Swedish University of Agricultural Science
Faculty of Natural Resources and Agricultural Science
Institution of Ecology

Locally valued habitats, species and sites and their significance for collaborative land use planning around Manusela National Park, Central Seram Island, Moluccas, Indonesia

Lokalbefolkningens värderingar av miljöer, arter och områden samt deras betydelse för den gemensamma markanvändningsplaneringen runt Manusela nationalpark, centrala Seram, Moluckerna, Indonesien

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Independent project in Biology 2011:09 • 15 hp • Basic level C
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Sammanfattning
När nya regler rörande markanvändning ska fattas bör olika intressenters åsikter bli hörda för att minska risken för framtida konflikter. Kommersiella företags åsikter är ofta tydliga och lättkommunicerade, men på grund av otillgänglighet och språkbarriärer är lokalbefolkningens åsikter och behov ofta förbisedda. Den här studien syftar därför till att ta reda på vilka arter och områden som är av betydelse för den lokala befolkningen i Masihulan på ön Seram i östra Indonesien. Detta är ett första steg för att underlätta bättre integrering av lokalbefolkningens behov i den lokala myndighetens beslutsprocesser.

Forskare på CIFOR (Center of International Forestry Research), med huvudkontor i Indonesien, har utvecklat metoden ”Tvärvetenskaplig landskapsutvärdering” som syftar till att identifiera resurser och miljöer som är viktiga lokala samhällen i tropiska länder. Metoderna är indelade i både fält- och bybaserade aktiviteter. Denna rapport fokuserar på de bybaserade aktiviteterna med bymöten, kartövning, hushållsundersökningar, personliga intervjuer och gruppdiskussioner.

Bland byborna i Masihulan var skogen den allra viktigaste marktypen. Det var den enda marktyp som användes inom samtliga användningskategorier; mat, inkomst, byggnadsmaterial etc. Dock har etableringen av en närliggande nationalpark gjort att arean tillgänglig skog har minskat. Några av byborna ser detta som ett hot medan andra ser det som en möjlighet. Bristen på kommunikation mellan den lokala myndigheten och byn har dock lett till konflikter mellan de två parterna.

Abstract

When new land use policies are made, opinions of stakeholders need to be taken in account, to avoid future conflicts. The motivations of commercial enterprises are often clear and easily communicated but due to inaccessibility and language barriers the indigenous people's perspectives and needs are harder to reveal. This study therefore aims to identify species and sites of importance for the local people in Masihulan village on Seram Island, East Indonesia. This is a first step to facilitate better integration of local people´s needs into local government decision-making processes.

Researchers at the Center of International Forestry Research (CIFOR), with headquarter in Indonesia, have developed an approached called "Multidisciplinary Landscape Assessment" that aims to assess important natural resources for local communities in tropical countries. The method is divided into field-based as well as village-based activities. This report is focused on the village-based activities with community meetings, participatory mapping, household survey, personal interviews and focus group discussions.

Among the villagers in Masihulan, the forest was the most important habitat. It was the only habitat used for all use categories; food, income, construction material and so one. However, the establishment of a nearby national park has led to limitations of the forest area that can be used by the villagers. Some villagers therefore see the national park as a threat while others see it as an opportunity. The lack of communication between the park authority and the village has however lead to conflicts between the two parts.

Contest list

Introduction

Worldwide forest loss and environmental degradation are rapidly increasing, leading to an immediate impact on local level in the tropical countries, such as Indonesia. The tropical rainforest provides many ecological services but when the forest area decreases many of the ecological services are lost. This, as well as a general reduced availability of renewable resources, are especially important to people that rely on them for their livelihood (COLUPSIA Inception workshop report, Laumonier 2010).

In tropical developing countries the decision-makers rarely view conservation as a significant local priority, rather as something imposed by rich countries (Sheil et al., 2006). They often see the local people as a problem and not the solution and this often leads to the local people being excluded in the decision-making process and management of protected areas (Boissière et al., 2009). It is rare that the conservationists seek true allegiances with the local people. Yet declining biodiversity, marginalization of remote communities and poverty are connected. For example development decisions that damage the forest often has a negative impact on the people that are depending on the forest for their livelihood (Sheil et al., 2006).

When new decisions or policies are made, the decision-makers are faced with a variety of stakeholders with different views and opinions. The motivations from commercial enterprises like mining or logging companies are often clear and easily communicated. However, the perspectives and needs of indigenous peoples are often unknown and will so remain unless specific efforts are made to reveal them (Sheil et al., 2002). Economic marginality, language barriers and inaccessibility makes such consultation difficult to implement but not less important. If the local people are not involved in the process opportunities for collaboration will probably be overlooked and conflicts are more likely to arise. A better understanding of the local people's perspective and needs are necessary to be able to include them in the decision-making process (Sheil et al., 2006).

By explicitly asking the local people what is of importance for them we can uncover important sites and species but also reveal issues, threats and suggestions for refinement of the land management (Sheil et al., 2006). Evaluations like this will not ensure effective conservation but it will help improve the decision-making process.

COLUPSIA project

In 2010 the Center for International Research on Agronomy and Development (CIRAD) together with its partner the Center for International Forestry Research (CIFOR) started a project called "Collaborative land use planning and sustainable institutional arrangements for strengthening land tenure, forest and community rights in Indonesia" (COLUPSIA). CIRAD is a French research center working with international development and agricultural issues in developing countries (www.cirad.fr/en/). CIFOR is an international center with headquarter in Indonesia and aims to contribute to the well-being of forest depending people while ensuring the sustainability of tropical forests (www.cifor.org).

The four-year project has two research sites, one in central Moluccas and one in West Kalimantan (Indonesian Borneo). The aims of the project are to contribute to actions that will help mitigate deforestation and environmental degradation. To reach this goal, the project is conducting an action research program that will support the development of sustainable institutional arrangements, promoting land policies and instruments involving the local community. The specific objective, or the purpose of the project, that is going to be achieved at the end of a four year period, is to "establish collaborative and equitable land use planning and natural resource management so that new institutional arrangements, environmental policies and instruments based on more secure land tenure and community rights can be designed and tested" (COLUPSIA

Inception workshop report, Laumonier 2010).

The project is a cooperation between several local Non Governmental Organizations and local universities in Indonesia and is co-financed by the European Union, CIRAD, CIFOR and Telapak. (COLUPSIA Inception workshop report, Laumonier 2010).

The aim of the study

To reach the aims mention above, the project is structured into several components. My study is a part of the component dealing with "Participatory investigation of resource use, opportunities and issues" with aim to gain a better knowledge of the area and community of Masihulan village in Central Seram, Moluccas, Indonesia. A specific aim is to learn and understand what species and sites are important for the local people, as a first step to facilitate better integration of local people´s needs into local government decision-making processes.

Material and methods

Seram Island

Seram is located in the Moluccas Province, also called Maluku, in the east of Indonesia (Figure 1). Within the thousand islands and islets in the province, Seram is the second biggest with a total area of 18,000 km^2 (Edwards, MacDonald & Proctor, 1993). In 2003, the human population on Seram was estimated to nearly 247 000 inhabitants (http://maluku.bps.go.id) and with most people located to the low-land area around the coast.

The 340 km long and 55 to 70 km wide island has a unique nature as it is located south of the equator between latitudes 2° 46´ and 3° 53´. It belongs as well to a biogoegraphic region known as Wallacea, where the Australasian and Asian flora and fauna meet. The fact that at least two thirds of the island is covered by primary rainforest, representing all elevations from sea level to the tree line, also contributes to its uniqueness. Since Seram never has been connected with New Guinea, the closest large land-mass area, the colonization of terrestrial animals and plants has been restricted (Edwards, MacDonald & Proctor, 1993).

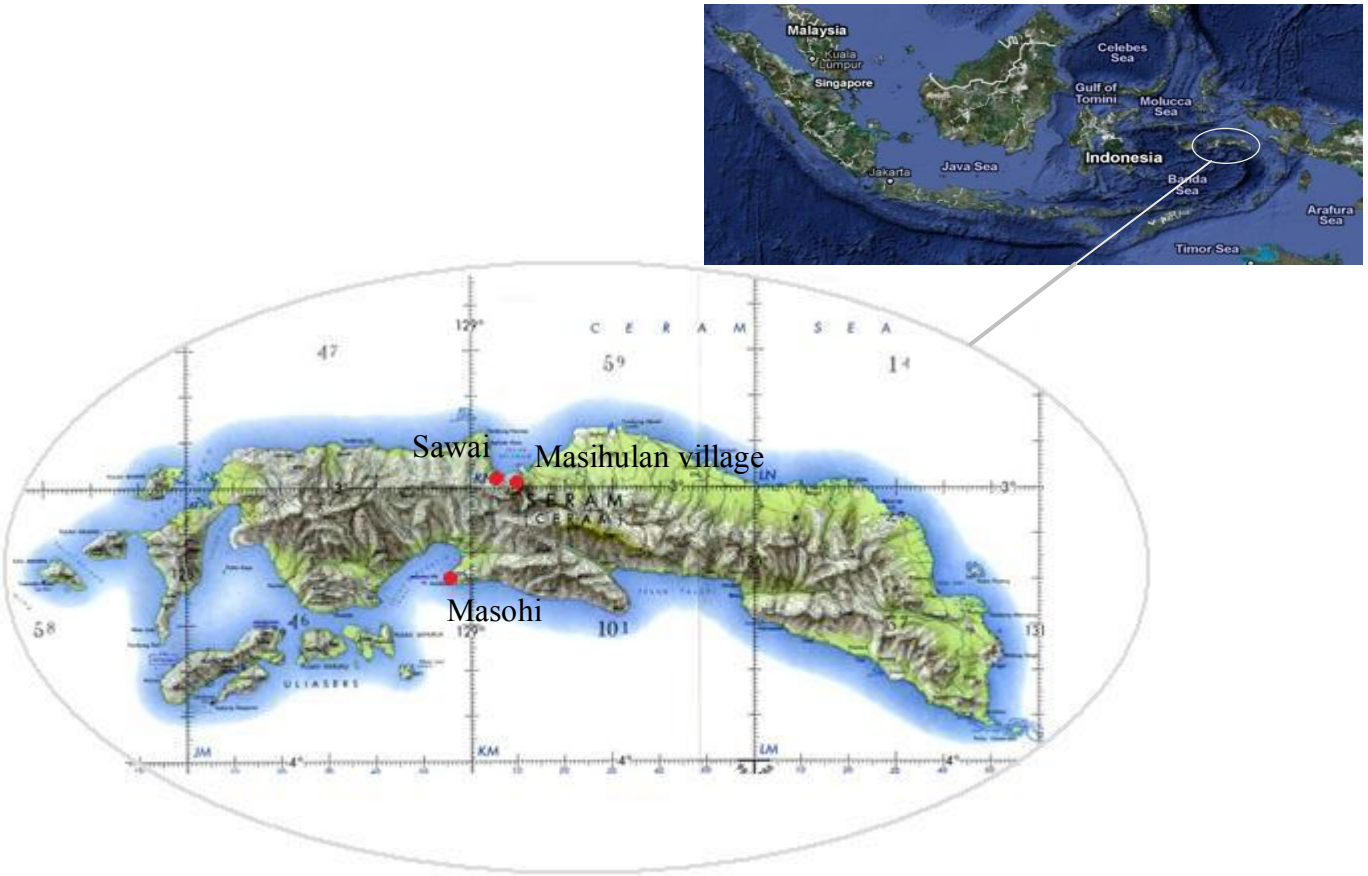

Figure 1. Seram Island is located in East Indonesia. On the larger map over Seram, Masihulan village and Sawai are located in the Central North while Masohi is in the South.
Sources: Wikipedia and Google maps

The "forest estate" (government-owned forest land) on Seram holds many official functions, such as production and conversion, from forest to gardens, as well as protection and conservation, as the Manusela National Park is located in the center of Seram covering about 10 % of the island. This makes the natural resource management and land use planning issue strongly dependent on forestry polices, since the forest holds unique biological diversity and much of the land in Moluccas is too steep for other land use than forestry. Forest timber has been extracted at small scale for local uses for housing, boats and fuel for hundreds of years in Moluccas (Ellen, 1993).

Industrial logging was quite active in the 1980s´ and 1990s´ but nowadays the forests have recovered well (Laumonier, Y., pers. com.). Even though timber is the officially most economically important forestry product, many of the local people are directly depended on the non-timber production for income, food security, welfare and employment.

Multidisciplinary Landscape Assessment

Multidisciplinary Landscape Assessment (MLA) is an approach developed and tested extensively by CIFOR researchers. It aims to assess factors of importance to local communities in tropical forest landscapes and to enhance better understanding between the forest communities, development practitioners and policy makers (Sheil et al., 2002). The methods of MLA are developed to get a quick overview of many different aspects of the site and community. It is divided into both village-based and field-based activities. Because of limited time my study was restricted to the village-based activities, including community meeting and participatory mapping, interviews and focus group discussions.

Community meetings and participatory mapping

The first activity held in the village was a community meeting. As many people as possible from the village were invited to attend. During this meeting all team members were presented as well as the project, its activities and aims. After the presentation, the participants were asked what habitats could be found around the village, what products they get from these and what they use the products for. These categories were later used as a base for the scoring exercises.

