



## **Dynamic water resources and policies in agriculture-forest frontiers: an analytical framework and application**

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At the border of forest and agricultural lands, water resources are increasingly under pressure. The agriculture-forest frontier, or “frontier”, is defined as a dynamic border area between agricultural and forest land, that changes over time due to human interventions. In the frontier, implementation of sectoral policies comes along with (well-known) major land use changes like deforestation and agricultural expansion, whereas changes in water resources are usually overlooked. However, water resources are affected, and water benefits shift between different groups of people and environment. This results in diverse problems (e.g. water scarcity, water pollution, water-stressed forests), which increasingly occur in the Global North (e.g. Germany, Spain, Australia) and Global South (e.g. Argentina, Indonesia, Tanzania) due to global social and environmental change. This poster has two aims: (1) to introduce an analytical framework to analyse hydrological regimes shifts, and (2) explore the empirical interplay between water resources and policies in frontiers. An interdisciplinary analytical framework is presented to study linkages between water resources and actor’s interventions in the agriculture-forest frontier. The “Pendulum Framework” enables research into the complex interplay of policies and changes in water and land use at multiple scales. This interplay is conceptualised as a pendular move, as interventions and land-water resources in the frontier may represent a back and forth movement between exploration, exploitation and restoration phase. Changes in water resources will be studied through water accounting and a spatially distributed hydrological model. Functioning of the framework will be illustrated with brief case studies of the Upper Rhine Valley in Germany and the Usambara Mountains in Tanzania. Both cases witnessed major conversions from respectively riparian and tropical forest to agricultural land, with degrading water resources as a result. Nowadays, efforts are undertaken in both areas to restore forest land and water resources. With this poster we intend to spark discussion on approaches to analyse hydrological regime shifts and reversals in highly diverse hydrological systems. In addition we want to engage in discussions how to study linkages between policy implementation and water resources in agriculture-forest frontiers at multiple levels.