A tale of two villages: Coupling social and ecological drivers to explore alternative futures for the forests of the Congo Basin.

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Abstract

Until recently, the pressure on the forests of the Congo Basin and their biodiversity was comparatively low. But this is changing with the combined and interacting effects of global warming and land-use change linked to mining, forestry or the development of large-scale plantations.
Exploring the possible futures of these forests and their biodiversity requires an understanding of the web of interlinked causal factors, where ecological processes and social drivers enter in complex and non-linear interactions across multiple scales. This knowledge can be used to develop models which weight external drivers of change - public policies, market changes, global warming - against endogenous processes shaping the system - forest and wildlife population dynamics, households' aspirations, cultural rules and norms.

The gordian knot of these models is the process by which a stakeholder decides to act. Two critical factors to consider and include are (1) the bounded rationality of stakeholders at every scale, taking decisions with incomplete or even faulty information, under situations of high uncertainty, and (2) their behavioural plasticity or the capacity to adapt their strategies to changing environmental and social conditions. These are defining elements of a social and ecological system, and ones that are notoriously difficult to represent with classical dynamic models.

To overcome this difficulty, as part of the CoForTips research project, we have been developing over the last three years a role-playing game: AgriForEst (Agriculture and Forest in Eastern Cameroon). This game and the model it embodies were developed through a

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participatory approach – the Companion Modelling (ComMod) approach- with men and women from both bantu and baka pygmies ethnic groups from four different villages in Eastern Cameroon. In AgriForEst, players represent households in a archetypical roadside village in the middle of the forest. They allocate labour force to different activities -hunting, gathering or cultivating - which impact the land cover of the board and generate resources. While the forest dynamic, wildlife reproduction and agronomic sub-components are based on actual research results, none of the rules regarding governance, land tenure nor conflict resolution are defined in the model. This gives complete freedom to the players to either mimic existing arrangements and institutions or invent new ones.

The game was used to explore (1) the response of local communities to a scenario of infrastructure development and (2) the complementarity and competition between food and cash crops (cocoa) in the later phases of the forest transition. The game sessions raised issues of governance, market access, power asymmetries between bantu and baka pygmies, between migrant and locals , and soil fertility maintenance and restoration. AgriForEst sheds light on the underlying process that underpin collective action in a typical forest village of the Congo Basin where local communities progressively move from hunting/gathering and shifting cultivation to more market integrated livelihood strategies.
Developed jointly with stakeholders, decision makers and academics across disciplines, such models serve as boundary objects, highlighting the forces driving change and the pitfalls and bottlenecks that must be overcome to avoid negative impacts of external interventions.

Keywords: Participatory Modelling, Cameroun, Forest Transition, Role Playing Game, Transdisciplinarity, CoForTips, ComMod