



## Integrating the Management of the Ruaha Landscape of Tanzania with Local Needs and Preferences

M. Masozera<sup>1</sup>, J.D. Erickson<sup>1</sup>, D.L. Clifford<sup>2</sup>, P. Coppolillo<sup>3</sup>,  
M. Nguvava<sup>4</sup>, H. Sadiki<sup>4</sup>, and J.A.K. Mazet<sup>2</sup>

<sup>1</sup>University of Vermont; <sup>2</sup>University of California, Davis; <sup>3</sup>Wildlife Conservation Society; <sup>4</sup>Sokoine University of Agriculture, Tanzania  
Health for Animals and Livelihood Improvement Project

Research Brief IO-O2-HALI

January 2010

*Sustainable management of landscapes with multiple competing demands requires balancing the diverse preferences and needs of stakeholder groups. Conservation and development organizations have often made unwarranted assumptions about what is desired by, or good for local people without engaging local stakeholders. This study uses conjoint analysis to assess the preferences of representatives from three stakeholder groups—local communities, district government officials, and non-governmental organizations (NGOs)—to identify potential competing conservation and development priorities facing local communities in the Ruaha Landscape of Tanzania. Representatives of local agricultural communities place high importance on investments in farmer's cooperatives that increase accessibility to supplies, loans, and capacity development. In contrast, district government officials and NGOs perceive investments to improve health, education, and tourism infrastructure as highest priorities for the region. Analysis suggests a need for incorporating issues deemed important by these various groups into a development strategy that aims to promote conservation of the Ruaha Landscape while improving the livelihoods of local communities. To be successful, future projects, whether conservation or development, must reconcile objectives at local to global scales and across sectors.*

### Background

The establishment of more than 44,000 protected areas, covering nearly 14 million square kilometers (km<sup>2</sup>) across virtually every country of the world may well be one of the most stunning conservation successes of the 20th century. However, conventional management strategies such as a 'fences and fines approach' that prohibit access to protected areas have escalated conflicts between local communities and management authorities in developing countries. These conflicts are more pronounced where communities were once dependent on these areas for their subsistence needs. Growing populations are also increasingly drawn to the borderlands of protected areas to access ecosystem goods and services, including firewood, bush meat, clean water, medicinal plants, and refuge areas during civil strife. Wittemyer et al. (2008) found that average annual population growth rates were higher in buffers of protected areas than in rural areas of the same country in Africa and Latin America.

Africa's long history of conservation has been dominated by management strategies that exclude human use of resources in protected areas. Post-colonial African governments have continued to embrace these strategies. Because many protected areas have been proposed on lands that are legally or customarily occupied and managed by local people, it has often been impractical, or impossible, to consider these lands off-limits to human use. Furthermore, in countries where remote populations endure social and economic marginalization, protected areas have further restricted livelihood options. As a result, the protectionist approach has caused skepticism

and even hatred between protected area managers and surrounding communities. There is a growing consensus among conservationists that the traditional protectionist approach will not ensure land and wildlife sustainability over the long run in Africa.

In many parts of Africa, and specifically in Southern Africa, different models of community based conservation programs have been undertaken in recent years that seek to link conservation with the alleviation of rural poverty, as well as encouraging community participation. Community based conservation (CBC) stresses the need to include local people either directly in protected area management or politically in the conservation policy process. However, the literature suggests that first generation CBC approaches have failed to achieve their goals. Songorwa (1999) notes that the main reasons were the failure to meet communities' expectations and the unwillingness of national governments to devolve ownership and management responsibility to local communities. In addition, the lack of community infrastructure and capacity to manage CBC projects has also been found to be an obstacle to success. In many cases, CBC approaches have been unable to address the complex and diverse interests of the people and institutions with claims to land and resources in and around protected areas.

Perhaps the lack of success of some CBC initiatives has been due to the characterization of community resource management needs by outside experts instead

GLOBAL LIVESTOCK COLLABORATIVE RESEARCH SUPPORT PROGRAM

UNIVERSITY OF CALIFORNIA, DAVIS ■ 258 HUNT HALL ■ DAVIS, CALIFORNIA 95616 USA

PHONE 530-752-1721 ■ FAX 530-752-7523 ■ E-MAIL [gcrsp@ucdavis.edu](mailto:gcrsp@ucdavis.edu) ■ WEB [gcrsp.ucdavis.edu](http://gcrsp.ucdavis.edu)

of the knowledge and priorities of local people. A major challenge for the next generation of CBC is to find more effective ways to engage people whose livelihoods, interests, and future are linked to those of a protected area while effectively engaging those with relevant jurisdiction or substantial local influence (e.g. community leadership; local, regional, and national government; wildlife and protected area management agencies; research and development organizations; and churches). There have been few systematic attempts to help stakeholders identify and then make informed choices between competing priorities in conservation or development.

