



## Surveys

## Management of non-timber forestry products extraction: Local institutions, ecological knowledge and market structure in South-Eastern Zimbabwe

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## ARTICLE INFO

## Article history:

Received 9 March 2010

Received in revised form 14 September 2010

Accepted 28 September 2010

Available online 8 November 2010

## Keywords:

Common-pool resources

Principal component analysis

Institutions

Forest degradation

## ABSTRACT

Common-pool resources (CPRs), such as forests, water resources and rangelands, provide a wide variety of economic benefits to forest-fringe dwellers in semi-arid areas of southern Africa. However, the public nature and competition involved in the use of these goods, and weak enforcement of institutional arrangements governing their use may lead to resource degradation. Using survey data from four communities in south-eastern Zimbabwe for 2008 and 2009, this paper examines the extent to which forest degradation is driven by existing common property management regimes resource and user characteristics, ecological knowledge and marketing structure. A Principal Component Analysis indicates that the existence of agreed-upon rules governing usage (including costs of usage), enforcement of these rules, sanctions for rule violations that are proportional to the severity of rule violation, social homogeneity, and strong beliefs in ancestral spirits were the most important attributes determining effectiveness of local institutions in the management of CPRs. Empirical results from a regression analysis showed that resource scarcity, market integration, and infrastructural development lead to greater resource degradation, while livestock income, high ecological knowledge, older households, and effective local institutional management of the commons reduce resource degradation. The results suggest that there is need for adaptive local management systems that enhance ecological knowledge of users and regulates market structure to favour long-term livelihood securities of these forest-fringe communities.

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### 1. Introduction

Natural resources are the most accessible source of products and incomes for many economically marginalised people, and are consequently under considerable pressure to provide both production and environmental benefits (Darlong and Barik, 2005). In principle, people can contribute to their economic well-being by harvesting non-timber forest products (NTFPs) (Shaanker et al., 2004). Typically, forest resources accessible to poor people in less developed regions are common-pool resources (CPRs). Because CPRs are often considered to have an inelastic supply, and because their sustainable utilization may be threatened by externalities associated with individual actions in the appropriation of such resources, their sustainable management is an important issue facing both development planners and policy makers (FAO, 2003). Following Hall and Bawa (1993), sustainable utilization of NTFPs can be defined as the level of harvest that does not impair the ability of the harvested population to replace itself. Ticktin (2004) cautions that ignoring the potential variation in harvest strategies and their drivers can lead to incorrect conclusions about resource use sustainability.

Research on CPRs management has shown that local community level resources management is the most viable option of CPR management (Agrawal and Gibson, 1999). The emphasis on the community-based approach arises from the assumptions that local communities not only understand their problems but also have greater incentive to find workable solutions to problems because their livelihoods depend on the natural resource (Belcher and Schreckenberg, 2007). Further, as economic opportunities from utilizing the resource grow, so the community will have greater incentive to conserve the resource base and manage it sustainably over time (FAO, 2003). The IUCN's (2005) contention that indigenous knowledge and the equitable participation of local people are crucial in the management and conservation of medicinal plants in southern Africa is consistent with these arguments.

Although local control over natural resources is commonly regarded as a win–win solution for environmental preservation and local development, the empirical evidence is rather mixed (Malla, 2000; Agrawal, 2001). Community-based approaches in Asia have shown that local institutional arrangements, including customs and social conventions designed to induce cooperative solutions, can overcome collective action problems and help achieve efficiency in the use of such resources (Agrawal, 2007). Other studies, however, have shown that factors such as increasing market integration, high population pressure, lack of economic incentives and the breakdown

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of traditional knowledge and beliefs increase the likelihood of degradation of CPRs under local control (Godoy, 2001; Belcher and Schreckenberg, 2007).

Poverty, low incomes, and immediate survival needs often drive local people to overharvest, at the expense of sustainability. As resources become degraded so people's livelihoods become increasingly vulnerable (FAO, 1996). In rural areas of Zimbabwe, for example, many people lack employment opportunities, due in part to their poor education and limited awareness (FAO, 1996). Moreover, in the face of the current uncertain economic environment in Zimbabwe, their poverty and marginalisation is expected to deepen and continue to the next generation, to the detriment of society as a whole (Saxena, 2003). The indifference of local people, combined with increased demand for NTFPs, has accelerated the degradation of many valuable NTFP resources.

The main objective of this study is to examine the extent to which forest degradation in south-eastern Zimbabwe is driven by existing local community management approaches, resource and user characteristics, ecological knowledge and marketing systems. The rest of the paper is organised as follows: Section 2 reviews literature on common-pool resource management NTFPs and their importance in rural livelihoods, market system, traditional knowledge and local institutional management effects on NTFP extraction. Section 3 describes the conceptual framework, study site and research methodology, while section 4 presents the results. The paper ends with conclusions and some policy implications of the study.

