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Migrants, livelihoods and equity: Understanding for Emissions Reduction in Jambi (Sumatra, Indonesia)

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Abstract

Continuing carbon emissions from conversion of peatlands for agriculture or plantation industry are targets for the Government of Indonesia in achieving a break with 'business as usual', while maintaining national economic growth. Land use by local farmers and spontaneous migrants to the peatlands in comparison with that on adjacent mineral soils is a relevant part of the issue, with indicators of equity relevant for pro-poor, pro-investment policy design for a green economy. The study compared four types of smallholder farming community in the Tanjung Jabung Barat district of Jambi (Sumatra, Indonesia): local farmers on mineral soils and peatland parts of the landscape, government-sponsored migrants on the mineral soils and spontaneous migrants on the peat. Focus group discussions and household survey were employed in the study. Average income per year per household was higher in mineral soil areas than on peat, suggesting that a shift of development towards mineral soils can be attractive for emission reduction. The income of transmigration villagers was about three times that of local villagers, because they grow oil palm and rubber. The older migrants have invested in coffee agroforestry under betel palms with lower profitability than the oil palm chosen by more recent migrants prioritize. Equity of income is higher in the peat soil areas than in mineral soil areas, as indicated by a lower Gini ratio. Financial surplus from oil palm income for transmigration villagers is used to buy new land from the local community and invest in oil palm expansion, further increasing the income gaps.

Keywords: agroforestry, peatland, rubber, oil palm expansion, income, Gini ratio

1 Introduction

Indonesia made voluntary international commitments to reduce carbon dioxide emissions through its NAMA (national appropriate mitigation actions) plans; it committed itself to reduce emissions 26% below the 2020 'business as usual' level, expecting a further 15% reduction with international support. The target is to achieve this emission stabilization at approximately the level of 2005 without compromising economic growth, aiming for 7% of GDP (gross domestic product) growth per year. These national targets require sub-national strategies in low-carbon emission development plans that fine-tune the design of interventions for a green economy. An understanding of current livelihood strategies in high- and low-emission parts of the landscapes is required. In Indonesia's lowland peat areas the total carbon stocks per ha are at least 10

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times as high as those on mineral soils (Agus et al. 2011) and emissions are high during conversion from forest to other land use, as well as in recurrent annual emissions due to drainage of the peat. Districts that have both peatland and mineral soils are a natural laboratory for operationalizing low emission development strategies. Tanjung Jabung Barat in Jambi province, neighbouring Riau province, is such a district; its estimated annual emissions from land use change alone were 6.6 ton CO_2 eq/ha/year for the 1990-2005 period, more than twice the average for Indonesia and one and half times the average for Jambi, the province with third-highest emissions per unit land area, after Riau and Central Kalimantan province (Ekadinata et al. 2011).

Emission reduction requires a break with current land use practices that have evolved because of providing local livelihoods. New forms of investment may be needed to support forms of land use that reduce emissions without decreasing human welfare. As different actors, both large-scale and smallholders, local communities and migrants are usually involved; reduced emission development may involve shifts between these groups. Basic data on current land use practices as source of income is needed, along with the equity-enhancing or equity-reducing characteristics of the various activities.

The objectives of the livelihood characterization study for Tanjung Jabung Barat district were to study: 1) land use strategies on the peatland and mineral soil parts of the District, lined to main land users and associated changes over time; 2) the livelihood strategies that include off-farm activities; and 3) the poverty and equity dimensions of different activities. The results can inform the design of emission reduction interventions in the district and others with similar characteristics.

2 Methods

2.1 The Study Area

The study site is Tanjung Jabung Barat district in Jambi Province, Sumatra, Indonesia (Figure 1). The total area is around 5,000 km^2 with almost 40% peat area in the east towards coastal areas. About 48% or 240,000 ha of the district is classified as 'forest area'. About 71% of 'forest area' is classified as production forest, 6. 65% is protected peat forest and 3.66% is a national park. The proportion of 'non forest area' in this district is very high, dominated by coconut agroforestry, rubber agroforestry, rubber monoculture and most recently palm oil.

