

KFCP Socio-Economic Baseline Report

November 2009

This report was prepared for
The Kalimantan Forests and Climate Partnership



Australia Indonesia Partnership
Kemitraan Australia Indonesia



Preamble

This report was prepared in accordance with the guidelines at the time of writing, including the overview of the KFCP project below. This research was carried out in collaboration with the Governments of Australia and Indonesia, but the analysis and findings in this paper represent the views of the author/s and do not necessarily represent the views of those Governments.

Australia's International Forest Carbon Initiative is a key part of Australia's international leadership on reducing emissions from deforestation. The Initiative will support international efforts to reduce deforestation through the United Nations Framework Convention on Climate Change (UNFCCC). It aims to demonstrate that reducing emissions from deforestation and forest degradation can be part of an equitable and effective international agreement on climate change. A central element of this is the Initiative's focus on developing practical demonstration activities in our region, particularly in Indonesia and Papua New Guinea.

Indonesia and Australia are working together under the Indonesia - Australia Forest Carbon Partnership (IAFCP/The Partnership) to support international efforts on REDD through the UNFCCC. A key focus is on practical demonstration activities to show how REDD can be included in a future global outcome on climate change. Activities under the partnership are funded through Australia's \$200 million International Forest Carbon Initiative (IFCI) administered by the Australian Department of Climate Change (DCC) and AusAID.

Australia has committed \$30 million over four years to the Kalimantan Forests and Climate Partnership (KFCP). Under the KFCP, Australia and Indonesia are working together to develop and implement a large scale REDD demonstration activity in Central Kalimantan. The KFCP is the first REDD demonstration activity of its kind in Indonesia. It aims to demonstrate a credible, equitable and effective approach to reducing emissions from deforestation and forest degradation, including from the degradation of peatlands, than can inform a future global outcome on climate change. With an overall funding target of \$100 million, the KFCP aims to raise remaining funding through contributions from or coordinated actions with the private sector or other donor countries.

This report was prepared by CARE International Indonesia (Frank Page, Benjamin Tular, Suhada, Sumarlin, Murianson Ilinda, Marsiano, Yeyet Suratno, Rano Andino, Natalia, M. Tolchah Mansur, Aris Yohanes, Mathius, Obrien Tinus and Yusuf Fabianus Hadiwinata) under the management of CARE Australia. The study was developed and managed by Grahame Applegate, with support from Tim Jessup, both of KFCP. Administrative Assistance was provided by Pak Eko Pranandhita of the KFCP in Palangkaraya. The work was financed by the IAFCP, managed by Neil Scotland from the IAFCP Partnership Office.

Australian Agency for International Development, Jakarta
Australian Embassy, Jl Rasuna Said Kav. C15 -16, Jakarta 12940, Indonesia



Australia Indonesia Partnership
Kemitraan Australia Indonesia



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Acronyms

BPS	: Badan Padan Statistics (Central Statistics Agency)
CIFOR	: Center for International Forestry Research
EMRP	: Ex Mega Rice Project
HDI	: Human Development Index
IAFCP	: Indonesia - Australia Forest Carbon Partnership
ICRAF	: World Agroforestry Center
GHG	: Green House Gas
GoI	: Government of Indonesia
KFCP	: Kalimantan Forests and Climate Partnership
NCASI	: National Carbon Accounting System of Indonesia
REDD	: Reduction in Emissions from Deforestation and Degradation
RT	: Rukun Tetangga neighborhood association, the lowest Govt administrative unit.
UNFCCC	: United Nations Framework Convention on Climate Change
UNPAR	: University of Palangka Raya

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KFCP Social Economic Baseline Executive Summary

Introduction

In May 2009, CARE International Indonesia conducted an in-depth social economic baseline for KFCP covering the KFCP project location with surrounding village as control. The baseline involved the following components:

- An in depth questionnaire survey which covered two pre-identified ecological zones e.g. the southern part of the dome (Block A) which was part of the ex PLG project areas where most of the forest is cleared by the Mega Rice Project and the Northern part (Block E) which is still forested. To enable tracking of project impacts, control areas were identified which were as much as comparable. The questionnaire was designed to generate information on demographics, livelihoods, land use, water management, land use practices (fire) and health. 1000 respondents (CARE)
- An in depth study on livelihood assets, land use management and economics of land use, which emphasized opportunity costs of alternative land use options, was conducted. This involved 60 responding households. This households were a sub set of the questionnaire survey (ICRAF)

The survey started May 17th and was finalized by July, 2009. The results of the in-depth study on assets and the economics and management of land use practices have been reported separately in the ICRAF report titled, *Sustainable Livelihood Options and Carbon Rights as Basis for Efficient and Fair Emission Reduction in the Central Kalimantan Ex-Mega Rice Project*. This report covers the results of socio-economic baseline survey conducted by CARE.

Purpose

The purpose of the socio-economic baseline survey was to:

- Identify and establish a baseline for monitoring key direct and indirect socio-economic factors that lead to GHG emissions in the study area;
- Establish a baseline for monitoring the pre-KFCP Project socio-economic status in the participating villages to see how they are influenced by the KFCP and then REDD interventions; and
- Provide a foundation for the socio-economic aspects of KFCPs monitoring system.

Framework

Overall design of the KFCP along with the various baseline activities is being guided by an analytical framework that was developed by a team of consultants from CARE, ICRAF, and GRM International. The framework shows factors that influence (either positively or negatively) GHG emissions and has served as the principal basis for design of the socioeconomic baseline survey dealt with in this report.

In simple terms, the framework looks at three major factors seen to influence GHG emissions in the micro (peat-land) climate covered under the KFCP. These include degradation in forest cover, fire (including both planned and spontaneous burning), and drainage of peat lands. In addition, some recent research also suggests that fertilizer use, particularly of nitrogen-based fertilizer, may be an important factor in GHG emissions.

These three factors are directly affected by a number of causes including, among others, land clearing for agriculture and to establish ownership, destructive exploitation of forest resources, fire use systems for clearing land, development of systems of waterways that drain the peat-land and serve as avenues of access for farmers, and climate change leading to long dry seasons. In turn, these factors are influenced by a range of contributing factors including livelihood insecurity, land tenure insecurity, government land use policies and law enforcement.

Design

The survey instruments were developed over a period of 2 ½ months (March to May 2009) by a team consisting of CARE, ICRAF, a livelihoods consultant and a survey specialist. An interactive process was adopted with several pre-tests and reviews and suggestions from AUSAID, CIFOR and UNPAR.

In order to meet the needs of the project, the instrument for the Baseline Survey was divided into two main parts. The first part collected plot level data on land use, land ownership, agricultural practices, fire management practices and on waterways and access. This was geared to provide information in a format that could not only be analyzed independently, but also subsequently linked to data collected in the field on land use via plot observation and satellite imagery. The second part was designed to collect a range of social and economic data on such things as education levels, livelihoods, use of forest products, household assets, housing health and participation in social groups.

The target area for the Baseline Survey covered a total of 14 settlements located along the Kapuas River and adjacent to the KFCP project area. These settlements form parts of 7 village administrative units (*desa*) that are spread among two sub-districts (*kecamatan*) within the district (*kabupaten*) of Kapuas in Central Kalimantan Province. The settlements and villages were further distributed among two main sections or zones – a Northern section (Block E) and a Southern section (Block A). This zonal separation was due to significant differences in ecology between the two areas. Block A, consists of an area subject to major land clearing under the now defunct EMRP and is largely devoid of forest cover. Block E is still largely forested. The different ecologies of the two areas generate significant differences in agricultural practices and livelihood strategies. The comparison between the Northern and Southern sections is designed to provide the project with information on the influence of ecology, particularly the existing levels of degradation, on the implementation of REDD interventions.

In addition, separate control areas comprising two villages in each of the North and South blocks and that were located adjacent to the study areas in each of the blocks were selected. This data will support the analysis of end-line data for determining the socio-economic impacts of the KFCP project and future REDD activities.

Due to the relatively compact nature of settlements in the area, it was decided that the survey would utilize a simple random sample of households. Required sample sizes for the target

areas were geared to provide a sufficient level of accuracy as a basis for measuring change in key project indicators over the period of KFCP implementation. This was set on a level allowing for a maximum 5 percentage point sampling error at a 95 percent level of confidence. Based on standard calculations to determine sample sizes, with small additions to ensure a margin of safety, it was decided to set the entire sample for the treatment areas at 600 households divided into 270 households for the North Block and 330 for the South. Finally, Some minor variations in the actual numbers of households interviewed led to an actual total of 275 households for the North Block and 326 for the South Block in the final sample.

Findings

Demography

The survey confirmed that within the KFCP target areas communities are relatively similar in ethnic make up. The majority are *Dayak Ngayu* (91%) and are living in relatively well-established communities.

The average family size is slightly larger in Block A, 4.67 persons per household, than 4.11 in Block E. In Block A, 91% of the households are two parent households and in Block E 84% of the households have two parents. Women headed households in Block A make up 7% of the households and in Block E 11% of the households with the remainder as male head of household.

The average education attained by adults is primary school, although the education levels are marginally higher in Block A than in Block E. In Block A, 24% have had some intermediate or high school education while in Block E only 15% have attended intermediate and/or high school. This difference reflects the easier access to intermediate and high schools for those living in Block A near the *Kecamatan* Center.

In migration has been limited and concentrated in the Mentengai area. The majority of the target population is Muslim; 87% in Block E and 63% in Block A.. In Block A, there are a greater proportion of Protestants (22% to 10%) and traditional Hindu Kaharingan (13% to 3%) than in Block E.

There are more social groups active (groups with over 10% of families participating) in Block A than in Block E. In Block A, active groups include *arisan* (informal savings groups), *handil* groups, Village Health Volunteers and PKK, religious groups, farmers groups, and cooperatives. The most active groups are *handil* groups (40% of families participate), *arisan* (37%), religious groups (43%) and farmers groups (39%).

In Block E the most active groups are *arisan* (36%), *handil* groups (22%), religious groups (34%), and farmers groups (24%).

In Block E, the level of social organization is less due to remoteness resulting in state organized or initiated social organizations being less common. In addition, there are fewer *Handil* constructed in Block E than Block A, resulting in fewer *Handil* groups.

The *Handil* groups are important in that they provide greater access to mineral soils (mostly acid-sulphate soils) and shallow peat. With 40% of the families in Block A reporting belonging to a *Handil* group, and 22% in block E, these groups and their members will be key stakeholders in KFCP's canal blocking efforts.

Livelihoods

In the KFCP area, almost all of the heads of households claim their main activity is work (97.8% in Block A and 96% in Block E). It is far less common for the non-head of household (wife or husband) to also work. As in most rural areas, children work as part of the family unit. In the KFCP area, children generally start working after they have finished their schooling or at 15 years of age.

Livelihoods differ between ecological zones (degraded peat swamp in Block A versus forested peat swamp in Block E) and villages. Households living in degraded peat lands (Block A) depend to a significant extent on agriculture as a key source of livelihood supported by exploiting the remaining forest areas.

In Block A, 43% of the families report agriculture (rubber (37%) and upland farming (6%)) as their main source of income. Other important primary sources of income and livelihoods include selling logs, fishing, sawmills, and gold mining.

Sources of secondary livelihoods are more diverse than those of primary livelihoods. 21% of the households in Block A report that upland farming of rice and cassava is their secondary source of income. Slightly lower percentages of households (17%) report that rubber or fishing is their most important secondary source of livelihoods.

Extraction of forest resources, logging, *gemor* collecting, and rattan are also relatively important secondary livelihoods; 16% of Block A households report one of these as their secondary source of income. Some households (6%) also depend on setting up small stores to provide additional income and others (5%) depend on hiring out their labor for their secondary incomes.

Further north, in Block E, households living in non-degraded peat swamp forests rely more on exploiting forest resources than on agriculture. In this area, gathering of non-forest timber products and artisan gold mining are important sources of livelihoods. Fifty-nine percent of the families in Block E report their primary source of income is gathering forest products (fishing (45% of households) and collecting *gemor* (14%)). In particular, *gemor* (*Alseodaphne* sp) is important and critical. For *gemor*, which is harvested for its bark which contains pyrethrum, trees are felled and small waterways dug into the peat for access. In areas located in the KFCP project, *Gemor* generates in between 30 to 50% of total income.

As with primary livelihoods, the secondary livelihoods in Block E are mainly extractive, fishing (29%), *gemor* collecting (17%), and gold mining (11%). Rubber is also a relatively important source of secondary incomes. In addition, from 5% to 4% of households rely on small stores, selling logs, rattan, and providing labor for their secondary sources of incomes

Overall, in both areas, 81% of the families supplement their diets and (mostly) non-cash income by fishing.

One of the key constraints to development is access to loans through banks or micro finance institutions. The majority of loans are from family members or other farmers/neighbours. Less than 4% are from Banks, and only 10% of the families in Block A and 2.7% in Block E borrow from saving/lending groups.

Borrowing money has increased over the last year, indicating that households are facing financial difficulties due to the collapse of rubber and other commodities prices. The level of

increase differs but is the highest in Block A were the share of households with loan increased from 40% to 70%.

Income and Health

The general baseline survey did not attempt to directly measure family incomes or expenditures in order to measure poverty. Adding a complete survey on family consumption and expenditures was not feasible within the overall survey considering the spectrum of information being gathered. In place of a consumption/expenditure survey, the survey analysis team has chosen a number of proxies to provide indicators of income status. These proxy indicators are shown in Table 1 below:

Table A: Poverty Proxy Indicators

Indicator	Block A	Block E
Households without Productive Plots	8.0%	12.0%
HHs that do not own house	33.3%	32%
Housing area per person below BPS (GoI) standards	62.2%	57.5%
Low quality walling	24.3%	24.0%
Households Receiving Cash Support	47.4%	35.6%
% of families with monthly expenditures on key food items less than the mode (Under IDR 200,000 per month)	11.7%	17.8%
Households without boats	11%	19%
Overall Drop Out Rate based on ages 7to 18 years of Age attending intermediate, junior high and high school	33.4%	33%
Diarrhea rates for children under 5	37%	27%
Access to skilled health personnel (use of sub-district health center)	19%	8.8%

Overall, it could be estimated that roughly one-fifth (based on expenditure, land, and boat ownership data) to a quarter (based on housing quality data) of the households in the area are poor in comparisons to their neighbours.

Access to health services, proper sanitation and housing are low to alarming low. The majority (almost 90%) of families use the river for both defecation and their source of drinking water. Treatment of drinking water is also minimal. Therefore, the diarrheal incidence in children under five is high; on average, 29% of the children under five suffered from diarrhoea in the week before the survey. The survey also found a high number of illness symptoms. Over half of the respondents reported suffering upper respiratory infections and fever in the month before the survey. Most depend of self-medication and local available practitioners (self treatment is most common in Block A and visiting a *Mantri* is most common in Block E). Very few seek assistance from skilled medical personnel (less than 10%).

Land Use

Ninety percent of the families surveyed have at least one plot of agricultural land. Twenty-two percent have only one plot, and 50% have between 2 and 4 plots.

The environmental degradation brought about by the Ex Mega Rice Project (EMRP) has had a major influence on crop selection and the types of soil local farmers are able to exploit.

In Block A, 49% of the plots recorded are planted in rubber, with another 14% devoted to upland rice production and another 30% classified as bush plots. Much of this land was made available by the opening of the forest and canals of the EMRP. The land use distribution is different in Block E, where almost 67% of the plots are rubber and 25% are bush plots. Upland rice plots in Block are a negligible 0.6%. Based on farmer's estimates, the area of claimed land in Block A is 2,233 ha and in Block E, 2,148 ha. Based on this data, the average farmer estimated plot size in Block A is less than 2 ha and about 3.3 ha in Block E.

In Block A, the use of both shallow and deep peat for agricultural purposes is significantly higher in than in Blok E. In Blok A 52% of the plots are located on shallow peat (less than 2 m depth) and 3.3% of agriculture is on deep peat (in excess of 2 m depth). Only 44% of agriculture in Block A is on mineral soils. In Blok E, almost 71% of agriculture is on mineral soils and 21%% is on shallow peat. Only 1% of reported plots is on deep peat.

In Block A, 49% of the rubber cultivation is on shallow peat and 3% is on deep peat. In Block E, less than 4% of the rubber is on either shallow or deep peat. In addition, 68% of the upland crops in Block A are on shallow peat. This data clearly indicates that Block A agriculture has expanded into peat areas opened up by the EMRP. In contrast, in Block E, aside from rattan plots, almost no plots are developed on shallow peat – almost all plots are reported to be on mineral soils.

Fertilizer use is not yet extensive in the KFCP area. Less than 10% in Block A and just over 4% in Block E use fertilizers on rubber. However, almost one-third of the upland rice plots are fertilized with nitrogen fertilizers.

In conclusion, in Block A, the opening of the forest by EMRP has allowed farmers to develop rubber cropping on peat soils and some upland cropping focusing on upland rice and cassava (also on peat soils). In Block E, farmers have not been able to open up land for field crops and remain reliant on rubber (on mineral soils), cassava, *mahang*, and forest resources.

Access to Forest and Drainage

Man made waterways - canals, *handal*, and *tatahs* - are important transportation routes to plots in Block A. In Block A, 81%% of the families report using man-made waterways to get to their plots (the remaining 19% either use the river or go over-land); 24% of the families use only canals to access their plots and another 24% use canals and *handil* or *tatah* to reach there plots. 30% use only *handils* and another 24% use a combination of *handils* and canals/*tatahs* to reach their plots. This means that 48% of the families use canals as part of their route to their plots and 54% of the families use a *handil* as part of their route. Only 4% use *Tatah* as part of their route.

It is also, Important to distinguish between areas of the EMRP location as the southern parts are exposed to tidal influences and so to an extent, these soils are of a acid sulphate nature. This explains the importance of *Handils* (more advanced water management systems) rather than *tatah* (which are basically small channels dug in the peat for extraction of resources). *Handil* management requires more organization, which is reflected in the importance of the *handil* groups which encompass over 40% of the household surveyed.

In Block E there is almost no reliance on man-made waterways to reach their plots. Almost 94% of the families report not using man-made waterways to reach their plots. Only 5.5% of the families use *tatah* to reach their plots and less than 2% use *handil*. There are no canals in the Block E area.

This data has clear implications for the canal blocking strategies of KFCP. Canal blocking will need to be focused on Block A and will require real alternatives/incentives that can replace the livelihoods of households losing access to current productive plots.

Use of Forest Products

Communities in the KFCP area continue to depend on the surrounding forest for supplemental sources of livelihood and household needs. The forest provides community members with timber, other forest products, and animal products. The two most important forest resources, exploited by over 80% of the families are fish (81% of HH) from the river and firewood (86% of HH) from surrounding forests.

Other forest products include timber from the *meranti*, *blangiran*, *galam* and *tumeh* trees. *Meranti* wood is collected by 14% of the households in both Blocks. *Blangiran* is collected in both Blocks, but is slightly more important in Block A (17%) than Block E (almost 10%). *Galam* and *tumeh* are collected by more than 10% of the HH in Block A, but is less important in Block E, where these species are collected by less than 2.2% of the HH.

Other non-timber products important to households in both blocks, aside from firewood, include bamboo, rattan, *gemor*, medicinal plants, and *dango* fruit. Rattan and *gemor* are more important in Block E and Block A. This is particularly true of *gemor*, which is collected by more than one-third of the households.

Overall, exploiting forest resources is a men's role. Women do assist the men in some timber extraction, but mostly in the collection of non-timber products. However, except in the cases of ornamental plants and rattan fruit, the forest products are predominantly collected by men, with only up to about a quarter of the families collecting together.

Fire

The use of fire for land clearing is universal.

Of the Blocks for which there was reported data on clearing methodology, the use of fire reflects each Blocks' farming systems. In Block A, fire is used to clear land for rubber, upland crops (mainly rice) and bush plots. In Block E, clearing by fire is mainly used to clear land for rubber.

The difference in farming systems is also seen in land clearing by fire in the past year, with a great deal more clearing by fire in Block A than Block E. In the past year, of the total plots in use in Block E, only 3.3% were cleared with fire and almost all of these plots (3%) were being cleared for rubber. In Block A, over 15% of the plots were cleared with fire in the past year; but only 1.4% of the plots were for rubber and 13.4% of the fire cleared plots were for upland agriculture. The difference in type of plot is important. Rubber plots are cleared only once before planting the rubber. Upland plots, particularly upland rice plots are burned annually. Thus in Block E, annual burning is primarily on new land and not repeated on that land again for generations. In Block A many of the plots are burned on an annual basis.

There is also a noticeable difference between the two Blocks on the type of soil on which burning takes place. In Block A, farmers report that almost 59% of their use of fire was on shallow peat and 38% was on mineral soils. Almost half of that burning was on rubber plots and the remainder on upland plots and bush plots.

In contrast, over 91% of the burning in Block E took place on mineral soils with only 6.6% on shallow peat. And the majority (almost 88%) of burning was to open up rubber plots.

The use of firebreaks to control clearing is greater in Block E than in Block A. In Block A, over all types of plots, firebreaks are reported to be used only 50% of the time. In Block E, the percentage is higher, almost 65%.

The main reasons reported for using fire was that burning during clearing improved soil fertility (74% in Block A and 55% in block E) and because it is relatively cheap and easy (18% in Block A and 40% in Block E). Fire is used on all soil types, which explains the relatively high incidence of fire on the margins of the dome in Block A and Block E. In addition, there appears to be more land clearing in Block A than in Block E. In the past year, 15% of the total plots in Block A were cleared (using fire), while only 3% of the plots in Block E were cleared (the remaining blocks were cleared in previous years).