After listing their answers the mapping exercise started to get information from villagers where they find the different habitats, products etc. The mapping exercise was held with men and women in separate groups so everybody would feel free to express themselves (Figure 2 and 3). For each group, men and women, a base map with the most general information such as nearby villages, mountains, rivers and coastline was prepared. This was made to make it easier for the participants to orientate themselves, even if they did not have previous experience of mapping. Both groups selected one person that draw and others helped him/her to point out the locations for landmarks, land use, local names etc (Figure 4). A legend was made to explain the symbols on the map and after the exercise the maps were hanged on the wall so they could be easily accessed by the villagers if they wanted to add, change or erase data (Figure 5 and 6).

Figure 2. Community meeting and participatory mapping with the men in Masihulan village

Figure 3. Mapping exercise with the women after the community meeting

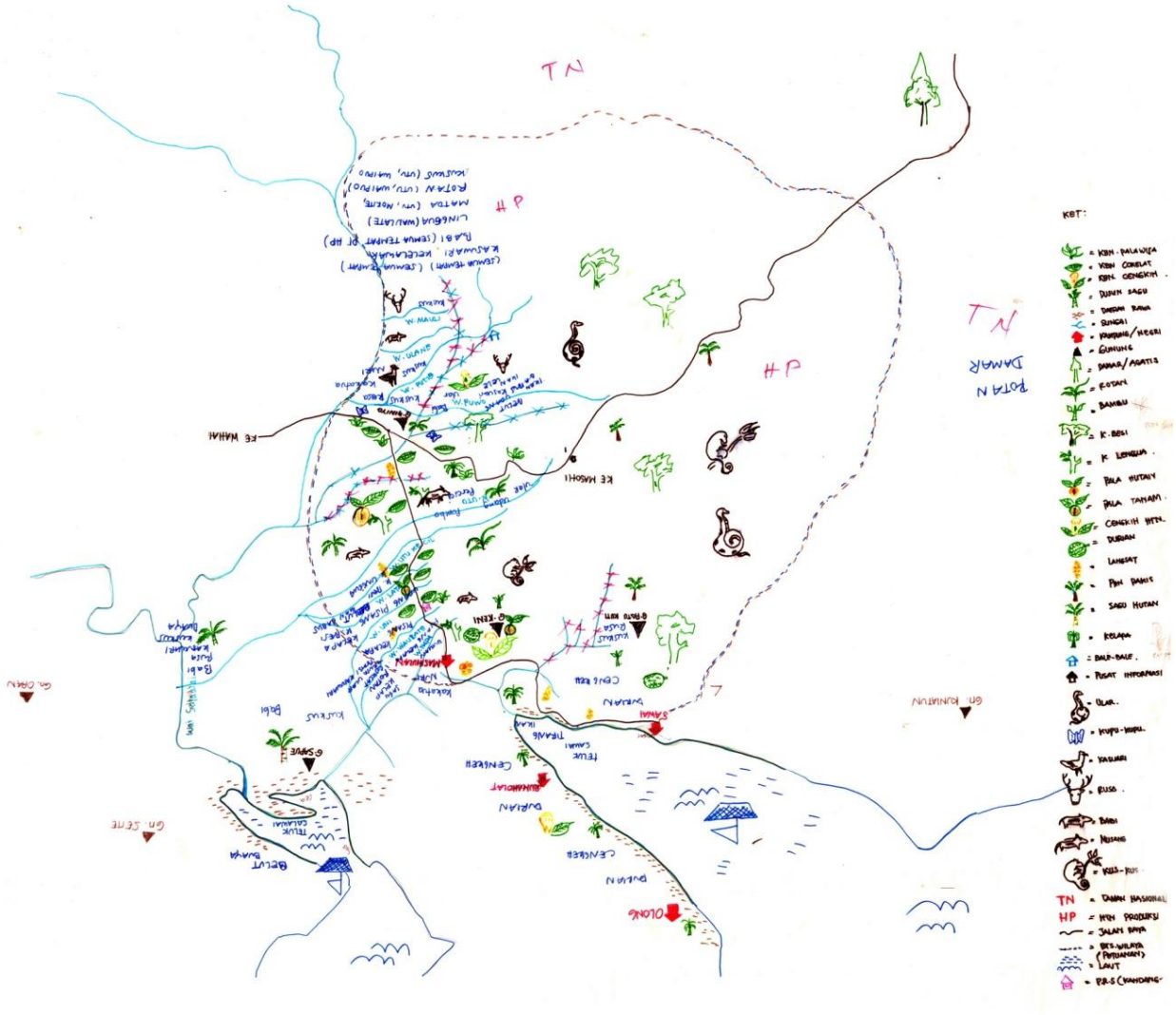

Figure 4. The final map from the men group showing the location for land use, species etcetera

Figure 5. The maps were hanged on the wall to be easilly accessed by villagers

Figure 6. Everybody had access to the map, men, women and children

At the end of the field study all participants gathered once again. During this final meeting information from the mapping exercise were cross-checked. Two days were then spent in the field collecting GPS coordinates for the habitats and land use that the men and women had mentioned during the mapping exercise. During this ground-checking, species that were scored as the most important for each use category (Appendix 2 and 3) were collected. The collected specimens were later sent to a herbarium in the Botanical Garden in Bogor, west Java for identification.

Household survey and personal interviews

To get background information about Masihulan the village head and the traditional leader were interviewed about the history of the settlement and important events. Thirty households were randomly selected for a demography and household survey, consisting of questions about their income and hopes for the future, as well as their perspective on the forest and land use. One of the questions in the household survey was to identify people in the village that know a lot about the nature and its history in the surrounding area. Based on this information five key informants were selected and interviewed more specifically about gardens and forest products as well as traditional knowledge on land use. All questionnaires used during the interviews are shown in Appendix 8.

Most of the interviews were held in the morning or afternoon when the people were not working in their gardens. Since few villagers spook English an interpreter was used for translating during the interviews. To create a good atmosphere snacks and cigarettes were offered to the person being interviewed and his/her family. The interviews were often held with the head of the family but in some cases, when the head of the family was too difficult to reach, his wife was asked to be interviewed instead.

Focus group discussion

The focus group discussions and scoring exercises, also called PDM (Pebble Distribution Method), is a central part of the MLA, clarifying the participant's priorities.

The exercises were held in two groups, men and women separately, with four to five participants in each group (Figure 7 and 8). The discussion consisted of four scoring exercises (Appendix 8) and was distributed over four days to prevent the participants from getting too tired and lose interest. The participants had 100 peanuts to distribute among different categories based on their importance. To see how important the different categories were in relation to each other the participants were asked to score the different categories instead of just ranking.

Figure 7. Focus groupdiscussion and scoring exercise with the men

Figure 8. It takes a while to agree about the final scoring

For example, when scoring the importance of each habitat to different use categories the participants were given one use category at the time (food, medicine, construction etc) and then asked to distribute the 100 peanuts between eight cards representing the different habitats (village, garden, national park etc). This made it possible to identify the most important habitat/ habitats for each use category. After villagers had scored the categories they were asked to explain the scoring. All the scoring results and associated explanations were documented.

Data analysis of the most important species

Since one species can be important to several different use categories the total score was calculated with the following equation to be able to determine which species that overall were the most important.

$$T = G * (P / (100 + R)) * (U / 100) \qquad \textbf{Equation 1}$$

T represents the total score while G stands for the general score, given by the participants under the previous scoring exercises. P is the percentage used from plants or animals for the specific use category. Since the participants only could list the 10 most important species some species were left out. To take them in consideration as well, the participants were asked to rank the remaining species, represented by R is in the equation. U represents the scoring of the importance of the use category. An example is shown in Table 1. Since one species can occur in many different use categories, the total score for one and the same species was summarized. An average of men and women groups determined the most important species (see Figure 14).

Table 1. To calculate the total score the equation T = G *(P / (100 + R)) * (U / 100) was used. In this example from the scoring of the most important species (men group) the total score for sago is 17 * (80 / (100 + 50)) * (20 / 100) = 1.81. General score = 17, Percent use from plants = 80, Remaining = 50, Use category = 20

Food	**20**				
Plants	**80**		Animals	20	
Plants name	**General score**	***Total score***	*Animals name*	*General score*	*Total score*
Sago	**17**	**1.81**	Fish	22	0.63
Coconut	15	1.6	Cuscus	19	0.54
Banana	13	1.39	Deer	15	0.43
Cassava	10	1.07	Wildpig	13	0.37
Taro	10	1.07	Snail	7	0.2
Paku-paku	9	0.96	Sago larva	5	0.14
Chili	9	0.96	Shrimp	5	0.14
Spinach	7	0.75	Eel	5	0.14
Corn	5	0.53	Snake	5	0.14
Sweet potato	5	0.53	Cassowary	4	0.11
Total	100	10.67	Total	100	2.86
Remaining	**50**	5.33	Remaining	40	1.14
		16			4

Results and discussion

Household survey and personal interviews

Village history and present condition

During the past 100 years Masihulan village has moved several times but has always been located in the surrounding area of Sawai. The village has only been at the present location, near the river Napa, for about 10 years. In 1999 the village moved further away from the coast for three main reasons: (1) the space for new households was limited in the previous site, (2) they had problems with the drinking water (at high tide the drinking water was becoming brackish) and (3) in 1999 a conflict between different religious groups started in Ambon. To be better prepared for an eventual attack, the village moved closer to the main road. The village housing area is today about 1.5 hectare consisting of about 80 households and around 460 people. The average number of children among the 30 interviewed households was 3.8 per family. The only religion is protestant and there are two clans, Patalima and Patasiwa, divided into different subunits or family groups.

Figure 9. The main road in Masihulan village

The level of education is generally low and few people have college diplomas or bachelor degrees. During the interviews education was often viewed as important for the future and the majority wished to be able to send their children to higher education so that they later would be able to get a good job and a better future. When comparing the education of parents with that of their children, more of the younger generations had been to college or universities.

The most common occupation in the village is farming and each household has in general 0.5 hectare for growing perennial crops and another one hectare for long term crops like durian and clove. The average income is about 20 000,000 rupiah (~1,650 euro) per year. The variation between families is large, from 825, 000 rupiah (~68 euro) up to almost 84 000,000 rupiah (~6900 euro) per year. Teachers, tree cutters and rock collectors are in general the best paid while the main occupation of farming is less well-paid.

The majority of the people in Masihulan wish that the hamlet, in the future, will become an independent village. They want the hamlet to continue to develop and be equal to other villages, both economically and educationally.

Government actions impact on local people

Manusela National park

In 1982 the borders of the "Protected forest" area were determined to protect the upstream area and keep the water resources. Within the protection area you could still plant durian, clove and other long term crops for garden purposes if this would not threaten the water resources. Five years later, in 1987, the protection area became a "Conservation area" with the establishment of the Manusela National park. As a national park area, the forest was now under strict conservation

status which meant that the people in Masihulan no longer were allowed to take anything from the forest.

This new restriction made the national park useless for the people (although villagers were still allowed to collect dammar resin from Agathis trees) and the perception of the park is today split among the villagers. Some see the rules as a threat, since they limit their resources and the management of the national park never benefits the villagers. Other claim that they still have enough forested area for gardening and to collect forest products. They view the national park as something positive since it helps prevent floods and sustains the forest for them and their children. The conservation forest still provides them with water and maybe, in the future, they can make an income by showing the area to tourists. They believe it is right to support the forestry department concerning the protection of the national park since it is also a good place for their children to learn about animals, plants and forest goods and services. They also want to spread the information and understanding about the importance of keeping the forest to others in Masihulan.

The lack of communication between the park authority, rangers and the local people has lead to conflicts and misunderstandings. The villagers therefore wish for more and better communication with the forest service in Masohi, which sets the management rules for the national park, to clarify the rules and reduce the misunderstandings.

Main road
In 1987 a road was build from Masohi (in the south) to the North coast (Wahai). More than 10 people from Masihulan worked for the project, helping them to find a suitable area for the road. In exchange they got a promise that a secondary road, between the main road and the Sawai village on the coast, would be built, passing also Masihulan. 20 years later, in 2007, the promise was realized (Figure 9). This road improved the transportation and made Masihulan more accessible. That in turn has improved their livelihoods and led to higher incomes as more tourists and visitors arrive as well as traders that buy their products.

Scoring exercises and focus group discussion

The most important habitat
During the first community meeting eight different habitats were identified by the villagers; village, lake, river, swamp, sago garden, fruit and vegetable garden, national park and forest outside the national park (also referred to as the "production forest"). These eight habitats have different functions and importance (Figure 10). For food, for example, sago garden is the most important habitat while for recreation river is the most important. For a complete list over each habitats importance for the different use categories see Appendix 1.