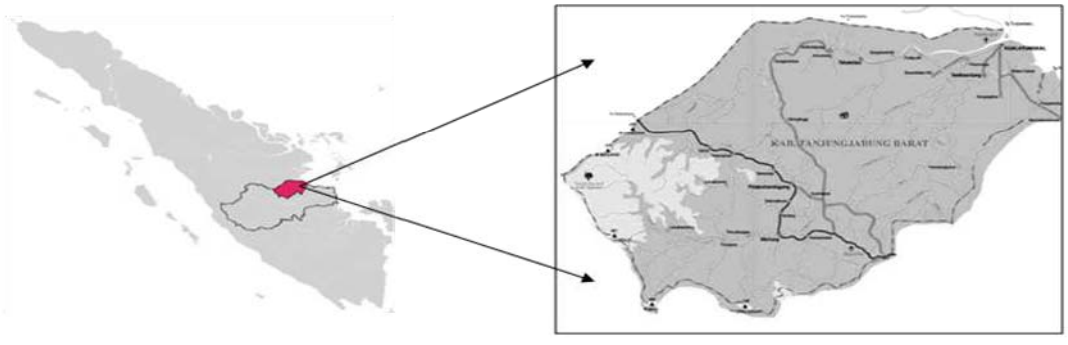

Figure 1: Location of Tanjung Jabung Barat district, Jambi province, Sumatra, Indonesia

In 2009, the population was approximately 266,952, with a density of 51 people/km^2. Early migration occurred in the 1940s to 1950s. These people were typically of Bugis and Banjar ethnicity, from Sulawesi and Kalimantan Island. More significant migration to this site occurred in 1980s and 1990s with the transmigration program. Transmigration was established to get establish a labour force in the area in order to develop large scale palm oil plantations. The study area is portrait of peat land areas in Indonesia with high pressure of migration and developing of oil palm plantation.

2.2 Research Method

The livelihood study using data collected from community and household interviews. Based on the type of soil (mineral soil and peat soil) and migration type (migrant and local community) we stratified the community in the study site into four strata which are as follows; 1) the local community living on mineral soil; 2) the transmigrant and spontaneous migrants on mineral soil; 3) the older migrant community on peat soil; and 4) the recent migrants on peat soil.

Eight focus group discussions were used to gather information on sources of livelihood, land management practices, demography, poverty, and major development or commercial activities. About 10 to 15 people representing the formal and informal leaders were invited to attend one day of discussion from 8 am to 5 pm in every focus group discussion. Following up on issues raised at the focus group discussions, more quantitative data was collected through a household survey (in-depth interview). Forty respondents were interviewed in the mineral area (some transmigrant village people and some local village people) and 40 in the peat area (some old migrants from the village and some recent migrants from the villages). As much as possible, both the husband and wife in each household were interviewed together.

3 Results and Discussion

3.1 Livelihood options

This section discusses the various livelihood options of the communities in the study area. It identifies what major and important livelihoods are at the present, as well as the changes of community

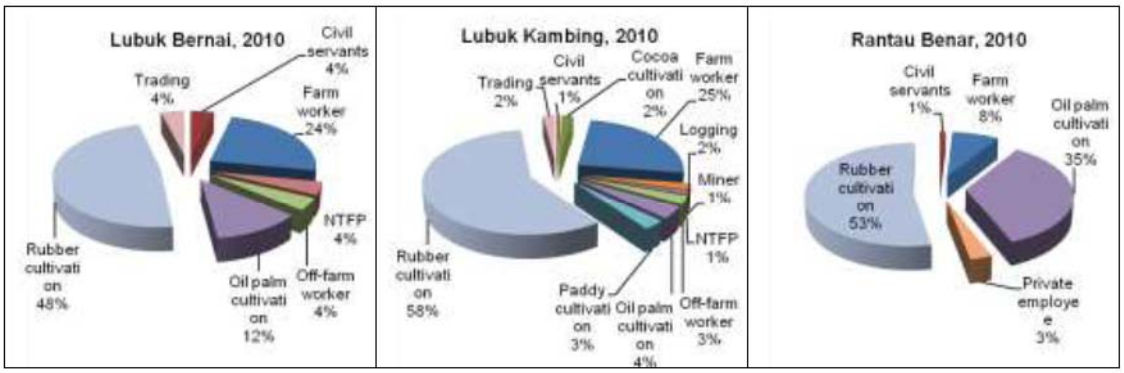

Figure 2. Components of main livelihoods strategies in mineral soil-local community

livelihoods in different periods and strata. Changes of livelihoods were examined for fivetime periods: 1) the early years of a village's establishment; 2) 1970's (logging concession period); 3) 1990s (transmigrant and oil palm period); 4) 2000's (reformation era); 5) the current time (2010). We interviewed three different community strata: 1) the local community living on mineral soil; 2) the transmigrant/spontaneous migrant community on mineral soil; and 3) the migrant community on peat soil (historic and recent migrants).

