

# Report for a Participative Community Development and Advocacy Project Analysis in Central Kalimantan, Indonesia



## Climate and Disaster Risks Project Analysis

Marion Künzler

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### **Text**

Marion Künzler, climate expert, *Bread for all*

### **Picture**

Marion Künzler, climate expert, *Bread for all*

Front page: Flooded area after heavy rainfall in Central Kalimantan in Indonesia.

**Bread for All** is the development organization of the Swiss Protestant Community of Churches. The organization supports 400 development projects and programs in 57 countries in Africa, Asia, and Latin America. In addition, its development policy has the goal of creating fairer international socioeconomic structures, maintaining creation, and bringing peace.

**Mission 21** works in 17 countries with 57 partner churches and organizations, a beacon of hope in the spirit of the Gospel. Around the world mission 21 assists in 100 projects, fighting against poverty, promoting health, improving the position of women, resolving conflicts peacefully and educating people in theology and the church. In Switzerland mission 21 organizes meetings, exchanges and research in the sensitive field of missionary work and developmental cooperation.

## Executive Summary

Climate change affects poor people in particular, because of their weak adaptive capacities. Development projects of all kinds can strengthen or weaken those capacities. At the same time, they can influence greenhouse gas emissions, the main cause of climate change, positively or negatively. Therefore it is important to evaluate the impacts of development projects on adaptive capacities and climate change mitigation, in order to find measures to improve projects in the face of climate change.

This Assessment Report presents the results and the lessons learned from the climate and disaster risk analysis of two projects. The overall goal of them is to create a new heaven and a new earth. The specific aims are to strengthen advocacy and education issues in Tamiang Layang and to develop rural communities in strengthening their economic opportunities in Loksado in Central Kalimantan, Indonesia. The analysis was conducted with the “Participatory Tool on Climate and Disaster Risks (CliDR)” from HEKS and Bread for All. The analysed project is run by the local Geraia Kalimantan Evangalis (GKE, Kalimantan Evangelical Church), and partly financed by Mission 21.

The evaluation shows that project beneficiaries suffer mainly from mining activities and floods in Tamiang Layang and flood, human diseases and pest diseases of plants in Loksado. Generally most of the observed risks are due to environmental risks and human activities (e.g. mining activities) and have a higher impact in this region than changing climatic conditions. Nevertheless, increasing flood frequency as well as landslide frequency might also be due to changing climatic conditions.

Future global warming will even increase these risks further, and add hazards that have been less important in the past, such as flooding or mining activities in Loksado. The local population has a wide array of efficient coping strategies to address flood, human and pest diseases. In contrast, the coping strategies for mining activities are all reactive strategies in Tamiang Layang and need to be strengthened further. Loksado’s population has a low vulnerability. But it might change immediately once mining activities are starting. Therefore preventive strategies to hinder an invasion of mining activities and all negative impacts consequently are very important. Unlike Tamiang Layang’s population is highly vulnerable.

Most of the screened project activities have a positive impact on those livelihood resources endangered by environmental and climatic risks. In Tamiang Layang more actions need to be taken to strengthen the livelihood resources and adaptive capacities of the population. Among others, the financial resources should be strengthened by diversifying the income, foster land planning to restrict the saleable land, strengthen human resources with advocacy trainings and implement concrete actions to force mining or other companies to rehabilitate the destroyed land. Especially the aspect of a balanced living of human beings with the highly vulnerable environment should be considered while promoting shorter rice field rotations. In Loksado, the human resources need to be strengthened with advocacy training on mining activities, awareness rising for organic agriculture and waste recycling. The financial resources need to be diversified as well to reduce rising pressure on land.

GKE’s activities contribute slightly to increase greenhouse gas emissions in the atmosphere but the amount is negligible compared to industrialised countries. Nevertheless, mitigation and adaptation measures often have high synergies and it is worth to consider them: For example reforestation and awareness rising on avoiding reforestation, use of organic agricul-

ture. Also the promotion of renewable energy and recycling of waste would decrease the GHG emissions.

Further lessons were learned during this seventh application of CliDR. The suitability of the guide in different environments was confirmed. Especially the suitability to other risks than climatic risks but environmental risks. The method of gender specific workshops was confirmed, especially as it could not be done properly in both communities. Women perspective risks to disappear in mixed groups. As in previous analysis as well, the introduced exercises for these consultations allowed participants to engage in a learning process themselves. Coordinators as well as the farmers of the screened project said they had learned a lot, too.

## Acknowledgements

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- The support and financing of Mission 21 and *Bread for all*.
- The support of Mission 21 coordination in Jakarta and Switzerland, particularly to Welman Boba and Maria Saselah.
- The church GKE for their warm welcome and support in organizing and facilitating stakeholder consultation.
- The project beneficiaries for participating actively in the workshops, which allowed most of the information in this report to be gathered.
- The developers of CRiSTAL, a tool which forms the basis of the HEKS and Bread for All Climate Analysing Tool, and the CARE Climate Vulnerability and Capacity Analysis (CVCA) Handbook, from which many of the exercises used in stakeholder consultations were drawn.

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## 1 Introduction

Climate change and development are highly intertwined: The risks of global warming could jeopardise decades of development efforts, particularly in the poorest regions of our planet. It is therefore vital to ensure that development projects strengthen their beneficiaries' capacities to confront climate change. It is also important to make sure that the same projects do not lead to excessive emissions of greenhouse gases.

Mission 21 supports community-level projects in rural areas in poor countries across the planet. Many of their beneficiaries are heavily threatened by climatic, disaster or environmental risks, mainly because of their high economic, social, environmental vulnerabilities. Even though Mission 21 does not engage in specific climate change projects, it has grasped the need to consider those threats and the related vulnerabilities.



Marion Künzler, a climate change expert of *Bread for All*, carried out the seventh climate and disaster analysis in a local project supported by Mission 21. In January 2011, she visited Indonesia and evaluated two development projects. The overall goal of them is to create a new heaven and a new earth, the specific aims are to strengthen advocacy and education issues as well as to develop rural communities in strengthening their economic opportunities in Tamiang Layang and Loksado in Central Kalimantan, Indonesia (see Figure 1). In contrast to former analysis, the assessment showed that their beneficiaries are not so vulnerable to climate change but more to environmental risks as mining and deforestation.

Figure 1: Map of Kalimantan and the project region marked in Central Kalimantan (Source: www.welt-atlas.com)

the HEKS and *Bread for All* "Participatory Tool on Climate and Disaster Risks (CliDR)", which is based on CRiSTAL<sup>1</sup>.

The analysis was executed with

This report is organised as follows. First, the project and its context will be briefly described. Then, the climate context in Indonesia is discussed. Third, the assessment results for the project will be presented, following the structure of CliDR. The last section discusses some lessons learned from the application CliDR.

<sup>1</sup> CRiSTAL is a tool jointly developed by the International Institute for Sustainable Development (IISD), Intercooperation, the International Union for the Conservation of Nature (IUCN), and the Stockholm Environment Institute (SEI).

## 2 The Project and its Context (Module 1 of CliDR)

### Background

Geraia Kalimantan Envangalis (GKE, Kalimantan Evangelical Church) was established in 1950 and uses the Synodic Presbyterian System. Its general vision is to create a new heaven and new earth specific vision. The specific objectives are broken down to 5 year plans (2010-2015). In 2010, 610 persons were working voluntary or paid for GKE in Kalimantan.

GKE is working on the issues of politics, education (e.g. school for wood manufacturing, agricultural school and university), economy, social and culture, gender, ethics, human rights and environmental problems (due to e.g. palm oil plantations or mining activities). Therefore it is working with different donors and has established different departments which implement program activities. GKE is collaborating with other Indonesian church organisations (e.g. women movements) to implement their program activities. The project analysis will focus on two programs of GKE. In General GKE is implementing two projects with an environmental focus:

- Parpem- Partisipasi dalam Pembangunan/ Participation in development cooperation
- Bidang Pembinaan/Congregation Development

These two projects have been analysed in two different villages. Generally, the project area of GKE is all over Kalimantan with no special regional focus.

### 2.1 Congregation Development Project (Bidang Pembinaan) in Tamiang Layang

Head: John Wattimena, staff: Darius

The overall goal is to create a new heaven and a new earth. Specifically in this project the aim is to strengthen advocacy and education issues.

Its project region is all over Kalimantan. But the analysis will focus on the village Tamiang Layang in the district Kapupaten Barito Timur in Central Kalimantan. Tamiang Layang is in a region where immense interventions damaged the nature and the livelihood resources of the local rural population. Mining of coal, gold and diamonds cause new challenges besides the climatic changes. Tamiang Layang is surrounded by secondary forest.

The target group of the project is the whole local population and not limited to church members. Most of them are rice and rubber farmers.

The project has a five year plan from 2010 to 2015. The financial resources come from GKE, Mission 21 and irregular contributions of the local government. The annual budget is about 400 Mio Rupees (46'000 Swiss Francs annually come from Mission 21. Thereof 15.000 Swiss Francs are for the environmental program.) GKE is paying all salaries extra, the project budget is exclusively for project activities.

### Project activities

- Advocacy on environmental education: series of seminars and workshops about HIV/Aids, burning of forests, electronic fishing in the rivers etc. for one region centralised in one village. Awareness raisings on long term and sustainable planification and not short term actions with negative long term impacts.
- Peace building on religious and ethical (between Dayak and migrated people) conflicts (see Annex for project description in German)

- Strengthening of democratization in the Islamic context: training of multipliers to strengthen the awareness of democracy

Mission 21 supports two components of the project:

- Strengthening of democratisation in an Islamic context, democracy, regional autonomy and transparency
- Peace building and religious duties

So far GKE aimed to raise awareness of people around the coal mine in Tamiang Layang and set up an organization. The population knows how to do self-campaign against mining activities. Some actions took already place, e.g. a demonstration with 100 people in front of the local representative house and a letter has been written to the local government to complain about the current situation.

### Local and external groups/institutions/organizations

In carrying out the projects activities effectively in the area, GKE involves different stakeholders such as

- LK3: an Islamic organisation working on the issues democracy, pluralism (for an open and tolerant society) and local wisdom
- Farmers local organisation working on rice and rubber
- Indonesian's Mining Advocacy Organization are invited to workshops as facilitators
- The forest faculty of Lamburang University collaborating for advocacy work
- Local government for local development policy. Local Government supports all activities (e.g. democratisation and agriculture) besides environmental advocacy work because of a conflict of interests. The local government is investigating in palm oil and mining activities and gives the concessions to enterprises.

Besides this no other local or international organisation or institution is neither involved nor operating in this area.

### Current risks

The main risks to Tamiang Layang are environmental problems caused by mining and palm oil activities. Several coal mines are contaminating water bodies, especially rivers due to huge use of water pumping during mining. Also fine dust settlement leads to sealed earth surface and makes it impossible to cultivate rice. Rubber harvest is affected by deposition of mud from flooding. Besides this the open transport of coal pollutes the air and causes respiration problems and increased cancer incidences. Loss of farming land due to expropriation as e.g. in Murutuwu for two big palm oil enterprises causes further conflicts.

