

Figure 4. Cumulative emission level, estimated for each land use category in West Tanjung Jabung Regency until year 2020

the various development scenarios are shown in Figure 5. These results can be used as a reference point to improve the development plan in Tanjung Jabung Barat district, ensuring that the goal of implementing a low-emissions development strategy can be achieved.

Policy implications and future activities

Emissions reduction activities in Tanjung Jabung Barat district should focus on the three land allocation zones that contribute to 87% of total emissions of carbon dioxide equivalent: Industrial Tree Plantation (HTI), Oil Palm Plantation (HGU) and Peatland (KPHLG). Low-emissions development can take place in the district if all stakeholders—local government, communities and private companies—are committed to their tasks and undertake their responsibilities.

For example, reducing emissions in the oil palm sector requires commitment from concession holders to optimise the use of abandoned and degraded land rather than opening land with high carbon stock. Similarly, reducing emissions in the HTI zone implies the commitment of pulp and paper industries to use raw materials from their planted trees and reduce (or even forego) the use of wood (mixed tropical hardwood/MTH) from natural forests.

There will be challenges in implementing low-emissions development in the field. For example, use of abandoned land (with low carbon stock) by

concession holders is regulated under the Agrarian Law. However, in reality, various land claims by local communities create difficulties for concession holders to use the land. Concession holders need clear legal status and secure tenure on concession land.

Similarly, to reduce emissions from the KPHLG zone, local government and local communities must work together to restore and maintain the protection function of KPHLG. Conversion of oil palm to *jelutung* systems could increase carbon stocks. However, commodity conversion needs careful consideration because it has an impact on farmers' income. Currently, oil palm systems make a significant contribution to farmers' incomes. Thus, besides *jelutung*, local government should consider the inclusion of other trees in the systems that could also provide income to farmers.

To provide communities around the KPHLG with clear legal status and tenurial access in order to effectively manage the land, the local government should consider provision of village forest permits for community forest (Hutan Kemasyarakatan/HKm) or other forms of cooperation that could strengthen the collaboration between local government and local communities.

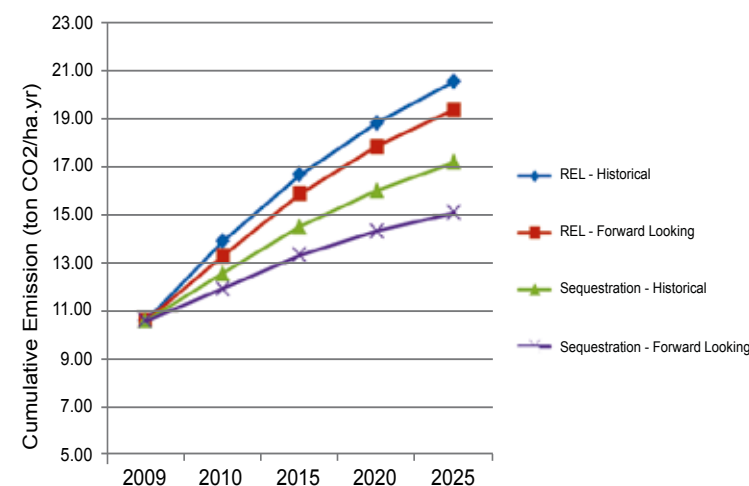


Figure 5. Reference Emission Level and estimated emission for each development scenarios in West Tanjung Jabung



Photo by Asep Ayat

To implement an emissions reduction strategy in Tanjung Jabung Barat district, a special working group should be established with the role of facilitating communication among all stakeholders, including decision makers at higher levels. This working group on low-emissions development could provide direction and recommendations on the feasibility of activities to be undertaken as part of an emissions reduction strategy that supports regional development.

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Citation

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Planning for low-emissions development in Tanjung Jabung Barat district, Jambi province, Indonesia



Photo by Asep Ayat

Tanjung Jabung Barat district in Jambi province, Sumatra, has had one of the province's highest rates of carbon emissions associated with land-use changes. During 2005–2009, the average annual emission of carbon dioxide or equivalent in the district reached 9.66 tonne per hectare. The main source of emissions was the conversion of previously logged forest to rubber and oil palm plantations. The national development policy to establish industrial tree plantations (Hutan Tanaman Industri/HTI) has greatly influenced the level of emissions in the district. At the time of writing, HTI is the dominant land-use system in Tanjung Jabung Barat.