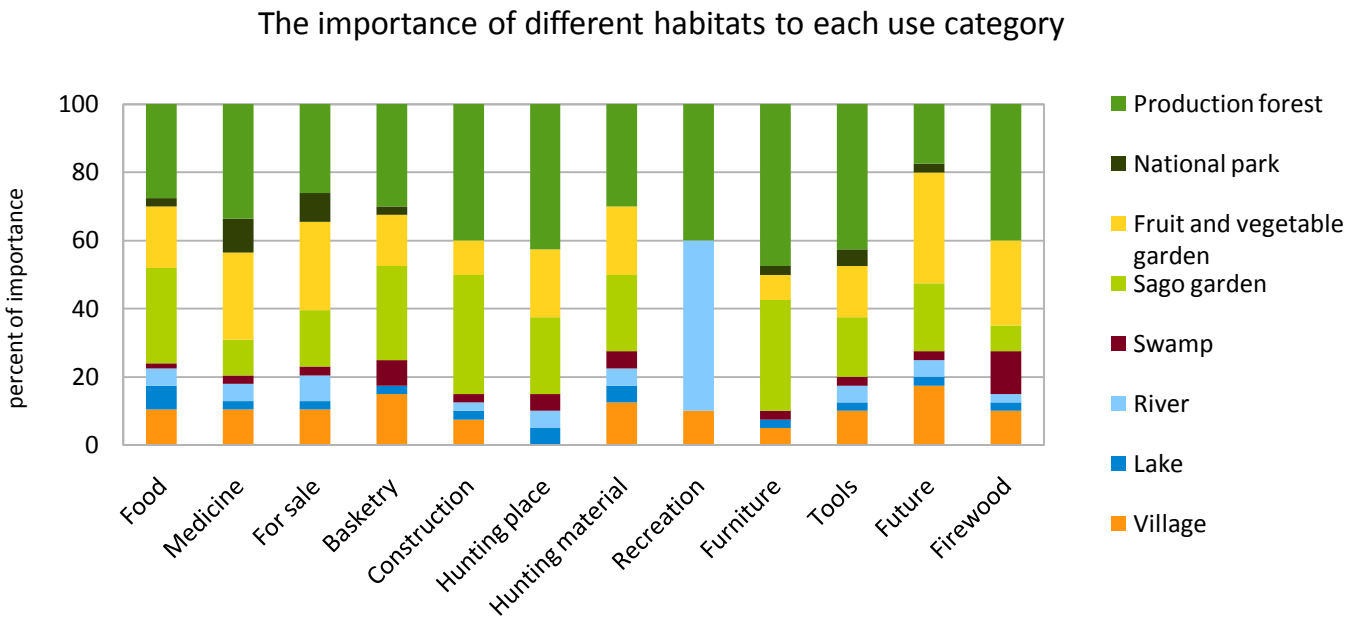

Figure 10. Importance of the different habitats for each use category, representing an average from men and women groups. The categories were defined by the local people.

Overall though, men and women scored the forest outside the national park as the most important habitat (Figure 11). It is the only habitat used for all the use categories and it provides many different food sources like wildlife, fruits and vegetables, without much management. The forest is close to the village and every house in the village has access to it, at any time. It also provides a lot of different materials like sand, rocks and timber to build houses, and species like rattan and bamboo are used to make tools, furniture and baskets. Besides food and construction material, it also provides many different sources of medicine, marketable items and firewood as well as a good hunting environment with lots of wildlife. The forest is appreciated as a recreation site with beautiful scenery, flowers and birds.

Threats to the forest

According to the interviews the biggest threat to the forest, caused by human activities, is illegal logging and over logging by outside companies. These activities contribute to forest degradation leading to erosion and natural disasters like landslides and flooding. Small-scale timber cutting, such as clearing for new gardens, has little impact on the forest. When opening a new garden the area is selectively cut, big trees are left, and the old garden is replanted with cacao, clove and other threes.

When asked what the villagers would do if the forest became more degraded or risked to disappear, the majority of people were willing to help reforest the area. They also wanted to give an understanding to the people that cut down the trees that their activity harms the forest. The area around the village has great potential for plantation or mining activities, but the village has refused those kinds of companies to expand such activities. Instead they want to protect the area from exploitation and preserve both the nature and the wildlife. To do this they believe it is important to coordinate with the local government and the local forestry service since the villagers alone do not have the authority to stop these kinds of companies.

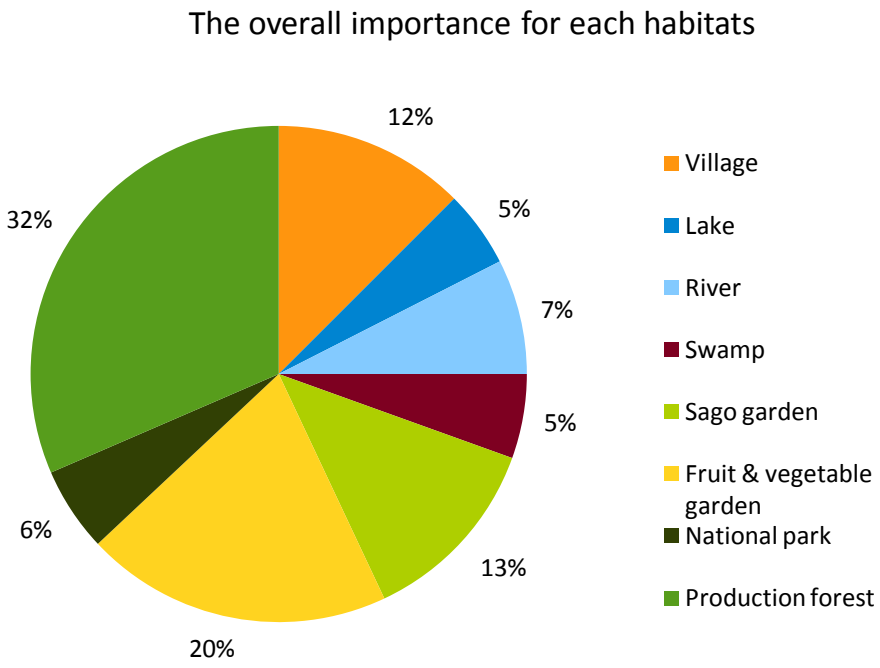

Figure 11. Overall importance of the different habitats, representing an average from the men and women scoring exercises

Other important habitats

The second most important habitat is fruit and vegetable garden. It provides the people in Masihulan with their daily needs and additional fruits and vegetables. In the garden they can grow many medicinal plants and products to sell. For the future the fruit and vegetable garden is the most important habitat since villagers believe that the yield will increase and provide them with more products to sell. This will make them able to earn more money and thereby enable them to send their children to higher education. Fruits and vegetable garden is however ranked less important than the forest as it takes lots of effort and time to take care of the garden, it only provides two types of food sources, vegetables and fruits, and there are less material for construction, furniture, tools and baskets. There are also fewer animals to hunt and the quantity and quality of firewood is lower than in the forest.

Even though sago is the most important species (Figure 14) the sago garden, together with the village, is overall ranked on third place. Sago is their staple food and they consume it almost every day. The sago garden also provides them with material for construction as the leaves and branches are used for roofing and walls. It is also used for basketry and it is a good place for hunting, even if it contains less animals then the production forest. Since sago is their main food they score the garden high for the future to ensure the food and income for their children.

The village is ranked as high as the sago garden since this is where they have their homes and raise their children. Their family and friends, as well as the church, are important items for recreation. In the village every house has their own garden, “toga”, where fruits, vegetables, spices and herbs but also medical plants can be grown. Fruit and vegetable garden as well as the village are ranked less important than the forest due to the lower production. The villagers believe that the population in Masihulan will increase and therefore view the village area as important for the future as they will need more space to build new houses for their children, better education and health facilities as well as roads.

In the village they have dogs for hunting and from the sago garden they get material to make hunting tools. The sago garden and the village both provide them with marketable items, fire

wood and material to make tools and furniture, but the quantity of these sources are lower then what they can find in the production forest or in the fruit and vegetable garden.

The impact of distance
When scoring how distance (one hours walk compared to four hours walk) affects the importance of different habitats, the forest, fruit and vegetable garden, sago garden and river were ranked more important when the distance got longer (Appendix 7). These are all habitats that provide villagers with water, food and products to sell. The lake, swamp and the national park however were ranked less important as the distance got longer since they provide less food and income opportunities.

The most important species and changes over time

Below the ten most important species, based on an average from the men and women group (Appendix 4) are described. For a complete list over the ten most important species per use category see Appendix 2 (women group) and Appendix 3 (men group).

Sagu (*Metroxylon sagu)* Sago

The most important species is sago palm (Figure 12 and 14). It is financially important since it can be harvested often and is easy to sell since villagers consume it every day. Besides using it for food and income, villagers also use it as a material for furniture and construction, like roofing and walls. Sago is common around the village and therefore easy to find and collect. The trees attract wild animals which make the sago groove a good place for hunting. It is also used to make tools and basketry although it is less important for such uses.

Figure 12. Sago, the most important species for the people in Masihulan

As mentioned above sago is the main staple for people in Masihulan. In the past, when the village was closer to Sawai, people had to walk a longer distance to get food. On the other hand they had more area to use since the national park was still not established. For the future both men and women groups ranked food as an important use category (Appendix 5 and 6) since they believe the village will continue to expand and more food will therefore be needed.

Bambu *(Bambusoideae spp*) Bamboo

Bamboo is used to make tools, basketry and furniture like table, chairs, beds and cabinets but also as construction material to build houses. It is easy to find and light to carry and the shoots from bamboo can also be used as food.

Bamboo is an important material for hunting tools (Appendix 2 and 3) such as traditional ones like bows and arrows. However these are less used today compared to 30 years ago (Appendix 5 and 6), as they are being replaced by modern hunting tools like shoot guns. Villagers predict that traditional hunting tools will continue to decrease as modern tools will be more and more common in the future.

Rotan *(Calamus spp)* Rattan

Rattan is easy to find and can like bamboo be used to make furniture, tools and traditional hunting tools but is also used as construction material. Compared to bamboo it has fewer uses and is therefore not as highly ranked. Areas with rattan are also good spots for hunting.

For basketry rattan is one of the most important species (Appendix 2 and 3). In the past basketry was more used since the material from the forest was free of charge and easily accessed. The transportation possibilities between nearby villages were bad and even if alternative material could be accessed, villagers could not afford to buy them. Today the transportation is better and they have more money and are therefore able to buy items based on other materials than rattan. The women group therefore ranked basketry as less important for the future (Appendix 5). Interestingly enough, the men group ranked the future higher (Appendix 6). Men believe it is important to keep the tradition and they think traditional basketry can attract visitors which will give them an opportunity to sell baskets and thereby get an extra income.

Lenggua *(Pterocarpus indicus)*

Lenggua is a tree common in the forest of the Moluccas, reaching about 25-35 meter height. The good quality of wood makes it ideally for construction and it is therefore, together with the fact that it has a high economic value, important for the future (Appendix 2 and 3). However, many people today do not have access to lenggua and are therefore not able to earn money from it. For the few people that actually do have access to it, the cost of cutting it down (salary for cutters, chain saw etc.) is high.

Lenggua is the most used species to make furniture (Appendix 2 and 3) and it can be transformed into many different kinds of products that can be found in every house in the village. In the past villagers had access to many materials to make furniture but no tools to construct them. The lack of money made them prioritize food and other things. Today with more money and more access to modern tools it is easier to make furniture, but also to buy such made from other materials like plastic. Villagers believe the demand for furniture will increase in the future (Appendix 5 and 6) and that it is important to have a nice and beautiful house, in your own style.

Kelapa *(Cocos nucifera)* Coconut

The young coconuts are used for eating while the older ones are used to extract oil for cooking. Coconut has a commercial value, but since the coconut trees near the village are still young the harvest is limited. In five years villagers believe the harvest will increase and that it is therefore important for future income. The trees attract snakes, cuscus (Figure 13) and wild pigs and are therefore good for hunting. Parts of the coconut tree can also be used to make basketry and furniture, but to a rather small extent.

Many coconut trees grow on the beach, and this environment is appreciated for recreation (Appendix 2 and 3). In the past and still today, opportunities for recreation are small due to high work load. Also, in the past people were not aware of the importance of relaxing but now they do and also think it will become more important in the future (Appendix 5 and 6). Villagers believe the future will bring more money so they can send their children to university, and when they return to visit, more time will be spent for recreation and relaxing.

Figure 13. Cuscus, a popular animal to hunt

Kayu Besi *(Intsia palembanicia)* Iron wood

Like lenggua, the price for iron wood timber is high, but few people have access to it and it is expensive to cut down. It is used to make many different kinds of tools as well as furniture and the branches from the trees are used for firewood (Appendix 2 and 3).

The fine quality makes it good for construction and it is therefore, together with the high economic value, important for the future even though villagers believe construction materials from the forest eventually will be less used since they can access nearby villages more easily now and buy modern construction material like concrete (Appendix 5 and 6).

Loleba *(Schizostachyum sp)*

Although loleba technically is a type of bamboo, villagers classify it differently. It is easy to find around the village and it is used for basketry, to make hunting tools, and to a lesser extent for construction (Appendix 2 and 3).

Loleba is one of the most important species for tool making since it has many uses. However, villagers have today access to more modern tools and they predict that such tools will become increasingly used in the future (Appendix 5 and 6).

Gofasa *(Vitex cofasus)*

Gofasa is a tropical tree reaching about 30-35 meters height. It is used for a number of different tools as well as a construction material (Appendix 2 and 3). The quality is good, but it is hard to find around the village.

