

Research Application Summary

**Participatory natural resources management plan of canhane community,
Massingir district, southern Mozambique**

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Abstract

We conducted a participatory mapping of natural resources and woody biomass estimation in Canhane Community, Massingir District in Mozambique. The aim of this study was to identify problems and opportunities for natural resources management, to quantify the biomass of mopane woodlands and recommend the best management practices. The resultant map provided a better organization of community's main activities. Biomass of *Colophospermum mopane* was significantly higher ($p < 0.01$) in open woodlands than in dense forests, suggesting the latter were in a transition state. We recommend strong private-community-NGO partnership to implement the proposed plan and measures of woodland rehabilitation and conservation.

Key words: mopane woodlands, biomass, participatory mapping, Massingir, Mozambique

Résumé

Nous avons conduit la cartographie participative des ressources naturelles et l'évaluation de biomasse du bois dans la Communauté de Canhane, district de Massingir en Mozambique. Le but de cette étude était d'identifier des problèmes et des occasions pour la gestion de ressources naturelles, de mesurer la biomasse des régions boisées de Mopane et de recommander les meilleures pratiques de gestion. La carte résultante a fourni une meilleure organisation des activités principales de la communauté. La biomasse du *Colophospermum mopane* était sensiblement plus haute ($p < 0.01$) dans les régions boisées ouvertes que dans les forêts denses, suggérant que les dernières étaient dans un état de transition. Nous recommandons un partenariat fort « secteur privé-communauté-O.N.G » pour mettre en application le plan et les mesures proposés de réhabilitation et de conservation de région boisée.

Mots clés: Régions boisées de Mopane, biomasse, cartographie participative, Massingir, Mozambique

Background

The community of Canhane extends over an area of 7,200 ha of land, south of the Limpopo National Park (LNP) with a total of 1,000 inhabitants distributed among 203 families. The area has good potential for tourism, but demand for land to accommodate several activities (agriculture, tourism, forestry and cattle production) has increased. As a result this community is facing land and resources degradation, which is also related to the inexistence of a land use and management plan. The plan would assist the community to work towards sustainable management of their natural resources. In this regard, LUPA, a local NGO working with the community of Canhane for the last 10 years is facilitating their social organization in managing their natural resources. This study was conducted as part LUPA's efforts and emerging linkage among university-NGO-communities in Mozambique. The goal of this study is to produce a participatory management plan in order to identify problems and opportunities for natural resources management, quantify the biomass of the main forest ecosystem – the mopane woodlands and recommend the best management practices for this community.

Literature Summary

Land use is the human modification of natural environment or wilderness into built environment such as fields, pastures, and settlements. The major effect of land use on land cover has been deforestation of large areas. More recent significant effects of land use include urban sprawl, soil erosion, soil degradation, salinization, among others (Kniivila, 2004). According to a report by the United Nations' Food and Agriculture Organisation, land degradation has been exacerbated where there has been an absence of any land use planning, or where high poverty levels dictate high dependency on natural resources. As a consequence the result has often been misery for large segments of the local population and destruction of valuable ecosystems. Such narrow approaches should be replaced by a technique for the planning and management of land resources that is integrated and holistic. This will ensure the long-term quality of the land for human use, the prevention or resolution of social conflicts related to land use, and the conservation of ecosystems of high biodiversity value.

Participatory (action) research emerged to make science respond more directly to the ideas and needs of those people most affected by poverty and resource degradation. Foremost, the aim of a participatory research and development approach is to learn from the women and men living in the "marginal"

Study Description

areas or who are struggling to make a living under often very difficult conditions (Lamelas, 2001).

A participatory rapid rural appraisal was conducted using a combination of techniques: participant observations, questionnaires to 34 families (17% of the total population) of which 21 were women and 13 men, semi-structured interviews to key informants (traditional leader – *Regulo*, secretary, religious leader, president of the fishermen and agrarian association, president of the Covane Community Lodge, the water committee, member of the committee for land and natural resources management and the school director). A participatory mapping and zoning of the natural resources was conducted with groups of 14 men and 13 women separately. In addition, a combination of remote sensing and field data collection techniques was used in order to produce the land use/land cover map of the area. A total of 34 temporary sampling plots were established in the field in order to study the biomass of mopane woodlands in the area and ecologically describe vegetation units.

Findings

The main activities of this community are agriculture (71% of the total number of families) and fishing (18% the total number of families), followed by cattle production (80%). Agriculture is basically traditional subsistence agriculture (maize, groundnuts and beans are the main crops). Main problems faced are crop failure due to erratic rainfall and animal conflict, decreasing fish stocks and pasture land degradation as a result of the high number of animals per unit area. Tourism is an emergent activity and although not reported as the most relevant, overall people agreed that it was a promising activity to reduce poverty and help overcome uncertainty associated with other activities. We produced a land cover/land use map that had 6 classes: (i) human settlements; (ii) massingir lake; (iii) dense mopane woodlands (canopy cover – CC- > 40%); (iv) agriculture; (v) medium density mopane woodlands (20% <CC< 40%); and (vi) low density mopane woodlands (CC < 20%). The last two have high cattle production activity. Characterization of the mopane woodlands indicate that the three densities of mopane correspond to degradation stages, but *Colophospermum mopane* still dominates these areas (abundances > 50%). Mean biomass of *C. mopane* was significantly higher ($P < 0.01$) in low density woodlands (6.40 ton/ha \pm 2.67) than in medium and high density woodlands (2.68 ton/ha \pm 1.27 and 0.38 ton/ha \pm 0.11, respectively). Finally we proposed a zonation map for the different uses: (i) Massingir Lake for fishing; (ii) Tourism Zone

(area: 439.6 ha); (iii) Forestry/cattle Zone (area: 4018.5 ha); (iv) Agriculture zone (Dry season area: 185.9 ha and wet season area: 239.5 ha); (v) Forestry zone (area: 754.5 ha); (vi) Stony zone suitable for mining (area: 183.2 ha); (vii) Settlement and expansion Zone (area: 1350.6 ha). The proposed zoning was agreed by local people in a one-day workshop.

Research Application

The results of this study (zoning map and biomass) approved by the community were given to LUPA as the institution responsible for coordinating the implementation of the proposed activities. The implementation strategy suggested included: (i) prioritize management/conservation activities for the different zones; (ii) establish partnership between the community and the private sector; (iii) improve the alliance with LUPA as a coordinating agency; and (iv) implement rehabilitation activities in degraded areas.

Recommendation

We recommend the use of this plan as a mean of organizing human activities in the area. Rehabilitation techniques for the degraded mopane woodlands such as reforestation and promote natural regeneration must be urgently implemented.

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