World Agroforestry Centre

Local Mitigation Actions Supporting the Low Emission Development Plan in Kutai Barat District, Indonesia – Initial Process

Kutai Barat Series

Indonesia has made a serious commitment to reduce emissions in order to mitigate global climate change. This commitment has been taken up in national level policies and by other parties through a series of efforts towards emission reduction targets. The land-based sector provides the greatest potential for reducing emissions in Indonesia. Considering the large geographic coverage and the range of land use policies and allocations across administrative hierarchies in the country, potential emission reductions from the land use sector are implemented at the sub-national levels of province and district (*kabupaten*). In Indonesia, the National Action Plan for Greenhouse Gas Emission (RAN GRK) and REDD+ is translated into the Regional Action Plan (RAD GRK) and the Provincial Strategies and Action Plan for REDD + (*Strategi dan Rencana Aksi Provinsi* - SRAP REDD+) at the provincial level as systematic initiatives of the emission reduction effort. Due to the principle of subnational autonomy in which development programs reside at the district (*kabupaten*) level, it is highly relevant that initiatives at the provincial level be translated into action plans at the district level.

Cover Photo: Landscape in Kutai Barat / MT Zulkarnain (Left), Land clearing for agricultural development / Subekti Rahayu (Right)

Highlights

1. Planning for low emission development efforts require commitments from multiple parties and the process towards developing the strategies should apply the principles of participation and inclusivity
2. The land-based sector in Kutai Barat provides great potential for mitigating climate change especially through the former logging concession areas which are the highest emission source in the district
3. Kutai Barat can potentially reduce its current emissions by 25.7 % by 2020 through addressing the historically high emission contributors
4. Emission reduction actions potentially entail a decrease in economic benefits; such a trade off should be considered carefully in the negotiation processes to determine the appropriate scenario(s) for the district.

Kutai Barat district is located in East Kalimantan province, with the district covering 3.2 M hectares and occupying almost 15 % of the province (see Figure 1). The district is dominated by large tracts of pristine forest in the north and agricultural areas and secondary regrowth in the relatively flat areas in the south. A small part of the district to the east is covered by peat swamp. Kutai Barat has considerable potential for emission reductions due to its large amount of forested land with high potential for carbon sequestration. However, land use changes fast as a response to fulfilling the district's target of economic development, with plantations and mining growing rapidly. These conditions demand a compromise that can align development activities with national commitments to reduce emissions.

Planning for low emission development efforts requires commitments from multiple parties and the process towards developing the strategies should apply the principles of participation and inclusivity

The design and construction of the planning steps for emission reduction strategies in this exercise applied the framework of Land Use Planning for Low Emission Development Strategy (LUWES) [1] which contains a systematic set of steps to integrate the processes of identifying emission sources, calculating historical emissions, predicting future emissions by considering historical emissions and local development plans, setting up a Reference Emission Level (REL) and regional action plans, and determining an implementation strategy.

Inclusivity is an important principle in planning emission reduction strategies. It will increase the perceived degree of success of the program that regulates different administrative levels and interests in the area. It was ensured that this process would take place in Kutai Barat, as local stakeholders including government agencies, private/companies and community groups participated in the process.

A planning unit was defined as a 'zone' where any land use change process was recorded and the zone contains factors affecting the activity and preparation in developing appropriate mitigation actions. Zonation is developed based on spatial-based integration between various formal district planning documents, forestry land status, land use permits and bio-physical elements (peat). Zones are shown in Figure 1 and their definitions are in Table 1.