While households feel there are benefits to clearing land with fire, there are also losses associated with fire; more so in Block A than in Block E. In Block A, over half the households (58.2%) report losses due to out of control fires. In Block E less than a quarter (22.5%) report ever experiencing losses due to out of control fire. In Block A, the survey found that over 37% of the plots reported that one time or another having been burned by out of control fires. In Block E, the impacts of out of control fires were less, with only 13% of the plots being affected.

The total respondent estimated losses due to out of control fires were higher in Block A than Block E, IDR 1.8 billion to IDR 221.4 million. In addition, per family loss among those who experienced losses is also higher in Block A than Block E, IDR 11.7 million to IDR 7.9 million per family.

In both Blocks, rubber plots and bush plots were the most effected by out of control fires. However, in Block A, a significant number of upland plots (12.6% of all burned plots) were also affected.

Respondents claimed that more than one-third (43% in Block A and 37% in Block E) of the fires that affected their plots originated in neighbouring plots as clearing fires that got out of control. The remaining fires were reported to have been the results of out of control forest fires.

When asked for causes of fires, almost two-thirds of the respondents answered long dry seasons, with a majority of the remaining fires (31% in Block A and 18% in Block E) coming from neighbouring plots where the fire got out of control.

The over 91% of the respondents in both blocks are aware that the local government has placed bans and restrictions on the use of fire in agriculture. In Block A two-thirds (66.5%) disagree with these restrictions. In Block E, the level of disagreement is less, with less than half (47.6%) disagreeing with these restrictions.

For KFCP, the difference between the two blocks will most likely require different strategies. For the areas in Block E that depend on opening up plots in forest land for long term crops such as rubber and rattan, the emphasis will need to be either on reducing the amount of land being cleared or finding practical and economic alternative methods for opening up suitable forest lands.

For areas in Block A that are dependent on annual burnings of upland plots, either alternative methods of clearing and fertilizing the soil for the next crop will need to be found or alternative livelihoods developed so that households do not need to farm these areas. In addition, incentives an/or alternative livelihoods will need to be found to prevent annual burning or opening up of land on shallow peat.

In both areas, if necessary, incentives and policies will need to be developed to prevent any further opening up of deep peat areas for any reason in order to prevent degradation and increased fire risk.

Overall, the contribution of the areas natural resource management and livelihood strategies to peat land degradation is determined by access to peat lands. The EMRP canals and clearing of forest both forced and provided an opportunity for households to adjust livelihoods toward a more cash based agricultural based economy and accelerated exploitation of the remaining peat forests. This exploitation and degradation leads to greater risks of fire due to increased use of fire and larger areas of drained peat and combustible forest cover. This triggers a spiral of increased exploitation, increased use of fire and waterways stimulating drainage, and further peat degradation, all of which enhance peat related GHG emissions.

The result of these different ecologies and the natural resource management systems adopted in each Block is that Block A is not only at risk of experiencing continued degradation, but presents the greatest challenge for reducing degradation. The challenge for the KFCP project in Block A is that rewetting and restoring peat forest will require the communities in Block A to change their current natural resource management patterns in order to reduce or forego agriculture on drained peat, use of man-made waterways, and use of fire to clear land. In addition, these communities will need to adopt forest exploitation methods that do not generate GHGs. These changes have a great potential for negatively impacting Block A livelihoods if there are no alternative sources of incomes or livelihood.

Concluding remarks

The baseline was designed to a) provide socio-economic data that can be tracked overtime in order to know if KFCP and REDD interventions are having negative, neutral, or positive affects on the socio economic welfare of the area, and b) to identify resource management/use patterns related to the three underlying factors, drainage, fire, and forest cover that influence the emissions of GHGs. Due to the different levels of forest degradation in the KFCP area, the analysis was divided and compares data from the Block A in the South and Block E in the North.

Demographically, both areas are similar with the majority of the population being *Dayak Ngayu*. There are little differences in family make up or religious affiliation. The education levels are slightly higher in Block A than Block E; this can be attributed to Block A's proximity to the sub-district center and easier access to education beyond primary school.

Block A is marginally wealthier than Block E, though the area itself cannot be considered wealthy. Block A has relatively higher family expenditures and greater (although still poor) access to social institutions and government educational, health, and other social-economic support programs. On the other hand, Block A households report higher levels of sickness symptoms and diarrhea in children.

These results show that socio-economically there are improvements that need to be or can be made:

- Roughly a fifth to a quarter of the population can be considered relatively poor compared to their neighbors, with Block E being relatively poorer;
- The water, sanitation, child nutrition, and health conditions are extremely poor and in need of improvement
- Post grammar school education levels can be improved with greater access to schools

Block A was partially developed by the EMRP, resulting in a system of canals and a majority of the area becoming degraded peat swamp forest and shrub and fern lands. The Block E section was not “developed” and remains primarily peat swamp forest. The difference in access to (ex) forest lands and the resulting degradation in Block A has resulted in real environmental and land use practice differences between the two Blocks.

Households in Block A tend to manage more plots and more total area than households in Block E. Block A cultivation and livelihood patterns are more diverse. While rubber crop cultivation and fishing are key sources of livelihoods in both Blocks, in Block A upland farming and bush plots also make important contributions to livelihoods. In Block E, there are few upland plots, and households rely more on extracting natural resources, particularly gold mining and *gemor* collecting.

More than half of Block A’s plots are on peat land. Shallow peat land is used for all types of plots including rubber, upland, and bush plots. To increase the fertility, a small percentage of Block A plots are applied with urea, and most of these plots are on peat land.

Block A households are highly dependent on man-made water-ways to reach their plots and to exploit forest resources. Starting with the EMRP canals, Block A households have organized to expand the water way system (through *handil* and *tatah*) in order to access their land.

Finally, Block A households are more dependent on fire to clear land, particularly upland plots, through routine burning to prepare them for new crops. Block A households also experience more accidental burning of their plots from out of control fire, and their estimates of losses per plot are higher than losses estimated by Block E households.

Block E households, on the other hand, do not have government built access to forestland, and therefore exert a lot less pressure on the forest. Households in Block E have fewer plots and the typical plot is smaller than the plots in Block A. This, combined with greater distances to markets and government service for the inhabitants of Block E has resulted in Block E residents being marginally poorer than Block A residents. Their monthly expenditures and assets are less than those in Block A, and their access to government educational, economic, health, and social programs is lower. That said, the health data for Block E is slightly better than Block A, but still not good.

The majority of Block E household plots are on mineral soils on the banks of rivers near their settlements. This alleviates pressure on the area's peat lands as access to cultivated plots is by river with almost no use of man-made waterways (*tatah*).

Rubber makes up more than two-thirds of the plots in Block E, and the remainder is some form of tree or rattan crop. There is little to no upland farming in Block E. Livelihoods are a combination of rubber and exploiting forest and natural resources, particularly fish, gold, and *gemor*.

As in Block A, fire is used to clear plots, but less frequently as clearing for rubber or other forest crops is usually a one time occurrence. There is clearly little or none of the annual burning apparent in Block A. In addition, the majority of the burning has been on mineral soils, not peat soils.

Implementing KFCP activities in both Blocks will require both community support and real alternative sources of incomes and livelihoods for the participating communities. However, the strategies will need to be different in each Block. In Block A, the dependence of household livelihoods on cultivating peat land, using man-made waterways, and using fire will require the development of direct REDD payment and alternative livelihood strategies that provide great enough economic benefits for households and communities that they choose to restrict and or abandon their access to peat and the use of man-made waterways and fire. This is a major challenge due to the fact that these communities' livelihoods are dependent on management techniques that degrade peat lands, prevent forest regeneration and cause GHG emissions.

Implementing KFCP activities in Block E will need to focus on REDD direct payment and alternative income generating strategies that give households and communities competitive/alternative economic benefits for preserving the existing peat swamp forests and managing extraction of forest resources in ways that are both sustainable and do not cause GHG emissions.

BACKGROUND

The Kalimantan Forest and Climate Partnership

The Partnership

The Kalimantan Forest and Climate Partnership (KFCP) is a component of the Indonesia-Australia Forest Carbon Partnership (IAFCP) that aims to advance the global effort to tackle climate change and protect the world's forests by reducing deforestation and forest degradation in developing countries (REDD). KFCP is the first large-scale demonstration activity under this initiative and is one of the first Government-to-Government REDD demonstration activities anywhere in the world. It is thus an extremely important program, not just for Indonesia, but also for its potential implications for REDD activities elsewhere.

KFCP Objectives

The primary goal of KFCP (which is to be implemented over the period from 2009 to 2012) is to demonstrate a credible, equitable and effective approach to reducing green house gas emissions from deforestation and forest degradation including from the degradation of peatlands, that can inform a post-2012 climate change agreement and enable Indonesia's participation in future international carbon markets. Among others, the KFCP is expected to achieve four principal intermediate results. There are:

- **Intermediate Result 1** – Successful reduction in deforestation and degradation of peat swamp forest through interventions in fire prevention, forest restoration, canal blocking and alternative livelihood development;
- **Intermediate Result 2** – Effective capturing and communication of knowledge based on research and monitoring of REDD demonstration activities both within Indonesia and internationally;
- **Intermediate Result 3** - Establishment of a KFCP GHG emission measurement and monitoring program and linkage of this to National Carbon Accounting System of Indonesia (NCASI); and
- **Intermediate Result 4** - Demonstration of practical and effective REDD GHG payment mechanisms.

In addition to these expected results, the program has also committed to addressing a number of key values, among them a commitment to ensure that communities in the project area do not experience negative socioeconomic impacts as a result of project activities.

Under this program Intermediate Result 1 relates to the specific physical, ecological and forest management practices interventions planned for the project. Unfortunately, in the field, many of these interventions have the potential to change land use practices and reduce access to forest resources in ways that could negatively affect the livelihoods and cultural practices of the communities in the project area. Intermediate Result 4, designing REDD GHG payment mechanisms, is designed to help mitigate these impacts and make possible economic and/or social benefits that are greater than the foregone opportunities.

The KFCP Study Area

The KFCP is being designed and implemented within the geographic area and under the legal and institutional framework of Presidential Instruction (INPRES) No. 2 of 2007 covering the rehabilitation, conservation and development of the Ex-Mega Rice Project (EMRP) in the Indonesian Province of Central Kalimantan, located on the major Island of Kalimantan or Borneo. This project, initiated in the 1990s was designed to convert 1 million hectares of largely peat-swamp land into areas for growing the country's staple food crop, rice. It proved to be a misguided effort and since the economic crisis and change of government in 1998 this objective has been abandoned. However, substantial portions of the area have been cleared of existing forest cover, major new drainage systems have been constructed and the area continues to be inhabited by a mixture of indigenous (mainly *Dayak*) population and in-migrants (mainly from Java) who moved to the region as part of the mega-rice scheme. The KFCP thus provides an important framework for examining the potential for effective local participation in REDD activities in a sensitive environment where promoting reforestation or halting further degradation of peat swamp forest along with successful promotion of alternative livelihoods could make a significant contribution to reducing GHG emissions.

In particular, activities are being centered on a cluster of communities within the EMRP area in the District (*Kabupaten*) of Kapuas in the Indonesian Province of Central Kalimantan on the island of Borneo. The study area covers parts of two sub-districts (*Kecamatan*) and 7 villages (*Desa*). These, in turn have been grouped into two distinct sub-regions – a North Block E (characterized by substantial remaining areas of forest cover) and a South Block A (where most of the land has been cleared). These two sub-regions or strata were purposively selected as it was expected they would represent different sets of socioeconomic or agronomic applications and hence, potentially different sets of activities or solutions. Finally each Block has been further divided into a “treatment” area where KFCP activities will be implemented and an adjacent “control” area that will not receive treatment and that can be used for comparison of key outcomes. These project areas are shown in Map 1 and are documented in **Table 1** below.

Table 1 – Locations and Estimated Numbers of Households and Population – KFCP Treatment and Control Areas

Sub-District	Village	Estimated Number of:	
		Households	Population
North Block E – Treatment Area			
Mantangai	Tumbung Muroi	423	1743
Timpah	Petak Putih	354	1160
North Block E – Control Area			
Timpah	Aruk	139	530
Timpah	Lawang Kajang	225	873
South Block A – Treatment Area			
Mantangai	Katunjang	322	1447
Mantangai	Sei Ahas	223	852

Mantangai	Katimpun	244	853
Mantangai	Katumpung	284	1035
Mantangai	Mantangai Hulu	551	1917
South Block A – Control Area			
Mantangai	Mantangai Tengah	467	1800
Mantangai	Pulau Keladan	650	2311

Source: Village statistics.

The Baseline Survey – Objectives and Design

Baseline Goals

In order to plan effective interventions, document social and economic impacts and prevent long-term negative socioeconomics impacts, KFCP requires a long-term project and socioeconomic monitoring system that is linked to measurements of GHG emissions. Among others, the system will need to able to:

Identify and monitor key direct and indirect factors that lead to GHG emissions in the study areas and document changes in patterns of behavior related to these factors over the duration of the project; and

Monitor the basic socioeconomic status in the participating villages to see how these are influenced by REDD activities.

A well-designed socioeconomic baseline survey is the foundation of this monitoring system. It needs to identify and collect relevant quantitative and qualitative baseline information on the range of socioeconomic and community forest management practices that drive GHG emissions and that will need to be addressed during the project.

In particular, the baseline survey is designed to provide a framework and initial set of data for developing draft and final monitoring systems. The overall monitoring system is a central component of the project in order to effectively measure project outputs and outcomes and to assist project managers in project implementation and avoiding any negative impacts on the local settlements within the project area. It will provide the basis for measuring longer-term population level socioeconomic impacts of KFCP interventions as well as of eventual REDD program activities.

An Analytical Framework for GHG Emissions

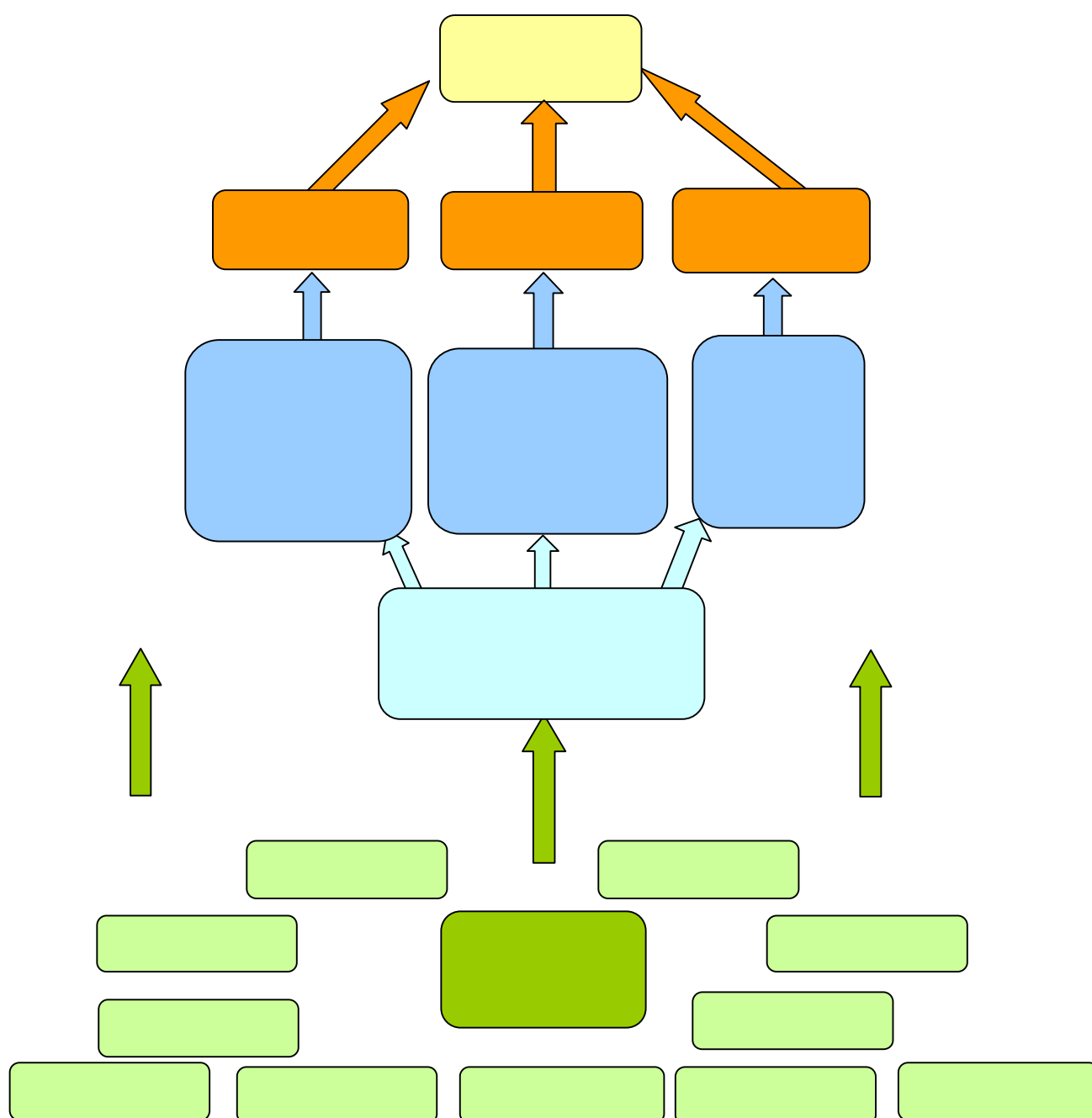
Overall design of the KFCP along with the various baseline activities is being guided by an analytical framework (**Figure 1**) that was developed by a team of consultants from CARE (the organization contracted by AUSAID to manage baseline activities), ICRAF, and GRM International. The framework shows factors that influence (either positively or negatively) GHG emissions and has served as the principal basis for design of the socioeconomic baseline survey dealt with in this report.

In simple terms, the framework looks at three major factors seen to influence GHG emissions in the micro (peat-land) climate covered under the KFCP. These include degradation in forest cover, fire (including both planned and spontaneous burning), and drainage of peat

lands. In addition, some recent research also suggests that fertilizer use, particularly of nitrogen-based fertilizer, may be an important factor in GHG emissions. The baseline survey is collecting information on fertilizer use and this factor may be added to the framework if it turns out that many farmers are using fertilizer on their plots.

There three factors are directly affected by a number of causes including, among others, land clearing for agriculture and to establish ownership, destructive exploitation of forest resources, fire use systems for clearing land, development of systems of waterways that drain the peat-land and serve as avenues of access for farmers, and climate change leading to long dry seasons. In turn, these factors are influenced by a range of contributing factors including livelihood insecurity, land tenure insecurity, government land use policies and law enforcement as shown in **Figure 1**.

Figure 1: Socio Economic Baseline Framework



Baseline Survey Components

The baseline survey covers a number of distinct, but also integrated information collection operations:

- A large-scale quantitative household socioeconomic survey aimed at collecting a fairly wide range of information on agronomic practices (plot level data) as well as on basic social and economic characteristics at the household level;
- A survey of a sub-sample of the main survey focusing on detailed information on the household economy (income/expenditure) as well as on the economics of agricultural and other livelihoods engaged in by household members;
- A series of focus group discussion (FGD) dealing with key issues related to opportunity costs, income, and farming practices; and
- Direct observation of agronomic and GHG influencing behavior on a small sample of plots.

The sub-sample, FGD and observations are the subject of a separate companion report. This report deals exclusively with the large-scale household survey that is referred to from here on as the Socioeconomic Baseline Survey or Baseline Survey for short.

Socioeconomic Baseline Survey Instrument Design

The survey instruments were developed over a period of 2 ½ months (March to May 2009) by a team consisting of CARE, ICRAF, a livelihoods consultant and a survey specialist. An interactive process was adopted with several pre-tests and reviews and suggestions from AUSAID, CIFOR and UNPAR. A review workshop was also held with NGOs, government officials and UNPAR representatives in Palangaka Raya, the capital of Central Kalimantan province.

In order to meet the needs of the project, the instrument for the Baseline Survey was divided into two main parts. The first part collected plot level data on land use, land ownership, agricultural practices, fire management practices and on waterways and access. This was geared to provide information in a format that could not only be analyzed independently, but also subsequently linked to data collected in the field on land use via plot observation and satellite imagery. The second part was designed to collect a range of social and economic data on such things as education levels, livelihoods, use of forest products, household assets, housing health and participation in social groups. A copy of the survey instrument (in Indonesian) is appended as Annex 1 to this report.

The design was also geared to addressing two important concerns. The first, in conjunction with the other baseline operations, was to provide a comprehensive view of general social conditions, livelihoods and agricultural practices in the project or target areas as well as in a set of adjacent “control” locations that would not be subject to specific project interventions. The second was to establish values for a set of baseline indicators reflecting key agricultural practices and socioeconomic conditions on which change could be measured (via appropriately designed follow-up surveys) over the course of the project in both the target and control areas. The combination of measuring change both over time and in relation to any changes in the control locations is intended to provide the project with a methodology to at least roughly assess any project effects or impacts on levels of GHG emissions or on implications for larger-scale implementation or REDD.