It is also used as firewood. However, firewood was more important in the past (Appendix 5 and 6) when villagers did not have access to gasoline and electric tools. Even though they still rely on firewood the use of gasoline has increased and they predict it will be even higher in the future.

Pisang *(Musa spp)* Banana

Bananas can be used for many different dishes, are consumed daily and can even replace sago if this has low availability. Every household in the village has bananas in their garden, the harvest is large and villagers can harvest every week to get products to sell. Products like this will have a more important role in the future (Appendix 5 and 6) since villagers believe the harvests will increase and that they will have more products to sell compared to the past when the garden was only used for self consumption.

The trunk of the banana tree can be used for traditional medicine. However, traditional medicine from the garden and forest is less used today compared to 30 years ago when villagers did not have access to modern medicines, doctors or health facilities. They still rely on the traditional medicine but believe it will be less and less used in the future (Appendix 5 and 6).

Durian (*Durio Zibethinus)*

There are lots of durian trees around the village and villagers use the fruits for commercial purposes, even though there is only one harvest per year. It is also used for firewood and to make traditional medicine. Since villagers can earn a lot of money by selling the fruits, durian is important for the future (Appendix 2 and 3).

The durian trees and their fruits attract many wild animals and groups of trees are therefore good hunting places. In the past, before the national park was established, hunting areas were larger. Villagers predict that the area used for hunting will be even less in the future since the population in Masihulan will increase and areas are needed for gardens. Even though they can hunt in the gardens, this environment is not as diverse as the forest.

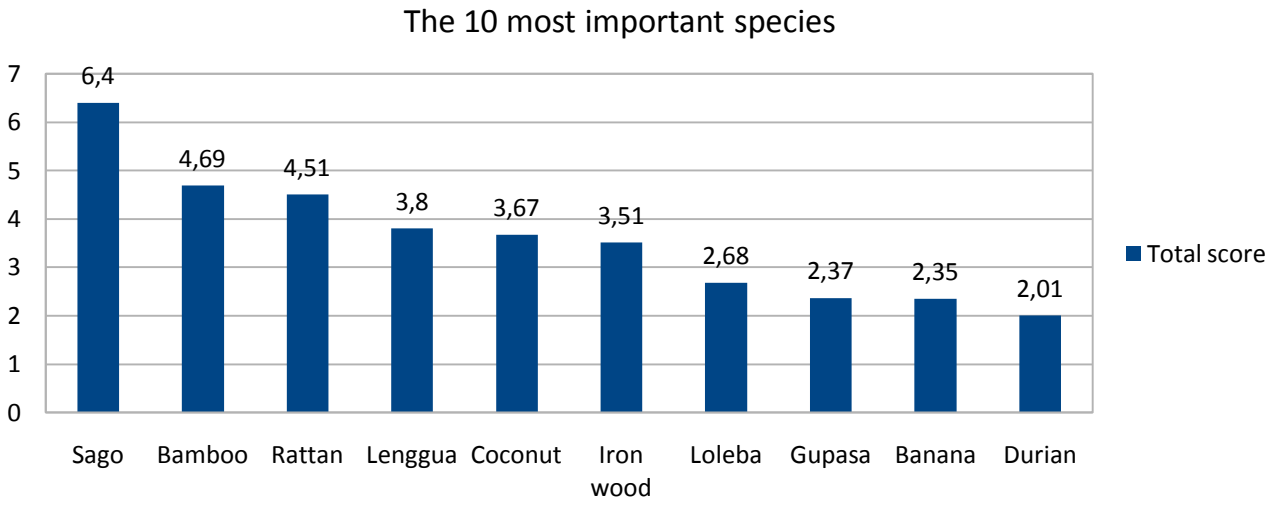

Figure 14. The most important species is sago followed by bamboo and rattan. The total score is an average from the men and women groups. For a complete list of the 12 most important species for men and women, respectively, see Appendix 4.

Improvement of the MLA approach

Household surveys and personal interviews

The questionnaires used in this study were difficult for the people in Masihulan to understand since they were too formally written and too long. The interviewed person often forgot the beginning of the question. One way to improve the method is to shorten the questions or divide them into sub-questions and, if possible, translate them to the local language.

When the head of the household was difficult to reach, his wife was asked for the interview instead. In some cases this worked well, but in others the women proved to be more shy and insecure.

The correctness of answers can be discussed. For example incomes may be hard to estimate. One interviewed woman mentioned that she only earns 825,000 rupiah per year. Although this number is extremely low, even compared to other low income families, earning around 2-3 000,000 rupiah per year, the fact that the interviewed woman was a widow and almost self providing with food etc. makes the extreme number possible.

The interpreter was not familiar with interviewing methods, and instead of explaining a misunderstood question he lead villagers to pre-made answers. Thus, it was hard to know if the answers came from the interpreter or the person being interviewed. Even though the interpreter came from a nearby Island, he did not understand the local dialect and it was therefore hard for him to communicate and understand the people in Masihulan, especially the women.

Scoring exercise and focus group discussion

Scoring is a quick and inexpensive method but it has some pitfalls, identified by Sheil and Liswanti (2006). For example can numbers imply an inappropriate precision and you can never be sure that all the participants truly understood the exercise. These pitfalls can however be limited by replication and cross-checking's.

The use of different languages sometimes lead to species being listed as two instead of one. For one scoring exercise for example, one species could be mentioned in the local language and for another exercise the same species could be mentioned in Indonesia or English. Some of these errors were eliminated during the ground-checking and specimen collection, when the list of the most important species was revised.

The participants sometimes mentioned single species and sometimes whole families. One example is loleba and bamboo. The men only mentioned and ranked bamboo while the women mentioned and ranked both bamboo and loleba. If loleba would be included in the bamboo category, that category would have been overrepresented, as the women in that case would have ranked it twice.

Scoring the distance was difficult for the participants since it was hard for them to envision unrealistic scenarios. The interpreter also had a hard time understanding this part and was therefore not able to explain it properly.

Conclusion

The forest outside the national park is considered the most important habitat by the villagers of Masihulan and even if they today have better access to modern materials and tools than before, they still rely on the forest for their livelihood. Since the beginning of the 1980s the forest area usable to the village has been limited by the Manusela national park. Still the majority see the park as something positive. People understand the importance of taking care of the forest to be able to keep its functions. The education level in the village is low but the willingness to learn is strong. Villagers want to understand the nature better in order to take better care of the natural resources around the village.

The communication between the local people and the forestry department has been poor which in turn has lead to confusion and conflicts about the management. Better collaboration between the two parts would benefit both the forest and the local community. This is also something that the people in Masihulan wish for, to avoid further misunderstandings and conflicts.

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Appendix 1

Pebble Distribution Method, land and forest types. The table show how important men (grey color) and women think the different habitats are for each use category

	Use category																									
Habitat	Overall		Food		Medicin		For sale		Basketry		Construction		Hunting place		Hunting material		Recreation		Furniture		Tools		Future		Firewood	
Village	10	15	11	10	11	10	6	15	15	15	0	15	0	0	25	0	20	0	0	10	10	10	20	15	20	0
Lake	3	7	11	3	0	5	0	5	0	5	0	5	0	10	0	10	0	0	0	5	0	5	0	5	0	5
River	10	5	0	10	0	10	5	10	0	0	0	5	0	10	0	10	40	60	0	0	0	10	0	10	0	5
Swamp	4	7	0	3	0	5	0	5	10	5	0	5	0	10	0	10	0	0	0	5	0	5	0	5	20	5
Sago garden	10	15	26	30	11	10	18	15	30	25	50	20	25	20	25	20	0	0	40	25	20	15	25	15	0	15
Fruit/veg. garden	20	20	26	10	31	20	32	20	10	20	0	20	25	15	25	15	0	0	0	15	15	15	35	30	20	30
National park	5	6	0	5	0	20	7	10	0	5	0	0	0	0	0	0	0	0	0	5	0	10	0	5	0	0
Production forest	38	25	26	29	47	20	32	20	35	25	50	30	50	35	25	35	40	40	60	35	55	30	20	15	40	40
Total per use category	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Appendix 2.

The 10 most important species for each use category according to the women

	General score	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**
Food	**15**					**Medicine**	**10**					**Basketry**	**9**		**Construction**	**10**		**Firewood**	**5**	
Plants	***75***		**Animals**	***25***	***100***	**Plants**	***80***		**Animals**	***20***			***100***			***100***			***100***	
Plant names			*Animal names*			*Plant names*			*Animal names*			*Plant names*			*Plant names*			*Plant names*		
Sago	13	1.17	Gabus fish	17	0.53	Bengkudung	18	1.44	Deer	18	0.36	Loleba	25	2.25	Sago	12	1	Sirih	17	0.83
Cassava	10	0.9	Deer	10	0.31	Benalu	18	1.44	Wild pig	18	0.36	Rattan	15	1.35	Iron wood	11	0.92	Gupasa	17	0.83
Bamboo	10	0.9	Cuscus	10	0.31	Seraei	8	0.64	Civet cat	11	0.22	Bamboo	12	1.08	Lenggua	11	0.92	Matoa	17	0.83
Coconut	10	0.9	Wild pig	10	0.31	Ginger	8	0.64	Snake	11	0.22	Sago	12	1.08	Anamole	10	0.83	Gumirang	17	0.83
Sweet potato	10	0.9	Snail	10	0.31	Laka	8	0.64	Mouse	11	0.22	Tikar	12	1.08	Samar	10	0.83	Samar	17	0.83
Taro	10	0.9	Eel	9	0.28	Kunyit	8	0.64	Monitor lizard	11	0.22	Coconut	12	1.08	Pulaka	10	0.83	Belo	17	0.83
Rattan	10	0.9	Shrimp	9	0.28	Papaya	8	0.64	Snail	11	0.22	Paku	12	1.08	Pulei	10	0.83	-	-	-
Banana	10	0.9	Crab	9	0.28	Kumis kucing	8	0.64	Bee	9	0.18	-	-	-	Bamboo	9	0.75	-	-	-
Papaya	9	0.81	Bats	8	0.25	Geloba	8	0.64	-	-	-	-	-	-	Rattan	9	0.75	-	-	-
Pineapple	8	0.72	Pigeon	8	0.25	Tali kuning	8	0.64	-	-	-	-	-	-	Loleba	8	0.67	-	-	-
Sum	100	9		100	3.13		100	8		100	2		100	9		100	8.33		100	5
Remaining	25	2.25	Remaining	20	0.63	Remaining	0	0	Remaining	0	0	Remaining	0	0	Remaining	20	1.67	Remaining	0	0
Sum total score		11.25			3.75			8			2			9			10			5

Appendix 2. Continued

	General score	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**
For sale	*10*					**Hunting place**	*7*		**Hunting material**	*5*					**Recreation**	*4*				
Plants	***90***		**Animals**	**10**	***100***	**Plants**	**100**		**Plants**	***100***		**Animals**	**0**	***100***	**Plants**	***50***		**Animals**	**50**	***100***
Plant names			*Animal names*			*Plant names*			*Plant names*			*Animal names*			*Plant names*			*Animal names*		
Sago	12	0.72	Deer	25	0.25	Beringin	10	0.56	Bamboo	20	1	-	-	-	Bintanggor	11	0.18	Seram kakatua	15	0.2
Cacao	12	0.72	Wild pig	25	0.25	Matoa	10	0.56	Loleba	20	1	-	-	-	Kayu merah	11	0.18	Lorry kit	12	0.16
Banana	12	0.72	Chicken	15	0.15	Durian	10	0.56	Nibong	15	0.75	-	-	-	Pule	11	0.18	Nuri	12	0.16
Iron wood	11	0.66	Dog	15	0.15	Langsat	10	0.56	Bintanggor	15	0.75	-	-	-	Belo	11	0.18	Butterfly	11	0.15
Lenggua	11	0.66	Cuscus	10	0.1	Kanari	10	0.56	Rattan	15	0.75	-	-	-	Orchid “batik”	11	0.18	Snake/python	11	0.15
Coconut	9	0.54	Shrimp	10	0.1	Kayu merah	10	0.56	Saribu	15	0.75	-	-	-	Orchid “daun halus”	11	0.18	Horn bill	8	0.11
Nut meg	9	0.54	-	-	-	Rattan	10	0.56	-	-	-	-	-	-	Katapang	9	0.15	Bayan	8	0.11
Clove	8	0.48	-	-	-	Sago	10	0.56	-	-	-	-	-	-	Rose apple	9	0.15	Pigeon	8	0.11
Durian	8	0.48	-	-	-	Geloba	10	0.56	-	-	-	-	-	-	Guava	9	0.15	Cuscus	8	0.11
Langsat	8	0.48	-	-	-	Cempeda	10	0.56	-	-	-	-	-	-	Asoka	7	0.12	Bat	7	0.09
Sum	100	6		100	1		100	5.6		100	5		0	0		100	1.67		100	1.33
Remaining	50	3	Remaining	0	0	Remaining	25	1.4	Remaining	0	0	Remaining	0	0	Remaining	20	0.33	Remaining	50	0.67
Sum total score		9			1			7			5			0			2			2