The local population is also complaining about an unfair distribution of generated energy. The majority of mined coal is transported to Java and China. Kalimantan who is providing the resource of coal suffers still of regular power cuts.

One main risk is also that the populations still plans in short-term and takes unsustainable decisions. A newer risk is climate change which aggravates negative impacts in the region.

### Prevention and preparedness systems

In Tamiang Layang exist no prevention and disaster risk system even so the population is facing floods in the last years. The local population gets no help. In case of floods the populations evacuates to higher ground. Some demonstrations have taken place but there was no reaction of the local government so far.

## 2.2 Participation in Community Development Project (Parpem - Partisipasi dalam Pembangunan) in Loksado

Head: Yan Sudialman Saragihm, staff: Yuanita Awiasi Akar, Peritno Ingkul Dasar

The overall goal is to create a new heaven and a new earth. Specifically in this project the aim is to develop rural communities through strengthening their economic opportunities.

The project region is in Central and South Kalimantan including Tamiang Layang and Loksado as well as ten other villages in the district Kapupaten Barito Timur. The analysis will focus on the village Loksado in Central Kalimantan.

The target group of the project is mainly rice farmers and especially women. In contrast to Tamiang Layang Loksado in the mountains of Kalimantan in a relatively intact environment of tropical forest. Nevertheless also in this region the pressure is increasing due to increasing population pressure and the increasing interest in resources as e.g. wood, coal and iron.

The project has a five year plan from 2010 to 2015. The financial resources are mainly from GKE and Simati (Netherland NGO). Mission 21 supported this program until 2005.

### Project activities

Project activities focus on the following subjects:

- Small economic development: increase of family income through diversification e.g. rubber and spices (e.g. cinnamon, candle nut). GKE implements workshops and trainings to teach the basic knowledge how to establish an alternative income with e.g. small shops and to raise the sustainable use of their natural resources. Mission 21 supported the planting of rubber trees from 2000 to 2005.
- Credit Union: If the farmers are members of the union, they get a loan for school fee, house construction or fish feed etc. The credit union was established with the aim to support women and to manage their financial resources.
- Animal husbandry
- Community Health Development and Gender: awareness building on health and gender issues in trainings, train the trainers and learn how to cope with their own problems
- Research, publication and documentation are planned but not yet implemented
- Village Conflict and Emergency Preparedness: As a new project activity it is planned to establish committees to address health and economical issues. Therefore cadres will be trained to support the local education of grassroots groups. The aim is to strengthen the population in the combat against mining companies for gold, nickel or iron. Some first trainings with the PRA approach were implemented.

- A new topic is also the sustainable and environmental friendly development which needs to be specified further.

So far, 300 health volunteers have been trained on health issues in different villages to support with generic medicine and their basic knowledge in emergency cases. About 50 villages have a medicine boxes where emergency medicine is stored. Besides this, various families send their children to school and are able to pay the fees with the additional income generated through the diversification

### **Current risks**

The main risks for Loksado are not the present but the underlying risks. In contrast to Tamiang Layang Loksado has the privilege that the environment is intact. But the government and companies are already aware about the huge potential for mining. There are resources know for gold, iron and nickel. Additionally the intact rain forest delivers a big potential for deforestation and the use of wood. Not specifically for Loksado but all over Kalimantan, the official plans of the government are also to expand oil palm plantations by 3 to 4 million ha. .

Besides this, waste recycling is a challenge as there is no waste deposit in Loksado and the population draw it into the river. A newer risk is climate change which aggravates negative impacts in the region

### 3 Scientific information about Climate Change and Disaster Risks in Indonesia (Module 2 of CiDR)

#### 3.1 Climatic conditions in Kalimantan

Kalimantan has tropical climate and very high rainfall throughout the year. Average rainfall is around 3000 mm per annum. The temperature varies between 29° C and 34° C and the humidity is in the range of 95-98%.

The extreme variations in rainfall are linked with the monsoons. Generally, there is a dry season (May to October), influenced by the Australian continental air masses, and a rainy season (November to April) that is the result of mainland Asia and Pacific Ocean air masses.

Central Kalimantan: The average air temperature is around 29 °C and reaches a maximum of 33 °C. Annual average of rainfall is 2732 mm with an average of 120 rainy days.

#### 3.2 The Observed and Projected Climate Changes

Climate change is already taking place now, thus past and present changes help to indicate possible future changes.

Over the last decades, the temperature in Indonesia increased at about 0.3° C (1901-1998). Annual precipitation has decreased by 2 to 3% in Indonesia. Precipitation patterns have changed; there has been an increase in precipitation in the northern regions. The seasonality of precipitation (wet and dry seasons) has changed; dry season rainfall in the northern region has decreased (Hulme and Sheard 1999; Boer and Faqih, 2004). IPCC 2007 shows that sea level has risen by an average of 2.5 mm annually. Intense tropical cyclone activity has likely increased in some regions since 1970. It is important to notice that these large-scale trends do not necessarily reflect local conditions in Tamiang Layang and Loksado village.

The projected climate change scenarios show the following for Kalimantan:

- **Temperature:** Warming will occur in Indonesia from 0.2 to 0.3°C per decade. Downscaled modelling specific for Indonesia projects that the rate of warming will be the highest in the island of Kalimantan (Susandi 2007).
- **Precipitation:** Changes in annual mean precipitation are varying largely. Downscaled modelling for Kalimantan project an increase of rainfall (+3 to 28%) during rainy season (DJF) and a mixed trend of rainfall (+7 to - 11% (during June to August (Hulme and Sheard, 1999) (See figure 2).  
There is an increased likelihood that the annual monsoon could be delayed by 30 days because of changes in regional climate (Naylor et al., 2007). Consequently, regions in Kalimantan with increasing rainfall might be exposed to high flood risk and the frequency of extreme events might increase (Boer and Faqih, 2004).
- **Sea level:** The trend of rising sea level continues. A simulation of Susandi (2007), Figure 3, indicates a sea level rise of 1.1 metre until 2100 and a loss of 90,260 km<sup>2</sup> land area, also Kalimantan would be seriously affected.
- **Extreme events:** Extreme rainfall and winds associated with tropical cyclones are likely to increase in Southeast Asia but there is less consistency between scientists about how occurrence will change (IPCC 2007).

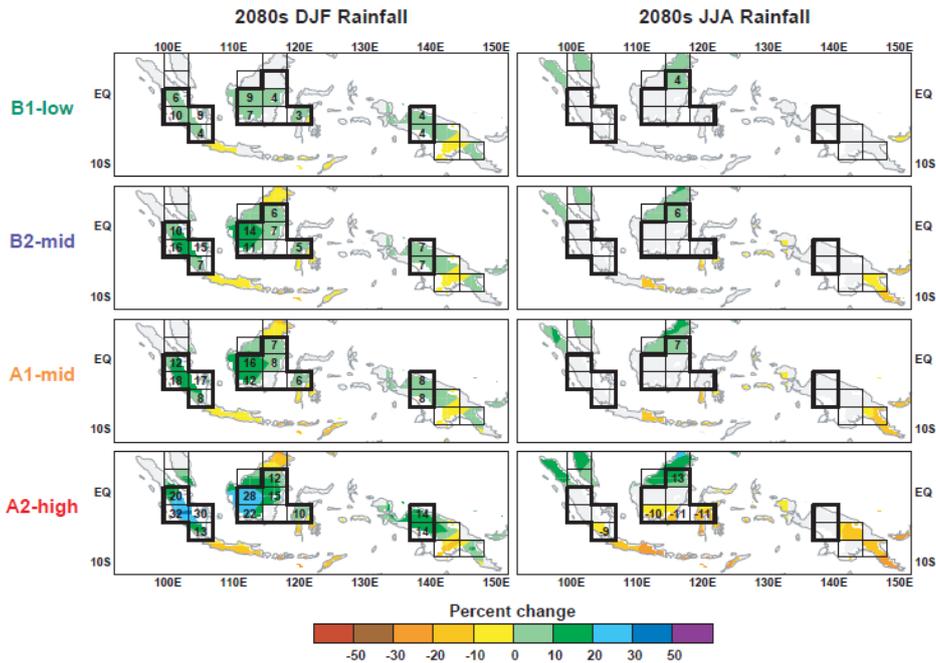


Figure 2: Change in December-February and June-August rainfall (per cent change from the average 1961-90 climate) for the 30-year period centred on the 2080s for the four scenarios. The printed numbers show the estimated change for each model land grid box across Indonesia. Changes are only shown where they are large in relation to simulated natural rainfall variability on 30-year time-scales (Hulme and Sheard, 1999).

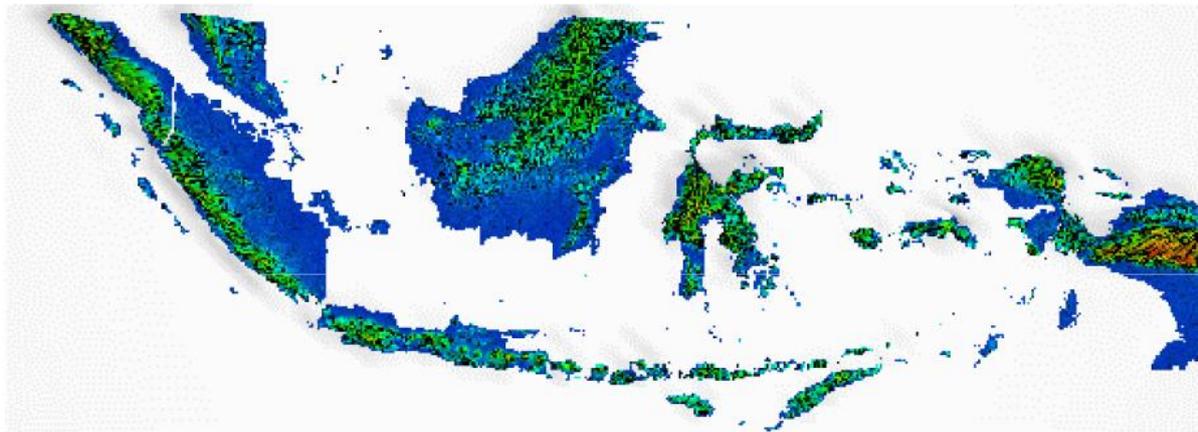


Figure 3: Sea level rise 2100 (Susandi 2007)

### 3.3 Geophysical Risks

Geophysical factors (e.g earthquakes, volcanoes or tsunamis) are not climate change related but natural hazards which can cause disasters. Indonesia experiences a wide range of natural hazards because it is located along the major tectonic plate boundaries. The map of OCHA 2007, Figure 4, illustrates Indonesia's exposure to seismic, volcanic and tropical storm hazard. In Kalimantan the earthquake intensity indicates a degree of I to VII. This means that

there is a 20% probability that those degrees of intensity will be exceeded in 50 years. Tropical storm intensity zones are not relevant for Kalimantan.