Indicators were selected to reflect the key factors (forest cover, fire and drainage of peat lands, fertilizer use) and underlying factors influencing GHG emissions noted earlier (see **Figure 1**). Indicators were also selected to measure baseline socioeconomic conditions in order to facilitate assessment of any project impacts (including possible negative impacts) on patterns of income generation and overall social and economic welfare. Examples of indicators reflecting the key factors and underlying factors affecting GHG emissions are shown in **Table 2**. Others, including those reflecting key socioeconomic conditions are discussed in the text.

Table 2 – Examples of Indicators Reflecting Key Factors Affecting GHG Emissions to be Derived from the Baseline Survey

Agricultural Practices:
Avg. no, of plots per family by type of crop
Prevalence of fertilizer use overall and by type of crop
Pct. of plots on mineral soils, shallow peat and deep peat
Est. of areas cleared by villagers by type of soil and cropping system
Waterways and Drainage:
Pct. of families using waterways (tatah, handil, canals) to reach their plots
Pct. of plots accessed by waterways
Pct. of plots drained
Fire Management:
Pct. of plots cleared by fire in last year
Pct. of plots ever cleared by fire
Pct. of plots cleared by fire by soil type
Pct. of plots cleared by fire using fire breaks
Pct of families using fire to clear land
Reasons for using fire to clear land
Reasons for not clearing land using alternative techniques
Reasons for clearing land using alternative techniques
Pct. of plots (and by crop) burned by accident
Origins & reasons for out-of-control burning
Pct. of families experiencing negative impact from out of control fires
Est. of losses due to out-of-control burning
Pct. of families using fire in other non-plot based activities
Pct. of families know of/agree with gov. regulations banning use of fire

Sample Design

The target area for the Baseline Survey covered a total of 14 settlements located along the Kapuas River and adjacent to the KFCP project area. These settlements form parts of 7 village administrative units (*desa*) that are spread between two sub-districts (*kecamatan*) within the district (*kabupaten*) of Kapuas in Central Kalimantan Province. The settlements and villages were further distributed among two main sections or zones – a Northern section (Block E) and a Southern section (Block A) where the zonal separation was due to significant differences in ecology between the two areas and the resulting differences in agricultural practices and livelihood strategies. Block A, which represents an area subject to major land clearing under the now defunct EMRP, was largely devoid of forest cover. On the other hand, Block E was still largely forested and offered greater opportunity for forest-related economic activities. The comparison between the Northern and Southern sections is designed to provide the project with information on the influence of ecology, particularly existing levels of degradation, on the implementation of REDD.

In addition as noted earlier separate control areas comprising two villages in each of the North and South blocks and that were located adjacent to the study areas in each of the blocks were selected.

In any case, due to the relatively compact nature of settlements in the area, it was decided that the survey would utilize a simple random sample of households, with separate samples being drawn for each of four strata (North Block Target, North Block Control, South Block Target and South Block Control). Required sample sizes for the target areas were geared to provide a sufficient level of accuracy as a basis for measuring change in key project indicators over the period of KFCP implementation. This was set on a level allowing for a maximum 5 percentage point sampling error at a 95 percent level of confidence. This can be seen in the formula:

$$n = Npq / (N-1)D + pq$$

Where n = The required sample size

N = The total number of units (households) in the population

p = The probability/frequency of the characteristic (in this case set at 0.5 to maximize the required sample size)

q = 1 – p

D = B / 4 where B is the allowed level of sampling error, in this case 0.05

The purpose of such a large sample here was to maximize the ability to measure change in key performance indicators. For many of these indicators, the sample sizes will allow measurement of changes of 10 percentage points or less, thus expanding the possibility of being able to justify various REDD activities and interventions over the project period.

Using the initial estimates of total household numbers of 777 for the North Block E and 1624 for the South Block A derived from village level reports in **Table 1** led to estimated sample sizes of 264 for the former area and 321 for the latter. An alternative set of estimates of total households (694 for the North Block and 1503 for the South Block) based on data collected at sub-village level led to slightly smaller sample requirements (254 and 316 households respectively). In order to ensure a margin of safety it was finally decided to set the entire

sample for the treatment areas at 600 households divided into 270 households for the North Block and 330 for the South.

Within each area sampling was broken down by village and by sub-village neighborhood units known in Indonesian as *Rukun Tetangga* or RT. These units tend to be of manageable size for listing and fieldwork organization, to represent distinct settlement locations, and are well understood by the population. Based on populations reported by local RT level officials, a constant sample fraction was used to allocate the sample proportionately among these units (see Table 3). Finally, some minor variations in the actual numbers of households interviewed led to an actual total of 275 households for the North Block and 326 for the South Block in the final sample. While these final sample totals were the ones used to calculate sampling weights, because they are marginal at best they have virtually no impact on survey accuracy. These final sample totals by RT are also shown in Table 3.

A similar procedure was used for the control areas with the exception that the allowable range of sample error was increased to 0.06 instead of 0.05 as was the case for the treatment areas. The reasons had to do with budget limitations, but also the realization that these were meant to be areas mainly for comparison and there was less pressure on the need to be able to measure actual changes in behavior over the period covered by the project. Based on Sub-Village data on total numbers of households by RT (as was used above), this resulted in estimated sample sizes of 172 households for the North Block and 223 for the Southern Block A that were then translated into figures of 175 and 225 for actual application in the field. Sample totals for the control areas are also shown in Table 3.

Table 3 – Total and Sampled Numbers of Households by Strata, Sub-District, Village and RT

Sub-District	Village	Settlement Unit	RT No.	No. of Households		
				Total from HH Listing	Original Sample	Final Sample
Treatment Areas						
North Block E						
Mantangai	Tumbang Muroi		1	28	11	11
Mantangai	Tumbang Muroi		2	42	16	17
Mantangai	Tumbang Muroi		3	17	7	7
Mantangai	Tumbang Muroi	Taburu	4	14	5	6
Mantangai	Tumbang Muroi	Teluk Kajang	4	42	16	17
Mantangai	Tumbang Muroi	Tanjung Kalanis	5	57	22	23
Mantangai	Tumbang Muroi	Tanjung Kalanis	6	31	12	12
Mantangai	Tumbang Muroi	Tanjung Kalanis	7	31	12	12
Mantangai	Tumbang Muroi	Lapetan	8	39	15	15
Mantangai	Tumbang Muroi	Lapetan	9	28	11	11
Mantangai	Tumbang Muroi	Lapetan	10	34	13	13
Timaoh	Petak Putih		1	110	43	44
Timaoh	Petak Putih		2	87	34	34
Timaoh	Petak Putih		3	40	16	16
Timaoh	Petak Putih	Kanjarau	4	94	37	37
		Total		694	270	275

Sub-District	Village	Settlement Unit	RT No.	No. of Households		
				Total from HH Listing	Original Sample	Final Sample
South Block A						
Mantangai	Katunjung		1	49	11	11
Mantangai	Katunjung		2	112	24	24
Mantangai	Katunjung	Tumbang Manguktup	3	68	15	15
Mantangai	Katunjung	Tuanan	4	29	6	6
Mantangai	Sei Ahas		1	114	25	25
Mantangai	Sei Ahas		2	108	24	23
Mantangai	Katimpun		1	63	14	14
Mantangai	Katimpun		2	93	20	20
Mantangai	Katimpun		3	67	15	14
Mantangai	Kalumpang		1	92	20	20
Mantangai	Kalumpang		2	94	21	20
Mantangai	Kalumpang		3	104	23	22
Mantangai	Matangai Hulu		1	115	25	25
Mantangai	Matangai Hulu		2	121	27	27
Mantangai	Matangai Hulu		3	128	28	28
Mantangai	Matangai Hulu		4	146	32	32
		Total		1503	330	326
Control Areas						
North Block E						
Timaph	Aruk		1	44	17	17
Timaph	Aruk		2	56	22	22
Timaph	Aruk	Tanjung Kupang	3	83	24	24
Timaph	Lawang Kajang		1	66	25	25
Timaph	Lawang Kajang		2	79	31	31
Timaph	Lawang Kajang		3	48	19	19
Timaph	Lawang Kajang		4	97	37	37
		Total		473	175	175
South Block A						
Mantangai	Mantangai Tengah		1	105	21	21
Mantangai	Mantangai Tengah		2	85	17	17
Mantangai	Mantangai Tengah		3	83	17	17
Mantangai	Mantangai Tengah		4	120	24	24
Mantangai	Mantangai Tengah		5	57	11	11
Mantangai	Pualu Keladan		1	51	10	10

Mantangai	Pualu Keladan		2	50	10	10
Mantangai	Pualu Keladan		3	55	11	11
Mantangai	Pualu Keladan		4	75	15	15
Mantangai	Pualu Keladan		5	62	13	13
Mantangai	Pualu Keladan		6	46	9	9
Mantangai	Pualu Keladan		7	70	14	14
Sub-District	Village	Settlement Unit	RT No.	No. of Households		
				Total from HH Listing	Original Sample	Final Sample
Mantangai	Pualu Keladan		8	55	11	11
Mantangai	Pualu Keladan		9	46	9	9
Mantangai	Pualu Keladan		10	40	8	8
Mantangai	Pualu Keladan		11	61	12	12
Mantangai	Pualu Keladan		12	45	9	9
Mantangai	Pualu Keladan		13	14	4	4
Total				1120	225	225

The Baseline Survey – Survey Implementation

Staffing Structure

Survey implementation involved a total of 35 enumerators, 8 supervisors and 2 field coordinators. These personnel were further divided into two teams with one comprising 1 coordinator, 2 supervisors and 17 enumerators covering the Northern section and the other comprising 1 coordinator, 3 supervisors and 18 enumerators covering the Southern section of the project area. Each team was further broken down into sub-teams of 2 to 3 enumerators, with each supervisor managing between 3 and 4 of these sub-teams. This arrangement was designed to maximize field efficiency in dealing with a number of relatively small and spread-out settlements but also maintaining adequate levels of communication and coordination between enumerators and supervisory personnel.

Respondent Selection

Again for reasons of timing and efficiency actual sampling was carried out in the field. However, this still involved rigorous procedures. This involved a complete mapping and listing of houses in each RT and then going door-to-door to confirm and list the families living in each house. Once the mapping and listing was completed, the team, in front of the village head and community leaders used a random numbers table (generated separately for each RT) to select the households to be included in the sample consistent with the specified number of households for that RT in the sample design.

Following this, the village head and village leaders confirmed if each family was in the village or not. If the selected family, and particularly the head of household was away from the village for an extended period of time and not expected to be back, then the random numbers table was used to select a replacement family. This was done to ensure integrity for the overall sample size. Fortunately, the field work was carried out during a period of

generally intermittent agricultural activity so that the number of households replaced was small thus limiting any unintended biases.

Survey implementation was carried out with a high degree of attention to quality and the security of personnel in an environment that is physically quite remote and where access to experienced interviewers is limited. This required a close concern with interviewer training, with quality control during fieldwork and with the safety of survey personnel in the field. These are highlighted below.

Interviewer Training

Because of the difficulties in obtaining experienced interviewers in Palangka Raya and because the great majority of applicants hired had no previous experience as enumerators or in conducting quantitative research surveys, extensive training was seen to be required. As a result, interviewers were given a full 7 days of training in Palangka Raya before being let out into the field. The training included explanations of the rationale for the survey, basic survey criteria or practices, how to undertake household interviews and how to use and complete the survey questionnaire. Key topics covered included the following:

- Reasons for and objectives of the baseline survey
- Criteria for conducting surveys
- Roles and responsibilities of enumerators and supervisors
- Introduction to the questionnaire
- Practicing active listening
- Interviewing skills
- Detailed understanding of the questionnaire
- Simulated interviews with feedback (2)
- Dealing with issues in the field
- Developing good relations with communities and respondents
- Understanding quality control systems and field procedures

Even after the formal training was completed, training continued in the first village covered by each team. Here the work schedule was designed not to maximize the rate of questionnaire completion, but to provide adequate time to review in detail all of the completed questionnaires and to provide feedback to the interviewers that could, where required, be followed up in the field. While this added a bit to fieldwork time, it provided a way to capture any systematic errors or misunderstandings before they “contaminated” a large number of questionnaires.

Interviewing and Quality Control

Once the sample was determined, interviews were carried out. Enumerators were expected to be able to complete two questionnaires each day. However, if the respondent had a large number of plots, the interviewers would only complete one interview each day. Direct

communication in the field through the use of hand phones (where signals were available) was also used to circumvent any problems that might have arisen.

Quality control was based on high levels of supervision by experienced supervisors (recruited from among CARE staff) as well as more senior Field Coordinators. Coordinators and supervisors accompanied the interviewers on their rounds in each village, monitoring interviews and, where necessary, even following up interviews by speaking directly with the respondents to ensure that interviewers exercised proper behavior.

All questionnaires were checked for completeness and for overall consistency (answers had to be correct as related to the question, with responses clearly filled in and in the proper units). The process involved four steps: first self checking by the interviewer, then cross-checking of work with other interviewers in the same team. The third step involved checking by the supervisors for each field team and as a final step, checking by the senior Field Coordinators assigned to the survey. Issues or problems uncovered during the checking were resolved in the field by the interviewers and supervisors. If necessary, interviewers would return to the affected household to either collect missing information or to correct/clarify information that appeared to be inconsistent or confusing.

Safety of Personnel

The area where the survey was conducted is quite remote. In some areas, the only access is by river and may be 6 or more hours away from hospital care. In addition, while security is generally not an issue in the KFCP area, nevertheless, moving a relatively large group of outsiders collecting economic and social information through rural and tight-knit communities required that security concerns be addressed and prepared for.

To this end, CARE updated its Palangka Raya Security Plan and shared it with all the survey personnel including coordinators, supervisors and interviewers. Key aspects of the plan included information on:

- The CARE Emergency Team
- Definitions of security indicators and criteria for reducing or discontinuing activities
- Full contact information for CARE staff, government offices, police, medical facilities, search and rescue and river and ground transportation
- Full lists and hand phone numbers of staff in the field combined with schedules and locations
- Descriptions of steps to take in a security or emergency situation

These emergency plans were socialized to all members of the baseline survey to ensure that a personal approach to safety would be accorded the highest priority and, where necessary, take precedence over collecting data or completing schedules.

Findings

Demographics

Demographically, there are very few differences between Block A and Block E.

The average family size is slightly larger in Block A, 4.67 persons per household, than 4.11 in Block E. The average household in Block A has 2.3 children under the age of 18 living at home and in Block E the average household has 2.11 children. In Block A, 91% of the households are two parent households and in Block E 84% of the households have two parents. Women headed households in Block A make up 7% of the households and in Block E 11% of the households with the remainder as male head of household.

Children between the ages of 0 and 15 make up 40% of the population. Adults from the ages of 16 to 65 make up 57.6% of the population and those over 65 make up 2.5%

52% of the population surveyed in Block A is male and 48% is female. 50.4% of the population surveyed in Block A is male and 49.6% is female. There are no statistical differences between the two blocks in gender and age make up.

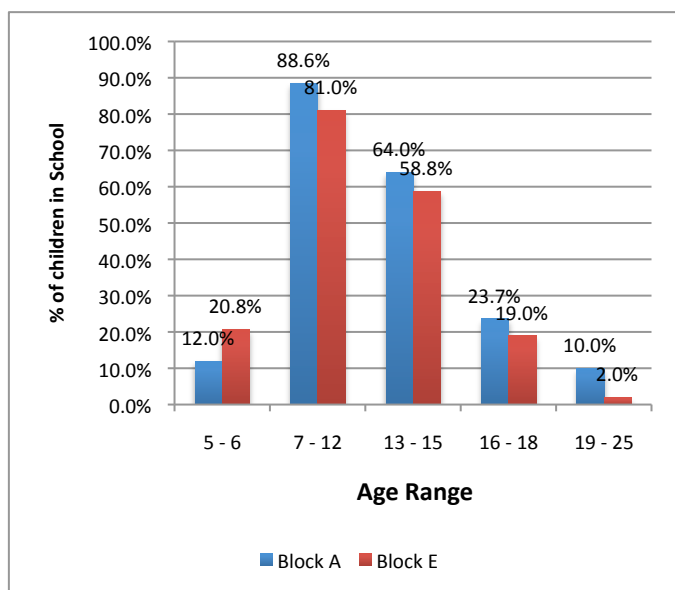
The survey confirmed that, within the KFCP target areas, the two blocks are similar in ethnic make up. The majority of the population *Dayak Ngayu* (91%) living in well-established communities. In-migration has been limited and is concentrated in the Mentengai area. There are a few other ethnicities in the area, with Banjar (from South Kalimantan) making up 5% of the population (4.2% in Block A and 6.4% in Block E) and Javanese making up another 2% of the population (1.7% in Block A and 2.4% in Block E). There is a small number (2.6%) of other *Dayak* groups living in Block A, most likely due to Block A's larger villages, easier accessibility, and proximity to the *Kecamatan* offices.

The predominant religion in the area is Islam, with 63% of the population in Block A and 87% of the population in Block E. Protestant Christians make up 10% of Block E and 22% in Block A. The traditional Hindu Kaharingan beliefs are stronger in Block A, where 13% still follow them; only 3% of the families in Block E identify themselves as Hindu Kaharingan. Only 0.8% of the households in both Blocks identify themselves as Catholic.

The average education attained by adults is primary school, although the education levels are marginally higher in Block A than in Block E. In Block A, 8% of the population has had no schooling, 65% have at least some primary schooling, 24% have had some intermediate or high school education, and 2% have had tertiary education. In Block E, 9% of the population has had no education, 76% have had at least some primary schooling, and 15% have attended intermediate and/or high school. This difference reflects the easier access to intermediate and high schools for those living in Block A near the *Kecamatan* Center.

The vast majority, 99%, of the inhabitants in the project area use the local dialect at home, and many are not fluent in *Bahasa* Indonesian. Only 1% of the families use *Bahasa* Indonesian at home.

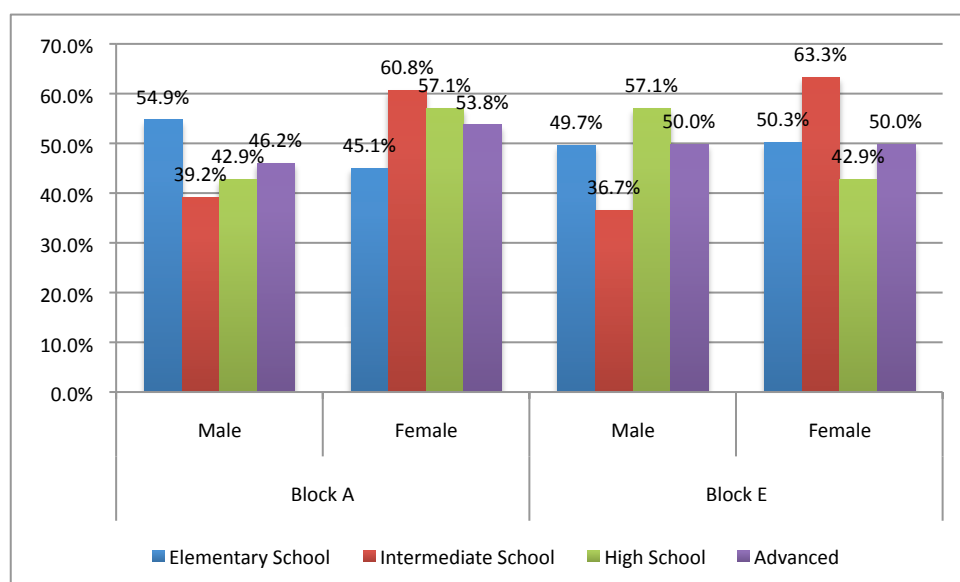
Graph 1: School Attendance by Block



For children of school age, over 80% of the 7 to 12 year olds are attending primary school. School attendance drops in for ages 13 and 15 to approximately 60% as not all children advance to intermediate school. Attendance continues to drop for children 16 through 18 (mostly high school), with 20% of this age group continuing school. Due to the increased distance to high schools in Block E, High School attendance is lower for Block E children in this age group. Very few students from the KFCP area go on to attend higher education, only 10% of 19 to 25 year olds from Block A and 2% from Block E continuing their education.

Of the students in school, the gender distribution in primary school is quite even; in Block A there are 10% more boys in school than girls, but in Block E, the distribution is basically 50/50. In Block A, the trend is for more girls to continue their schooling than boys with larger percentages of girls attending intermediate school, high school, and advanced programs. In Block E, more girls continue to intermediate school, but more boys attend high school. This difference in trends is most likely due to the distance and expense of sending children out of the village to attend high school for households in Block E.