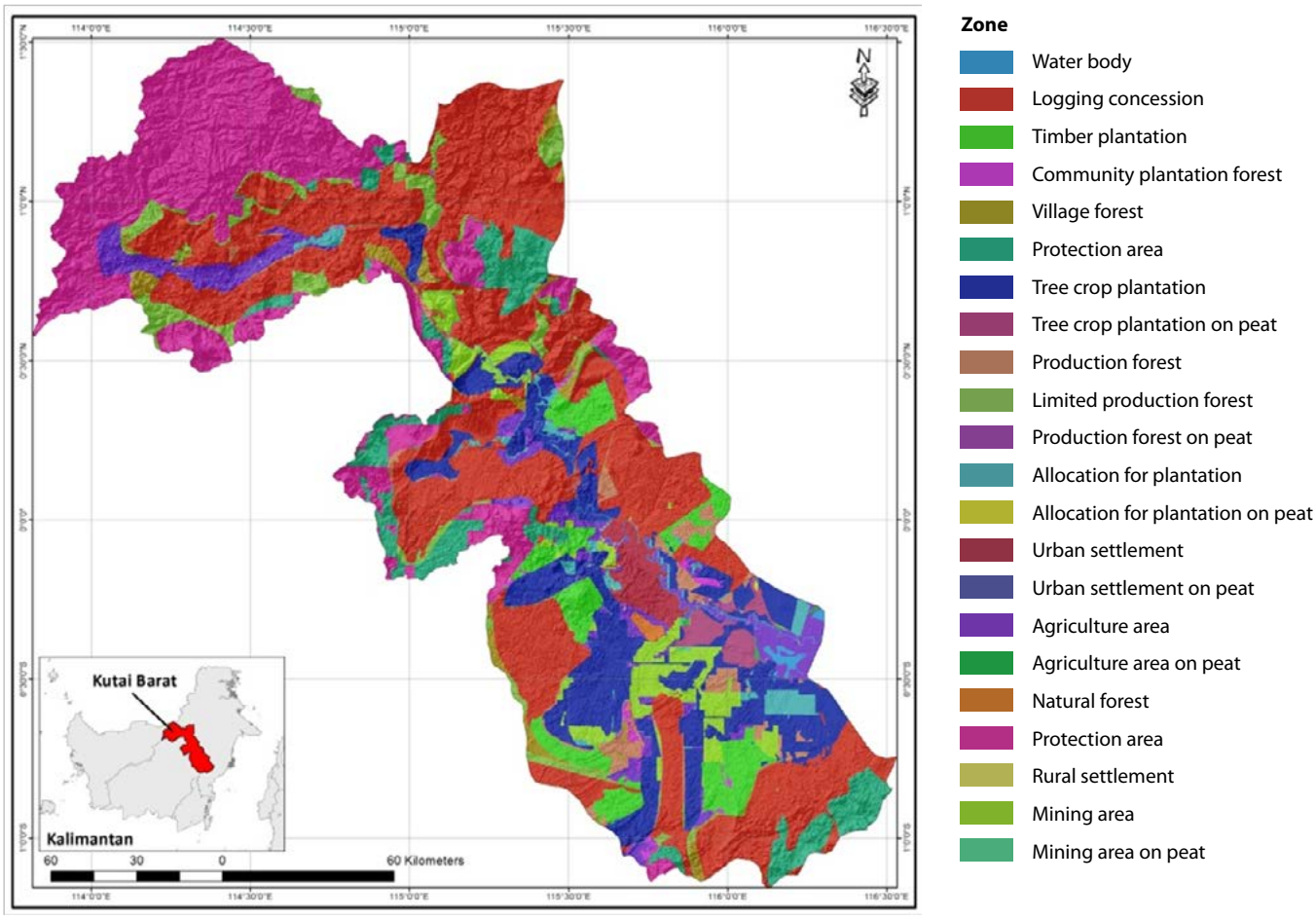

Figure 1. Map of zones as planning units for mitigation actions

Table 1. Zone Definition

Zone	Definition	Future land use as planned
Protection Area	Forest area defined as remaining forest that functions as a buffering system	Follow historical changes; No intervention
Natural Forest	Area for preserving flora and fauna	Follow historical changes; No intervention
Limited Forest Production	Production forest with limited type of management	Follow historical changes; No intervention
Production Forest	Forest that functions as timber producer	Follow historical changes; No intervention
Logging Concession	Special permit for logging activities	Primary forest change to logged over forest
Timber Plantation	Permitted area for timber plantation development	Primary and secondary forest change to forest plantation
Village Forest	Forest area for villager uses and to enhance livelihood	Follow historical changes; No intervention
Community Plantation Forest	Forest area where management activities are undertaken by communities and in small holder plantation as common use	Primary and secondary forest change to forest plantation
Tree crop plantation	Nonforest area permitted for tree crop plantation development	Secondary forest, community plantation and shrub change to rubber (25%) and oil palm (75%)
Mining	Forest area and nonforest areas that have function as mining activities	Area will change to cleared land, plantation forest and shrub.
Agricultural Area	Nonforest area allocated for agricultural activities	Secondary forest, mixed garden, shrub will convert to agricultural land
Allocation for Plantation	Nonforest area allocated for tree crop plantation activities	Secondary forest and shrub will convert to tree crop plantation
Rural Settlement	Forest and nonforest areas that function as rural settlement	All land uses are for rural settlement
Urban Settlement	Forest and nonforest areas that function as urban settlement	All land uses are for urban settlement