The local community on mineral soil were the Malay people who already lived in the villages before the 1900s. The history of agriculture systems in this area began more than a century ago, and over time the systems have transformed from sub-systems to become more market oriented. Currently, the livelihoods of most communities rely more on commercial tree-crops such as rubber and oil palm, and many people work as farm labourers (Figure 2).

The transmigrant and spontaneous migrants on mineral soil area were mostly come from Java island. People in this area rely on commercial tree-crops, especially oil palm. Currently, important livelihoods in the region are oil palm cultivation, daily labour for oil palm companies, farm work, livestock work and trading.

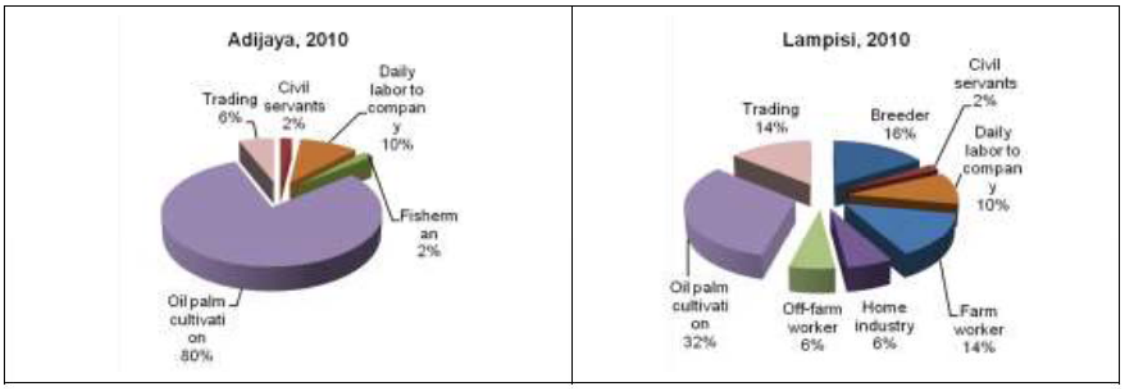

Figure 3. Components of main livelihoods strategies in mineral soil-migrant community

The transmigrant and spontaneous migrants on mineral soil area were mostly come from Java island. People in this area rely on commercial tree-crops, especially oil palm. Currently, important livelihoods in the region are oil palm cultivation, daily labour for oil palm companies, farm work, livestock work and trading.

The two transmigrant villages located in the mineral area shows oil palm option is still a main source of income, but there are others. Villages and communities are more developed; there are off-farm sectors such as home industries. Entrepreneurial ventures and trading are fairly advanced. In contrast, in the newly established transmigrant villages, dependency on oil palm is very high, reaching about 80% of total livelihoods. This figure is followed by labourers who work at the oil palm companies (10%) (Figure 3).

The migrant community in the peat soil area is comprised of migrants (both historic and recent) who have come from Banjar, Java, and Bugis since the 1900. The migrant people mostly rely on agricultural sectors that require specific drainage systems (canal and ditch) to manage and drain excess water, avoid high level of peat acidity, and to prevent flooding in tidal phases. They spent a lot of money in order to maintain the drainage system.

Recently, coconut agroforestry and coffee agroforestry were major sources of livelihoods in peatland villages. However, oil palm is also an important source of livelihood. It has been predicted the role of oil palm will increase because of its profitability. Other sources of livelihood are farm work, off-farm work,

swamp paddy cultivation and rubber harvesting (Figure 4).

