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Relearning traditional knowledge to achieve sustainability: honey gathering in the miombo woodlands of northern Mozambique

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Introduction, scope and main objectives

The miombo woodlands are the most widespread forest type in southern Africa, covering approximately 3.2 million km^2 across seven countries (Angola, DR Congo, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe). Of the 50 million people who live there, 80% are rural, their livelihoods depending on miombo for agricultural and grazing land and products including fuel wood, construction materials, traditional medicines and foods such as wild tree fruits and mushrooms. Particularly for poorer households, miombo woodland resources account for a larger percentage of household income than subsistence agriculture (Campbell *et al.* 2002).

The Niassa National Reserve extends over 42,000 km^2 and includes one of the least disturbed areas of Africa's deciduous miombo woodlands. Established to protect important populations of wildlife species, it also includes populations of a number of the world's threatened tree species (Oldfield, Lusty and MacKinven 1998 in Timberlake *et al.* 2004) as well as other plant species of conservation importance (Timberlake *et al*. 2004). The Niassa Reserve is home to more than 40,000 people, most from two ethnic groups, the Ajaua (Yao) and Macua, who inhabit 50 settlements, and live, on average, on less than one dollar/day (Cunliffe *et al.* 2009). They depend largely on subsistence rain-fed agriculture, but soils are poor and nutrients quickly depleted, so agricultural productivity is low and short-lived; new forest land must continuously be cleared for cultivation. Reserve inhabitants also hunt, fish and harvest forest products. These activities, depending how they are managed, have the potential to negatively impact both the sustainability of harvests and biodiversity. To help the reserve managers address their two principal objectives, biodiversity conservation and community development (GOM & SGDRN 2006), a multi-institutional team carried out research to evaluate inhabitants' uses of forest species and to determine if and how these activities affect key tree species. Further, the project sought to develop, in a participatory way, approaches to better meet the needs of local people while supporting the conservation objectives of the reserve through improved management and use of natural resources.

Methodology/approach and initial results

1. Use of trees by local people

Questionnaires applied to 30 % of households in 7 settlements revealed that 47% of households gathered honey, mostly from wild hives, a major source of cash. This led to a decision to focus on honey as a potential livelihood option that could be compatible with the conservation objectives of the reserve.

2. Honey collection and production, a threat and an opportunity

In focus group discussions, separate groups of 20–25 men or women answered 28 questions about honey gathering. Mr Alberto Siabo, from the local Macua community, was also interviewed as an expert informant, as he was very knowledgeable about plants and honey harvesting. They all confirmed that honey was an important source of income, and identified the principal tree species important to bees (Table 1). *Julbernardia globiflora* and *Brachystegia boehmii* were most frequently mentioned.

Table 1. Tree species important for hives and/or nectar. Trees with asterisks were sampled within the impact study (section 3).

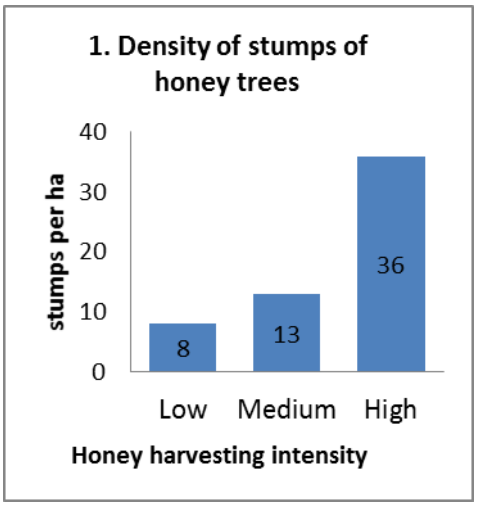
Local name	Scientific name	Hive tree	Nectar source
Njombo	*Brachystegia boehmii**	x	x
Nchenga	*Julbernardia globiflora**	x	x
Nzolo	*Pseudolachnostylis maprouneifolia**	x	x
Ncueso/Mkwesu	*Tamarindus indica**	x	x
Nchiso/Ntxisu	*Terminalia sericea**	x	x
Nzacala	*Diospyros kirkii*		
Npindimbi	*Vitex payos*	x	
Ncalati	*Burkea africana**		x
Ntumbati	*Pterocarpus angolensis**		x
Mnonji (Baobab)	*Adansonia digitata*	x	
Mbanga	*Pericopsis angolensis*		
Mpapa	*Brachystegia spiciformis**		x

Gathering techniques reported by collectors threaten future harvests and the woodland: setting fire to the grass below the honey tree to pacify the bees with smoke (75% of collectors); and then felling the tree (82% of collectors) to reach and cut out the hive, thus destroying the colony and the future potential for bees to use that cavity. Collectors commonly set several fires and fell several trees a day. Since excess fire frequency was a concern of the reserve managers and the tree populations of the Niassa Reserve were of conservation interest, it was decided to further study honey harvesting, its effects on the woodland, and the potential to improve its management and benefits from its harvest.