Appendix 2. Continued

	General score	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**	
Furniture / Decoration	*7*					**Tools**	*8*					**Future**	*10*					
Plants	***80***		**Animals**	**20**	***100***	**Plants**	***100***		**Animals**	**0**	***100***	**Plants**	***90***		**Animals**	**10**	***100***	
Plant names			*Animal names*			*Plant names*			*Animal names*			*Plant names*			*Animal names*			
Lenggua	17	0.79	Deer	16	0.22	Sago	18	1.44	-	-	-	Cacao	15	1.13	Deer	17	0.14	
Anamole	11	0.51	Cassowary	12	0.17	Loleba	18	1.44	-	-	-	Sago	15	1.13	Wild pig	14	0.11	
Rattan	11	0.51	Cuscus	12	0.17	Rattan	16	1.28	-	-	-	Iron wood	11	0.83	Dog	10	0.08	
Bamboo	11	0.51	Crocodile	12	0.17	Gofasa	16	1.28	-	-	-	Lenggua	11	0.83	Cuscus	10	0,08	
Orchid "batik"	10	0.47	Shrimp	12	0.17	Lenggua	16	1.28	-	-	-	Clove	8	0.6	Chicken	10	0.08	
Rose	8	0.37	Snake	12	0.17	Bamboo	16	1.28	-	-	-	Nut meg	8	0.6	Crab	8	0.06	
Asoka	8	0.37	Crab	12	0.17	-	-	-	-	-	-	Durian	8	0.6	Shrimp	8	0.06	
Taro	8	0.37	Butterfly	12	0.17	-	-	-	-	-	-	Coconut	8	0.6	Snail	8	0.06	
Orchid "halus"	8	0.37	-	-	-	-	-	-	-	-	-	Banana	8	0.6	Gabus fish	8	0.06	
Coconut	8	0.37	-	-	-	-	-	-	-	-	-	Langsat	8	0.6	Bee	7	0.56	
Sum	100	4.67		100	1.4		100	8		0	0		100	7.5		100	0.8	
Remaining	20	0.93	Remaining	0	0	Remaining	0	0	Remaining	0	0	Remaining	20	1.5	Remaining	25	0.2	
Sum total score		5.6			1.4			8			0			9			1	Total score = 100

Appendix 3.

The 10 most important species for each use category according to the men

	General score	Total score		General score	Total score		General score	Total score		General score	Total score		General score	Total score		General score	Total score		General score	Total score
Food	**20**					**Medicine**	**10**					**Basketry**	**5**		**Construction**	**10**		**Firewood**	**6**	
Plants	**80**		**Animals**	**20**	**100**	**Plants**	**90**		**Animals**	**10**	**100**		**100**			**100**			**100**	
Plant names			*Animal names*			*Plant names*			*Animal names*			*Plant names*			*Plant names*			*Plant names*		
Sago	17	1.81	Fish	22	0.63	Tali kuning	10	0.5	Wild pig	11	0.06	Sago	20	1	Iron wood	20	1.05	Matoa	10	0.32
Coconut	15	1.6	Cuscus	19	0.54	Beringin	10	0.5	Civet cat	11	0.06	Paku	20	1	Lenggua	20	1.05	Belo	10	0.32
Banana	13	1.39	Deer	15	0.43	Tali hulaleng	10	0.5	Dog	11	0.06	Bamboo	20	1	Gofasa	15	0.79	Iron wood	10	0.32
Cassava	10	1.07	Wild pig	13	0.37	Antawali	10	0.5	Snake	11	0.06	Rattan	20	1	Siki	10	0.53	Gofasa	10	0.32
Taro	10	1.07	Snail	7	0.2	Kumis kucing	10	0.5	Mouse	11	0.06	Tikar	7	0.35	Samar	7	0.37	Bintanggor	10	0.32
Paku-Paku	9	0.96	Sago larva	5	0.14	Durian (Globa)	10	0.5	Monitor lizard	11	0.06	Coconut	5	0.25	Samama	6	0.32	Samar	10	0.32
Chili	9	0.96	Shrimp	5	0.14	Jarak	10	0.5	Millipede	11	0.06	Beringin	4	0.2	Matoa	6	0.32	Sirih	10	0.32
Spinach	7	0.75	Eel	5	0.14	Banana	10	0.5	Eel	8	0.04	Saribu	4	0.2	Pulaka	6	0.32	Durian	10	0.32
Corn	5	0.53	Snake	5	0.14	Sago	10	0.5	Leech	8	0.04	-	-	-	Kejawas hutan	5	0.26	Pala hutan	10	0.32
Sweet potato	5	0.53	Cassowary	4	0.11	Cassava	10	0.5	Crocodile	7	0.04	-	-	-	Nibong	5	0.26	Kayu merah	10	0.32
Sum	100	10.67		100	2.86		100	5		100	0.56		100	5		100	5.26		100	3.16
Remainder	50	5.33	Remaining	40	1.14	Remaining	80	4	Remaining	80	0.44	Remaining	0	0	Remaining	90	4.74	Remaining	90	2.84
Sum total score		16			4			9			1			5			10			6

Appendix 3. Continued

	General score	Total score		General score	Total score		General score	Total score		General score	Total score		General score	Total score		General score	Total score		General score	Total score
For sale	6					**Hunting place**	5		**Hunting material**	5					**Recreation**	5				
Plants	**90**		**Animals**	**10**	**100**	**Plants**	**100**		**Plants**	**90**		**Animals**	**10**		**Plants**	**60**		**Animals**	**40**	**100**
Plant names			*Animal names*			*Plant names*			*Plant names*			*Animal names*			*Plant names*			*Animal names*		
Cacao	20	0.6	Snail	20	0.12	Beringin	20	0.63	Bamboo	20	0.9	Cassowary	100	0.5	Beringin	20	0.6	Snake	25	0.5
Banana	20	0.6	Chicken	16	0.1	Durian	15	0.47	Paku	14	0.63	-	-	-	Katapang (beach)	20	0.6	Cassowary	17	0.34
Sago	15	0.45	Deer	15	0.09	Kanari	15	0.47	Tebu hutan	14	0.63	-	-	-	Matoa	15	0.45	Nuri	15	0.3
Coconut	15	0.45	Wild pig	15	0.09	Kayu merah	15	0.47	Nibong	14	0.63	-	-	-	Coconut	15	0.45	Seram kakatua	15	0.3
Durian	5	0.15	Dog	11	0.07	Sago	7	0.22	Bintanggor	10	0.45	-	-	-	Iron wood (beach)	10	0.3	Mambruk	13	0.26
Corn	5	0.15	Cuscus	11	0.07	Langsat	6	0.19	Namu-namu hutan	10	0.45	-	-	-	Bintanggor (beach)	8	0.24	Owl	10	0.2
Cassava	5	0.15	Shrimp	7	0.04	Cempeda	6	0.19	Rattan	10	0.45	-	-	-	Samama	6	0.18	Horn bill	5	0.1
Clove	5	0.15	Snake	5	0.03	Coconut	6	0.19	Beringin	8	0.36	-	-	-	Sibu-sibu	6	0.18	-	-	-
Nut meg	5	0.15	-	-	-	Enau	5	0.16	-	-	-	-	-	-	-	-	-	-	-	-
Taro	5	0.15	-	-	-	Mango	5	0.16	-	-	-	-	-	-	-	-	-	-	-	-
Sum	100	3		100	0.6		100	3.13		100	4.5		100	0.5		100	3		100	2
Remaining	80	2.4	Remaining	0	0	Remaining	60	1.88	Remaining	0	0	Remaining	0	0	Remaining	0	0	Remaining	0	0
Sum total score		5.4			0.6			5			4.5			0.5			3			2

Appendix 3. Continued

	General score	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**		**General score**	**Total score**	
Furniture / Decoration	*5*					**Tools**	*8*					**Future**	*15*					
Plants	***95***		**Animals**	**5**	***100***	**Plants**	***95***		**Animals**	**5**	***100***	**Plants**	***75***		**Animals**	**25**		
Plant names			*Animal names*			*Plant names*			*Animal names*			*Plant names*			*Animal names*			
Lenggua	25	1.19	Deer	35	0.09	Gofasa	20	1.52	Stingray	30	0.12	Cacao	15	0.94	Nuri	15	0.32	
Bamboo	17	0.81	Cuscus	25	0.06	Iron wood	20	1.52	Deer	25	0.1	Durian	15	0.94	Seram kakatua	15	0.32	
Iron wood	17	0.81	Wild pig	23	0.06	Enau	15	1.14	Crocodile	25	0.1	Clove	10	0.63	Cuscus	10	0.21	
Rattan	15	0.71	Turtle	15	0.04	Bamboo	15	1.14	Wild pig	20	0.08	Coconut	10	0.63	Dog	10	0.21	
Pakis	10	0.48	Civet cat	2	0.01	Sago	10	0.76	-	-	-	Iron wood	10	0.63	Deer	10	0.21	
Sago	10	0.48	Monitor lizard	0	0	Rattan	10	0.76	-	-	-	Nut meg	10	0.63	Chicken	10	0.21	
Coconut	6	0.29	Crocodile	0	0	Lenggua	5	0.38	-	-	-	Sago	8	0.5	Cassowary	10	0.21	
-	-	-	Snake	0	0	Matoa	5	0.38	-	-	-	Damar	8	0.5	Shrimp	10	0.21	
-	-	-	-	-	-	-	-	-	-	-	-	Lenggua	8	0.5	Fish	5	0.11	
-	-	-	-	-	-	-	-	-	-	-	-	Nisat	6	0.38	Wild pig	5	0.11	
Sum	100	4.75		100	0.25		100	7.6		100	0.4		100	6.25		100	2.14	
Remaining	0	0	Remaining	0	0	Remaining	0	0	Remaining	0	0	Remaining	80	5	Remaining	75	1.61	
Sum total score		4.75			0.25			7.6			0.4			11.25			3.75	Total score = 100

Appendix 4.

The sum of the total score for the twelv most important species, women group

Sago	Rattan	Bamboo	Loleba	Lenggua	Coconut	Iron wood	Banana	Gofasa	Cacao	Samar	Durian
1,17	0,9	0,9	2,25	0,917	0,9	0,917	0,9	0,833	0,72	0,833	0,48
1,08	1,35	1,08	0,667	0,66	1,08	0,66	0,72	1,28	1,125	0,833	0,56
1	0,75	0,75	1	0,793	0,54	0,825	0,6				0,6
0,72	0,56	1	1,44	1,28	0,737						
0,56	0,75	0,513		0,825	0,6						
1,44	0,513	1,28									
1,125	1,28										
7,095	6,103	5,523	5,357	4,475	3,493	2,402	2,22	2,113	1,845	1,666	1,64

The sum of the total score for the twelve most important species, men group

Sago	Iron wood	Coconut	Bamboo	Lenggua	Rattan	Gofasa	Banana	Durian	Beringin	Cassava	Paku
1,813	1,053	1,6	1	1,053	1	0,789	1,387	0,5	0,5	1,067	1
0,5	0,316	0,25	0,9	1,188	0,45	0,316	0,5	0,316	0,2	0,5	0,63
1	0,3	0,45	0,808	0,38	0,713	1,52	0,6	0,15	0,625	0,15	
0,45	0,808	0,188	1,14	0,5	0,76			0,469	0,36		
0,219	1,52	0,45						0,938	0,6		
0,475	0,625	0,285									
0,76		0,625									
0,5											
5,717	4,622	3,848	3,848	3,121	2,923	2,625	2,487	2,373	2,285	1,717	1,63

Appendix 5.

Scoring of the different use categories importance in the past, present and the future. This table represent the women group

Use category	30 years ago	Present	Next 20 years	Total
Food	40	25	35	100
	14	15	15	
Medicine	40	30	30	100
	10	10	5	
For sale	30	35	35	100
	0	10	15	
Basketry	40	30	30	100
	10	9	5	
Construction	40	30	30	100
	13	10	5	
Hunting place	40	30	30	100
	10	7	5	
Hunting material	40	30	30	100
	8	5	5	
Recreation	25	35	40	100
	0	4	10	
Furniture	20	40	40	100
	0	7	10	
Tools	40	30	30	100
	10	8	5	
Future	25	35	40	100
	15	10	15	
Firewood	45	35	20	100
	10	5	5	
Total	100	100	100	

Appendix 6.

Scoring of the different use categories importance in the past, present and the future. This table represent the men group

Use category	30 years ago	Present	Next 20 years	Total
Food	15	35	50	100
	12	20	13	
Medicine	50	30	20	100
	10	10	6	
For sale	10	40	50	100
	5	6	10	
Basketry	30	20	50	100
	7	5	10	
Construction	70	20	10	100
	10	10	10	
Hunting place	70	20	10	100
	7	5	5	
Hunting material	70	20	10	100
	8	5	5	
Recreation	40	10	50	100
	7	5	6	
Furniture	20	30	50	100
	5	5	10	
Tools	50	40	10	100
	9	8	10	
Future	10	40	50	100
	10	15	10	
Firewood	50	40	10	100
	10	6	5	
Total	100	100	100	

Appendix 7.