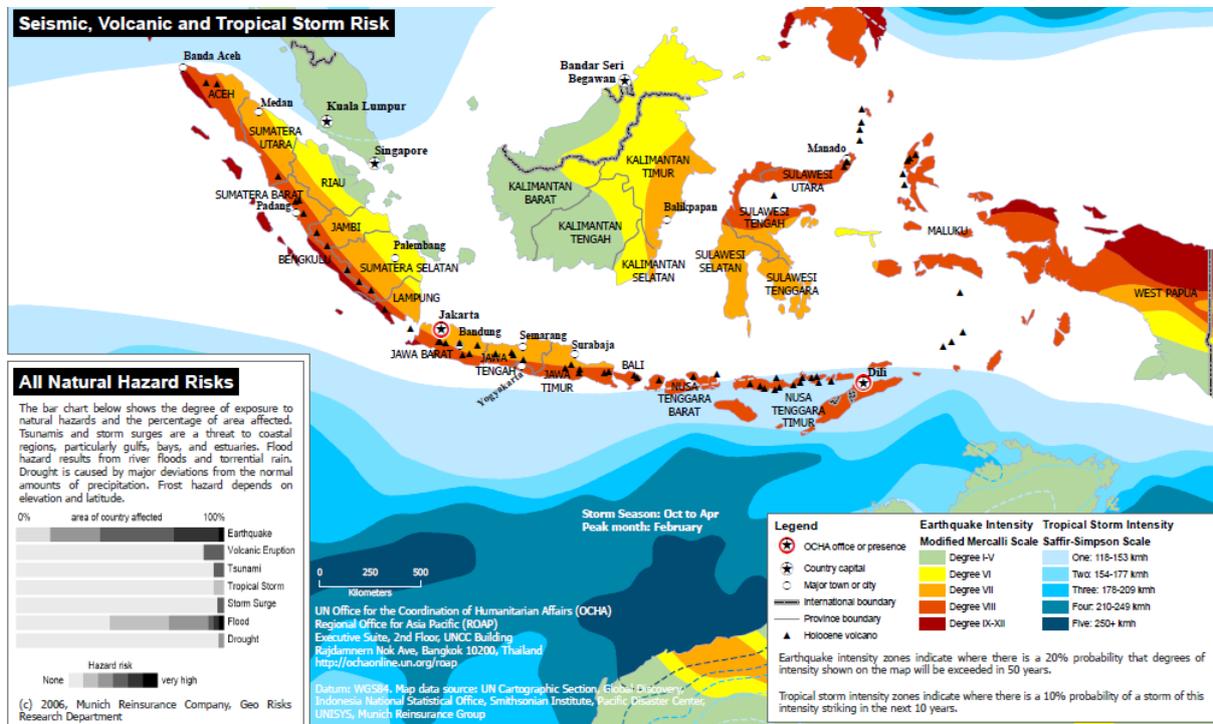


Figure 4: Indonesia's exposure to seismic, volcanic and tropical storm hazard (OCHA 2007)

### 3.4 Impacts of Climate Change and Disasters in Indonesia

Detrimental and beneficial impacts of the on going and projected climate change and variability are widespread in both socio-economic and natural systems. There impacts include:

- Water resources:** Precipitation in parts of Indonesia has decreased and is projected to continue to decrease during critical times of the year (i.e., during the dry season) and can lead to prolonged droughts. In other areas of Indonesia, it is projected that rainfall will increase and may occur in fewer, more intense events which could lead to flooding. These types of trends combined with an overall shift of the seasonality and timing of rainfall will lead to unpredictable and uncertain water availability and consequently, uncertain ability to produce agricultural goods and economic instability. Groundwater near the coasts is also at risk due to saltwater intrusion, a result of higher sea levels, over-extraction of the resource (resulting in lower groundwater levels), and recharge with more saline surface waters (WWF 2007).
- Agriculture, Food Security:** Agriculture's share of GDP in 2006 was 13 per cent and generates 43 per cent of the country's total employment (IFAD 2010). Agricultural productivity will be constrained due to e.g. prolonged droughts, increased flooding, and more frequent and severe storms. Indonesia may experience even more adverse impacts, including less food production and increased hunger. For example, a recent study that looked at assessing the risks of climate change on Indonesia rice production suggests that under future climate projections, there is a significant 30-day delay in the onset of monsoon season and a substantial decrease in precipitation later in

the dry season (Naylor et al., 2007), which when combined with temperature increases of up to 4°C (for every 1°C increase in minimum temperature, rice yields decrease by 10%; Peng et al., 2004), will lead to massive drops in rice production. A temperature increase beyond 2.5°C and the resulting drop in rice yield would incur a loss in farm-level net revenue of 9 to 25% (Lal, 2007). Besides agricultural damage, sea level rise might also lead to a loss of traditional resources such as fish, fishponds and prawn production. Therefore climate change will weaken national food security and self-sufficiency (PEACE 2007).

- **Biodiversity and ecosystem services:** The IPCC states that up to 50% of Asia's total biodiversity is at risk, specifically due to climate change (Cruz et al., 2007). Climate change poses an additional risk to coral reefs, especially those whose habitats are already threatened. In a 2000 survey, only 6 percent of Indonesia's coral reefs are in excellent condition, 24 percent in good condition, and the remaining 70 percent are in fair to poor condition (John Hopkins University and Terangi 2003) The loss of coral reefs in Asia may be 88 per cent in the next 30 years because of warming sea-surface temperatures, sea level rise, and other added stresses. Massive coral bleaching lead to widespread loss of coral reefs and biodiversity, including the fish that many Indonesians rely on for food and livelihoods. Also Indonesian's marine turtle population might be impacted by sea-level rise, increased extreme weather events, warming temperatures, and changes in ocean circulation and salinity patterns (WWF, 2007). Indonesia contains some of the world's most endangered species and is therefore especially threatened by the effects of climate change. More frequent forest fires might have a significant impact on wildlife habitat and biodiversity and translate into serious economic and domestic and trans-boundary pollution consequences as well as changes in species distribution, reproduction timings, and phenology of plants (WWF, 2007).
- **Human health:** Human health in Indonesia will be adversely affected by climate change and its associated effects both directly (e.g., deaths due to heat waves, floods, and storms) and indirectly (e.g., increases in infections and diseases and less available food). Direct effects, such as higher temperatures, changes in precipitation and sea-level rise can cause more frequent and severe heat waves, floods, extreme weather events, and prolonged droughts and lead to increased injury, illness, and death. Indirect effects, which are more difficult to attribute to climate change, may include more widespread vector-borne infections (e.g., malaria and dengue), an expansion of water-borne diseases (such as diarrhoea), an increase in infectious diseases, poor nutrition due to food production disruption, ill-health due to social dislocation and migration, and increased respiratory effects from worsening air pollution and burning. Rising temperatures can compound the effects of poverty and poor hygiene on bacterial proliferation, leading to diarrhoeal disease and endemic morbidity and mortality (WWF 2007).
- **Infrastructure:** Flooding and sea-water intrusion due to sea-level rise and declining dry-season precipitation, will seriously affect infrastructure. Much of Indonesia's population and industries infrastructure are concentrated in low lying coastal areas. Thus loss of property and coastal habitats might also lead to displacement of people (WWF 2007).

It is important to notice, however, that other factors threaten the livelihoods of Indonesian's communities as well. For example resource degradation and the overexploitation of natural

resources such as unsustainable fishing practices in association with the environmental decline.

### 3.5 Indonesia’s Contribution to Climate Change

Indonesia has become one of the three largest emitters of greenhouse gases in the world (see Figure 9). This is largely due to the significant release of carbon dioxide from deforestation. Yearly emissions in Indonesia from energy, agriculture and waste all together are around 451 million tons of carbon dioxide equivalents (MtCO<sub>2</sub>e). Emissions from energy and industrial sectors are relatively small, but are growing very rapidly. Yet land-use change and forestry (LUCF) alone is estimated to release about 2,563 MtCO<sub>2</sub>e – mostly from deforestation, as estimated by the IPCC (Baumert *et al.* 2005). While data on the emissions from different sources does vary between studies, the overall conclusion is the same. Indonesia is a major emitter of GHGs (PEACE, 2007). Nevertheless, looking at per capita emission Indonesia ranks on position 130 with 1.8 metric tons of CO<sub>2</sub> per capita worldwide (US rank with 18.9 metric tons of CO<sub>2</sub> per capita on position 11), (US Department of Energy CDIAC, 2010).

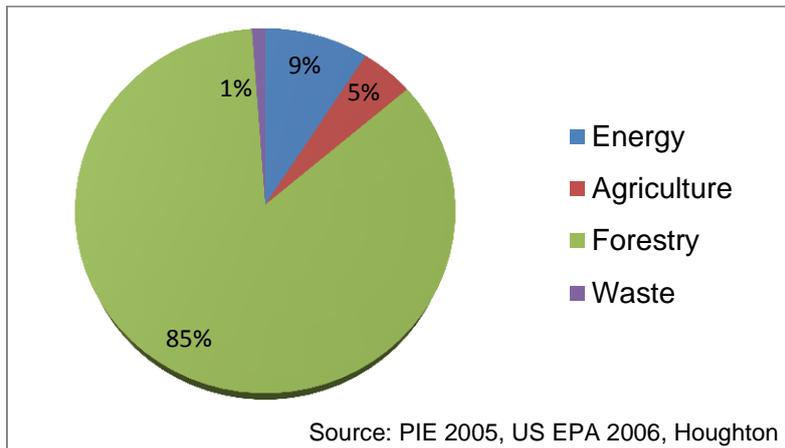


Figure 5: GHG emission in MtCO<sub>2</sub>e in 2005 in Indonesia

Indonesia is host to vast forested areas and has the third largest tropical forest. About 24 billion tons of carbon stock (BtC) are stored in vegetation and soil, and 80% of this (about 19 BtC) is stored in the standing forest (State Ministry of Environment, 2003). But out of the 108 million ha of forest area, almost half is in poor and degraded conditions (Department Kehutanan RI, 2006). Land use change and deforestation, estimated at 2 million hectares (ha) per year results in the release of a large amount of Indonesia’s carbon reservoir and has significantly increased (Forest Watch Indonesia 2002). Indeed, the emissions from Land use, land use change and forestry (LULUCF), notably deforestation, account for 83% of the yearly emissions of greenhouse gases in Indonesia, and 34% of global LULUCF emissions (PEACE, 2007). Figure 10 below shows the extend of deforestation in Kalimantan up to 2020.

**Deforestation and land conversion:** The largest carbon dioxide emissions in the forestry sector, 74 percent come from deforestation and land conversion (LUCF), followed by forest-related energy consumption (23%), and the remainder is from forest-related industrial processes (3%). Forest fires are the main contributor of deforestation and land conversion, accounting for 57%. Annually, around 2000 million tons (Mt) of CO<sub>2</sub> are released from forests: 600 Mt are caused by decomposition of dry peat and 1,400 Mt through annual burning sea-

son (Wetlands International 2006). Global warming will likely cause a vicious cycle by drying up the rainforest and peat swamps, thus increasing the risks of even more intense fires (PEACE, 2007).