The land-based sector in Kutai Barat provides great potential for mitigating climate change especially through the former logging concession areas which are the highest emission source in the district

Land use and land cover change analyses were conducted for 2000-2009 [2] and emissions were calculated as the decrease in carbon stocks at the landscape level [3]. It is evident that emissions from the logging concession zone (locally termed as HPH) and the tree crop plantation and timber plantation (*Hutan Tanaman Industri* – HTI) zones caused approximately 70 % of all emissions occurring in Kutai Barat. Extraction of timber in the logging concession zone contributed the highest emission share (46%) followed by land clearing in the tree crop plantation zone (16.6 %) and in the timber plantation zone (9 %) as shown in Figure 2.

Different types of forest and vegetation cover changes took place in logging concession areas, tree crop plantation areas, protection forest (*Hutan Lindung* or HL) areas and timber plantation areas and they mostly demonstrate decreases in forest density as a result of timber extraction activities and land clearing in those designated areas (Table 2). Ten types of change contributed more than half (53 %) of the emissions in Kutai Barat for 2000-2009.

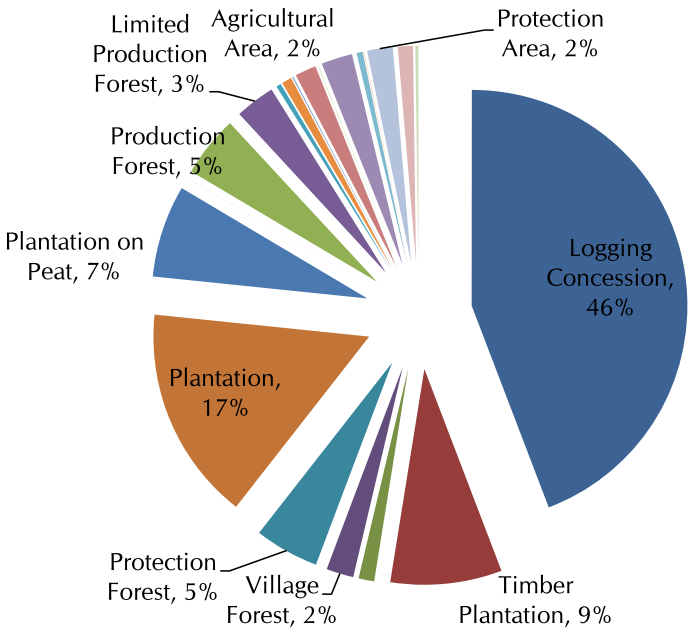

Figure 2.Land-based emission shares from different zones 2000-2009

Table 2. Types of land cover changes contributing to the ten highest emission shares in different zones

Zone	Land cover type in 2000	Land cover type in 2009	% emission shared base on land use change
Logging Concession	Dry lowland forest high density	Dry lowland forest medium density	14 %
		Dry lowland forest low density	2 %
	Dry lowland forest medium density	Dry lowland forest low density	14 %
		Shrub	2 %
Tree crop plantation	Dry lowland forest high density	Dry lowland forest medium density	3 %
	Dry lowland forest medium density	Dry lowland forest low density	6 %
		Shrub	3 %
Protection Forest	Dry lowland forest medium density	Dry lowland forest low density	3 %
Timber Plantation	Dry lowland forest high density	Dry lowland forest medium density	3 %
	Dry lowland forest medium density	Dry lowland forest low density	3 %

Kutai Barat can potentially reduce its current emissions by 25.7 % by 2020 through addressing the historically high emission contributors

Two approaches in setting up the REL were considered: a historical baseline and a forward-looking baseline. The historical baseline solely uses rate of historical land use changes as the basis for projecting future emissions, while the forward-looking baseline is developed by taking into account the district's development plans, including implementation rates, in the estimation of future emissions. These approaches show a substantial difference in the projected cumulative CO_2 emissions by 2020 (Figure 3).