This research brief reports on the use of conjoint analysis (CA) to identify similarities and differences in perceptions of different stakeholder groups – non-governmental organizations (NGOs), village government, agro-pastoralists, and agriculturalists – regarding root causes and potential solutions for challenges related to balancing conservation and development needs in the Ruaha Landscape of Tanzania. Identifying stakeholder priorities and evaluating trade-offs before implementation of management can reduce the framework for successfully engaging multiple stakeholders at the local, regional, national, and international scales.

*Study Area.* The Ruaha Landscape covers over 45,000 km<sup>2</sup>, including the 10,300 km<sup>2</sup> Ruaha National Park (RNP), four Game Reserves, two forest reserves, and the Pawaga-Idodi Wildlife Management Area (WMA), and is an area of southern Tanzania with outstanding biodiversity and significant potential for livelihood improvement through ecotourism, hunting, and the provision of ecosystem services. It is situated within one of the World Wide Fund for Nature's 'Global 200' ecoregions, and encompasses two Audubon Society Important Bird Areas and two proposed Ramsar sites. The area harbors an intact large carnivore fauna, including the continent's third largest population of African wild dogs, and is part of a priority 'hotspot' for African carnivore conservation.

While conservation activities have the potential to improve local livelihoods, wildlife is an under-developed resource in the southern portion of the landscape. Less than 10% of the Ruaha National Park is developed for photographic tourism, and communities are poorly integrated into the wildlife economy, with fewer than 2% of local residents involved in or deriving revenues from tourism. Recognizing similar patterns throughout Tanzania, legislation was established to allow villages to directly benefit from wildlife by establishing WMAs in village lands surrounding protected areas. As part of the WMA process, villages must establish and adopt land use plans so that conservation and development objectives are balanced at the village level and the necessary governance structures are established. WMAs are designed with the joint objectives

of conservation and development, but the necessity of making tradeoffs between these are also apparent at the village and national levels. The low rainfall in this portion of the Ruaha landscape makes decisions over land use and tenure for dryland agriculture and livestock production especially contentious.

To better understand village-level priorities, this study applied a combination of focus group meetings and a conjoint survey workshop with representatives of the villages of Idodi and Pawaga divisions, the gateway communities to the Ruaha National Park. We also surveyed government, business, and NGO organizations at the regional level to analyze their preference alignment with village priorities.

*Conjoint Analysis.* Conjoint analysis (CA) is a technique for establishing the relative importance of different attributes in the provision of a good or service. Often referred to as choice modeling, CA has its origin in market research where it has been used to identify factors influencing the demand for commodities. In a typical CA study, individuals are asked to rank hypothetical scenarios composed of different levels of important attributes in the provision of a good or service.

A four phase analytical strategy was used to develop the choice modeling exercise in the current study. First, focus group meetings were conducted at both the village and district levels where representative stakeholders identified critical problems facing local communities – identified problems included agriculture, livestock, education, and health issues. Representatives included agriculturalists and agro-pastoralists, religious leaders, tribal leaders, local government representatives, business owners, and representatives from water users' associations and women's groups, with particular attention paid to gender representation. At the district level, key stakeholders were selected based on their relationship with or involvement in the four economic sectors identified, including representatives of government at the district level, non-governmental organizations (NGOs), and business operators.

Second, attributes were formulated to address community needs and concerns. They included investment in farmers' cooperatives, water infrastructure, tourism infrastructure, extension services, health, and education. These attributes were formulated as potential solutions to address the major problems identified in focus groups, and each attribute had a mix of two or three possible levels of investment.

Third, a conjoint ranking survey was designed to solicit preferences for the five attributes and various levels. Ten alternatives, each depicting a unique bundle of attribute levels, were designed for participant ranking based on an orthogonal design that allows estimation of linear and

quadratic main-effect components over the entire range of 108 possible alternatives with the least number of trials. To complete the conjoint survey, two participants – the village executive officer and one other stakeholder – from each of 21 villages from Pawaga and Idodi divisions were invited to participate in an all-day workshop (with 38 of 42 ultimately attending, including 26% women). Each participant was asked to individually rank 10 alternatives provided in Kiswahili on index cards by sorting and stacking them in order from most to least preferred alternative. Respondents also answered a series of attitudinal and demographic questions. Subsequently 11 district-level representatives completed the survey. Finally, an ordered probit model (a popular specification for a binary response model) was used to identify differences in preferences for potential solutions to address the problems identified in Phase 1.