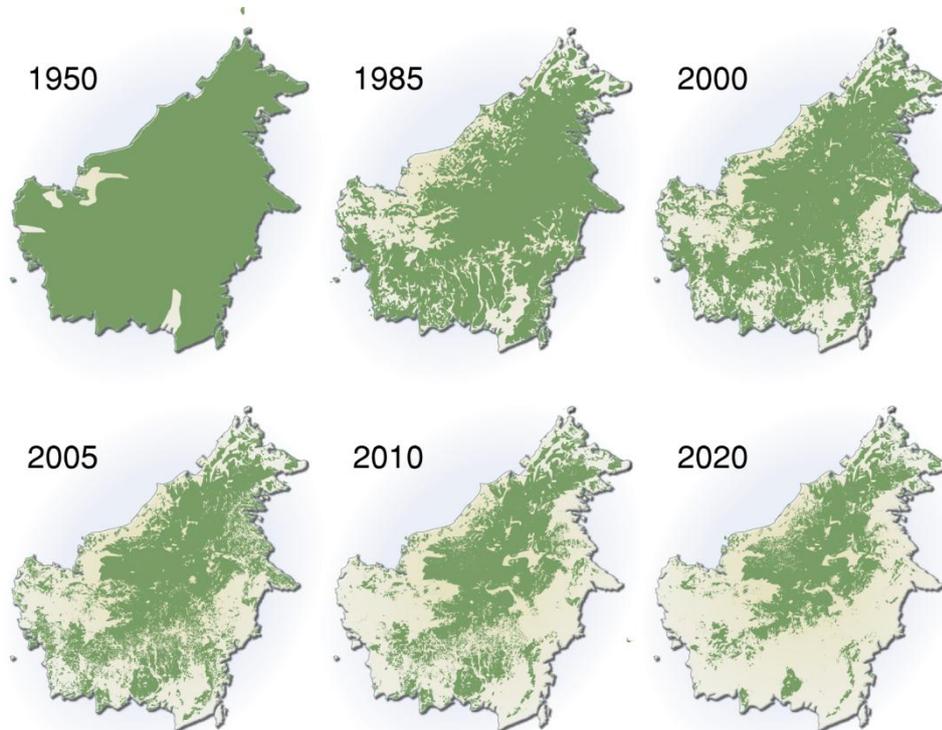


Figure 6: Extent of deforestation in Borneo 1950-2005, and projection towards 2020 (UNEP/GRID-Arendal, 2007)

**Energy sector:** Emissions from non-forestry sectors are small, in absolute and per capita terms, but are growing very rapidly. Current emissions from the energy sector, about 275 MtCO<sub>2</sub>e, account for 9% of the country's total emissions. But these emissions from industry, power generation, and the transport sector are growing very rapidly in the wake of industrialization and economic growth. It is expected that, with current governmental policies that promote the expansion of fossil fuels and the high barriers to clean and renewable sources of energy, the trend is that emissions from energy sector will continue to demonstrate a strong growth, tripling in the next 25 years from about 275 MtCO<sub>2</sub>e in 2003 to about 716 MtCO<sub>2</sub>e in 2030. Improvement in energy intensity of the economy, about 2% between 2000 and 2004, has been offset by strong economic growth as a whole (World Resources Institute 2007).

**Agriculture and waste sector:** Emissions from the agriculture and waste sectors are very small and insignificant globally, coming mainly from rice production. The sector is the main contribution of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) emissions. 70 per cent of the emissions from the agriculture sector are generated by rice cultivation. Albeit small, greenhouse gas emissions from the Indonesian waste sector in 2000 ranged from 32 – 60 MtCO<sub>2</sub>e. This ranks Indonesia as the sixth largest emitter in the waste sector (USEPA 2006).

## **4 Participative Analysis of Project Activities in Tamiang Layang and Loksado<sup>2</sup>**

This chapter presents the results of the stakeholder consultations for the analysis on climate change conducted in January 2011.

The information on climate and disaster risks, their impacts and the current coping strategies was collected during two one-day specific workshops (partly gender specific) with the local population. As the poor farmer families are the main project beneficiaries of GKE, one workshop took place with women (w) and men (m) in Tamiang Layang and one workshop in Loksado.

The structure of this chapter follows the structure of CliDR which was used for the analysis. First, the project specific climate and disaster risks, their impacts and current coping strategies are identified. Secondly, the most important livelihood resources and their vulnerability are analysed in the context of climate and disaster risks. Then, the project's impact on adaptive capacities and on greenhouse gas emissions is evaluated. The last section looks at possible project revisions.

### **4.1 Climate and Disaster Risks, their Impacts and Coping Strategies in Tamiang Layang and Loksado (Module 3 of CliDR)**

Chapter 3 has already dealt with the impacts of climate change and disasters on national level. Scientific information on a more local level is not available. Therefore, the results of consultations with project representatives and beneficiaries help to identify the consequences of climate change and disasters on a local scale.

#### **Identifying Natural Risks (Module 3, Part A)**

The main natural hazards identified in the workshops were in Tamiang Layang mining activities and floods, in Loksado flood, human diseases and pest diseases of plants.

Based on the assessment conditions, it is difficult to evaluate the results under the gender aspect as the groups have not been separated properly. Nevertheless as far as possible the results are gender-specific: women (w) and men (m).

Generally most of the observed risks are due to environmental risks and human activities as e.g. logging, oil palm plantation and mining activities and have the higher impact in this region than changing climatic conditions. Nevertheless, increasing flood frequency might be due to mining activities (as mentioned by participants as a reason) but might also be due to increasing rainfall during raining season (as observed by participants in Loksado). Consequently also increasing landslide frequency might be due to increasing rainfall during raining season.

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<sup>2</sup> Corresponds to module 3-7 of CliDR

	Tamiang Layang	Loksado
<b>Hazards</b>	<ul style="list-style-type: none"> <li>• Flood</li> <li>• Mining activities</li> <li>• Landslides</li> <li>• Oil palm</li> <li>• Logging</li> <li>• Erosion of river board</li> <li>• No clear seasonality (rain, summer)</li> </ul>	<ul style="list-style-type: none"> <li>• Flood (w, m)</li> <li>• Human diseases (w, m): Malaria, diarrhoea, dengue</li> <li>• Plant diseases/pests (w): insect attacks of rice and rubber stem, worm attacks rice stem, rats, monkeys, cancer on rubber trees</li> <li>• Landslides (w, m)</li> <li>• forest fires (w)</li> </ul>
<b>Observed changes in the last ten years</b>	<ul style="list-style-type: none"> <li>• flood frequency is increasing</li> <li>• mining activities are increasing</li> </ul>	<ul style="list-style-type: none"> <li>• Flood occurred in 2002 and 2010, frequency of floods is increasing</li> <li>• Landslides in the rainy season are increasing</li> <li>• New diseases are occurring e.g. cikungunya (~transmitted by mosquitos)</li> <li>• Malaria and diarrhoea cases are decreasing</li> <li>• Forest fires occurred in 2005</li> <li>• In 2001 and 2005 the summer season was much longer and more fields were burning.</li> <li>• Rabies decreased due to animal quarantine and immunisation</li> <li>• Rainfall intensity and frequency is increasing during rainy season(w)</li> <li>• Rotation of fields is getting shorter, yield of rice is decreasing (w)</li> <li>• Harvest season of new rubber trees gets shorter (w)</li> </ul>

Most of the observed climate changes by the farmers are consistent with scientific assessments on the impacts of climate change in Kalimantan: e.g. increased intensity of rainfall and therefore increase of landslides and floods. Changing rainfall patterns were not linked by participants with increasing frequency of flood and landslides but rather with mining activities. Reasons might be that it's a slowly developing change and thus not so obvious. In contrast, increasing mining activities and its impacts are obvious and thus mainly responsible for the increasing risks (opinion of participants).

Even if in this region the impacts of environmental risks are worse, it is necessary to consider changing climatic conditions in future project. Climate change might worsen existing risks. Therefore the adaptive capacities of the population to climate change needs to be strengthened and its vulnerability to natural and climatic risks reduced.

### Impacts and Current Coping Strategies in Tamiang Layang and Loksado (Module 3, Part B and C)

In an exercise on the impacts of hazards and their coping strategies, participants identified the following consequences and strategies in the village Tamiang Layang and Loksado:

Hazard	Impact	Coping Strategies
<b>Mining Activities (Tamiang Layang)</b>	<ul style="list-style-type: none"> <li>• Forest destruction (m)</li> <li>• Water pollution (m, w)</li> <li>• Air pollution (m, w)</li> <li>• Diseases transmission (m)</li> <li>• Loss of land (m)</li> <li>• Damage of roads (m)</li> <li>• Destruction of environment (m)</li> <li>• Destruction of rice field (m)</li> <li>• ↑ criminality (w)</li> <li>• ↑ Domestic violence (w)</li> <li>• ↓ Rubber products (w, m)</li> <li>• ↑ Cooperative members (w)</li> </ul>	<ul style="list-style-type: none"> <li>• Peace demonstration (w)</li> <li>• ↑ Rubber plantation (w)</li> <li>• Workshop to increase environmental awareness (may 2011)</li> </ul> <p>Suggestions of coping strategies:</p> <ul style="list-style-type: none"> <li>• Advocacy program with government (m)</li> <li>• Report to local politics (m)</li> <li>• Reforestation (m)</li> <li>• No more land sold (w)</li> <li>• Accept no new companies (w)</li> <li>• Temporarily stop of activities (m)</li> <li>• Fight for eco-friendly policy (m)</li> <li>• Audit of mining companies (m)</li> <li>• Assessment of 100 companies (m)</li> <li>• Implement existing regulations (m, w)</li> <li>• Legal services to protect local rights (w)</li> </ul>
<b>Flood (Tamiang Layang)</b>	<ul style="list-style-type: none"> <li>• ↓ Farming Income/yield (m, w)</li> <li>• ↓ community Income (w)</li> <li>• ↓ rice storage (m, w)</li> <li>• ↑ nutrition problems of children</li> <li>• Interrupt daily activity (m)</li> <li>• Road damage (m)</li> <li>• Pollution of river (m)</li> <li>• ↑ transmission of diseases (m, w)</li> </ul>	<ul style="list-style-type: none"> <li>• New fields at highland (m)</li> <li>• Diversify income with fishing, fruit and rubber trees (m, w)</li> <li>• Reparation works (m)</li> <li>• Clean rubbish (w)</li> <li>• Medical assistance (m)</li> <li>• Networking with environmental organisation (w)</li> <li>• Build collaborations (w)</li> </ul>
<b>Flood (Loksado)</b>	<ul style="list-style-type: none"> <li>• Damage of infrastructure: house, bridge, trees (w, m)</li> <li>• Damage of rice plantation (w)</li> <li>• Death of people and cattles (w)</li> <li>• Interruption of daily activity(w)</li> <li>• No electricity (w)</li> <li>• Dirty water (w)</li> </ul>	<ul style="list-style-type: none"> <li>• Reparation of infrastructure (w)</li> <li>• Moving to other places (w)</li> <li>• Community support for e.g. food, money (w)</li> <li>• Produce electricity with kerosene (w)</li> <li>• Collection of rainwater (w)</li> </ul>
<b>Human diseases (Loksado)</b>	<ul style="list-style-type: none"> <li>• Lower daily activity (w)</li> <li>• Low income (w)</li> <li>• Increase of expenditure (w)</li> </ul>	<ul style="list-style-type: none"> <li>• Visit a doctor (w)</li> <li>• Saving money (w)</li> <li>• Support of health centre to prevent diseases (w)</li> <li>• Education for healthy nutrition (w)</li> </ul>
<b>Plant pest/diseases (Loksado)</b>	<ul style="list-style-type: none"> <li>• Rubber trees die (w)</li> <li>• No rice harvest (w)</li> <li>• Decrease of income and open depth (w)</li> <li>• No banana harvest (w)</li> </ul>	<ul style="list-style-type: none"> <li>• Use of chemical pesticide (w)</li> <li>• Burn dry leaves to protect (w)</li> <li>• Bamboo sound against rice attacks (w)</li> <li>• Boggle against monkeys (w)</li> <li>• Selling stored rice (w)</li> </ul>

Based on the assessment conditions, it is difficult to evaluate the results under the gender aspect as the groups have not been separated properly.

