SLUSE FIELD COURSE

Interdisciplinary Land Use and Natural Resource Management

A case study of the *Hutan Kemasyarakatan* community Forestry Programme in Tugusari, Sumberjaya

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Abstract

This report investigates to what extent the HKm-programme, a community forestry programme, is able to fulfil both its socio-economic goals of improving farmers' livelihoods, and its environmental goals of improving environmental protection of the Way Besai watershed in the Protected Forest areas (Sumberjaya sub district, Province of Lampung, Southern Sumatra). The socio-economic goals are achieved by granting farmers secure land tenure in exchange for providing environmental services. Tenure security is a very important issue for the population living and cultivating in the State owned Protected Forest areas. The environmental services are provided by using complex agroforestry systems together with soil and water conservation in the coffee fields of the Protected Forest areas.

Introduction

Responsible authors: Joris, Sigrid, Raúl and Christina

Indonesia is a country in Southeast Asia with a recent turbulent history. After the Dutch colonial period ended in 1950, the Soekarno government wanted to make the independent Indonesia more homogeneous by turning the Javanese culture into *the* Indonesian culture. Therefore a programme *"Transmigrasi"* was made to encourage migration from the overpopulated Java to the outer islands of Indonesia (Elmhirst, 1999). The subsequent local migration programme *"Translok"* was initiated as numerous spontaneous migrants *"forest squatters"* had settled and opened coffee fields in the State-owned Protected Forest (PF) areas. In 1994 the Suharto regime began the construction of the Way Besai Hydropower Dam and soil and water conservation (SWC) through reforestation became a priority in the Way Besai watershed including the highlands of Sumberjaya sub district (Potter, 2008). Consequently the regime forced the "*forest squatters"* to relocate in the area. This caused conflict and violence between the local populations and the authorities. The fall of the Suharto regime in 1998, entailed instability and weakness of authorities, thus the evicted farmers returned to their reforested fields in PF areas. Land tenure insecurity was and is still a concern to the farmers in the PF areas.

In the sub district of Sumberjaya, the Hutan Kemasyarakatan programme (HKm-programme), a community-based forest management programme, is addressing the issue of tenure security and environmental protection in combination. The HKm-programme was initiated by the Indonesian government together with local and international NGOs, i.e. WATALA (Friends of Nature and Environment) and ICRAF (World Agroforestry Centre). The goals of the programme is to reward farmers land tenure security in return for "environmental services". Thus the farmers have to fulfil restrictions, such as SWC through implementing complex agroforesty systems *"multistrata"* in their coffee fields, in order to obtain tenure security (Potter 2008). The HKm-programme may have large impacts on both farmers' livelihoods and the environment, hence it is interesting to look into whether it accomplishes its goals and investigate if the farmers comply with the rules.

Our assignment

Our assignment is then to investigate *"to what extent does the HKm-programme is able to fulfil both its socio-economic goals of improving farmers' livelihoods, and its environmental goals of improving environmental protection of the watershed?"* To achieve this, the history and implementation of the HKm-programme has to be considered to understand the development, objectives and methods of the HKm-programme. Secondly the compliance of the HKm members with the rules and regulations is studied to verify if the project is well implemented and structured and is not just an empty shell. We hypothesize that the farmers might not completely comply with the HKm rules of 400 non-coffee trees/ha, as they wish to use the space to maximise yields and because the monitoring institutions may be weak. Hereafter the socio-economic aspects of the programme are investigated; these are the aspects which have a direct impact on the livelihoods of the farmers. The primary socio-economic aspect of the HKm is the possibility of tenure security for the farmers in the PF areas. This tenure security can have a big impact on the farmers' livelihoods through changes in agricultural practices. So the changes in their management of the coffee fields and the impacts these have on their livelihoods are investigated. In relation to this we will also look into their motivations to join the HKm-programme. We expect that the HKm-programme will in the long term improve farmers' livelihoods, as tenure security is essential for sustainable livelihoods. But we expect to see that the HKm-programme in short term will be an obstacle to the involved farmers, as they must invest time and resources in meetings and applications etc. and it is a limitation of the farmers' options, as they must follow the rules and cultivation plans, hence they cannot choose to cultivate the most profitable crops. Finally, we are focusing on the environmental impacts of the HKm-programme, since this is one of the objectives of HKm. We hypothesise that the HKm-programme will maintain the environmental services; through increasing tree density, reducing soil erosion and increasing water infiltration of the involved areas. And we expect to find significant differences in tree density, tree biodiversity and SWC techniques between HKm and non-HKm fields.

Methodology

Responsible authors: Joris, Sigrid, Raúl and Christina

This report is the result of a two weeks long interdisciplinary field course in Indonesia in March 2010. The interdisciplinary approach, cross-cutting traditional demarcations, implied cooperation between students with different cultural and educational backgrounds – both internal in the group from Copenhagen University (KU) and in cooperation with our Indonesian counterparts from University of Lampung (UNILA). This has given us a lot of great experiences, but it has sometimes also been a reason for misunderstandings and caused challenges for the cooperation and the data collection and interpretation. Working together with the Indonesian students has been a great advantage; their knowledge about the local context and contacts to relevant informants has been a big contribution to the research.

Case study

We were in the preparation period allocated to do the field work in the village of Tugusari. As this is a village with more than 6.000 inhabitants, we tried to delimit the size of our study site. Since we wanted to investigate the results of the HKm-programme, it was reasonable to study the HKm group in Tugusari, which had already obtained the permanent permit[1] in 2007. The name of the HKm group is Mitra Wana Lestari Sejahtera (MWLS), it covers a size of 222 ha and contains 73 households divided in six sub-groups. We chose to do a case study of the sub-group Sumber Rezeki, which is located central in the MWLS area and has fields, which differ in both steepness, age and soil conservation methods. It contains 24 households. We decided to conduct 20 forest inventories and correspondingly 20 household interviews. Hence, we hoped to be able to make correlations between the data from the forest inventories and the data collected from the household interviews. This did not fully succeed, because not all farmers were available in both houses and fields, and some household interviews were carried out without definite knowledge of their field, and some forest inventories were carried out without knowledge of the owning household. This is a problem for our analysis because we cannot correlate all our data, but we collected enough data to make some general conclusions. In the sampling of farmers, we chose

[1] Permanent permit is legal tenure security of 35 years (which is extendable) granted by the District Government.

those who had representative fields for the area concerning steepness, age of the plants and soil conservation methods, but also after if they were available at the time – a factor that showed to have big influence on our fieldwork in general during the 10 days. Furthermore, in order to be able to analyse the differences in environmental services between HKm and non-HKm-area, we chose five households in the HKm group of Lirikan, a group who have temporary permit[2], but have not obtained permanent permit yet. To investigate the households and compare them to the HKm-households we conducted five forest inventories and five household interviews, methods, which will be explained in the following chapter.

Participatory Rural Appraisal (PRA)

In our research we made use of methods from the PRA. We used the approach in the initial period of the field work to attain preliminary knowledge about the HKm-programme, the agricultural practices and to explore the farmers' knowledge and their perceptions of their livelihoods.

Transect walk

A transect walk guided by a farmer, through the PF area (MWLS fields and the natural forest) was done the first day in the field. The transect walk provided us with a good first impression of the area, the agricultural practices used in the HKm-fields, the range and type of crops that could be expected to be found and familiarised us with the local setting. At the same time it allowed for asking questions to understand the management of the coffee agroforestry system in a casual way, while actually seeing the subject of discussion. Especially, the social science students of the group benefitted from this trip, as they had the least preferences for knowing the nature of the agroforestry carried out and by that the background for the livelihoods we were later going to investigate down in the village.

[2] Temporary permit is legal tenure security of 5 years (first step in the process of obtaining permanent permit) granted by the District Government

Pic. 1: Transect walk through the HKm-area.

Focus group discussion (FGD)

We carried out a semi-structured FGD on the second day in Tugusari to reassure that what we had chosen to investigate was coherent with the reality of the location – we had read a lot from home, but we were aware of that often reality changes fast. The participating farmers were gathered with help from the president of MWLS, Mr. Wahono. The purpose of the FGD was to gain an understanding of the community, their organisation and their perception of the HKm-programme and how they comply with the rules etc. In order to obtain this we had prepared an interview guide with topics to be discussed in the focus group (app. A). The discussion among the farmers was lively and made it difficult for the interpreters to keep up with the speed in translating from both Bahasa Indonesia and Javanese.

Pic. 2: Focus group discussion.

We had also planned a FGD in the end of our stay to make the farmers evaluate and comment on our data and findings before we left the place for good. Unfortunately time ran out in combination with misunderstandings about which day we were going to leave. This last discussion we think might had eliminated much of the uncertainties in our data, which we have struggled with back in Denmark.

Participatory mapping

In combination with the FGD we also made the farmers do a participatory map of the Sumber Rezeki in MWLS. Our mapping exercise concerned the division of land in the farmer group, and we ended up with a map showing the groups' territory, the fields, paths and owners of these. From this map we were able to select the fields for the forest inventories. The farmers easily understood the exercise and were very familiar with drawing a map. They must have done similar exercises several times before, as one of the requirements of the HKm-programme is to map the area the group wants to manage.

Key informant interviews (KII)

Key informant interviews were carried out with the head of the village, the president of MWLS, a representative of the local forestry department and a representative from the WATALA. These interviews mostly provided quantitative, but also qualitative data regarding demography and history of the village as well and history of the HKm-programme and its process in the village. And from the interview with the president of MWLS the field site were determined. Especially the data acquired from WATALA, which facilitates with the HKm-process in MWLS proved to be of importance for our understanding of the situation.

Pic. 3: Key informant interview with the head of village.

Household interviews (HHI)

The household interviews were most often carried out by an UNILA and a KU student together with an interpreter, but some of them were also conducted by a single UNILA student to be more efficient. The questionnaires were prepared from home, to make sure that all respondents answered the same questions to make the collected data comparable. After meeting our counterparts in Bandar Lampung the questions were changed because of the information they and the teachers gave us. Unfortunately we discovered too late, that the questionnaires used were the

old version, and many of the questions were not suited to ask a farmer. The main reason for this was because of illness among KU students. Another problem, which we first realised late in the process, was that the UNILA students did not use the same interview guide. Consequently, we have very specific data regarding input and output from the fields for some households, but not from all, which proved to be a problem in the analysis. The reason why we did not realise this at the time, where it was possible to change, was because of poor information sharing in the group.

Pic. 4: Household interview.

Forest Inventories (FI)

In order to examine the differences in environmental services delivered by the area with permanent permit and an area without permanent tenure security, we needed information about tree density and composition, the infiltration capacity of the soil and the techniques used for soil conservation. We chose to carry out FIs in 20 of the 24 fields in the Sumber Rezeki part of the HKm-area. By doing 20 10X10m inventories a 1% forest inventory of the Sumber Rezeki part of the HKm-area was done. Also five forest inventories in the area of Lirikan, which is without 35 year permit, were carried out. In each 100m^2 plot all species of trees were counted and determinated. Other data recorded during the FIs was the age of planted trees, the steepness of the field and the methods used for soil conservation. With the FIs estimations of the total, coffee and

non-coffee tree densities could be made. During the FIs the borders of the fields were recorded with GPS by marking the corners of each field with a waypoint and walking around the borders with the GPS to track the borders of the fields and the Sumber Rezeki area. The FIs were carried out by both KU and UNILA students, with the help from farmers. The data collected from the FIs in the HKm-area was good and gave us the information needed. The biggest difficulty was the steep terrain and the inaccessibility, which often made it difficult to carry out the inventories and mark the borders of the fields.

Pic. 5: Forest inventory.

Measuring infiltration capacity

The infiltration rate is the rate at which water infiltrates the soil, this is not a constant. Generally, water infiltrates at a faster rate first and slows down later (fig. 1). After some time the infiltration rate slows down to a stable level: The infiltration capacity has been reached. The rate of infiltration slows down because the pores in the soil get saturated with water. This is the rate of infiltration with a fully saturated soil. The infiltration capacity is measured by recording the rate at which water enters the soil. There are many methods to do this, the simplest is pushing a solid metal ring into the ground and a pond of water sits on the soil, within the ring. Then the level of water in the reservoir and the time are recorded. A simple ring provides a measure of the ponded

infiltration rate, but by using a single ring, a large amount of water may escape around its sides, giving higher readings than would normally be obtained. To prevent this, a double ring is sometimes used (Davie, 2002). In order to be able to compare the infiltration capacity in fields with complex agroforestry systems with monoculture coffee fields we planed to do infiltration measuring in each plot sample per each kind of field, in MWLS (HKm) and Lirikan (non HKm). The hypothesis was that HKm coffee fields would show a higher infiltration rate than the non HKm-fields.

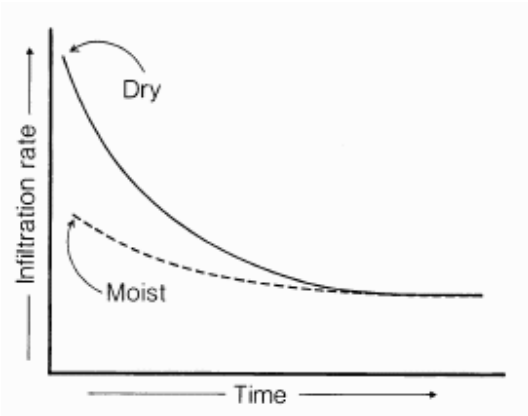


Fig. 1: a typical infiltration curve (Diamond and Shanley, 1998)

Unfortunately, once in the field, we realised that we were not able to do all the necessary measurements in so few available field work days. The equipment for doing the measuring was very difficult to carry by motorbike. The general illness among the KU students limited our field work too. Hence only did only two measurements, at least to try the method: one in a coffee field in the HKm-area and one in a monoculture coffee field in a non HKm-area. The results are presented in the app. B, as they are not representative or reliable enough to conclude upon.

Use of the interpreters

Our interpreters were two local students from UNILA, Ms. Icha and Mr. Kodri. Their interpretation and knowledge was a major advantage for us, as they were not only translating interviews, but also sharing their knowledge about the culture and nature of the countryside.

Additionally they were hardworking and had to juggle translating three different languages, Bahasa Indonesian, Javanese and Sundanese into English.