How distance affects the importance of different habitats

1 hours walk	Men	Women
Garden	15	20
Lake	5	2
River	15	22
Swamp	5	3
Sago garden	15	20
National park	5	14
Production forest	40	19
Total	100	100

4 hours walk	Men	Women
Garden	17	25
Lake	3	2
River	15	24
Swamp	5	3
Sago garden	18	22
National park	2	2
Production forest	40	22
Total	100	100

Appendix 8.

Questionnaries and datasheets used during the community meeting, interviews and focus group discussions.

Questionnaire 1. ***Key Informant interview/Village Head***
VILLAGE DESCRIPTION/PERSPECTIVE OF LAND USE *(DESKRIPSI DESA DAN PERSPEKTIF GUNA LAHAN)*

Respondent				Date day\month\yr.		/	/		Inputted by		
Village				Writer					Checked by		
Checked by				Interviewer					File name		
Written on back	*Y*	*N*	This is page		of		Original or copied?	O	C	Backups?	File copied?

No.	Questions *(Pertanyaan)*	Answers *(Jawaban)*
	I. Village description *(Deskripsi desa)*	
1.	Since when does this village exist and when was it formally acknowledged by government? (Sejak kapan desa ini berdiri dan kapan disyahkan pemerintah (definitif)).	
2.	What is the area of the village? What does it border on? *(Berapakah luas wilayah desa? Sebutkan batas-batas wilayahnya!)*	a.Area *(Luas)* ……..
		b. Borders *(Batas-batas)* -North *(Utara)* …… -East *(Timur)* …… -South *(Selatan)* …… -West *(Barat)* ……
3.	What is the area of forest land, garden, ladang (swidden), swamp, settlement, and others? *(Berapa luas kawasan hutan, kebun, ladang, rawa, pemukiman dan lain-lain!)*	a.Forest Area *(Luas Hutan)*: ……..
		b.Swidden Area *(Luas Ladang)*: …….
		c.Garden (*Luas kebun)*:…….
		d. Settlement *(Luas Pemukiman)*:…….
		e. Others *(Luas Lain-lain)*:……
4.	What is the population of the village? *(Berapa jumlah penduduk desa?)*	……people *(Jiwa)*
		…….. households *(KK)*
5.	What ethnic groups are living in the village? List from the most to the least numerous. *(Sebutkan suku-suku yang terdapat di desa ini dan urutkan berdasarkan jumlah yang paling dominan)*	
	II. Land use *(Guna lahan)*	
1.	Where do the villagers usually go for swidden cultivation; forest product gathering, gardening, and recreation (attractive places)? *(Sebutkan tempat-tempat yang biasa didatangi penduduk desa untuk berladang, mencari hasil hutan, berkebun, berekreasi (tempat-tempat yang menarik)).*	a. Swidden cultivation *(Berladang) :*
		b. Forest product gathering/hunting *(Mencari hasil hutan/ berburu):*
		c. Gardening *(Berkebun):*
		d. Fishing *(Mencari ikan) :*
		e. Recreation *(Rekreasi)* :

Questionnaire 1. ***Key Informant interview/Village Head***
VILLAGE DESCRIPTION/PERSPECTIVE OF LAND USE *(DESKRIPSI DESA DAN PERSPEKTIF GUNA LAHAN)*

Respondent				Date day\month\yr.		/	/		Inputted by		
Village				Writer					Checked by		
Checked by				Interviewer					File name		
Written on back	*Y*	*N*	This is page		of		Original or copied?	O	C	Backups?	File copied?

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2.	Is there any plan of land conversion in the village? For example: for transmigration, mining, plantation or others? If yes, where is the location?	a. If no, what is the reason? *(Kalau tidak ada , apa alasannya?)* b. If yes, what is the land for? *(Ada, lahan untuk?):*
	(Apakah ada rencana-rencana untuk pengalihan fungsi (konversi) lahan di desa? Misalnya untuk transmigrasi, pertambangan, perkebunan, dan lain-lain? Bila ya, dimana lokasinya?)	1. Mining (Where?) *(Pertambangan; dimana?):* 2. Plantation (Where?) *(Perkebunan; dimana?):* 3. Agriculture (Where?) *(Pertanian; dimana?):* 4. Settlement/transmigration (Where?): *(Pemukiman/transmigrasi; dimana?):* 5. Others (Where?):*Lainnya (sebutkan dimana?):*
3.	Are there any changes in the area of the forest utilized by the villagers from year to year? *(Apakah ada perubahan luasan hutan yang dimanfaatkan oleh masyarakat desa dari tahun ke tahun?)*	a. Increase (What for?) *(Bertambah digunakan; untuk?):* b. Decrease (What for?) *(Berkurang digunakan; untuk?):* c. No change *(Tidak berubah digunakan)*
4.	Are there any changes in village rules concerning forest utilisation? *(Apakah ada perubahan aturan desa tentang pemanfaatan lahan hutan ?)*	a. No change, for…? *(Tidak berubah, untuk…?):* b. Getting stricter, for…? *(Menjadi lebih ketat, untuk…?)* c. More flexible, for…? (*Menjadi lebih longgar, untuk…?):*
5.	Is it getting more difficult to utilize/obtain a new forest area? *(Apakah saat ini mulai/sudah sulit mengguna-kan/mendapatkan areal hutan yang baru?)*	a. More difficult *(Menjadi lebih sulit):* b. Easier *(Lebih mudah):* c. No change *(Tidak berubah):*

Questionnaire 2. ***Key Informant Interview-Traditional Leader***

CULTURAL BACKGROUND OF LAND USE ***(LATAR BELAKANG KULTURAL PENGGUNAAN LAHAN)***

Respondent				Date day\month\yr.			/	/		Inputted by		
Village				Writer						Checked by		
Checked by				Interviewer						File name		
Written on back	*Y*	*N*	This is page		of		Original or Copied?	O	C	Backups?		File copied?

No.		Answers *(Jawaban)*
	I. General description of traditional community *(Gambaran umum masyarakat adat)*	
1.	Describe briefly the history of the traditional community of this village! *(Bagaimana asal usul masyarakat adat yang ada di desa ini? (Uraikan!)*	
2.	Are the traditional rules and institutions still functioning significantly here? *(Apakah peraturan dan kelembagaan adat masih berfungsi tinggi di sini?)*	a. No, reasons *(Tidak, alasan):* b. Yes, examples *(Ya, sebutkan contohnya):*
3.	How long will the traditional rules be valid and what are the reasons? *(Sampai kapan aturan adat ini akan diberlakukan dan apa alasannya?)*	
4.	To whom do the traditional rules apply and how are they maintained? *Kepada siapa aturan adat berlaku dan bagaimana upaya melestarikan aturan adat tersebut?*	a. Insiders *(Orang dalam):* b. Outsiders *(Orang luar):* c. Measures *(Upaya):*
	II. Traditional rules and regulations (*Norma dan peraturan adat)*	
1.	Are there any places traditionally protected from disturbance (e.g. sacred places or traditional land/forest)? If yes, please name them! *(Apakah ada tempat-tempat yang secara adat dilindungi atau tidak boleh diganggu (misalnya tempat keramat atau tanah/hutan adat)? Bila ya, sebutkan!)*	
2.	Why are those places protected? *(Mengapa tempat-tempat tersebut dilindungi?)*	
3.	Are there any traditional rules used for protecting the forest? *(Apakah ada peraturan adat yang dipakai untuk melindungi hutan?)*	

Questionnaire 2. ***Key Informant Interview-Traditional Leader***

CULTURAL BACKGROUND OF LAND USE ***(LATAR BELAKANG KULTURAL PENGGUNAAN LAHAN)***

Respondent				Date day\month\yr.			/	/		Inputted by		
Village				Writer						Checked by		
Checked by				Interviewer						File name		
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4.	What traditional sanctions are imposed on people who damage the forests? *(Sanksi-sanksi adat apa yang dikenakan bila seseorang merusak hutan?)*	
5.	Are there any changes in the area of the forest being utlized? *(Apakah ada perubahan luasan hutan yang dimanfaatkan?)*	a. Increase (What for?) (*Bertambah; digunakan untuk...?):* b. Decrase (What for?) (*Berkurang; digunakan untuk...?):* c. No change (What for?) (*Tidak berubah; digunakan untuk…?):*
6.	Are there any changes in the traditional rules concerning forest land-uses? *(Apakah ada perubahan aturan adat dalam pemanfaatan lahan hutan ?)*	a. No change (What for?) *(Tidak berubah, untuk...?):* b. Becomes stricker (What for?) *(Menjadi lebih ketat, untuk...?):* c. Becomes more flexible (What for?) (*Menjadi lebih longgar, untuk...?)*
7.	Is it difficult to use/find new forest area? *(Apakah sulit untuk menggunakan/ mendapatkan areal hutan yang baru?)*	a. More difficult (Why?) (*Menjadi lebih sulit, karena... ?):* b. Easier (Why?) *(Lebih mudah, karena...?):* c. No change (Why?) *(Tidak berubah, karena...?):*

Questionnaire 4. HOUSEHOLD SURVEY *(Survei rumah tangga)* **** HH Survey-minimum 30 Households/village***												
Respondent				Date day\month\yr.		/	/			Inputted by		
Village				Writer						Checked by		
Checked by				Interviewer						File name		
Written on back	*Y*	*N*	This is page		of		Original or Copied?	O	C	Backups?	File copied?	

HH no./name *(KK No./nama)*		**Ethnic group** *(Suku)*		**Age** *(Umur)*	

No.	**Questions** *(Pertanyaan)*	**Answers** *(Jawaban)*
A. Dangers/threats of human activities to forest *(Bahaya/ancaman kegiatan manusia bagi SDH lokal)*		
1.	According to Bapak/Ibu which human activities can disturb the sustainability of forest functions and benefits to local communities? Why?	
2.	Could you please list them based on their degree of danger? *(Tolong Bapak/Ibu urutkan berdasarkan bahaya atau ancaman tersebut !)*	
3.	Beside dangers and threats are there also some advantages/benefits from those human activities? Please explain. *(Disamping bahaya/ancaman apakah ada pula keuntungan/jasa lain dari jenis kegiatan yang telah Bapak/Ibu sebutkan tadi ? (selain kerugian barangkali ada keuntungannya pula) !*	
B. Perceptions of local communities on dangers/threats *(Persepsi masyarakat tentang bahaya)*		
1.	What threats are very dangerous for human life in this village, according to Bapak/Ibu? (e.g. natural disasters, hunger, pests, always changing government regulations, etc.) (*Ancaman apa saja yang menurut Bapak/Ibu membahayakan kehidupan yang menyangkut desa ini? (Misalnya bencana alam, kelaparan, banjir, penyakit menular, peraturan pemerintah yang berubah dll.)*	
2.	Please, make a priority list of above threats based on their degree of danger, according to Bapak/Ibu *(Tolong diurutkan ancaman yang disebutkan diatas dari yang paling berbahaya menurut Bapak/Ibu).*	
3.	What do you (Bapak/ibu) do to prevent or to reduce those dangers/threats? *(Apa saja yang Bapak/Ibu lakukan untuk mencegah atau mengurangi bahaya tersebut?)*	
4.	If you (Bapak/Ibu) are being informed that those dangers/threats will come soon, what do you do? *(Jika Bapak/Ibu diberitahu bahwa bencana tersebut akan datang segera, apa yang Bapak/Ibu lakukan?)*	

Questionnaire 4. HOUSEHOLD SURVEY *(Survei rumah tangga)*

**** HH Survey-minimum 30 Households/village***

Respondent				Date day\month\yr.		/	/		Inputted by		
Village				Writer					Checked by		
Checked by				Interviewer					File name		
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C. Sources of income (*Sumber pendapatan*)		
1.	Where does your income come from, beside from forest and ladang? *(Dari mana saja sumber penghasilan Bapak/Ibu selain dari hutan dan ladang?)*	
2.	How big is your income? (Note: according to local unit/value, which will be converted later on into Rp/month) *(Berapa besar jumlahnya? (CT. Sesuai ukuran lokal, kemudian dikonversikan nantinya ke Rp/bulan))*	
3.	Are there any other household's member, who work (earn money)? If 'yes', who, what job, how much do they earn? *(Apakah ada angggota keluarga lainnya yang bekerja (yang menghasilkan uang)? Bila ya, siapa dan apa pekerjaannya, dan berapa besar penghasilannya sebulan?)*	
D. Taboos and restrictions (*Tabu dan pantangan)*		
1.	Are there any restrictions, believes, or traditional norms used, especially concerning utilization of plants, animals, and other forest products? If 'yes', please explain. *(Apakah di kalangan masyarakat di sini masih ada pantangan, kepercayaan, atau aturan adat khusus yang masih diberlakukan dalam menggunakan tumbuhan, binatang dan memanfaatkan hasil/hutan lainnya? Jika ya, jelaskan!)*	
2.	Are there any restrictions, believeness, or special traditional norms implemented concerning land and forest clearing? *(Apakah ada pantangan, kepercayaan, atau aturan adat khusus yang masih diberlakukan dalam membuka atau menggunakan lahan ataupun lokasi hutan tertentu?)*	
E. Aspiration of local community *(Aspirasi masyarakat lokal)*		
1.	Is your (Bapak/Ibu) life better than five/ten years a go? Why? *(Apakah kehidupan Bapak/Ibu sekarang lebih baik dari pada lima/sepuluh tahun yang lalu? Mengapa?)*	
2.	What future do you hope for for your children/young generation? *(Apa yang Bapak/Ibu harapkan terhadap anak-anak/generasi muda di masa depan?)*	