Graph 2: Gender Distribution of Students by Block



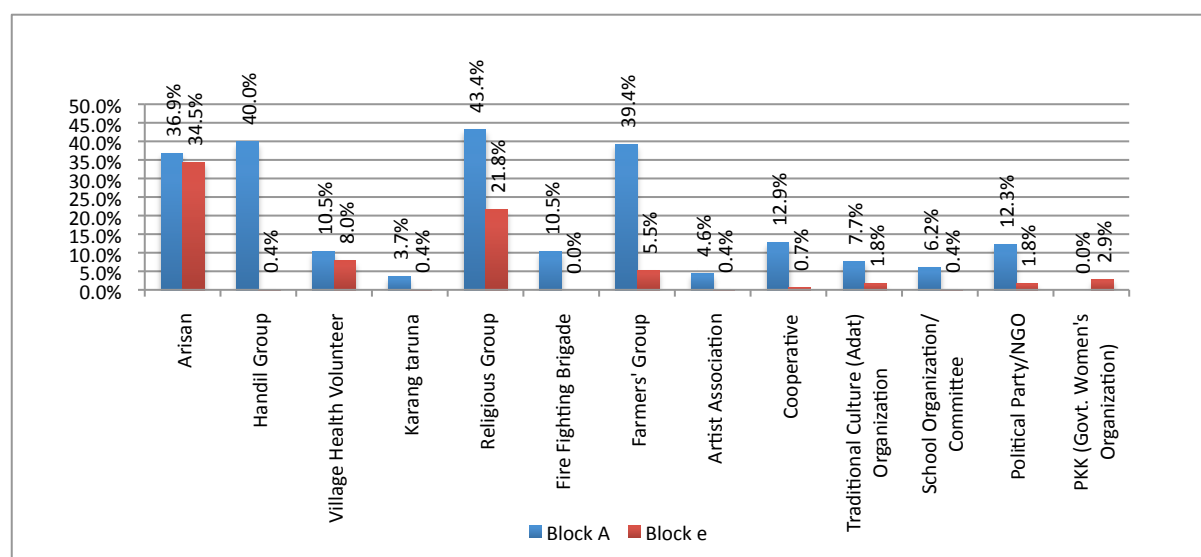
Social Capital

There are a number of social groups with over 10% household participation in Block A than in Block E. In Block A, active groups include *arisan* (informal savings groups), *handil*¹ groups, Village Health Volunteers and PKK (women's organization) religious groups, farmers groups, and cooperatives. More households have members participating in the following groups, *handil* groups (40%), *arisan*² (37%), religious groups (43%) and farmers groups (39%).

In Block E the most active groups are *arisan* (34%), religious groups (22%), , and village health volunteers (8%).

In Block E, the level of social organization is less due to its remoteness, resulting in state organized or initiated social organizations being less common. In addition, there are fewer *handil* constructed in Block E than Block A due to ecological reasons elaborated below, resulting in fewer *handil* groups.

Graph 3: % of Families Involved w/ Social Groups



The *handil* groups are important because these are established by communities to manage tidal influenced lowland areas, mostly on shallow peat and acid-sulfate soils. The southern part is still tidal influenced, which explains why these groups occur here. With 40% of the families in Block A reporting belonging to a *handil* group, their members will be key stakeholders in KFCP's canal blocking efforts.

Summary

There are few differences demographically between the two blocks. The KFCP area is quite homogeneous in terms of ethnicity and language. The majority religion is Islam, however, religion appears to be a personal choice for individuals and mixed marriages are common.

¹ A *handil* is a man-made water way usually constructed by a group in order to reach their cultivated plots or to access forest for timber and non-timber products.

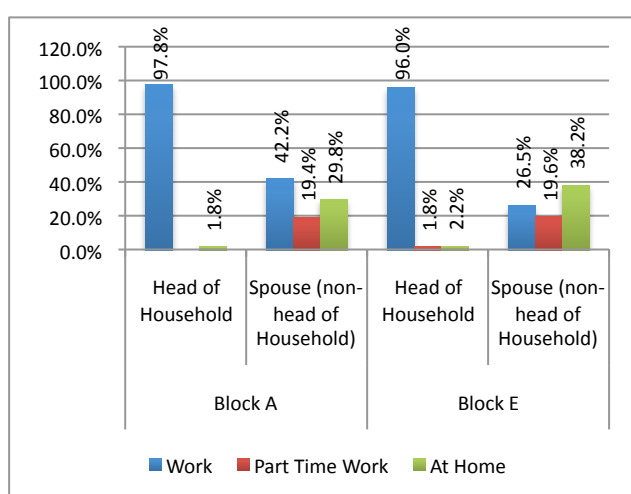
² Social savings groups

Block A's development from the EMRP and proximity to the *Kecamatan* results in higher levels of education for current students and more involvement in community and social groups.

Livelihoods

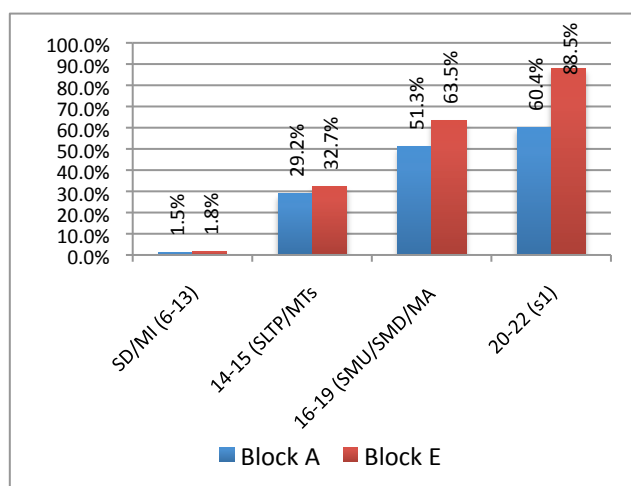
Livelihoods in the KFCP area are primarily based on agriculture and extraction of forest resources. In Block A, due in large part to the improved access and clearing of forests from the EMRG, the pattern of livelihoods include both upland agriculture and forest extraction. In Block E, where there is still limited access to forest area and almost no land clearing in peat areas, livelihoods are still based on forest extraction.

Graph 4: Head of Household and Spouse Work Patterns



The data presented below reflects a recent change in the economic conditions of the area. Over the past decade, the area experienced two booms, which, at the time of the survey, had come to an end. The first boom was in illegal logging (particularly in Block A), which has been greatly reduced in the past few years due to increased law enforcement in the area. As logging declined, households shifted into rubber to take advantage of high prices. These prices collapsed (by around 50%) with the world wide economic crisis in late

Graph 5: School Age Children Working by Age Group



2008.

In the KFCP area, almost all of the heads of households claim their main activity is work (97.8% in Block A and 96% in Block E). It is far less common for the non-head of household (wife or husband) to also work. In Block A just over 42% of spouses work full time and in Block E only 26.5% of their spouses consider themselves to be working.

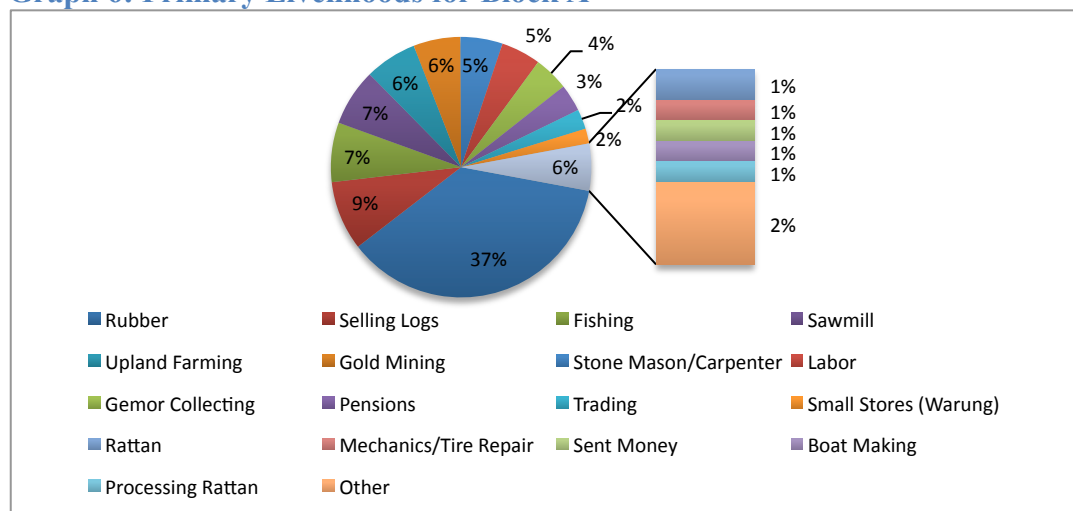
As in most rural areas, children work as part of the family unit. In the KFCP area, children generally start working after they have finished their schooling or at 15 years of age. There are very few children working under the age of

13; most of the drop-outs aged 13 and under stay at home but don't work. In the overall KFCP area, approximately 30% of the children between 14 and 15 have begun to work. As is consistent with the education data, more high school (51.3% to 63.7%) and university aged children (60.4% to 88.5%) are working in Block E than in Block A. In fact, almost all university-aged children in Block E are working.

The survey collected data on the primary and supplemental sources of livelihoods (up to five levels). This report will discuss the data of the primary and secondary sources of livelihoods by Block.

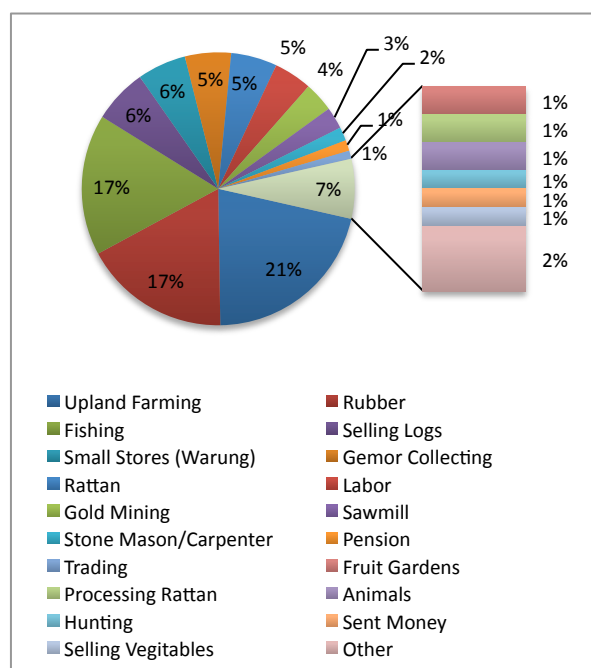
In Block A, the survey found that, despite the drop in rubber prices, rubber is the largest source of primary income, with 37% of the households claiming rubber to be their main source of income.

Graph 6: Primary Livelihoods for Block A



Other important primary sources of income and livelihoods include selling logs, fishing, sawmills, upland farming, and gold mining. As would be consistent with a rural area dependent on natural resources, trading and retail/service business make up a very small percentage, less than 5%, of primary livelihoods.

Graph 7: Secondary Livelihoods for Block A



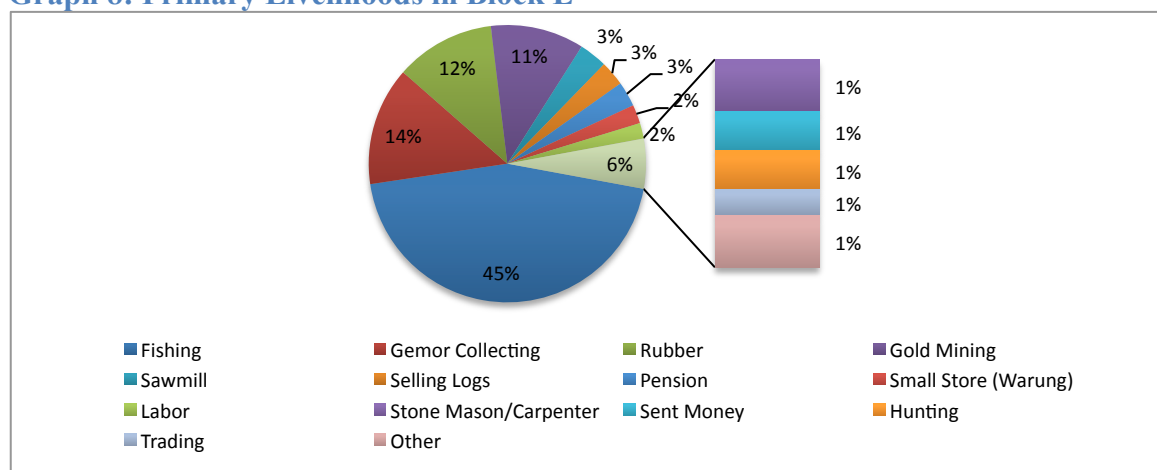
Sources of secondary livelihoods are more diverse than those of primary livelihoods. 21% of the households in Block A report that upland farming of rice and cassava is their secondary source of income. Slightly lower percentages of households (17%) report that rubber or fishing is their most important secondary source of livelihoods.

Extraction of forest resources, logging, *gemor* collecting, and rattan are also relatively important secondary livelihoods; 16% of Block A households report one of these as their secondary source of income. Some households (6%) also depend on setting up small stores to provide additional income and others (5%) depend on hiring out their labor for their secondary incomes.

From this data, it is clear that rubber is the most important source of livelihoods in Block A. Over half (54%) of the households report

that rubber is their primary or secondary source of income. Upland farming and fishing are also important sources of incomes; over half (51%) of households report them as either primary or secondary sources of livelihoods. Even though these commodities are more often secondary sources of income, they are an important part of Block A households' livelihood strategies.

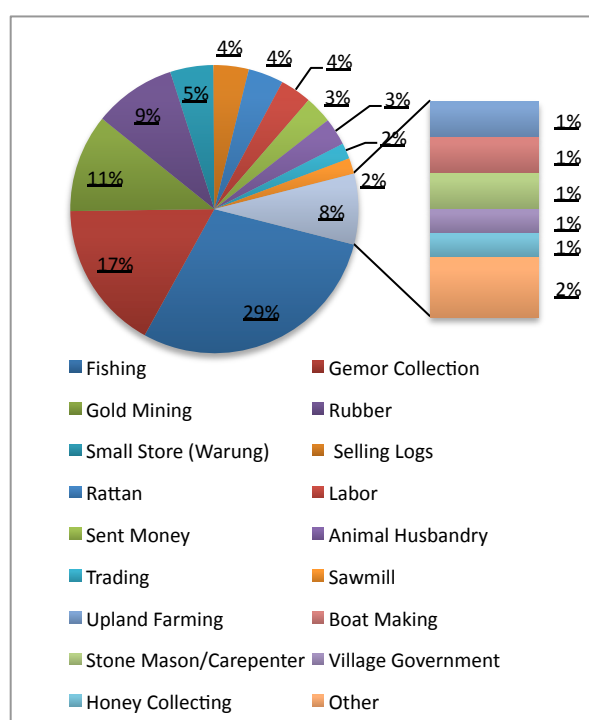
Graph 8: Primary Livelihoods in Block E



The pattern of livelihoods in Block E reflect the fact that these villages are located mostly in forests that have not been cleared or degraded. The survey found that the three most important sources of livelihoods are fishing (45%) and *gemor* (*Alseodaphne sp*) collecting (14%). The importance of *gemor* collecting is noteworthy, as it has become a main alternative to rubber cultivation, particularly when rubber prices are depressed. These two main livelihoods are followed closely by rubber (12%) and gold mining (11%). This distribution of livelihoods (**Graph 8**) reflects both the ecology of the area and the area's

response to the changing economic conditions, particularly to the decline in rubber prices.

Graph 9: Secondary Livelihoods in Block E



As with primary livelihoods, the secondary livelihoods in Block E are mainly extractive, fishing (29%), *gemor* collecting (17%), and gold mining (11%). Rubber is also a relatively important source of secondary incomes. In addition, from 5% to 4% of households rely on small stores, selling logs, rattan, and providing labor for their secondary sources of incomes (**Graph 9**).

Block E is primarily dependent upon exploiting forest resources. At this point in time, there are few alternatives, such as cultivated agriculture or trade readily available to these communities.

Table 4 below shows the official GoI classifications of primary livelihoods in each block. These results reflect the results of sources of livelihoods described above, but

are slightly different. This difference is due to the fact that the data presented above reflects the sources of household income, while the data in **Table 4** reflects how the primary earner in each household defines their primary occupation.

Table 4: Classification of Primary Livelihoods by Block		
	Block A	Block E
Agriculture and Hunting	50.3%	14.6%
Forestry	14.0%	14.9%
Metal Mining	8.2%	12.2%
Fishing	7.5%	44.6%
Retail Trade	6.0%	6.5%
Wood Industry – wood goods (excluding furniture) and matts from rattan etc.	4.3%	
Other services	3.2%	2.4%
Educational Services	1.7%	1.1%
Government administration, Defense administration, and Social Security administration	1.2%	0.6%
Mineral, Chemical, and Sand Mining	0.8%	
Health and Social Services	0.5%	0.2%
Personal and Household Services	0.4%	0.4%
Activities for organizations not classified elsewhere	0.4%	0.0%
Water transportation	0.3%	0.6%
Other business services	0.3%	0.0%
Activities without clear definitions	0.3%	0.9%
Construction	0.3%	0.9%
Basic metals industry	0.1%	
Machine and Equipment Industry for office, accounting, and data management	0.1%	
Hotel and Restaurant	0.1%	

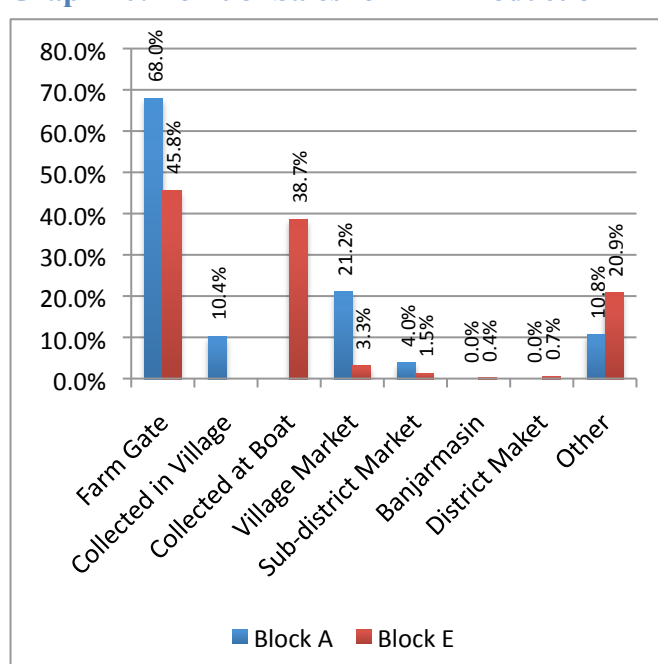
Nevertheless, the results are consistent with the results for primary sources of livelihoods. Block A is more dependent on agriculture and cultivation than Block E. Block E is more dependent on fisheries, forestry, and mining, than Block A.

Market and Financial Services Access

Market locations

Markets in the KFCP area are dominated by traders who travel the river collecting goods to be sold to larger buyers downstream in the district capital or Banjarmasin. The data on household point sales reflects this market structure; more than half (58%) of all households in the KFCP area sell their production at the farm gate (directly from either the field or house to traders or collectors). Some households sell their production at local village markets, but these are more concentrated in Block A, which not only contains larger villages, but also the sub-district seat. Almost no households from either block sell directly to larger buyers in the District Capital or Banjarmasin.

Graph 10: Point of Sales for HH Production



In Block A, 68% of households sell at least some of their products at the farm gate (directly from either the field or house). Another 21% of production is sold in local village markets. No families in Block A report selling to buyers in the District Capital or Banjarmasin.

In Block E, 45.8% of households sell at least some of their products at the farm gate and 38.7% directly at the traders boat. Villages in Block E are smaller and more remote and do not have developed village markets therefore very few households sell their products at village markets. Finally, the survey found that one household sold some production directly to buyers in the District Capital and one sold directly to buyers in Banjarmasin.

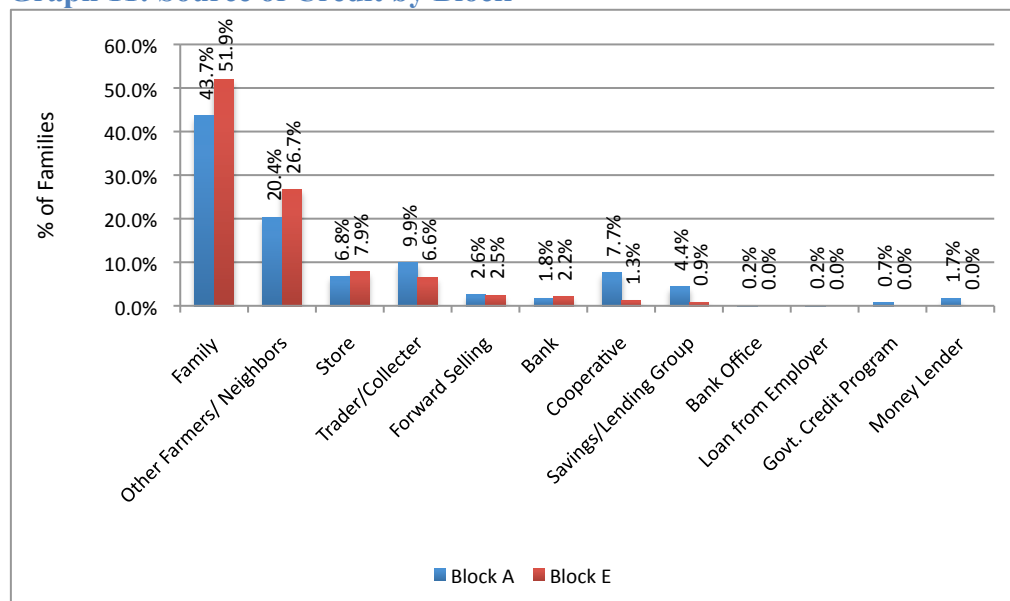
The market chain in the KFCP areas runs from the fields to buyers in larger centers including Banjarmasin. Study of the marketing networks may provide the KFCP project and region with opportunities for improved and/or alternative livelihoods. However, aside from the economics of the trade, the relationships between households, collectors, traders, and buyers are integral to the system, and any efforts to implement marketing interventions will need to take these relationships into account.