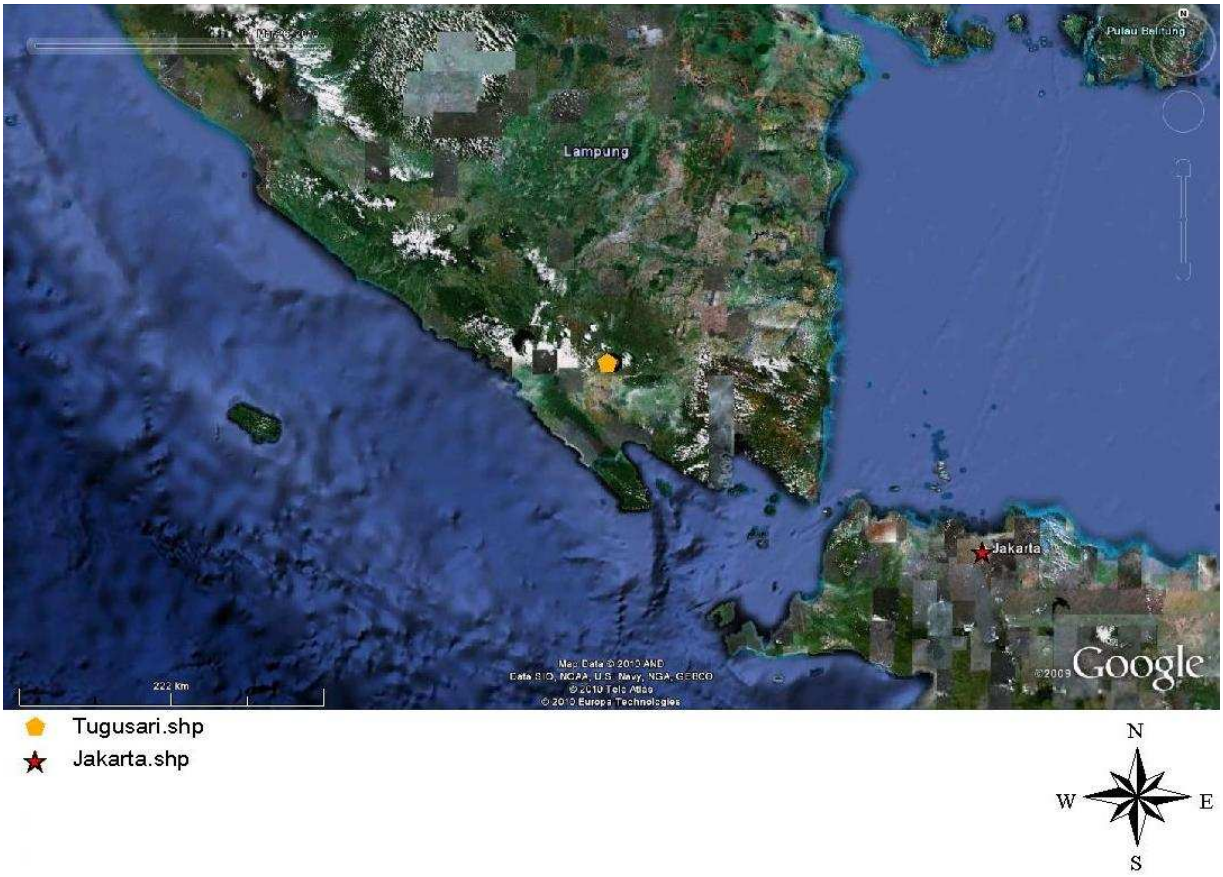
Pic. 6: Ms. Icha translating during the key informant interview with the head of the village.

Results & Discussion

Introduction and timeline of Tugusari

Responsible authors: Sigrid

Tugusari is a town located in the sub-district Sumberjaya in the Lampung province on Sumatra, Indonesia. Of the Sumberjaya sub-district about 40% of the area is classified as PF and approximately 10% as National Park. These areas are primarily located on slopes. The remaining area is primarily lowland and privately owned. The HKm-areas are situated in the PF areas. In order to better understand the context of our study and especially the point of view of the inhabitants we studied the history of Tugusari (see fig. 2). Location of the field site:



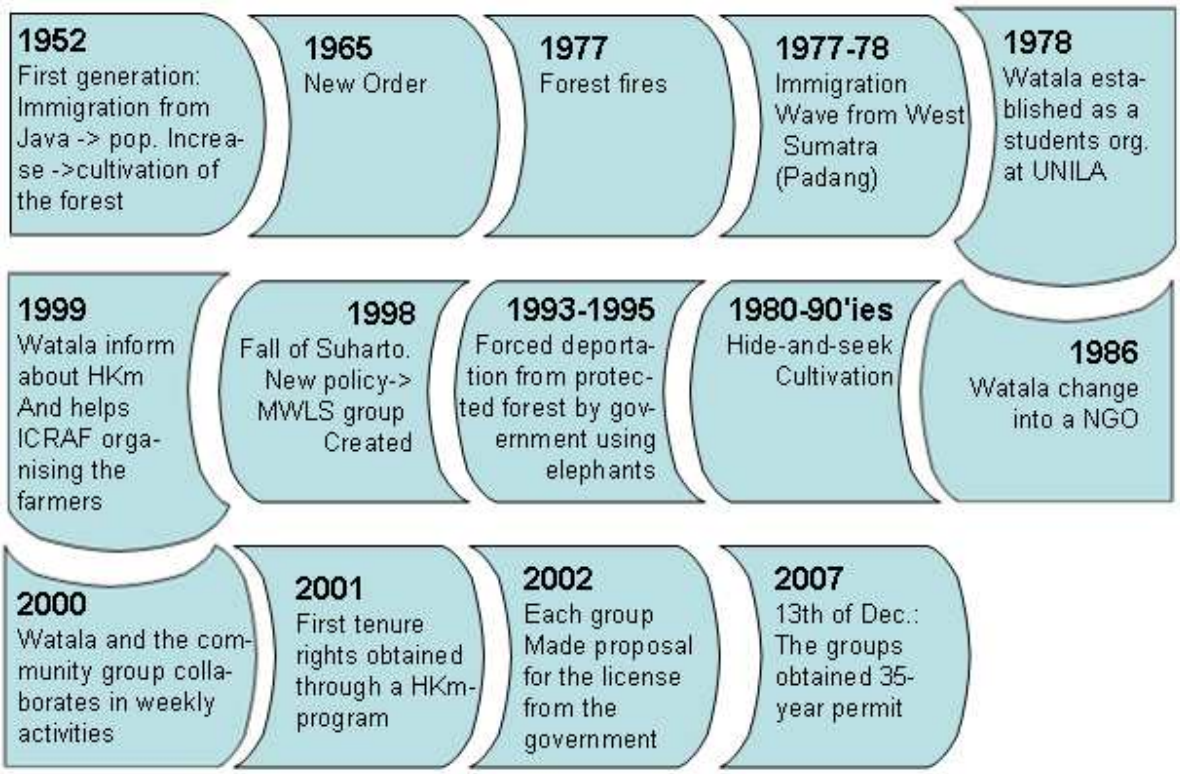


Fig. 2: Timeline of key events of relevance to Tugusari

The objectives of HKm-programme

Responsible authors: Christina

The objective of the HKm is to "improve the welfare of local communities through the utilisation of forest resources in an optimal, equitable and sustainable while maintaining the sustainability of the forest functions and the environment." (App. C) The intent is that natural resource management should be democratic, accountable and transparent. Also aims of capacity building and improving access to markets and competitiveness are included in the objectives. Through the HKm-programme, groups of farmers can apply for permits to manage their coffee fields, which are located in PF areas.

According to the rules of 2007 the group have to establish internal regulations to ensure management of the forest area according to prevailing laws. The group must use participatory procedures for decision making, conflict resolution and organisational management internal in the group. The group ought to prepare a map of the area they wish to manage; showing the areas that are to be protected and the areas which will be cultivated. Also a cultivation plan for the period must be produced in order to obtain the permit (Pender et al. 2008; 2). SWC techniques must also be used and areas that are within 500m of a dam or lake, 200m from a water spring or 100m from a riverbank or land with a slope of more than 40% are not allowed to be cultivated. It is not allowed to cut down trees or in other ways opening the canopy in the protected areas. In the cultivation areas is intensive forestry and agroforestry allowed, but only if it happens in an environmental sustainable manner. In cultivation areas, the farmer group has to maintain the production potential of timber and non-timber forest products (NTFP). The group must avoid either causing soil erosion, change of the land structure or the natural extent or disturbing the environmental protection functions of the area. The specific regulations for West Lampung Province include that farmers must plant at least 400 non-coffee trees per hectare as a part of multistrata agroforestry systems (i.e. the combination of agricultural crops with different vertical levels of trees and shrubs).

The history and implementation of the HKm-programme

Responsible authors: Christina

In 1998 the Indonesian government and collaboration with NGOs initiated the first edition of the community forestry programme, HKm, which has been revised several times since. It was first established by decree No. 677/1998 allowing farmers to cultivate the state forest, which they earlier had been evicted from, introducing agroforestry practices and outlawing clearing of new forest. The next decree No. 865/1999 incited famers to organise themselves in groups and it now became possible to obtain temporary tenure security (5 year permit) from the Ministry of Forestry. Since 2001 *"there has been a strong political will (...) to shift the development paradigm from a top-down, state-centred, supply-driven process, to a bottom-up, local demand-driven approach."* (World Bank, 2006) Decree No. 31/2001 was in line with this tendency and temporary permits were now possible to obtain from the District Government. Furthermore, it

became possible to obtain permanent tenure security (25 year permit) from the Ministry of Forestry. Decree No. 37/2007 exempted the famers to pay tax for NTFP as they have had to pay until then. Decentralisation was still in progress and the permanent permit was prolonged to 35 years and was now possible to obtain from the District Government, based on recommendations regarding HKm land reserve from the Ministry of Forestry (App. D).

In the process of obtaining permanent tenure security of 35 years, the first step is to get the management and cultivation plan, the internal organisation and regulations and the map approved by the Ministry of Forestry. Subsequently the District Government will grant the group with temporary permit of 5 years on individual level. The monitoring process falls in two steps; annual self-monitoring by the farmer group and government monitoring every fifth year. Each year the farmer group must monitor and evaluate the progress and report the results to the Local Forestry Department and District Government. Every fifth year is the progress monitored by the District Government. If the group demonstrates good performance of its management plan and complies with the regulations during the period of temporary permit will the group obtain permanent permit and be granted legal status as a cooperative (Pender et al. 2008; 2). The permanent permit can be extended based on evaluations every five years. The monitoring parameters for permanent permit are based on rules from the District Government (PSDABM No. 225/2006) and the group must have a minimum score of 65%. The parameters are divided into three clusters; institutional parameters account for 22% of the total parameters, physical parameters account for 60% and socio-economic and ecological parameters account for 18%.

The HKm-programme in Sumberjaya

Responsible authors: Christina and Joris

In Sumberjaya sub district have 26 farmer groups obtained temporary permit, covering an area of 16.865,48 ha. In Tugusari have seven groups obtained temporary permit, among them the group Lirikan holding 92 households, where we conducted five FIs and HHIs. Lirikan obtained temporary permit in 2006 but the group has not obtained permanent permit yet. So far have only three farmer groups obtained permanent permit, i.e. 711 households maintaining 1970 ha protected forest (App. D). One group in Tri Budi Syukur, one in Simpang Sari and one in

Tugusari; MWLS. MWLS contains six sub-groups; Sumber Rezeki (19,9 ha), Mekar Sari I (40,5 ha), Mekar Sari II (44,4 ha), Jasundo (29,7 ha), Marga Asih (22,2 ha) and Marga Jaya (20, 2 ha). MWLS also manages a protection area of more than 45 ha. The subsequent diagram illustrates the organisation of an HKm group (Group):

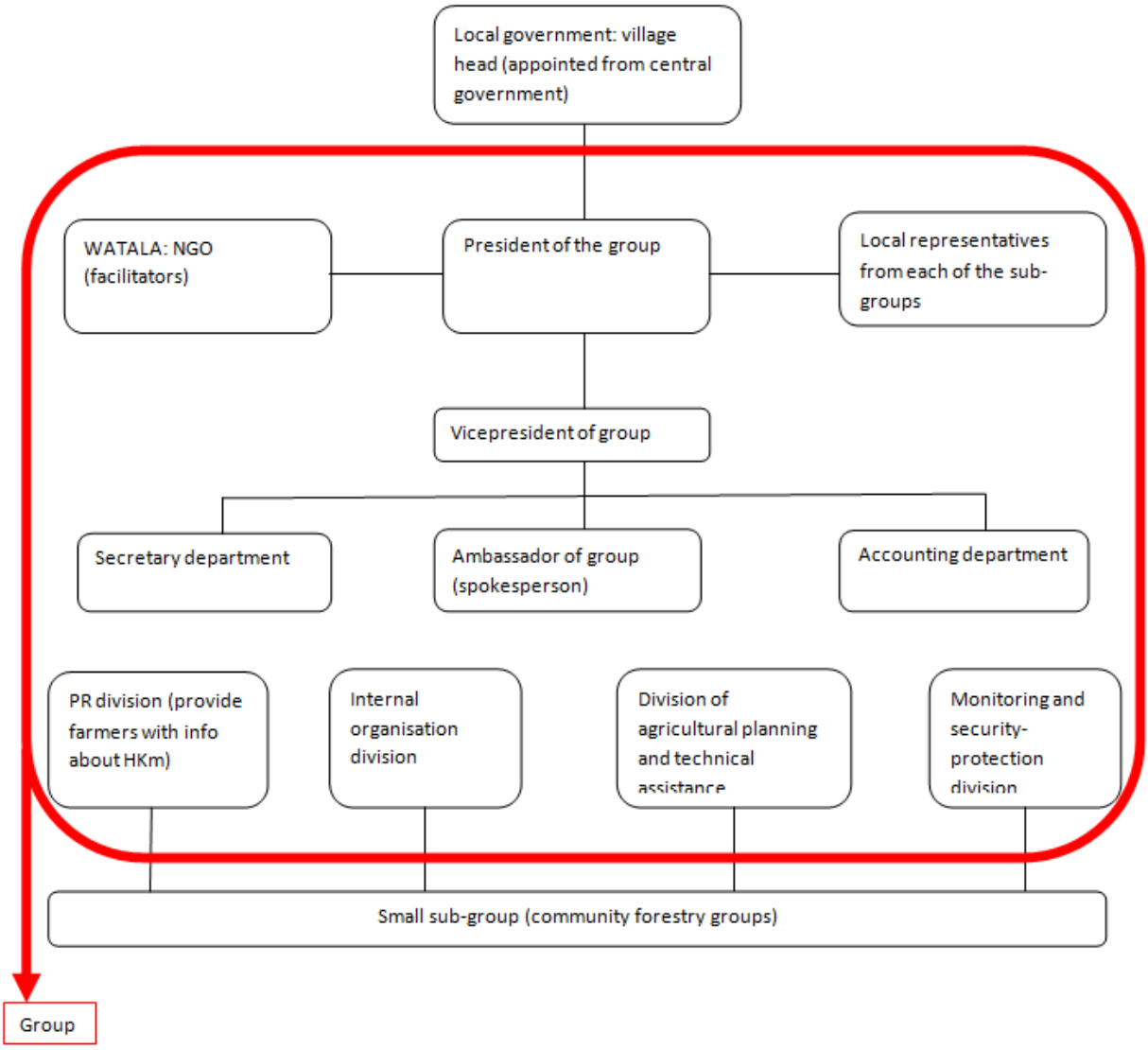


Fig. 3: Structure of the MWLS group

The HKm-groups works under the village head and is lead by a group president, who cooperates with WATALA (fig. 3) and representatives from each sub-group. Under this level works a spokesperson for the group, a secretary and an accounting department. Subsequently there is a

level, which works in the group under the president and the previously mentioned level, which is in direct contact with the subgroups. This level consists of a PR division, which provides the farmers with new information about the HKm-programme, an internal organisation division, a division of agricultural planning and technical assistance and a monitoring and protection division. This last division controls if none of the HKm-regulations are infringed.