Questionnaire 4. HOUSEHOLD SURVEY *(Survei rumah tangga)*

**** HH Survey-minimum 30 Households/village***

Respondent				Date day\month\yr.		/	/		Inputted by		
Village				Writer					Checked by		
Checked by				Interviewer					File name		
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3.	What do you expect/predict will happen in your village in the next few months/years? *(Apa yang Bapak/Ibu harapkan dan perkirakan akan terjadi pada desa ini beberapa bulan/tahun mendatang?)*	
4.	In case the forest is degraded or disappears, what are you (Bapak/Ibu) going to do ? *(Seandainya hutan ini berkurang atau habis, apa yang akan Bapak/Ibu lakukan?(Bagaimana caranya agar hutan ini tidak musnah ?)*	
5.	Is there any species of plants or animal, which may play an important role in protecting and maintening forest functions and benefits? If there is, please explain! *(Apakah ada jenis tanaman atau binatang yang dianggap penting untuk perlindungan dan pemeliharaan fungsi dar manfaat hutan?Jika ada, apa saja dan mengapa?)*	
6.	If someone wants to learn something about forest (plants, animals, and specific areals), who is among villagers able to explain it? (notes; at least five persons) *Jika ingin belajar atau mengetahui 'tentang hutan' (tumbuhan, binatang dan lokasi-lokasi tertentu) siapa orang-orang di desa ini yang banyak memiliki pengetahuan tersebut? (CT. Minimal lima orang)*	

Questionnaire 5. **** Key Informants (3-5 persons)***

TRADITIONAL KNOWLEDGE ON LAND USE *(Pengetahuan tradisional tentang penggunaan lahan)*

Respondent				Date day\month\yr.			/	/		Inputted by	
Village				Writer						Checked by	
Checked by				Interviewer						File name	
Written on back	*Y*	*N*	This is page		of		Original or Copied?	O	C	Backups?	File copied?

	Land use/management (*penggunaan/ pengelolaan lahan)*	
1.	What names do you have for different soils/ lands in wetland-paddy/tree-crop farming/ ladang etc surrounding the village? What are these names based on? (location/soil texture/colour/forms/others) *Apa sebutan yang Bapak/Ibu berikan untuk macam-macam tanah/lahan di sawah/kebun/ ladang di sekitar desa ini? Berdasarkan apa penyebutan dan pengelompokan tersebut ? (Lokasi/butiran tanah/warna/bentuk/lainnya)*	a. b. c. d.
2.	According to you (Bapak/Ibu) what is the most suitable use of each land location? (e.g. farming, pasture, fish culture, etc.) *Menurut Bapak/Ibu penggunaan sebagai apakah yang paling cocok untuk masing-masing lokasi tersebut? (Bercocok tanam, berternak, memelihara ikan, lainnya …)*	a. b. c. d.
3.	What management is needed to use those lands? (burning, weeding, cutting, howing, fertilizing, others….) *Bagaimana cara mengolah lahan tersebut? (Dibakar, ditebas, ditebang, dibajak, dipupuk, lainnya ……)*	a. Burning *(Dibakar)* : b. Weeding *(Ditebas)* : c. Cutting *(Ditebang)* : d. Howing *(Dibajak)* : e. Fertilizing *(Dipupuk)*
4.	According to you, is the management of your land easy or difficult? If difficult, how do you overcome the problems?	
5.	a. How fertile are your lands? b. Based on what consideration was your statement? (soil colour, structure, slope, surrounding vegetation, compactness, others…) c. If not fertile, how do you overcome that problem? *a. Seberapa suburkah lahan Bapak/Ibu ? b. Berdasar apakah pernyataan tersebut ? (Warna, butiran tanah, lereng, tumbuhan, kegemburan, lainnya …) . c. Jika tidak, bagaimana mengatasinya?*	a. Very fertile Fertile Moderate Not fertile b. Colour *(Warna)* Structure (*Butiran Tanah)* Slope *(Lereng)* Vegetation *(Tumbuhan)* Compactness *(Kegemburan*) Other *(Lainnya):*…… c.
6.	Do you know where there are fertile soils near this village? Please give us the names of the location(s). *Apakah Bapak/Ibu mengetahui lokasi yang subur di wilayah desa ini? Jika ya, dimana tempatnya?*	a. b. c.

Questionnaire 6. **** Key Informants – (3-5 Persons/Ethnic)***

GARDEN AND FOREST PRODUCT COLLECTION AND SALE
(PENGUMPULAN DAN PENJUALAN HASIL HUTAN DAN KEBUN)

Respondent				Date day\month\yr.			/	/		Inputted by		
Village				Writer						Checked by		
Checked by				Interviewer						File name		
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Name *(Nama)*		**Ethnic** *(Suku)*		**Age** *(Umur)*	

No.	**Questions** *(Pertanyaan)*	**Answers** *(Jawaban)*
1.	What forest products do you mostly /usually get? *(Hasil hutan apa yang paling sering/biasa Bapak/Ibu peroleh dan ambil dari hutan?)*	
2.	When do you usually get the best forest products? *(Kapan Bapak/Ibu bisa memperoleh hasil hutan yang biasa Bapak/Ibu ambil dengan mutu yang paling baik?)*	
3.	Where do you usually get the best forest products? *(Dimana Bapak/Ibu bisa mendapatkan hasil hutan tersebut dengan mutu yang paling baik?)*	
4.	Are there any changes in a)location and b) quantity of forest products that you usually collect? *(Apakah ada perubahan tempat/lokasi dan jumlah hasil hutan yang biasa bapak ibu peroleh dari waktu ke waktu?)*	a) Changing location, previously in *(Tempat/lokasi berubah, dulu di daerah):* ..... Now in *(sekarang di daerah...)*..... Permanent place/location, in *(Tempat/lokasi tetap, di daerah):*..... ..... b) Increased quantity *(Jumlah bertambah):* ..... Decreased quantity *(Jumlah berkurang):*..... No change *(Tidak berubah)*:.....

Questionnaire 6. **** Key Informants – (3-5 Persons/Ethnic)***

GARDEN AND FOREST PRODUCT COLLECTION AND SALE
(PENGUMPULAN DAN PENJUALAN HASIL HUTAN DAN KEBUN)

Respondent				Date day\month\yr.			/	/		Inputted by		
Village				Writer						Checked by		
Checked by				Interviewer						File name		
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	Prices *(harga)*			
5.	What are the selling prices of the following products from ladang/ garden/forest? *Berapa harga jual dari hasil ladang/kebun/hutan?*	**Unit** *(Satuan)*	**Prices (Rp)** *(Harga (Rp))*	**Remarks** *(Keterangan)*
	Rattan *(Rotan)*			
	Damar *(Damar)*			
	Cacao			
	Banana			
	Others			
6.	Please list ten important products, which are easily sold! *(Tolong diurutkan sepuluh barang/produk yang paling mudah dijual)*	(1)		
		(2)		
		(3)		
		(4)		
		(5)		
		(6)		
		(7)		
		(8)		
		(9)		
		(10)		

Data Sheet 1: SETTLEMENT HISTORY & LAND USE *(SEJARAH PEMUKIMAN & PENGUNAAN LAHAN)*

**** Key Informants – Village Head/Traditional Leader***

Respondent [1]			Date day\month\yr.		/	/	Inputted by [8]	
Village [2]			Booker [3]				Checked by	
Checked by [4]			Original or Copied? [5]	O		C	File name	
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Name *(Nama)*		**Gender *(Jenis kelamin)***	**M *(L)***	**F *(P)***
Age *(Umur)*		**Ethnic group *(Suku)***		

Question: Please tell us about the history of this village! If the village was moved from (an) earlier location(s), what was the reason to move and what was done with the old/abandoned settlement?

(Permintaan: *Tolong sebutkan sejarah pemukiman/desa ini! Alasan apa yang mendorong warga untuk pindah lokasi dan dipergunakan sebagai apa lokasi yang telah ditinggalkan tersebut?)*

No	Name of place *(Nama tempat)*	Location (*Lokasi*)	Year of abandoning *(Tahun ditinggalkan)*	Reason for abandoning *(Alasan ditinggalkan)*	Present utilisation *(Kegunaan sekarang)*

Data Sheet 2: DISASTERS AND IMPORTANT EVENTS *(BENCANA DAN KEJADIAN PENTING)*

**** Key Informants – Village Head/Traditional Leader***

Respondent			Date day\month\yr.		/	/	Inputted by [8]	
Village			Booker [3]				Checked by	
Checked by			Original or Copied? [5]	O		C	File name	
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Name *(Nama)*		**Gender *(Jenis kelamin)***	**M *(L)*** **F *(P)***
Age *(Umur)*		**Ethnic group *(Suku)***	

Question: Please tell us when there have been important events for the village, causes thereof and special remarks if any! Tell us according to the sequence of the events.

(Permintaan: *Tolong sebutkan kejadian/peristiwa penting, penyebab dan tanda-tanda khusus bila ada! Sebutkan berdasarkan urutan waktu kejadiannya!)*

No	Year *(Tahun)*	Disasters/important events *(Bencana/kejadian penting)*	Causes *(Penyebab kejadian)*	Special remarks *(Tanda-tanda khusus)*

Data Sheet 3: LAND AND FOREST TYPES *(JENIS LAHAN DAN HUTAN)*											
										**** Community Meeting***	
Participants		*Group* [1]			Date day\month\yr.		/	/	Inputted by [8]		
		Village (Language) [2]			Checked by [4]				Checked by		
		Facilitator [3]			Original or Copied? [5]	O		C	File name		
		Written on back [6]	*Y*	*N*	This is page [7]		of		Backups?	File copied?	

Question: Please tell us what land and forest types can be found in the village area, and where there are good examples of each of them!

(Permintaan: *Dapatkah Bapak/Ibu menyebutkan jenis-jenis lahan dan hutan yang dapat ditemui di wilaya desa serta lokasi contohnya!)*

No	**Land and forest types (Local names)** *Jenis lahan dan hutan (Nama Lokal)*	**Location of example (Name of place and river)** *Lokasi contohnya (Nama tempat dan sungai)*	**No**	**Land and forest types (Local name)** *Jenis lahan dan hutan (Nama lokal)*	**Location of example (Name of place and river)** *Lokasi contohnya (Nama tempat dan sungai)*

Data Sheet 4: FOREST PRODUCTS *(JENIS HASIL HUTAN)*

**** Community Meeting***

Participants		*Group* [1]			Date day\month\yr.		/	/	Inputted by [8]	
		Village (Language) [2]			Checked by [4]				Checked by	
		Facilitator [3]			Original or Copied? [5]	O		C	File name	
		Written on back [6]	*Y*	*N*	This is page [7]		of		Backups?	File copied?

Question: Please tell us about forest products you know (local names), and the location(s) where they are collected!

***(Permintaan:** Dapatkah Bapak/Ibu menyebutkan nama lokal dari jenis-jenis hasil hutan dan lokasi pengambilannya!)*

No	**Forest products** (Local name) ***Jenis hasil hutan*** *(Nama lokal)*	**Location** (Place and river names) ***Lokasi pengambilan*** *(Nama tempat dan sungai)*	**No**	**Forest products** (Local name) ***Jenis hasil hutan*** *(Nama lokal)*	**Location** (Place and river names) ***Lokasi pengambilan*** *(Nama tempat dan sungai)*

Data Sheet 5: DEMOGRAPHY *(DEMOGRAFI)*

**** Household survey***

Respondent [1]			Date day\month\yr.		/	/	Inputted by [8]	
Village [2]			Booker [3]				Checked by	
Checked by [4]			Original or Copied? [5]	O		C	File name	
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Household name ***(KK /nama)***		**Ethnic** ***(Suku)***		**Age of informant** ***(Umur)***	

Name *(Nama)*	**Family relationship** *(Hubungan keluarga)*	**Age** *(Umur)*	**Gender** *(Jenis kelamin)*	**Religion** *(Agama)*	**Ethnic group** *(Suku)*	**Education** *(Pendidikan terakhir)*	**Occupation/job** *(Pekerjaan)*	
							Primary *(Utama)*	**Secondary** *(Sampingan)*

Valuable goods/owned facilities *(Barang berharga/fasilitas yang dimiliki)*				**Remarks** *(Keterangan)*
Kind of goods *(Nama barang)*	**Number (unit)** *(Jumlah/satuan)*	**Year of buying** *(Tahun beli)*	**Price** *(Harga)*	
1. House (rumah)				
2. Electricity/generator *(Listrik/generator)*				
3. Television/parabola *(Televisi/parabola)*				
4. Chainsaw *(Gergaji mesin)*				
5. Bicycle/motorbike *(Sepeda/motor)*				
6. Boat *(Perahu)*				
7. Type writer (Mesin tik)				
8. Others *(Lainnya)*				

Data Sheet 6: PDM LAND AND FOREST TYPES ***(PDM JENIS LAHAN DAN HUTAN)*** **** Key Informants/FGD/PDM***												
Respondent				Date day\month\yr.		/	/	Inputted by				
Village				Writer				Checked by				
Checked by				Interviewer				File name				
Written on back	*Y*	*N*	This is page		of		Original or copied?	O	C	Backups?	File copied?	

