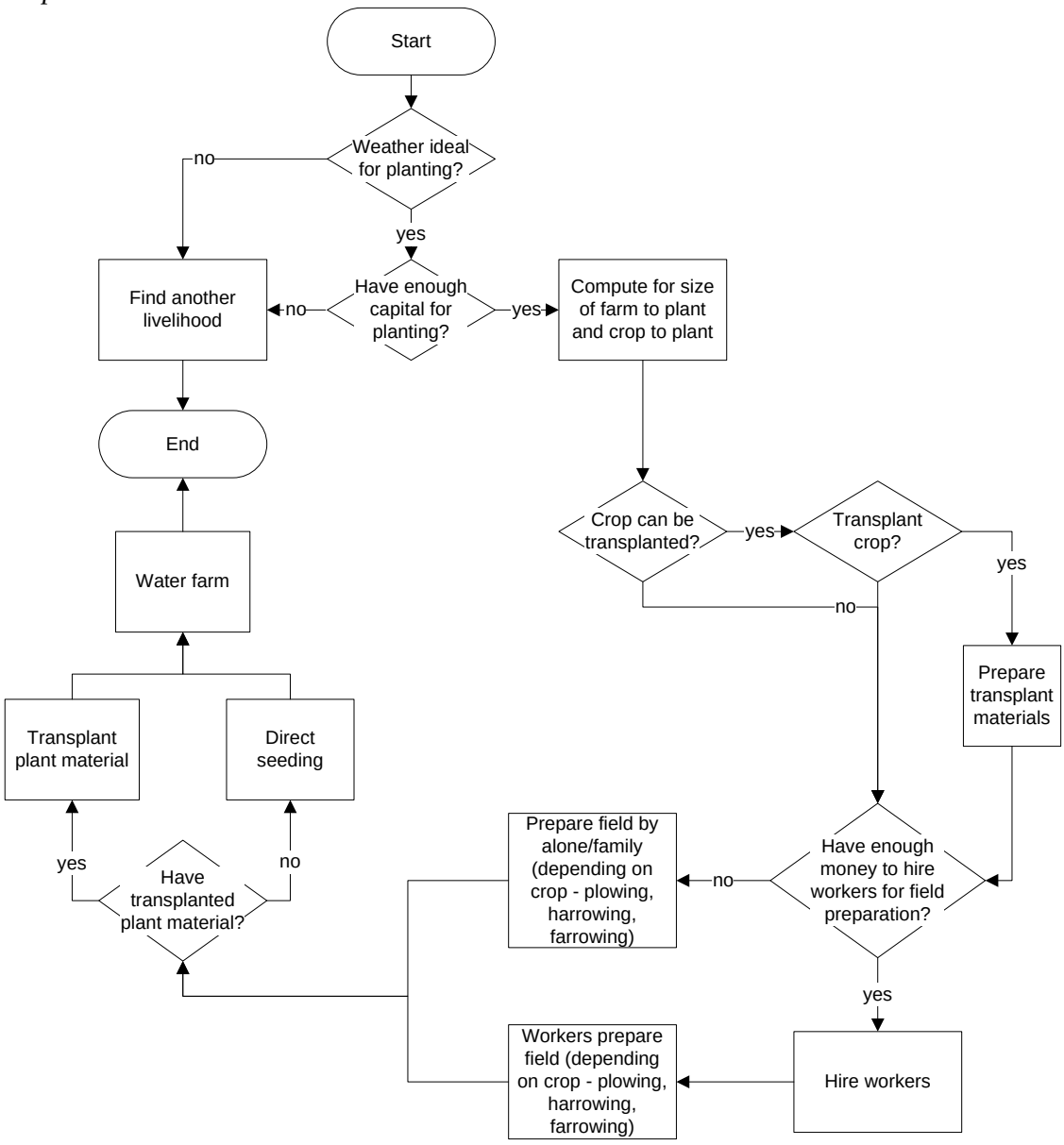
Q3. What would you like to see in the model?

- Results of what has been discussed
- Something similar to the Bohol model
- Showing the 3 landscapes – upland, lowland, and coastal

Annex 2. Activity diagrams of livelihood activities

Figure 1. Lowland Farming.

