

TROPICAL RESOURCES

The Bulletin of the Yale Tropical Resources Institute

Citation guide

Source: Tropical Resources
Volume: 29
Published: 2010

Yale Tropical Resources Institute
Yale School of Forestry and
Environmental Studies
195 Prospect Street
New Haven, CT 06511
U.S.A
<http://www.yale.edu/tri>



Community-Based Conservation in Tanzania: Getting the Incentives Right

Eliezeri Sungusia, MEdSc 2010

Introduction

Networks of protected areas (PAs) remain the single most dominant approach for conserving biodiversity in the tropics (Bruner et al. 2001). In Tanzania, PAs occupy about 24% of the country's land cover (WPT 2007). Generally, PAs have done a good job of sustaining much of the existing wildlife populations. However, the effectiveness of these areas is increasingly being questioned because of the following factors: (1) establishment of most PAs ignored species spatial dynamics and human encroachment (Gaston et al. 2006); (2) PAs exist as habitat patches with human settlements between them (Groom et al. 2006); and (3) growing human population and ensuing pressure on PAs (Groom et al. 2006). These issues create challenges for both wildlife and conservationists, and the latter has recently realized that eviction of the human population, as an approach for land conservation, comes with huge social costs and therefore is unfeasible.

Wildlife Management Areas: At What Cost?

To create a refuge for wildlife outside of the PAs and to open wildlife corridors, Wildlife Management Area policy was introduced in Tanzania in 1998. It was designed to encourage the involvement of local communities through the establishment of so-called Wildlife Management Areas (WMA). WMA are normally established on buffer zones of existing parks and along wildlife corridors. The objective of WMA is two fold: wildlife conservation and rural economic development (Songorwa 1999). WMA is established and managed by villagers through an Authorized Association (AA). The revenue generated from wildlife utilization (mainly trophy hunting) is shared between

the AA and the government.

The policy acknowledges huge opportunity costs (the benefits from alternative land uses such as agriculture) associated with establishment of WMA. Many WMA are agriculturally marginal but others are on highly productive land. It follows that for WMA to make economic sense to landholders, inter alia, its benefits must exceed costs. This means that villagers must be paid to conserve wildlife habitat. So far, the amount of payment expected by villagers is unknown. Concurrently, there is a growing sense that Community-based Wildlife Management (CWM), of which WMA is a part, has failed to deliver both to the environment and communities (Blaikie 2006, Nelson and Agrawal 2008). The caveat is that communities must receive the payment they expect first for the ecological effectiveness goal to be realized.

In an effort to determine the amount of payment expected by villagers for the formation of WMA, I conducted contingent valuation surveys in villages forming two WMAs during the summer of 2009. The focus was to estimate the amount of payment/compensation anticipated by villagers and assess the influencing factors. In this paper, I will discuss the latter.

Description of the Study Area

I conducted this study in the Idodi-Pawaga and Ikona WMA bordering Ruaha and Serengeti National Parks, respectively. The Idodi-Pawaga WMA, which is managed by the MBOMIPA^[1] Authorized Association, is located in the Iringa Region and covers an area of 776.65 km² and involves 21 villages. The Ikona WMA, which is managed by the JUHIWAIKO^[2] Authorized Association, is located in the Mara region and involves 5 villages. Ikona WMA falls squarely within the corridor used by wildebeests during their great migration between the Serengeti National Park in Tanzania and the Maasai Mara Reserve in Kenya.

Inhabitants of the two areas are farmers and livestock keepers. The average landholding is 2 hectares. Agriculture is mainly rain-fed and the recent

Eliezeri Sungusia graduated with a Bachelor of Science degree from Sokoine University of Agriculture in 2004. He worked for the Wildlife Division of the Government of Tanzania and WWF. At Yale, he focused on Environmental and Resource Economics. Eliezeri returned to Tanzania to apply the knowledge and skills acquired at Yale in advancing conservation efforts.

shortage of rainfall has resulted in very low harvests, and food insecurity was a threat in many villages. Communities in villages forming Ikona WMA are well known for *vimoro* (singular *kimoro*) – smoked game meat. In almost every home I visited, I was invited for a lunch that included *kimoro*.

Methods

I used the Contingent Valuation Method (CVM) to determine factors influencing individual's WTP for no WMA on the village land. This method will provide insight on the magnitude of incentives required to trigger (behavioral) response from the villagers. For convenience, I have divided this section into three parts: (1) the Contingent Valuation Method, (2) the experimental design, and (3) the elicitation format. The three parts are described in turn.