### Efficiency and sustainability of coping strategies

Farmers in Tamiang Layang and Loksado employ a wide array of coping strategies. The strategies are a mix of preventive (e.g. diversify income, savings) and reactive (e.g. reparation works) measures. Most of the strategies to fight against flood, human and pest diseases are sustainable and also in the long-term efficient. An exception is the use of chemical pesticides. In contrast, the coping strategies for mining activities are all reactive strategies in Tamiang Layang. They could be efficient in the future (as most of them are not implemented yet) in the long-term but the sustainability is questionable. Thus efficient long-term adaptation strategies are very important for Tamiang Layang, especially considering the rising mining activities but also increasing flood frequency. Floods are increasing due to climate change (increased rainfall) and the negative impacts of mining activities. This combination of mining activities and climate change with a high dependence on natural resources renders the population in Tamiang Layang highly vulnerable.

Nevertheless, currently Loksado's population has a low vulnerability. But it might change immediately once mining activities are starting. Therefore preventive strategies to hinder an invasion of mining activities and all negative impacts consequently are very important.

## 4.2 Livelihood Resources and their Vulnerability (Module 4 of CiDR)

This section first presents the most important resources for the local populations' livelihoods. In a second step, the impact of natural hazards and climatic stimuli on those resources are analysed, and in a third step, their importance for the current coping strategies is evaluated. The results of this section were identified by project beneficiaries in the workshops mentioned above.

### Identifying Livelihood Resources (Module 4, Part A)

Participants of the two workshop locations identified the following resources as their most important livelihoods. The categorization into five different types was undertaken during the workshops:

Tamiang Layang:

- Natural resources: Rice, fish, forest, water, rubber, vegetables
- Financial resources: selling agricultural products (rice, vegetables) , selling fish, selling livestock, handicraft made of rattan, iron and plastic, selling rubber, sewing, employment
- Human resources: Agricultural, health, traditional and medicine skills
- Physical resources: Transport, irrigation and communication systems, school, hospitals
- Social resources: Family, farmers community, church, adat, cooperative

Loksado:

- Natural resources: Rice (w), rubber (w), water (w), chicken (w)
- Financial resources: nutmeg (w), cinnamon (w), bamboo (w), banana (w)
- Human resources: agricultural knowledge (w), good health (w)
- Physical resources: school building (w), health centre (w), transport infrastructure (w), irrigation system (w)

- Social resources: credit union (w), village community (w), family (w), farmers community (w)

### Vulnerability of livelihood resources (Module 4, Part B)

Basically the following resources are affected (at least 5 points in a sum for Tamiang Layang, at least 3 points in a sum for Loksado):

	Tamiang Layang (> 5 points)	Loksado (> 3 points)
Vulnerable Livelihood resources	<ul style="list-style-type: none"> <li>• Natural resources: Rice, fish, forest, water, rubber, vegetables, livestock</li> <li>• Financial resources: selling agricultural products, selling fish, selling livestock, rotan handicraft, selling rubber</li> <li>• Human resources: Agricultural skills, health skills</li> <li>• Physical resources: Transport, system, irrigation system, school, hospitals</li> <li>• Social resources: Family, farmers community</li> </ul>	<ul style="list-style-type: none"> <li>• Natural resources: rubber (w), rice (w), water (w),</li> <li>• Financial resources: banana (w)</li> </ul>
Rank of hazard	<ol style="list-style-type: none"> <li>1. Mining activities</li> <li>2. Flood: due to mining activities &amp; Climate Change?</li> </ol>	<ol style="list-style-type: none"> <li>1. Flood</li> <li>2. Human diseases and plant pest/diseases</li> </ol>

In Tamiang Layang, first rank had mining activities with the highest impact and secondly flood was rated. Mining activities have the main impact in this region. The impact of climate change is low but is contributing to more frequent floods. Tamiang Layang population is highly vulnerable to those hazards. Also all resources are affected.

In Loksado, flood is the hazard with the highest impact on farmer's livelihoods. Human diseases and pest diseases are secondly. Both risks are due to climate change: rainfall intensity is increasing and causing floods, rising temperatures and humidity are creating more favourable conditions for human and plant diseases/pests. Generally the risks that Loksado's population is facing are very low compared to Tamiang Layang and also former analysis of different places. Therefore, the vulnerability is very low and only some natural and financial resources are affected.

Overall, the risks experienced, especially by the people in Tamiang Layang, are mainly reinforced by environmental risks and on going climate change. Therefore reactive strategies are necessary in Tamiang Layang and preventive strategies in Loksado to resist against interest of mining activities. The results of Tamiang Layang give a good indicator what might happen if mining companies succeed to start around Loksado as well. So far the population is tackling against this hazard but further strengthening is necessary. Besides this, also adaptation to climate change will become more important.

A protocol of the stakeholder consultations including more detailed information can be found in the annex to this report.

### Importance of livelihood resources for Coping Strategies (Module 4, Part C and D)

The importance of resources for coping strategies was not evaluated in the stakeholder consultation but can be induced from the previous results:

#### A. Tamiang Layang

All *Natural resources* are important for many coping strategies, such as income diversification with rubber trees or fishing.

*Financial resources* are also necessary to diversify income and trade.

*Human resources* are needed for almost every coping strategy.

*Social resources* were mentioned for almost all coping strategies to deal with coal mining.

*Physical resources* are mentioned for medical assistance or waste recycling.

#### B. Loksado

All *Natural resources* are important for many coping strategies, such as rainwater collection or a balanced nutrition.

*Financial resources* are also necessary to save money, to pay the visit of a doctor or buy chemical pesticides.

*Human resources* are needed for almost every coping strategy.

*Social resources* are mentioned for Community support of e.g. food, money or to visit a doctor.

*Physical resources* are mentioned for medical assistance or waste recycling.

In short, in both villages, almost all resources are needed to deal with the impacts of climate change and other risks.

### 4.3 The Project and Adaptive Capacities (Module 5 of CliDR)

This section analyses the impact of the two project components on livelihood resources that are considered either heavily affected by natural risks or very important for current coping strategies, in order to evaluate the projects influence on adaptive capacity of its beneficiaries. In the present case, all resources were considered to be relevant. The analysis was conducted in a meeting with project staff of GKE and mission21.

### A. Impact on Activities in Tamiang Layang

Project activity	Livelihood resources affected
Advocacy program rises awareness on environmental problems, Improve local policy (environmental friendly)	Self-organization, forum building, action groups, meeting of religious leaders, environmental problem skills => social and human resources
Identification of problems and work out alternatives	Demonstration => social and human resources
Support and advice how to plant rubber seedlings	Reforestation of rubber (14000 seedlings), additional income, land is not sold anymore => human, natural and financial resources
Capacity development on land issues/right/impacts	Land right/impact skills => human resources
Increase religious tolerance and cooperation	=> Human resources

### B. Impact on Activities in Loksado

Loksado: Project activities	Livelihood resources affected
Capacity development on rice/rubber cultivation	Agricultural skills, storage of rice (no selling anymore), additional income of cultivating and selling rubber, overuse of soil, decrease of rice yield, rice fields on steep position, erosion risk => human, financial resources and natural resources
Capacity development on environmental problems	Environmental skills => human and natural resources
Primary health care	Health care skills, better health, decrease of death/diseases => human resources
Training for health supporters	Health supporters => human resources
Building Credit unions and training to use credit efficiently	small shops, improvement of marketing bikes, TV => financial and physical resources

### Evaluation of the Overall Impact on Adaptation

The analysis shows that all resources are positively affected by GKE's activities. Specifically the project activities in Tamiang Layang are mainly strengthening natural, financial, human and social resources, those in Loksado natural, financial, human and physical resources. Both projects are already strengthening most of the vulnerable resources (in Loksado natural and financial resources, in Tamiang Layang all resources) compared to the results of the vulnerability matrix. Except the physical resources are not strengthened in Tamiang Layang.

There is, however, a lot of room for further strengthening, especially to take into account the impacts of climate change for implementing activities of GKE.

#### 4.4 The Project and Mitigation (Module 6 of CliDR)

This section deals with the project components impact on greenhouse gas emissions, and essentially consists of looking at some potential sources or sinks for greenhouse gases (GHG), and analysing what the project's impact on those sources is. The evaluation is purely qualitative, as no emissions or sink measurements have been conducted. The analysis has been conducted through a meeting with the project staff of GKE.

The project appears to be influencing the greenhouse gas balance of the zone as follows:

Project activity	Impact of greenhouse gas (GHG) emission
Use of electricity (diesel, coal)	↑ GHG emission
Use of car (fuel)	↑ GHG emission
Reforestation of rubber	↓ GHG emission
Air-condition, bad isolation	↑ GHG emission
Use of chemical fertilizer and pesticide	↑ GHG emission (Loksado)
Use of energy saving light bulbs	↓ GHG emission
Burning of waste	↑ GHG emission, environmental pollution

The project does not have a large scale impact on GHG emissions. In sum, the project might have a slight negative impact on GHG emissions which is unavoidable but negligible. Yet it is important to take those effects into account, particularly in view of a possible extension of some activities that are beneficial to mitigation, such as reforestation, waste recycling or organic agriculture.

The assessment of project emissions does not reflect the national emission balance with around 85 % of GHG emissions in the forestry sector, 9% in energy, 5% in agriculture and 1% in waste sector. In contrast, reforestation with rubber is going ahead the trend in the forestry sector. But the local situation shows as well that there exist mitigation opportunities regarding the improvement of natural carbon sinks and to reduce the release of GHG.

#### 4.5 Project Revision (Module 7 of CliDR)

Based on the previous two sections on the project's impact on adaptive capacities and mitigation, this section seeks to identify areas where this impact could be improved by means of project revisions or the design of new activities. The analysis according to the project revision cycle provided in the CliDR is not discussed here, as it has been left to the project managers to decide how to move on regarding new or revised activities.

