

Participation in Sustainable Tropical Forest Management

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Abstract: This study reports the results of a test in Forest Kibira, Burundi, of a method designed to assess the level and nature of participation by local people in forest management quickly and easily. The methods participatory method was deemed helpful. However, the method was felt in need of revision. Although, the hypothesized functions of participation are not wrong, in our opinion, they reflect a way of looking at forest management which, we concluded, needs rethinking. In our discussion of the change needed we make use of Jordan's concept of authoritative knowledge and social or cultural capital. Finally, we conclude that, given the dynamism and complexity that characterize natural forests and their inhabitants, co-operation among all stakeholders in an ongoing dialogue is probably the only way that sustainable forest management can in fact occur.

Key words: Tropical forest, participatory method, forest kibira, burundi

INTRODUCTION

Tropical forest loss and degradation continue at unprecedented rates, eroding biological diversity and prospects for sustainable economic development of agricultural and forest resources (Parrotta, 2003). Between 1980 and 1990, an estimated 15.4 million hectares per year of tropical forests and woodlands were destroyed or seriously degraded, principally through agricultural expansion, uncontrolled livestock grazing, logging and fuel wood collection (FAO, 1993). It is estimated that subsistence agriculture involves possibly 500 million people, with an impact on 2.4 million square kilometers including cleared tropical forests to provide crops for people engaged in subsistence agriculture (World Bank, 1994). Impoverished people have been blamed for high discount rates, shorter time horizons without regard for long-term resource conservation (Dasgupta, 1993). If people have only resources, incentives to hold onto the resources may prevail. Property rights affect access to and distribution of natural resources, which in turn affects the level of poverty and long-run quantity and quality of resources (Dasgupta and Maler, 1991). Property rights and deforestation have received the attention of Deacon (1999), Alston *et al.* (1999) and Angelsen (1999) among others. But these studies focus on open access (lack of property rights) in frontier tropical areas. Rights by clearing land mean deforestation is a title establishment strategy for

open access dwellers in places like Brazil's forest frontier. The failure to distinguish between common property and open access has been identified as a main reason behind forest nationalization that can speed exploitation of forest resources due to lack of local [individual or community] control over resource use that is built into rights (Bromley *et al.*, 1992). Common property regions have rules regulating the ways in which individuals obtain access to natural resources, thereby eliminating the open access dilemma. Property rights, similar to contracts, play an important role in reducing the costs of monitoring players. There is a significant body of literature advocating private property for efficient, non-depleting use of renewable resources (Anderson and Hill, 1990). Neoclassical economic theory states that in the absence of market failures such as imperfect land markets, household use of resources is Pareto efficient in a private property regime. Transforming resources from open access into a private property alters degradation when privatization is feasible. However, localized common property systems may be more feasible. According to the FAO, between 240 and 300 million people around the world depend directly on shifting cultivation in tropical areas that have other than private property rights for agricultural production (FAO, 1986) found that sustainable common pool resources are linked to local self-governance, which connects community with its natural resource life-support system to adapt to changes from ecological conditions. Community members tend to

be very similar in terms of ethnicity, education, race, wealth and this homogeneity can limit conflicts. A homogeneous group may better succeed in designing and enforcing equitable conservation measures than a heterogeneous one (Baland and Platteau, 1996). Community dwellers share a common history and can expect a common future together. Because the rule systems can accommodate generational transfers of rights and land tenure, people can expect that they are making decisions that will determine the quality of life of their children and grandchildren. Then, generational transfers should translate into very low discount rates over time. However, little quantitative economic analysis has been done to explore what a household would do under different property regimes. This study, focuses on two property rights regimes, private and common property that are relevant for subsistence households in tropical forests. The empirical model is based on realistic parameters and functional forms to explore resource use for such a household under common and private property rights. The dynamic household model developed here offers a method to explore changes in forest and soil resource use due to changes in economic conditions. This is relevant for ecological economics where understanding the ecological links between forest, soil and subsistence agriculture resources in an economic context can lead to sustaining livelihoods and resources over time. Data from an Indonesian forest used for fuelwood and for agricultural cropping helps calibrate the model of a household maximizing utility under two property rights regimes. The study tackles more connections between resources and threats to these resources than other studies mentioned in the literature review. About 80% of the logged wood is for domestic consumption in the form of fuel wood for energy supply in cooking and other uses (Bulte, 1997). It is imperative to include this form of wood demand into a model addressing tropical forest use and sustainability. The analysis allows a test of whether high discount rates discourage sustainable forest and soil resources due to accelerating harvest. Forest cover helps soil quality and in turn, agricultural productivity in the paper's model of dynamic resource constraints, where land is rotated between agricultural tillage and fallow periods for managing soil productivity. Simulations yield compelling results for assessing the impacts on natural assets of soil qualities and forests. Results show there are cases, when the common and private property rights yield parallel resource use with a bequest motive and incentive for gaining resale value, respectively. Natural capital, like land and forest in various places, may be threatened by the disconnect in time between short-term human interests and ecological long-term processes. When the