Contingent Valuation Method (CVM)

CVM is a survey approach frequently used in non-market valuation studies to determine what people would be willing to pay (WTP) for a specified change in quality and/or quantity of a good being valued (Carson et al. 2003). CV surveys create a hypothetical market for the environmental goods and services otherwise not traded in the market. Respondents are then asked to state their WTP or Willingness to Accept (WTA) for the good in question (Hanemann 1991). Most researchers prefer asking WTP as opposed to WTA as the former appears to be more plausible to respondents (Carson et al. 2003). Commonly used CV questions formats are open-ended and closed-ended questions (Bateman et al. 1999). Closed-ended format, in particular double-bounded format, has been demonstrated to improve statistical efficiency of CV valuation and therefore most CV studies use this method (Hanemann et al. 1991). Despite its flexibility and ability to estimate total value (Carson et al. 2001), CVM is rife with controversy. Criticisms range from inconsistency of CV with economic theories to methodological. In a nutshell, CV is embattled with hypothetical and strategic biases (For details see Carson et al. (2001) and Hausman (1993)).

Experimental Design

In the Idodi-Pawaga WMA, study villages fall in six wards. I employed cluster sampling to cluster villages by wards. This was done purposely to minimize the cost (time and money) of visiting each of the 21 villages forming the Idodi-Pawaga WMA. In each ward, random sampling was used to select one

study village, making a total of six surveyed villages. In Ikona WMA, member villages fall into two wards of Ikona and Makundusi. I randomly selected one study village from each ward, making a total of two surveyed villages. In total, I managed to conduct 300 interviews. The plan was to focus on heads of household (husband and wife) but in many cases, it wasn't possible to meet with both heads of a family. In those cases, I interviewed the available head of household.

Elicitation Format

I used a closed ended double-bounded questions format to elicit respondent's willingness to pay for change from WMA to no WMA. The valuation question was designed to provoke respondents to weigh costs and benefits of doing without WMA. The enumerator read the valuation scenario and clearly informed the respondent that going back to no WMA would cost his or her household a certain amount of money. The valuation question (willingness to pay question) was preceded with several questions aimed at ensuring that the respondent understood the aspects of valuation questions and collecting respondent's socioeconomic characteristics.

Results and Discussion

Generally, 66% of respondents (n=294 households) strongly support WMA. Some respondents cited direct benefits, e.g. employment they have received, as the reason for their strong support of WMA. The majority cited anticipated benefits in the future as a reason for their response. One would expect the percentage of respondents who strongly support WMA to tally with those who feel better off in the presence of WMA. But only 60% of respondents reported that they were better off. The optimistic respondents who are currently worse off can be a reason for this discrepancy. The message here seems to be that not everyone in the community is happy with WMA on their village land. The few against WMA may actually be very influential in a community and destructive of wildlife resources, which further jeopardizes/compromises the success of WMA. With regard to the WTP question, only 20% said they would be ready to pay for a change to no WMA. One issue that should be noted clearly is that the majority of those who strongly supported WMA did so with the condition that some issues need to be addressed, including crop damages and benefit sharing. Crop damage, benefit sharing scheme, and annual income influence on individual's stated WTP are discussed

below. Other influencing factors, but not discussed here, include education level, age, relationships with WMA leaders, and major economic activity.

Crop damage

It's virtually impossible to contain African elephants (*Loxodonta africana*) within the boundaries of dry national parks and reserves when they can smell ripe corn, rice paddies, watermelons, or water on farms bordering protected areas. Thus, it's not surprising that 80% of African elephant's range lies outside of formal protected areas (Hoare 1999). Crop damage, mostly by elephants, is the major cause of anger among villagers. It stands out as a deal breaker on the relationship between villagers and wildlife (including wildlife authorities). In Tanzania no compensation is offered for crop damage or human loss caused by wildlife. However, the government offers some amount as a consolation for a loss of life, livestock, crops, or injury caused by dangerous animals. Due to serious underfunding and excessive red tape, many victims don't even receive the already paltry compensation available.