Loans and Access to Credit

Loans come from a variety of sources but most important are close relatives (family) and neighbors (64% in Block A to 79% in Block E). In addition money is borrowed through credit with shop owners (6.8% in Block A to 7.9% in Block E) and from traders and collectors who “pre-pay” for delivery of harvest (9.9% in Block A and 6.6% in Block E). There also appears to be a small number of saving/lending groups in Block A providing loans to 4.4% of the households.

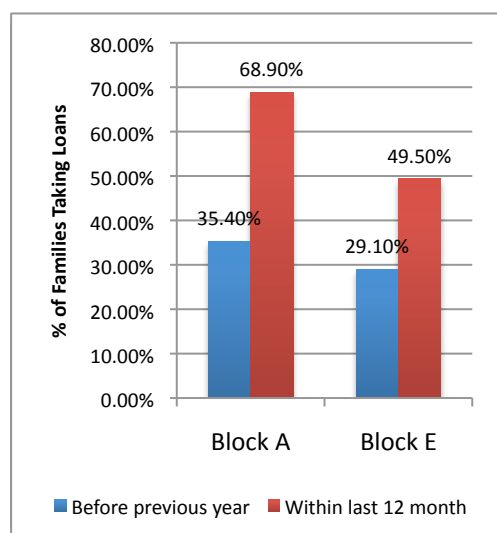
Aside from cooperatives in Block A, access to formal channels such as banks and other financial institutions, is limited or non-existent.

Graph 11: Source of Credit by Block



Access and utilization of credit can indicate economic activity, level of economic development, and or level of economic stress. It is clear from graph 11 that the formal lending sector has not penetrated the KFCP area, reflecting the areas remoteness and low level of economic development.

Graph 12: % of Families Taking Loans from All Sources



Moreover, the share of households that are borrowing money has increased significantly compared to the past years. Graph 12 shows a sharp and consistent increase in loans from all sources during the past 12 months compared to all loans taken previously. In Block A the increase is 95% and in Block E the increase is 70%.

Indications are that this is caused by volatile (non-seasonal) commodity prices for both *gemor* and rubber, which have both fallen recently. Based on informal conversations in the area during the baseline process, it is likely that households are borrowing in order to maintain consumption. This is a hypothesis to consider during implementation, for if households in the area are borrowing for consumption, it is possible that the area will experience a decline in wealth if

the sources of loans, (the income and savings of other families and neighbors) becomes exhausted and is unsustainable.

Wealth/Income Indicators

The general baseline survey did not attempt to directly measure family incomes or expenditures in order to measure poverty. Adding a complete survey on family consumption and expenditures was not feasible within the overall survey considering the spectrum of information being gathered. In place of a consumption/expenditure survey, the survey design team chose a number of proxies to provide indicators of income status. These proxies were:

- Access to land
- Housing standards (floors, walls, and roofs)
- Sources of lighting
- Cooking fuel
- Government support received
- Total family investments (such as boats, refrigerators, etc.) and investments in the past year
- Monthly Expenditures on key food items including rice and starches, meat and chicken and cooking oil and also yearly major outlays on cultural ceremonies or family investments³.

These indicators were chosen because, except for government support, they have the potential to reflect a household's expenditure level, which is in itself a reflection of a household's income. Government support potentially indicates which families are classified as low income by government poverty prevention programs.

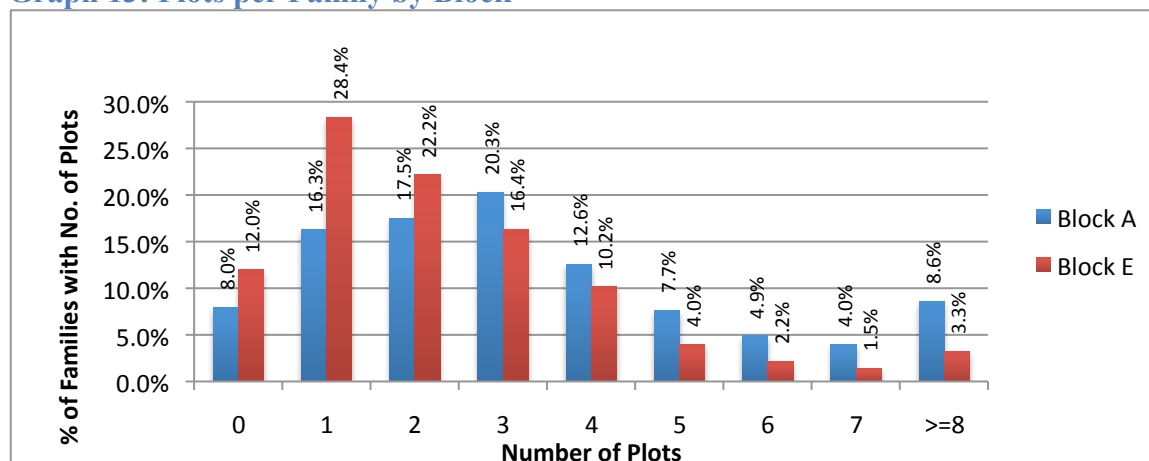
Access to Land

Land access

A majority, 90%, of the households in the KFCP area have access and control over some land. Only 8% in Block A and 12% in Block E report not owning or having access to a plot. These plots include all land used for agriculture (food crops, agro-forestry) and land left fallow. Most, households, 34% in Block A and 51% in Block E, have between 1 and 2 plots. The graph below shows the distribution of plots among the households in the KFCP area.

³ This brief consumption/expenditure survey was not designed to determine total family incomes, but develop a measure of comparative wealth within the target areas.

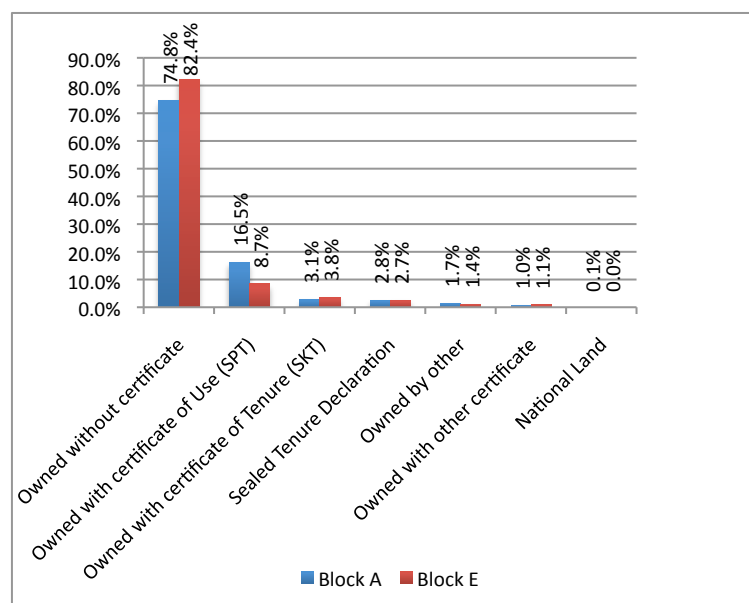
Graph 13: Plots per Family by Block



Land tenure

The differences in the patterns of land tenure between Block A and Block E are not significant. Overall tenure is based on *adat*/customary law with 77.6% claiming land without certificates. However 21% of land is owned through some form of formal acknowledgement, with 14% having use rights granted by a Surat Pengunahan Tanah (Land Utilization

Graph 14: Land Ownership in Both Blocks



Certificate SPT) from the Sub-District Head. 3.3% having use rights under a (now discontinued) *Surat Keterangan Tanah* (Official Land Certificate SKT) granted by the village head. 2.8% of the plots are owned directly under sealed tenure declarations and 1% under official land certificates. Plot location and tenure have not been related yet. This could provide more insight to what extent these plots are located on land within the national forest estate.

Housing

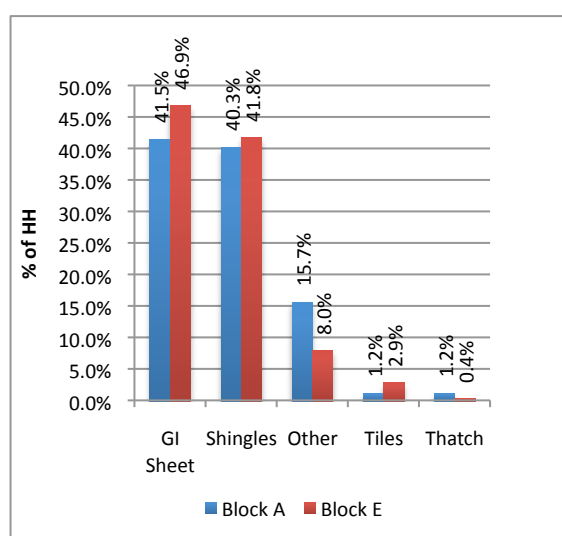
The majority (67%) of households own the houses they live in. 27% of households who do not own their own house, most likely living in their parent's or a relatives' house. This is relatively high and is rooted in the old long house culture where multiple generations within the same family would live together. Almost no households rent or contract housing in the KFCP area.

Indonesian Government Standards for housing area per person are variable depending on agency. The Indonesian Central Statistic Agency (Badan Pusat Statistics, BPS) generally uses 9 m² per person as the minimum standard for housing area. At this level, 62% of the households in Block A and 58% of the households in Block E are below standard. The average floor space per person in Block A is just over the standard at 9.2 m² per person and in Block E, the average is 10.3 m².

The survey collected data on housing materials as a long-term proxy for wealth levels. Key findings were:

- Flooring, particularly dirt flooring, which is often an indicator of poverty in many areas, is not an indicator in the KFCP area; in the KFCP area, the villages are located on or over the river and dirt floors or cement floors, are often impossible. The data bears this out. Ninety-seven percent of the houses have wood floors. 2% have dirt floors and 1% have tile floors.
- Walling material is more variable. The survey recorded the quality (and thus expense) of walling materials. Because the vast majority of housing in the area have wood walls, the survey recorded the type/quality of the wood used for walling and assigned three values (poor quality, medium quality, and high quality) to the materials.

Graph 15: Roofing Materials in Both Blocks



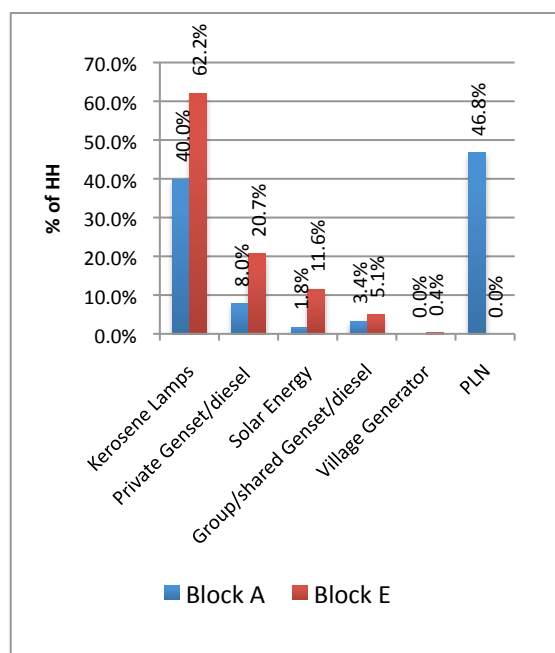
of the housing have zinc roofing and 41% have wooden shingle roofing. Very few (2%) houses have ceramic tile roofs and almost no (0.08%) houses use thatch for roofing.

Based on these standards, 24% of the households lived in housing with poor quality walls and only 3% lived in housing with high quality walling.

In poor communities, glass windows represent a significant expense in housing materials and were chosen by the survey designers as another wealth indicator. Glass has to be brought in as opposed to timber. This is born out by the data. In the KFCP area, 37% of the houses had glass windows. The majority, 63% did not have glass windows installed.

Roofing materials can also indicate wealth standards. In the KFCP area there is an almost even split between the use of zinc sheet and wooden shingles for roofing – 44%

Graph 16: Source of Lighting for Both Blocks



The main sources of lighting are different for each Block (graph 16). In Block A, electricity is available from *Pelayanan Listrik Nasional* (PLN National Electricity Service) in 3 villages and 47% of the households in that Block use PLN electricity to light their homes. Another 40% of households rely on kerosene lamps for their lighting. The majority of these households are in the two villages not served by PLN. Further North, in Block E, PLN services are not available and kerosene lamps are the main source (62%) of lighting. Private or shared generators providing electric lighting to another 26% of the households surveyed. The use of solar panels is worth noting. Due to the remoteness of Block E, solar panels are relatively well established there (11.6% of HH use them). This indicates the potential for further adoption of renewable energy in the area.

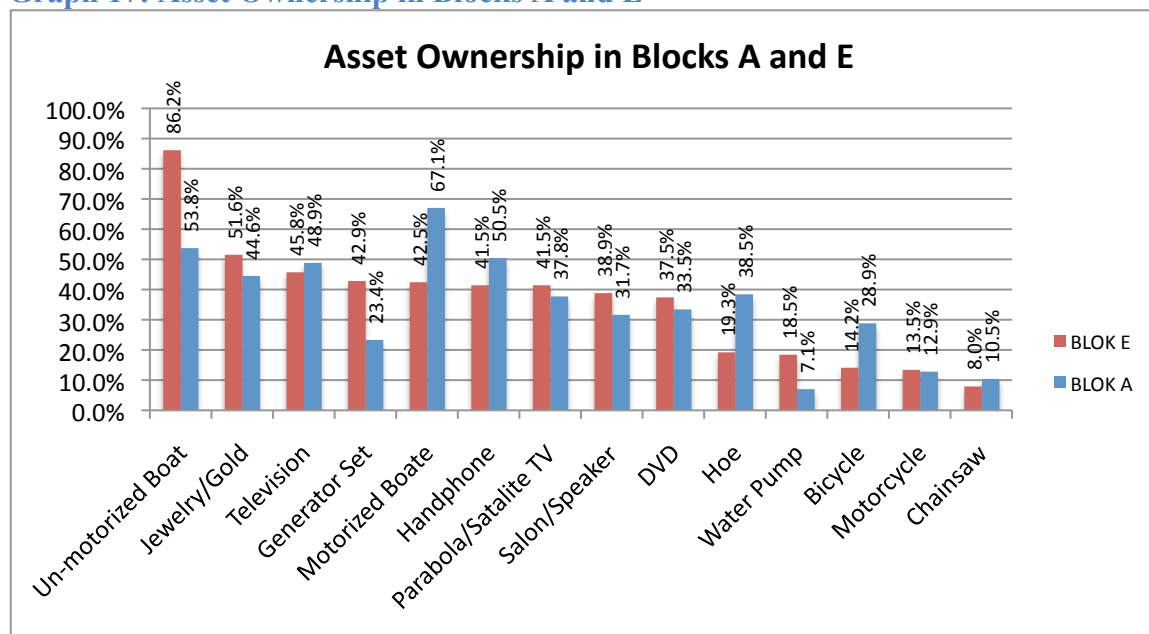
Wood is the preferred fuel for cooking; 88% of the households in Block A and 78% of the households in Block E use wood for cooking fuel. The only alternative used is kerosene stoves, which are more popular in Block E (22%) than in Block A (12%).

Assets

Major assets are generally evenly distributed between the two Blocks except for type of boats (motorized or un-motorized), generator sets, and water pumps. Between 40% and 50% of the households in both blocks own televisions, jewelry/gold as assets, hand phones, and parabola TV receivers. Almost double the percentage of households in Block E own generator sets than in Block A (43% to 23%) due to the fact that PLN electrical services are available in portions of Block A. The higher reliance on agriculture in Block A is reflected in more households in Block A than Block E (18% to 7%) owning water pumps. The biggest difference is that two-thirds of the households in Block A own motorized boats compared to only 42% in Block E. Conversely, 85% of the households in Block E own un-motorized boats compared to 54% in Block A.

Overall, 11% of households in Block A and 19% in Block E do not own at least one boat.

Graph 17: Asset Ownership in Blocks A and E



The survey asked respondents if they had purchased new assets or upgraded old assets during the previous year. The results show remarkable difference between the two blocks. In Block E, households made greater investments in non-motorized boats, motorized boats, and generator sets. In Block A, households made greater investments in hand-phones, bicycles, family entertainment, and agricultural equipment. It shows in the deforested areas, households invest in improved communication and agricultural intensification.

Expenditures

The survey design included a number of consumption questions in order to provide an indicator of consumption for the KFCP area. Monthly expenditures for consumption per family were measured for rice and other grains, potatoes and other tubers, meat and chicken, dairy (eggs and milk), oils and margarine, and social events. These indicators were not designed to measure absolute levels of income (it does not cover all expenditures nor in-kind income that is consumed directly), but to measure relative changes over time; one would expect expenditures in these areas to increase/decrease over time if area wide incomes increase/decrease. This indicator also can give us an indication of the income distribution in the area.

As is consistent with other data, Block A appears slightly wealthier than Block E. In Block A, the average family expenditure on these categories is IDR389, 464 per month and in Block E it is IDR 362,486 per month.

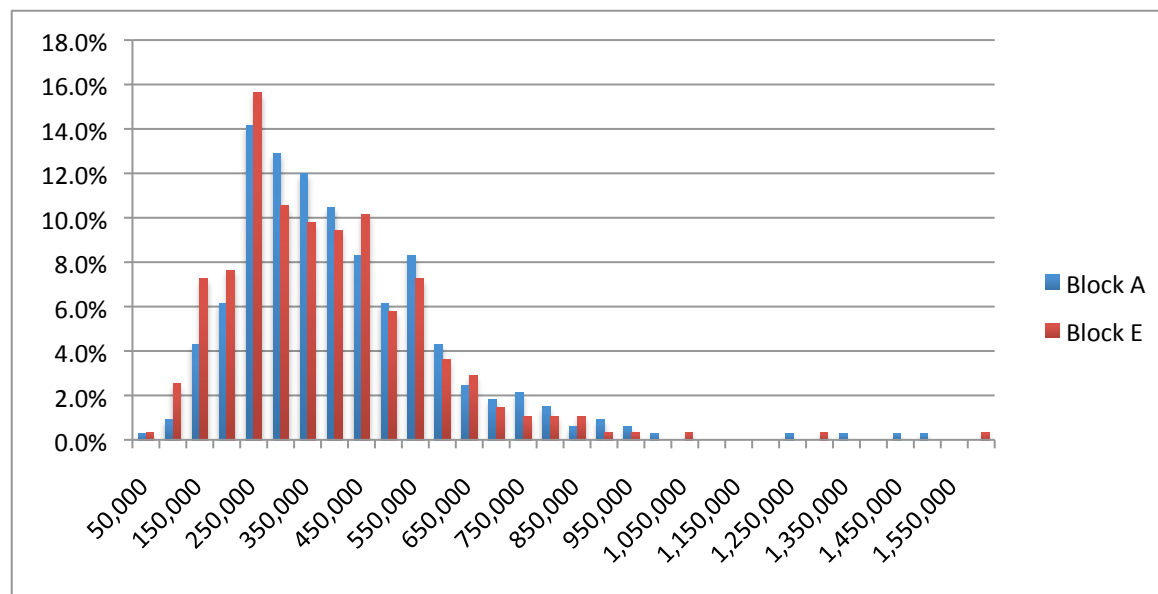
Table 5: Partial Family Expenditures per Month

Block	IDR
Block-A	389,464
Block-E	362,486

The histogram in **Graph 18** also shows that these household expenditures are relatively higher in Block A than Block E. The mode for both areas' expenditure data is between IDR 200,000 and 250,000 per month, 14.2% of the households in Block A and 15.6% in Block E

expense this amount on the commodities measured. But in Block A 74.2% of the households have partial expenditures over IDR 250,000, while in Block E it is 66.2%. For partial expenditures less than IDR 200,000 there is a greater percentage in Block E (17.8%) than Block A (11.7%).

Graph 18: Partial Expenditure Distribution in KFCP Area



Health Indicators

Water, Sanitation, and Health

The baseline survey shows that access to health services and proper sanitation are alarmingly low contributing to high levels of diarrhea among children under 5 and high levels of illness symptoms among the whole population.

Throughout the KFCP area, the majority (95%) of households use the river for defecation. Only 3% of the households have septic tanks. Most of the households (74%) share a “toilet” which is almost always a floating raft on the river with a hole in it.

The source of water for 88% of the households in the KFCP area is the river, most often the bathing and water collection is done from the same floating raft used for defecation. Therefore defecation and water collection/bathing is done in close vicinity. Ground water is a measurable source of water only in Block E, where 17% of the households get their water from pumps; a majority (77%) of these ground water sources are more than the government recommended 10 meters from places of defecation.