Preparations



Maintenance of existing farms

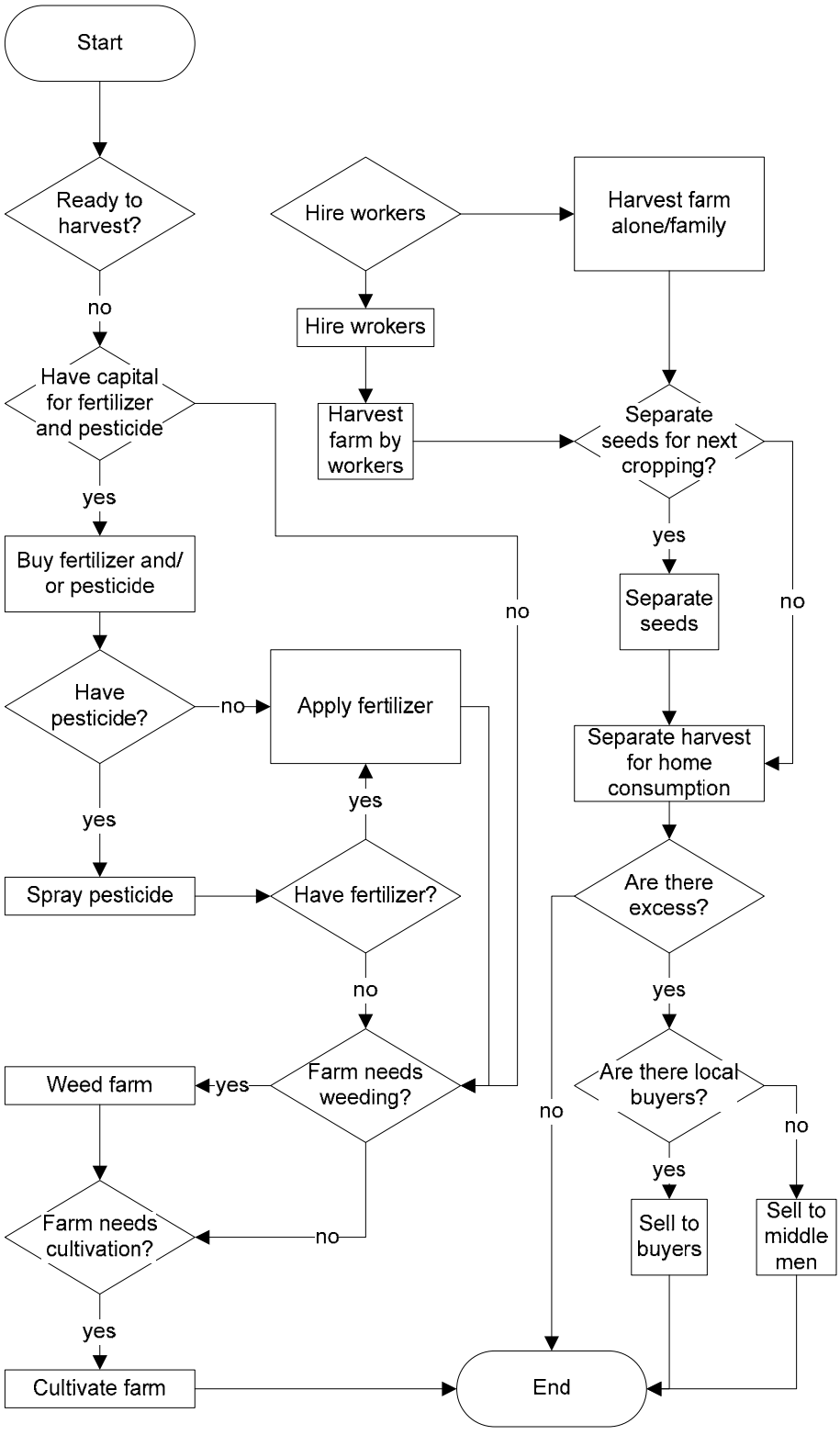
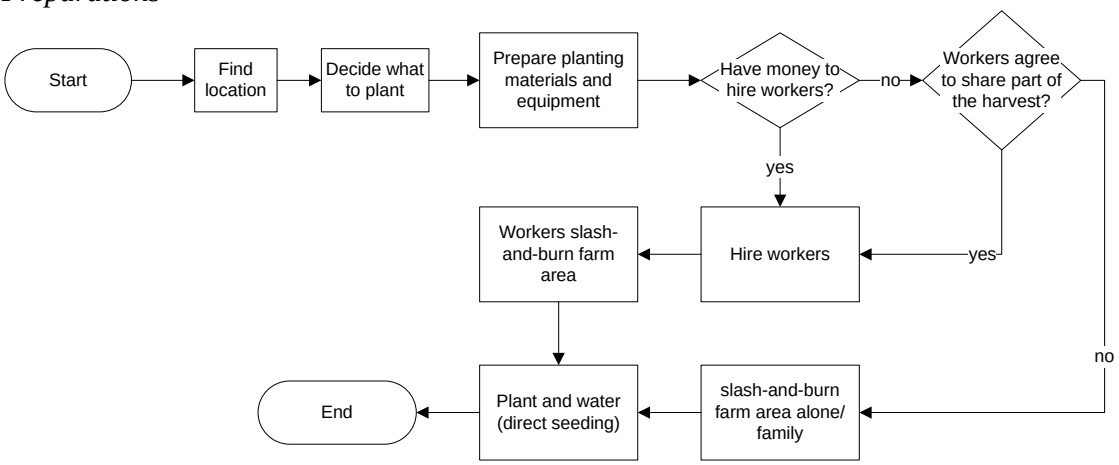


Figure 2. Upland/Swidden Farming.

Preparations



Maintenance of existing farms

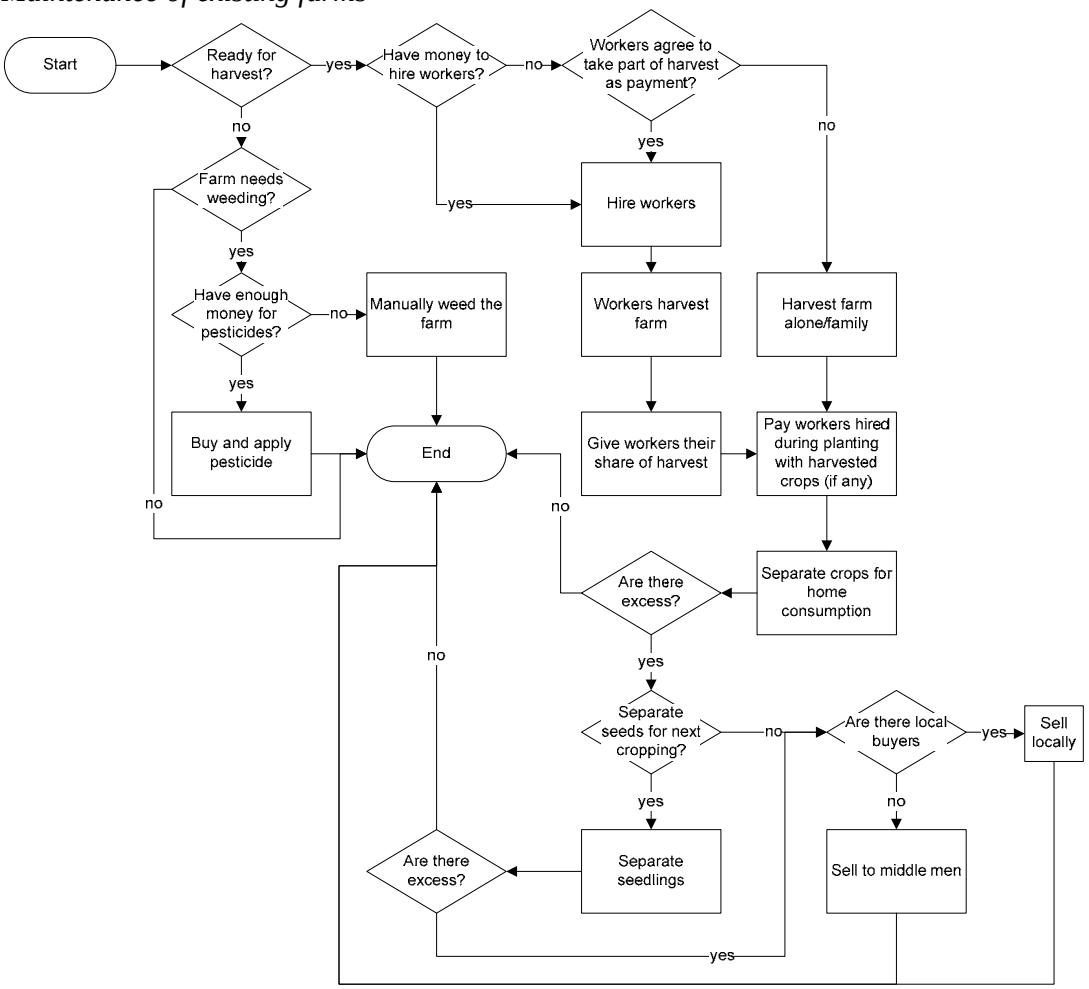
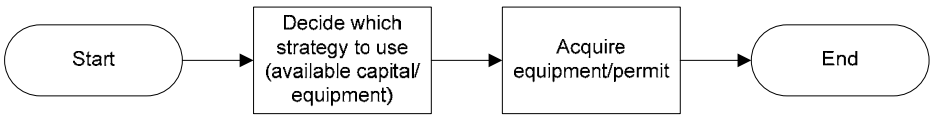


