

**Theme 4: Biodiversity, Ecosystem Services and Biological Invasions**

**11 - Progress in tropical forest management: Assuring sustainability, avoiding degradation and assisting**

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Room "Baden-Baden" (Novotel Freiburg)

**IUFRO17-3790 Implications of changes in tropical shifting cultivation intensification on future GHG emissions in the Congo Basin**

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**Abstract:** Traditional shifting cultivation used to be a sustainable type of land use for the subsistence of populations in tropical rainforests. The vast resource of moist tropical forests together with low population densities allowed for long fallow periods on sparsely distributed slash and burn parcels with large areas of untouched forest in between. Population growth and concomitant increase in land demand for subsistence as well as increasing infrastructure development for commercial forestry, cash crops and mining, however, altered the picture over recent decades. As a result, fallow periods were reduced due to lack of pristine land. In this study we use field data and modeling results from the Congo Basin to assess the impacts of reduced fallow periods on Carbon sequestration dynamics using a BGC model calibrated and validated with > 150 research plots distributed over the western Congo Basin and representing different management and land use histories. We find that the average carbon sequestration rate reduces over the number of cultivation cycles and that a reduction of the fallow from 10 years to 7 years reduce the average carbon sequestration between 13 and 21% and from 7 years to 4 years between 23 and 29% depending on soil fertility. We then use these results to estimate the overall impacts of different development trajectories on GHG emissions from land use and land use change in the Congo Basin for the next decades with the GLOBIOM model, an economic partial equilibrium model which represents the main land-based sectors. We show that the fact that carbon sequestration on fallow land is not taking into account in many models leads to an overestimation in future emissions in the Congo Basin and tends to overestimate the negative environmental impacts of shifting agriculture, especially when fallow is long.

shifting agriculture, Congo Basin, deforestation

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Room "Baden-Baden" (Novotel Freiburg)

**IUFRO17-2333 Sustainable woodland management and livelihood options in a charcoal producing region: an agent-based modelling approach**

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**Abstract:** Woodland resources provide livelihoods for millions of people in Africa. Concerns about the impact of human utilization of woodlands have led to vigorous debates on woodland degradation. Based on previously collected ecological and socio-economic information, we explore different sustainable woodland management options for a semi-arid region in Kenya using an agent-based modeling (ABM) approach. Satellite image analysis of this area shows a rapid loss of woodlands, mainly due to charcoal production. Using an ABM approach, we are able to simulate the impact of different land management options under varying economic conditions and policy arrangements for a 20-year period in a spatially explicit way.

Within the modeling framework, we use an agent typology to include the diversity of household incomes and decision-making strategies. The typology is based on 295 household interviews that focused on livelihood strategies and decision-making under different scenarios. To incorporate key drivers of woodland degradation, we use information from an assessment on the effect of key woodland degradation drivers (i.e. charcoal production, shifting cultivation and livestock grazing) on different woodland indicators. This assessment, based on 71 sample plots, showed that species diversity, tree density and biomass decrease with increasing agricultural intensity and charcoal production in this area.

livelihoods; species diversity; land-use; Kenya

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Room "Baden-Baden" (Novotel Freiburg)

**IUFRO17-3905 The Tropical managed Forests Observatory: a research network addressing the resilience of tropical logged forests**

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**Abstract:** While attention to logging in the tropics has been increasing, studies on the long-term effects of silviculture on forest dynamics and ecology remain scarce and spatially limited. Indeed, most of our knowledge on tropical forests arise from studies carried out in undisturbed tropical forests. This bias is problematic given that logged and disturbed tropical forests are covering now a larger area than the so-called primary forests. A new network of permanent sample plots in logged forests, the Tropical managed Forests Observatory (TmFO), aims to fill this gap by providing unprecedented opportunities to examine long-term data on the resilience of logged tropical forests at regional and global scales. This presentation aims to introduce the TmFO which currently includes 22 experimental sites distributed across three tropical regions, with a total of 452 permanent plots and 880 ha of forest inventories. We will present here the main objectives and research questions of TmFO as well as its main results on the long term impact of logging on Carbon fluxes and biodiversity. From these results innovating silvicultural practices will be presented

Resilience, Tropical Forests, silviculture

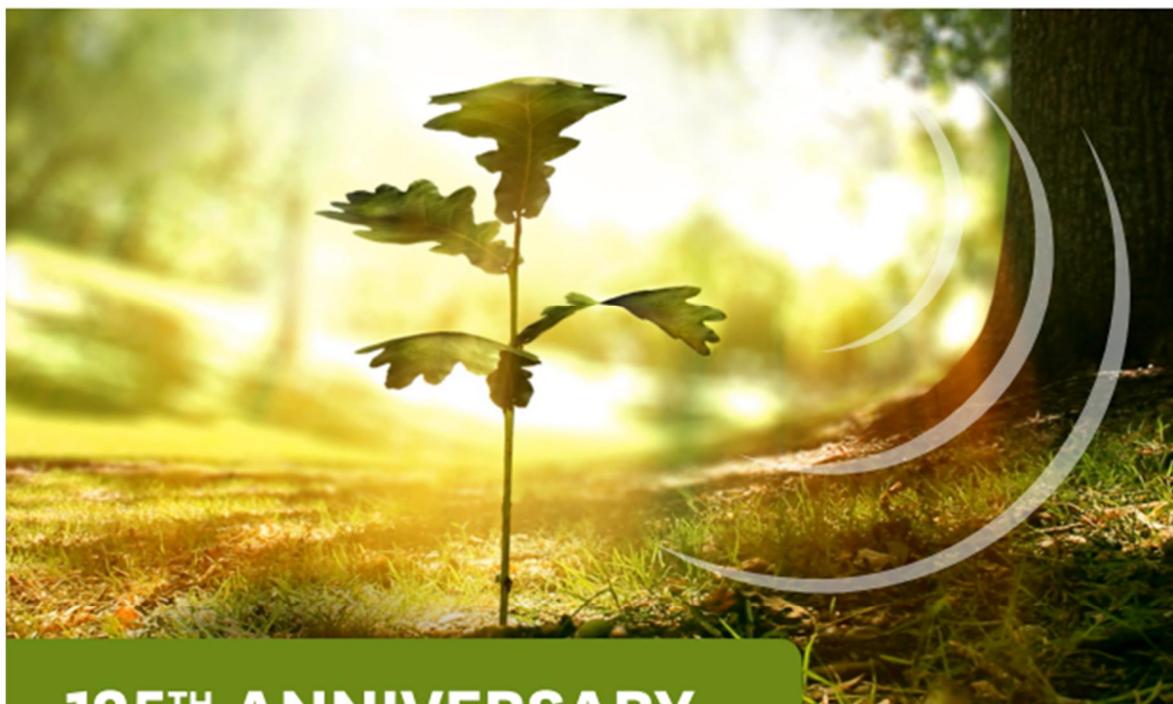
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