Forest areas in Tanjung Jabung Barat cover 240 090.55 ha¹ or 48% of the district's total area. Approximately 71% of the forest area is categorised by the Government as Production Forest. Spatial

Main issues

- Mitigation of climate change through changes to agriculture, forestry and other land uses requires thorough consideration of the balance between economic and social benefits that can be gained from development and the environmental risks that arise with different types of land management.
- The Presidential Regulation no. 61 Year 2011 (National Action Plan to Reduce Greenhouse Gas Emissions), known as RAN-GRK, provides the detail of Indonesia's commitment to reduce emissions.
- Implementation of the plan at sub-national level needs practical and comprehensive tools to plan activities that will reduce emissions.
- Emissions reduction requires integrated cooperation, not only between local government agencies but also with all ministries responsible for forests and other land uses.
- Emissions are caused by different actors and factors. Discussions between all stakeholders are crucial.

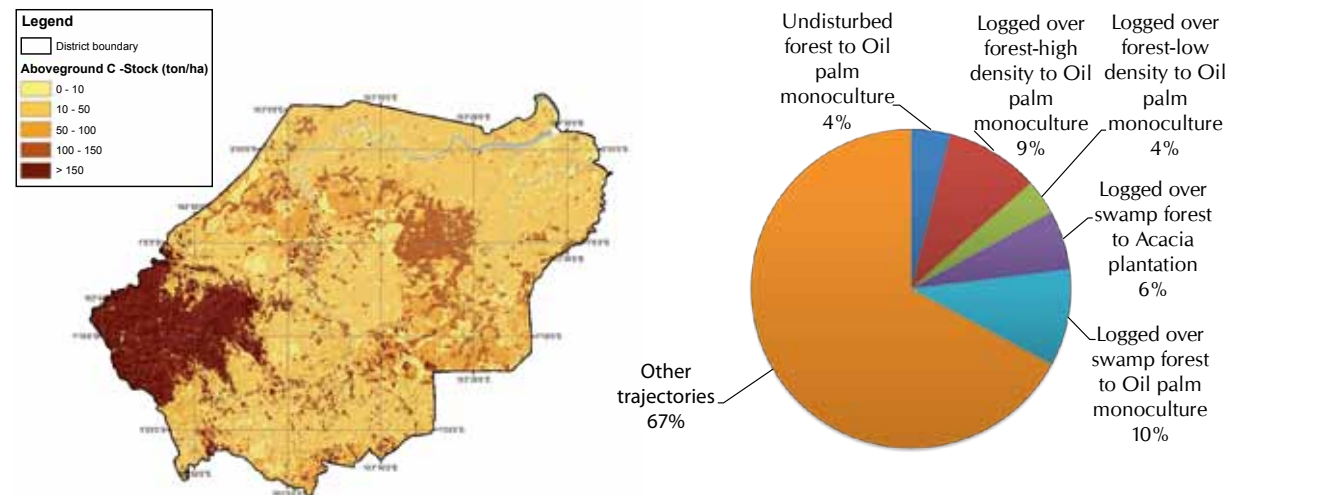


Figure 1. Carbon stocks map and sources of carbon emission in West Tanjung Jabung

analysis conducted by the World Agroforestry Centre (ICRAF) showed that most of the Production Forest areas were allocated for HTI (156 306 ha) and oil palm plantations (90 655 ha).

To estimate possible reductions in emissions and plan activities to bring them about, the District Planning and Development Agency (Badan Perencanaan Pembangunan Daerah/Bappeda) collaborated with the World Agroforestry Centre (ICRAF) in a study called Land-Use Planning for Low-Emissions Development (LUWES). The project aimed to provide the local government with recommendations that could be included in the regional land-use plan (Rencana Tata Ruang Wilayah/RTRW).

Integrating the development plan with the regional land-use plan

Future emissions from a region can be estimated by analysing its land-use development plan. From discussions with local government agencies in Tanjung Jabung Barat, we were able to obtain land-related development documents, such as maps of mining areas, oil palm plantations, HTI concessions and agricultural commodities. These maps were then combined with the RTRW to derive a map of land-use allocation zones.

There were 12 land-use allocation zones, including mining, production forests, peatland forests (under Peatland Protected Forest Management Unit/ Kesatuan Pengelolaan Hutan Lindung Gambut/