Figure 3. Fishing.

Preparations



Fishing activity

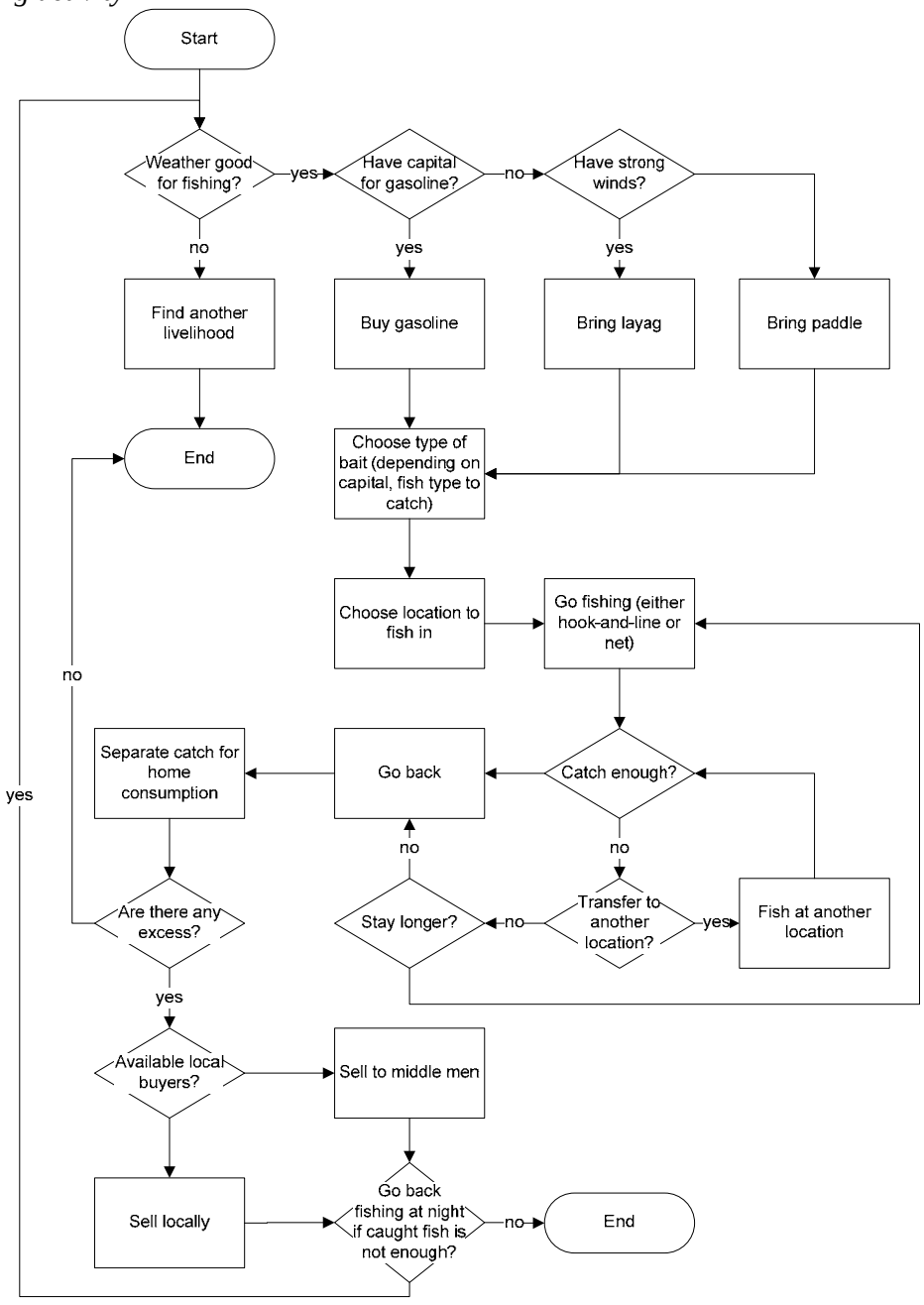


Figure 4. Seaweed farming.