Regarding sanctions and punishment in cases of non-compliance with the HKm-programme it is the task of the HKm-group itself to take action. The HKm groups themselves decide the sanctions and punishment. An incident of MWLS showed that one farmer, who illegally cut a tree were punished to plant 100 new trees (App. E).

Agricultural Rules & Compliance

Responsible authors: Joris and Raúl

Contributing authors: Sigrid and Christina

There are some rules that the farmers in the HKm-programme have to comply with, e.g. planting 400 non-coffee trees/ha, of which at least 30% has to be timber trees, the rest being multipurpose or fruit trees, and having at least 10 different species of non-coffee trees. The compliance with these rules has been tested with the FIs in both the HKm-area and non HKm-area.

In the HKm-area the following non-coffee tree species have been found:

Table 1: FI data from the HKm-area

Non-coffee Tree Species	**Total Number trees in the 20 Samples**	**Percentage from the Total of the Non-coffee Tree Species**
Leucaena leucocephala	57	26.8%
Gliricidia sepium	37	17.4%
Areca catechu	20	9.4%
Cordyline spp.	17	8%
Michelia sp.	16	7.5%
Erythrina subumbrans	15	7%
Persea americana	13	6.1%

Paraserianthes falcataria	11	5.2%
Parkia speciosa	8	3.8%
Artocarpus heterophyllus	6	2.8%
Theobroma cacao	5	2.3%
Gmelina arborea	4	1.9%
Durio zibethinus	2	0.9%
Toona sureni	1	0.5%
Artocarpus altilis	1	0.5%

15 different species of non-coffee tree species were found in the HKm-sample plots.

In 1 ha the average densities are:

Table 2: Tree densities in the HKm-area

non-coffee trees:		1065 trees/ha
	timber trees:	14,6%
	other non-coffee trees:	85,4%
coffee trees:		2785 trees/ha
total trees:		3850 trees/ha

I

In this case the density of non-coffee trees is quite high: 1065 individuals, meaning that the first agricultural rule has been accomplished as well as the regulation of the diversity of non-coffee species: 15 species. In contrast the necessary percentage has not been achieved; only 14,6% of the non-coffee trees are timber trees, represented by 4 species: *Michelia* sp., *Paraserianthes falcataria*, *Gmelia arborea* and *Toona sureni* (table 2). Nevertheless some of the multipurpose trees may also be considered timber trees, like: *Parkia speciosa* and *Erythrina subumbrans* (Levang & de Foresta, 1991). Other trees, that commonly are only considered fruit trees, can also be used as timber trees, depending on the needs of the farmer. Fruit trees of which the wood can be used are: *Artocarpus altilis*, *Persea americana* and *Durio zibethinus* (ibid). In addition, *Leucaena leucocephala* & *Gliricidia sepium*, normally small can also develop as timber trees (ibid).

The most prevalent non coffee trees are *L. leucocephala* (26.8%), *G. sepium* (17.4%). Follow by: *A. catechu* (9,4%), the two species of the genus *Cordyline* (8%), *Michelia* sp. (7.5%) and *E. subumbrans* (7%) (fig. 4).

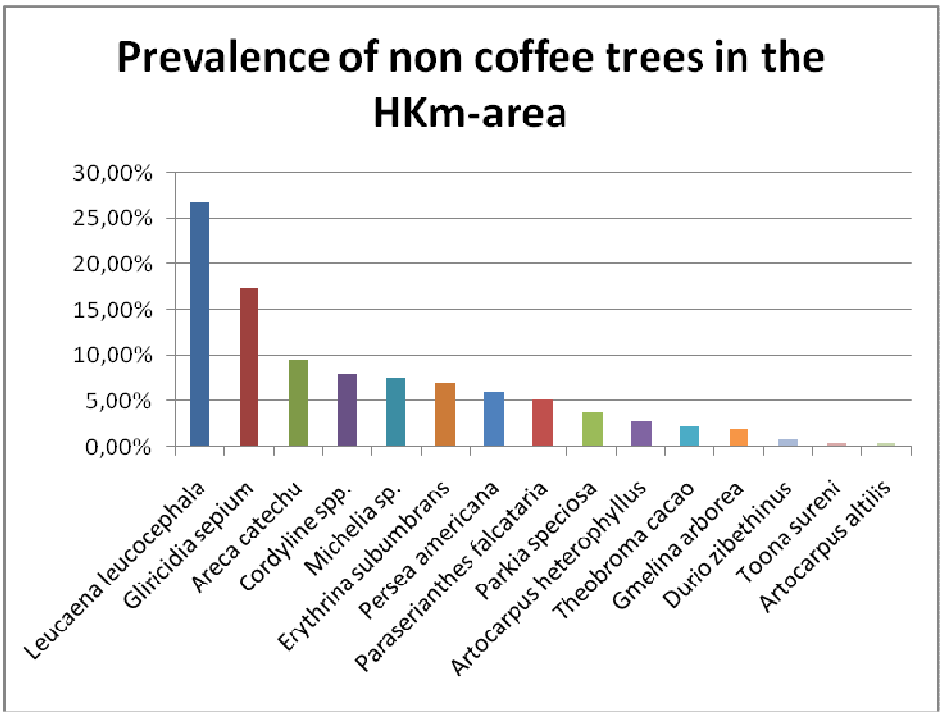


Fig. 4: Importance of the non-coffee species in the HKm-area.

L. leucocephala and *G. sepium* are broadly cultivated nitrogen fixing trees (NFT) that have become popular relatively recently, and the farmers have learned to use them through agricultural training (Roshetko, 2001). This confirms what *Potter* wrote about farmers backgrounds in agricultural knowledge, which are complex and with hybrid origin, rather than purely indigenous (Potter 2008).

A. catechu and the two species of *Cordyline* are mainly hedge plants. These plants are very distinctive and can be used as field guides by the farmers. *Michelia* sp. appears as the main timber tree. *E. subumbrans* is a very common multipurpose tree used in Australasia.

Generally, the farmers of the HKm-fields seem to, somewhat, comply with the rules. However, discoveries from field showed that some rules about soil management were not followed, since there were newly planted coffee trees on the steep slopes just next to a stream, which is provoking increased erosion (see pic. 7). Moreover, some cash-crops were discovered hidden in the conservation area of MWLS: Chili - *Capsicum* sp. because of the farmers' economical necessities (Potter 2008).

Pic. 7: New coffee plantation, in the HKm-area, on a steep slope near a stream.

The farmers are only monitored every fifth year by representatives from the government, and they monitor themselves on yearly basis. Still all fields in the HKm-area had more than 400 non-coffee trees/ha which was against our expectations. A farmer mentioned that he, through the HKm-programme, realised that his land is protected forest, and that he has to protect it. If the water from the mountain is not protected, then there might not be water for the rice fields. This matches the answer from Henri Sitorus, representative from WATALA: "*The farmers realise that their land is protected forest and they plant more trees to protect the water. When farmers realise*

that they need the water for cooking and drinking and also for their fishponds: they protect the forest. They also replace old trees before they die by planting extra."

Generally, farmers comply with the rules because of the fear of being evicted from their fields, even though this has never happened in Tugusari in during the HKm-programme. About this a farmer said: *"The purpose is to join the programme of government in order to get security (…) and we joined HKm to feel safe."* This matches the conclusion of Arifin et al. 2009 from their studies in Sumberjaya: *"The results suggest that farmers would be willing to accept contracts with many land use and tree planting restrictions, provided that they have certainty that they and their families will be able to stay on the land for a relatively long period."*

The compliance by the HKm-members has been investigated and compared to the non HKm-area by visiting the fields. The quantity of non-coffee trees found in the 5 samples of 100 m^2 plots there:

Table 3: FI data from the non HKm-area

Non-coffee Tree Species in *Non HKm Fields	**Total Number of Trees found in the 5 Samples**	**Percentage from the Total of the Non-Coffee Tree Species**
Areca catechu	21	33.9%
Gliricidia sepium	13	21%
Michelia sp.	12	19.4%
Maranga triloba	5	8.1%
Erythrina subumbrans	4	6.5%
Cordyline spp.	3	4.8%
Artocarpus heterophyllus	1	1.6%
Alstonia scholaris	1	1.6%
Tectonia grandis	1	1.6%
Syzygium aromaticum	1	1.6%

M. triloba, a native and pioneer tree, should not be counted. So there are 9 species that were cultivated by the farmers.

The sampling in the non HKm-area was very limited because of bad conditions on the road and heavy rain.

Pic 8: Bad conditions of the dirt road in non HKm-area.

Table 4: Tree densities in the non HKm-area

non-coffee trees:		1240 trees/ha
	timber trees:	22,6%
	other non-coffee trees:	77,4%
coffee trees:		3820 trees/ha
total trees:		5060 trees/ha

In Lirikan only two of the rules of the HKm are fulfilled, as shown in table 4: The number of non-coffee trees is 1240 trees/ha and the diversity of tree species is the required 10 species. But the percentage of timber trees is only 22.6%. As in the case mentioned before, one tree species can be considered as both timber tree and non-timber tree depending on the farmers' necessities.

The non HKm-fields have a high total density, and especially the density of coffee trees: 3820 individuals/ha, this is 75.5% of the total trees/ha. When comparing the coffee tree density between the HKm-area and the non HKm-area, with a two-sample T-test assuming unequal variances, tested to a significance level of 5%, a significantly higher density was found in the non HKm-area. On the contrary, no significant difference was found between the total densities and non-coffee densities in HKm and non HKm-areas. Sample plot number 5 was a monoculture coffee field and some other similar fields were observed.

The most prevalent non-coffee tree species in the non HKm-areas are: *Areca catechu* (33.9%), *Gliricida sepium* (21%) & *Michelia* sp. (19.4%). *G. sepium* is the most common NFT and *Michelia* sp. is the main timber tree in the non HKm-area (fig. 5).

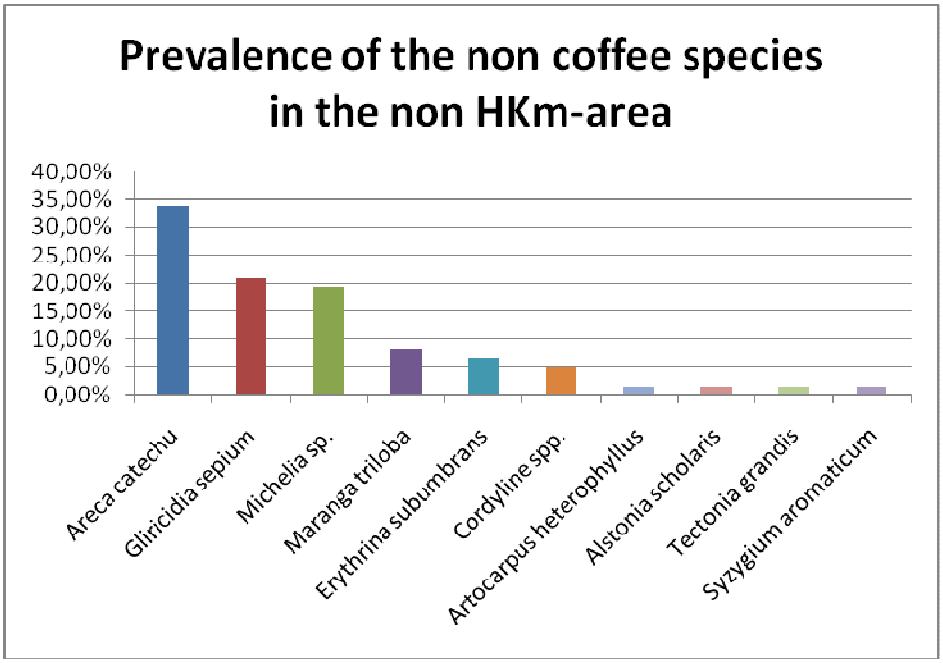


Fig. 5: The importance of the non-coffee species in the non HKm-area.

The high presence of *A. catechu* in the samples seen on fig. 5, can be primarily explained by the used sampling technique. Almost all the sample plots were made at the roadside. This palm is commonly used as a hedge plant. The sample technique was done like that because of difficult access to the fields, caused by the steepness and heavy rain. *A. catechu* is also a highly valued fruit tree as it delivers areca nuts.

The presence of *M. triloba* may suggest poor control of weeds by the farmers. Some non HKm-plots were only with vegetables, fruit plants or cash-crops, so they were managed as non-coffee fields (see pic. 9). In addition some of them were without vegetation cover at all.

Pic. 9: Cash crops (soya beans) in non HKm-fields.

Organisational rules and compliance

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To be able to receive the temporary permit a group needs to be organised, have internal regulations, cultivation plans and a map. These conditions are assessed by the government and if these are found sufficient the temporary HKm permit is awarded. The MWLS group has a strong organisation, regular meetings and trainings. Also they have made internal regulations, cultivation plans and a map. ICRAF and WATALA helped the group with this. The groups presented their results in March 2002, and in April 2002 they got their temporary permits (App. E). MWLS got their 35 year permit in 2007. The Lirikan area has a temporary permit, but we did not notice very strong organisation here. We suspect this is a result of not having received assistance from the NGO.

Sub conclusion

Both the HKm and non HKm-area have on average a non-coffee tree density of well over 400 trees/ha, but in the non HKm-area one inventoried field did not reach this requirement. In both areas also at least 10 different non-coffee tree species were identified. But if strict definitions of timber trees are used, neither area achieved the necessary 30% of timber trees. In contrast with our hypothesis the farmers had well over 400 non-coffee trees/ha, this is because they can give extra income, without compromising on the coffee yield and because the farmers realize the importance of protecting the water resource. Unfortunately we observed that some of the rules about the buffer zones around streams and on slopes are broken. In the non HKm-area many monoculture fields existed in between the agroforests. MWLS has a strong organization and good monitoring and control; this was not noticed in Lirikan.

Land tenure security and the HKm programme

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Land tenure security was a central issue for all the farmers in the study. One farmer expressed his feelings about tenure security in this way: *"Permission is like being one big family cultivating the land and that is calming the heart."* The common perception among the farmers was that the HKm-programme serves as an opportunity to obtain secure land tenure, and this was their primary motivation to join. It was of great importance to the farmers that they were able to cultivate the PF area in a legal manner. Several farmers also had fields outside of MWLS, in areas where they had only obtained temporary permit. These farmers clearly expressed their wish of obtaining permanent tenure security in these fields and it was the same case for the farmers of Lirikan, who only have obtained temporary permit. Other motivation factors, such as the reinforced cooperation and information sharing among the farmers were also present. With the HKm-programme and the obtained tenure security in Sumber Rezeki, it is possible for the farmers to cultivate the fields more intensively and thereby it is easier to fulfil the livelihood needs of the household. Before HKm, when it was illegal to cultivate in the protected forest areas, the farmers had to play ”hide and seek” with the forestry department. The farmers had to be very careful not to be revealed when cultivating e.g. they were forced to work in the fields at night and

they could not use motorbikes to carry fertilizer or harvest etc. Consequently, the fields were not maintained well and the yields were not as high as it is now under the HKm-programme. Based on the HHIs it is evident that all of the famers in Sumber Rezeki are ethnic Javanese and Sundanese.