## Findings

Figure 1 shows the relative importance of attributes when considering all respondents together. Overall, investment in farmers' cooperatives was the most important attribute with a relative importance score of 28%, followed by investments in health, tourism, water infrastructure, and livestock extension services.

When considering differences in priorities among groups, investment in farmers' cooperatives was the most important attribute for the agro-pastoralist and agriculturalist respondents, with relative scores of 33% and 37%, respectively. The lack of emphasis on water and livestock extension services may be explained by the low participation of pure pastoralists in the conjoint workshop. The results from district government employees and NGO respondents show that investment in health and education was the most important attribute with relative scores of 35.5% and 29.9%, respectively. Investment in tourism infrastructure was the second most important attribute for district government representatives. However, tourism was given low priority amongst village representatives and was rarely mentioned as an economic activity during village focus group discussions, representing a key disconnect between district-level and local-level priorities.

Results of the focus group research and conjoint analysis revealed some differences in key priority areas for development. Differences revolve around short-term versus long-term actions to address the issues facing village districts along the edge of the Ruaha National Park and other protected areas. In general, the local stakeholder participants preferred immediate income-generating

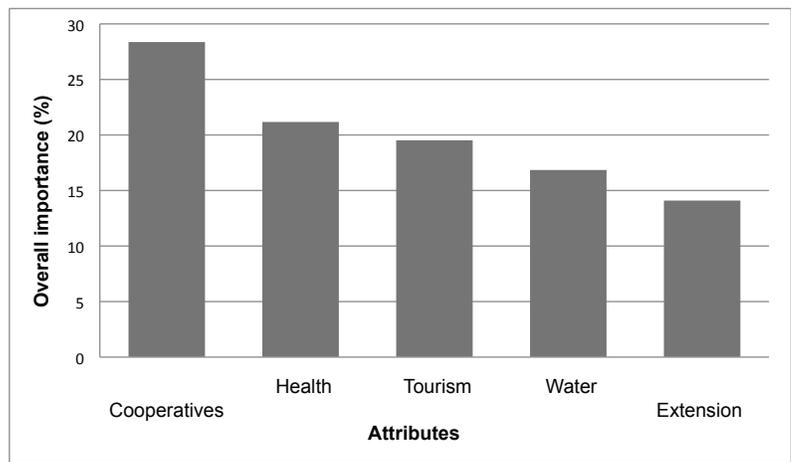


Figure 1. Overall importance of attributes from the conjoint analysis (all respondents: village and district representatives).

actions, while district stakeholders preferred longer-term investment, such as improvement of health, education, and tourism sectors. Goals around tourism development in village-controlled WMAs showed a considerable disconnect between village-level and district-wide priorities. This likely comes from the high expectations from local communities of the financial benefits from the WMA, which have not materialized. Most of the revenues from the WMA come from investors through royalties and taxes, and this money goes mainly into community development projects (i.e. school, health facilities, roads, and water) but with little perceived direct impact on household incomes and livelihoods. In addition, there is a perception of lack of transparency and accountability in the management of the WMA.

## Practical Implications

Sustainable management of landscapes with multiple competing demands, such as in the Ruaha Landscape, is complex due to the diverse preferences and needs of stakeholder groups involved. Finding a management strategy that integrates community preferences at the local level with those of other stakeholders at the district, national, and international levels is of paramount importance.

Over the last few decades land use in the Ruaha Landscape has been increasingly shaped by an approach akin to that of the problem-isolation paradigm, which breaks down a complex problem into a suite of small, easy-to-understand elements. From the biodiversity conservation perspective, the problem-isolation paradigm has proved unsatisfactory because biodiversity cannot be contained within the confines of a protected area, nor can people be easily kept out of areas required for biodiversity conservation. From the rural development perspective, the problem-isolation paradigm has also proved a particularly unsatisfactory model to shape land use, because the definition of the problem

and the identification of the solution have tended to be top-down and centralized. For instance, the Usangu rice schemes upstream of the focal villages examined here, were conceived to create opportunities for expanding crop agriculture, but because they were planned and implemented in isolation, they had the unintended consequences of undermining Tanzania's hydroelectric capacity and ecotourism industries. To be successful, future projects, whether conservation or development, must reconcile objectives at local to global scales and across sectors.

