Title: Mangrove community-based management in Eastern Africa: experiences from rural Mozambique

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Background: Mangroves are important resources to coastal communities in eastern Africa, Mozambique being no exception. However, despite the existence of a regulatory system for mangrove resources exploitation, many sites face over-exploitation of woody and other resources, with negative impact in the social and economic lives of the communities. Mangrove restoration and community-based management is increasingly advocated as a tool for conservation and to improve the lives of the communities. Globally there are several initiatives, however many of them fail to meet their goals. Understanding how such models work and what are the factors behind the success or failure is crucial to identifying successful strategies and interventions for improvement that can be replicated elsewhere. The aim of this study was to describe the community experience and critically analyse a mangrove community-based management model being implemented in a rural community in central Mozambique.

Methods: The study was conducted at the central Mozambican community of Nhangau, located in the outskirts of Beira town. High resolution images and a participatory approach (community members, local leaders, and government officials) were used to map mangrove distribution and restored areas. Participatory rural appraisal methods were used to collect historical information on causes of mangrove degradation, current and historical uses of mangroves, the restoration process, and details on the management actions for mangrove sustainable use. The data collected were also used to identify the strengths and weaknesses of the Nhangau mangrove replantation and management program. The study incorporated a mixed approach, combining semi-structured questionnaires used to guide open interviews with key informant and focus group discussions (FGDs), and reports available at government institutions. Interviewed people and FGDs included: members of the local Natural Resources Management Committee (NRMC); Managers and key informants (influential people from the community; government, NGO representatives and local authorities); local community (fisherman, fish traders, fuel wood and invertebrate collectors, including women), mangrove pole cutters, mangrove charcoal producers, honey producers, students (members of the local environmental club), and community rangers. This flexible approach was useful for data

validation and triangulation, and also created opportunities for traditionally more reserved groups to speak such as women, youth and illegal cutters.

Results: Mangroves play an important role in the life of the communities of Nhangau as they provide firewood, building material, wood for furniture, medicine, food collection (mangrove crab and molluscs) and support fisheries – a major source of income in the community. According to the community, mangrove deforestation occurred in the 1990 due to unregulated mangrove exploitation. It resulted in a reduction of fish, shrimp and crab stocks, severe coastal erosion, high temperatures, strong winds and whirlwinds (that destroyed many houses) and reduced availability of wood resources. In 1996 the local government started working with the local community in mangrove plantation and a model for community-based management was created, with the assistance of NGOs KULIMA and ADEL-Sofala. Up to now 10 ha of mangrove have been replanted, while other areas recovered naturally. Mangrove restoration has reportedly improved the lives of the communities by providing protection against coastal erosion and storms, temperature regulation and improvement of fish stocks. Local government and NGOs assisted on mangrove restoration and promoted alternative income-generating activities, such as beekeeping, production of medicinal plants, and production of energy-efficient stoves. The community is raising awareness and enforcing national regulations for mangrove exploitation, and have created their own set of local regulations, such as defining no-cut areas and creating a mechanism that promotes sustainable use of wood resources. NGOs also assisted in the creation of a community-based organization (the Natural Resources Management Committee NRMC), a crucial step for the community to access funds from the government, NGOs and fines charged to offenders. However there are several challenges such as limited resources for law enforcement and lack of compliance, mostly by outsiders, but also other members of the community who struggle to find alternatives from mangrove cutting. The community also needs to create an incentive system for those who engage in restoration and management activities, for at the moment they see little benefit. There is also a need to provide technical assistance so that the community can monitor their own activities and make informed decisions for better management (e.g. the community did not have the right estimate of the total restored area). However it is important to mention that several “elements of success” for common goods management were found at Nhangau, such as community awareness, mangrove restoration, successful livelihood projects and others.

Conclusion:
There are still several opportunities to be exploited in order to improve this model, such as developing eco-tourism and carbon trading. These would alleviate the financial pressure while also creating jobs for members of the community. The community also needs to clearly define its boundaries as well as a larger no-take area and develop a local management plan. This study provides elements to support mangrove community-based management strategies in the WIO region and elsewhere.