The HKm-programme and changing livelihood strategies

Responsible authors: Sigrid, Christina, Joris and Raúl

The effects of the HKm-programme on livelihood strategies have been analysed using the five livelihood assets (DFID 1999).

Social assets

In connection to social assets both vertical and horizontal networks have been established and strengthened as results of the HKm-programme and especially, because of support from NGOs. An aim of the HKm-programme is to empower local communities and strengthen their self-reliance and internal coherence. According to the farmers of MWLS, the NGO WATALA plays a significant role in facilitating the HKm-process. WATALA acts as a bridge between the HKm farmers and the government and facilitates negotiation between the two. In 2007 a law from 2001, demanding HKm farmers to pay tax for NTFPs was exempted because of action from WATALA (App. F). Furthermore, WATALA shares information from government level to the HKm farmers, and does that faster than local forestry department is able to. Hence these vertical linkages are strong social assets to the Sumber Rezeki farmers. According to the local forestry department, the MWLS group does often know about information before they do, because of WATALA. This leads to miscommunication and mistrust in the in the local forestry department. Although the local forestry department says that WATALA will leave the community eventually, WATALA itself emphasise their attempt to empower the community and make it self-reliant. Despite of this controversy the relationship between the local forestry department and WATALA is an equal professional partnership (App. D and F). Based on the HHIs, FGD and KIIs it was clear that the support from WATALA was essential for the success of HKm in MWLS. In other

areas, where WATALA is not present, the implementation and compliance of the HKm-programme is not in an as strong progression as in the MWLS area. Reasons for this might be weak institutions, too much bureaucracy, lack of money or lack of political will to do what is needed to facilitate and carry out a successful HKm process.

Additionally horizontal networks have been made, establishing the MWLS as a community cooperative. To obtain the permanent permit through the HKm-programme, the MWLS farmers have established internal rules and participatory decision-making and management procedures. In addition the farmers share their skills and knowledge about cultivation practices and SWC techniques both internally and among external farmers. Moreover some farmers mention that the cooperation and relation among the farmers outside the work in fields has also increased. Consequently, they have increased their ability to negotiate, participate and cooperate, and the strong network is an important social capital to the Sumber Rezeki farmers. However the HHIs showed that not all farmers have time or prioritise to join the frequent group meetings even though there was no clear tendency of poorer farmers not joining and more wealthy farmers joining as we had expected.

Human assets

There are a number of impacts of the HKm-programme related to human capital. WATALA provides training and education of the farmers, supplying skills and knowledge about sustainable cultivation practices, SWC techniques, use of livestock and information about the coffee market and prices. The MWLS farmers have leaned how to oculate the coffee trees and they have been taught about hydrology. Thus the farmers are very well aware of the fact that they are reliant of the vulnerable water resources in the PF area, for their rice fields and fishponds in the village. These attained skills and knowledge is a great human asset to the famers of Sumber Rezeki.

The following shows how the farmers use their skills and knowledge. In the MWLS area coffee is grown in high densities, between 2000 and 3500 coffee trees/ha, based on data from FI. The data on coffee trees density can be correlated with the data on yearly production from the HHIs, this

shows that a higher density of coffee trees leads to a higher coffee yield (Fig. 6). The farmer with the low density and low yield admitted that he has these low numbers because he does not maintain his field.

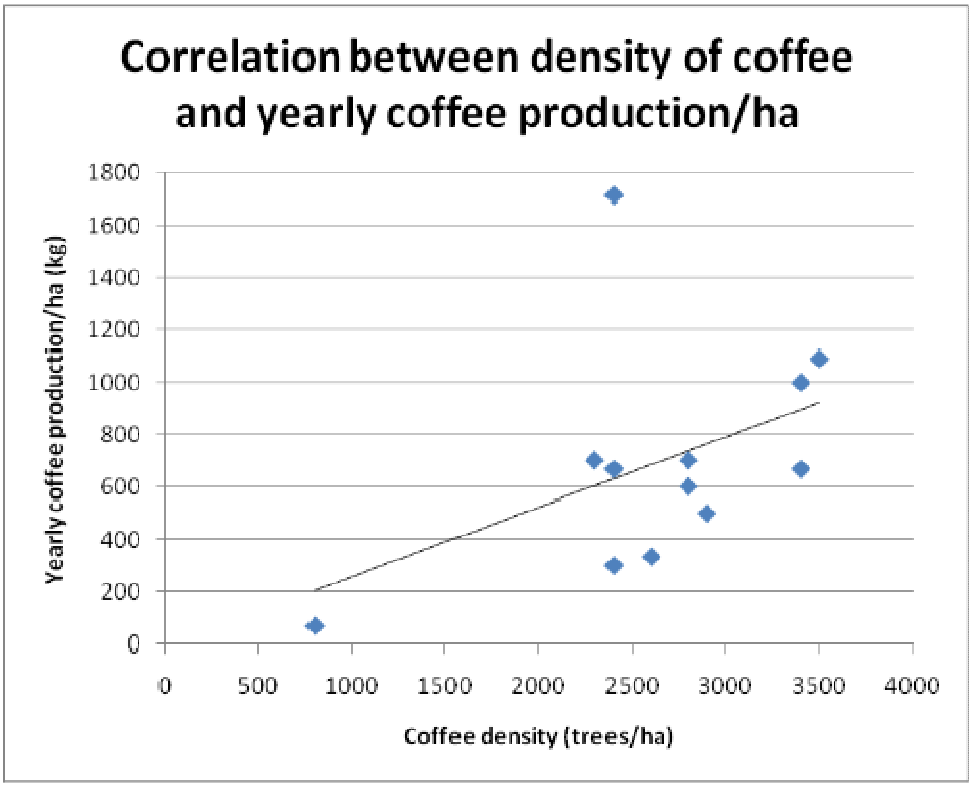

Fig. 6: Correlation between the density of coffee (trees/ha) and the yearly coffee production/ha (kg).

A different correlation that could be extracted from both the FI and the HHIs is how the coffee yield is affected by the number of non-coffee trees. It is very interesting for the farmers to plant non-coffee trees, since these do not affect the coffee production (Fig. 7), but offers an extra income or food. The fact that the coffee yields are not lowered, can be explained because the farmers plant a lot of nitrogen fixing species (55,6% of the non-coffee trees in Sumber Rezeki are nitrogen fixing species) and they prune the trees to prevent them from blocking the sun too much.

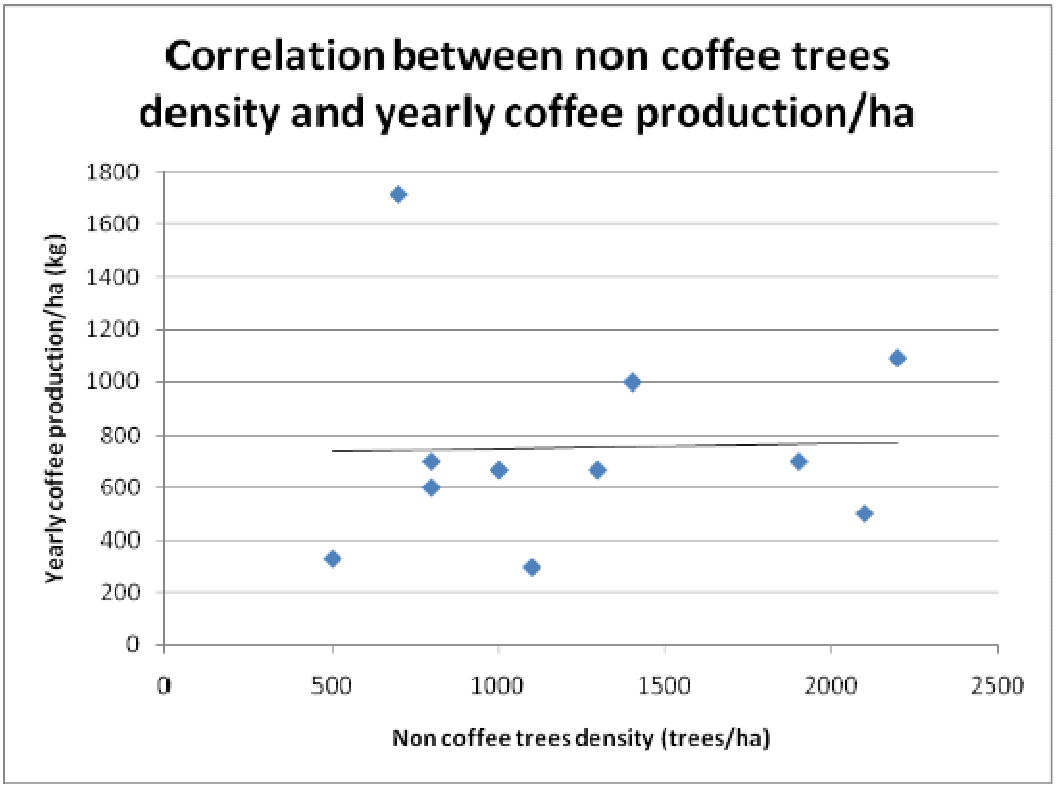

Fig. 7: the correlation between the density of non coffee trees (trees/ha) and the yearly coffee production/ha (kg)

The farmers themselves made this formula to calculate the expected daily income from working in the coffee fields. Their basis is that 200 days/year of efficient work in the coffee field is usually enough to ensure a good harvest. The prices/kg fluctuates between 3-17.000 Rp with an average of 10.000 Rp and the normal yield/ha is 700-1000 kg.

$$\frac{\text{Yield of coffee/ha}}{200 \text{ days}} = X \text{ Rp/day} \qquad \frac{10.000.000 \text{ Rp}}{200 \text{ days}} = 50.000 \text{ Rp/day}$$

This leaves the farmers with time to engage in other income generation activities, such as working as day labourers, traders etc.

Financial assets

In terms of financial assets are a few impacts of the HKm-programme to be mentioned. According to several HHIs and KIIs has land prices in the MWLS area increased as a result of the obtained tenure security. Before the HKm-programme it was not possible to gain legal ownership of the land and it was the coffee trees, which were traded at prices 200-500.000 Rp/ha. Furthermore, the fields were not maintained well, because of the insecure tenure situation. After obtaining tenure security the farmers are able to maintain the fields well and get a higher yield, therefore the conditions of the land have improved. This has of course an impact on the prices in addition to the obtained legal ownership. Prices of land in the MWLS area range between 5-10.000.000 Rp/ha. This has increased the financial capital of each Sumber Rezeki household, although selling land is hardly ever realised. According to the rules of the MWLS it is not possible to leave the group i.e. selling the land, because the permanent permit is granted to the group as a community cooperative. Though, if a field is badly maintained the group will take over the ownership and offer a monetary compensation to the owner. Subsequently the group collectively will decide the future of the fields e.g. selling or reforesting the land.

Physical assets

In relation to physical assets, the main impacts of the HKm-programme are the establishment of a dirt road to the fields in 1998 and owning a motorbike. The dirt road was opened as a part of the HKm-programme. Before the HKm-programme there was no dirt road to the fields, since it was illegal to cultivate in the protected forest, hence they were very hard accessible on foot and impossible on motorbike. The dirt road has increased the accessibility to the MWLS area and has also increased the physical capital of the farmers in Sumber Rezeki.

During the transect walk we noticed that because of the steepness of the dirt road to the fields and the distance between the village and the fields, a motorbike is a big advantage (almost a necessity) for the farmers to maintain their fields. This assumption has been statistically tested by comparing the coffee yields/ha of farmers who own a motorbike with the yields of the farmer

who do not own one. This was done with a two-sample T-test assuming unequal variances and tested to a significance level of 5%. The result of this is that the farmers with a motorbike have statistically significant higher yields than those who do not own a motorbike. Continuing on this, the net present values (NPV) of the difference between owning a motorbike and not have been discounted for a 10 year period. This has been done using an interest rate of 4% and the average price of a motorbike, the average price of fertilizer and herbicide for both farmers with and without a motorbike, the price of fuel, the average income from harvest from both farmers with and without a motorbike and the extra income that can be earned by driving a motorbike. The results of this show that buying a motorbike brings extra income, both due to higher yields, due to more fertilization and herbicide use, and off farm income by driving a motorbike. After joining the HKm-programme it is possible for the MWLS farmers to exploit their motorbikes in the farming activities and increase their income. Consequently owning a motorbike has become a major physical asset for the households.

Natural assets

The natural capital of the Sumber Rezeki area has increased with the implementation of the HKm-programme. Farmers mention that the micro-climate in the past, before HKm, was more dry and hot due to mono-culture practices and that there were not any cover crops. Protection of natural resources, particularly the water resources in the PF area is essential to the farmers and the village. Therefore the farmers have invested in SWC techniques. According to the FI 30% use terraces and 25% of the farmers have established wind holes, which is supported by this quote; *"Research also demonstrates that, in many circumstances, greater land tenure security leads to improved forest management"* (Contreras-Hermosilla and Fay, 205: 18). The SWCs are very resource demanding to establish and would certainly not have been made in the period without tenure security, where the farmers were not able to maintain the fields well. The president of MWLS states that before HKm the farmers did not care about the condition of the forest, but now they do (App. E). The HKm-programme has entailed increased intensification and investment in the fields, thus increasing yields and income.

Sub conclusion

Improvements in all the five livelihood assets have been observed, that have been caused by the tenure security achieved through the HKm programme. The social assets have been expanded by vertical networks with the NGOs between the farmers and the government and by horizontal networks, which represents the cooperation between farmers. The human assets have increased due to training, organized mostly by WATALA, about sustainable cultivation practices, SWC techniques, use of livestock, etc. As an improvement in financial assets the increase in land prices of the HKm-area has to be mentioned. The creation of the dirt road to the MWLS-area in 1998 is an important physical asset created by the HKm-programme, this allowed motorbikes, another physical asset, to reach the fields and this allowed for agricultural intensification. The HKm-programme also had an effect on the natural assets of the farmers, the multistrata agroforests have led to better micro-climate and the farmers have started to invest resources in creating SWC techniques. Because of the improvements in all these five assets it is fair to conclude that our hypothesis about long-term improvement of the farmers' livelihoods is correct. This was also confirmed by the HHI, in which we asked about the livelihood changes after HKm. We expected the programme to be an obstacle for the farmers in the first years because of meetings and limitations. But the farmers had no problems in accepting the limitations put by the HKm-programme and farmers were free to choose to attend the MWLS meetings or not. The primary motivation to join HKm is the secure land tenure; the other reasons that were mentioned are cooperation and information sharing between farmers.

The HKm –programme and the environment

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The tenure security provided by the HKm-programme is not only increasing the livelihood assets of the farmers, but is also a way for the authorities to monitor and obtain control of the rural populations, whom are cultivating in PF and neighbouring buffer areas (Potter, 2008). Comparing the HKm fields with the non-HKm fields is essential in order to gain knowledge about the

relation between tenure security and biodiversity in trees. Especially, considering that there is no secondary data on biodiversity in trees from before the HKm-programme was implemented.