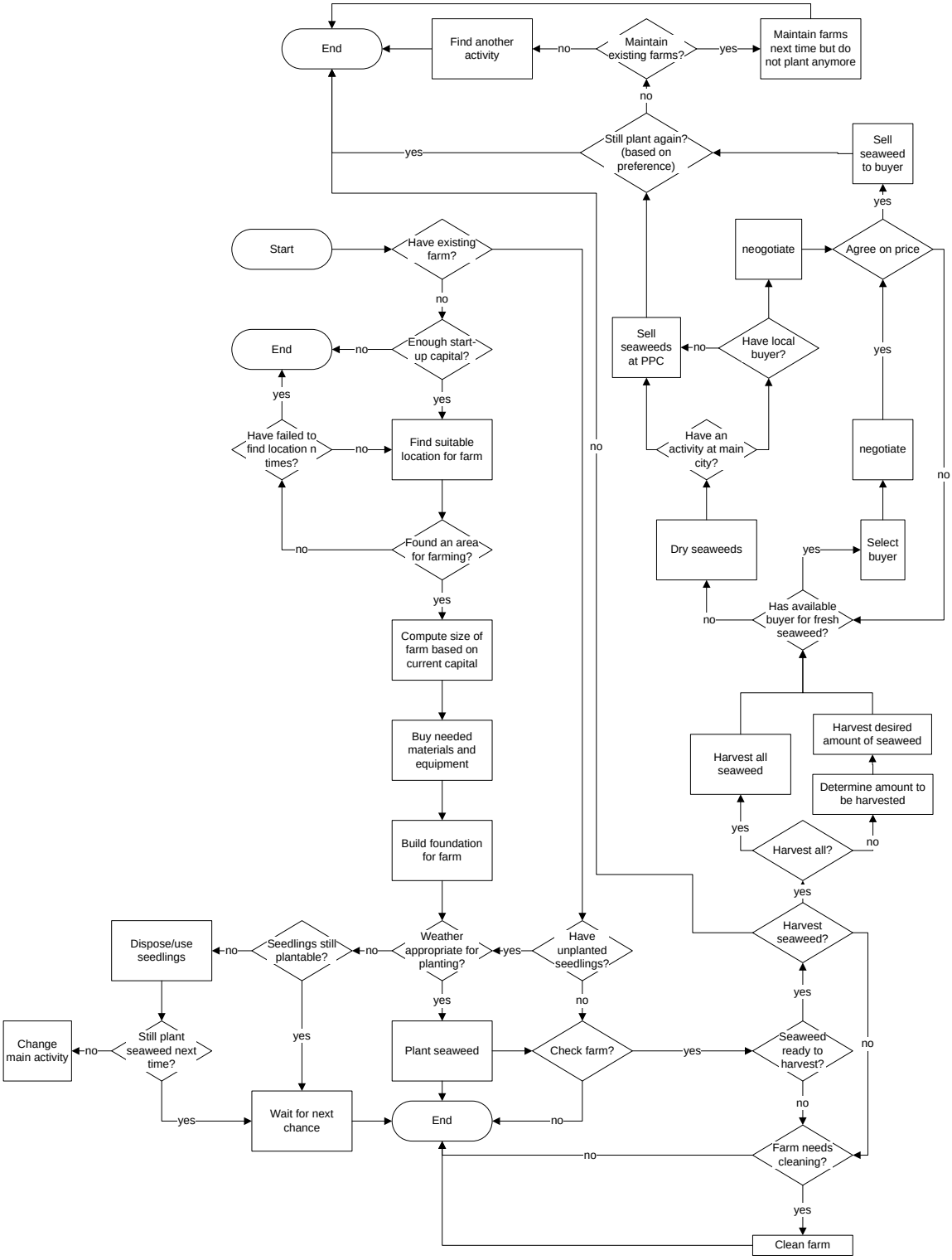


Figure 5. Milkfish fry catching.

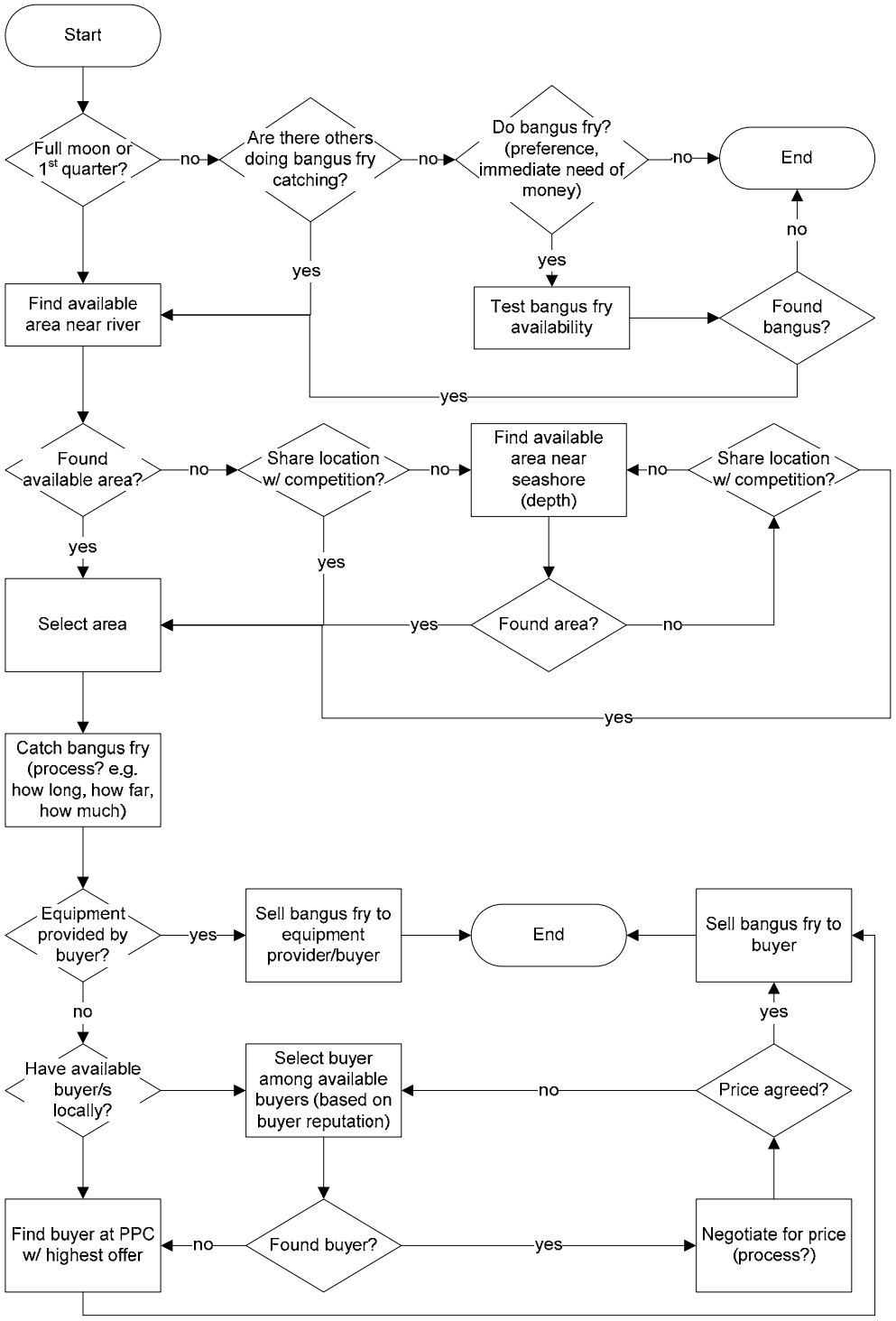


Figure 6. Charcoal-making.

