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Global goals, local actions: A framework for integrating indigenous knowledge and ecological methods for rangeland assessment and monitoring in northern Kenya

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Abstract

This thesis is about testing a methodological framework for integrating indigenous knowledge and ecological methods for promoting local communities' participation in the implementation of Global Environmental Conventions (GECs) such as the Convention on Combating Desertification (CCD) and the Convention on Biological Diversity (CBD) at local community levels. The thesis (divided into Part A and Part B) tackles the integration of indigenous knowledge and ecological methods for assessing and monitoring human impacts on the environments of northern Kenya around sedentarized settlements that was associated with land degradation and desertification as well as the loss of biodiversity. Development of the framework is based on in-depth analysis of theoretical and methodological analysis of environmental indicator selection. The implementation of the framework is approached at three levels: the global level related to the articles of the GECs, the national level concerned with the prioritizing of the action programs and finally, the local community levels where the actions of implementations of the conventions take place. In implementing the framework, the thesis focused on the third part which involved local communities in participatory research. Implementation at the local level involves the consideration of a diversity of ecological, production and social-cultural factors, and the use of local knowledge for resource assessment and monitoring. The implementation of the framework was conducted in Marsabit District, Northern Kenya, in two contrasting environments where two pastoral communities were used as partners. In the sub-humid (Ariaal) zone, the study sites were represented by the Karare and Lkijiji settlements. This zone included a National Forest Reserve and Game Reserve that is protected from livestock grazing, which served as a benchmark for monitoring vegetation change. The arid lowlands (Rendille), were represented by the Kargi and Korr settlements. In order to implement the framework the research was aimed at (a) understanding herder knowledge and ecological methods for assessing and monitoring the impact of pastoral sedentarization on land degradation; (b) applying herders' knowledge of landscape classification by asking participatory questions for monitoring changes in biodiversity; (c) using herder and ecological indicators for assessing and monitoring land degradation; and (d) understanding long-term changes in vegetation cover using herder monitoring and ecological monitoring methods.

For addressing the goals in implementing the framework, herders' knowledge and ecological methods were integrated in three sequential steps. Semi-structured interviews and group discussions with key informants were used to generate information on livestock

management, changes in vegetation indicators and historical changes in land use patterns. Joint transect walks were conducted with knowledgeable herders to assess environmental change using ecological indicators (vegetation and soil) and herder anthropogenic indicators (i.e. landscape grazing potential and landscape grazing suitability). Monitoring of marked transects, satellite images taken at different times, and herders' knowledge were used to evaluate long-term changes in vegetation cover around permanent settlements in the arid lowlands that were previously mapped as desertified sites. Finally, a workshop was organized with herders and Environmental Management Committees (EMCs) in which they participated in informal discussions on issues addressed by the joint research project.

The analyses showed that the rangelands both the sub-humid (Ariaal) and the arid lowlands (Rendille) had shrunk during the previous three to four decades. Mobility had however remained as the main strategies for land use for grazing through splitting of the herds between the mobile (*fora*) managed in the remote rangelands, and home-based rangelands. Although it had been earlier hypothesized that pastoral sedentarization contributed to degradation of vegetation around settlements, the present research found no evidence of permanent degradation. In the sub-humid zone an increase in bush cover, a decline in herbaceous species, or an increase in unpalatable as opposed to palatable plant species was found according to herder assessments. For making comparisons, the herders separated the biodiversity into those species that are desirable for livestock grazing and those that are undesirable. For the herders, the qualitative changes in vegetation indicators were associated with continuous grazing, banning the use of fire for range management, and episodic rainfall. Ecologists on the other hand, considered the total species pool, which showed no variability across land use gradients from the settlements compared to the benchmark.

In the arid lowlands, vegetation recovery around the Kargi and Korr settlements was observed. Around the Korr settlement that was mapped some 25 years ago as being desertified, key fodder species now dominate the areas around the settlement, which also has higher herbaceous and shrub cover. In these arid lowlands herders have been actively involved in environmental management. The home herds are located in pastoral camps outside the settlements, and due to protection, the rangelands within a 4 km radius of the settlements show recovery of both herbaceous and woody vegetation. Monitoring of the communal grazing areas did not show significant variations in species composition over the 24 year period, although the herders reported changes in land use patterns from seasonal to year round grazing. The changes in species composition were confirmed by ecological methods, which linked the changes to seasonal variability, as opposed to permanent loss in

species composition. Around the permanent settlements of Kargi and Korr, satellite imagery showed an increase in vegetation cover between1986 and 2000. The evidence shows that conservation methods practiced by local communities have reversed land degradation reported earlier in the 1970s. The evidence further shows that the arid ecosystems of northern Kenya exhibited resilience with a capacity for recovery, when appropriate management measures were taken. The research found no evidence of permanent degradation leading to desertification. Herders monitored land degradation using multiple indicators including livestock productivity, landscape grazing potential, landscape grazing suitability and changes in vegetation and soil characteristics. Herders' perceptions of land degradation were influenced by livestock production performance, from which they inferred other qualitative indicators, in addition to biophysical and anthropogenic indicators. From the observations made, there is no evidence of permanent land degradation around the settlements in either the sub-humid or the arid lowlands, which could be attributed to pastoral sedentarization. On the contrary, even the areas reported as desertified some 25 years ago have shown recovery. The findings also support the recent "greening of the sahel" which has been marked by vegetation recovery after the return of normal rains. In this study, both stochastic rainfall and management practices contributed to the reversal of desertification. From the results we may conclude that local community participation in assessment and monitoring of environment change in the grazing lands of northern Kenya would contribute to the successful implementation of GECs at community levels. The thesis showed that integrated methods would improve local communities' participation in the implementation of GECs. The most important contribution of this thesis is the evidence about the ability of herders to assess and monitor environmental change, and the use of herder knowledge for selecting sensitive indicators that meet the criteria defined in the articles of GECs, particularly those related to the CCD and the CBD. The thesis makes specific recommendations for achieving the global goals through local actions that are linked to traditional pastoral production in northern Kenya.

Key words: Biodiversity; global environmental conventions; herder indicators; ecological indicators; land degradation; local participation