In order to better understand the actual biodiversity in the Sumberjaya area it is relevant to look into the areas' history (see introduction). The HKm-programme enhanced farmer participation and introduced agroforestry by intercropping the coffee plants with trees. This was not very popular among the farmers; only when fruit trees were among the species to be reforested the farmers started to get involved. Consequently fruit trees like the jackfruit and durian entered the coffee fields (Potter, 2008). The rules of the HKm-programme emphasises the importance of timber trees in the agroforestry system. Consequently this has lead to increased biodiversity in the coffee fields of Sumber Rezeki, indicating that tenure security has a positive impact on biodiversity.

Table 5: The diversity in tree species found in each of the 20 sample plots in Sumber Rezeki:

Plot & Farmer	1- Jumali	2- Muhadi	3- Muhalif	5- Samiranto	6- Hoirul	7- Swidiono	8- Murdiman	9- Budiono	10- Tomy	11- Asep
Sample	6	6	6	5	5	6	6	5	5	4

Plot & Farmer	12- Atang	13- Solihin	14- Sujio	15- Hamzah	16- Amin	17- Harman	18- Kaisar	21- Olih Abas	22- Arifin	20 – Yayan
Sample	7	5	5	7	4	5	7	5	5	5

Plot & Farmer = N° of the Plot & Farmer's Name.

Sample = N° of Tree Species found in the Plot Sample.

Table 6: The diversity in tree species found in each of the 5 sample plots from the non HKm fields:

Plot & Farmer	1- Herman	2- Maman	3- Oleh	4- Juarmin	5- Daris
Sample	8	6	4	4	2

Plot & Farmer = N° of the Plot & Farmer's Name.

Sample = N° of Tree Species found in the Plot Sample.

Based on the tables above it is possible to conclude that the coffee fields of Sumber Rezeki, with permanent tenure security, have higher diversity in tree species than in Lirikan, the area without permanent tenure security. The total number of tree species found in the 20 sample plots of Sumber Rezeki were 16, containing both coffee and non coffee trees. Correspondingly in the 5 sample plots of Lirikan were only 11, and maybe only 10 should be considered as being planted by the farmers as one of the species found in Lirikan is a native pioneer tree, which typically grows wild in the secondary forests in Indonesia. Regretfully, the numbers of samples in Lirikan are far less than in Sumber Rezeki: 5 samples against 20. This implies that a comparison between the two areas may give a weak result. Another possibility is to compare the average of number of tree species per plot in the two areas. Hence we have an average of 5.45 tree species per sample in Sumber Rezeki and 4.6 tree species per sample in. Thus we can conclude that the Sumber Rezeki is more diverse in tree species than the non HKm fields. Not only based on FI data, but also on our observations: none of the Lirikan fields were well managed agroforestry systems.

Some were monoculture coffee fields, like plot number 5, where the only non-coffee trees found were; *M. triloba*, a pioneer tree, hence not planted on purpose. Others had vegetables and other cash crops instead of coffee. Also plots with no vegetation were found and these showed clear signs of erosion. The biodiversity and conditions of the field plots in Lirikan are very diverse, e.g. plot 1 has eight different tree species whereas plot 5 only has two. This can be explained by the fact that the group has not obtained permanent permit, thus being less organised than Sumber Rezeki, where the fields are more homogenous, according to collected data. The farmers of

Sumber Rezeki have to comply with the rules of planting both timber and multi-purpose trees in order to secure legal ownership. Although another reason for planting different tree species can be to extract NTFP such as fruits and fodder for livestock. The shade of the non-coffee trees and the benefits of NFT provide advantages to the coffee production, but they are difficult to assess when farmers are speaking about direct benefits. In the same way the benefits of SWC, which different species of trees with different types of roots with each their different depths and functions, are providing to the Way Besai watershed are too abstract and are long term benefits.

Based on the HHIs, one farmer expressed his belief in more agroforestry leads to higher coffee prices. This shows expectations of direct economic benefits from increased agroforestry practices. This follows the idea of *Potter*'s article, as the complex multistrata coffee system with secure tenure and medium management intensity brought the highest returns, yielding various fruits as well as coffee. This idea goes hand-by-hand with newly introduced markets: "bird-friendly coffee" and "organic coffee". Unfortunately, as past studies said, lot of farmers do not adhere yet to strict "organic" and "bird-friendly" guidelines (Potter, 2008). They are still using chemical fertilizers and herbicides, like the Round-Up as mentioned in the FGD. A farmer explained that the organic fertilizers are very expensive for to buy and use, and difficult to carry to the field compared to the chemical fertilizers.

A key animal for the State and NGOs (WWF) in the PF is the Sumatran tiger, which is almost extinct (WWF 2010). According to the FDG, it was more than five years ago since the farmers heard a tiger in the PFs of Tugusari. However during transect walks and FIs sun bears and siamang monkeys were observed. All these three species are categorised as CITES Appendix I, which means that they are threatened from extinction (UNEP-WCMC 2010).

During observations in the natural forest of the PF, a surprisingly small number of rattan (native palms from the *Calameae* botanic family) were found. Rattan's stems are valuable NTFP, especially for the Semendo people, who make baskets of these (Potter, 2008).

Sub conclusion

In relation to the natural forest of the PF, the impact of the HKm-programme in the biodiversity in general is relatively positive. Based on observations, transects walks and the FIs, the farmers, who have obtained permanent permit seem to respect the natural forest more than the farmers without permanent permit, as they want to comply with the rules of HKm. However, in general the biodiversity in the Sumberjaya watershed has been decreasing as the local rural population has been increasing (Gaveau et al, 2007). In a long term perspective, to motivate farmers by granting tenure security may bring unintended consequences, such as attracting more people to the area, especially if authorities do not have alternative strategies, e.g. promoting off-farm activities.

As stated earlier the HKm-programme has positive impact on the biodiversity in trees in the fields in Sumber Rezeki. It may furthermore have positive impact on the conservation of the biodiversity in the natural forest, but clearly this is very limited and has to be reinforced by other kind of strategies. Consequently it seems necessary to strengthen the possibilities of off-farms and alternative farming activities among the local population, e.g. fish ponds. Based on observations and HHIs it is evident that this is already a very popular activity.

Conclusion

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Through this report we have investigated the impacts of the HKm-programme on both the farmers' livelihoods and the environmental protection in Tugusari. In the beginning of this study we hypothesized that farmers might not comply with the regulation about 400 non-coffee trees/ha, because they might want to maximise their coffee yields. In contrast with this hypothesis the farmers had well over 400 non-coffee trees/ha, this is because they can give extra income, without compromising on the coffee yield and because the farmers realise the importance of protecting the water resource. Also most of the other agricultural and organisational rules have been followed by the farmers in the HKm-areas. So it is fair to conclude that the HKm-programme is well implemented and organised in the MWLS group. Our second hypothesis was that the HKm-programme will improve the livelihoods of the farmers in the long-term. We found this to be true since we observed improvements in all of the five livelihood assets and the farmers also told this directly in the household interviews when asked about livelihood changes after HKm. We also expected the programme to be an obstacle for the farmers in the first years because of meetings and limitations. But the farmers had no problems in accepting the limitations put by the HKm-programme and farmers were free to choose to attend the MWLS meetings or not. Finally we expected to find differences in tree density, tree biodiversity and soil and water conservation techniques between HKm and non-HKm fields will be found. The tree density was found out to be higher in the non HKm-fields than the HKm fields but this difference was not statistically significant. The HKm-area did have higher species diversity than the non HKm-area and there were terraces and wind holes in the HKm-area, which were not found in Lirikan. Considering all this it can be concluded that the HKm-programme in the MWLS group has a good impact on the livelihoods of the members and some positive effects on the environmental services provided by the upland areas. In a long term perspective, to motivate farmers by granting tenure security may bring unintended consequences, such as attracting more people to the area, especially if authorities do not have alternative strategies, e.g. promoting off-farm activities.

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Appendices

Appendix A: Focus Group Discussion

1. What was the motivation for joining the HKM programs?

2. How do you perceive the HKM Programs?

   a. What did you think about the HKM Programs before you need?

   b. What do you think now about the HKM Program?

   c. As empowering the community?

   d. As placing constraints on the community?

3. Is important for you to own your own land?

   a. What problems do you face when you don't own your land?

   b. What are the advantages of owning your own land?

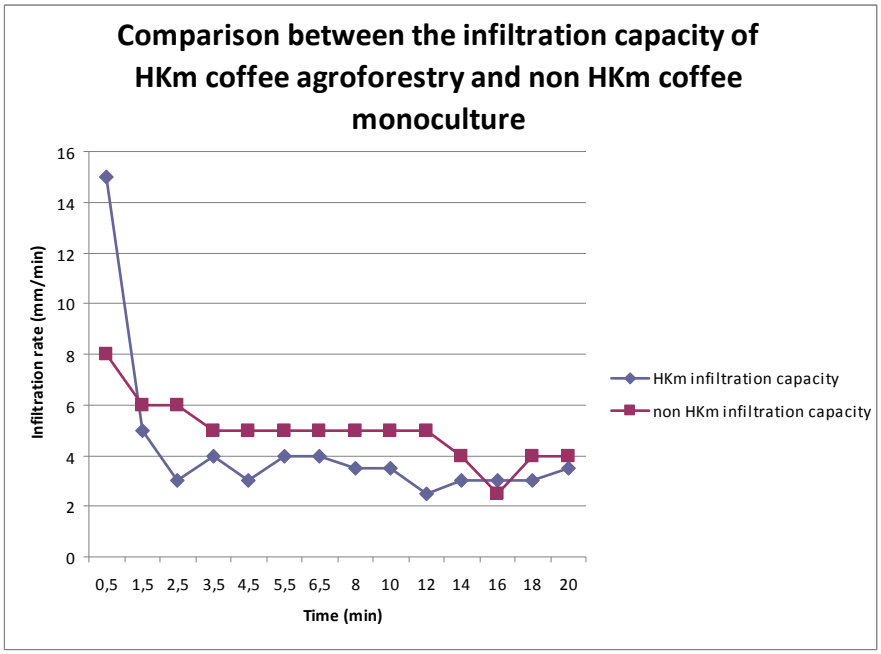
   c. Is there other way of getting ownership of land than through the HKM Program?

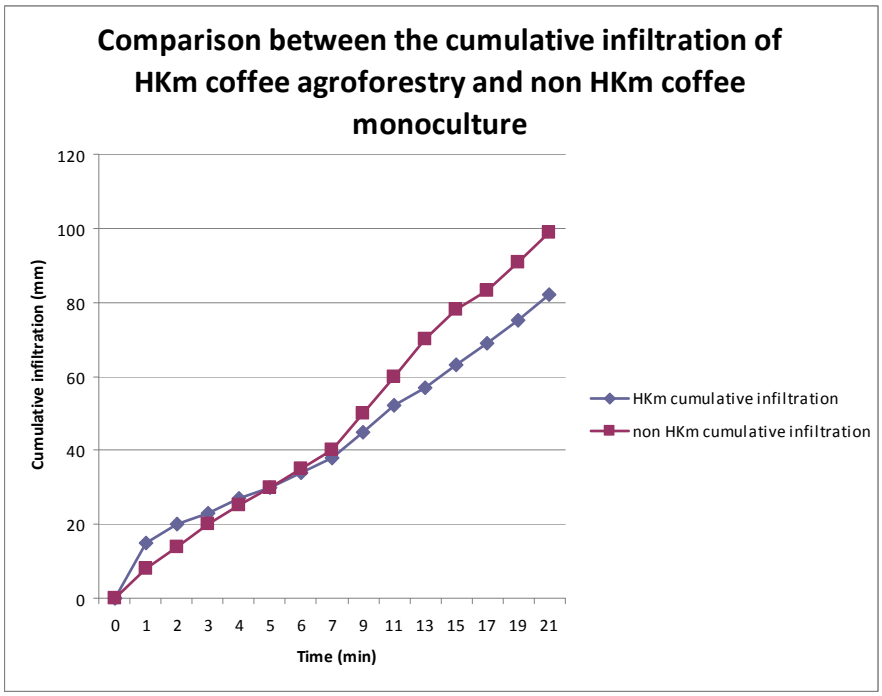
4. How is the relationship between the community forest and the HKM Authority?

5. Can you mention some helpful NGO which in the HKM process.
   a. How they help /assist/support the community?

6. How do you perceive the relationship between the NGO and the HKM authority?

Appendix B: Water infiltration





Appendix C: Objectives of the HKm

Objectives	Aims to empower local communities in forest management while maintaining the sustainability of forest functions and the environment in order to improve kesejahteraannnya (Article 3).	Intended for capacity building and provision of access to local communities in sustainable forest management to ensure the availability of jobs for local people to solve social and economic problems that occur in society (Article 3). HKM aimed at improving the welfare of local communities through the utilization of forest resources in an optimal, equitable and sustainable while maintaining the sustainability of forest functions and the environment (Article 4).	▪ P.37 use "term" intent and purpose of the "phrase" that is more sharp and concrete than SK 31. HKM Penyelengaraan in P.37 was intended to "memgembangkan capacity" and "providing access" and is intended to improve the welfare of society. Sharper and concrete than the use of the word SK 31: meant to "empower" communities in order to improve their welfare.