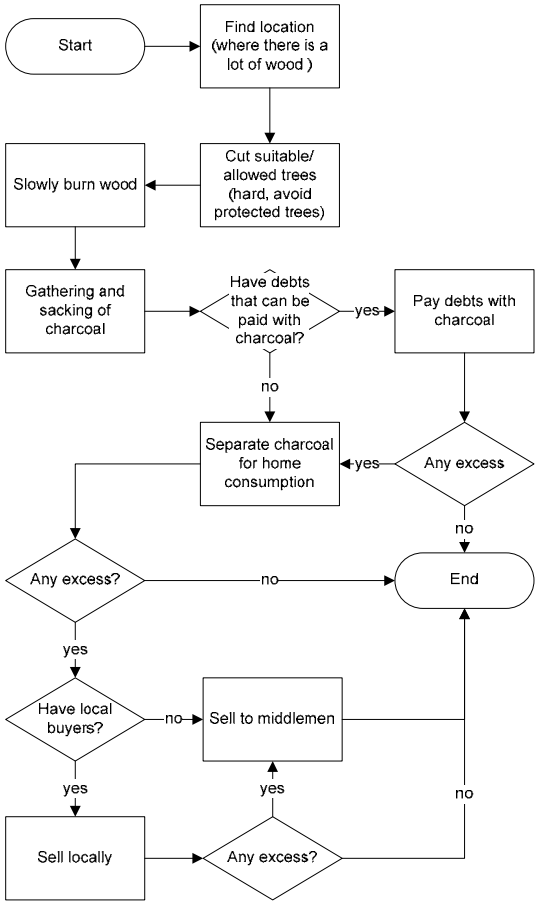


Figure 7. Resin collection.

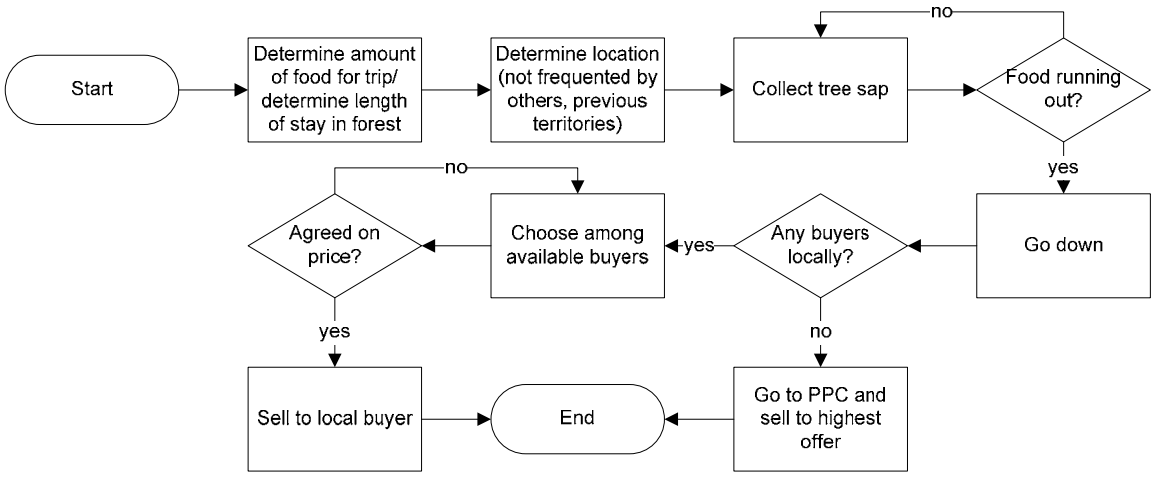


Figure 8. Copra making.

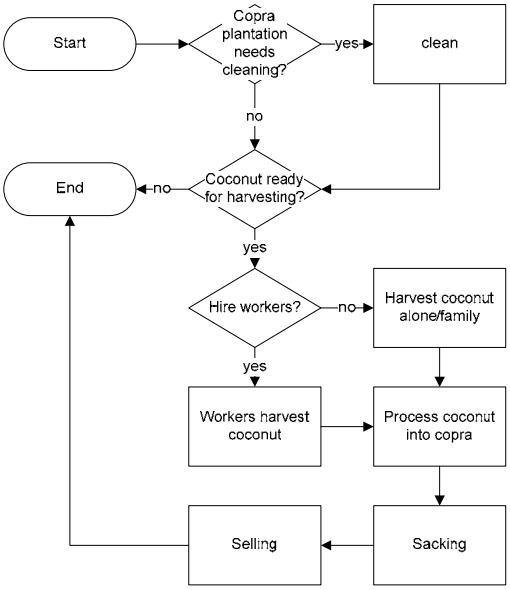


Figure 9. Coconut shingles making.