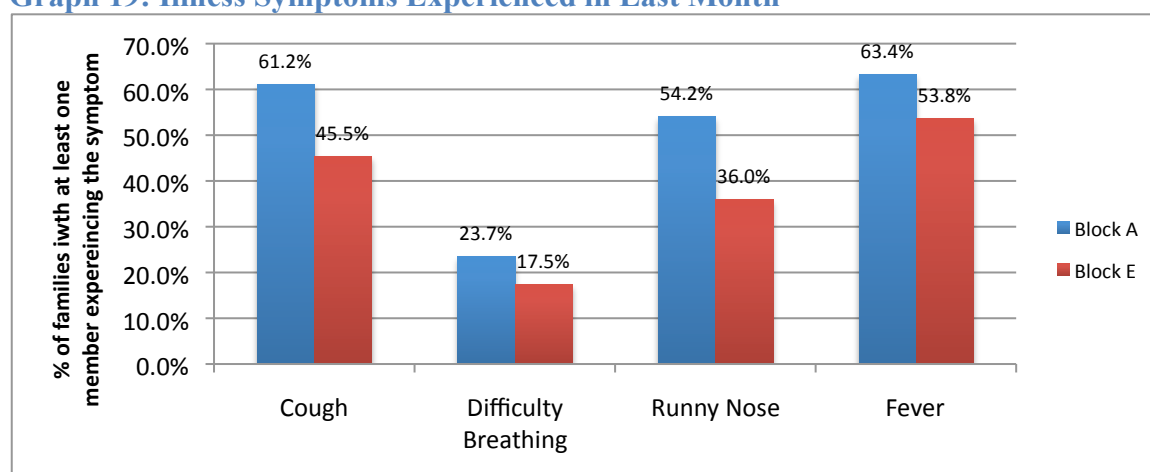
Processing drinking water by boiling and/or water treatments (*kaporit*) is more prevalent in Block A than in Block E. In Block A, 59% of the households report at least boiling water before drinking (16% also treat their water by decanting or sterilizing with *kaporit*) and another 27% treat their water without boiling it. In Block A, 14% of the households report drinking water without any treatment. In Block E, 57% of the households report at least boiling their water (33% also pre-treat water before boiling it). Thirty-one (31) percent of the households in Block E report drinking water that is untreated.

The impacts of the poor access to clean water and good sanitation are high levels of diarrhea in children under five. Despite higher levels of treating water in Block A, the percentage of children under 5 experiencing diarrhea (3 or more wet stools in a 24 hour period) during the last week was 37%. In Block E, the rate was lower with 21% of children under 5 experiencing diarrhea. The difference could be due to Block E being further up river and the larger, more concentrated populations of the villages in Block A.

These results in Block A are almost over three times the national average of 11% diarrhea rates in children under five⁴. These results are consistent with the lack of sanitation and where defecation areas and water sources are essentially one and the same.

The area also has high rates of other illness symptoms (**Graph 19**), more so in Block A than in Block E. The three most common symptoms reported were coughs, rhino rhea (runny noses), and fever. Block A had higher percentages of households reporting at least one family member having these symptoms than households in Block E. The graph below shows the prevalence of each of the symptoms in each Block.

Graph 19: Illness Symptoms Experienced in Last Month



Most households depend on self-medication, locally available practitioners, nurses or *mantri* (medical aide). Self-treatment is most common in Block A where over 49% to 65% of the households report self-treating depending on the symptom. Consulting with a *mantri* is less common, from 10%-15% of the time in Block A. In Block E, consulting with a *mantri* is most common with households seeking assistance from 40% to 50% of the time. Households in Block E report self-treating for 34% to 42% of the time. Overall, very few seek assistance from skilled medical personnel (less than 10%); however, seeking treatment from the government health center is more common in Block A, up to 19% of the time, due to the proximity of the health center.

Overall, the access to water, sanitation, and health services is very low, albeit typical for such remote river communities. The impact of the lack of access to these services and poor hygiene and sanitation practices is seen in the high levels of diarrhea in children and illness symptoms in adults.

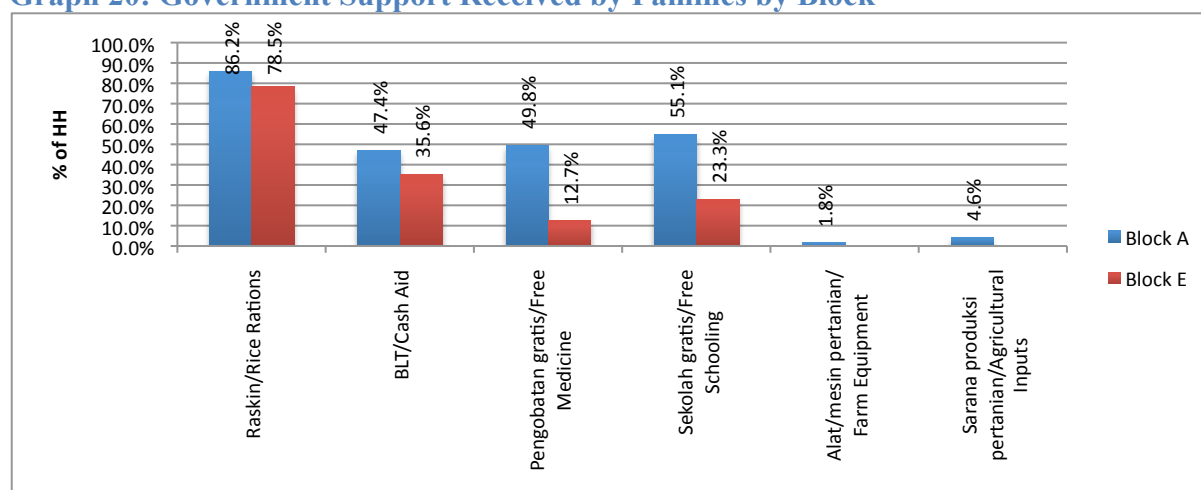
⁴ WHO reports for Indonesia a national average of 11% (110 cases/1000 children) for 2006

Access to Government Support

Over the course of the last decade, the Indonesian government has been developing a social safety net. This has been increasingly providing support both financially as well as through improved access to basic services. Access to government support is greater in Block A than in Block E; this is in large part due to the proximity of Block A to the Sub-district Center and the greater remoteness of Block E. Households in both areas receive government rice rations for the poor (*Raskin*) and direct cash support (*Bantuan Langsung Tunai, BLT*). However, the access to free medicines, free schooling, and government supported agriculture implements and inputs is from 2 to 3 times higher in Block A than E. This difference is due to easier access to government services in Block A.

It is important to note, that although the *Raskin* program is targeted at to the poor, there are strong local cultural values that promote equal distribution of such government aid. Therefore, village heads often distribute the *Raskin* rice ration to all members of the village, not just the poor. This is the reason for the high percentages of households reporting receiving a portion of the government rice rations. The communities do not apply this value to the direct cash transfers, and that program appears more successful for reaching its intended target groups.

Graph 20: Government Support Received by Families by Block



Summary: Poverty Analysis

The Baseline Survey was not designed to directly measure the level of poverty in the KFCP area but to be able to measure changes over time. Nevertheless, the data collected by the Baseline can give an indication of comparative poverty in the area, and of poverty related issues. This analysis uses local, community indicators from the ICRAF focus group discussions and, where applicable, indicators consistent with the Human Development Index (HDI).

As part of the focus groups discussions conducted by ICRAF, community members identified a number of “poverty indicators”. These indicators⁵ are listed below along with an indication if the baseline collected that data.

⁵ Suyanto, Noviana Khususiyah, “Analysis of Local Livelihoods From Past to Present”, by2009: p. Suyanto, Noviana Khususiyah (ICRAF report on development of community identified indicators)

- Family does not have member with a permanent job
- Family does not have access to land (data available)
- Family income is less than IDR 50,000 per day (equivalent to 1.5 million per month) (proxy data available)
- Housing
 - Made from low quality timber (data available)
 - Small size of house (area per person) (data available)
 - Family does not have a house (data available)
- Family is unable to send children to school
- Family is unable to buy clothing
- Family is unable to buy medicine if sick
- Family does not have a boat
- Eats less than 3 times a day

Poverty levels can also be assessed using the HDI. The HDI is made up of measurements of life expectancy, literacy and schooling, and income levels. The general baseline provides us HDI data on schooling levels.

Looking at the data collected and combining with both the community developed indicators, GoI BPS standards, and HDI Education indicator; we can begin to illustrate poverty levels.

Indicators with data available include:

- Households without land
- House ownership
- Housing Size – Compared to GoI BPS standards
- Housing constructed of low quality timber (walling)
- Households receiving direct cash support
- Partial household expenditures
- Households without boats
- Gross drop out rates for intermediate school, middle school and high school

The table below shows these indicators.

Table 6: Poverty Proxy Indicators

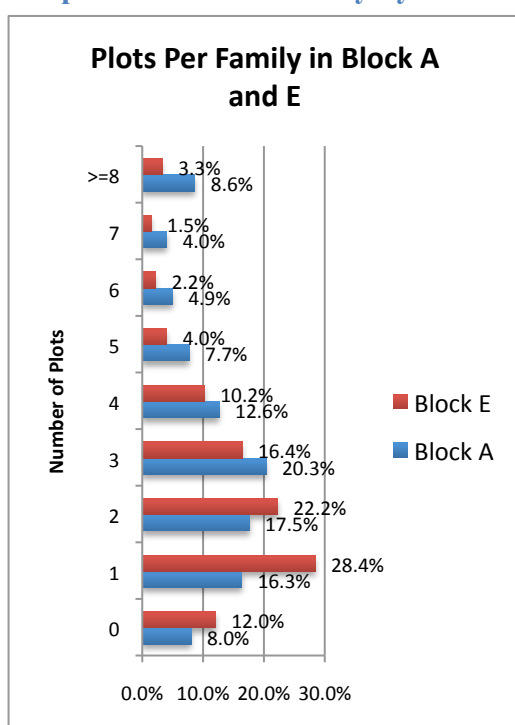
Indicator	Block A	Block E
Households without Productive Plots	8.0%	12.0%
HHs that do not own house	33.3%	32%
Housing area per person below BPS (GoI) standards	62.2%	57.5%
Low quality walling	24.3%	24.0%
Households Receiving Cash Support	47.4%	35.6%
% of families with partial monthly expenditures less than the mode (Under IDR 200,000 per month)	11.7%	17.8%
Households without boats	11%	19%

Overall Drop Out Rate based on ages 7to 18 years of Age attending intermediate, junior high and high school	33.4%	33%
Diarrhea rates for children under 5	37%	27%
Access to skilled health personnel (use of sub-district health center)	19%	8.8%

In terms of housing quality, roughly one-quarter are below standard, and almost two thirds are below national standards for floor area per person. One-third of the households do not own their own house.

In terms of expenditure, between 12% and 18% have very low levels of expenditures, and for one-third to almost a half of the KFCP area

Graph 21: Plot Per Family by Block



households are officially considered poor enough to receive direct cash aid.

The health care data reflects the overall poverty of the area and the lack of public health and health services infrastructure. The same can be said for the education infrastructure, particularly in Block E.

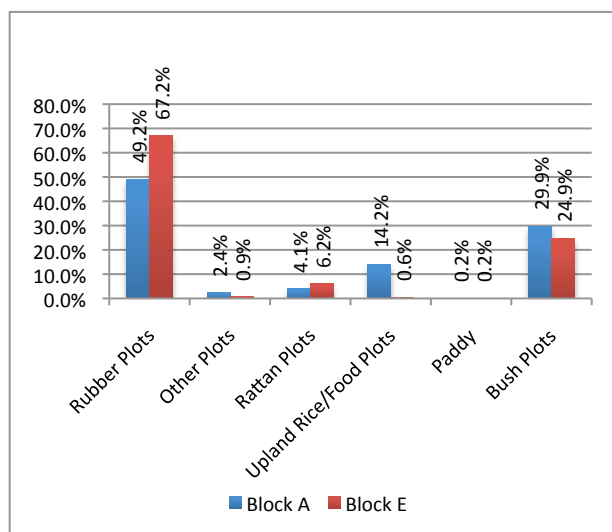
Overall, it could be estimated that roughly one-fifth (based on expenditure, land, and boat ownership data) to a quarter (based on housing quality data) of the households in the area are poor in comparisons to their neighbors.

Forest Cover and Land Use

Plot Distribution

Throughout the KFCP area, 90% of the households interviewed during the baseline survey had at least one plot of land for agricultural purposes. In Block A, twelve percent of households do not have any plots of agricultural land and in Block E 8% of the households do not have agricultural land. The majority of households have from 1 to 3 plots of land. However, there is a tendency for households in Block A to have slightly more plots of land than households in Block E.

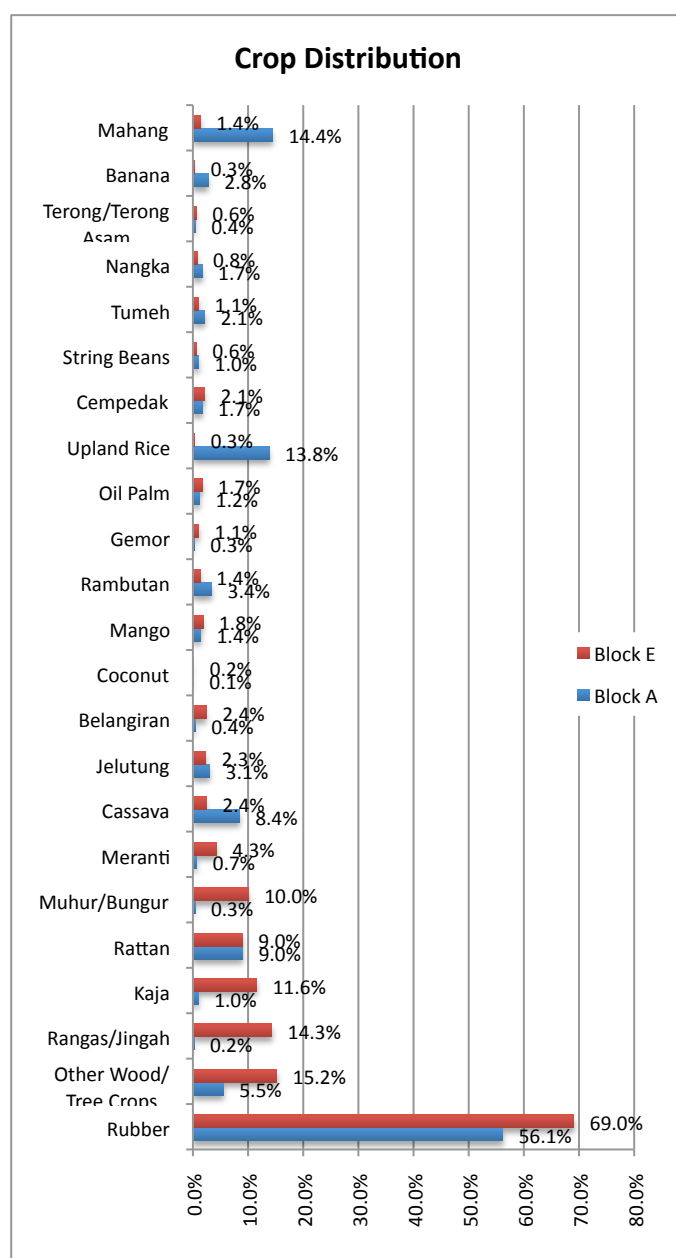
Graph 22: Plot Distribution by Type in Both Blocks



In Block E, most of the plots are devoted to rubber (67%), bush plots (25%), and rattan (6%). Rubber plots are generally fully devoted to rubber, although in rubber plots during the establishment period, food crops, such as cassava or bananas, may also be grown. In Block A, 10% of rubber plots also have *mahang* planted on them. Other crops such as rattan (6.1%) or other tree crops (8.2%) are not uncommon. Less than 3% of the rubber plots have other commodities such as *gemor*, *jeletung*, or *rambutan*.

Bush plots are mixtures of a variety of tree or food crops without a particular main crop. The most common commodities cultivated in bush plots are *mahang* (21.6%), rubber (10.5%), and *gelam* (10.2%). *mahang* (*macaranga sp*) is a

Graph 23: Crop Distribution by Block



pioneer species and an indicator of disturbance within peat ecosystems. *gelam* (*melaleucacajuputhi*) is suitable vegetation for acid sulphate soils (shallow peat) and repeated burning. Other species (less than 4%) cultivated in bush plots include *tumeh*, *rambutan*, rattan, *sengon*, and other tree crops.

In Block E, rubber is the dominant crop. Food crops are hardly produced. Farming is rubber based with most of the rubber planted in mixed cropping systems.

In Block A, rubber (49%) and bush plots (30%) are also important, but in addition, upland rice/food crops plots are significant (14%), probably facilitated by easier access to potential plots and less biomass to clear. These upland plots are mainly devoted to upland rice (97.5%), which is often intercropped with cassava (39%), while the remainder is planted to cassava.

Overall, rubber is the most important tree crop in the KFCP area, with 56% of the plots having rubber in Block A and 69% in Block E. Often rubber is

Table 7: Total Area Claimed by Each Block

	Block A	Block E	Block E w/o 2 Rattan Plots
Total Area Claimed	2,233	2,148	1,548
Area Cleared	1,792	1,495	895
Area Fallow	441	653	653
Average Plot Size	2.0	3.3	2.4
Average Area per HH	6.9	7.8	5.7

found intercropped or in mixed cropping arrangements with other crops.

In Block E, other forest products that are planted in relatively significant amounts on plots include *rangas/jingah*, *kaja*, rattan, *muhur/bunger*, and other wood/timber crops. Very few of

the plots in Block E have vegetable, grain, or fruit crops.

In Block A, the crop distribution is quite different. Rubber is still the main crop planted on agricultural plots (56%). However, the tree, *mahang* is also popular (14%), and field crops of upland rice (14%) and cassava (8%) are also important. In Block A, there are also marginally more fruit and vegetables planted, but not in great amounts.

The differences in crop distribution between Block A and E reflect the different ecological situations. In Block A, where the forest has been cleared and access improved, there is area readily available and more suited for upland crops. In Block E, the forest remains largely intact, and the farming systems in Block E reflect this.

Estimated Agricultural Land Area

The survey collected data on each respondent's estimate of the area of the family plots. The survey design team is aware of the unreliability of farmers estimating land area. However, it was felt that such data would provide the KFCP project with a starting point on area claimed in the project area. A starting point than can be refined as the project enters implementation.

Table 7 shows the results of the data collected. There are two results reported for Block E due to two respondents who claim to have 300 ha plots of rattan. These two very large plots skew the household average and therefore needs to be verified during implementation.

Including the two large rattan plots, the survey finds that the households surveyed claim a total of 4,382 hectare of which a part is in the KFCP areas. Of that area, 3,288 ha are under production and 1,094 are fallow/bush land. These fallow lands are an integrated part of the farming system. Extrapolating this data to the total number of households, that would indicate that all households living within the KFCP area claim an estimated 17,227 ha with 11,158 ha in Block A and 6,069 ha in Block E.

In Block A the average plot size of 2 ha is less than in Block E, which is 3.3 ha (excluding the two large rattan plots the average Block E plot is 2.4 ha) . However, as indicated above, households in Block A tend to have slightly more plots than households in Block E and therefore report a higher average area per family than a typical⁶ family in Block E. If the two large plots are included, then the average area per household is larger in Block E than in Block A.

⁶ Because 2 very large plots in Block E skew the data higher, the "typical" block size is estimated without those two large plots included in the data.

Table 8: Area by Crop for Both Blocks

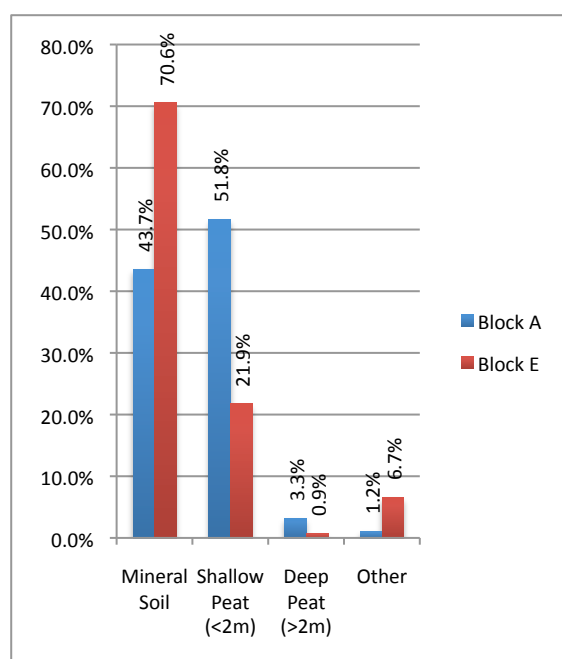
	Block E		Block A	
	Est. HA	%land	Est. HA	%land
Rubber Plots	1,047	47%	810	38%
Other Plots	23	1%	4	0%
Rattan Plots	134	6%	701	33%
Upland Plots	285	13%	2	0%
Paddy	2	0%	1	0%
Bush Plots	743	33%	630	29%

large rattan plots emphasize the importance of rattan to the typical villager.

Utilization of Peat Lands for Agriculture

One of the key questions is to what extent peat lands within the KFCP project site are used

Graph 24: Percent of Land by Soil Type (peat versus mineral soils)



for agriculture or other land use. The hypothesis is that the disappearance of peat swamp forest, either through mechanical clearing (during the mega rice project) or through continued degradation due to drainage, fires, logging, *gemor* extraction and land clearing by small holders, increases the use of peat areas for agriculture and cultivation. This increased utilization of peat lands and use of fertilizer, in particular N-fertilizers, accelerates the process of degradation, peat loss, and the release of GHG.

The key assumption that easier access to peat soils in Block A will enhance utilization of peats is supported by the data presented in **Graph 24**. Over half the plots in Block A recorded by the survey are estimated by the respondents to be located on shallow peat (defined as peat less than 2 meters deep) and another 3.3% of the plots are on deep peat (greater than 2 meters deep).