3. Impact of honey harvesting on honey trees

Three areas that had experienced different intensities of honey harvest (a long period, i.e. high; a medium period, i.e. medium; or starting recently, i.e. low) were selected for systematic, stratified sampling on 2 blocks/area within 7-13 rectangular transects of 200 m x 40 m per block. On each transect, all trees > 20 cm dbh of 8 tree species important for hives and nectar and a threatened species, *Dalbergia melanoxylon* were identified and measured at 1.3 m above the ground (dbh). Stumps and felled trees were also identified and measured and likely cause of mortality was determined (i.e. windfall, felling and removal, felling for honey harvest, elephant damage). In addition, evidence of recent fire was recorded.

The most intensively harvested area had the highest density of stumps, 36/ha (Fig 1). Felling for honey gathering was the principal source of tree mortality (Fig 2). The proportion of transects with evidence of recent fire was also highest in intensively harvested areas (Fig 3). Research in the reserve had revealed that trees grew, on average, only 0.25 cm/year (Ribeiro, unpublished data), so the average honey tree was about 200 years old.



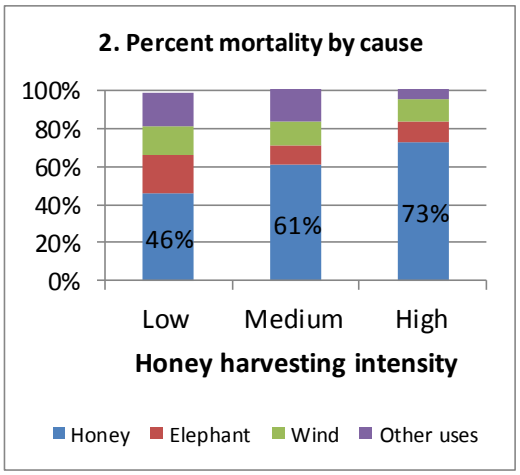


Figure 1 (left). Stumps per ha in three honey collection areas with different intensities of use.
Figure 2 (right). Sources of mortality of trees with different intensities of honey collection.

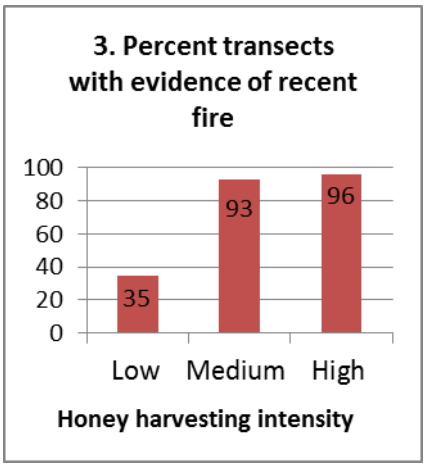


Figure 3 (left). Evidence of recent burning in areas with different intensities of honey collection.

4. Sharing information about the impacts of honey harvesting and alternative approaches

The 13th Congress of the International Society of Ethnobiology took place in France in May, 2012, shortly after this stage of the research. One of the events focused on honey gathering by indigenous peoples around the world. This represented an opportunity to learn about traditional methods used to sustain honey production. After determining that Mr Siabo had sufficient respect among the local communities, the research team arranged that he be invited to attend the meeting,accompanied by the reserve's conservation coordinator, who translated for him when he and other honey gatherers shared their experiences. When Mr Siabo returned, he had a newfound recognition of the value and importance of his own knowledge.

Mr Siabo described nondestructive ways of gathering honey that he had been taught by an uncle in 1975, "a year of hunger when honey was all there was to eat or sell". These techniques involved using certain plants, spread on the skin and around the cavity, to prevent the bees from stinging ("Namalungo grande", *Ampelocissus obtusata*; "Namalungo pequeno", *Rhoicissus digitata*, "Chiwambola", *Olax dissitiflora*, and "Nacaute", *Steganotaenia araliacea*). In addition, a smoke torch of green leaves or "Ntomonhi" (*Diplorhynchus condylocarpum*), wrapped around burning kindling, is placed in a cleared area below the tree to provide smoke, and the collector climbs the tree, using a rope, to remove the honeycombs. Mr Siabo agreed to join the research team at meetings to disseminate and discuss the results of the impact study, and to describe and demonstrate these nondestructive methods.