Appendix D: KII with staff of Forestry Management

1. The objective of HKm: sustainable forest, wealthy communities

2. HKm policy:
   - S.K. (decision) Forestry Ministry No. 677/1998: HKm propose through "koperasi" and direct permission from ministry
   - S.K. No. 865/1999 via groups and then continued by "koperasi". Permission is got from the ministry
   - S.K. No. 31/2001 via farmer groups, temporary permit is from head of district (bupati), permanent permit is from the ministry
   - S.K. 37/2007 Permanent permit is from "bupati" based on the decision from the forestry ministry about HKm's land reserve

3. HKm in Sumberjaya
   - Temporary permit : 16.865,48 ha : 26 farmer groups
   - Definitive permit : 1970,72 ha : 3 farmer groups
   - Temporary Permit :

     Tugu Sari village : 7 groups
     Lirikan : 92 HH
     Laksana Bawah : 70 HH
     Laksana Jaya : 115 HH
     Simpang Kodim : 79 HH
     Mekarsari Jaya : 54 HH
     Tri Tunggal : 97 HH
     Ulu Petay : 109 HH

     Simpang Sari village : 1 group
     Sumber Sari : 65 HH

     Sukapura village : 2 groups
     Srimulya : 549 HH
     Airpakuan : 223 HH

     Purajaya village : 3 groups
     Abung Jaya : 800 HH
     Bantol Jaya : 287 HH
     Harim Sejahtera : 521 HH

     Way Pette village : 1 group
     Harapan Lestari : 197 HH

Swdang Pagar village : 1 group
Rukun Sejahtera : 900 HH

Purawiwitan village : 1 group
Sidomakur : 271 HH

Muara Jaya 1. village : 1 group
Ribang Alam : 1360 HH

Muara Jaya 2. village : 2 groups
Asahan lestari : 214 HH
Gunur Raya : 317 HH

- Permanent permit :

Tugu Sari village : 1 group
Mitra Wana Lestari Sejahtera (MWLS) : 6 sub-groups : 73 HH : 260 ha

Simpang Sari village : 1 group
Setiawana Bakit: 3sub-groups: 145HH: 239ha

Tri Budi Syukur village: 1 group
Binawana : 15 sub-groups : 493 HH : 645 ha

4. The monitoring process
   - There are 2 steps in monitoring:
     1) Self-monitoring by group
     2) Government monitoring
   - The progress report from the group to the government
   - Routine meeting every 3rd month: linkage of institution, NGO, all the members of HKm
   - Evaluation from independent team: in 2008 it was held for the first time by Forestry department, PLN(hydropower), NGO

5. Parameters of monitoring is based (perda – rules of district government) PSDABM No. 225/2006. It was modified by stakeholders:
   - institutional : 22 %
   - Physical : 60 %
   - Socio-economic and ecological : 18 %
   - For temporary permit monitoring is done every year

- For permanent permit monitoring is done every 5th year

6. Consequences for communities outside the HKm program
   - There is no real consequences
   - Persuasive approach to not clear new forest land

7. Consequences for community who join the HKm program
   - Internal in the group
   - If the group do not comply with the regulation, there are no sanctions from the government – ass long as farmer do not clear new protected forest land

8. To get the permanent permit minimum score is 65 % (parameters)
   For temporary permit:
   - It has an institution
   - It has internal regulations
   - It has cultivation plans
   - It has a map/data

9. Relationship between government and HKm groups
   There are no conflicts; however there are misunderstandings from the community. E.g. Community think that HKm just want to legalise their activity in the forest, but they do not plant trees, minimum 400 trees/ha

10. Relationship between government and NGO
    - The NGOs only communicate with high level government – not with staff in the field, this leads to miscommunication
    - NGO seldom speak to field staff, so the community knows about the information sooner than the field staff. This leads to less community trust in the field staff. In fact the NGO will leave the community anytime.

Appendix E: KII with President of MWLS

History of HKm:

1952: first generation: immigrants from West-Java (national reconstruction body) -> population increase -> start cultivation of forest, this land is now HKm.

1993 to 1996: deportation from the land with and destruction of the houses with elephants.

1998: in the past: individual cultivation => policy for group cultivation = > people established small groups, but many people were afraid to return, because of deportation.

> 9 persons had high motivation to initiate a group=> they started the program and asked people to return and cultivate previously used land.
>
> Starting to build streets
>
> 9 persons grew to 22

17 july 1998: leader of west-Lampung informed the people about the HKm regulations from Jakarta: allowed to cultivate what was cultivated, but no expansion.

1999: WATALA informed Tugu Sari people about HKm & helped with ICRAF to organize the people. (WATALA still had more members than the community group) The community group provided seedlings of fruit trees as preparation, these were offered to the people to attract them to HKm.

2000: WATALA and the community group made a collaboration for a weekly activity to e.g. build streets and persuade people to join the group.

2001: most of the people were interested to join. The group was divided in 4 subgroups.

01/2001: start of cultivation of new seeds, finished in march 2001

Mai 2001: evaluation of the project=> result: good

15th of mai 2001: named the subgroups to get license from the government

03/2002: each subgroup made a proposal for the license

04/2002: got the 5 year license

To get long term license:

> Keep cultivating the fields
>
> Guarantee security for the people
>
> Take care of & maintain the main functions of the forest

13/12/2007: got 35 year license in Jogjakarta from the vice president of Indonesia

Monitoring and evaluation:

Yearly from 2002 to 2006 by NGO

In 2007 by the government

Regulations are multi-stakeholder created

Impact:

Before HKm: Deportation => no jobs here (hunger) => work in the city and people didn't care about the forest because of insecurity => forest fires

Now: security => people care about the forest

1 family was given 1.5ha to cultivate

Achieved progress:

- Higher diversity
- Each farmer: more than 10 species (except for coffee)
- Reduction of use of chemical fertilizer
- Trail and error testing for new species

Non compliance of rules:

Punishment: established by the group itself

-social punishment: e.g. if one tree is cut, the farmer must plant 100 trees in the protected area (not in the fields) (has happened)

-group punishment: have to go to a court, held by the group, and they will investigate and interrogate. If he continues to break the regulations -> informing of government officer -> land will be taken away (never happened)

Appendix F: KII with WATALA

1. What is WATALA?
    a. History
    b. Organisation
    c. Funding
2. How do you perceive the HKm program?
    d. As empowering the communities?
    e. As placing constraints on the communities?
3. How is the opportunity for the farmers to negotiate with the Forestry department?
4. How is the relationship between WATALA and the Forestry department?
5. Why do you think farmers in MWLS plant more than 400 trees/ha than they have to?
    f. And why do you think they protect forest land that they are allowed to cultivate?
6. Do you know if all farmers in Tugu Sari, who cultivate in protected forest area, are members of the HKm program?
    g. If not; how many farmers are outside the HKm in %?
    h. If not; why are the farmers not members?
        i. Constraints (high cost, lack of info) or an actual choice?
7. What happens if farmers do not comply with the HKm rules?
    i. Sanctions, loss of tenure security, eviction?
8. Do the farmers in the HKm program have to cultivate organic crops?

1. WATALA was established in 1978 and was a student organisation/ campus community in the university UNILA in Lampung. It organised adventure activities.
   In 1986 WATALA became a NGO, but still a social community
   Members from 1986 to now: 306, but only 20 active
   WATALA has 5 offices in Lampung; West-, East-, Central Lampung, Pesawaran, Panggamus.
   Vision: make harmony in natural resource management and have justice for farmers and needy people around the forest.

   Mission: A. Increase no. of members
   B. Encourage democracy and natural resource development
   C. Awareness of young people about the nature
   D. Empower networking between farmers, government and NGO
   E. Natural resource activities

   Principle: a. Familiarity between members
   b. Transparency and accountability
   c. Justice

d. Democracy

Board of WATALA (3-5 persons)

Executive director

Funding manager Organisation manager Project manager

Staff Staff Staff

WATALA is funded by the Ford foundation, UNDP, DFID, Heifer of Indonesia and Samdana
Financial support donors is grants not loans

2. The HKm program is empowering the farmers.
   WATALA train and educate the farmers, gives them skills and knowledge
   WATALA helps farmers to overcome constraints and solve the problems
   W has a role in creating the policy of HKm (government level) – some policies has changed because of W experience and influence
   W helps farmers to sustainable livelihoods; education, use of livestock, access and info about the market

3. They meet in farmers groups. The W facilitates the farmers groups so farmers are a part of the process in creating the HKm regulations. W is a bridge between the farmers and the government. In 2001 policy from province government; farmers had to pay tax for Non Timber Forest Products. The policy was changed because of W action.

4. Equal partnership, harmony. W uses a pervasive approach to the Forestry government, but do not demonstrate.

5. 2 reason: 1. Because farmers realize their land in Protected Forest and by planting many trees it can keep hydrology. 2. Replacement before the old trees die – not only for cultivation, but also to maintain environmental services and because farmers realize that their own water sources should be protected. Households, fish ponds rely on the water from the mountain.

7. Almost all, but in Lerikon are non-HKm households – they lack the facilitation from NGO
   70% HKm, 30% non-HKm
   The non-HKm households have actually been members, but their temporary permit expired, but they did not get the permanent permit. It is the results from the monitoring and evaluation that decide whether the farmers get the HKm permit extended. There are no taxes or prices to be in the HKm.

8. There are no clear sanctions for the farmers. The group itself decides the sanctions for non-compliance. Illegal logging will be handled by the Forestry department and will be punished with jail.
If the farmers do not cultivate the land – the group will take the land and reforest it and give a monetary compensation/payment.
Price of HKm-land depends on the condition of the land (cultivation high/low yield) and the status of land tenure. The price is negotiated between seller and buyer.

9. No. In the past the farmers used chemical fertilizer, but now they should decrease chemical fertilizer and instead use manure and organic fertilizer. The farmer does not cultivate organic crops, but use organic treatment. 2007 – 2011 target: 50% of the HKm members should not use chemical fertilizer anymore. Consequently members need livestock to produce manure and they need motorcycles to transport it to the fields.

Appendix G: Household interview guide

1. Respondent Profile:

Name:
Age:
Ethnic:
Coming into the village:

2. Family

No	Name	Family Relation	Gender	Age	Remark
1.					
2.					
3.					

3. Land size

4. Plants Diversification:

No	Plants Diversification	Trees	Age	Use	Production
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10					
11					
12					
13					
14					
15					
Fishery					
1.					

5. **Income Resources**

I.	Income Resource	Volume	Price/unit	Total

		(Kg/Lt)	**(Rp)**	**(Rp)**
	Total Income			
II.	**Input**	**Volume (Kg/Lt)**	**Price/Unit (Rp)**	**Total (Rp)**
	Total Input			
III.	**The Real Income (I – II)**			

6. The Objectives of HKm:

7. Motivation in joining HKm:

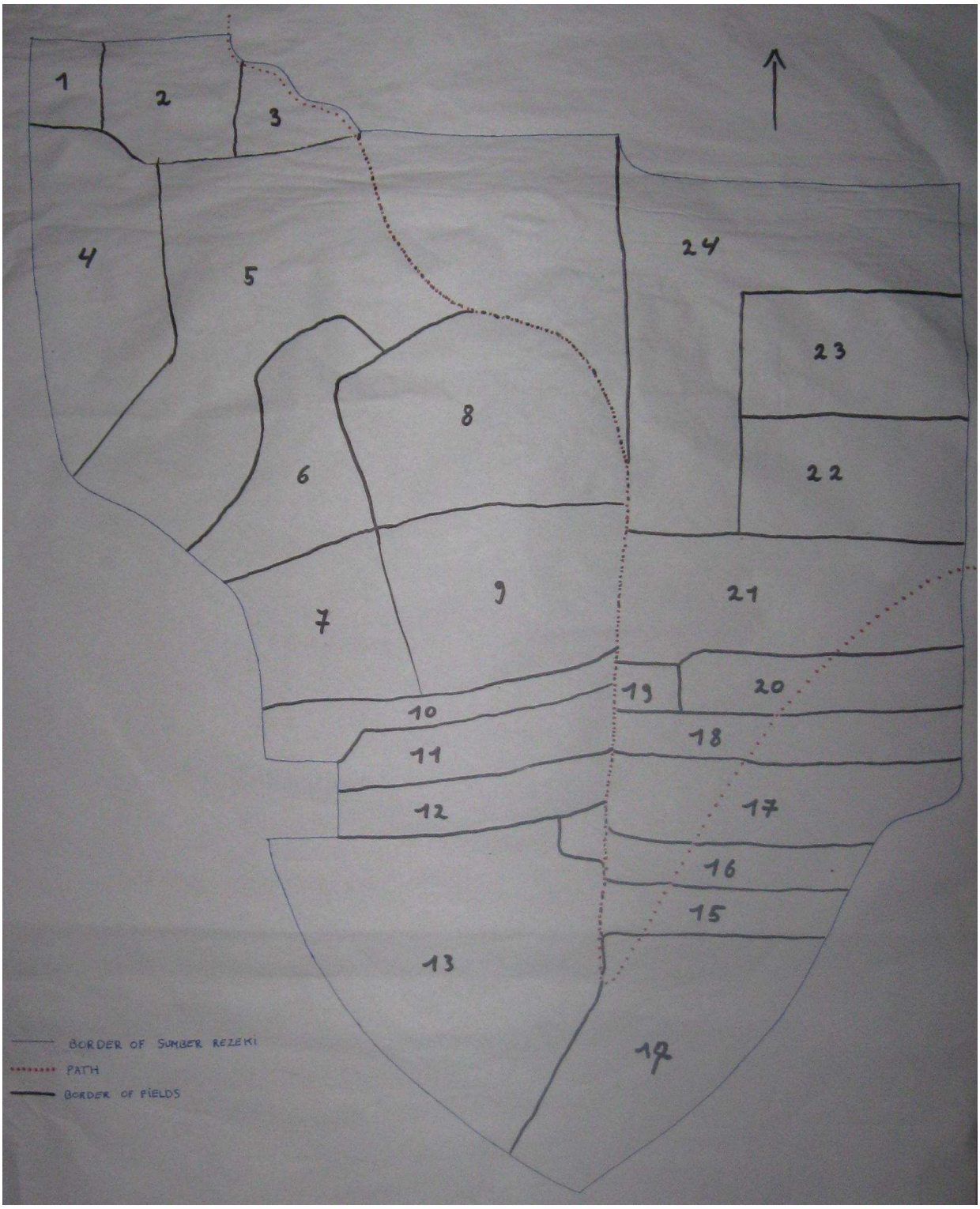
8. The value of land tenure security:

9. Impacts of HKm

Before	**After**

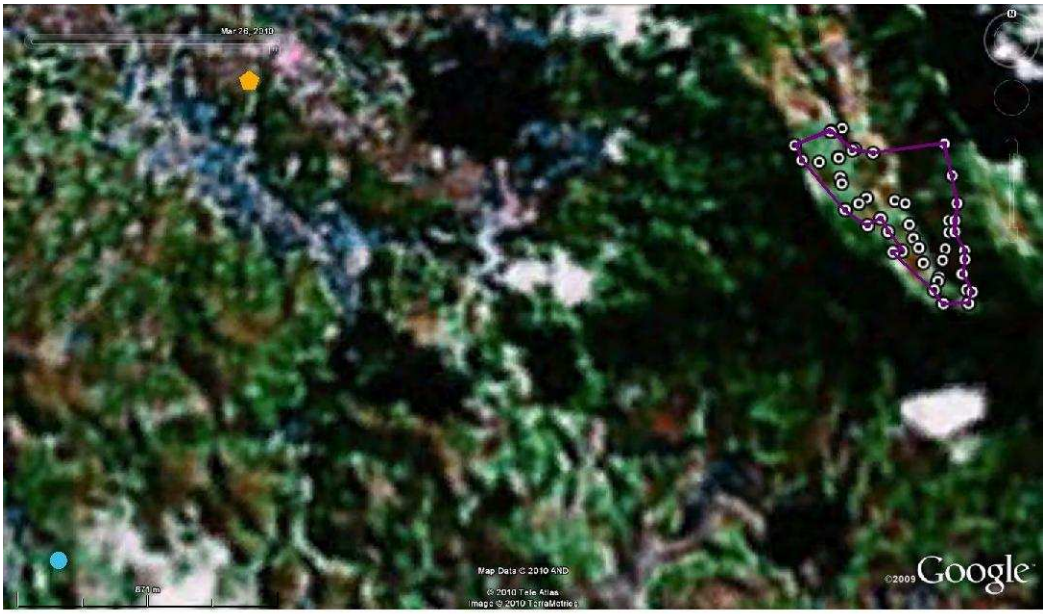
10. Ranking Exercise:
    1.
    2.
    3.