##### A. Suggestions for Regarding Adaptive Capacities to risks and Mitigation in Tamiang Layang

In spite of the above mentioned positive effects on adaptive capacities, a lot more can be done to render populations more resilient against natural and environmental risks. The following list proposes a number of activities which could reinforce those capacities:

- Diversification of income (reduce dependence on natural resources)

- Land planning to restrict the saleable land and to optimize the use of it
- To force mining or other companies to rehabilitate the destroyed land ( and to avoid that the government is responsible for it)
- To implement an effective advocacy program with concrete actions
- GKE could take over the role as a mediator between the local population, the companies and the government
- The aspect of a balanced living of human beings with the highly vulnerable environment should be considered. The promotion of e.g. shorter rice field rotations led in Loksado to lower rice harvest and forced the farmers to use chemical fertilizers.
- The implementation of effective advocacy training could help people and local organizations to put companies under pressure, to fight for their rights and to bring the necessary change in the behaviour of companies, legislation and control. This would include:
  - A. Legal issues: Land, human, water and environmental rights as well as their constitution => peace),
  - B. Principles of Corporate Social Responsibility, the human rights obligations of Business
  - C. Negotiating skills & tactics, local and regional campaigning skills
  - D. Training of media skills

In Tamiang Layang, gender aspects were not specifically considered. So it might be interesting to take this more into account in future action and to have separate analysis.

Note that measures should as far as possible build on existing local coping strategies, as the population seems to be quite proactive concerning such measures.

## **B. Suggestions for Improvements Regarding Adaptive Capacities to risks and Mitigation in Loksado**

- Awareness raising and implementation for the impacts of mining activities, organic agriculture and waste recycling
- Capacity Development in advocacy work (also through exchange between both programs) to fight against the danger of starting mining activities. Also an advocacy training as mentioned above (see recommendations for Tamiang Layang).
- Diversification of income to reduce rising pressure on land with e.g. handicraft, ecotourism or organic agriculture

## **Suggestions for Improvements Regarding Mitigation**

The reduction of greenhouse gas emissions or the improvement of sinks is not the primary concern of the farmers, as they are only minor emitters of greenhouse gases. Yet it is still worth considering emissions reducing or sinks improving measures. Mitigation and adaptation measures often have high synergies as e.g. reforestation does not only serve as a carbon sink but also as a coping strategy against soil erosion and quality.

Some mitigation improvements in the project activities of GKE could include

- *Promoting renewable energy:* The current use diesel and coal generation is not environmental and climate friendly. It would be interesting to think about renewable energy as e.g. hydro or solar power. This would reduce CO2 emissions and give a strong advocacy component against coal mining (as the community is relying on renewable energy).
- *Organic agriculture:* the use of organic pesticides and fertilizer would reduce the release of GHG emissions (as organic pesticides and fertilizer are releasing GHG emissions during their production) and support a sustainable use of natural resources.
- *Supporting reforestation and avoiding deforestation:* The promotion of agro forestry in farming and reforestation could preserve and enhance carbon sinks.
- *Recycling waste:* the practice to burn waste is not only polluting the environment but releases also GHG emissions. The recycling of waste and also a raised awareness on waste management could reduce waste generation as well as reduce GHG emissions.

#### General Remarks for a project revision

- The two project Bidang Pembinaan (Congregation development) and Parpem (Partizipasi Dalam Pembangunan – Participation in Community Development) seem to be punctual and not very interlinked. Much more Synergies, cooperation and linkages between the different activities have to be installed. For example the handicraft activities are not really linked and embedded in the Parpem and/or advocacy activities (i.e. advocacy for a strong adat culture and village solidarity based on traditional culture of which traditional handicraft can be an expression of). Also an exchange of advocacy for mining, palm oil or deforestation between Tamiang Layang and Loksado might be interesting.
- Due to resources restriction we would recommend to concentrate all activities of the Church bodies (rural development, income generating and advocacy) in one region to enable these linkages and synergies and to have an impact.
- To strengthen team building in local communities for common interests.

## 5 Lessons Learned from the Application of the Tool

The climate change analysis presented in this report is the seventh one conducted with the HEKS and Bread for All “Participatory Tool on Climate and Disaster Risks”. Besides evaluating a specific project, the application of the tool also aimed at testing and improving it. The following lessons were drawn:

- The experience in the seventh country worldwide and in the second one on the Asian continent confirms the suitability of the tool in very different environments.
- The applied concept was not optimal. There was not project visit because of time restrictions and the analysis of two projects in such a short time. Therefore it was more difficult to understand the project activities, the climate change and other risks as well as to distinguish both projects and their activities. The two days for workshops with farmers, one day in Tamiang Laying with a mixed group and one day in Loksado with a separated group led to very different results. In reality, it was difficult to get both views of women and men as there were too many participants (over 30 in each workshop) and on the first day only one moderator. Some of the results were collected in advance, unfortunately some linkages were missing, so most of it needed to be redone. On the second day the participants were divided into two groups with a second moderator. One day to present the results and discuss the remaining modules was appropriate.
- The workshop participants were very interested in learning and understanding climate change. The challenge was to handle more than 30 participants in each workshop. It is also a challenge to collect information of farmers and at the same time interpret the results to give a feedback. Also the way forward after the workshop and which aspects GKE will take up in their future project work need to be considered. Thus, another workshop implemented by GKE with farmers in both villages was proposed to give an appropriate feedback to them.
- The suboptimal constellation for the analysis strengthened the view that separated groups are necessary to take into account both gender views. The results can hardly be analysed gender related without separation. And also, the women are less active if the groups are mixed and dominated by men.
- The team for the project analysis consisted of around 10 persons. This was by far too many people as during the workshop 2-3 persons are active. Therefore number of people in the project analysis team should be limited by 5 persons.
- For the first time Climate Change risks did not play such a big issue during the project analysis. But rather environmental risks as e.g. mining, palm oil plantation and waste were the main hazards for those two villages. The analysis showed that the tool can also be applied for other risks. It is open enough and easy to adapt to different conditions.
- The analysis showed also that the existing education level of the beneficiaries as well as of the project staff is essential for the level of the analysis. The awareness of project staff on environmental issues exists but is not implemented yet in the project area and is also not acting as an example. For example the waste management is known as a main concern. But during the coffee breaks in the workshops, lunch boxes were provided made of carton packages, small drinking bottles and plastic wrapping around the food. The participants draw the waste into the nearby river. Besides this climate change is also not the main risks in these areas. Therefore the impression was that before the issue climate

change can be treated other issues need to be deepened. It might be worth to think about conditions precedent to implement further project analysis on climate change.

- Project staff of GKE was very happy with the process. They looked at it as capacity building for themselves. They thought it will help them to stimulate future project developments. Some of the suggested improvements to enhance mitigation and adaptation capacities will be included to apply a project proposal in the climate fund of Bread for all and Swiss Catholic Lenten Fund.
- The comparison of the both villages Tamiang Laying and Loksado was very interesting. As the first named village is already facing various problems as e.g. mining activities and floods that might start or increase in the future in Loksado as well.

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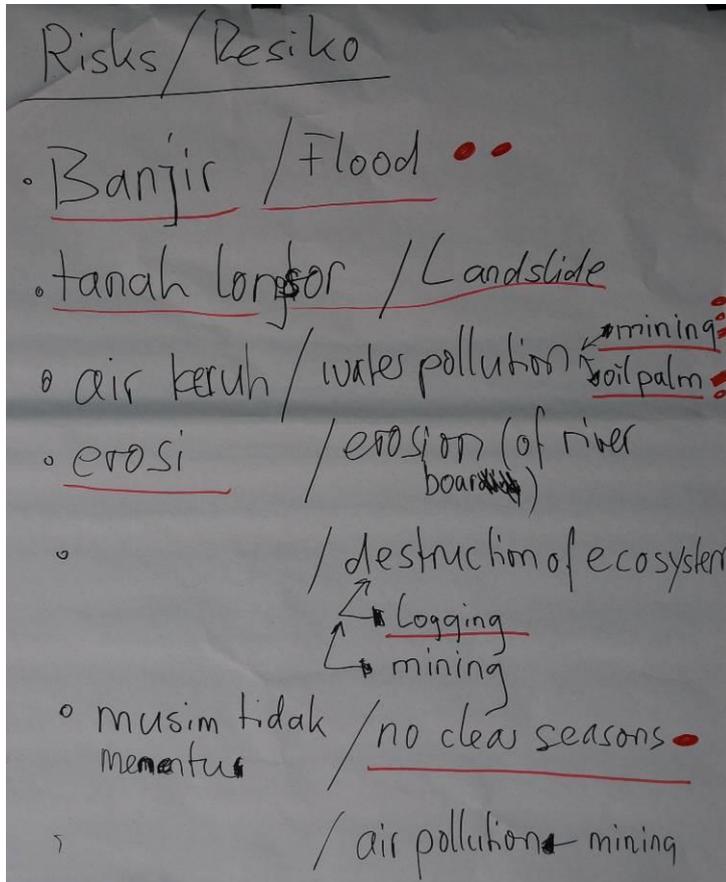
## 7 Annex: Minutes from Workshop in Tamiang Layang, Kalimantan, Indonesia

### 7.1 Day 2, Tuesday 25th, 2011, Mixed Groups in Tamiang Layang

Participants of workshop:



**Exercise 1: Hazards (mixed groups in Tamiang Layang)**



Besides these results the participants mentioned also the following issues:

- Skin problems
- Destruction of ecosystems: loss of biodiversity, fish habits and birds
- Loss of water springs because mining companies are using it
- Air pollution

**Exercise 2: Vulnerability Matrix (mixed groups in Tamiang Layang)**

Sumber Penghidupan	Resiko 1 Mining	Resiko 2 Banjir	<del>Resiko 3</del>
<u>Natural Resources</u>			
Karet/Rubber	3	2	
• Padi/Rice	3	3	
• Ternak/cattle	1	1	
• Sayur/vegetables	2	3	
<u>Ikan/Fish</u>	3	3	
<u>hutan/Forest</u>	3	3	
<u>air/water</u>	3	3	
<u>Handicraft</u>	3	3	lanaman obat/pati
• rice/vegetables	3	3	Sayur mayur
• livestock	3	3	berbagai ternak
fish	3	3	penangkapan ikan
rubber	3	3	penyakit karet
sewing	0	0	menjahit
employment	0	0	PKS
handycraft	2	2	Pengrajin :
- iron	3	0	= besi
- rotan	0	2	= rotan
- plastic	0	0	= plastik
<u>Financial resources</u>			

	Risiko 1 Mining	Risiko 2 Banjir	
human resources			SDM
• agricultural skills	3	3	↳ keahlian di bidang pertanian
• traditional medicines	3	1	↳ keahlian tentang obat-obatan tradisional
• health skills	3	2	↳ keahlian di bidang kesehatan
• Livestock skills	1	0	↳ keahlian di bidang perikanan
physical resources			Sumber Daya Fisik
• transport system	3	3	↳ Sarana transportasi
• irrigation system	2	0	↳ Sarana irigasi
Communication	1	3	↳ Sarana komunikasi
schools	2	3	↳ bangunan sekolah
hospitals	3	3	↳ Sarana / bangunan kesehatan / pendidikan
social resources			Sumber daya Sosial
• family (w/m)	2	3	↳ keluarga (L/P)
• farmers community (w/m)	3	3	↳ komunitas petani (L/P)
• Church (w/m) / Religion / adat	3	1	↳ jemaat gereja
Cooperative / Cooperation	2	1	↳ komunitas agama adat
	1	1	↳ koperasi
			↳ komunitas agama

**Notes**

- Agricultural skills are no longer sufficient to resolve problems (high impact (3)) due to mining activities and floods.
- Transport system is affected by mining activities because tracks destroy the roads (high impacts (3))
- Church community is affected by mining activities because people relocate, thus the church loses member. After a discussion the value was changed to low impact (1)
- Family's activities are interrupted during a flood, thus have a high impact (3).
- Livestock is nearly not affected by mining activities. Because livestock farming is not in the same area less affected compared to agricultural farming, thus low impact (1)

**Results**

- Mining activity is the hazard with the highest impact on farmer's livelihoods. Flood is second.
- The following resources are affected (at least 5 points in a sum ):
  - Natural resources: Rice, fish, forest, water, rubber, vegetables
  - Financial resources: selling agricultural products, selling fish, selling livestock, rotan handicraft, selling rubber
  - Human resources: Agricultural skills, health skills
  - Physical resources: Transport, system, irrigation system, school, hospitals
  - Social resources: Family, farmers community
- All resources are highly vulnerable.