Instruction *(Permintaan)*:

1. Among the following land/forest types on these cards, which one do you think is the most important? Please distribute 100 pebbles among the cards to express the importance! *(Diantara jenis-jenis lahan/hutan berikut mana yang paling penting menurut Bapak/Ibu? Distribusikan kancing-kancing berikut (100 biji) ke dalam kartu-kartu yang telah disediakan berdasarkan tingkat kepentingannya!)*

2. For each of the use categories (food, medicine, …..the future) on the cards, which type of land/forest is the most important ? Please distribute 100 pebbles among the cards based on importance of this category of use! *(Untuk setiap kategori guna berikut (makanan, obat-obatan, …,masa depan), di jenis lahan/hutan mana yang paling penting diperoleh menurut Bapak/Ibu? Distribusikan kancing-kancing berikut (100 biji) ke dalam kartu-kartu jenis lahan/hutan yang telah disediakan berdasarkan persentase jumlah/banyaknya jenis kategori guna dimaksud yang terdapat dalam lahan/hutan tersebut!)*

Habitats	**Overall (1**	Food	Medicine	Forsale	Basketry	Constructi	Hunting p	Huntingma	Recreatio	Decoratio	Tools	Future	Firewood
Village *(Kampung)*													
Lake *(Telaga)*													
Garden *(Kebun)*													
River *(Sungai)*													
Swamp *(Rawa-rawa)*													
Sago garden *(Kebun sagu)*													
National park *(Tanaman nasional)*													
Production forest *(Hutan produksi)*													
Total per use category (Total per kategori guna)= **100**													

Data Sheet 7: PDM PAST-PRESENT-FUTURE *(PDM MASA LAMPAU - MASA KINI - MASA DEPAN)*

**** Key Informants- FGD/PDM***

Respondent				Date day\month\yr.			/	/	Inputted by			
Village				Writer					Checked by			
Checked by				Interviewer					File name			
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Instruction /*Permintaan*:

(1) How important were/are/will be forest uses and values 30 years ago, at present, and in 20 years from now? Please distribute 100 pebbles among the cards based on the total importance of the forest at a particular time! (*Menurut pendapat Bapak/Ibu bagaimanakah kegunaan hutan pada saat 30 tahun yang lalu, sekarang, dan 20 tahun yang akan datang? Distribusikan kancing-kancing berikut (100 biji) ke dalam kartu-kartu yang tersedia berdasarkan kegunaan hutan pada waktu tertentu.)*

a. How important were/are/will be forests at present, 30 years ago and in 20 years from now, per use category? Please distribute 100 pebbles among the use category cards, first for '30 years ago', then for 'present', and lastly for '20 years from now'! (*Seberapa penting hutan pada saat 30 tahun yang lalu, sekarang, dan 20 tahun yang akan dating untuk setiap categori jenis kegunaan? Distribusikan 100 biji kancing berikut pada kartu-kartu yang telah disediakan.)*

	30 years ago *(30 tahun yg lalu)*	**Present**	**Next 20 years** *(20 tahun yg akan*	**Total** *(Jumlah)* **=100**
Total importance *(Seluruh kegunaan)*				
Food *(Makanan)*				
Medecine *(Obat-obatan)*				
Fore sale *(Dijual)*				
Basketry *(Anyaman)*				
Construction *(Bahan rumah)*				
Hunting place *(Tempat berburu)*				
Hunting material *(Bahan berburu)*				
Recreation *(Rekreasi)*				
Decoration *(Dekorasi)*				
Tools *(Perkakas/alat)*				
The future *(Masa depan)*				
Firewood *(Kayu bakar)*				
Total per time =100				

Data Sheet 8: PDM DISTANCE OF LAND & FOREST TYPES *(PDM JARAK JENIS LAHAN DAN HUTAN)*

**** Key Informants-FGD/PDM***

Respondent				Date day\month\yr.		/	/		Inputted by				
Village				Writer					Checked by				
Checked by				Interviewer					File name				
Written on back	*Y*	*N*	This is page		of		Original or Copied?		O	C	Backups?	File Copied?	

Instruction: Compare the importance of 'one unit of' the different habitats on the cards (you can think of 'one unit of land' as the size of a football field)! Do this twice: the first time assume that the land can be reached from the village on foot in one hour, the second time in 4 hours. Please distribute 100 pebbles among the available cards for each type of land according to their importance!

(Permintaan: *Untuk luasan yang sama (misalnya seluas lapangan sepakbola), bandingkan kegunaan dari masing-masing jenis lahan yang tercantum didalam kartu-kartu. Lakukan ini dua kali: pertama, bayangkan apabila lahan-lahan tersebut terletak 1 jam dari kampung; kedua, apabila terletak 4 jam dari kampung. Bagikan 100 biji di antara kartu-kartu yang tersedia untuk setiap jenis lahan. Lahan yang bernilai lebih tinggi mendapat biji yang lebih banyak).*

Name of respondent																
Age *Umur*																
Ethnic group Suku																
Gender (M/F) *Jenis Kelamin (L/P)*																
1 Hour Walk *(1 Jam tempuh)*																
Lake *(Telaga)*																
Garden *(Kebun)*																
River *(Sungai)*																
Swamp *(Rawa-rawa)*																
Sago garden *(Kebun sagu)*																
National park *(Tanaman nasional)*																
Production forest *(Hutan produksi)*																
Total per person =100																

Data Sheet 8: PDM DISTANCE OF LAND & FOREST TYPES *(PDM JARAK JENIS LAHAN DAN HUTAN)*

**** Key Informants-FGD/PDM***

Respondent				Date day\month\yr.		/	/		Inputted by						
Village				Writer					Checked by						
Checked by				Interviewer					File name						
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Name of respondent																
Age *Umur*																
Ethnic group Suku																
Gender (M/F) *Jenis Kelamin (L/P)*																
4 Hours Walk *(4 Jam tempuh)*																
Lake *(Telaga)*																
Garden *(Kebun)*																
River *(Sungai)*																
Swamp *(Rawa-rawa)*																
Sago garden *(Kebun sagu)*																
National park *(Tanaman nasional)*																
Production forest *(Hutan produksi)*																
Total per person =100																

Data sheet 10: PDM MOST IMPORTANT SPECIES PER USE CATEGORY *(PDM JENIS YANG PALING PENTING PER KATEGORI GUNA)*

**** Key Informants – FGD/PDM***

Respondent				Date day\month\yr.			/		/		Inputted by	
Village				Writer							Checked by	
Checked by				Interviewer							File name	
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Instruction:

d. Compare the importance of the use categories on the cards (food, medicines, …., the future), and distribute 100 pebbles among them to express that importance! Secondly,
e. List the forest products you think are the most important in each use category (agree on up to ten) and
f. Distribute 100 pebbles again to express the relative importance of each of the products (separately for each use category)
g. Lastly indicate in 'remaining' how important the remaining unlisted species are compared to the ones listed in this scale (sum of all those listed already = 100)

Permintaa:

c. *Dari berbagai kategori guna hutan (makanan, obat-obatan, …, masa depan) yang manakah yang menurut Bapak/Ibu paling penting?)*
d. Jenis hasil hutan yang manakah yang paling penting menurut Bapak/Ibu yang termasuk dalam setiap kategori guna hutan?
e. Dari berbagai jenis tumbuhan dan hewan yang manakah yang paling penting menurut Bapak/Ibu?
f. Nyatakan di dalam "Tersisa" bagaimana pentingnya bagian yang tersisa dari species yang tidak terdaftar dibandingkan dengan yang terdaftar (yang jumlahnya 100)!

This form has 4 pages

	Use category *(Kategori guna)*														
	Food *(Makanan)*	**Medlcine** *(Obat-obatan)*	**Light construction** *(Kontruksi ringan)*	**Heavy construction** *(Konstruksi berat)*	**Boat contrcuction** *(Konstruksi perahu)*	**Tools** *(Perkakas)*	**Firewood** *(Kayu bakar)*	**Basketry** *(Anyaman)*	**Ornament/trad/Ritual** *(Hiasan/adat/ritual)*	**Marketable items** *(Dijual)*	**Hunting function** *(Bahan berburu)*	**Hunting place** *(Tempat berburu)*	**Recreation** *(Rekreasi)*	**The future** *(Masa depan)*	**Total PDM = 100** *(Total pdm)*
General PDM															

Data sheet 10: PDM MOST IMPORTANT SPECIES PER USE CATEGORY *(PDM JENIS YANG PALING PENTING PER KATEGORI GUNA)*

**** Key Informants – FGD/PDM***

Respondent			Date day\month\yr.		/	/	Inputted by				
Village			Writer				Checked by				
Checked by			Interviewer				File name				
Written on back	*Y*	*N*	This is page		of		Original or Copied?	O	C	Backups?	File copied?

	General Pdm			**Total pdm=100**		**General pdm**			**Total pdm=100**		**General pdm**		**General pdm**		**General pdm**
Food *(makanan)*					**Medicine** *(obat-obatan)*					**Light construction** (*Konstruksi ringan)*		**Heavy construction** *(Konstruksi berat)*		**Boat construction** *(Konstruksi perahu)*	
Plants (*Tumbuhan)*		**Animals** (*Binatang)*			**Plants** (*Tumbuhan)*		**Animals** (*Binatang)*								
Plant names *(Nama tumbuhan)*	pdm	Animal names *(Nama binatang)*	pdm		Plant names *(Nama tumbuhan)*	pdm	Animal names *(Nama binatang)*	pdm		Plant names *(Nama tumbuhan)*	pdm	Plant names *(Nama tumbuhan)*	pdm	Plant names *(Nama tumbuhan)*	pdm
Total pdm =100?															
Remaining *(Tersisa)*		Remaining *(Tersisa)*			Remaining *(Tersisa)*		Remaining *(Tersisa)*			Remaining *(Tersisa)*		Remaining *(Tersisa)*		Remaining *(Tersisa)*	

Data sheet 10: PDM MOST IMPORTANT SPECIES PER USE CATEGORY *(PDM JENIS YANG PALING PENTING PER KATEGORI GUNA)*

**** Key Informants – FGD/PDM***

Respondent			Date day\month\yr.		/	/	Inputted by				
Village			Writer				Checked by				
Checked by			Interviewer				File name				
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	General pdm			Total pdm=100		General pdm		General pdm			Total pdm=100		General pdm			Total pdm=100
Tools (*Perkakas)*					**Firewood** (*Kayu bakar)*		**Basketry** (*Anyaman)*				**Ornaments/ritual** (*Hiasan)*				
Plants (*Tumbuhan)*		**Animals** (*Binatang)*			**Plants** (*Tumbuhan)*		**Plants** (*Tumbuhan)*		**Animals** (*Binatang)*			**Plants** (*Tumbuhan)*		**Animals** (*Binatang)*		
Plant names *(Nama tumbuhan)*	pdm	Animal names *(Nama binatang)*	pdm		Plant names *(Nama tumbuhan)*	pdm	Plant names *(Nama tumbuhan)*	pdm	Animal names *(Nama binatang)*	pdm		Plant names *(Nama tumbuhan)*	pdm	Animal names *(Nama binatang)*	pdm	
Total pdm =100?																
Remaining *(Tersisa)*		Remaining *(Tersisa)*			Remaining *(Tersisa)*		Remaining *(Tersisa)*		Remaining *(Tersisa)*			Remaining *(Tersisa)*		Remaining *(Tersisa)*		

Data sheet 10: PDM MOST IMPORTANT SPECIES PER USE CATEGORY *(PDM JENIS YANG PALING PENTING PER KATEGORI GUNA)*

**** Key Informants – FGD/PDM***

Respondent				Date day\month\yr.		/	/		Inputted by		
Village				Writer					Checked by		
Checked by				Interviewer					File name		
Written on back	*Y*	*N*	This is page		of		Original or Copied?	O	C	Backups?	File copied?

	General pdm			Total pdm=100		General pdm			Total pdm=100		General pdm			Total pdm=100
Marketable prod. *(Dijual)*					**Hunting function (***Bahan berburu)*					**Hunting place (***Tempat berburu)*				
Plants *(Tumbuhan)*		**Animals** *(Binatang)*			**Plants** *(Tumbuhan)*		**Animals** *(Binatang)*			**Plants** *(Tumbuhan)*		**Animals** *(Binatang)*		
Plant names *(Nama tumbuhan)*	pdm	Animal names *(Nama binatang)*	pdm		Plant names *(Nama tumbuhan)*	pdm	Animal names *(Nama binatang)*	pdm		Plant names *(Nama tumbuhan)*	pdm	Animal names *(Nama binatang)*	pdm	
Total pdm =100?														
Remaining *(Tersisa)*		Remaining *(Tersisa)*			Remaining *(Tersisa)*		Remaining *(Tersisa)*			Remaining *(Tersisa)*		Remaining *(Tersisa)*		