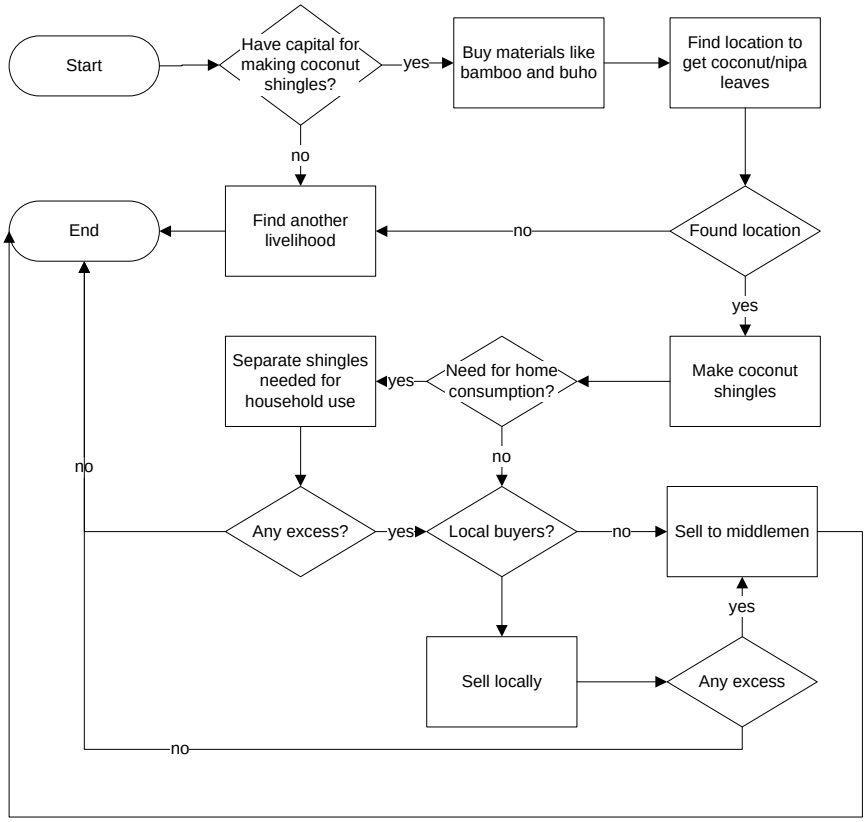
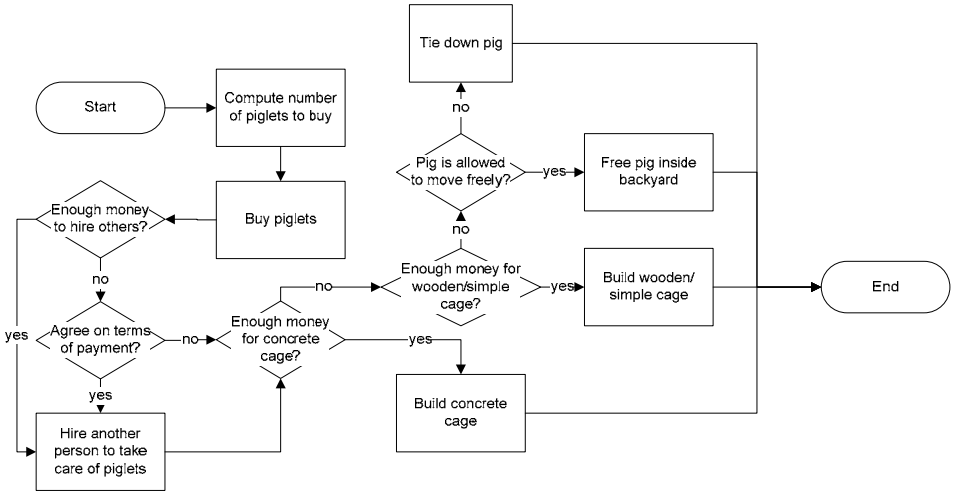
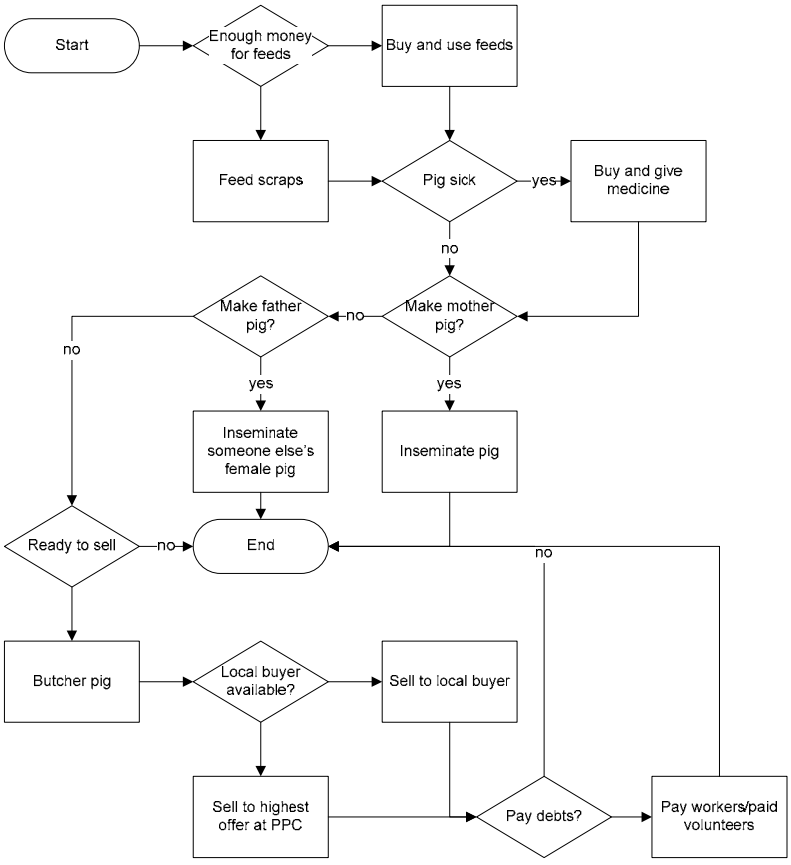


Figure 10. Hog-raising.

Preparations



Caring/maintenance of hogs



Annex 3. Highlights of the interviews with GO and NGO representatives

Government organizations

PCSD

- This government agency is tasked to implement the Strategic Environmental Plan (SEP) Act (RA 7611) and the Environmentally Critical Areas Network zoning. The ECAN zones would be integrated into the Comprehensive Land Use Plan (CLUP) of the municipalities of Palawan. It is promoting the ECAN as a development tool.
- It is the highest body for making policies regarding environmental management in Palawan.
- It also provides resource persons and training designers for trainings depending on the requests.
- Also involved in environmental education thru a multi-media approach such as radio programs, leaflets and on-site campaigns. It is also involved in establishing Coastal Resource Management Learning Center as a model for other barangays.
- Although this organization is a consultative body for LGUs, it also provides assistance in implementation of laws and regulations because of the limited resources of the LGUs.
- Through collaborations with other organizations, it comes up with projects such as the Malampaya Wetlands Project and the Calamianes Mangrove Project.
- It is also a counterpart in the management of the Balabak area together with Sulusulawesi.
- It collaborates with different organizations at multi-levels – sometimes being proponents to projects, or sometimes it is involved in data-sharing.
- Develops tools for monitoring of ECAN
- It conducts the province-wide State of the Environment yearly.

PENRO

- This government agency is responsible for establishing Community-Based Forest Management (CBFM).
- It handles applications for special uses of lands for tourism purposes.
- It has a mangrove reforestation program wherein contractors are paid to plant mangroves in validated areas within the barangays. PENRO then evaluates the planted mangroves.
- It is responsible for conducting the training on Environmental Performance Monitoring.

CENRO

- This government agency is focused on forestry lands and its protection. They enforce the laws and files charges against violators.
- It also has information campaigns about DENR programs and environmental awareness through schools and barangay assemblies. This activity is done yearly in each barangay, although hot-spots are prioritized.