WMA appear to exacerbate the problem of crop damage by elephants. About 53% of respondents claimed more incidences of crop damage after WMA than before WMA. WMA enhances protection of wildlife. This gives elephants more freedom to enter village land and destroy crops and property. When elephants destroy a two-acre corn farm owned by a family, it means that family is going to suffer serious shortages of food until the next harvest. Indeed, it's nearly impossible to convince a family that elephants are a good thing to conserve and therefore they should support WMA.

Income

There has been discussion in the literature about income elasticity (i.e. the change in demand for environmental quality due to change in income) of environmental improvements. McFadden and Leonard (1993) argued that income elasticity must be at least or greater than one because environmental protection is a luxury good. The negative income elasticity of environmental improvements is also possible (see Hanemann (1999) and Kristrom and Riera (1996) for more details). This means that respondents with



Figure 1. A family posing for a photo in Makundusi village, Serengeti District in Tanzania. Human population growth in villages around wildlife-rich areas is a major challenge to conservation.

relatively high income are expected to state higher WTP than those with relatively low income. This view is somewhat supported by this study in which a unit increase in respondent's annual income is predicted to have no effect on the individual's response to WTP question. But due to limited economic opportunities, low-income families may be willing to pay more for a proposed change if that would mean increased access to wildlife resources. Notwithstanding, the overriding factor seems to be the losses incurred by an individual that are associated with wildlife.

Benefit sharing

WMA can be thought of as an enterprise that is supposed to generate revenue through sustainable utilization of wildlife. According to WMA Regulations (2005), the generated revenue should be subjected to a benefit sharing formula. The Government will determine the formula from time to time. IRA (2007) established that only 40% of the revenue remains with WMA to be shared among member villages. The rest goes to the central government. This benefit-sharing scheme in favor of the government weakens the incentive and makes villagers feel cheated. Benefit sharing among member villages forming a particular WMA is a contentious area as well. Both Ikona and Idodi-Pawaga WMA constitutions dictate that revenue shall be shared equally among member villages. Confrontations arise because some villages consider themselves more endowed than other villages and therefore more deserving of a lion share of the revenue. A good example is Robanda village, a member of Ikona WMA. All respondents from this village want the benefit sharing formula reviewed in their favor. Robanda claims to be the most endowed of the five villages forming Ikona WMA and thus attractive to investors. Respondents lamented that Robanda used to make money before joining WMA due to a good number of investors in the village. The revenue must now be equally divided among five member villages, thus eroding the good money once enjoyed by this single village. As a result, pulling out of WMA is high on their agenda, but legal hurdles are currently too high to overcome.

Conclusion and Policy Implications

The debate on whether we should conserve biodiversity for its own sake (McCauley 2006) or for humanity's sake (Balvanera et al. 2001) is a relevant one. But one should not underestimate the power of the latter, namely the power of economic incentives to change behavior toward nature. For poor villagers,

the expectation that they may ethically be obliged to conserve biodiversity is an oversimplification at best. WMA is one of the efforts recognizing the power of economic incentives to achieve conservation goals. The cornerstone of WMA policy, like other Community-based Wildlife Management schemes, is "the right to manage, use, dispose of, and benefit from wildlife resources" (Taylor 2009). The major caveat is that the benefit should be large enough to offset the costs incurred by landholders (villagers). Getting the incentives (benefits) right requires, inter alia, understanding of the interplay between different factors and villager's opinions toward WMA and the compensation expectations. These factors include but are not limited to crop damage by wildlife, level of education, level of income, benefit sharing formula, and opportunity cost of WMA to individual villages. A victim of crop damage by elephants expects compensation for the loss incurred. Equally so, a village doesn't expect a decline in income after joining WMA (e.g. Robanda village). Otherwise, how could villagers be expected to live in harmony with nature?

Also of relevance to policy is the need to look at WMAs and villages as heterogeneous institutions. Whenever possible, policies should account for variation in characteristics among and within WMAs. The amount of payment anticipated by villagers in Ikona WMA may not be the same as that anticipated by villagers in Idodi-Pawaga WMA. Within WMA, the amount of compensation anticipated by Makundusi and Robanda villagers (Ikona WMA), and Itunundu and Mapogoro villagers (Idodi-Pawaga WMA), may not be the same. Embracing such issues at all phases of policy formation and implementation may be a way forward in getting the incentives right.

Acknowledgements

I thank Prof. Robert Mendelsohn for advising this study and TRI Bulletin editors for their helpful comments on a previous draft. I thank Compton Foundation and Yale Tropical Resources Institute (TRI) for funding the study. The cooperation of villagers in the study area and everyone else who contributed to the success of this study is highly appreciated. Thank you!