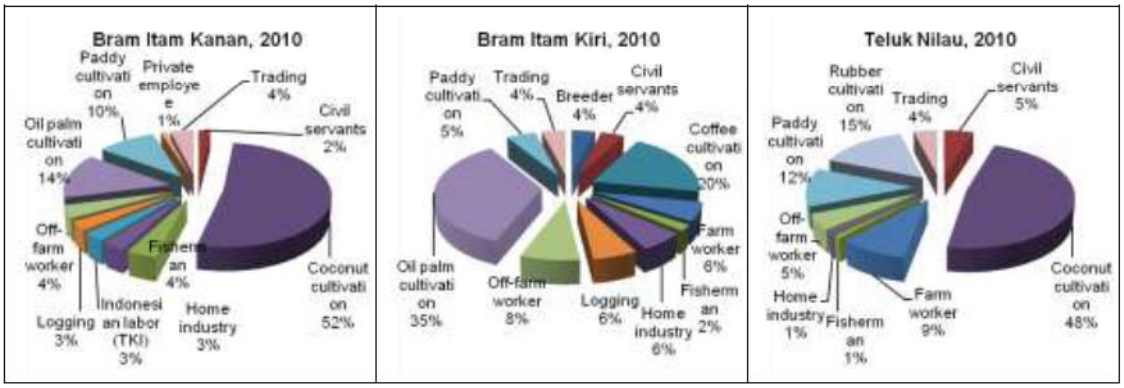

Figure 4. Components of main livelihoods strategies in peat-migrant community

3.2 Land holding area of the household

Based on our survey of 80 households, our findings reveal that the average land holding of transmigration villagers in mineral soil was the highest (8.12 ha), following by recent migrants in peat (6.19 ha), local villagers in mineral soil (4.91 ha) and the lowest was old migrant villagers in peat (4.37 ha) (Figure 5).

The compositions of land holding by land use types were different across the sites. Transmigration villagers owned 99.6% of oil palm and only 0.4% of bush fallow. The ratio of transmigration villagers to oil palm was very high. However, the composition of land holding by land use for local villagers in mineral soil is different. They owned 35% of oil palm, 35% of rubber, and 30% of bush fallow.

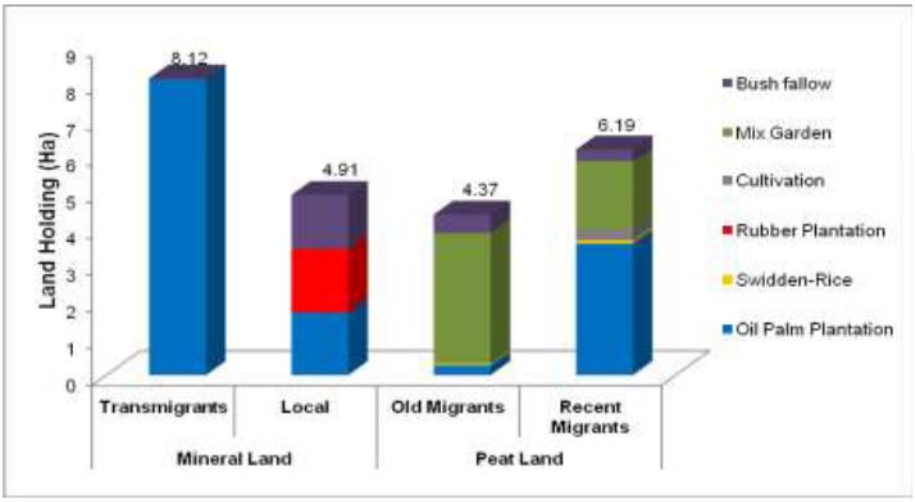

Figure 5. Land holding per household

In peatland, the agroforestry or mixed garden system that consists of a mix of coconut with betel palm (*Areca catechu*) and/or coffee is very important for old migrants. The average mixed garden plantation (agroforest) land is 3.56 ha or 81% of total land holdings while the average oil palm land is 6% and bush fallow 11%. The swidden-rice percentage is very small.

All land belonging to transmigration, local and old migrant villagers is private land. However, for the recent migrants in peat, around 71% of total land holding is state land. They planted mostly oil palm (82%) and a small area is used for a mix of gardens and bush fallow. The private land belonging to the recent migrants is located far away from the village or in the previous villages of the migrants and it is mostly planted by mixed trees (agroforestry).

3.3 Poverty and equity status of the household

3.3.1 Poverty analysis

We used income as a quantitative indicator to assess the poverty of the studied area. The calculation of income included the value of commodities consumed. However, most of income came from cash crop (crops grown for profit).

The average of total income per year per household in the mineral area was higher than in the peat area. However, the difference of income between transmigration villagers and local villagers was high. The income of transmigration villagers was about three times of local villagers. In contrast, the income of old migrants and recent migrants in the peatland area was almost the same. The daily income per capita of transmigrant villagers in the mineral area was IDR 71,455 (USD 7.9)[1], local villagers was IDR 25,046 (USD 2.8). In the peat area, the daily income of old villagers was IDR 32,484 (USD 3.6) and recent migrant villagers was IDR 27,816 (USD 3.1) (Figure 6).