Appendix H: Maps of the HKm area of Sumber Rezeki

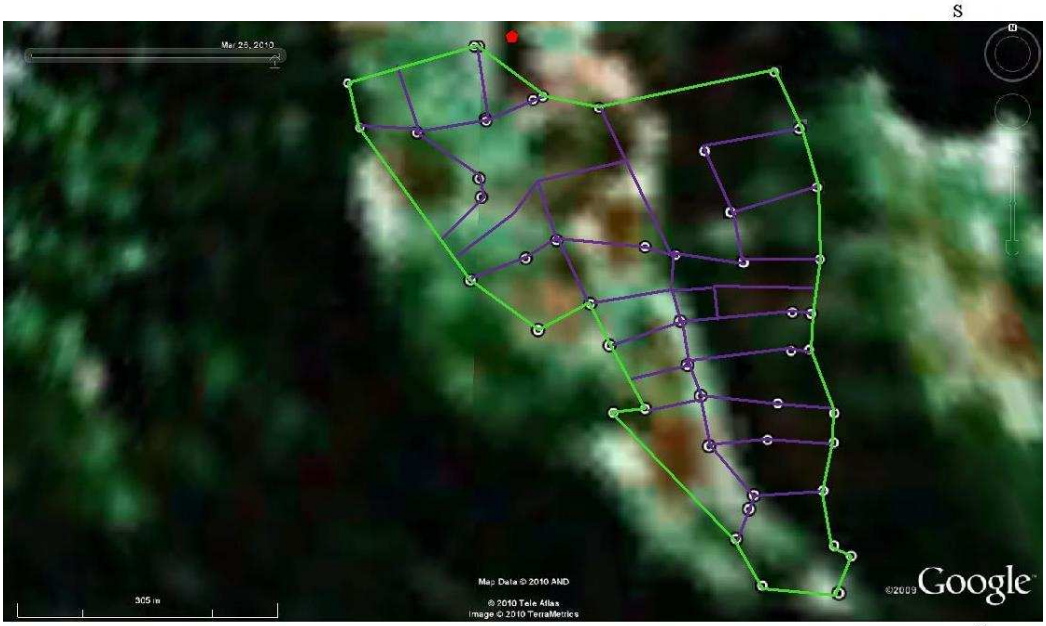


1: Jumali
2: Muhadi
3: Muhalif
4: Darso
5: Samironto
6: Hoirul
7: Swidriono
8: Murdiman
9: Budiono
10: Tomi
11: Asep
12: Atang
13: Solihin
14: Sujio
15: Hamzah
16: Amin
17: Harman
18: Kaisar
19: Dodo
20: Yayan
21: Olih
22: Zainal Arifin
23: Kotong
24: Muhadi.

Maps based on GPS data



Lirikan
Tugu Sari
Border Sumber Rezeki



Shelter
Border Sumber Rezeki
Field borders

Appendix I: Synopsis

SLUSE FIELD COURSE

Interdisciplinary Land Use and Natural Resource Management

An investigation of the *Hutan Kemasyarakatan* Social Forestry Program in Way Besai watershed, Sumberjaya

TUGUSARI, SUMBERJAYA WATERSHED

Sigrid Vinter, Joris Bens, Raúl Rivarola & Christina Hjortdam
24th of February 2010

1. Introduction

The Suharto regime, that ruled Indonesia from 1950-1998 with shifting presidents and shifting philosophies has left its marks on Indonesia and Sumberjaya. The regime wanted to enforce itself by making the very diverse populations of the Indonesian Archipelago more homogenous. Consequently the Lampung province has had a strong immigration from Javanese and Sundanese farmers, who carried their own cultures with them; and this has led to different livelihood strategies, conflicts and local migration. The Javanese and Sundanese migrants settled in protected forest areas. The government realised that the Protected Forest areas was being seriously damaged and forced the migrants to move to other locations in the area i.e. *Translok*. All land with no clear ownership was now declared as state property. Migrants were allocated 2 ha of land for cultivation, and if plots were unsuitable for cultivation it was impossible to claim another. Hence a lot of ”forest squatters” settled in the Protected Forest areas. The forest borders were guarded by national military, evicting the squatters if they were discovered. The strong in-migration, overruling of local customs and large insecurity in livelihoods caused tensions and conflicts in the local societies (Lynch 1995).

When the regime ended in 1998, the control over land areas ended as well, and great confusion of ownership developed. Should national or local rules be enforced? Today all land with no proves of private ownership is still property of the state, but local tenure systems are still more common. Many farmers without tenure rights face an insecure future, because the state without warning can sell the rights to the land e.g. logging and plantation companies etc.: deforestation is common when the state is the manager of forest resources (Elmhirst 1999).

Sumberjaya, aka Tugusari, is the main town in the Sumberjaya sub district in the north of the Lampung province. It is a relatively large village with approximately 8000 inhabitants and a large influx of seasonal labourers, especially during the coffee harvest. The living strategies are very diverse; some are landless labourers who take salaried work as farmers or construction workers, others earn their living as traders. The village contains a lot of government services such as police stations, sub district office and schools of different kinds. For this reason the number of government employees is high compared to other villages.

In the sub district of Sumberjaya is the World Agroforestry Centre (ICRAF) involved in several projects empowering local farmers through the RUPES framework (Rewarding Upland Poor for Environmental Services). A government initiated program; *Hutan Kemasyarakatan* Social Forestry Program (HKm) has been working since 2001 with financial support from the International Fund for Agricultural Development (IFAD) and the Ford Foundation.

1.2 The Hutan Kemasyarakatan Social Forestry Program (HKm)

In 2001 the Indonesian government initiated the HKm program. The objectives of the HKm are to improve environmental sustainability by rewarding local farmers living in the state forest secure land tenure. It was established by decree No. 31/kpts-II/2001from the Ministry of

Forestry. Under the program groups of households can apply for permits to manage state forest lands. To obtain a permit, the group has to establish internal regulations to ensure management of the forest area according to prevailing laws; use participatory procedures for decision making, conflict resolution, and organisational management and prepare a location map with the area managed, protection and cultivation blocks and the period and plan for managing the area (Pender et al. 2008; 2). To introduce soil and water conservation (SWC) protection blocks are created, where forest should be protected and rehabilitated to offer SWC. The areas that should be in the protection blocks are areas within 500m of a dam or lake, 200m from a water spring or 100m from a riverbank or land with a slope of more than 40%. In the protection areas tree cutting or other ways of opening the canopy are not allowed. In the other areas intensive forestry and agroforestry are allowed, if they happen in a sustainable manner.

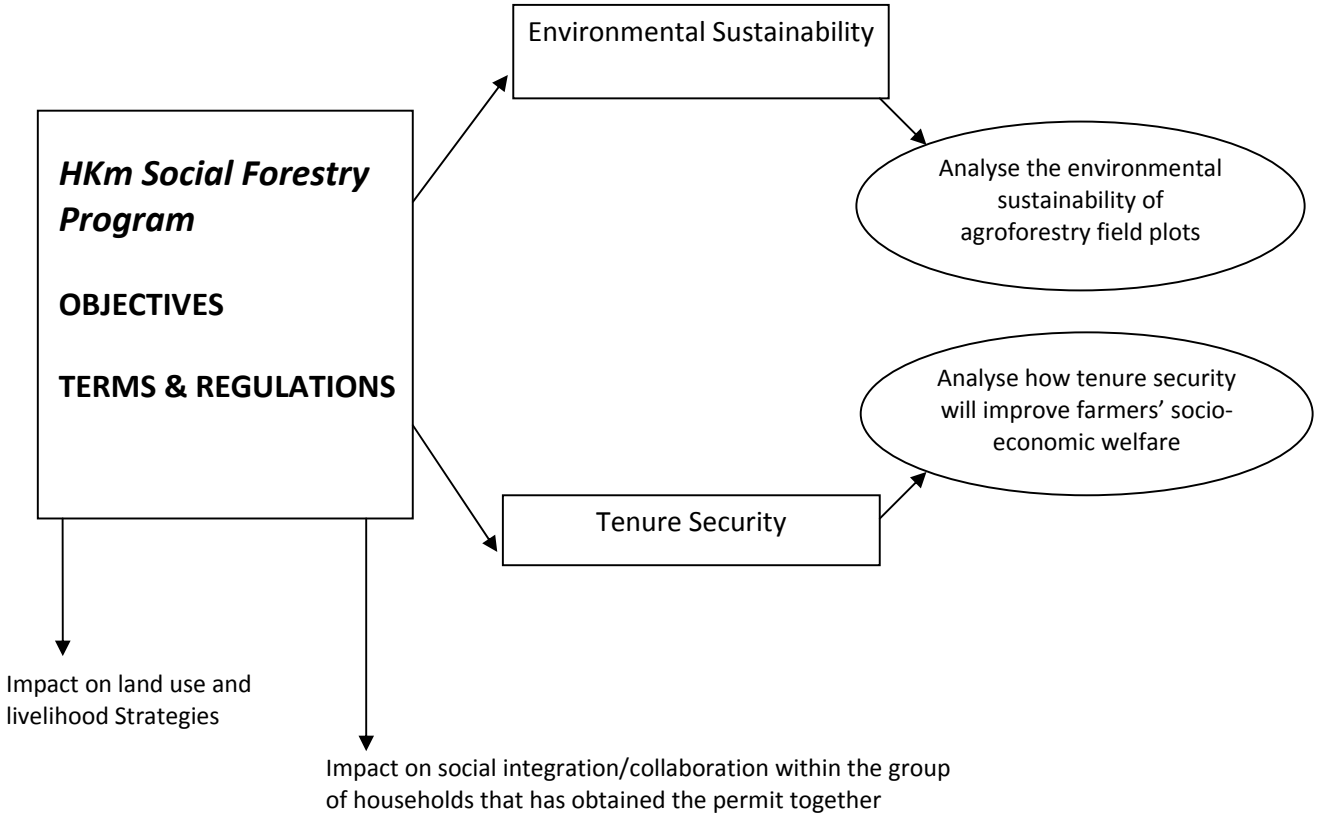
In the cultivation blocks the households have to maintain the production potential of wood and non-wood forest products and avoid causing soil erosion, changing the land structure or otherwise changing the natural extent or disturb the protection functions of the area. Some of the specific regulations for the West Lampung district are that farmers have to plant at least 400 non-coffee trees per hectare as a part of multi-strata agroforestry systems and use appropriate SWC measures in the cultivation block. They also have to protect the natural forest in the protection blocks. First a group of households can acquire a provisional permit for a period of three to five years, after this they can get a definitive permit for a period of 25 years. The management plan of the household groups has to be approved by the Forest Department and then the permits are provided by the district head. To obtain the definitive permit the group has to obtain formal legal status as a cooperative and must demonstrate adequate performance of its management plan and adherence to the regulations during the period of the provisional permit. (Pender 2008)

Now, almost 10 years after the first community group obtained tenure rights, it is interesting to investigate whether the programme has reached its objectives, and examine the environmental sustainability and the impact of land tenure security on farmers livelihoods.

1.3 Hypotheses

These are our hypotheses we will be working from:

1. The HKm program will increase the environmental sustainability; increase tree density, reduce soil erosion and increase water infiltration of the involved areas.
2. Tenure security is essential to farmers and obtaining land tenure security will improve their socio-economic welfare.



1.4 Problem statement

"To investigate whether the objectives of the Hutan Kemasyarakatan Social Forestry Program has been reached"

1. By analysing the environmental sustainability of agroforestry field plots within the HKm program.
2. By analysing the enrolled farmers motivation, compliance and possible changed livelihood strategies.

Regarding the concept; **environmental sustainability**, are we using the definition according to the HKm program i.e. >400 timber trees per ha and SWC parameters. Hence, we will not assess the actual sustainability of the HKm parameters, but assess whether farmers comply with the terms and regulations of the HKm program.

1.4.1 Research questions

1. What are the objectives of the HKm program?
2. How are the objectives being achieved?
3. How do HKm-farmers comply with the terms and regulations of the HKm program?
4. How environmental sustainable are the selected land plots?

5. Why is land tenure security important?
6. What does the obtained tenure security imply for the farmers?
    a. How does the tenure security affect farmers' socio-economic welfare?

1.5 Study site

Sumberjaya, which means "source of wealth, is a sub district in the Bukit Barisan mountain range. These mountains that span the west coast of Sumatra form the upper watersheds of all the major rivers on the island. The Way Besai watershed is approximately 40.000 ha and with an approximate population of 87,350 people in 2004 (Suyanto 2009). About 40 per cent of the sub district is classified as Protection Forest and approximately 10 per cent as National Park. These areas are primarily located on slopes. The remaining area is primarily lowland and privately owned. Actually only approximate 10 per cent of the watershed is forested and about 70 percent is used for coffee gardens (Pender et al. 2008). The Way Besai watershed supplies a hydroelectric run-off dam owned by PLTA Way Besai, that started producing electricity in 2001 (Suyanto 2007) and has a maximum capacity of 90 MW (Suyanto 2009).

Sumberjaya is situated in the tropical climatic zone: There is no sharp distinction between the dry and wet season, but the rain is mostly concentrated from November to May. In the dry season the average rainfall is still above 100mm. According to measurements carried out 1974-1998 the average annual rainfall ranges from 2426mm – 3366mm with a mean rainfall of 2500mm-2600mm a year. The relative humidity is around 87% with maximum value of 99%. The average temperature is around 22C, with minimum of 14,2C and maximum of 32C (Afandi 2004).

2. Methodology

We have planed the field design to feature both quantitative and qualitative methods from both the social and natural sciences, hence attempting to triangulate the methods and generate reliable results. The subsequent is an outline of the research methods we hope to be able the conduct, although we are aware of the need for and prepared to adjust to the actual situation once we are in the field.

2.1 Transect walks and sketch mapping

When we arrive to the field we want to get a good image of the actual situation in the field site. We will find a local guide to take us around in the field site. We will observe the landscape and draw a sketch map of the field site. We will also talk with locals to introduce our purpose of study and by using a snowball sample gather persons for the focus group interview.

2.2 Stratified sampling

We are going to do a snowball sample for gathering a group for the focus group interview (Rea 1997). The focus group would preferably consist of the village head and other informed persons from the community. And this group will determine the wealth parameters and indentify categories for stratified sampling. Then we will be able to conduct interviews with households selected from the categories. We expect to conduct 15-20 household interviews and the same for the forest inventories (Rea 1997).

2.3 Interviews

2.3.1 Structured interviews

We will conduct structured interviews with approximately 15 to 20 households (stratified sampling according to wealth ranking) to acquire specific data concerning livelihood strategies; household size, income, yield, employment, education, ethnicity etc. We will also include questions regarding awareness of the HKm program, motivations to join; perceptions of the HKm program and examine whether the HKm program has caused changes in livelihood strategies. Consequently the interviews will not be strictly structured once we reach the final questions.

2.3.2 Semi-structured interviews

In order to attain information about the HKm program and process are we going to conduct semi-structured interviews with key informants from the local forestry office and from the hydropower dam in the watershed. We will hopefully be able to locate and interview staff from a NGO (World Agroforestry Centre) in the area, which is involved in the HKm process. See appendix 4.2, 4.3 and 4.4 for interview guides.