The Niassa Reserve has a community monitoring agent in each village who collects data for the reserve's management. They helped organize meetings with nine groups of honey hunters, and accompanied the team to share the main findings. Figures 1-3, drawn on flip charts, were explained to the honey hunters, followed by a discussion of the consequences for future production of destroying hives, colonies and cavity trees, and of alternatives. The honey hunters acknowledged that their practices were destructive, and that heavily collected areas no longer produced honey. Mr Siabo described the methods he used, and when others indicated interest in learning them, he showed them his techniques. The demonstrations included making a rope from bark, preparation and use of the protective plants, making and using the smoke torch, climbing the tree, tranquilizing the bees, removing the honey combs and extinguishing the torch. Mr Siabo also emphasized the importance of leaving the larval combs in the hive so the colony could reproduce.

These demonstrations revealed that climbing a tree to obtain the honey was faster and less work than felling one. The idea of revisiting the same trees to harvest honey repeatedly was also appealing, and led to extensive discussions about rights to particular trees. People claimed to recognize trees from which others had obtained honey, and respected collectors' exclusive rights to collect from these trees. During the discussions, honey hunters also revealed that community leaders had agreed which honey harvesting zones could be used by each community.

5. Adoption of improved harvesting methods

To build on the recognition of rights on the part of communities and individuals to continue to obtain honey from certain areas and certain hive trees, an incentive for repeated and therefore nondestructive honey gathering, the research team proposed that the communities monitor their honey harvests, documenting who obtained honey when and where. This would also provide a foundation for developing honey marketing plans. Forms were developed and distributed to the agents, thereby providing the research team with a means for evaluating the extent of adoption of improved practices.

Groups of honey collectors in seven communities were revisited a year after the initial discussions and demonstrations. All the monitoring agents indicated that collectors had obtained honey through climbing, not felling. In response to researchers' questions, the honey hunters' corroborated the records, saying they preferred climbing because it was less time-consuming than felling. A few of them said they had previously heard of nondestructive ways to obtain honey, but that no one had been willing to teach them. Now that the 'secrets' were 'out', they agreed to teach others.

Discussion

Many people have recently arrived in or returned to the Niassa Reserve after a period of conflict. This may have led to the loss of traditional knowledge about nondestructive honey harvesting methods. It seems, too, that traditional knowledge about honey collection may have been held within families. Giving Mr Siabo the opportunity to participate in an international conference about honey collection and production, and to exchange knowledge with indigenous people from other countries, helped him recognize its value. Having observed the felling of trees and the progressive degradation of areas where he had collected honey, he also recognized the importance of promoting nondestructive methods that would allow for continuous and sustainable harvests. Empowering local people and supporting them to diffuse crucial information may be a more effective way of igniting change in a community than campaigns or programmes by outsiders. Local honey hunters' interest in adopting these practices may reflect their trust in and respect for the individual conveying the message, as well as the fact that he spoke the same language (both verbally and contextually).

Conclusions and Outlook

Widely recognized as a vital habitat for elephants and other large mammals, the Niassa Reserve also retains extensive populations of miombo woodland trees. During this project and since, the human population density within the reserve has continued to increase, and with it, the extent of agricultural

clearing. In addition to a controlling poaching, the reserve managers propose to work with the communities to encourage livelihood options that are compatible with biodiversity conservation. Honey production, based on nondestructive gathering from the wild, represents one of these. Its promotion will require continuing support to honey gatherers, including capacity development and marketing.

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References

Campbell BM, Jeffrey S, Kozanayi W, Luckert M, Mutamba M, Zindi, C. 2002. Household Livelihoods in Semi-Arid Regions: Options and Constraints, Center for International Forestry Research (CIFOR), Bogar, Indonesia, pp. xi-xiv, 3-46, 68-73, 90-102, 125-141.

Cunliffe R, Mandondo A, Games I, Ngarivhume J, Dore D. 2009. Reconciling Conservation Goals with Agriculturally Based Livelihoods: A proposal for future development of the Niassa National Reserve and surrounding areas. Niassa Imperial Tobacco Project, Main Report, Vol. 1, Xhanduko Centre for Agrarian and Environmental Research, Harare, Zimbabwe, pp. ii-47.

GOM (Government of Mozambique) & SGDRN. 2006. Management Plan of the Niassa National Reserve 2007-2012. Sociedade para a Gestão e Desenvolvimento da Reserva do Niassa, Mozambique and Ministry of Tourism, Maputo, Mozambique.

Timberlake J, Golding J, Clarke, P. 2004. Niassa Botanical Expedition: June 2003, Prepared for Sociedade para a Gestão e Desenvolvimento da Reserva do Niassa Moçambique, Biodiversity Foundation for Africa, pp.3-20.