## 2. Common-Pool Resource Management

An important distinction must be made between the CPRs and the resource management regimes under which they are held. Resource management regimes are often based on the basis of property rights held over the resources. There are essentially four types of property rights; open access, common property, private property and state ownership (Heltberg, 2001). Property rights regimes perform the function of limiting use, coordinating users and responding to changing resource condition. Thus regimes have two main functions, flow and stock management. They define and enforce rules of resource access (flow management) and limit aggregate output from the resource to ensure continued future flow of benefits (stock management). CPRs are natural resources for which it is difficult to exclude potential users and which can be depleted through over-use (McKean, 2000). Most CPRs in southern Africa (including Zimbabwe) are largely held under common property. *Common property* resources belong to the community, and access rules are defined with respect to community membership. It is a system of shared private property with clear boundaries, rights and management and use rules, yet potential free-rider problems have to be surmounted for communities to organise collective action (McKean, 2000). Hence, conservation rules may or may not be established resulting in regulated or unregulated common property regimes (Heltberg, 2001). Unregulated common property is where access is limited by community membership, but conservation rules are not enforced. Unregulated common property is prone to cause resource degradation if (1) the user population is large relative to the resource, and (2) the income from exploiting the resource is high relative to the opportunity cost of time; for example, due to easy access, good extraction technology, high value of the resource, or if users lack outside employment options. Regulated common property is when both access and conservation rules are in place (Baland and Platteau, 1996).

State protected areas in Zimbabwe are frequently surrounded by local common property systems and functionally creating systems in which some resources are managed under more than one management regime. It is important to examine whether common property regimes continue to function well and contribute to conservation. There has been limited research on common property regimes

embedded with state property. Common property regimes in Sengwe communal, Chiredzi District, Zimbabwe are suitable for evaluation of such institutional overlap.

### 2.1. NTFPs and Their Role in Rural Livelihoods

NTFPs include all biological materials, except timber, extracted from the forest for human use. The term also encompasses service functions rendered by forestlands (Shiva, 2001; Saxena, 2003). NTFPs are generally most extensively used to supplement diets and household income, notably during particular seasons in the year, and to help meet medicinal needs. NTFPs are also widely important as a subsistence and economic buffer in hard times such as death of a bread winner. The importance of forest foods and incomes thus often lies more in its timing than in its magnitude as a share of total household contribution (FAO, 1995; Townson, 1995).

Millions of people in southern Africa depend on the harvest of NTFPs for their livelihoods, and the importance of understanding the complex relationships between NTFP harvest and conservation is increasingly recognized (Ticktin, 2004; Belcher and Schreckenberg, 2007). This is due to increased concern about overexploitation and interest in the promotion of NTFP harvest as a conservation and development strategy (Cunningham, 2001; SCBD, 2001). The sustainability of NTFPs extraction for the long-term ecological integrity of forests depends on a variety of considerations, including its importance to the local economy, possibility of alternative sources of income to the people, ecological impacts of NTFP extractions, and legal status of the forests (protected areas versus other categories) (Adhikari et al., 2004; Agrawal, 2007).

The current use of NTFPs in southern Africa has several problems: collection is rarely controlled or managed, leading to environmental damage if too many resources are taken (Darlong and Barik, 2005). The way people make use of NTFPs depends on the opportunities and constraints they face (FAO, 1996). When conditions are favourable, such as good market access, forest products with high demand and high value will be harvested more intensively, causing further declines in resources. NTFPs could play a greater role in supporting livelihoods if their extraction and sale were managed more carefully. It is important to know to what extent the local people depend on and what factors determine the dependence on forest. Well-defined property rights and local institutions that regulate the use of, and access to, resources are critical components of local management systems, and represent a key to ensuring sustainability (Berkes et al., 2000).

Scholars of the commons believe that the future of viable local institutional arrangements will depend greatly on how the different types of people–forest relationships respond to economic, social, and political changes which either reinforce or erode people's incentives and capabilities to practice local forest management (Berkes et al., 2000; Belcher and Schreckenberg, 2007). Forests can be managed in ways that minimise the ecological impact of harvesting. However, when dependence is high, as is the case in most developing countries such as Zimbabwe, the ecological impact will primarily be determined by the status of knowledge among the people, institutions that govern use and harvest of NTFPs, and the marketing system (Shaanker et al., 2004).

### 2.2. The Impact of Market Forces on NTFP Extraction

Exposure to market pressures and opportunities is inescapably changing many subsistence-based use systems to market-oriented production systems, with clear losses of biodiversity (Lawrence, 1996; Bennett and Robinson, 2000). Moreover, as market prices seldom reflect the values of environmental and other 'external' costs and benefits, market demand may lead to short-term overexploitation and even to local extinction of some plants and animals that provide

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