Second RUFORUM Biennial Meeting 20 - 24 September 2010, Entebbe, Uganda

Research Application Summary

Assessment of changes in natural resources: A participatory approach

Baaru, M.W.[1], Gachene, C.K.K.[1], Onwonga, R.N.[1], Mbuvi, J. P.[1] & Gathaara, V.[2]
[1]University of Nairobi, Department of LARMAT, P. O. Box 30197, Nairobi, Kenya
[2] Kenya Agricultural Research Institute, Nairobi, Kenya
Corresponding author: bmwamuyu@gmail.com

Abstract

This study analyzed changes in natural resources in Machakos District of Kenya using participatory approaches. The results show that natural resources have decreased since the ranch became a settlement scheme. Natural forests decreased, vast land was cleared, rivers dried-up while soil erosion, drought, temperatures and land degradation increased. Land productivity declined and most farmers abandoned the traditional crops for modern high value crops. However, farmers adopted various coping strategies. Drought resistant crops, early maturing crops and water harvesting were some of the strategies adopted by farmers. The results also show that resource base management at the community level was still a challenge and a lot of investment needed to be made in this area. As part of the study, farmers knowledge of changes in natural resource use was assessed in a resettlement area. Over a period of about 50 years, significant land degradation has occurred as a result of increased population pressure, poor natural resource management and climate change effects. This was reflected in poor/low land productivity and reduced availability of water. Farmers responded by moving away from growing indigenous crops to growing short-duration crops.

Key words: Climate change, Kenya, Machakos, natural resource degradation

Résumé

Cette étude a analysé l'évolution des ressources naturelles dans le district de Machakos au Kenya en utilisant les approches participatives. Les résultats montrent que les ressources naturelles ont diminué depuis que le ranch est devenu un projet d'implantation. Les forêts naturelles a diminué, une vaste territoire a été déboisée, de rivières asséchés tandis que l'érosion des sols, la sécheresse, les températures et la dégradation des terres ont augmenté. La productivité des terres a diminué et la plupart des agriculteurs ont abandonné les cultures traditionnelles pour les cultures modernes à valeur élevée. Toutefois, les agriculteurs ont adopté diverses stratégies d'adaptation. Les cultures résistantes à la sécheresse, la maturation précoce des

cultures et récolte de l'eau ont été quelques-unes des stratégies adoptées par les agriculteurs. Les résultats montrent également que la gestion des ressources au niveau communautaire est toujours un défi et beaucoup d'investissements doivent être faits dans ce domaine. Dans le cadre de l'étude, les connaissances des agriculteurs concernant les changements dans l'utilisation des ressources naturelles ont été évaluées dans une zone de réinstallation. Sur une période d'environ 50 ans, la dégradation des sols s'est produite à la suite de la pression démographique accrue, la mauvaise gestion des ressources naturelles et les effets du changement climatique. Cela s'est reflété dans les pays pauvres / faible productivité des terres et la disponibilité réduite de l'eau. Les agriculteurs ont réagi en s'éloignant de plus en plus des cultures autochtones vers les cultures de courte durée.

Mots clés: Changements climatiques, au Kenya, Machakos, la dégradation des ressources naturelles

Background

Participation is a key element among the criteria of 'good governance' for effective participatory planning. Legitimacy demands interactive participation throughout the spatial planning processes, by all stakeholders, at all stages from problem prioritization, data collection, spatial analysis, through to decision-making. This is one of the best ways to 'empower' communities, as participation prioritizes local decision-making and reinforces responsibilities. Many 'empowerment' methods have been used to demand for legal recognition of customary land and resource rights (McCall and Peter, 2005). For instance, in Guyana, Amerindian people claimed ancestral land titles (Griffiths, 2002) as a result of participatory mapping of resources through Participatory Geographical Information Systems (PGIS); the Zuni pueblo of New Mexico prepared digital maps of 'non-graphic descriptions' of their appropriated lands and received a quarter of a million hectares as compensation (Marozas, 1991). In the Philippines, claiming ancestral domain title is conditional on preparing a resource management map for the area (Rambaldi and Callosa-Tarr, 2002); and in Indonesia, through participatory mapping it was possible to identify traditional village territories and competing rights claims (Sirait *et al.*, 1994), that were crucial for planning.