- It also monitors compliance to ECC of different establishments thru scheduled and random inspections.
- CENRO facilitated the GMA project in establishing water systems – impounding dams.
- Aside from its regular activities on protection works, it is also involved in the following activities:
  - Distribution of vegetable seeds, fruit tree seedlings and fertilizers to each PO per CBFM.
  - Participated in conducting the training on Environmental Performance Monitoring (EPM). This EPM was to be used as basis for policy-making in CBFM areas.
  - In the coastal areas of Honda Bay, mangrove reforestation was done and different livelihood programs, such as crab-fattening, lamayo, sea cucumber culture and micro-lending, were monitored.
  - Reforestation projects
  - Conducts trainings on forestry laws and regulations together with other government agencies such as KSK and Bantay Gubat.

City ENRO

- This office is composed of several sectors:
  - Land Management
  - Mines and Geosciences Management
  - Protected Areas Management
  - Environmental Management
  - Forest Management
- It is one of the lead or support agencies in the following programs:
  - Pista Y Ang Kagueban ("Feast of the Forest") – a yearly community-based reforestation activity
  - Love Affair with Nature – similar to Pista Y Ang Kagueban but is done in coastal areas
- This office is also responsible for validating areas that are to be used for certain uses such as mangrove reforestation, small-scale mining, etc, and identifies conflicts, especially with the ECAN zones.
- It was also involved in establishing task forces to implement laws/ordinances and apprehend violators, together with other government agencies:
  - Task Force Sagip Buhay Ilang (as support agency) – wildlife
  - Task Force Sagip Hangin (as lead agency) – air quality

City Agriculture

- This government agency is mainly concerned with food sustainability
- It has two divisions - fisheries and agriculture
- Technicians are assigned to each barangay to oversee the status of these barangays
- The agriculture sector is involved in the following activities:
  - It provides technical assistance such as trainings to community members:
    - Capacity-building
    - Rice and corn farming
    - Pest management of fruit trees

        - Food processing
        - Ornamental gardening
    - It also provide and/or loan materials such as rice and corn seeds, pesticides and fertilizers
    - It also provides vegetable seeds yearly every Nutrition month
    - This agency also sells/loans discounted seedlings of fruit trees such as mango, citrus, and cacao.
    - It also set-up the tractor pool for farmers
    - This agency is also involved with irrigation systems in the barangays by providing estimates for repair and sometimes providing materials for repairs of dams.
    - This agency is also assisting the STCMPC.
- The fisheries sector is involved in the following activities:
    - It overseas the social, livelihood and physical conditions of the component barangays of the FRMP project in Honda Bay, such as Brgys. San Rafael, Tanabag and Concepcion
    - As part of its extension work, it provides assistance in livelihood thru capacity-building such as providing trainings on livelihood activities in the coastal areas such as capture, mari-culture, post-harvest/processing
    - It was also consulted for the PCRA of component barangays of FRMP project in Honda Bay
    - It is also involved in the establishment of fish sanctuaries by facilitating the process and providing the funding.
    - Also involved in passing ordinances as a consultative body for technical information.
    - It also assists in drafting management plans by facilitating the process and presenting the data.
    - Information dissemination by this sector is done thru multi-media means such as conducting symposiums, radio promotions, leaflets, participation in major events, design modules for trainings, conduct trainings, and billboards.
    - Every start of the year, this sector conducts consultative meetings/information dissemination campaigns at each barangay. This activity also provides an opportunity for this agency to hear out the concerns of the community. At the end of the year, the barangays are revisited, if there is a chance to do so.

BFAR-FRMP

- The interventions of this agency at the study site are mostly related to integrated coastal resource management.
- It was involved in the upland reforestation project together with the LGU.
- It was also involved in the milkfish culture project in Brgy. Concepcion.
- It is involved in resource enhancement projects implemented continuously throughout the year, together with other government agencies, such as City ENRO. The activities they are involved with are on mangrove reforestation and nursery, riverbanks rehabilitation and establishment of fish sanctuaries.
- Monitoring of projects of BFAR-FRMP is contracted to NGOs such as Fundacion Santiago.

- Its livelihood projects, such as seaweed farming, stem from proposals from the community through POs organized by NGOs. Together with other agencies, they conduct trainings for POs.

BFAR-Regional Training Center (RTC)

- This agency covers Region IV-B.
- Involvement of projects with other agencies are at multi-level:
  - Provides funds
  - Provides technical assistance
  - Provides resource persons
- Trainings are regularly conducted every year but not necessarily in the same areas. A list of priority areas, which have been validated by the same office, and those areas who have submitted advance requests are prioritized.
- For the Upland Reforestation project of FRMP, this agency is tasked to validate areas of reforestation and monitor them. They give trainings for livelihood activities identified thru the FRMP project such as the Milkfish Fishpen Culture in Brgy. Concepcion and the seaweed farming in Tanabag. They also provide materials for rehabilitation such as seaweed if area was affected by storms or pests.
- Information dissemination is done together with other BFAR offices by means of radio programs, organizing forums, attending meetings and visits to schools.

Kilusan Sagip Kalikasan (KSK)

- This is a province-wide task force whose task it so protect and enhance the environment through community development.
- The agency apprehends violators of environmental laws with the assistance of the Philippine National Police, Western Command, the communities and volunteers.
- It also tries to educate communities thru information drives. They have a program in Citizen Welfare Training Service (in lieu of Reserved Officer Training Corps) wherein college students are taught aspects about the environmental and environmental laws. This is done with the assistance of DENR-BFAR, PCSD, Haribon, selected staff from Palawan State University and volunteers in giving lectures.
- It also has a monthly newsletter that lists apprehensions of violators and other updates.
- It is also promoting community-based law enforcement.

NCIP

- This agency's main task is to delineate the ancestral domains of Palawan.
- In delineating the ancestral domains they perform the following activities:
  - Facilitates IPs in making work and environmental plans
  - Social preparation of IPs thru document preparation, census on genealogy and defining the extent of ancestral domain thru self delineation
  - Conduct field validation and conflict resolution
  - Boundary survey
  - Preparation and submission of reports

- The activities of this agency are conducted with the help of NGOs in the area and local IP organizations.
- Processing of ancestral domain claims is expensive thus funding from outside organizations is needed to speed up the process.

Provincial Planning Development Office (PPDO)

- This agency's main task is to facilitate the process of making plans by different organizations.
- The agency has five divisions:
  - Plans and programs - The planning process normally takes 2 days and the output are a list of projects and some project details. Planning is done with the cooperation of different sectors and is done yearly in an area.
  - Research – The Community-Based Management System (CBMS) was developed by this division. It also conducts monitoring of surveys. It also provides training to numerators.
  - GIS – This division maps existing infrastructures and provide lan-use maps
  - Water – This division assists the community in developing barangay environmental sanitation project/plan wherein the management of the project is at barangay level with assistance from this division. It is also involved in the planning, monitoring and evaluation of water systems.
  - Energy – Involved in making energy management plan. Also, it conducts studies on alternative energy sources, such as solar and wind. It has linkages with other agencies and organizations, such as the Department of Energy, UP Solair, Shell, and Paleco.
- This agency also provides students with reference materials.