natural capital is managed with the future in mind through the bequest, the forest is sustained. The stronger property rights to bequeath lead to greater conservation of soil quality and forest biomass.

MATERIALS AND METHODS

The basic purpose is to explain the formation of local communities and its impact on management of environmental resource at the local level. Our methodological approach builds on insights from 'new institutionalism' and theoretical and empirical literature from new institutional economics that underscore the role of formal and informal institutions for solution for the of common-pool resource problems. The theoretical framework underlying this study will be based on institutional approach to resource management. The perspective on institutions adopted here follows the approach of North (1990), who defines institutions as humanly devised constraints that shape human interaction that ultimately affects the performance of economy by their effects on the costs of exchange and production. In the context of common-pool resource management, institutions can be more specifically defined as a set of accepted social norms and rules for making decisions about resource use: these defines, who control the resource, how conflicts are resolved and how the resource is managed and exploited (Richards, 1997). The problem of environmental degradation from the economic perspective is to get the institution right. The underlying causes of environmental degradation will be found in those problems that systematically result in institutional failures. The basic theme of economic reasoning in the domain of institutional changes is that the propensity to achieve equity and economic efficiency in the allocation of resources. An institution established to achieve such an objective remains in place, as long as it serves the purpose. Whenever, the underlying economic relations change, common property institutions will have to be more evolutionary in nature in response to underlying economic circumstances of the community. In order to, explain the impact of Common Property Resources (CPR) on Nature Resources Management (NRM) the relationships between the community level variables need to be explicitly defined. The relationships between these broad categories of variables are presented in Fig. 1. This framework guides our empirical analysis, which draw on household cross-sectional data from 30 different forest user groups and 600 households in the Tropical forest in Burundi. The physical characteristics of resource include area of forest, type and species composition, which determine the productivity of the resource system.

