POSTER ABSTRACT

Designing low carbon land-use scenarios for Indonesia

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Background. Indonesia has made a non-binding commitment to reduce its GHG emissions by 26-41% by 2020. In 2010, total GHG emission for CO2, CH4, and N2O without LULUCF and peat fire reached 0.87 GtCO2e. The inclusion of LULUCF and peat fires significantly increases the total GHG emissions to about 1.62 GtCO2e with main contributing sectors were LULUCF, energy, waste, agriculture, and industry. As contribution of emission from land-based activities is very high, a significant reduction from these sectors, especially forestry and agriculture, is expected. However, a slowdown in deforestation rate may influence the national target achievement in forestry and agriculture sectors as well as a disruption in providing employment in the sectors. In other side, future land development can be achieved without land conversion through land-use optimization, agricultural cultivation technology application, investment on third generation biomass energy resources, and vertically settlement development. Therefore, it is emerged to advance low carbon land-use scenarios without deteriorate economic development.

Objective. The primary objective of this work is to design low carbon land-use scenarios for Indonesia while maintaining the target achievement of the land-based sector development.

Method. We exploit both AFOLU-A and AFOLU-B models to fulfill the emission reduction target with minimum cost. AFOLU-A estimates the demand for land (for food including bio-fuel, livestock, and settlement) in target year (2050) and constructs the land-use conversion matrix of the target year in which the land-use pattern is made as close as possible with that of the BAU. AFOLU-B estimates the GHG emission level under the baseline or BAU scenarios following IPCC Guidelines 2006 and determines appropriate countermeasures that result in 26% emission reduction from the BAU with minimum cost.

Result. The decrease of rice and oil palm growth rates, the increase of per capita food consumption, and the decrease of rice crop intensity gradually boost the demand of crop land. This demand is likely satisfied by converting forest land and other land categories in 2050 (Figure 3). Figures 4 and 5 shows the detailed year-by-year land-use changes of crop land, forest land, and other land under BAU and countermeasures up to 2050. However, these scenarios provide different implication on rice and palm oil productions. The increase of crop land, including paddy field, can meet national demand of all periods and safe a surplus up to 18% than BAU in 2050. Rice self-sufficiency is possible. Opposite situation happens in palm oil production, where small excess demand persists up to 2050.