## Acknowledgements

This study would not have been possible without the generous participation of representatives from 21 villages in the Ruaha Landscape, who participated in our focus group discussions and the workshop. This publication was made possible through support provided by the Global Livestock CRSP Jim Ellis Mentorship Program for Graduate Students, and the Norman E. Borlaug Leadership Enhancement in Agriculture Program (LEAP).

## Further Reading

Ervin, J. 2003. "Rapid assessment and prioritization of protected area management effectiveness in four countries." *BioScience* 53(9): 833-841.

Hutton, J.M., and N. Leader-Williams. 2003. "Sustainable use and incentive-driven conservation: realigning human and conservation interests." *Oryx* 37: 215-226

Songorwa, A.N., T. Buhrs, and K.F.D. Hughey. 2000. "Community based wildlife management in Africa: A critical assessment of the literature." *Natural Resources Journal* 40: 603-643.

Wainwright, C., and W. Wehrmeyer. 1998. "Success in integrating conservation and development? A study from Zambia." *World Development* 26 (6): 933-944.

Wells, M., and T. McShane. 2004. "Integrating protected area management with local needs and aspirations." *Ambio* 33 (8): 513-519.

Wittermyer, G., P. Elsen, W.T. Bean, A. Coleman, O. Burton, and J.S. Brashares. 2008. "Accelerated human population growth at protected areas edges." *Science* 321: 123-126.

*About the Authors:* Dr. Michel Masozera was a Jim Ellis Award Recipient 2006-2007, Norman E. Borlaug LEAP Fellow Fall 2007, and is currently the Director of Payment for Ecosystem Services at the Wildlife Conservation Society (WCS). He can be contacted by email at [mmasozera@wcs.org](mailto:mmasozera@wcs.org). Dr. Jon Erickson is an Associate Professor in the Rubenstein School of Natural Resources and Environment at the University of Vermont. Email: [jon.erickson@uvm.edu](mailto:jon.erickson@uvm.edu). Dr. Deana Clifford has been the HALI project Coordinator based at the Wildlife Health Center in the School of Veterinary Medicine, University of California, Davis and is currently a Veterinary Epidemiologist with the California Department of Fish & Game. Email: [dclifford@ucdavis.edu](mailto:dclifford@ucdavis.edu). Dr. Peter Coppolillo is an Associate Conservation Ecologist and former Director of the Ruaha Landscape Program for the Wildlife Conservation Society (WCS). He is currently Coordinator for the WCS Yellowstone Program. Email: [PCoppolillo@wcs.org](mailto:PCoppolillo@wcs.org). Mariam Nguvava served as the HALI project socioeconomic Research Assistant and currently is a Teaching Assistant at Sokoine University of Agriculture in Tanzania. Email: [mariamnguvava@yahoo.com](mailto:mariamnguvava@yahoo.com). Dr. Harrison Sadiki is the HALI project Field Coordinator and Veterinarian at Sokoine University of Agriculture. Email: [hsadily@yahoo.com](mailto:hsadily@yahoo.com). Dr. Jonna Mazet is Professor of Wildlife Health and Epidemiology and Co-Director of the Wildlife Health Center at the University of California, Davis. Email: [jkmazet@ucdavis.edu](mailto:jkmazet@ucdavis.edu).

The Health for Animals and Livelihood Improvement (HALI) project was established in 2006 and is a stakeholder-driven research and capacity-building program to assess the effects of zoonotic disease and water management on animal health, biodiversity, and livelihoods in the Ruaha ecosystem, Tanzania. The project is led by Dr. Jonna Mazet. She can be contacted via post at Wildlife Health Center, One Shields Ave., School of Veterinary Medicine, University of California, Davis, CA 95616, USA, or via email: [jkmazet@ucdavis.edu](mailto:jkmazet@ucdavis.edu).



The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, and Central Asia.

*This publication was made possible through support provided by the Office of Agriculture, Bureau of Economic Growth, Agriculture and Trade, under Grant No. PCE-G-00-98-00036-00 to University of California, Davis. The opinions expressed herein are those of the authors and do not necessarily reflect the views of USAID.*

*Edited by David Wolking & Susan L. Johnson*