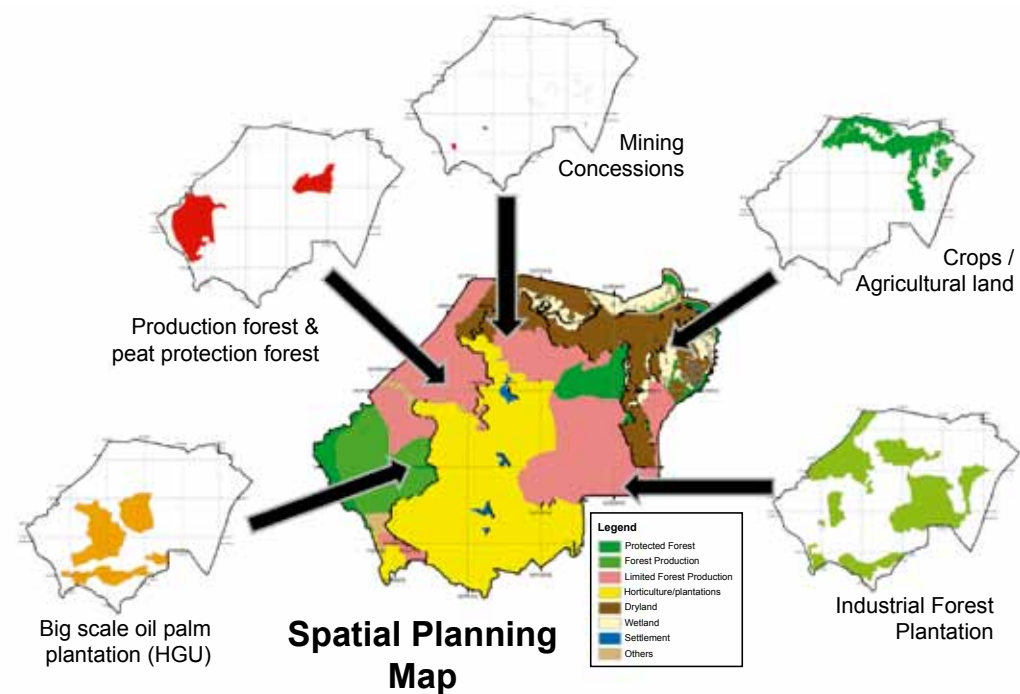


Figure 2. An integrated map of Land Use Allocation Plan and Regency Spatial Land Use Planning

KPHLG), industrial tree and oil palm plantations. In discussion with the relevant government agencies, we created detailed development and management plans for each zone (Table 1). This was useful for predicting the type and size of land-use conversions that might occur in the future, including the associated emissions.

More than half of the district's area is allocated to large-scale private companies. Careful planning is required because this current allocation is vulnerable to conflict between communities, companies and government. A sound RTRW plays a big role in ensuring a just and fair distribution of the benefits from using natural resources and forests. In the context of the RAN-GRK, RTRW are important for developing regional action plans to reduce emissions (RAD-GRK).

Estimating future greenhouse gas emissions

We used the land-use allocation map, discussions with government agencies, a land-cover map for 2009

and time-averaged carbon stocks for each land-cover type (based on surveys and measurements in the field) to estimate the future emissions from the district. We used a computer program called REDD Abacus SP that was specifically developed to estimate emissions from land-use changes, including their associated opportunity costs (economic gain or loss from the change). Figure 3 shows the projected emissions until the year 2025. Based on the current development plan, the projected cumulative emissions will be 36 tonne per hectare per year. This is lower than the projected cumulative emissions based on historical land-use changes, which was 44 tonne per hectare per year.

In the development plan projection, the highest emitters would be the zones allocated for HTI (10.1 tonne per hectare per year), oil palm plantations (2.9 tonne per hectare per year) and KPHLG (1.9 tonne per hectare per year). Overall, these zones would make up 78% of the district's total carbon emissions by the year 2020. The high amount of projected emissions in these areas would be largely due to extensive conversion of forests to acacia species and oil palm plantations.

Table 1. Land-use allocations with associated development plans, Tanjung Jabung Barat district

No.	Allocation	Area (hectare)	Percentage	Development plan
1	Mining concession	1248	0.30	All mining concession areas will operate and convert to open areas. Operation will adhere to land reclamation and restoration policies
2	Production forest	7558	1.60	Non-concession areas will be used as buffer forests, such as community forests or as destinations for ecotourism
3	Limited production forest	34 058	7.40	Non-concession areas will be used as buffer forests, such as community forests or as destinations for ecotourism
4	Industrial forest plantations (HTI)	156 306	34.00	All areas will be converted to <i>Acacia</i> species plantations except for settlement, oil palm systems and tree-based systems
5	Protected area	10 969	2.40	The protected area will be maintained as it is
6	Peatland Protected Forest Management Unit/(KPHLG)	14 016	3.00	Forested area will be protected and oil palm systems will be converted to mixed tree-based systems by planting <i>jelutung</i> (<i>Dyera</i> species)
7	Big Scale Oil Palm concession (HGU)	90 655	19.70	Large-scale oil palm plantations will be established
8	Settlement	2103	0.50	Expanded as needed
9	Wet/irrigated agricultural land	23 127	5.00	Priority to paddy rice systems
10	Dryland agriculture	73 403	16.00	Tree-based systems such as oil palm, rubber, fruit and coconut
11	Other land uses	44 865	9.70	Tree-based systems such as oil palm, rubber, fruit and coffee as well as horticulture and settlements
12	Taman Hutan Rakyat (TAHURA)	1882	0.40	All land will be converted to rubber systems

