Background:

- Collaborative Research Centre 990 - EFForTS: Ecological and Socioeconomic Functions of Tropical Lowland Rainforest Transformation Systems (Sumatra, Indonesia) investigates land-use change in Jambi Province\(^1\).
- Science-based knowledge as generated by EFForTS is crucial for informed decision-making concerning sustainable land-use.
- From Science Education perspective, land transition towards crops, e.g., oil palm and rubber, and its effects can be classified as Socioscientific Issue (SSI).
- Need for teacher training on such a factually and ethically complex, controversial SSI in Indonesia\(^2\) and worldwide\(^3\).
- Teacher educators and teachers act as change agents and multipliers for SSI teaching and learning.

Goals:

- Qualifying (teacher) educators for teaching EFForTS-related Socioscientific Issues (SSIs) and fostering corresponding competencies
- Developing evidence-based EFForTS educational resources
- Implementing EFForTS-education into Indonesian higher education, evaluating the effects and dissemination in Indonesia and worldwide

Research questions:

- How can EFForTS-related SSIs be reconstructed and evaluated for SSI teaching and learning in Indonesian teacher education?

Collaborative Design of EFForTS-Education:

<table>
<thead>
<tr>
<th>Exemplary Course Concepts of (\text{EFForTS}) education</th>
<th>Phases of Course Concepts based on the SSI Teaching and Learning model</th>
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</table>
| (1) Encounter focal issue in context of land-use change in Jambi province | Learning objectives:
  - Understanding and applying of Scientific practices, Disciplinary Core Ideas, and Cross-cutting Concepts of EFForTS-Research
  - Decision-making and socioscientific reasoning including scientific inquiry, perspective-taking and dealing with complexity. |
| (2) Engage with EFForTS-Research (topics, methods, and findings) | Engagement with:
  - Life Cycle Analyses (LCA) of palm-oil-based biodiesel
  - Measurement methods for meteorological parameters and biogeochemical cycles in oil palm plantations
  - Development of own LCA for different management scenarios of plantations
  |
| (3) Synthesize Key Ideas & Practices for application and transfer to further contexts | Development of own LCA for different management scenarios of plantations
  |
| I) Biodiesel from Palm Oil: Impact of Land-Use Transformation on Biogeochemical Cycles | Identification of:
  - preconceptions and controversial positions regarding palm-oil-based biodiesel
  - ecological and socio-economic consequences of biodiesel production and consumption |
| II) Agent-based modeling – socio-economic and ecological impacts of farmer households’ decisions and behaviors | Perception of multi-perspective narratives of farmer households on land-use decisions and their socio-economic and ecological impacts
  - Identification of synergies & trade-offs
  |

Outlook

How effective is the resulting training with educational course concepts and the corresponding materials?

Literature: