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Bankine

NATIONAL PARK

COMMUNITY ACTION PLAN

Simon M. Munthali, Inacio Timane, Rogerio Jamice & Marta Mangove



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ACRONYMS

AS	Associação
AWF	African Wildlife Foundation
CAP	Community Action Plan
CDO	Community Development Officer
CEF	Community Enterprise Fund
DNAC	Directorate of Conservation Areas
IUCN	International Union for Conservation of Nature
GLTFCA	Great Limpopo Transfrontier Conservation Area
GPS	Geographic Positioning System
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
Km	Kilometre
LG	Local Government
MITUR	Ministério de Turismo (Ministry of Tourism)
MoU	Memorandum of Understanding
NGO	Non-governmental Organization
NP	National Park
NRC	Natural Resources Committee
PA	Park Authority
PG	Provincial Government
TFCA	Transfrontier Conservation Area

Executive Summary

At least 2,696 people settled in, and deriving their livelihoods from Banhine National Park, are almost entirely dependent on natural resources utilization.

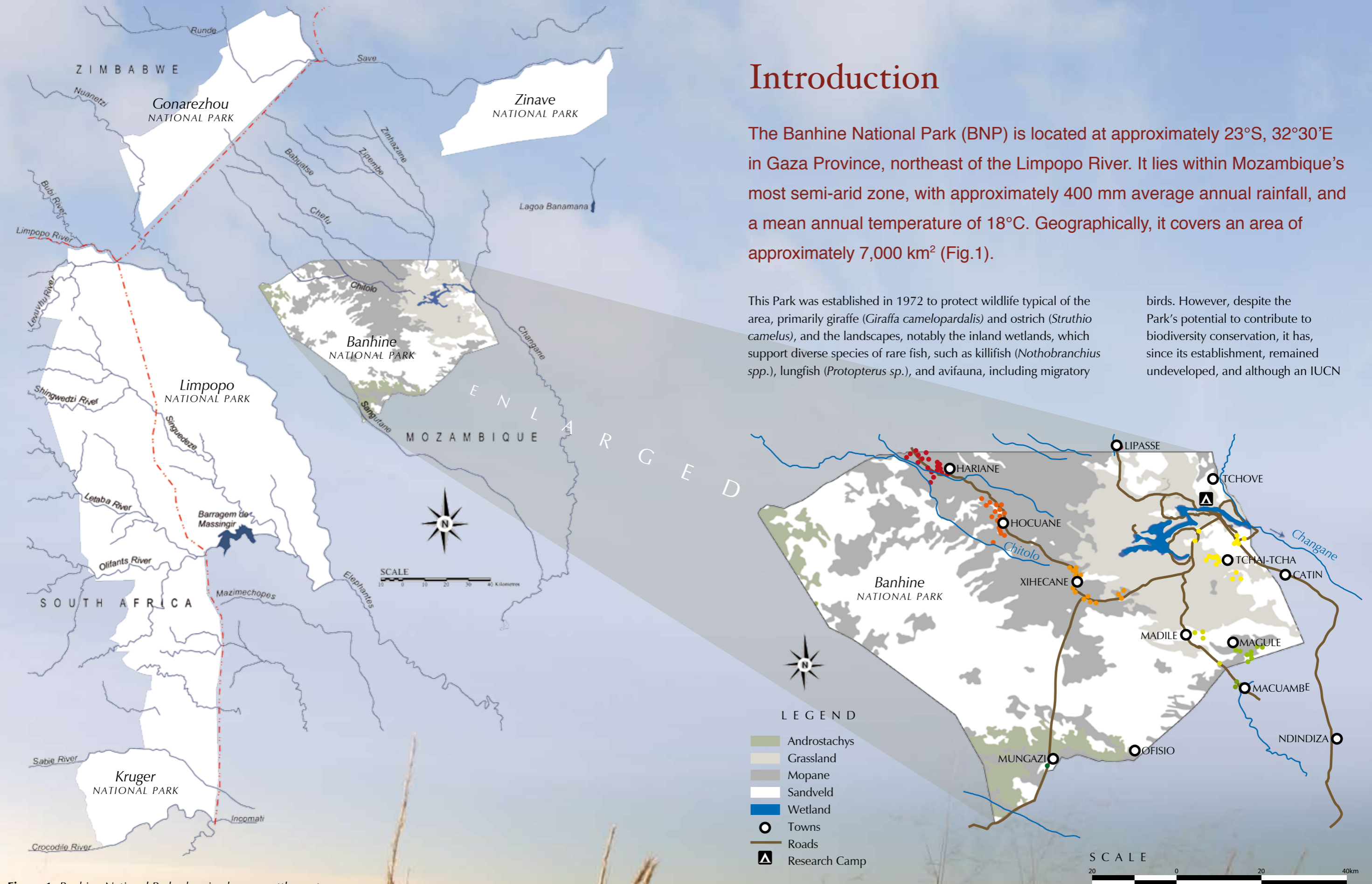
These people are characterized by high food insecurity; low literacy; extremely low household income; exceptionally underdeveloped physical capital (in terms of household possessions and assets, supportive infrastructure, and technology relevant for enhancing households and rural livelihoods); exceedingly limited and underdeveloped essential social amenities, such as health facilities, schools and water supply.

Overall, poverty in all its manifestations, i.e. undeveloped human capital and lack of physical, economic and social capital assets, is a deeply entrenched phenomenon in and around Banhine National Park.

Co-existence of these communities and wildlife in Banhine National Park poses a major challenge, especially when populations of both increase, thus triggering intensive human-wildlife conflicts, and competition among humans, livestock and wildlife for finite resources, such as water and land. This is exacerbated by the Government of Mozambique's policy on human settlements in protected areas, which has to date been quite ambiguous, although the generally accepted principle is that communities are encouraged to voluntarily leave protected areas and settle elsewhere. Irrespective of this principle, the government has also made it clear that communities in protected areas should fully participate in management of these areas, and benefit socioeconomically from protected areas management.

This report provides specific recommendations on how communities should benefit from Banhine National Park, and provides an action plan that should guide the Park's management authority in integrating local communities in the Park's management to specifically ensure communities will sustainably harvest the natural resources most in demand (such as poles, firewood, herbs, fruits, palm wine and fish); improve food security through integration of agro-forestry and dry-land conservation agriculture around Banhine; offset community pressure on the Park's resources by setting quotas and defining resource harvesting protocols and stimulating economic opportunities in which the communities can participate, such as ecotourism and its auxiliary enterprise development in partnership with the state, and/or the private sector, and hence, contribute to relieving poverty among these communities.





Introduction

The Banhine National Park (BNP) is located at approximately 23°S, 32°30'E in Gaza Province, northeast of the Limpopo River. It lies within Mozambique's most semi-arid zone, with approximately 400 mm average annual rainfall, and a mean annual temperature of 18°C. Geographically, it covers an area of approximately 7,000 km² (Fig.1).

This Park was established in 1972 to protect wildlife typical of the area, primarily giraffe (*Giraffa camelopardalis*) and ostrich (*Struthio camelus*), and the landscapes, notably the inland wetlands, which support diverse species of rare fish, such as killifish (*Nothobranchius spp.*), lungfish (*Protopterus sp.*), and avifauna, including migratory

birds. However, despite the Park's potential to contribute to biodiversity conservation, it has, since its establishment, remained undeveloped, and although an IUCN

Figure 1: Banhine National Park, showing human settlements.



ABOVE: An aerial view of a small part of the Banhine wetlands showing some of the maze of channels and pools that characterize the wetlands. Photo: Marc Stalmans

Category 3 protected area, there are human settlements within the Park. Ten settlements are located within the Park (Fig. 1), with a population of at least 2,696 people, representing a density of about 0.39 people per km². These people are predominantly Tsonga speaking Shangaans, living in lineage groups of polygamous extended families. An important feature of these people is their strong traditional governance structures and beliefs in ancestral spirits and traditional medicines, reminiscent of their ancestral lineage to the Nguni people of South Africa.

National parks such as Banhine, are established to conserve natural ecosystems and their attendant biodiversity, as well as preserve historic and cultural features, secure landscapes (which enrich the human experiences through their beauty), and provide opportunities for rural development, scientific research, education, recreation and tourism development. The presence of human settlements in Banhine therefore, is a problem because communities' activities, such as agriculture, livestock husbandry, introduction of exotic plants and animals, hunting and extraction of timber resources are ¹prohibited by law and perceived to have detrimental impacts on the ecosystems and wildlife.

Co-existence of people and wildlife in Banhine National Park poses a major challenge, especially when populations of both increase, thus triggering intensive human-wildlife conflicts, and competition among humans, livestock and wildlife for finite resources, such as water and land. This seems inevitable because livestock and agricultural fields are concentrated in grasslands and wetlands, which are also most suitable for wildlife's foraging and source of drinking water. This is aggravated by a generally held perception that rural communities are degraders of the environment (c.f. Duraiappah 1996). Irrespective of these fears, the Mozambique government would like to reconcile ecological requirements of the Park with the communities' livelihoods by integrating some of their needs into the Park's management régime.

This report briefly discusses the socioeconomic status of the Banhine communities; sets the baseline on the current socioeconomic situation; identifies the natural resources currently in high demand in the Park; recommends mechanisms through which communities could continue accessing the most demanded resources in the Park, including identifying alternative livelihood strategies that need to be developed to enhance household income and food security; provides specific recommendations on how communities should benefit from Banhine National Park, and provides an Action Plan — guiding the Park's management authority in integrating local communities in the Park's management, and more specifically ensuring communities would sustainably harvest some of the most in demand natural resources, offset community pressure on the Park's resources and avail economic opportunities in which the communities can participate in partnership with the state, and/or the private sector, thus contributing to poverty relief.

¹ Government of Mozambique: Revised Forest and Wildlife Act, 10/99 of 7th July 1999

1. Socio economics and Baseline Setting

The concept of sustainable livelihoods is a key element in the development debate and might be achieved through access to a range of key resources.

1.1 Current Livelihood Strategies

In discerning the communities' socioeconomic status, the following ²parameters based on the "sustainable rural livelihoods" framework described by Scoones (1998) were considered:

- Gender and age structure of the communities.
- Human capital (education level, skills and occupation).
- Economic/financial capital (land ownership, agriculture production, food security and alternative livelihood strategies).
- Physical capital (household assets, possessions and presence of supportive infrastructure).
- Natural capital (use and level of community dependence on natural resources).
- Social capital (community institutional governance and networks).

1.1.1 Gender and Age Structure

The age structure of communities (head of households) in Banhine represents a relatively young population. With exception of Lipasse where the population is much older (62.3 ± 3.5 years), in most villages people are in the late 30s to mid-50s years of age (Fig. 2). The age structure of male and female headed households does not differ significantly.

1.1.2 Human Capital, Education, Skills and Occupation

The entire Banhine area has undeveloped schools, hence illiteracy is quite high. At least 65% of the community members have never attended school, 28% have attempted primary education, while 7% have had some informal training, e.g. in carpentry or nursing. Women have the highest illiteracy rate accounting for about 53% of the illiterate members of the communities.

² Information on these parameters was obtained in a participatory manner, where 109 (58 males and 51 females) community members in the villages of Tchai-Tchai, Hocuane, Xlhecane, Hariane, Magule, Madile, Lipasse, Mucuambe, Mungazi and Tchove were interviewed and provided information on these parameters.

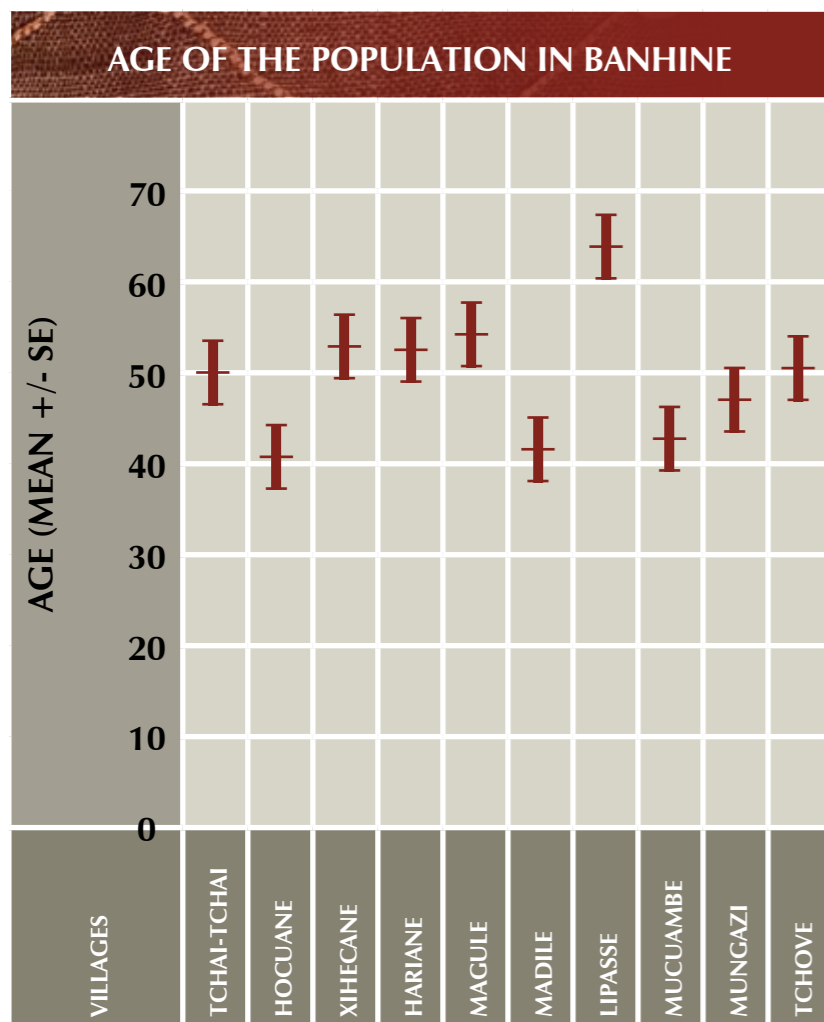


Figure 2: Age represented as the mean \pm standard error (SE) of the population in Banhine.

Besides illiteracy, the communities in and around Banhine NP are subjected to a most hostile environment. Firstly due to the semi-aridity of the area, characterized by inadequate and erratic rainfall (~400 mm/annum) and poor soil fertility, subsistence agricultural production on which 95% of the community members rely, based on drought-tolerant crops, such as sorghum, millet, beans, water melon, pumpkins, cowpeas and cassava is very poor, leading to endemic famine and food insecurity. Secondly there are no visible economic activities, hence, only about 4% of the community members are self-employed, and 1% employed mainly temporarily, or seasonally. Some of the temporary employees are labourers working in Banhine NP. Consequently, poverty in all its manifestations, such as undeveloped human capital, and lack of physical, economic and social capital assets is an entrenched phenomenon in and around Banhine. It is intended therefore, that the development of Banhine NP should contribute to the welfare of local communities through continued regulated access to critical natural resources without jeopardizing the resource base, and participation in income generation activities, either singly or in partnership with the state, and/or the private

sector. Improving the financial capital of these communities however poses a daunting challenge for a number of reasons:

- The Park has underdeveloped tourism products as most wildlife species were exterminated during the protracted civil and political conflicts from the 1970s to the 1990s.
- Poor accessibility of the Park.
- Lack of supportive infrastructure in and around the Park.

1.1.3 Economic/Financial Capital Landholding

The landholdings in Banhine, in terms of homesteads and house-hold gardens, are generally small (0.30 — 4.10ha.). Ownership of land passes through family lineage inheritance, and is allocated through traditional leadership structures. Besides the homestead landholdings, communities have access to expansive areas from where they extract or access various resources (pasture, water, fish, game meat, traditional medicine, fruits and sacred sites). In terms of resource utilization, therefore, there is a territorial overlap shared by various communities, except for some resources, such as fish and access to sacred sites, which are guided by strict traditional protocols and ceremonies.

Food Security

A household is considered food secure when its occupants do not live in hunger or fear of starvation. As Banhine NP is located in a semi-arid area, characterized by persistent drought, food insecurity is a major problem faced by the communities. The main food crops grown in and around Banhine (sorghum, millet, beans, water melon, and cowpeas) are local varieties whose performance

under the local conditions has dwindled over hundreds of years, probably due to ³ inbreeding depression, leading to very low yields. Relatively high-yielding crops, such as water melon and pumpkin, which can produce up to 400 pumpkins, or water melons per hectare easily spoil due to lack of proper storage technology. Consequently, for nearly seven months of the year, communities rely heavily on natural resources, exerting great pressure on biodiversity. Any development in Banhine therefore, should consider improvement of food security for the communities as a priority.

Hunger Coping Mechanisms

Of the natural resources utilized during the period of the year when crops are minimal, the following species of plants and animals are of most importance (Fig. 4):

- Roots of trees, such as *Boscia albitrunca* which communities dig and select sizeable roots, split the roots, sun-dry them, pound and cook for food. The plant can be quite poisonous if not well dried and treated. Similarly, they use water lily, (*Nymphaea spp.*) The tubers are extracted from the wetlands, sun-dried, pound and cooked for food. Water lilies are however available only when there is water in the wetland and hence are an unreliable source of food as Banhine is often dry.
- Palm wine, extracted from lala palm (*Hyphaene petersiana*) is a popular drink in and around Banhine. Besides being a recreational drink, palm wine is widely consumed by both adults and children during times of severe food shortage. The sap is extracted and collected by a tapper. Typically the sap is collected from the cut at the apex of a relatively young palm tree. Fire is lit at the cut end to facilitate the collection of sap. A container, well covered at the top to prevent debris from falling into the sap, is fastened to the cut stump to collect the sap. The white liquid that initially collects is very sweet and non-alcoholic before it is fermented into an alcoholic drink. Though alcoholic when fermented, palm wine is an important source of nicotinic acid and vitamin C (⁴ Cunningham & Wehmeyer 2008). The tapping method used in Banhine, which involves cutting and burning the apex of young palm trees, is destructive to the palm and thus not sustainable in the long term. An alternative tapping method must be introduced to save the palm in the Park.
- Indigenous fruits, such as *Strychnos spinosa*, *Strychnos madagascariensis* and others are abundant both in and outside the Park.
- Fish, especially the rare lungfish, *Protopterus annectens*, which can aestivate for many years underground becoming active as soon as water becomes available in the wetland. It is highly sought after by community members, who dig it up for food during dry periods.
- Food purchase/food donation/game meat may in a small number of communities and families supplement the above hunger coping strategies. Game meat may be eaten, sold or bartered.



Figure 3: Traditional varieties of pumpkin (top) and water melon (bottom). Communities want improved and better tasting varieties, and need assistance in improving their storage techniques.

³ Yields from traditional varieties of sorghum for instance, are only about 35.8 \pm 4.8 kg/ha

⁴ Cunningham, A. B. and Wehmeyer, A. S. (2008). Nutritional value of palm wine from *Hyphaene coriacea* and *Phoenix reclinata* (Arecaceae). J. Economic Botany (42): 301-306.

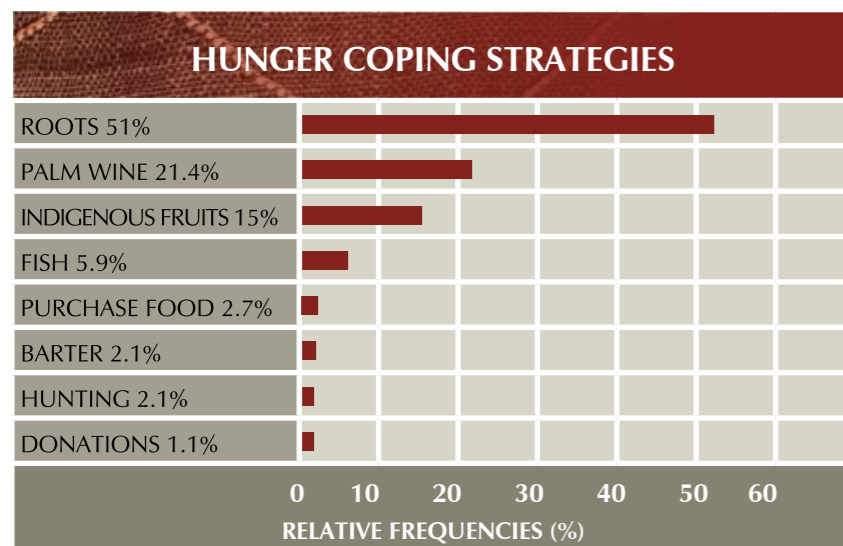


Figure 4: Hunger coping strategies adopted by the Banhine communities.

TOP LEFT: Women harvest water lily seeds prior to the mass fish catch. Photo: Roger Bills

TOP MIDDLE: Squirrel trap. Photo: Roger Bills

TOP RIGHT: Lala palm and the leaf used to tap the sap, collected in a calabash. Photo: Marc Stalmans

BOTTOM RIGHT: Tapping lala palm. Photo: Simon Munthali

TOP LEFT: Baobab seed pods drying. Photo: Roger Bills
TOP RIGHT: Barbel being prepared. Photo: Harry van der Linde

BOTTOM LEFT: Baobab. Photo: Simon Munthali

BOTTOM MIDDLE: Drying fish. Photo: Roger Bills

BOTTOM RIGHT: A lungfish extracted from its cocoon. Photo: Roger Bills

Household Income

Monthly income of the majority (52.74%) of the communities is less than ⁵ MZN/MTn 500/month; 26.58% MZN/MTn 500 – 1000; 9.85% MZN/MTn 1000 – 2000; 5.34% MZN/MTn 2000 – 3000, while only about 5.49% earn more than MZN/MTn 3,000 per month. Most relatively high income earners live in Tchai-Tchai, Hariane (shop owners) and Madile (traditional healers and those selling crops). Female headed households are among the poorest, all earning less than MT 500 per month. The village level house income is summarized in Fig. 5.

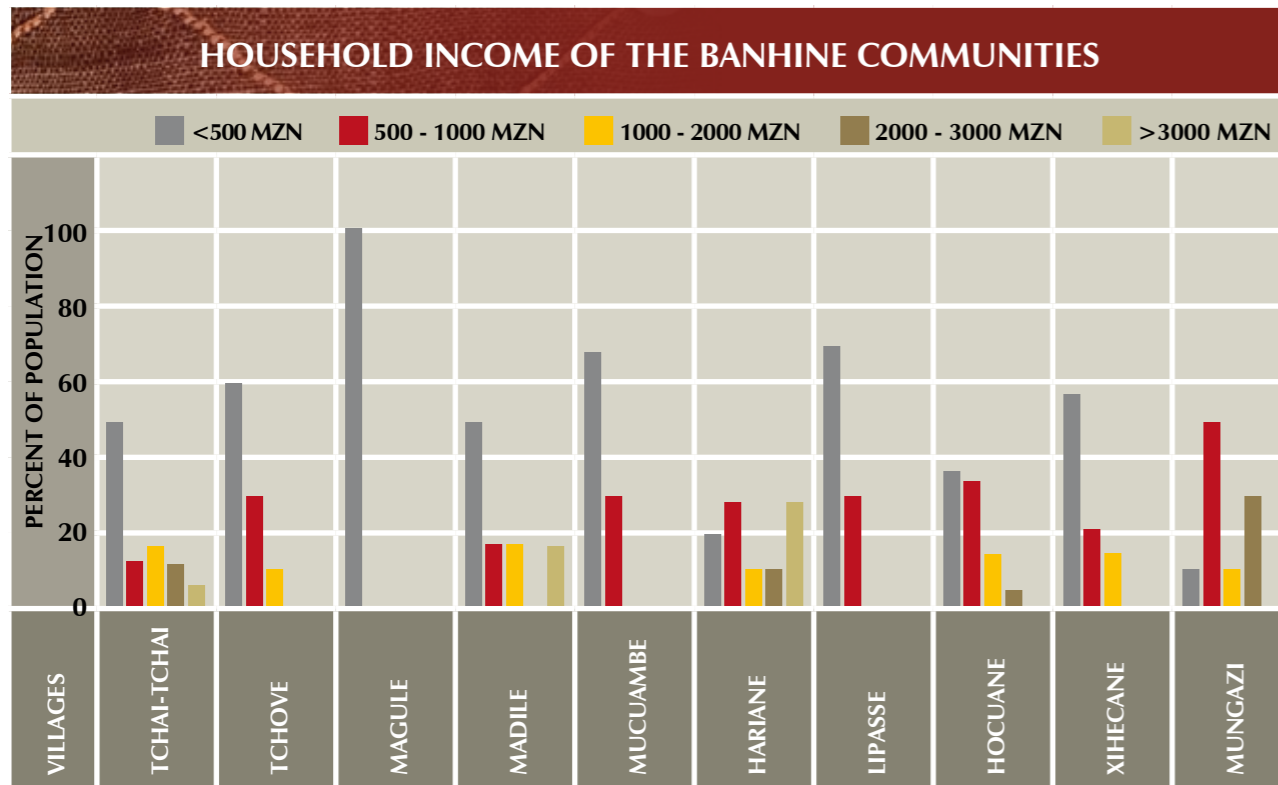


Figure 5: Household income of the Banhine communities.

Alternative Options Improving Household Income

The Banhine communities have very limited alternative livelihood, and income generating opportunities, with the majority, 54.8%, having no alternative options by which to earn a living or offset famine. Of the remainder, 10% rely on selling palm wine; 9.7% sell chickens; 7.5% sell charcoal; 5.9% sell livestock; 3.8% operate small shops; 3.3% are traditional healers; 2.3% sell crafts; 1.3% engage in logging and only 1.1% sell a portion of their crops for cash.

The communities that are able to sell part of their crops (Madile and Tchove) utilize clay soils in the mopane woodlands and have access to wetlands, where they utilize patches of richer alluvial soils for crop production. Selling of palm wine is most prevalent, practiced by most villages (such as, Tchai-Tchai, Tchove, Magule, Madile, Mungazi, Hocuane and Lipasse). Village specific alternative income generation strategies are shown in Fig 6.

1.1.4 Physical Capital

The physical capital, in terms of household possessions and assets, supportive infrastructure, and technology appropriate for enhancing households and rural livelihoods of the communities in and around Banhine, is poor and undeveloped. An average of 46% of community members have no household assets; 25% own a radio; 23% own a bicycle; 2.6% own a car; and about 1% own a sewing machine. Most households own some livestock (Fig. 7; Table 1).

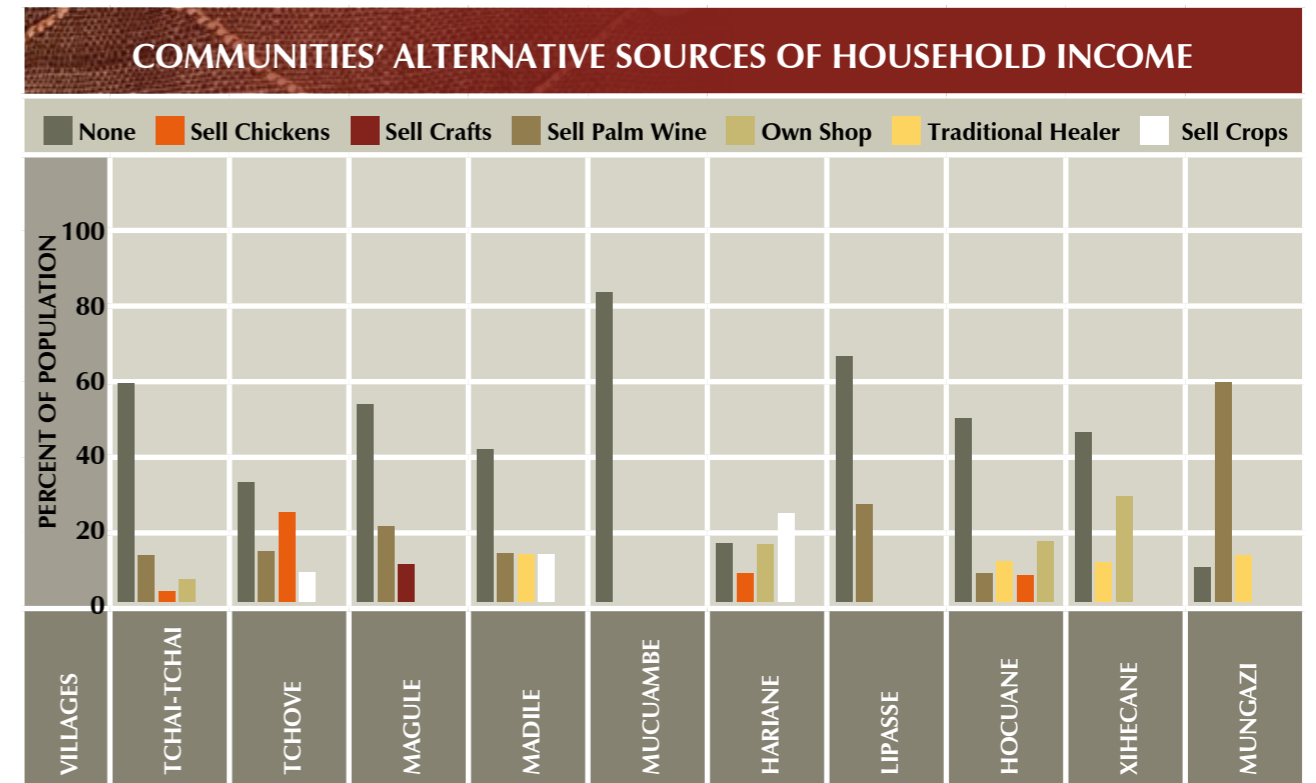


Figure 6: Communities' alternative sources of household income.

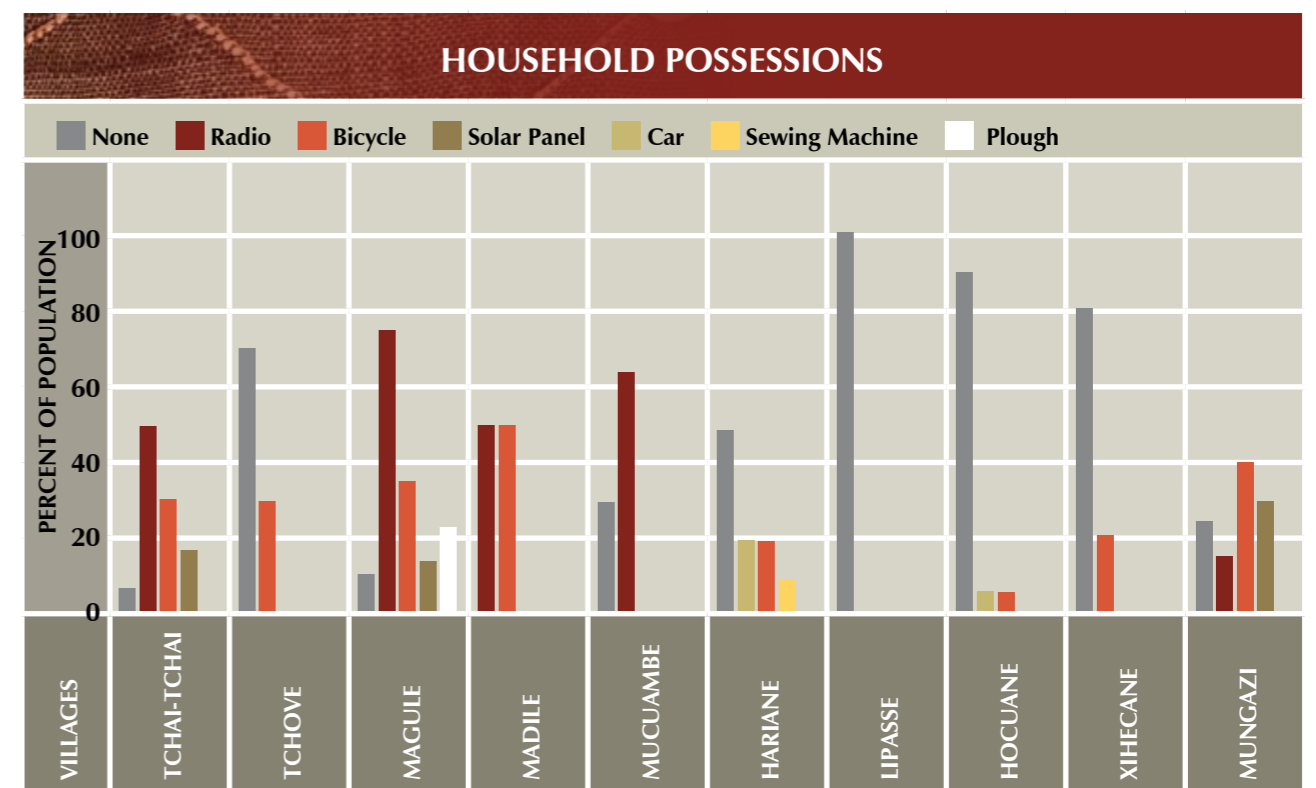


Figure 7: Household possessions.

⁵ US\$1 = MZN/MTn 35 (Metical redenominated 2006)

Table 1: Landholding and livestock ownership.

LAND & LIVESTOCK										
VILLAGES	TCHAI-TCHAI	TCHOVE	MADILE	MAGULE	MUCUAMBE	HARIANE	LIPASSE	HOCUANE	XIHECANE	MUNGAZI
Land (ha)	1.9 ±1.1	1.4 ±1.1	1.8 ±0.83	1.3 ±0.95	0.76 ±0.47	1.2 ±0.92	2.3 ±1.6	2.4 ± 1.2	2.5 ±1.6	1.6 ±1.1
Chicken	13.6 ±3.4	5.6 ±5.1	12.5 ±2.5	18.3 ±4.2	9.3 ±2.2	25.3 ±4.6	33.7 ±3.3	12.1 ±3.5	16.8 ±4.3	4.3 ±1.9
Cattle	5.4 ±2.8	2.6 ±2.0	10.0 ±3.7	2.6 ±1.8	6.0 ±1.9	29.0 ±7.3	9.3 ±4	7.2 ±3.6	6.1 ±3.4	1.9 ±1.8
Goats	5.8 ±2.6	13.6 ±3.4	5.6 ±5.1	12.5 ±2.5	18.3 ±4.2	9.3 ±2.2	25.3 ±4.6	33.7 ±3.3	12.1 ±3.5	16.8 ±4.3
Sheep	2.4 ±2.1	0	1.0 ±1.3	1.1 ±1.7	0	3.6 ±2.6	0	4.8 ±2.4	4.6 ±2.9	0
Pigs	0	0	0	0	0	0	0	0	0	2.3 ±1.5
Donkeys	0.89 ±1.6	0.1 ±0.57	0.17 ±0.57	0.5 ±0.87	0.33 ±0.76	0.1 ±0.57	0	0.53 ±1.2	0.1 ±0.47	0
Dogs	2.0 ±1.4	1.4 ±1.2	3.3 ±1.4	4.5 ±1.9	2.3 ±1.4	1.6 ±1.3	0.33 ±0.76	0.82 ±1.0	2.6 ±1.6	1.0 ±1.2
Cats	0	0	0	0	0	0	0	0.33 ±0.58	0.45 ±1.0	0

Adoption of technology is also extremely poor, with only about 2.5% of the communities using ploughs to assist them with farming and 5.7% using solar panels mainly for powering their radios. None of the female-headed households has adopted any form of improved technology.

Similarly access to essential social amenities is very limited with very long distances to relatively good health facilities (41 ±4.2 km); schools (6 ±3 km) and water (4 ±2 km) (Table 2). There is a critical need for development of social amenities around Banhine NP.

Table 2: Distance (km) to various social amenities.

SUPPORTIVE INFRASTRUCTURE											
VILLAGES	TCHAI-TCHAI	TCHOVE	MADILE	MAGULE	MUCUAMBE	HARIANE	LIPASSE	HOCUANE	XIHECANE	MUNGAZI	MEAN ± SE
Access to water	2	10	2	4	3	4	2	5	4	4	4 ±2
Access to good health facility	30	48	33	34	35	72	30	60	12	52	41 ±4.2
Access to school	2	1	32	⁶ N/S	6	1	6	3	2	0.2	6 ±3

⁶ No school nearby

1.1.5 Natural Resource Capital

The Banhine communities have access to and use a diverse range of natural resources, both outside and inside the Park, and would like to continue to extract them, irrespective of the Mozambique’s Forestry and Wildlife Act, which forbids such use. As noted earlier, besides the homestead landholdings, communities have access to expansive areas where they extract/access various resources (pasture, water, fish, game meat, traditional medicine, fruits, sacred sites, etc.). In terms of natural resources utilisation there is in practical terms, therefore, free access.

The most commonly utilized resources in the Park can be grouped into five broad categories see Fig. 8:

- Category 1:** Demanded by at least 70% of the villages in the Park; includes access to sacred sites, poles for construction (mainly mopane and ironwood in southern part of the Park), firewood and grass.
- Category 2:** Demanded by about 60% of the villages, includes fruits, mud (for house construction), and traditional medicine.
- Category 3:** Demanded by about 50% of the villages, includes tree roots and marula.
- Category 4:** Demanded by about 30% of the villages, includes palm wine and logging especially in the southern part of the Park.
- Category 5:** Demanded by ≤ 20% includes fish, water lilies and land.

Besides using resources in the Park, about 70% of the communities also use forestry resources outside the Park, while only about 3% of community members use wildlife outside the Park.



Figure 8: Natural resources demand ranking.