2.3.3 Focus group interview

By using a snowball sample we will gather a group of villagers for a focus group interview. We will prefer to have the village head and other informed people in the focus group. The purpose

of the focus group interview is to gain an understanding of the community, their organisation and their perception of the HKm program and how they comply with the rules etc. See appendix 4.5.

2.4 Rapid Rural Appraisal (RRA)

In RRA methods are the information collected by the investigator and then carried home for analysing as opposed to Participatory Rural Appraisal (PRA), where the locals are involved in the information collection and processing. So, in RRA the information is owned by the outsider investigator, where in the PRA the information is owned by the locals and then shared with the investigator (Selener 1999).

2.4.1 Wealth ranking

Wealth ranking is a PRA technique that we are planning to use during the focus group interview. Ranking and scoring for social characteristics have long been part of the repertoire of social anthropologists (Chambers 1997). We plan to do a wealth ranking of the households in the community by using the mapping method, which will combine the wealth ranking with participatory mapping. To do this we need a list of all the households in the community. Then some members of the community define the wealth criteria according to how they perceive the community's own cultural, social and economic context. Next a community map is drawn indicating all the homes and names of each household. To finish this PRA the participating members of the community rank the households on the map according to the established levels of wealth (Selener 1999).

2.4.2 Participatory mapping

Participatory mapping, in which local people make their own maps, is probably the most widespread PRA method. In participatory resource mapping, local people present their view of their natural resources. (Chambers 1997) We will involve the villagers in a participatory mapping exercise concerning changes in land use and natural resources during a part of the community history. To accomplish this we want them to draw:

- A historical map: Depicting the land use and natural resources, in their community, before the end of the Suharto regime (1990s).
- A present day map: Showing the land use and natural resources of today.
- A future map: With their expectations for future land use and natural resources.
    - For this PRA exercise we need some large sheets of paper and pencils.

2.5 Forest Inventories

We will be conducting forest inventories in the fields of the farmers that are selected for the household interviews. We need to do forest inventories to be able to check if the farmers are complying to the HKm-regulation that a minimum density of 400 timber trees/ha. We might be able to find a correlation between differences in reforestation and socio-economical status. The data that we need for our research are only the tree species and number of trees; this will allow us to conduct the inventories in minimal time. The sampling density will be at least 3%, so we

will sample 3 plots of 10 by 10m per ha. In each sampling plot all trees (dbh ≥ 10cm) and saplings (dbh: 5 to 9.9cm) will be recorded. (Vletter 2002) The data will be collected on the forest inventory form (see appendix 4.9).

2.6 Measuring soil erosion or sedimentation in the rivers

To be able to know if the HKm-scheme provides soil and water conservation, we will be assessing the erosion and infiltration on the area of some of the farmers that are selected for the household interviews, both in and outside HKm. We will be using the revised universal soil loss equation (USLE) to measure the erosion. The basic forum of USLE is $A = R \cdot K \cdot L \cdot S \cdot C \cdot P$. In this formula A is the computed soil loss. R is the rainfall-runoff erosivity factor, K is the soil erodibility factor, L is the slope length factor, S is the slope steepness factor, C is the cover-management factor and P is the supporting practices factor. The R- and K- factor have to be determined through secondary data. The L-, S-, C- and P-factor will be determined in situ. The formula for the C-factor is $C = PLU \cdot CC \cdot SC \cdot SR$, where PLU means prior land use, CC is crop canopy, SC stands for surface or ground cover and SR is the surface roughness. (Renard et all. 1997) To determine these factors in situ we need a measuring tape, clinometers, notebook and pencils. The Infiltration Rate is a measure of how fast water enters the soil and is measured in inches/hr or mm/hr. The method that we are going to use is the one recommended by the "Soil Quality Test Kit Guide" (USDA, 1999), because it does not requires any expensive technology or too much time to do it.

2.7 Tools for analysing data

We will be using ArcMap to make digital maps of the data collected with our GPS. And we can use the created maps in combination with the data from the participatory mapping to create digital maps on scale with all the collected information.
With SPSS we can do a statistical analysis of the data that we collected in situ.

Day / Activities	Morning	Afternoon	Evening
7th - 9th of March	Arrival to Bandar Lampung and joint preparation of fieldwork together with Indonesian students at WISMA/UNILA		
Wedensday 10th	Transfer to Sumberjaya/Tugusari	Initial fieldwork: location of field site	Groupmeeting: discussion of field design and methods, plan tasks for the next day
Thursday 11th	Initial fieldwork: transect walks, observation, informal interviews, sketch map of the field site	officials/experts for semi-structured interviews and make interview appointments	Groupmeeting: discussion of the day's results, develop field design and methods and plan tasks for the next day
Friday 12th	Initial fieldwork - continued: use snowball sampling to gather a group for focus group interview	Meeting with professors to discuss final fieldwork proposal, methods and workplan	Groupmeeting: dissusion of the day's results and plan tasks for the next day
Saturday 13th	Fieldwork: GPS mapping of the field site, use snowball sampling to gather a group for focus group interview	Fieldwork: GPS mapping of the field site, use snowball sampling to gather a group for focus group interview	Focus group: semi-structured interview, ranking exercise, participatory mapping
Sunday 14th	Groupmeeting: discussion of results from the focus group exercise, stratify the sampling based on the ranking exercise, plan tasks for the day	Fieldwork: semi-structured household interviews and forest inventories (2-3)	Groupmeeting: discussion of the day's results, evaluate sampling and methods, plan tasks for the next day
Monday 15th	Fieldwork: semi-structured household interviews and forest inventories (2-3)	Fieldwork: semi-structured household interviews and forest inventories (2-3)	Groupmeeting: discussion of the day's results, overview of collected data, plan tasks for the next day
Tuesday 16th	Fieldwork: semi-structured household interviews and forest inventories (2-3)	Fieldwork: semi-structured household interviews and forest inventories (2-3)	Groupmeeting: discussion of the day's results, intermediate evaluation, plan further fieldwork
Wedensday 17th	Fieldwork: semi-structured household interviews and forest inventories (2-3)	Fieldwork: semi-structured household interviews and forest inventories (2-3)	Groupmeeting: discussion of the day's results, overview of collected data, plan tasks for the next day
Thursday 18th	household interviews and forest inventories (1-2), semi-structured expert interviews	Fieldwork: semi-structured household interviews and forest inventories (1-2), semi-structured expert interviews	Groupmeeting: discussion of the day's results, overview of collected data, plan tasks for the next day
Friday 19th	household interviews and forest inventories (1-2), semi-structured expert interviews	Fieldwork: semi-structured household interviews and forest inventories (1-2), semi-structured expert interviews	Groupmeeting: analyse the collected data and prepare the final presentation
Saturday 20th	Buffer time	Buffer time	Debriefing in Sumberjaya
Sunday 21st	Return to Bandar Lampung		

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4. Appendices

4.1 Data Matrix

Issues	Research questions	Data needed	Methods
Tenure security as a reward **- On three levels**	**Institutional:** - What is tenure security according to HKm?	- Objectives and framework of the HKm. - (Conditional) tenure security according to the HKm. - Monitoring of the HKm parameters. - Consequences of non-compliance. - Power relationship between HKm community/ state/NGOs.	Literature review Expert interviews with local HKm authorities

	- What is the role of NGOs in relation to the HKm (state) and the HKm community? **HKm community:** - What is the perception of the HKm? - What is the perception of tenure security?	- Perception of the HKm. - Power relationship between HKm community/ state/NGOs. - Awareness and perception of the HKm and objectives. - The motivation for joining the HKm. - The history of the community in the HKm. - Perceptions of tenure (in)security. - Alternative tenure rights. - Internal regulations and decision	Expert interviews with local NGOs involved in the HKm process Focus group interviews

		making. - Consequences of non-compliance. - Monitoring of HKm parameters. - Power relationship between HKm community/ state/NGOs. - Perceptions of environmental sustainability.	
	- How has land use changed after obtaining tenure security?	- (Past) and present map of land use and natural resources.	Participatory mapping exercise with village elders.
	HKm household: - What is the	- The motivation for joining the HKm. - Perception of	Structured interviews

	perception of tenure security? - What is the perception of the HKm? - How has the livelihood strategy changed after obtaining tenure security?	tenure (in)security. - Awareness and perception of the HKm and objectives. - Change in the livelihood strategy after obtaining tenure security. - Consequences of environmental sustainability for cultivation practices.	
	Non-HKm household: - What is the perception of tenure security?	- Perception of tenure (in)security. - Constraints or reasons for not joining the HKm.	Semi-structured interviews

	- What is the perception of the HKm?	- Perception of the HKm.	
Restrictions of the HKm	- Are the restrictions of HKm applied?	- Number of trees / ha.	- Forest inventories
SWC (Soil and Water Conservation)	- Is the soil and water really improved by HKm?	- Data on soil erosion or sediment in the streams - Data on infiltration	- USLE (Universal soil loss equation), field sampling of erosion or sampling of sediment in the streams - Sampling infiltration - Expert interview with hydropower dam employee

Biodiversity in trees	- Is there an evident difference in biodiversity of trees between agroforests in the HKm program?	- Tree species composition	- Forest inventory

4.2 Semi-structured interview *with the local forestry office (HKm authority)*

1. What are the objectives of the HKm program?
2. What is the status of the HKm program in Sumberjaya?
    a. How far is the HKm process?
        i. How many community groups are involved?
        ii. How large is the HKm area?
        iii. How many groups have obtained the 5 year permit?
        iv. How many groups have obtained the 25 years permit?
        v. How many groups are applying to obtain the 5 year permit?
3. How is the monitoring process?
    a. Who monitor the parameters?
    b. Which parameters are monitored?
    c. How are the parameters being monitored?
4. What are the consequences if an HKm group does not comply with the regulations?
    a. Are there any sanctions from the authorities?
5. How is the relationship between this office and the HKm groups?
6. How is the relationship between this office and the NGOs involved in the HKm process?
7. How is the relationship between the HKm groups and the NGOs?

4.3 Semi-structured interview *with the local NGO (ICRAF) involved in the HKm process*

1. What are the objectives of the HKm program?
2. How do you perceive the HKm program?
    a. As empowering the local communities?
    b. As placing constraints on the local communities?
    c. How is the opportunity for negotiation?
3. What role does this NGO play in the HKm process?
    a. Do you support the farmers? - How?
4. How is the relationship between the NGO and the HKm groups?
5. How is the relationship between the NGO and the HKm authority?
6. How is the relationship between the HKm groups and the HKm authority?

4.4 Semi-structured interview with Hydropower dam employee

1. What data/statistics do you have on water and sediment flow? -Can we see it?
2. What is your perception of the HKm program?
3. What impact do you think the HKm program has on the sediment load?
    a. Do you have data supporting this?
4. Is the hydropower dam involved in the HKm program? – How?
5. Is the hydropower dam engaged in other projects attempting to reduce sediment load from the catchment area?

4.5 Focus group interview with the local HKm community

1. How many households are members of this community?
2. What are the objectives of the HKm program?
3. How do you perceive the HKm program?
    a. As empowering the community?
    b. As placing constraints on the community?
4. What is the history of the HKm program in this community?
5. What were the motivations for joining the HKm program?
6. What is the importance of land tenure security?
    a. What does it imply to have tenure security?
    b. What does it imply to have tenure insecurity?
    c. Are there alternative chances of obtaining tenure security?
7. What internal regulations have you established in the community concerning the HKm?
8. What procedures have you established for decision making concerning the HKm?
9. What are the consequences if a farmer does not comply with the regulations?
    a. Are there any sanctions from the community?
10. How is the monitoring process?
    a. Who monitor the parameters?

b. Which parameters are monitored?
c. How are the parameters being monitored?

11. How is the relationship between the community and the HKm authority?
    a. Do you receive any kind of technical assistance or support?
12. How is the relationship between the community and the NGO?
    a. Do you receive any kind of technical assistance or support?
13. How is the relationship between the NGO and the HKm authority?
14. What is you impression of the environmental results of the HKm?
    a. What does environmental sustainability mean to the community?

4.6 Semi-structured interview with non-HKm farmers

1. Why are you not a part of the HKm program?
2. What is your opinion of the HKm program?
3. Is land tenure security important for you?
    a. Why?
    b. Do you have secure tenure?
4. How do you cope with tenure insecurity?
5. How much of your income is generated from farming activities/off-farm activities?

¼:_____ ½:____ ¾:____ all:____

4.7 Structured household interviews – stratified sampling of 15 – 20 households

Household no.:_____ Household location (GPS):_____

Name of respondent:_____

How many people live in the household?

	Family relation	Gender	Age	Employment (primary and secondary)
Head of household				
Member 2				
Member 3				

Member 4				
Member 5				
Member 6				
Member 7				
Member 8				
Member 9				
Member 10				

What is your ethnical background?_____

When did you move to the village?_____

What is the size of the land that you cultivate/perceive as "your own"?_____

Do you cultivate it all?_____

What crops do you cultivate and for what purpose?

	Coffee	Rice	Fruits/Vegetables
Own-consumption			
Cash crops			

Do you have livestock? Yes:___ No:___

If yes: For what purpose?_____

_____

How much of your income is generated from farming activities?_____

¼:_____ ½:_____ ¾:_____ all:_____

How much of your income is generated from off-activities?_____

¼:_____ ½:_____ ¾:_____ all:_____

Do you know the objectives of the HKm program? Yes:___ No:___

If yes: Do you see the HKm program as an opportunity?_____

_____

- Or as putting constraints on your possibilities? _____

_____

What was your motivation for joining the HKm?_____

_____

_____

What does land tenure security mean for your household?_____

_____

_____

E.g. land value, reduced corruption, increased equality in the village, protection of forest.

Have your sources of income/employment changed since you obtained the tenure permit?

Time spent in the field: less:_____ more:_____ equal:_____

*Why has the time spent in the field changed?*_____

_____

Gender division of labour: the same:____ different:_____

_____

*Why has the gender division of labour changed?*_____

_____

Farming income: increased:_____ decreased:_____ the same:____

Off-farm income: increased:_____ decreased:_____ the same:____

*Why has the income increased/decreased?*_____

_____

_____

_____

Have the HKm regulations made you change your cultivation practices?

Types of crops: the same:____ different:_____

_____

Farming system: the same:____ different:_____

_____

_____

Use of fertilizers/manure: the same:____ different:_____

_____

_____

Has the HKm program increased the cooperation/internal coherence within the community?

Yes:___ No:___ *Why?*_____

_____

4.8 Ranking exercise

1. Which parameters are important in ranking households according to their wealth?
2. Do you consider yourselves wealthier than people outside HKm?
3. Please indicate all the households on the future participatory map.
4. Could you rank the households on a map according to their wealth?

To do this we will need a large sheet of paper, pencils and a list of the community's households (if this is not available, it should be put together by the participants). We will based on the wealth ranking stratify our sampling of households for interviews and forest inventories.

4.9 Forest inventory forms for trees

To collect the data needed for the forest inventories we need printed forms, someone to determine the different tree species (preferably the farmer or an Indonesian student), forest inventory forms for trees, a measuring tape, a clip board and pencils.

Name: Date: / 2010
Inventoried area: Total area:
Year reforested:

Local name	**Scientific name**	**Number of trees**