Women group 3:

Resiko	Dampak / Pengaruh	Strategy untuk menjawab persoalan
Miring	<ol style="list-style-type: none"> <li>1. POLOSI UDARA.</li> <li>2. POLOSI AIR</li> <li>3. PRODUKSI KARET MENURUN.</li> <li>4. MENINGKATNYA ANGGRA KEMISKINAN.</li> <li>5. MENINGKATNYA ANGGRA KRIMINAL</li> <li>6. RUSAKNYA MORAL. (KERT)</li> </ol>	<ol style="list-style-type: none"> <li>1. MENDESAK SEMUA PERUBAHAN PERTAMBANGAN BERTANGGUNG JAWAB ATAS KERUSAKAN LINGKUNGAN.</li> <li>2. MENDESAK DPRD UNTUK MEMBUAT PERDA TENTANG PERLINDUNGAN HAK MASYARAKAT ADAT.</li> <li>3. DEMONSTRASI SEORANG DAMAI</li> <li>4. MEMBERIKAN MASUKAN KEPADA MASYARAKAT UNTUK TIDAK MENJUAL LAHA</li> <li>5. TUTUP TAMBANG HARGA MATI KEMBANGKAN PERKEBUTAHAN KARET.</li> </ol>
Banjir	<ol style="list-style-type: none"> <li>1. GAGAL PANEM.</li> <li>2. PENGGHASILAN MASYARAKAT MENURUN.</li> <li>3. RAWAT PANGAT.</li> <li>4. CAIZI KURANG.</li> <li>5. WABAH PENYAKIT / DIARI, MALARIA DLL</li> </ol>	<ol style="list-style-type: none"> <li>1. REBOISASI → PENANAMAN KARET / PENANAMAN POKOK BUAH.</li> <li>2. MENJALIT KERJASAMA DENGAN ORANG / ORGANISASI yg peduli lingkungan hidup.</li> <li>3. BERUSAHA MEMELIHARA SANITASI</li> </ol>

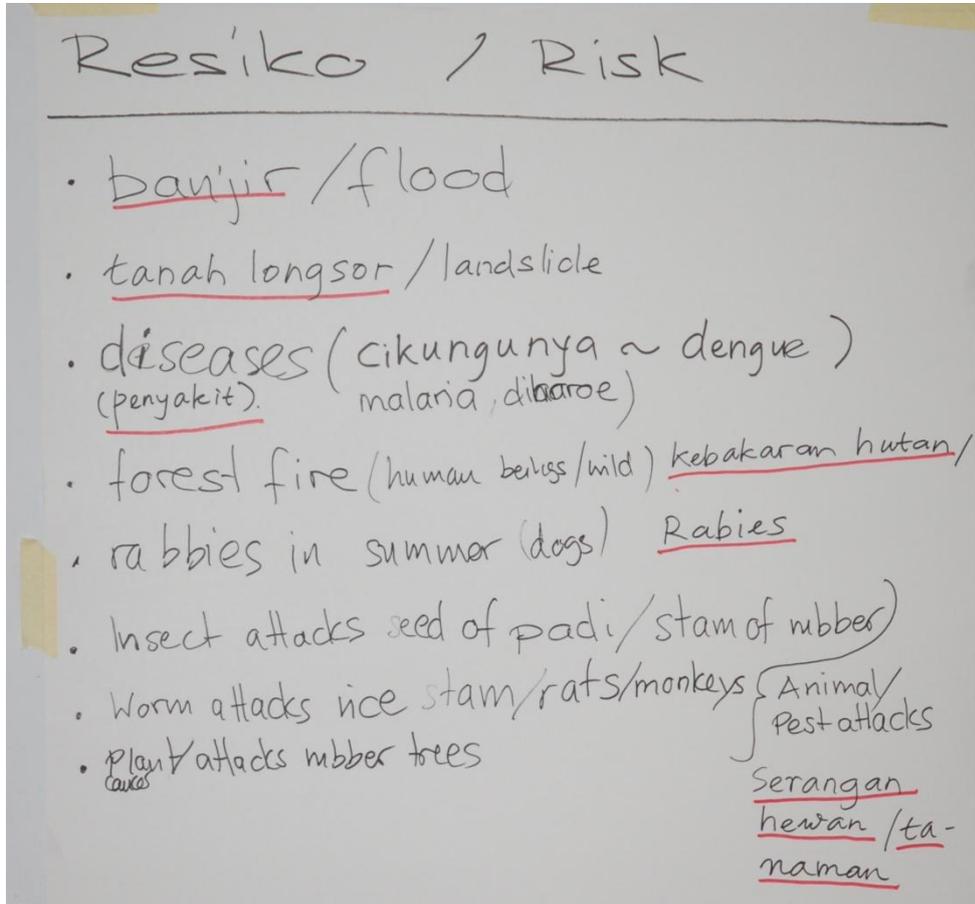
## 7.2 Day 3, Wednesday 26<sup>th</sup>, women and mixed group in Loksado

Participants of women workshop:



Participants of both groups (women and mixed group):



**Exercise 1: Hazards list (women group)**

**Observed changes of hazards in the last 10 year:**

- Flood occurred in 2002 and 2010, frequency of floods is increasing
- Landslides in the rainy season are increasing
- New diseases are occurring e.g. cikungunya (~dengue)
- Malaria and diarrhoea cases are decreasing
- Forest fires occurred in 2005
- Rabies decreased due to animal quarantine and immunisation

### Exercise 2: Seasonal Calendar (women group)

Kegiatan	1	2	3	4	5	6	7	8	9	10	11	12	Events
Membersihkan lahan							X	X	X				preparing field (rice)
Membakar lahan									X	X			burning of field (rice)
Menanam padi										X	X		plauting rice (beans)
Dasamba	X											X	harvesting cereals
Menuai padi			X	X									harvesting rice
Menjemur padi				X	X								drying rice
Bawananng (pesta panen)					X	X							post harvesting ceremony
Menanam karet										X	X		planting seed of rubber
Membersihkan lahan		X			X			X			X		cleaning field of rubber (every 3 months)
Menoreh karet	X	X	X	X	X	X	X	X	X	X	X	X	harvesting rubber (after 3)
Menampung karet	X	X	X	X	X	X	X	X	X	X	X	X	store liquid rubber
Menjual karet	X	X	X	X	X	X	X	X	X	X	X	X	selling (once a month)
Musim hujan	X	X	X	X				X	X	X	X		rainy season

Observed changes in season over the last 10 years:

- Harvest season of rubber is starting earlier. It seems to be due to the use of chemical pesticides and fertilizers which accelerate the growth, thus harvesting of new planted trees is already possible after less than 10 years.
- In 2001 and 2005 the summer season was much longer and more fields were burning.
- In 2002 and 2010 were very high floods. Several persons died damage of irrigations system and the main bridge over the river broke down. In 2010 in accordance with the observations of participants it rained the whole year around for the first time.
- Generally the rainfall frequency and intensity increased during rainy season. Participants could not agree if the rainy season got longer or shorter but observed changes in rainfall patterns.
- Yield quantity and quality of rice decreased. Accordingly to the participants the field rotation got shorter and is no longer a cycle of 7 years. The remaining land was used to plant more rubber trees.

### Exercise 3: Vulnerability Matrix (women group)

Sumber Kehidupan	Risiko 1 banjir + flood	Risiko 2 penyakit diseases manusia	Risiko 3 serangan newan pest	livelihood resource
<u>karet</u>	1	<del>2</del> 1	3	rubber f.r.
<u>Padi</u>	3	1	3	rice n.r
<u>water/air</u>	3	0	0	water n.r
<u>Ek Ayam</u>	1	0	0	chicken n.r
Kemiri	0	<del>2</del> 1	0	muscat f.r
Kayu Manis	0	1	0	zint f.r
bambu	0	1	0	bambo f.r
<u>banana</u>	0	1	2	 f.r
Sekolah	1	0	0	school building p.f
Tempat pelayanan Kesehatan	1	0	0	health center p.f
Transportasi	2	0	0	transport infrastructure p.f
Irigasi	0	0	0	irrigation system s
Ahli Pertanian (Pakar Pertanian)	0	0	0	agricultural knowledge w.s
Pakar Kesehatan yang bagus	0	2	0	good health w.s
Koperasi	0	2	0	credit union s
Komunitas Desa	1	0	0	village community (incl. health) s
Kelempok Tani	0	0	<del>2</del> 1	farmer's community
	<del>13</del> 13	10	10	

#### Discussion during the scoring:

- Water is polluted caused by floods, thus has a high impact (3).
- Chickens feed is destroyed by floods, thus has a high impact (3).
- Nutmeg is growing on the hills and thus not affected by floods,
- The villages community is affected by flood, thus can't continue with the daily activities.
- Rubber is affected by human diseases because the ill person can't work

#### Results

- Flood is the hazard with the highest impact on farmer's livelihoods. Human diseases and pest diseases are secondly. Generally the risks that Loksado's population is facing are very low compared to former analysis of different places.

- The following resources are affected (at least 3 points in a sum ):
  - Natural resources: rubber, rice, water
  - Financial resources: banana
- The most vulnerable resources are natural and financial resources.