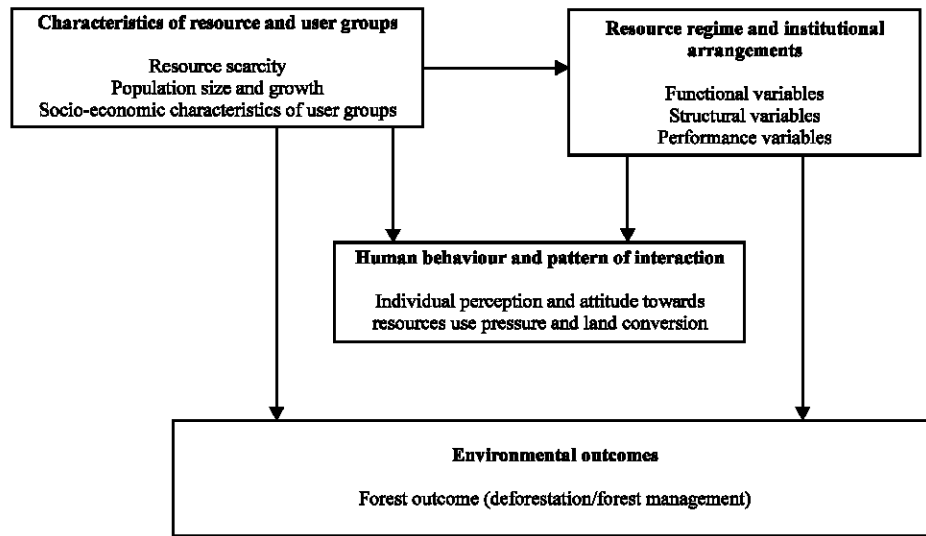


Fig. 1: Framework guide of empirical analysis

By physical attributes of resource we mean the state of the resource such as levels of scarcity, size of the resource system and the natural boundness of the resource. Wade (1987) points out a positive relationship between resource scarcity and collective action. However, Bardhan (1993) argue that institutional arrangements are likely to break down at ecological stress and high level of resource scarcity. Regarding population growth, Dasgupta (1995) hypothesized that higher growth rate negatively affects the likelihood of collective action. Population growth is assumed to be responsible for degradation of CPRs, both directly as more users exploit limited and imperfectly managed commons and indirectly through worsening poverty and disruption of management institution (Heltberg, 2001). Characteristics of user groups focus both on social and economic attributes of households and community such as group size, assets holding and income inequality, ethnicity, proximity of the resource users and the location of resource, which we consider source of heterogeneity. Olson (1965) considers that smaller the group size, greater the likelihood of collective action. Ostrom (1992) claims that heterogeneity in asset structure can actually favour the possibility of collective action, especially where, there are a need for leadership and entrepreneurship. We treat all these variables as the exogenous variable of our model, which determine the local level NRM management institutions and institutional arrangement of collective action. Physical attributes of resources and socio-economic characteristics of user groups together with institutions and resource regime are said to be responsible for shaping human behaviour in respect to resource

management or exploitation. Participants react differently according to the incentives and constraints inherent in the situation. Strategic interactions among participants in an action situation produce different outcomes (Tang, 1991). Human behaviour-through the use pressure and land conversion-together with physical characteristics of resource determines successful forest outcomes.

RESULTS AND DISCUSSION

The Findings presented in this study (Table 1-5), specified 6 relevant stakeholders: the local community, other communities, the government, the timber companies, the conservation project and traders. Each stakeholder was listed on a different colored card. The form also asked four questions, each a concrete example of a component of forest management. The questions pertained to seeking information about fish, looking for rattan, looking for valuable wood and problems between timber concessionaires and other stakeholders. These questions were designed to reflect local forest management by identifying, who had knowledge, who controlled and made use of resources and who was involved in conflict resolution. We anticipated a sample of 12-15 respondents in each area, evenly divided (if possible) by gender and representing whatever, diversity we found. Respondents could be individuals or groups. People were asked first to rank the stakeholders by importance¹¹ for each of these four topics. It was necessary to rank all 6 stakeholders (for analysis purposes), even if their role was quite unimportant. The people were then asked to allocate

Table 1: Mean order of importance: Location Karuzi

Importance	Men (n = 5)	Women (n = 7)	Mixed group (n = 4)	Overall mean
Community	1.00	1.00	1.00	1.23
Other communities	3.00	3.00	3.00	2.73
Government	3.00	4.00	3.00	3.53
Traders	4.00	5.00	4.00	4.48
Timber companies	5.00	5.00	4.00	4.52
Conservation project	5.00	5.00	4.00	4.92

Table 2: Mean order of importance: Location Nyaruhama

Importance	Men (n = 7)	Women (n = 7)	Mixed group (n = 4)	Overall mean
Community	1.00	1.00	1.00	1.00
Other communities	2.96	2.14	2.63	2.57
Conservation project	3.75	4.43	3.94	3.75
Government	3.64	3.75	3.38	3.93
Traders	4.82	4.50	4.31	4.58
Conservation project	4.82	5.15	5.06	5.01

Table 3: Mean order of importance: Location Rukiga

Importance	Women (n = 2)	Business (n = 6)	Gov't (n = 7)	Overall mean
Community	2.38	1.67	1.61	1.77
Other communities	3.50	2.96	2.54	2.83
Government	3.75	3.50	4.29	3.90
Traders	4.50	3.54	4.36	3.90
Timber companies	2.88	4.42	4.04	4.07
Conservation project	4.13	4.92	4.11	4.55

Table 4: Mean frequency of interaction between stakeholders

Mean frequency of interaction	Men (n = 5) (%)	Women (n = 7) (%)	Mixed group (n = 4) (%)	Overall mean (%)
Community	48	40	45	45
Other communities	20	21	16	19
Government	11	7	10	13
Traders	11	15	11	10
Timber companies	8	10	10	7
Conservation project	2	7	7	5

Table 5: Mean frequency of interaction between stakeholders in different locations

Mean frequency of interaction	Karuzi (n = 5) (%)	Nyaruhama (n = 7) (%)	Rukiga (n = 4) (%)	Overall mean (%)
Community	44	60	43	49
Other communities	12	6	17	11
Government	13	10	10	11
Traders	13	12	6	11
Timber companies	11	6	12	9
Conservation project	8	6	12	8