References

- Balvanera, P., G. C. Daily, P. R. Ehrlich, T. H. Ricketts, S. A. Bailey, S. Kark, C. Kremen, and H. Pereira. 2001. Conserving biodiversity and ecosystem services. *Science* 291: 2047-2047.

- Bateman, I. J., I. H. Langford, and J. Rasbash. 1999. Willingness-to-pay question format effects in Contingent Valuation studies. In *Valuing Environmental Preferences: Theory and Practice of the Contingent Valuation Method in the US, EU, and Developing Countries*, edited by I. J. Bateman and K. G. Willis. Oxford University Press: 511-539.
- Blaikie, P. 2006. Is small really beautiful? Community-based natural resource management in Malawi and Botswana. *World Development* 34: 1942-1957.
- Bruner, A. G., R. E. Gullison, R. E. Rice, and G. A. B. da Fonseca. 2001. Effectiveness of parks in protecting tropical biodiversity. *Science* 291: 125-128.
- Carson, R. T., N. E. Flores, and N. F. Meade. 2001. Contingent valuation: controversies and evidence. *Environmental & Resource Economics* 19: 173-210.
- Carson, R. T., R. C. Mitchell, M. Hanemann, R. J. Kopp, S. Presser, and P. A. Ruud. 2003. Contingent valuation and lost passive use: damages from the Exxon Valdez oil spill. *Environmental & Resource Economics* 25: 257-286.
- Gaston, K. J., K. Charman, S. F. Jackson, P. R. Armsworth, A. Bonn, R. A. Briers, C. S. Q. Callaghan, R. Catchpole, J. Hopkins, W. E. Kunin, J. Latham, P. Opdam, R. Stoneman, D. A. Stroud, and R. Tratt. 2006. The ecological effectiveness of protected areas: The United Kingdom. *Biological Conservation* 132: 76-87.
- Groom, M. J., G. K. Meffe, and C. Ronald Carroll. 2006. *Principles of conservation biology* (3rd edition). Sinauer Associates, Inc.
- Hanemann, M., J. Loomis, and B. Kanninen. 1991. Statistical efficiency of double-bounded dichotomous choice contingent valuation. *American Journal of Agricultural Economics* 73: 1255-1263.
- Hanemann, W. M. 1991. Willingness to pay and willingness to accept - how much can they differ. *American Economic Review* 81: 635-647.
- Hanemann, W. M. 1999. The economic theory of WTP and WTA. In *Valuing Environmental Preferences: Theory and Practice of the Contingent Valuation Method in the US, EU, and Developing Countries*, edited by I. J. Bateman and K. G. Willis. Oxford University Press: 42-96.
- Hausman, J. A., ed. . 1993. *Contingent Valuation: A Critical Assessment*. Amsterdam: North-Holland.
- Hoare, R. E. 1999. Determinants of human-elephant conflict in a land-use mosaic. *Journal of Applied Ecology* 36: 689-700.
- IRA. 2007. *Assessment and Evaluation of Wildlife Management Areas in Tanzania*. A report prepared for the Ministry of Natural Resources and Tourism, United Republic of Tanzania. Institute of Resource Assessment, University of Dar es Salaam <http://www.tnrf.org/node/7651>: Accessed on 10/18/2009.
- Kristrom, B. and P. Riera. 1996. Is the income elasticity of environmental improvements less than one? . *Environmental & Resource Economics* 7: 45-55.
- McCauley, D. J. 2006. Selling out on nature. *Nature* 443: 27-28.
- Nelson, F. and A. Agrawal. 2008. Patronage or participation? Community-based natural resource management reform in sub-Saharan Africa Corruption perceptions index 2006. *Development and Change* 39: 557-585.
- Songorwa, A. N. 1999. Community-based wildlife management (CWM) in Tanzania: are the communities interested? *World Development* 27: 2061-2079.
- Taylor, R. 2009. Community based natural resource management in Zimbabwe: the experience of CAMPFIRE. *Biodiversity and Conservation* 18: 2563-2583.

Notes

[1] MBOMIPA is an acronym and literally means "Sustainable Utilization of Natural Resources in Idodi and Pawaga Divisions".

[2] JUHIWAIKO is an acronym and literally means "The Society for Wildlife Conservation in Ikona".