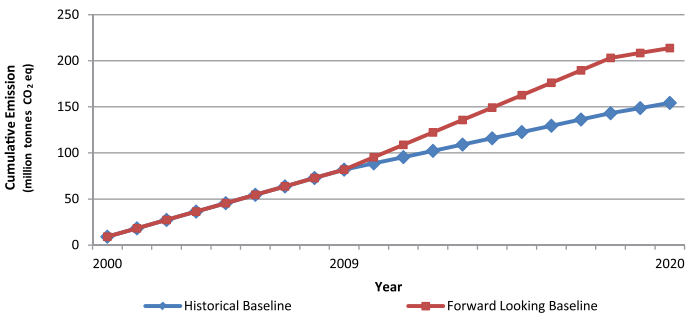

Figure 3. Two approaches used to establish baselines

Determination of the baseline for establishing the REL requires careful and comprehensive consideration by the district policy makers, because it involves multiple interests including the need for continuing development agenda which may likely involve extraction of natural resources. Figure 3 demonstrates that future cumulative emissions based on local development interests (the forward-looking model) will be higher than the cumulative emissions based on projected past land use changes (the historical model), because land requirements for future development very likely will be larger than past recorded levels. Thus, to accommodate future development in Kutai Barat, which is critical for district needs, we applied a forward-looking baseline as the REL for emission reduction in Kutai Barat district.

The main mitigation actions are defined based on the aspirations of the multiple stakeholders by taking into account emission sources and shares. Scenarios are developed for each zone to allow the detailed identification of problems and to design intervention activities. Primary considerations in developing scenarios are adhering to the principles of guarding existing forest cover, rehabilitating degraded forest areas and planting/replanting economically viable trees. The zones being prioritised for mitigation actions are those contributing the highest emission shares (see Figure 2), namely the logging concession, tree crop plantation, mining, protection forest and timber plantation zones. The corresponding mitigation actions developed for those zones are shown in Table 3.

Scenarios were developed to reflect the details of mitigation actions and for the purpose of calculating potential future emissions—in this case until 2020. Trends on cumulative emissions for each scenario can be observed in Figure 4.

Scenario 1 takes place in the logging concession zone and potentially reduces cumulative emissions by 12 %, while Scenario 2 in the tree crop plantation zone reduces emissions by 8 %. Total emission reductions observed from the cumulative emissions of all scenarios reaches 26 %.

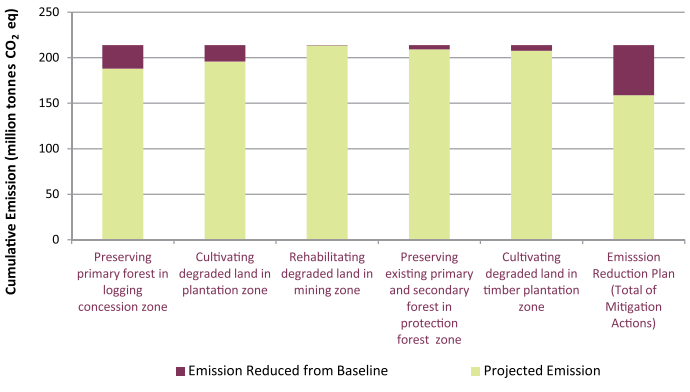

Figure 4. Scenarios and their impacts on reducing cumulative emissions 2000-2020

Table 3. Emission reduction scenarios and the corresponding mitigation actions

Zone	Scenario Developed for Each Z one	Main Mitigation Actions	Enabling Condition/Assumption/ Supporting Activities
Logging Concession	Scenario 1: Preserving primary forest in logging concession zone	Preserving 50 % of primary forest area	Implementing sustainable forest management
Tree crop plantation	Scenario 2: Cultivating degraded land in tree crop plantation zone	Preserving 80 % of remaining primary forest area and converting 20 % to plantations	Issuing the regulation
		Developing tree crop plantations only in degraded areas	
Mining	Scenario 3: Rehabilitating degraded land in mining zone	Rehabilitating approx 30 % of ex-mining area to plantation forest.	Implementing Best Management Practice
Protection Forest	Scenario 4: Preserving existing primary and secondary forest in protection forest zone	Preserving remaining primary and secondary forest	Buffering protection forest
Timber Plantation	Scenario 5: Cultivating degraded land in timber plantation zone	Prioritising of planting in degraded land	Issuing the regulation, recommendation to the private company

The scenarios developed require support from various sources and levels, enabling conditions and other supporting activities in the district. It is also important to note that they were built on the bases of some assumptions, which inevitably need consultation with various parties. In the context of emission reductions, it is important to focus on the direction of activities and phases, and on the identification of factors, issues and budget needs. District authorities should facilitate the establishment of enabling conditions and develop supporting activities that will lead to the creation of conducive conditions for the agreed scenario.