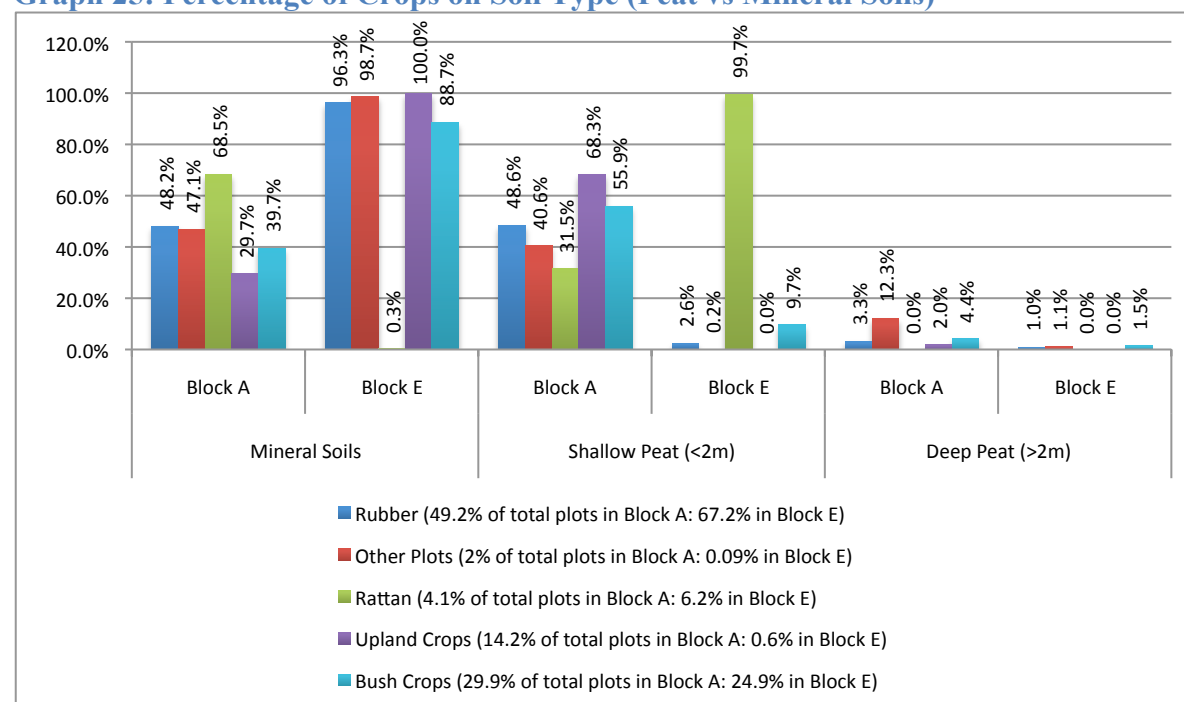
In Block E, due to limited access, use of peat land is less, which was already underlined by the limited number of plots on these soils. Almost 71% of the plots in the survey are reported to be on river levees and adjacent mineral soil. Only 22% are on shallow peat, and less than 1% is reported to be on deep peat.

Crops per soil type

Graph 25 below shows the distribution of plot types across soils. As noted above, a majority of Block A plots are located on shallow peat. When broken down by plot type, almost 49% of Block A rubber plots are on shallow peat and another 2.6% are on deep peat. In addition, 68% of Block A's upland plots are on shallow peat, as are 65% of their bush plots. These

numbers indicate a high level of agricultural dependence on shallow peat land on the part of farmers in Block A.

Graph 25: Percentage of Crops on Soil Type (Peat vs Mineral Soils)



Block E farmers use peat lands to a much lesser extent. For all crop types except rattan, the great majority (88% or higher) of plots are on mineral soils. The only crop type dependent on shallow peat in Block E is rattan. Rattan is grown further from the village and is cultivated extensively (land clearing, intercropped with rice at initiation, and then grown with the recovering vegetation); basically, all rattan plots in Block E are on shallow peat.

Use of Fertilizer

Research has proven that nitrogen fertilizer when applied contains compounds that cause the release of GHGs. However there is not a high use of nitrogen fertilizer in the KFCP area. The two main crops that receive fertilizer are rubber and upland rice. Most fertilizer is used in Block A, where only 10% of rubber plots receive fertilizer and 33% of the upland rice plots receive fertilizer.

Table 9: Use of Fertilizers

Type of Fertilizer	Urea		TSP		NPK		Other Chem Fert	
	Block A	Block E	Block A	Block E	Block A	Block E	Block A	Block E
Rubber Plots Block A- n=563: Block E- n=442	9.2%	4.3%	1.8%	1.8%	1.4%	0.7%	2.0%	2.5%
Other Plots Block A- n=28: Block E- n=6	7.1%						3.6%	
RattanPlots Block A- n=47: Block E- n=41	2.1%	2.4%						
Upland Plots Block A- n=162: Block E- n=4	32.7%	25.0%	9.3%	75.0%	8.6%		8.0%	25.0%
Bush Plots Block A- n=342: Block E- n=164								

The data on the use of nitrogen fertilizers, in particular urea (46% Nitrogen) and NPK, is important because when nitrogen is used on peat, it will trigger the rapid decomposition of that peat. This is an important source of GHG emissions. The baseline indicates that in Block A as much as 72% of the plots fertilized with urea are on shallow peat lands. The remainder is on mineral soils. Therefore, although urea is not widely used, most of what is used is on peat therefore contributing the GHG emissions.

Summary on Plot Description

The environmental degradation brought about by the EMRP has had a major influence on crop selection and the types of soil local farmers are able to exploit.

In Block A, the opening of the forest by EMRP has allowed farmers to develop some upland cropping focusing on upland rice and cassava. In Block E, farmers have not opened up land for field crops and remain reliant on rubber, cassava, *mahang*, and other forest resources.

The accessibility to peat land in Block A has resulted in a greater number of plots being developed on shallow peat in that block. Almost half the rubber is planted on shallow peat and over half the upland crops are on shallow peat. In contrast, in Block E, aside from rattan plots, almost no plots are developed on shallow peat – almost all plots are reported to be on mineral soils.

These findings will affect the strategies of used in KFCP in each block. In Block A, the project will need to consider incentives and alternatives that move existing plots off peat lands (or transform them to activities that retain carbon) and reduce the use of urea. In Block E, the alternatives and incentives can be designed to prevent any further opening up and draining of peat lands, which causes the greatest amount of GHG emissions.

Waterways as Access to Forests and Drainage

Due to the nature of the area, land is accessed by water. Transport over water is the main way of reaching agricultural plots as well as other parts of the forest for extracting timber and non-timber resources. The four types of water ways are.

Table 10: Use of Man-made and Natural Waterways

	Block A	Block E
Use Canals	48.0%	0.7%
Use Handil	54.2%	0.7%
Use Tatah	5.8%	5.5%
Use River	90.5%	69.8%

- Rivers, which are defined as natural waterways
- Canals, which are waterways dug by the EMRP
- *handil*, which are waterways constructed by local user groups to access acid sulphate and shallow peat lands, with the most dominant land use being upland plots with tree crops planted on dikes. *Handils* are most often managed by groups of farmers.
- *tatah*, which are smaller canals often constructed by individuals or small groups for logging and/or access to plots.

The survey results (**Table 10**) show that the river is key for both Blocks, with 90% of households using the river in Block A and 70% in Block E. However, in Block A, the EMRP area, canals and *handil* are also important transportation routes to plots and forests.

48% of Block A households use canals and 54% use *handils* to reach their plots and/or the forest.

In Block E, there are essentially no canals except at the border of the two blocks, which explains the low use of canals. In Block E, the main form of transportation is by river or by land; this is consistent with data that the majority of their plots are on mineral soils, which are generally near the river and villages. A small percent of households (5.5%) use *tatah* to reach their plots. *Tatah* are traditionally used for accessing the forest (not plots) and often abandoned when the activity (timber collection, *gemor* collection, and the like) is completed.

Table 11: Use of Man-made Waterways by Combinations

Man made waterways	Block A	Block E
Not use of all	19.1%	93.8%
Canals	23.7%	0.4%
CanalsTatah	1.5%	0.0%
Handil	29.8%	0.4%
HandilCanals	21.5%	0.0%
HandilCanalsTatah	1.2%	0.4%
HandilTatah	1.5%	0.0%
Tatah	1.5%	5.1%

Data on the use of man-made waterways (Table 11) shows that man-made water ways not of great importance in Block E, where almost 94% of the households do not use them to reach their plots, but are of great importance in Block A. In Block A, 81% of the households report using man-made water ways to reach their plots. Canals, *handils*, and a combination of the two are the main means of access to the plots in Block A. Again, this is consistent with the data that shows that a large portion of plots in Block A are located in (shallow) peat areas.

In Block A, human-made waterways are important for reaching a majority of each type of plot, except rattan plots. Over 52% of Block A's rubber plots are accessed by man-made waterways. The use of man-made waterways is higher for other plots (82%), bush plots (74%) and upland plots (85%).

Table 12: Use of Waterways in Block A to Reach Each Type of Block

	Rubber Plots	Other Plots	Rattan Plots	Upland Plots	Bush Plots	Total use of Routs for all Plots
Land Routes	7.8%		4.3%		3.2%	5.0%
Canals	1.2%		2.1%	1.2%	6.4%	2.8%
Handil	1.2%		2.1%	1.2%	2.0%	1.5%
HandilCanals	0.4%			0.6%	0.9%	0.5%
Rivers Only	39.8%	17.9%	57.4%	14.8%	22.8%	31.3%
RiversCanals	19.9%	35.7%	12.8%	29.6%	22.2%	21.5%
RiversCanalsTatah		3.6%			0.6%	0.8%
RiversHandil	24.0%	32.1%	17.0%	37.0%	33.0%	28.4%
RiversHandilCanals	4.1%			13.6%	6.4%	5.9%
RiversHandilCanalsTatah					0.6%	0.2%
RiversHandiTatah				1.2%	1.8%	0.2%
RiversTatah	1.6%	10.7%	4.2%	0.6%		1.7%
Tatah						
Total	100.0%	100.0%	100.0%	100.0%	100.0%	

This high level of use on man-made waterways in Block A will have to be carefully addressed in the KFCP canal blocking activities to ensure that household livelihoods are not negatively impacted by the closing of man-made waterways.

The different use of peat lands for agricultural plots is also evident in the differences in the use of drainage of plots. In Block A, 30% of the plots are drained. Half of the plots are drained with channels between 30cm and 70cm deep. Over a quarter of these channels are deeper than 70cm.

In Block E, only 5.5% of the plots are drained, although over half of these use channels deeper than 70cm.

Table 13: Drainage of Plots by Block			
		Block A	Block E
Drainage Ditches	Deep (>70cm)	7.9%	3.6%
	Shallow (0-30cm)	6.2%	1.1%
	Medium (30-70cm)	15.9%	0.8%
Total Plots w Drainage		30.0%	5.5%
Plots w/o Drainage		70.0%	94.5%

Summary of Waterways

Households in Block A are highly dependent on man-made waterways to reach their plots; 81% use man-made waterways. These waterways are crucial for reaching almost half of the rubber plots or a majority of upland and bush plots in the Block.

Block E, on the other hand is not nearly as dependent on man-made water ways; only 6% of households use man-made waterways to reach their plots. In general, farmers in Block E use the river and natural feeder streams or walk to their plots.

This data has clear implications for the canal blocking strategies of KFCP. Canal blocking will need to be focused on Block A and will require real alternatives/incentives that can replace the livelihoods of households losing access to current productive plots.

Use of Forest Products

Communities in the KFCP area continue to depend on the surrounding forest for supplemental sources of livelihood and household needs. The forest provides community members with timber, other forest products, and animal products. The two most important forest resources, exploited by over 80% of the families are fish (81% of HH) from the river and fire wood (86% of HH) from surrounding forests.

Table 14: Timber Products Exploited by Block		
Timber Products		
	Block A	Block E
Wood- Meranti	14.5%	14.2%
Wood - Blangiran	17.2%	9.8%
Wood - Galam	13.5%	1.8%
Wood - Tumeh	11.4%	2.2%
Madang	6.2%	2.5%
Wood - Mahang	3.7%	
Wood -Jelutung	3.1%	0.4%
Wood-Othe Forest	0.6%	2.2%
Wood - Cengal		2.5%
WoodMahang	1.8%	
Wood - NyatuTree	0.6%	0.4%
Wood- Gemor	0.9%	0.4%
Wood – Kaja	0.3%	0.4%
Wood- Gaharu		0.7%
Bark – Meranti		0.4%

Table 15: Non-Timber Products Exploited by Block

	Block A	Block E
Fire Wood	86.8%	86.2%
Bamboo	25.8%	18.5%
Rattan - Hearts	11.1%	29.8%
Gemor - Bark	18.5%	36.0%
Rattan - Rods	15.4%	17.1%
Medicinal Plants	19.7%	14.9%
Fruit - Dango	5.2%	14.9%
Rattan - Fruit	4.3%	5.5%
Honey	4.6%	6.5%
Decorative Plants	6.8%	3.6%
Fruit-Forest Manggis	5.5%	4.7%
Purun (Reeds for mats)	9.5%	1.5%
Fruit - Ramunia	5.5%	2.5%
Fruit - Binjai	2.2%	2.2%

- Fruit - Tutup Bali
- Sap - Nyatu Tree

A small percentage of HH from each block continue to hunt in the forest. Bird hunting is the most common, with almost 10% of HH. Other animals hunted include wild pig, deer, and lizards. A small number of HH hunt snake for meat and skins.

Other forest products include timber from the *meranti*, *blangiran*, *galam* and *tumeh* trees. *Meranti* wood is collected by 14% of the households in both Blocks. *Blangiran* is collected in both Blocks, but is slightly more important in Block A (17%) than Block E (almost 10%). *Galam* and *tumeh* are collected by more than 10% of the HH in Block A, but is less important in Block E, where these species are collected by less than 2.2% of the HH.

Other non-timber products important to households in both blocks, aside from fire wood, include bamboo, rattan, *gemor*, medicinal plants, and *dango* fruit. Rattan and *gemor* (the bark is used in making mosquito coils) are more important in Block E and Block A. This is particularly true of *gemor*, which is collected by more than one-third of the households in Block E.

Other non-timber products occasionally collected (by less than 2% of the HH in either block) include:

- Fruit - Tangkuhis
- Fruit - Durian
- Fruit - Kasturi
- Fruit - Tanggaring
- Karet - Getah
- Fruit - Papaken
- Fruit - Hutanlainnya
- Fruit - Kapul
- Fruit- Jelutung
- Sap - Meranti
- Sap - Jelutung
- Seeds - Tengkawang Tree

Table 16: Hunting by Block		
	Block A	Block E
Fish	81.2%	81.8%
Birds	7.4%	9.5%
Wild Pig	3.1%	3.6%
Deer	2.5%	3.6%
Lizards (Biawak)	0.9%	1.1%
Snake	0.3%	0.7%

Gender Roles in Forest Exploitation

Overall, exploiting forest resources is a men's role. Women do assist the men in some timber extraction, but mostly in the collection of non-timber products. However, except in the cases of ornamental plants and rattan fruit, the other products are predominantly collected by men, with only up to about a quarter of the families collecting together. The results of the survey questions on who does collection of forest products are displayed in **Table 17** below.

Table 17: Types of forest products				
Timber Products	Men and Women	Men	Women	% HH Collecting
Meranti - Wood	7%	93%	0%	14%
Wood - Blangiran	9%	92%	0%	14%
Wood - Galam	9%	91%	0%	8%
Wood - Tumeh	11%	88%	0%	7%
Madang	7%	93%	0%	5%
Wood - Jelutung	0%	94%	11%	2%
Wood - Cengal	17%	83%	0%	1%
Wood Mahang	0%	83%	17%	1%
Wood – Gemor	29%	71%	0%	1%
Non-Timber Products				
Fire Wood	23%	71%	6%	86.30%
Gemor Bark	12%	87%	1%	26.50%
Ornamental Plants	3%	18%	79%	22.80%
Bamboo	22%	68%	10%	22.50%
Rotan - Hearts	36%	61%	3%	17.00%
Medicinal Plants	23%	64%	13%	16.00%
Rotan - Rods	20%	76%	5%	14.80%
Fruit - Dango	29%	64%	7%	9.70%
Honey	2%	59%	39%	9.00%
Rotan - Fruit	16%	41%	44%	7.30%
Hunting				
Birds	8.4%	92.8%		8.30%
Fish	40.5%	51.8%	7.7%	81.50%

Use of Fire

Table 18: Total House-holds using Fire		
	Block A (n=299)	Block E (n=157)
Households that:		
Do not use Fire to Clear Any Plots	13.40%	29.30%
Cleared using fire	86.60%	70.70%

Fire is the most common way to clear land in the KFCP area. In Block A, 86.6% of the households who have agricultural plots reported using fire for clearing at least some of their plots. In Block E the percentage was 70.7%. These plots are mostly cleared, planted with food crops and rubber and then gradually evolved into jungle rubber plots.

The survey collected data on whether fire was used to clear plots and when that took place. This data was not available for all plots, as plots may have been cleared by previous owners (or generations) and the current owners did not know or remember the clearing method used or when. Therefore, in Block A there were no definitive responses for 20% of the plots and in Block E for 28% of the plots. Of the remaining plots, in Block A, 81.4% were cleared by

fire, and in Block E 74.2% were cleared by fire.

Table 19: Total Plots Cleared by Fire

From Total Plots with Data on Clearing Method	Block A (n=914)	Block E (n=472)
Cleared by Fire	81.4%	74.2%
Cleared w/o Using Fire	18.6%	25.8%

Of the Blocks for which there was reported data on clearing methodology, the use of fire reflects each Blocks' farming systems. In Block A, fire is

used to clear land for rubber, upland crops (mainly rice) and bush plots. In Block E, clearing by fire is mainly used to clear land for rubber.

Table 20: Plots Cleared by Fire by Type of Plot

	Block A (n=744)	Block E (n=350)
Rubber Plots	53.0%	87.7%
Other Plots	2.4%	0.3%
Rattan Plots	1.1%	4.6%
Upland Plots	20.8%	0.9%
Paddy	0.1%	
Bush Plots	22.6%	6.6%

The difference in farming systems is also seen in land clearing by fire in the past year, with a great deal more clearing by fire in Block A than Block E. In the past year, of the total plots in use in Block E, only 3.3% were cleared with fire and almost all of these plots (3%) were being cleared

for rubber. In Block A, over 15% of the plots were cleared with fire in the past year; but only 1.4% of the plots were for rubber and 13.4% of the fire cleared plots were for upland agriculture. The difference in type of plot is important. Rubber plots are cleared only once before planting the rubber. Upland plots, particularly upland rice plots are burned annually. Thus in Block E, annual burning is primarily on new land and not repeated on that land again for generations. In Block A many of the plots are burned on an annual basis.

Table 21: Type of Plots Cleared by Fire

Cleared by Fire before last year (2008)		Block A (n=1,144)	Block E (n=658)
	Rubber Plots	33.0%	43.6%
	Other Plots	1.4%	0.2%
	Rattan Plots	0.7%	2.4%
	Upland Plots	0.2%	0.2%
	Paddy	0.1%	0.0%
	Bush Plots	14.3%	3.5%
	Total	49.7%	49.8%
Cleared by fire in the last year (2008)	Rubber Plots	1.4%	3.0%
	Other Plots	0.2%	0.0%
	Rattan Plots	0.0%	0.0%
	Upland Plots	13.4%	0.3%
	Bush Plots	0.3%	0.0%
	Total	15.3%	3.3%

Table 23: Burning on Soil Type in Block E

	Deep Peat (>2m)	Shallow Peat (>2m)	Mineral Soils/Other	Total
Rubber Plots	0.9%	6.0%	80.9%	87.7%
Other Plots			0.3%	0.3%
Rattan Plots			4.6%	4.6%
Upland Plots			0.9%	0.9%
Paddy				
Bush Plots	0.9%	0.6%	5.1%	6.6%
Total	1.7%	6.6%	91.7%	100.0%

Table 22: Burning on Soil Type in Block A

	Deep Peat (>2m)	Shallow Peat (>2m)	Mineral Soils/Other	Total
Rubber Plots	1.2%	27.7%	24.1%	53.0%
Other Plots	0.1%	1.2%	1.1%	2.4%
Rattan Plots		0.1%	0.9%	1.1%
Upland Plots	0.4%	14.4%	6.0%	20.8%
Paddy		0.1%	6.0%	6.2%
Bush Plots	1.3%	15.2%		16.5%
Total	3.1%	58.7%	38.2%	100.0%

In contrast, over 91% of the burning in Block E took place on mineral soils with only 6.6% on shallow peat. And the majority (almost 88%) of burning was to open up rubber plots.

The use of firebreaks to control clearing is greater in Block E than in Block A. In Block A, over all types of plots, firebreaks are reported to be used only 50% of the time. In Block E, the percentage is higher, almost 65%. In Block A 45% of the rubber plots cleared with fire

Table 24: HH Using Fire Breaks by Type of Plot

	Block A		Block E	
	Not Use Fire Break	Use Fire Break	Not Use Fire Break	Use Fire Break
Rubber Plots	29.0%	23.9%	30.3%	57.4%
Other Plots	0.8%	1.6%		0.3%
Rattan Plots	0.5%	0.4%	2.3%	2.3%
Upland Plots	7.9%	12.9%	0.3%	0.6%
Paddy	0.1%			
Bush Plots	11.6%	11.0%	2.3%	4.3%
Total	50.0%	49.9%	35.1%	64.9%

main reasons households used fire to clear their differences in agricultural systems in the two blocks. were that fire increased fertility and reduced pests. The predominance of these answers reflects the greater number of households growing upland rice.

In Block E, the two main reasons for using fire were to increase fertility and to clear land more easily and less expensively. This reflects the situation in Block E where most of the clearing of land has been for rubber on previously uncleared land.