The average family size ranged from 3.1 to 3.8 members at both sites. Using the international poverty line standard of USD 1.00 a day (the World Bank standard), the percentage of respondents living below the international poverty line in mineral area and in peat area was none (0%).

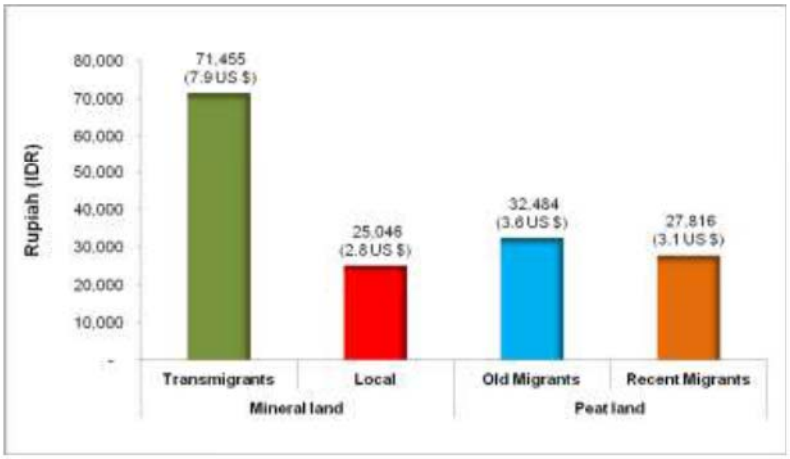

Figure 6. Income per capita per day

The basic income equation for income from self-employment (in agricultural or business) is:

$$I = \sum_{i-i}^{n} piyi - \sum_{j-1}^{m} qjvj$$

[1] Average exchange rate in 2010 was USD 1 = IDR 9,000.

Income (*I*) is gross value (price times quantities of all *n* products) minus total costs (price times quantities of all *m* purchased inputs), for example, fertilizers, seeds, tools, hired labour (Angelsen and Lund, 2011). Agriculture is the major source of income in both the mineral and peat areas, but the type of agricultural income is different. In transmigration villages in the mineral area, the highest source of income is from oil palm plantation (75.24%), while rubber plantation (60.68%) was the major source of income of the local villages in the mineral area. The share of income from oil palm plantation in local villages in the mineral area is low (8.90%) (Figure 7). It is expected the share of income from oil palm will increase in the near future as about 35% of land holdings are currently immature oil palm.

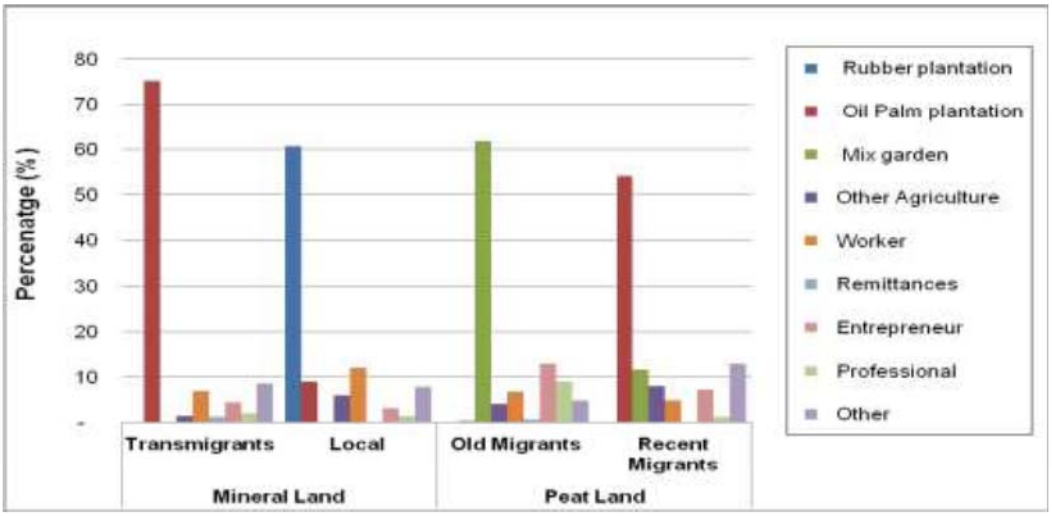

Figure 7. Household income by activity type (%)

In the peatland area, the major source of income between old migrants and recent migrants is also different. The highest source of income for old migrants is the mixed garden (62%), while oil palm (54%) is the major income for recent migrants.