Emission reduction actions potentially entail a decrease in economic benefits; such a trade off should be considered carefully in the negotiation processes to determine the appropriate scenario(s) for the district

In response to emission reduction actions, impacts to economic development need to be evaluated. In principle and at the minimum, opportunity cost analysis[1] can be applied to assess the trade-off between emission reductions and economic benefits. The Net Present Value (NPV)[2] is used to compare the benefits of different types of investments and is applied to reflect the profitability of different types of land use activities.

Most mitigation scenarios show a positive correspondence between a reduction in emissions and a decrease in economic benefits (Figure 5), except for Scenario 5 in the timber plantations where a 3 % emission reduction slightly increases the economic benefits (< 1 %). Hence, Scenario 5 is the most feasible scenario from an economic perspective, albeit with only a small emission reduction. In contrast, Scenarios 1 and 2 have considerable positive impacts on emission reduction but incur high economic costs. These tradeoffs are important factors for consideration in the negotiation processes which should lead to agreed levels of emission reduction by recognizing a tolerable level of economic loss. Part of the discussion within that negotiation process should also consider the possibility of taking advantage of any potential carbon market through REDD+ schemes. This latter approach will potentially bring incentives to offset the economic loss. This Kutai Barat case highlights where approaches within RAD GRK alone are most unlikely to be sufficient to meet the district's commitment to reducing emissions. Synergising the RAD GRK initiative with SRAP will potentially increase the success of emission reduction efforts.

Rational and transparent policy negotiation processes will ensure accountability and equality between the parties in selecting the appropriate mitigation scenario. By doing so, the chance of successful implementation is higher, with possible conflicts in the future more able to be minimized. Nevertheless, the required involvement of multiple stakeholders, actors, policies and regulations complicates the negotiation process and the involvement of a neutral facilitating organization is necessary especially to forestall any anticipated negotiation deadlock.

1 A common definition of opportunity cost is a forgone benefit after making a choice.
2 The NPV of a project or investment is defined as the sum of the present values of the annual cash flows minus the initial investment.

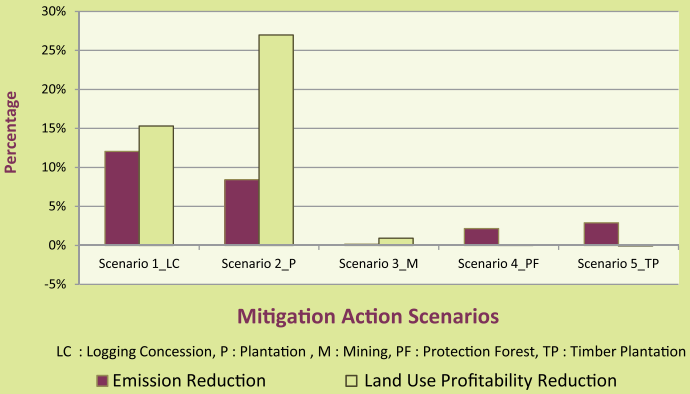

Figure 5. Emission reduction and decrease in economic value of land uses (a negative value indicates increased profitability)

Next steps

Follow-up activities are needed in the context of low-emission development in Kutai Barat which can be summarized as:

- Designing a strategy to integrate the principles of mitigation; such a strategy should be aligned with development activities, which include district planning and budgetary allocations.
- Identifiying of Kutai Barat authority in each zone to optimize their role in implementing scenarios and to verify the current assumptions and ensure they are expressed on a more objective and credible basis.
- Creating synergies with national policies, which require continuous and intensive communication activities across provincial and district level authorities.

Furthermore, it is important that there is follow up on the clear assignment within each agency at the district level to oversee the development process or the formation of a special working group comprised of various local government agencies to coordinate and plan activities. The working group should also be responsible for evaluating whether these activities have met the low emission development goals at the regional and national levels.

Key references

[1] Dewi S, Ekadinata A, Galudra G, Agung P and Johana F. 2011. *LUWES; Land Use Planning for Low Emission Development Strategy*, Bogor, Indonesia, World Agroforestry Centre-ICRAF, SEA Regional Office. 47p.

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