There is also a noticeable difference between the two Blocks on the type of soil on which burning takes place. The survey collected basic data on soil types, deep and shallow peat and mineral soils, by defining deep peat as peat over 2 meters deep and relying on farmers estimates regarding the depth. The results showed that little burning is done on what farmers estimate to be deep peat. However, Block A farmers report that almost 59% of their use of fire was on shallow peat and 38% was on mineral soils. Almost half of that burning was on rubber plots and the remainder on upland plots and bush plots.

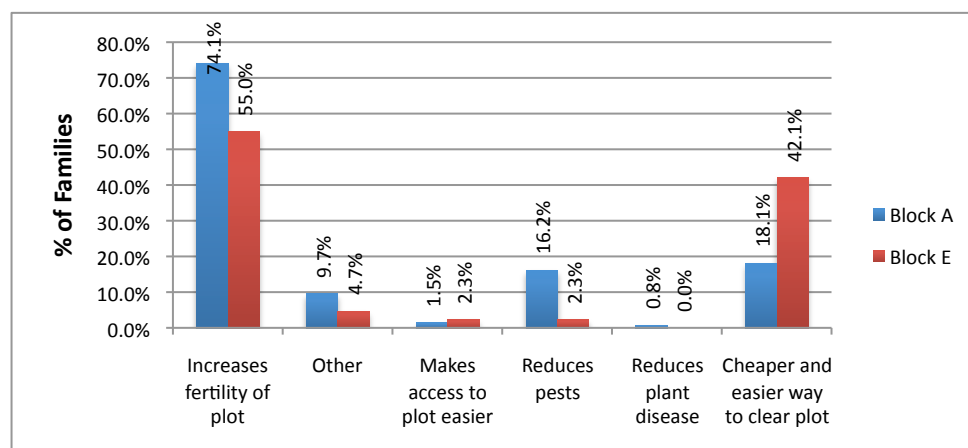
had firebreaks and almost 62% of the upland plots cleared with fire had firebreaks. Using fire to clear rattan plots had the lowest use of firebreaks with 43%. In Block E, except for rattan plots, firebreaks were used at least two-thirds of the time. In the rattan plots, farmers built firebreaks only 50% of the time.

The survey collected data on the plots. Again the results reflect the In Block A, key reasons for using fire

Table 25: Percentage Plots, by Type of Plot, Cleared with Fire Breaks

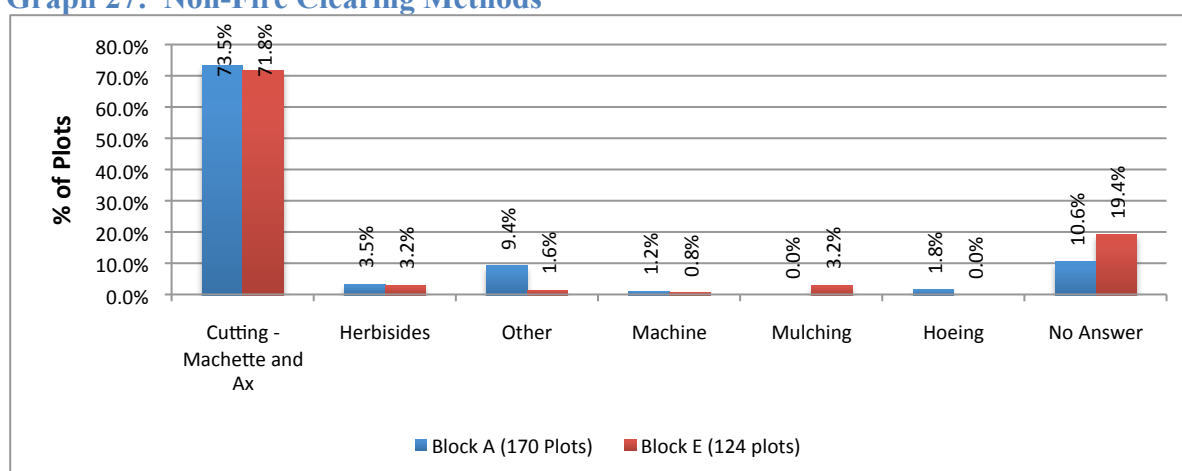
	Block A	Block E
Rubber Plots	45.2%	65.5%
Other Plots	66.7%	100.0%
Rattan Plots	42.9%	50.0%
Upland Plots	61.9%	66.7%
Paddy	0.0%	
Bush Plots	48.8%	65.2%

Graph 26: Reasons for Using Fire



As noted above, In Block A 18.6% of the plots and in Block E 25.8% of the plots were not cleared by fire. When plots were not cleared with fire, the main method was to use axes and machetes to cut down and clear the trees.

Graph 27: Non-Fire Clearing Methods



There are many reasons that households did not use fire to clear their plots, and it is clear that in general, following government regulations or protecting the environment were not strong motivators to clearing without using fire.

Table 26: Reasons for Not Using Fire

	Block A	Block E
Government Regulations	13.5%	11.3%
Other	63.5%	57.3%
Protect the Environment	11.8%	12.1%
No Answer	11.2%	19.4%

Plots and losses due to fire

Table 27: % of Households Experiencing Loss due to Uncontrolled Fire

	Block A	Block E
HH Experienced Loss due to Fire	58.2%	22.5%
HH Not Having Experienced Loss due to Fire	41.8%	77.5%

Table 28: % of plots burned by uncontrolled fire by type of plot

	Block A	Block E
Rubber Plots	49.3%	57.5%
Other Plots	1.2%	2.3%
Rattan Plots	3.5%	3.4%
Upland Plots	12.6%	0.0%
Bush Plots	33.4%	36.8%

Table 29: Estimated Losses Due to Out of Control Fires

	Block A (n=156)	Block E (n=28)
Total Estimated Losses	IDR 1,827,585,000	IDR 221,414,000
Per Family Giving Estimate	IDR 11,715,288	IDR 7,907,643

Table 30: Sources of fire for burned plots

	Block A	Block E
From Neighboring Plot	42.9%	37.2%
From out of control forest fire	48.8%	57.7%
Other	8.3%	5.1%

While households feel there are benefits to clearing land with fire, there are also losses associated with fire; more so in Block A than in Block E. In Block A, over half the households (58.2%) report losses due to out of control fires.

In Block E less than a quarter (22.5%) report ever experiencing losses due to out of control fire. In Block A, the survey found that over 37% of the plots reported that one time or another having been burned by out of control fires. In Block E, the impacts of out of control fires were less, with only 13% of the plots being affected.

The survey asked the respondents to estimate the losses they have experienced due to out of control fires burning their plots. As would be expected, the total losses were higher in Block A than Block E, IDR 1.8 billion to IDR 221.4 million. In addition, per family loss among those who experienced losses is also higher in Block A than Block E, IDR 11.7 million to IDR 7.9 million per family.

In both Blocks, rubber plots and bush plots were the most effected by out of control fires. However, in Block A, a significant number (12.6% of all burned plots) of upland plots were also affected.

Respondents claimed that more than one-third (43% in Block A and 37% in Block E) of the fires that affected their plots originated in neighboring plots as clearing fires that got out of control. The remaining fires were reported to

have been the results of out of control forest fires.

Table 31: Reasons for out of Control Fires

	Block A (n=428)	Block E (n=87)
No answer/don't know	0.7%	10.3%
Long Dry Season	65.7%	65.5%
Other	2.8%	5.7%
Spread from other fields	30.8%	18.4%

When asked for causes of fires, almost two-thirds of the respondents answered long dry seasons, with a majority of the remaining fires (31% in Block A and 18% in Block E) coming from neighboring plots where the fire got out of control.

The over 91% of the respondents in both blocks are aware that the local government has placed bans and restrictions on the use of fire in agriculture. In Block A two-thirds (66.5%) disagree with these restrictions. In Block E, the level of disagreement is less, with less than half (47.6%) disagreeing with these restrictions.

Table 32: Agreement with Government Fire Regulations

Know or agree with gov. regulations banning the use of fire		BLOCK-A		BLOCK-E	
		#	%	#	%
YES	Agree	104	32.0%	132	48.0%
	Disagree	206	63.4%	120	43.6%
NO	Agree	5	1.5%	12	4.4%
	Disagree	10	3.1%	11	4.0%
GRAND TOTAL		325	100.0%	275	100.0%

Conclusions on Fire Use

While the use of fire for clearing land is almost universal, the agricultural and fire practices in Block A, combined with a local environment that is open to cultivation and prone to repeated fire, result in fire being both more necessary for livelihoods and a greater threat to both peat and livelihoods than fire is in Block E.

A greater percentage of plots are cleared with fire in Block A than in Block E. One-fifth of the plots cleared by fire in Block A are upland crop plots and these appear to be cleared annually. In Block E, fire is used mainly to clear rubber plots, which requires the use of fire only once in the life cycle of rubber.

In addition, over half of Block A plots cleared by fire, many of which are upland plots, are located on shallow peat increasing the risk of peat fires, particularly combined with less use of fire breaks in Block A. In Block E, the large majority of burning takes place on mineral soils.

The impetus for using fire, particularly in Block A, is that farmers see it as improving soil fertility and reducing pests. In Block E, the ease and low cost of using fire is an important impetus also.

The results of greater and more frequent use of fire in Block A than Block E are both a greater number of plots being damaged by out of control fires and larger financial losses from out of control fires in Block A than Block E. These losses are mainly in rubber and bush plots, but, in Block A, upland plots also.

Finally, despite the greater damage from out of control fires in Block A, a two-thirds majority of survey respondents feel that the benefits of using fire outweigh the detriments and do not agree with government regulations for limiting or forbidding the use of fire in agriculture. There is less resistance to such regulations in Block E, where less than half the respondents disagree with regulations limiting/prohibiting the use of fire.

For KFCP, the difference between the two blocks will most likely require different strategies. For the areas in Block E that depend on opening up plots in forest land for long term crops such as rubber and rattan, the emphasis will need to be either on reducing the amount of land being cleared or finding practical and economic alternative methods for opening up suitable forest lands.

For areas in Block A that are dependent on annual burnings of upland plots, either alternative methods of clearing and fertilizing the soil for the next crop will need to be found or alternative livelihoods developed so that households do not need to farm these areas. In addition, incentives an/or alternative livelihoods will need to be found to prevent annual burning or opening up of land on shallow peat.

In both areas, if necessary, incentives and policies will need to be developed to prevent any further opening up of deep peat areas for any reason in order to prevent degradation and increased fire risk.

Summary: Natural Resource Management Analysis

Although demographically very similar, the economic situation and management of natural resources are different between the two Blocks. The opening of the forest and construction of canals by the Mega Rice Project has had a large influence in Block A on how households and communities, access, manage and exploit their natural resources.

The opening of forestland and the easier access to this land via canals and other waterways has resulted in Block A having the following characteristics on how Block A households and communities manage their natural resources:

- Adopting more diverse agricultural/cultivation activities, particularly rubber (due to available market opportunities, recent high prices, and disappearance of other forest based opportunities) and upland plots with upland rice, along with continued extraction of forest products including fishing, logging, mining, and *gemor* collecting;
- Easier access to land has led to higher average number of plots per family and larger plots;

- Easier access to local government affected land tenure practices as it has increased the number of households holding some form of government certificate for the land they are using;
- Former forest lands are converted into agricultural land. This leads to greater use of peat lands for agriculture, including upland plots, rubber, and bush plots;
- Higher use of fertilizer, much of which is on peat lands;
- High dependence on man-made waterways to reach household plots;
- Higher extraction of timber products and illegal logging before increased government enforcement of regulations;
- Fire is used more frequently to clear plots on peat soils;
- Less use of fire breaks when using fire to clear plots;
- Greater dependence on fire for clearing land, particularly upland plots;
- Higher number of plots burned by out of control fire combined with higher losses per plot; and
- High disagreement with government regulations restricting the use of fire for clearing plots.

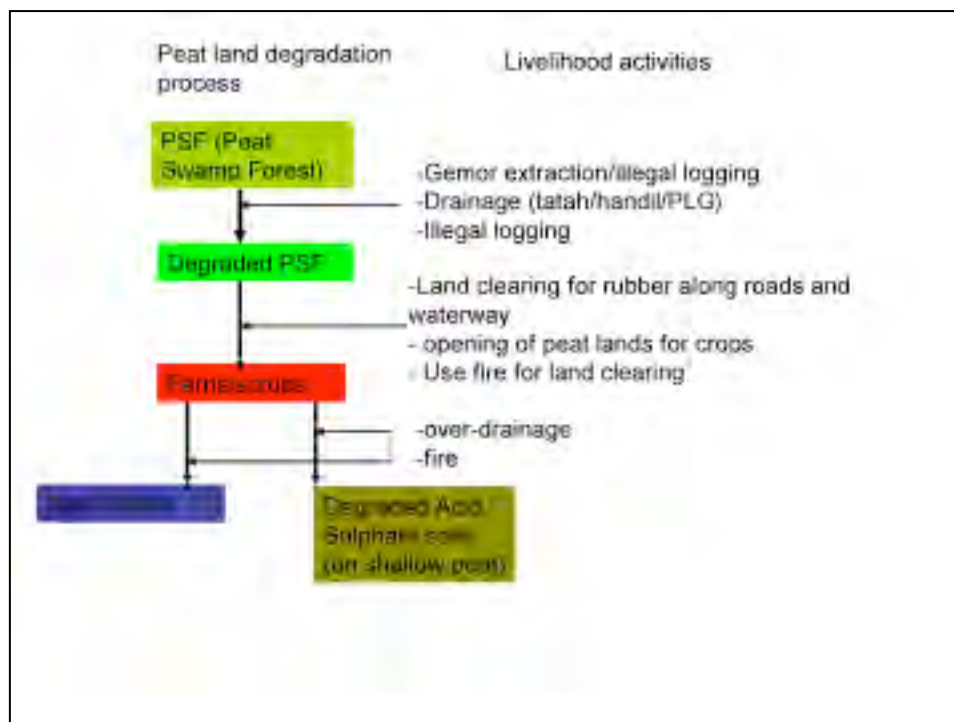
In Block E, where development by the EMRP did not take place, households continue to be dependent on forest extraction. Without the clearing and canal construction of the EMRP, communities in Block E have not been able to significantly extend their agriculture (both in terms of location and diversity of production) into peat lands and therefore continue to base their livelihoods and economy on extracting forest resources. In Block E, characteristics of how households manage their natural resources include:

- Aside from rubber cultivation, little cultivation of upland crops or other crops and a high dependence on extraction of forest resources including fish, *gemor*, and gold;
- Smaller and fewer plots per household;
- Minimal use of peat lands for agriculture;
- Little use of fertilizer;
- Very low dependence on man-made waterways to reach their plots;
- Less extraction of timber products and therefore relatively more dependence on non-timber products, particularly *gemor*;
- Marginally less use of fire, and little use of fire on peat lands;
- Higher use of fire breaks when using fire to clear plots;
- Little use of annual burning of plots due to low numbers of upland plots;
- Fewer plots burned by out of control fires and less loss per household affected;

- Less disagreement with government regulations restricting the use of fire for clearing plots.

Overall, the contribution of the areas natural resource management and livelihood strategies to peat land degradation is determined by access to peat lands. Traditional *tatahs* have a negative, but limited, impact on peat lands as the communities do not have the skills or means to widen and deepen them; thus the landscape remains forested. On the other hand, the EMRP canals and clearing of forest both forced and provided an opportunity for households to adjust livelihoods toward a more cash based (see investments in agriculture tools and fertilizers), agricultural based economy and accelerated exploitation of the remaining peat forests (including illegal logging before enforcement of government regulations). This exploitation and degradation leads to greater risks of fire due to increased use of fire and larger areas of drained peat and combustible forest cover. This triggers a spiral of increased exploitation, increased use of fire and waterways stimulating drainage, and further peat degradation, all of which enhance peat related GHG emissions. The graphic below diagrams the different steps in the peat land degradation process.

Figure 2: Peat Land Degradation Process



The result of these different ecologies and the natural resource management systems adopted in each Block is that Block A is not only at risk of experiencing continued degradation, but presents the greatest challenge for reducing degradation. Continued degradation is possible due to the access through man-made waterways to peat land areas and the opening of these lands to managed cultivation, which includes the use of fertilizer and fire for clearing, and which further degrade or destroy peat and peat forests. The challenge for the KFCP project in Block A is that restoring peat forest will require the communities in Block A to change their current natural resource management patterns in order to reduce or forego agriculture on drained peat, use of man-made waterways, and use of fire to clear land. In addition, these communities will need to adopt forest exploitation methods that do not generate GHGs.

These changes have a great potential for negatively impacting Block A livelihoods if there are no alternative sources of incomes or livelihood.

The natural resource management systems in Block E are currently less destructive of peat forests than those of Block A. The challenge for the KFCP project in Block E is as much as, if not more so, to prevent forest degradation and strengthen the area's capacity and to sustainably exploit the forest in a way that does not generate GHG emissions and leakage of GHG from peatlands.

Conclusions

The baseline was designed to a) provide socio-economic data that can be tracked overtime in order to know if KFCP and REDD interventions are having negative, neutral, or positive effects on the socio economic welfare of the area, and b) to identify resource management/use patterns related to the three underlying factors, drainage, fire, and forest cover that influence the emissions of GHGs. Due to the different levels of forest degradation in the KFCP area, the analysis was divided and compares data from the Block A in the South and Block E in the North.

Demographically, both areas are similar with the majority of the population being *Dayak Ngayu*. There are little differences in family make up or religious affiliation. The education levels are slightly higher in Block A than Block E; this can be attributed to Block A's proximity to the sub-district center and easier access to education beyond primary school.

Block A is marginally wealthier than Block E, though the area itself can not be considered wealthy. Block A has relatively higher family expenditures and greater (although still poor) access to social institutions and government educational, health, and other social-economic support programs. On the other hand, Block A households report higher levels of sickness symptoms and diarrhea in children.

These results show that socio-economically there are improvements that need to be or can be made:

- Roughly a fifth to a quarter of the population can be considered relatively poor compared to their neighbors, with Block E being relatively poorer;
- The water, sanitation, child nutrition, and health conditions are extremely poor and in need of improvement
- Post grammar school education levels can be improved with greater access to schools

Block A was partially developed by the EMRP, resulting in a system of canals and a majority of the area becoming degraded peat swamp forest and shrub and fern lands. The Block E section was not "developed" and remains primarily peat swamp forest. The difference in access to (ex) forest lands and the resulting degradation in Block A has resulted in real environmental and land use practice differences between the two Blocks.

Households in Block A tend to manage more plots that and total area than households in Block E. Block A cultivation and livelihood patterns are more diverse. While rubber crop cultivation and fishing are key sources of livelihoods in both Blocks, in Block A upland farming and bush plots also make important contributions to livelihoods. In Block E, there are few upland plots, and households rely more on extracting natural resources, particularly gold mining and *gemor* collecting.

More than half of Block A's plots are on peat land. Shallow peat land is used for all types of plots including rubber, upland, and bush plots. To increase the fertility, a small percentage of Block A plots are applied with urea, and most of these plots are on peat land.

Block A households are highly dependent on man-made water-ways to reach their plots and to exploit forest resources. Starting with the EMRP canals, Block A households have organized to expand the water way system (through *handil* and *tatah*) in order to access their land.

Finally, Block A households are more dependent on fire to clear land, particularly upland plots, through routine burning to prepare them for new crops. Block A households also experience more accidental burning of their plots from out of control fire, and their estimates of losses per plot are higher than losses estimated by Block E households.

Block E households, on the other hand, do not have government built access to forestland, and therefore exert a lot less pressure on the forest. Households in Block E have fewer plots and the typical plot is smaller than the plots in Block A. This, combined with greater distances to markets and government service for the inhabitants of Block E has resulted in Block E residents being marginally poorer than Block A residents. Their monthly expenditures and assets are less than those in Block A, and their access to government educational, economic, health, and social programs is lower. That said, the health data for Block E is slightly better than Block A, but still not good.

The majority of Block E household plots are on mineral soils on the banks of rivers near their settlements. This alleviates pressure on the area's peat lands as access to cultivated plots is by river with almost no use of man-made waterways (*tatah*).

Rubber makes up more than two-thirds of the plots in Block E, and the remainder is some form of tree or rattan crop. There is little to no upland farming in Block E. Livelihoods are a combination of rubber and exploiting forest and natural resources, particularly fish, gold, and *gemor*.

As in Block A, fire is used to clear plots, but less frequently as clearing for rubber or other forest crops is usually a one time occurrence. There is clearly little or none of the annual burning apparent in Block A. In addition, the majority of the burning has been on mineral soils, not peat soils.

Implementing KFCP activities in both Blocks will require both community support and real alternative sources of incomes and livelihoods for the participating communities. However, the strategies will need to be different in each Block. In Block A, the dependence of household livelihoods on cultivating peat land, using man-made waterways, and using fire will require the development of direct REDD payment and alternative livelihood strategies that provide great enough economic benefits for households and communities that they choose to restrict and or abandon their access to peat and the use of man-made waterways and fire. This is a major challenge due to the fact that these communities' livelihoods are dependent on management techniques that degrade peat lands, prevent forest regeneration and cause GHG emissions.

Implementing KFCP activities in Block E will need to focus on REDD direct payment and alternative income generating strategies that give households and communities competitive/alternative economic benefits for preserving the existing peat swamp forests and

managing extraction of forest resources in ways that are both sustainable and do not cause GHG emissions.