3.2.2 Equity analysis

In order to analyze the equity of income, decomposition analysis was applied using the Gini coefficient that ranges from 0 (equal distribution of income) to 1 (total concentration of income). Gini decomposition is commonly applied in economic analysis, it is a (Alderman and Garcia 1993) formula that was developed by Fei, Ranis, and Kuo (1978) and Pyatt, Chen, and Fei (1980). The computation results of the decomposed Gini ratios show income is higher in the mineral areas (0.39) than in the peat areas (0.22), but this figure is relatively small. This indicates that income at both sites is equally distributed.

The assessment of income inequity s calculated using the concentration coefficient. A source of income is influential in improving income equity if it has a concentration coefficient of less than 1. On the contrary, if the concentration coefficient is higher than 1, the source of income is influential in causing income inequity.

Income from rubber plantations reduced the overall inequity of income distribution at the mineral area. This suggests that the income from rubber plantation is relatively equally distributed, making this income

important in reducing poverty and increasing income equity. On the other hand, income from oil palm plantations from private land leads to unequal income distribution in the mineral area. Wealthy farmers often extend their private land through purchasing, which seems to have concentrated the income from private land into the hands of fewer people. In contrast, in the peat area, income from oil palm plantation on state land reduced inequity of income, since forest areas were more available in the peat area (Figure 8 and Figure 9).

The coefficient concentration for mixed gardens (1.89) showed an increase in the inequity of income in the peat area, and the share of income was high (37.52%). This implies the value of mixed gardens in the peatland area is high.

Working (assessed through wages) from agriculture, especially in oil palm plantation, makes up an important share of total income (5.76% - 8.28%) and the concentration coefficient was lower than usual for both sites, which implies a distribution that is equal. It is important to note that for poor farmers, their wages are a very important income source.