100 points among these stakeholders, depending on frequency of interaction, for each topic. Zero was an acceptable value for frequency of interaction. Researchers and local people found this instrument much more useful. People could answer the questions more easily and researchers had more confidence in the answers. As with most surveys, there was some variation in people's comfort levels. Most people found it fairly easy and many appeared to enjoy it. One employe in one of the timber companies involved in a dispute with a nearby community refused to do the sort; and some of her co-workers mysteriously disappeared before we could ask them. The analysis of the resulting data is quite simple. The results are a simple average of ranking by importance and by

frequency of interaction-both important issues in assessing people's involvement in managing forests. Disaggregating the responses by gender, occupation, location or other dimension is also easy. The most interesting similarity among the groups was the importance assigned to the local community. Averages ranged from 1.00-1.93, whether disaggregated by gender, occupation or location (Table 1- 5), for various ways the data sets were analysed). In all cases the local community was ranked the-most important and in all but one (Table 5) it received the highest average score in frequency of interaction. Interestingly, Nyaruhama is the community that is within the timber company which is partially owned by Rukiga from a nearby area and they reported interacting most frequently with the timber company on forest management issues, with the community a close second. This makes an interesting contrast with the timber companies, also within a timber concession, but one wholly owned and operated by outsiders. There, the concessionaire is ranked fourth in importance (Table 3) and shares second place (11%) with other communities and government in frequency of interaction, far below the mean for interaction with community (49%; Table 4). The Conservation Project rose to third place in terms of mean order of importance and fourth place for frequency of interaction, in Karuzi (Table 2 and 4) where the project has been active for 4 years, from sixth place in karuzi, Nyaruhama and Rukiga (Table 1-3), a community, which has not yet been involved with the project. This suggests both less communication with the project than its leaders might wish for Karuzi and an accurate depiction of the no communication that has existed between the project and Nyarugari. These data show the pre-eminence of local communities in local forest management. Most of our card sorting was done in local communities and one could argue that local communities perceive their own importance to be greater than would other stakeholders in the area. However, the card sorting data from outsiders do not confirm this view. In Table 1 and 2, the conservation project responses and in Table 4 and 5, the Business and Government responses, reflect similarly high ranking of communities by outsiders, both in terms of importance and in terms of interaction. This provides clear evidence of the near unanimity with which local people's management is recognized as pre-eminent in the area-despite governmental perceptions to the contrary (in the form of timber concessions held by outsiders and the conservation activities under way in the wildlife reserve). Conducting the card sorting exercise with more distant stakeholders would be of interest, but was outside the scope of our test. Differences in men's and women's ordering (Table 1-3) both for importance and for frequency of interaction appear to be minimal.

CONCLUSION

In this short study, we have presented the results of a test undertaken in North West tropical forest Burundi. The method initially proposed was found to be useful (with some revision), in concert: the quantitative participatory card sorting method. The research findings from the application of this method confirmed our suspicion that local people were the primary managers of the forest in the area. This prompted us to rethink our assumptions about the participation of local people in forest management. We realised that we had assumed the pre-eminence of timber concessionaires in forest management-consistent with national laws-with local people potentially participating in the modern system. However, in the test context, traditional forest management appeared far more sustainable and operational than did management by the timber concessionaire. We then proposed use of Jordan's concept of authoritative knowledge to account for the curious dismissal of indigenous systems in contexts like this where local management is so obvious and so widely acknowledged. The modern approach to forest management is, at the moment, generally considered authoritative; the traditional system is not-regardless of evidence to the contrary. This probably should change if we are interested in fostering more sustainable management. The existence of a functioning indigenous management system constitutes a form of social or cultural capital which can serve an important function if recognized and integrated into other management systems. On the basis of the problems identified with the concept of participation in forest management, we concluded that it may be useful, within the context of criteria and indicators, to try to break the concept down into its constituent parts. One issue that seemed appropriate was local people's rights and obligations to manage the forest co-operatively. The definition of who has which rights and obligations may need to be assessed for each forest management unit and defined locally. One of our goals in the BFM project is to develop simple, transparent, inexpensive methods, or tools, for use in assessing sustainable forest management.

In sum we are convinced that co-operation and mutual accommodation will be necessary among the various stakeholders connected with natural forests if they are to survive and be managed sustainably for all concerned. We hope this discussion can move us a little further forward in developing appropriate and useful tools for assessing the social dimensions of sustainable forest management.

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