Non-Government Organizations

ELAC

- The main goal of this non-government agency is to educate the communities about environmental laws. However, due to resource constraints, they are focused mainly on forest resources. ELAC is involved with almost the entire Palawan area.
- The organization provides para-legal training to communities with regards to environmental laws. The kinds of laws discussed in these trainings are based on the requests of the community.
- The group also organizes public dialogues in the communities, especially if there are violators of the laws within the community.
- This agency also assists in the implementation of the laws by being part of the apprehension of violators and helping in filing cases against them.

Haribon Palawan

- Assisting the indigenous people (IPs) through the following activities
  - Assists in meeting the requirements for ancestral domain claims by delineating the boundaries of the claim, re-organizing and re-structuring the constitution and by-laws of the IPs and documents the application.

- Involved in capacity-building of IPs by conducting leadership trainings and, together with the Department of Education, provide non-formal education to IPs.
- Assists IPs in acquiring temporary permits for gathering non-timber forest products while the ancestral domain claim hasn't been approved.

- This non-government organization was also hired by BFAR through the FRMP project to oversee the coastal resource management of coastal barangays.
  - It conducted coral surveys for the PCRA of coastal barangays.
  - Organize public hearings for establishment of fish sanctuaries.
  - Together with BFAR, it performs stock enhancement.
  - Develop tools to monitor resources, the organizations and livelihood programs.
  - Organize POs
  - Provide technical assistance to POs such as trainings on field methods and skill, providing equipment, and assists in licensing.
  - One of its future projects would involve coral gardening and enhancement, to which they would be conducting trainings on coral gardening.

Budyong Rural Development Foundation Incorporated (BFRDI)

- This NGO assists communities by facilitating the process of the making and submitting project proposals.
- It conducts trainings on leadership, management and proposal-making for the community.
- Also, it is involved in assisting in developing livelihood activities for the community by means of conducting technical trainings.
- Some of the previous activities of this organization were:
  - Help organize the community for the CBFM project. They also provided technical assistance and worked on the documents related to the project.
  - Cleaning-up rivers, planting of plants, and related activities within protected areas.
  - Establishment of furniture shop in San Rafael.
  - Assisted in the construction of the barangay development plan of San Rafael prior to the LPF project.
  - In Ulugan Bay, it assisted in the mangrove reforestation of the area, helped establish cooperatives, and provided capacity-building trainings.
- Efforts of the organization are based on the requests of the communities.
- At the moment, this NGO is currently looking into the possibilities of seaweed production. Also, it is trying to retrieve the traditional rice variety by establishing seed banks and providing the seeds.

Fundacion Santiago

- This NGO is contracted by the FRMP project to promote business and livelihood enterprises.
- It micro-finances good-performing cooperatives and provides livelihood loans. Funds come from USAID.
- It is also involved in community organizing and establishment of cooperatives.

- Monitoring of livelihood activities are monitored by Fundacion Santiago, the cooperative and the individual members. The process is facilitated by Fundacion Santiago.
- It also supports mariculture development such as seaweed farming.
- It provides trainings on financial management and livelihood techniques. The trainings on livelihood depend on the request of the POs or of the community. Some of the trainings this NGO provides are the following:
  - Leadership
  - Values formation
  - Policy formation
  - Food processing
  - Marketing
  - Product design/packaging

Natripal

- It is an IP organization that has membership coming from the entire Palawan province.
- It has refused to be identified as a major stakeholder in the study site of LPF in Palawan, Philippines.
- It was said that the organization has had few activities in the study site, more specifically in San Rafael:
  1) Assisted the Tagbanuas of San Rafael in acquiring their ancestral domain claim in 1991, but it was done when Natripal was still called Tribal Filipino Apostolate
  2) Established the Natripal store in San Rafael
  3) Training for honey in San Rafael
- Earlier this year, a proposed project for honey was made to the Tagbanuas of San Rafael with the funding coming from the embassy of Finland. This project stemmed from the fact that the participants of the training for honey in 2004 in San Rafael requested for financial assistance but, the project proposal itself was later turned down by the same group.
- This non-government organization develops project proposals and provides technical assistance, such as trainings, to IPs if the project is approved and acquires funding.

Annex 4. Clarification questions for the activity diagrams

Bangus fry catching:

1) Which would you prioritize, testing the availability of bangus fry or wait until others have started catching bangus fry?
2) In PPC, do you canvas for the highest offer, have a regular buyer, or sell to the first one with a good offer?
3) How do you select a buyer among several buyers, is it based on reputation, affinity (friend) or blood relation?
4) How do you negotiate? Do you first try to know the dominant selling price of the bangus fry locally, or based on the average selling price at PPC or do you negotiate the price based on previous prices?
5) How far or how long do you search for bangus fry?
6) How much do you catch or how long do you catch bangus fry? Is there a minimum/maximum amount (kg)?

Fishing:

1) How do you choose which technique you are going to use?
2) How do you determine if you had enough catch for the day?
   - amount of fish caught
   - amount of time spent fishing
   - time of day

Lowland Farming:

1) Which will you prioritize given existing capital, the type of crop or size of farm?
2) If you do not have enough capital, do you still proceed with planting? How? Do you get loan/borrow money? Borrow plant materials from others?
3) What makes you decide to hire workers? Desire to finish planting immediately? Available capital? To help others earn money? Other factors?
4) Which do you prioritize or how do you choose if you have only capital for one item - pesticide or fertilizer?
5) Is it automatic that the priority of the harvest is for home consumption?

Seaweed Farming:

1) What are the guidelines for site selection?
2) Are they being followed?
3) How is the process of negotiation/marketing?
4) How long is the shelf life of dry seaweeds?
5) How long can the seedlings be kept before expiring?
6) If you don't have enough start-up capital, do you look for credit? If yes, what are your criteria for accepting a credit contract?
7) What do you do if the seaweeds are ready to be harvested? (paano pag ninakawan?)
8) What about deciding not to do seaweed farming?

General question for all activity diagrams:

How do you market the goods you have made/collected?