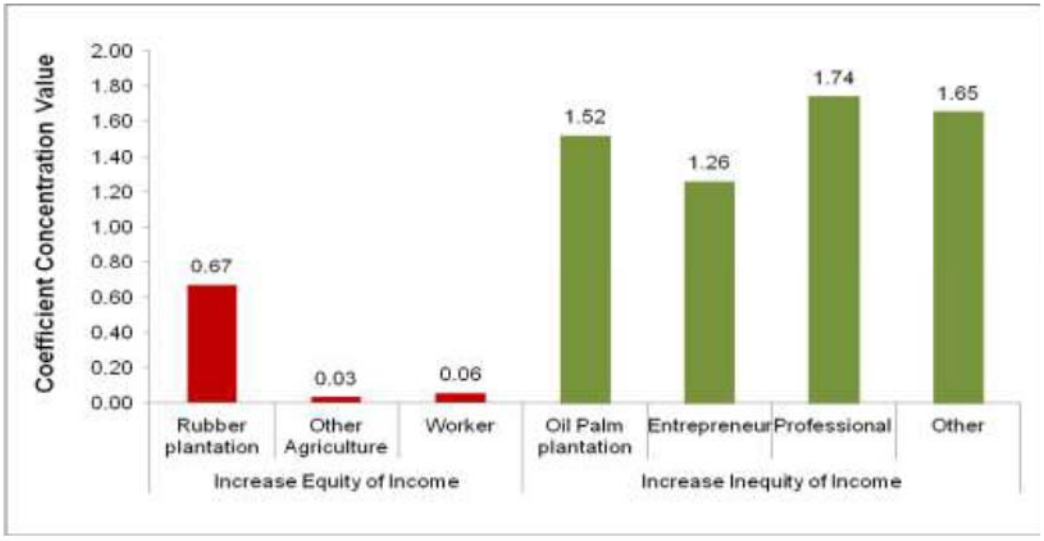

Figure 8. Coefficient concentration in mineral area

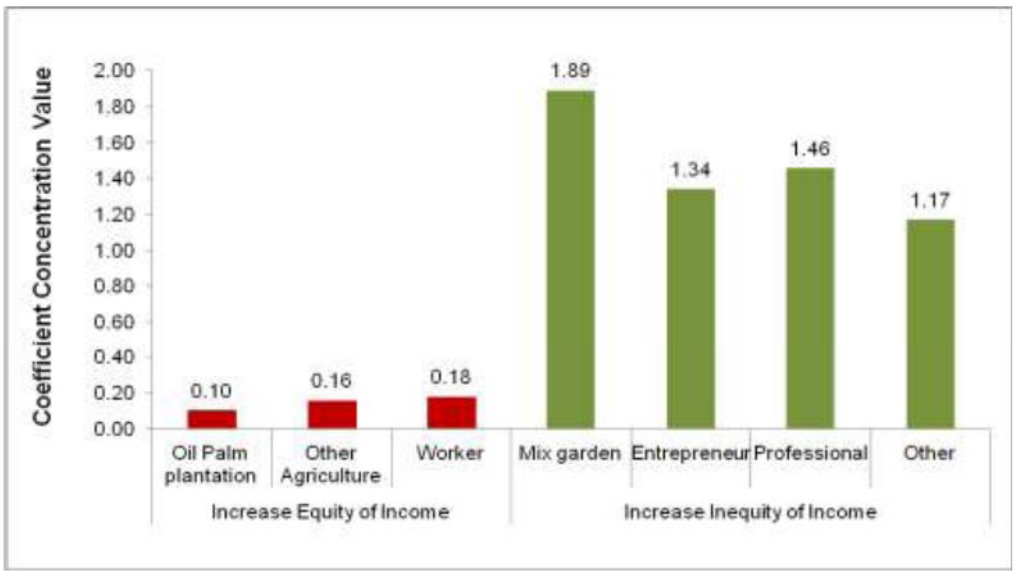

Figure 9. Coefficient concentration in peat area

Other agriculture (agriculture from household gardens and livestock) also reduces income inequity at both sites. About 2.85% - 5.89% of total income is from 'other agriculture'. Non-farm income (entrepreneurship and professional work) is more unequally distributed at both sites, the mineral area and the peat area. Income from entrepreneurship accounted for 4.10% of total income in the mineral area and 10.18% in the peat area. Income from professional work was 1.88% of the total income in the mineral area and 5.20% in the peat area. Most non-farm income came from professional work requiring higher skills, higher education and large amounts of capital, such as teaching, government positions, *warung* (small shops) and trading. Therefore, non-farm income widened the income disparities between individuals and households in the community.

4 Conclusion and Policy Implications

This study shows the welfare level among different community types, as indicated by income and land holdings are different. The average of total income per year per household in the mineral area is higher than in the peat area. However, the difference of income between transmigration villagers and local villagers is also high. The income of transmigration villagers is about three times that of local villagers. In contrast,the income of old migrants and recent migrants in peatland is almost same. The compositions of land holding by land use types were different across the sites. Most of the transmigration villager land was oil palm. The composition of land holding by land use for local villagers in mineral soil is different, dominated by rubber and oil palm. In peatland, the agroforestry or mixed garden system that consists of a mix of coconut with betel palm (*Areca catechu*) and/or coffee is very important for old migrants's income stability.

The equity of income is higher in the peat area than in the mineral area, indicated by a lower Gini ratio. Income inequity is very high between transmigrant and local villagers in the mineral soil area. The surplus from oil palm income for transmigration villagers is used to buy new land from the local community and investing in oil palm expansion, further increasing the income gaps.

Designing an intervention of emission reduction without understanding the livelihood strategy of communities can often lead to misleading recommendations. In this study, the economic situation of villagers has been outlined. Some of these implications from this study are as follows:

- A total restriction of the development of oil palm will have a negative impact on smallholder livelihoods. The development of oil palm can still continue but it should be converted from the land that has a lower carbon stock. Rahayu et al. 2011 reported the average carbon stock of oil palm plantation is 40 tonne C per ha. Not converting land that has carbon stock of more than 40 tonne per ha could be used as a threshold for a policy.
- Reward rubber agroforestry farmers by giving technical assistance, providing good planting materials, increasing the quality of slab and improving their access to the market.
- Policy development in local villages should be a priority in order to reduce the income inequity between transmigrant and local villages.

- Rehabilitate degraded peatland area with agroforestry systems such as coffee, coconut, betel nut, and *jelutung*.
- Consider restricting large scale development programs in peatland in order to avoid the environmental and socio-economic impacts of large-scale demographic shifts.
- Prioritize livelihood development for local village in order to decrease the income gap between transmigrant and local village.

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