Literature Summary

It is generally acknowledged that indigenous knowledge is qualitatively different from scientific knowledge. The indigenous knowledge is symbolic, metaphoric, and visionary-mystical in

'scientific' terms-and commonly related to the land and land features. This deep knowledge, with its obligations of stewardship of the land, together with the specialized, location- and resource-specific, problem-oriented indigenous technical knowledge, provide a basis for local people's participation in resource management.

The study sought to use farmers knowledge to 1) determine natural resources (e.g. land, water, forests, soil) that were available at Kathekakai location in Machakos District, Kenya at the time of settlement, and 2) assess changes that had occurred since the ranch become a settlement scheme.

Study Description

The study was carried out at Kathekakai Settlement Scheme, in Machakos district of Kenya. The area, which was a ranching enterprise for nearly a hundred years, was recently subdivided by members into individual farm holdings. The climate of the districts is typically semi-arid with mean annual temperature varying from 15ºC to 25ºC and a total annual rainfall ranging between 400 mm and 800 mm (Braunn, 1977; Michieka and Van Der Pouw, 1977). Rainfall is bimodal in distribution with the long rains starting from March to May and short rains from November/December to early January. Short rains are more reliable than the long rains and therefore most important. The soils are mainly luvisols and of low inherent fertility. The main land use practices are agriculture and livestock farming. The crops grown include maize, beans, peas, millet, and sorghum while cattle rearing is the main activity in livestock production.

Data collection. Exploratory and descriptive designs were the tools used for data collection. First, the purpose of the research was introduced to government agencies, NGO's and community leaders. A kick-off meeting was then held with local community. Data were collected through house hold interviews using questionnaires, field visits (transect drive), and focus group discussion during which a resource mapping exercise was also carried out.

Research Application

The PRA exercise which was conducted through focus group discussion and resource mapping exercise involved 30 farmers (13 men and 17 women) from Kathekakai location (Fig 1).

In order to get farmers perception on resource availability and change, two groups were formed based on the time the farmer settled in the area. According to the farmers, first settlement

occurred between 1995 and 1999. The first group had farmers who settled before 2000 (Fig. 2). The farmers drew a map showing resources as they were at time of settlement. The second group consisted of farmers who settled after 2000 (Fig. 3) who indicated the resources as they were currently (2009) on another map.

Figure 1. Focus group discussion.

Figure 2. Group 1 drawing resources before 2000.

Farmers indicated that the farm was a ranch under communal ownership. However, most of the land is now under private ownership, with men owing 71% and women 18%. Only about 8% women owned land and this was through succession after death of the husband. From the discussions, it was clear that the ranch was endowed with a lot of natural resources. Different types of old natural and traditional trees and shrubs were available (Fig. 4) at the time of settlement. The rivers that passed through the area had clean water, safe for drinking and were flowing throughout the year. Big earth dams for water harvesting had been constructed and wind vanes were used to pump water into well established water tanks throughout the ranch, both for livestock and human drinking. The roads established were not well maintained.

Figure 3. Group 2 drawing resources at present.

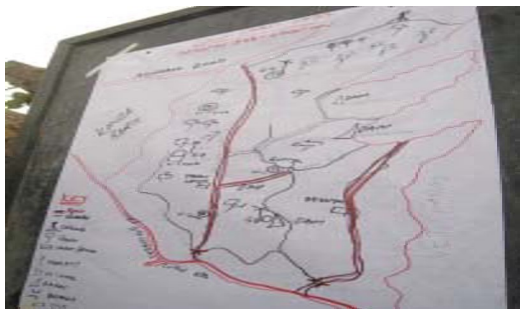

Figure 4. Resources at time of settlement .