**Exercise 4: Risks, Impacts and Coping Strategies (women group)**

Resiko	Dampak/Pengaruh	Strategi untuk mengatasi masalah
Banjir	<ol style="list-style-type: none"> <li>1. jembatan rusak</li> <li>2. Pohon tumbang</li> <li>3. Tanaman sawah rusak</li> <li>4. Rumah rusak</li> <li>5. Penduduk meninggal / ada korban</li> <li>6. Aktifitas penduduk terganggu</li> <li>7. Ternak hilang</li> <li>8. Listrik mati</li> <li>9. Kurang air bersih</li> </ol>	<ol style="list-style-type: none"> <li>1. Gotong royong memperbaiki jembatan</li> <li>2. Membuat jembatan semen-tara dari bambu</li> <li>3. Mengungsi ke tempat keluarga</li> <li>4. Kontribusi / bantuan untuk para korban bencana/meninggal (uang/barang)</li> <li>5. Menggunakan lampu minyak tanah / genset</li> <li>6. Menampung air hujan</li> </ol>
Mabah Penyakit (tumbuh manusia)	<ol style="list-style-type: none"> <li>1. Aktifitas di sawah/ladang menurun</li> <li>2. Penghasilan berkurang</li> <li>3. Pengeluaran bertambah</li> <li>4.</li> </ol>	<ol style="list-style-type: none"> <li>1. Perobat ke dokter / rumah sakit</li> <li>2. Menabung</li> <li>3. Kader Rajin memberi penyuluhan cara mencegah penyakit</li> <li>4. Setiap keluarga rajin membawa anak/balita ke Posyandu</li> </ol>
Serangan hewan	<ol style="list-style-type: none"> <li>1. Padi rusak, pohon karet mati / gagal panen</li> <li>2. Penghasilan kecil / tidak ada / rugi</li> <li>3. Panen pisang gagal</li> <li>4.</li> </ol>	<ol style="list-style-type: none"> <li>1. Penyemprotan hama dgn larutan kimia</li> <li>2. Membakar daun kerir untuk mengusir hama</li> <li>3. Memasang peralatan bambu yang bisa dibunyikan</li> <li>4. Membuat orang-orang utk mengusir monyet</li> <li>5. Menjual beras stok lama ke tempat lain (Kandangan)</li> </ol>

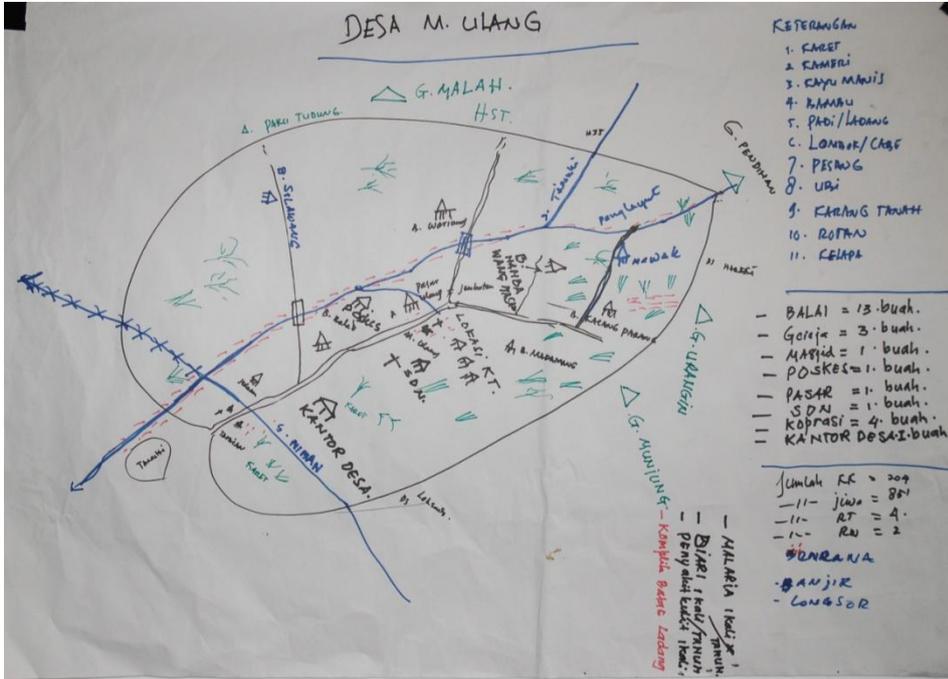
RISIKO / RISK

- banjir / flood
- tanah longsor / landslide
- diseases (cikungunya ~ dengue) (penyakit) malaria, demam)
- forest fire (human beings / bird) kebakaran hutan /
- rabies in summer dogs / Rabies
- insect attacks seed of padi / stem of rubber)
- Worm attacks rice stem / rats / monkeys (Animal / pest attacks)
- Plant attacks rubber trees

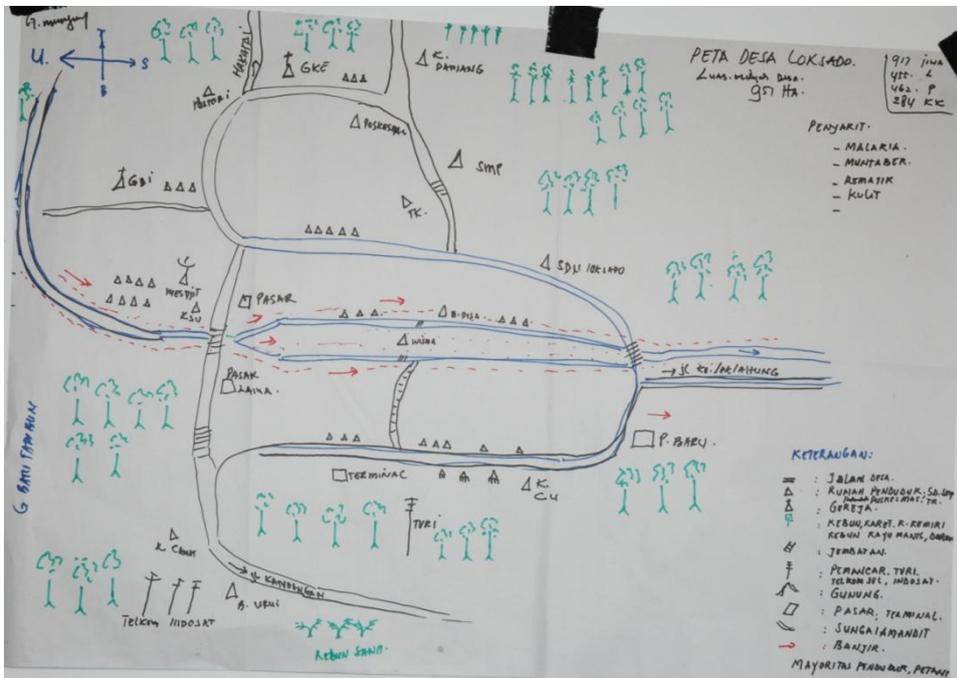
Serangan hewan / tanaman

**Exercise 1: Hazards maps (mixed groups)**

**Village Desa**



**Village Loksado**



### Exercise 2: Seasonal Calendar (mixed groups)

#### Village Loksado

	1	2	3	4	5	6	7	8	9	10	11
- Menilih Karet .	✓										
- Ladang .		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1. Manahbas .						✓					
2. Penabangan pohon						✓	✓				
3. Pembakaran .								✓			
4. Memanduk .									✓		
5. Menanam padi										✓	
6. Penyilangan padi											✓
7. Memuntik .											✓
8. Pesta panen				✓	✓						✓
- Kayu manih .											
- Kaminting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- kacang tanah .							✓		✓		
- bambu / ricing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- pisang							✓	✓	✓	✓	✓
- Cabi							✓	✓	✓	✓	✓

#### Village Desa

NLO / KEGIATAN	Jan	Feb	Maret	4	5	6	7	8	9	10	11	
1. BERLADANG / BAHUMA	Pembesihan	Pembesihan	Pembesihan	PANEN	PANEN	PESTA PANEN / BAHUMA	MANAHBAS	BATUBANG	BUMBUKUN	PEMBANGKUN	PELEMAN MANI	Pembesihan
2. MEHADAP KARET	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3. JUAC. BAMBU	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4. BALABUH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5. BAMBU RAFTING	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6. KAMINTING / KEMIRI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7. MENANAM BIBIT KARET DLL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8. PANEN PISANG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9. KACANG TANAH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10. MUSIM BUAH-BUHAN				✓	✓	✓	✓	✓	✓	✓	✓	✓
12.						TANAMAN / KERINGAN	TANAMAN / KERINGAN	PANEN	juac	juac	juac	juac
						PELEMAN BANG.	PELEMAN BANG.	PELEMAN BANG.	PELEMAN BANG.	PELEMAN BANG.	PELEMAN BANG.	PELEMAN BANG.

LOKSADO 26. JANUARI 2011  
( TRAMP DESA )

**Exercise 3: Risks, Impacts and Coping Strategies (mixed groups)**

**Hazard Investor for mining activities**

	Dampak / Pengaruh	Strategi untuk mengatasi masalah
Resiko Investor datang	<ul style="list-style-type: none"> <li>- Lingkungan rusak</li> <li>- Masyarakat kehilangan lahan.</li> <li>- Sungai keruh.</li> <li>- Hutan rusak.</li> <li>- Menimbulkan penyakit.</li> <li>- Masyarakat kesulitan air bersih.</li> <li>- Hilangnya habitat alam.</li> <li>- Tanaman &amp; terdapat signal musuh.</li> <li>- Pencemaran udara.</li> </ul>	<ul style="list-style-type: none"> <li>- Penanaman kembali hutan.</li> <li>- Mempertahankan adat.</li> <li>- Menulis surat keberatan.</li> <li>- Berdialog dgn pemerintah.</li> <li>- Dimmo.</li> <li>- Membantu kesehatan masyarakat.</li> <li>- Menegakkan peraturan &amp; adat.</li> <li>- Membantu pagus dayak</li> </ul>
	<p><u>Ekonomi</u></p> <ul style="list-style-type: none"> <li>- Pendapatan masyarakat berkurang.</li> <li>- Pengangguran bertambah.</li> <li>- Menimbulkan kemiskinan.</li> </ul>	
	<p><u>Budaya</u></p> <ul style="list-style-type: none"> <li>- Hilangnya adat istiadat masyarakat.</li> <li>- Perubahan hubungan kekeluargaan.</li> <li>- Kejahatan merajai rako.</li> </ul>	
	<p><u>Dampak terhadap ibu-ibu</u></p> <ul style="list-style-type: none"> <li>- . . .</li> </ul>	

**Hazard: Flood**

	Dampak / Pengaruh	Strategi untuk mengatasi masalah
Resiko Banjir	1. DENGAN BANJIR AIR MINJUM TERCEMAR.	<ul style="list-style-type: none"> <li>- PENANAMAN Pohon DI DAS</li> <li>- AKSI PENANAMAN MINIMAL 100 Pohon / TAHUN / KK</li> <li>- PENYULUHAN KESEHATAN KEPADA WARGA</li> <li>- Boleh Terbagi Kesehatan &amp; MEDIS SECARA BERKALA.</li> <li>- PENYULUHAN PENTING NYA KESEHATAN MENYANGKUT ASUPAN AIR SEHAT &amp; SEMURNA MELALUI PKK.</li> <li>- AKTIFKAN RASA KEGOTONG ROYONGAN BAIK DI TINGKAT RT/AN WAJUPUN DESA.</li> <li>- MENGHENTIKAN PENEBAHAN Pohon SECARA LIR.</li> <li>- MENGUPAYAKAN BAMBU DI OLAH MENJADI SE BAHAN BAKU 1/2 JADI C KUNY SEBAGAT MAT</li> <li>1. PENANGKAP IKAN</li> <li>2. KANDANG TERKAMPUNG</li> <li>3. BAHAN BERJAYANTAN</li> <li>4. BAHAN BERJAYANTAN TRADISIONAL</li> <li>5. KUBI DUNUNG</li> <li>6. TIRAI CANTAI</li> <li>7. ATAP</li> <li>8. SOUPERA.</li> </ul>
	2. INFRA STRUKTUR RUMAH	
	3. PERTANIAN	
	4. TRANSPORTASI KAKI TERGANGGU.	
	5. KOLAM IKAN / KERAMBA GABAC PANEN.	