CRC 990
Ecological and Socioeconomic Functions of Tropical Lowland Rainforest Transformation Systems
Sumatra, Indonesia

EFForTS

DFG

C07
Determinants of land use change and impact on household welfare among smallholder farmers

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Background
Rapid land use changes, especially the expansion of oil palm plantations, has raised concerns about impacts on biodiversity, climate change, and food security. Moreover, NGOs have reported human rights violations, land conflicts and other negative impacts on local communities. In spite of controversial debates, there is a lack of a rigorous quantitative, micro level assessment of the determinants and impacts of land use change among smallholders. This gap will be addressed in SP C07.

Research questions addressed in four work packages (WPs):
1) What are differences in the economic profitability of different transformation systems and agricultural activities?
2) What are the determinants of recent land use changes?
3) What are the impacts of land use changes, especially oil palm adoption, on household income and income distribution?
4) What are the impacts on household food security?

For all questions, particular emphasis will be on institutional issues and infrastructure aspects.

Data base
Between October and December 2012 a household survey was carried out in Jambi province. 5 regencies were selected purposively. These are Sarolangun, Batanghari, Muaro Jambi, Tebo, and Bungo and comprise most of the lowland transformation systems. From each of the selected regencies, four districts and two rural villages from each of these districts were selected randomly. In addition, the villages where the core research plots are located, were also included in the sample. In total, 703 farm households out of 45 villages were covered (see map for location of sampled villages).

Figure 1: Selected villages
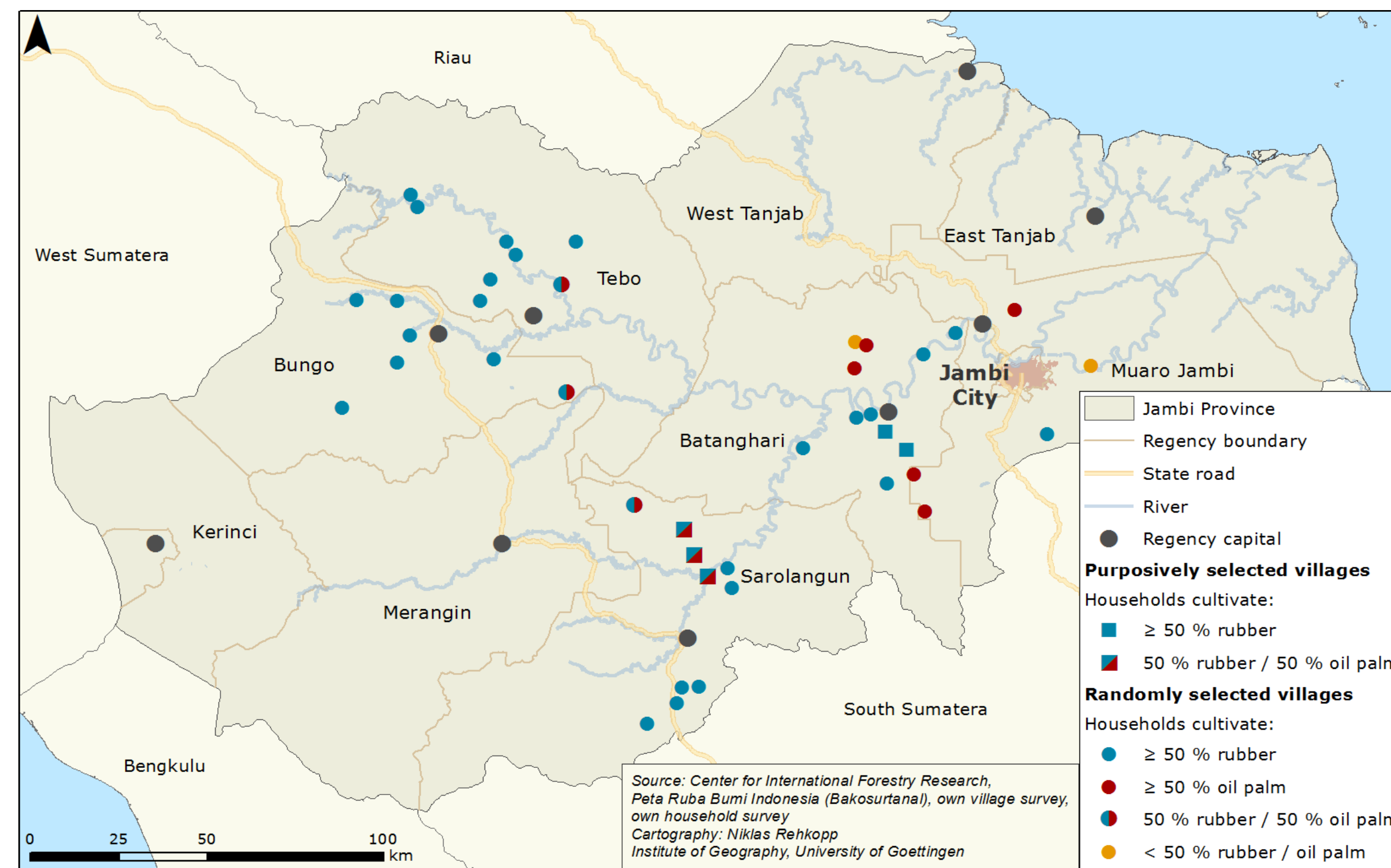
WP1: Economic profitability of different transformation systems
- Gross margin and profit analysis for all relevant agricultural and forestry activities.
- Take into account system intensity

WP2: Determinants of recent land use changes
- Analysis based on innovation adoption literature.
- Focus on adoption of oil palm and rubber plantations and associated disadoption of extensive forms of land use.
- Micro level determinants of adoption analyzed with multivariate probit model.
- Duration models will be applied to study timing of adoption.

WP3: Impacts of land use changes on income/income distribution
- Effect of adoption on household income will be estimated using instrumental variable and/or endogenous switching models.
- Later, fixed effects panel models (from 2015)
- Inequality decomposition analysis to establish whether oil palm expansion contributes to increasing income disparities.

WP4: Impacts of land use changes on food security
- Estimation of calorie, food variety score, and micronutrient consumption models, using instrumental variables.
- To understand underlying mechanisms, we will develop causal chain model (land use → activity incomes → nutrient consumption), to be be estimated with 3-stage least squares.

Direct cooperation within project group C
- Sampling framework, questionnaire development
- International markets, policy regimes (C01 Brümmer)
- Comparison of current land use changes with historical determinants and outcomes (C02 Faust/Dittrich, C03 Hauser-Schäublin)
- Comparison with other parts of Indonesia (C04 Klasen/Lay)

Direct cooperation with SPs of project group A and B
- Development of questionnaire, including identification of easy-to-observe proxies for ecological functions (A02 Hölscher, B09 Tscharntke/Clough, B10 Wiegand/Meyer/Lay)
- Socioeconomic-ecological tradeoffs along intensity gradients (B01, B06, B08, B09)
- Data /results used in integrated models (B10, C06)
- Bird market survey in collaboration with B09

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