Presently, the situation has changed and most of the resources are no longer in existence (Fig. 5). Where they existed, they were poorly managed. Natural trees had been cut down for various uses including building, firewood and charcoal and exotic trees e.g grevilliea have replaced indigenous species. The number of people in the ranch had increased year after year, a situation farmers associated to its proximity to Nairobi, the city of Kenya. Faster rate of population growth was identified as one of the major drivers of environmental change in the area, causing significant impacts on the natural resource base. The primary and most direct impact was land cover change mainly through opening of new land for agriculture, and other activities (UNDP, 2008). From the discussions, it was clear that the ranch was endowed with a lot of natural resources. However, more land has been cleared to pave way for cultivation and other development processes. Farmers reported this as a major contributing factor to increased soil erosion that had led to declining land productivity, a situation that had increased food insecurity and poverty. This was observed this during the household interview where school going children stayed at home due to hunger.

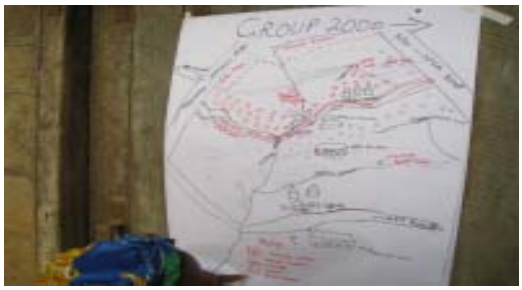

Figure 5. Resources at present.

Rivers that used to be annual had become seasonal and piped water was no longer flowing. The trend, according to the residents is worrying especially since population was still increasing. It was apparent that in the absence of alternative opportunities, and lack of sustainable management of natural resource the increasing population was causing significant in environmental degradation and resource depletion (UNDP, 2008).

Farming systems had also changed over time. Farmers were abandoning traditional crops such as sweet potato (19%), cassava (16%) , sorghum (15%), green grams (9%), and millet (8%) for modern and high value crops for economic purposes. Farmers related this to climate change which demanded a

change in the way of doing business. Most (98%) of the farmers believed that climate had changed with time. They agreed that this change had decreased crop production (29%), inreased drought and temperatures (15% and 10% respectively). However, farmers had adopted measures to cope with climate change (Table 1).

Table 1. Coping strategies against climate change adopted by farmers.

Coping strategy	Frequency	% of respondents
Drought resistant crops	26	25
Early maturing crops	18	17
Water harvesting	15	14
De-stocking	10	10
Conservation agriculture	6	6
Irrigation	5	5
Off-farm employment	8	8
Change of livestock breeds	3	3

The declining natural resource base after settlement was associated with poor management especially of communal resources. However, with proper training this could be averted. The farmers were adopting coping strategies and were eager to learn more about climate change.

References

McCall, M.K. and Minang, P.A. 2005. Assessing participatory for community-based natural resource managemernt: Claiming community forests in Cameroon. *The Journal of Geographical* 171(4):340-356.

Marozas, B.A. 1991. The role of GIS in American Indian land and water rights litigation. *American Indian Culture & Research Journal* 15:77-93.

Griffiths, T. 2002. Guyana: empowerment of indigenous peoples through participatory mapping. World Rainforest Movement Bulletin No. 62.

Rambaldi, G. and Callosa-Tarr, J. 2002. Participatory 3-dimensional modelling: guiding principles and applications. ASEAN Regional Centre for Biodiversity Conservation (ARCBC), Los Banos.

Sirait, M.T., Prasodjo, S., Podger, N., Flavelle, A. and Fox, J. 1994. Mapping customary land in East Kalimantan, Indonesia: A tool for forest management. *Ambio* 23:411-17.

United Nations Environment Programme. 2008. Environmental change and socioeconomic factors in Africa. In: Encyclopedia of Earth. Cutler Cleveland, J. (Ed.). Washington, D.C.: Environmental Information Coalition, National Council for Science and the Environment.