Table 2. Emission reduction scenarios and implementation plans, Tanjung Jabung Barat district

Zone	Emissions reduction scenario	Cumulative reduction (tonne carbon dioxide equivalent per hectare per year)	Contribution to emissions reduction (%)	Activity
Industrial forest plantations (HTI)	(1) Avoid conversion of primary forest to acacia (2) Maintain existing smallholders' tree-based systems (3) Expedite planting acacia in bush fallow and grassland areas within the concession zone (\pm 21 000 ha)	1.16	21	Persuade concession holders to maintain primary forest by promoting HTI and HCVF (High Conservation Value Forest) spatial regulation. Implement results of agreement between Tanjung Jabung Barat government, community and concession holders on forest boundaries. Implement moratorium on use of wood from natural forests for pulp and paper industries
Big Scale Oil Palm concession (HGU)	Prohibit conversion of forest to oil palm (\pm 8759 ha)	2.2	40	Persuade concession holders not to convert high-density forests and primary forests to oil palm systems in support of the Government's commitment to reduce emissions by 26%
Peatland Protected Forest Management Unit/(KPHLG)	1) Maintain existing forest area 2) Establish systems with <i>jelutung</i> (<i>Dyera</i> species)	1.48	27	Promote the concept of Conservation/Protected areas and their purpose to communities around the KPHLG. Request more Forest Police from the Ministry of Forestry. Establish relevant local institutions to support KPHLG. Promote the value of <i>Dyera</i> species to the local community and explore access to its national and international markets
Production forest (HP) and limited production forest (HPT)	1) Maintain primary forest area 2) Establish rubber systems in non-forested areas	0.64	12	Promote the concept of Conservation/Protected areas and their purpose to communities around the KPHLG. Provide rubber seedlings to establish rubber systems in the area

Developing scenarios to reduce emissions
Discussions about ways to reduce emissions in the development areas for industrial tree and oil palm plantations and KPHLG areas were held with the district's government agencies. Various options were discussed carefully because activities in the development areas provided significant contributions to the economic wellbeing of Tanjung Jabung Barat. The low-emissions development scenarios needed to consider the consequences of reduction activities not only for the environment but also for the economic prosperity of the district. The scenarios developed are listed in Table 2.

Implementing reduction activities in areas allocated for oil palm plantations (Right of Use Title/Hak Guna Usaha/HGU) was projected to give the largest reduction, mainly through prohibiting conversion of natural forests (with high carbon stocks) to oil palm. The establishment of oil palm plantations would be allocated to degraded or abandoned land with lower carbon stocks. Thus, emissions could be minimised or even avoided and might even result in carbon sequestration. This scenario could reduce emissions by 2.2 tonne per hectare per year or 40% of the total possible reductions.

Another significant scenario was improving the management of KPHLG areas by planting *Dyera* species and enforcing the protection of peatlands. This scenario could reduce emissions by 1.48 tonne per hectare per year or 27% of the total possible reductions.

Based on the low-emissions development strategy scenarios, emissions in Tanjung Jabung Barat district could be 27% lower than the reference emissions level (Figure 3). Cumulative emissions reductions for

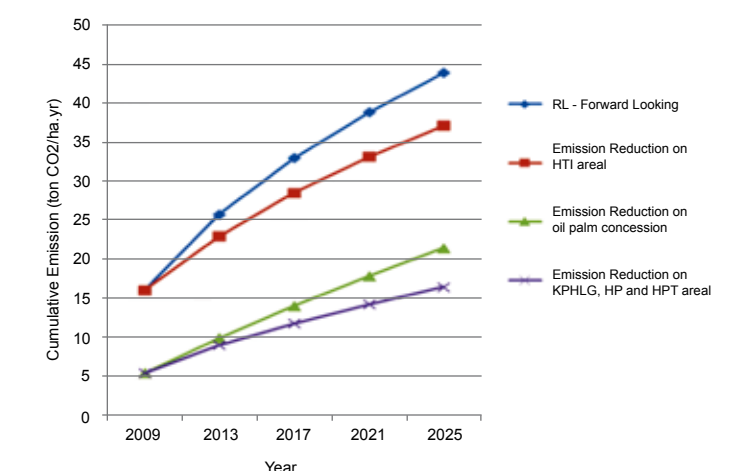


Figure 3. Reference Emission Level West of Tanjung Jabung Barat based on LUWES analysis