Use of traditional medicine, though falling in Category 2, is fully entrenched among the communities, with nearly 93% relying on it to treat various ailments, including enhancing fertility among males and females. At least 58 plant species are utilized for medicinal purposes. Among these, listed in order of importance, chivodzuane, nconono, marula, chanatsi, mboco and chicucuane (Table 3), are most in demand in the Park. The relative abundance of these species in Banhine has not been established but this is required to guide sustainable harvesting for herbal medicine. DNAC should engage a partner (NGO, or university) to establish the relative abundance of these important plant species in the Park.

The other form of access to the Park that should be recognized is to sacred sites. About 84% of the communities believe in ancestral spirits, to which they connect through providing offerings and special prayers. Most sacred sites are located in the Park. Sacred sites are either an ancient burial site, or may be an old tree, mostly baobab or marula. These sites are held in great respect by communities, and entrance to these sites is guided by strict traditional protocols. DNAC with assistance from its partners should log GPS coordinates and map all sacred sites in the Park and determine which communities use each site. This will allow for easy monitoring of community usage of these sites.

1.1.6 Social Capital

Social capital represents networks, governance, social relations, affiliations, associations, norms, trust and disposition to work for a common good. For the Banhine communities, although the government has integrated political leadership into the traditional governance system, the latter is well entrenched in the community, with 72% of the community members strongly believing in the traditional governance system, which guides land allocation, and access to certain valuable and rare resources, such as fish, as well as access to sacred sites. Communities highly respect their traditional leaders and this should be recognized in organizing communities’ support for the Park’s management and in promoting sustainable use of natural resources.

In addition to the traditional governance system, communities in Tchait-Tchai and Tchove have established a modern natural resource governance system in the form of Associações, which will guide and represent the

communities in negotiating access to the Park’s resources, including partnerships with DNAC, and/or the private sector in developing conservation enterprises in which communities would benefit.

Prior Government Engagement

At least 56% of the community members have been engaged and are aware of the government’s plans to develop and effectively manage Banhine NP, however, the majority (76%) do not subscribe to the option of relocating from the Park. Information has been disseminated by the Park’s officials, NGOs, and the Frelimo party. This awareness should be intensified by the Park authority and its partners to encourage communities to relocate from the Park in order to ease pressure on the Park’s resources. Coexistence of people and wildlife in Banhine NP, especially when populations of both increase, is considered a management problem that would be manifested in the form of human-wildlife conflicts, and competition between humans, livestock and wildlife for finite resources, such as water and land. This seems inevitable because livestock and agricultural fields are concentrated in grasslands and wetlands, most suitable for wildlife’s foraging and source of drinking water.

Table 3: Number of villages demanding a particular medicinal plant and relative frequencies for each plant’s use in percent.

DEMAND FOR MEDICINAL PLANTS AND RELATIVE FREQUENCIES OF EACH PLANT’S USE BY VILLAGES (%)											
LOCAL MEDICINAL PLANT NAME	NO. VILLAGES UTILIZING IT	TCHAI-TCHAI	HOCUANHE	XLHECANE	HARIANE	MAGULE	MADILE	LIPASSE	MACUAMBE	MUNGAZI	TCHOVE
Chivodzuane	7	23	7	0	0	20	29.4	11.1	22.3	13.2	0
Nconono	5	22.2	2.3	31.3	0	20	23.4	22.3	33.3	7.1	26
Marula	5	15.3	20.9	22.7	10.5	0	11.8	0	0	0	5.3
Chanatsi	5	7.1	14	0	0	0	5.9	0	0	3.8	5.3
Mboco	4	1.6	2.3	0	0	0	0	11.1	0	13.2	0
Chicucuane	3	1.6	2.3	0	0	10	0	0	0	0	0
Chimamaruka	2	1.6	0	0	0	5	0	0	0	0	0
Nfenha	2	1.6	2.3	0	0	0	0	0	0	0	0
Chagwari	2	0	2.3	0	0	0	0	0	0	0	10.5
Ntsengueti	2	0	2.3	0	0	0	0	0	0	3.8	0
Kofwa	2	0	0	2.3	0	5	0	0	0	0	0
Wambo	2	0	0	2.3	0	5	0	0	0	0	0
Chakwari	2	0	0	2.3	5.3	0	0	0	0	0	0
Numanhama	2	0	0	2.3	0	0	0	0	0	0	10.5
Mondjo	2	0	0	2.3	0	0	5.9	0	0	0	0
Ncotsi	2	0	0	0	5.3	0	0	0	0	0	5.3
Nguambe	2	0	0	2.3	0	0	0	0	0	0	5.3
Ntoma	2	0	0	0	5.3	0	0	11.1	0	0	0
Nhangula	2	0	0	0	5.3	0	0	0	0	0	5.3
Malumadada	2	0	0	0	5.3	5	0	0	0	7.1	0
Cambeko	2	0	0	0	0	0	5.9	0	0	0	5.3
Chicucuane	2	0	0	0	0	0	5.9	0	11.1	0	0
Chissindi	2	0	0	0	0	0	0	0	0	3.8	5.3
Massolo	1	2	0	0	0	0	0	0	0	0	0
Chilindze	1	1.6	0	0	0	0	0	0	0	0	0
Cambeco	1	1.6	0	0	0	0	0	0	0	0	0
Corro	1	1.6	0	0	0	0	0	0	0	0	0
Chicutse	1	0	0	0	0	0	0	0	0	3.8	0
Dungulu	1	1.6	0	0	0	0	0	0	0	0	0
Ncuacua	1	1.6	0	0	0	0	0	0	0	0	0

Continued

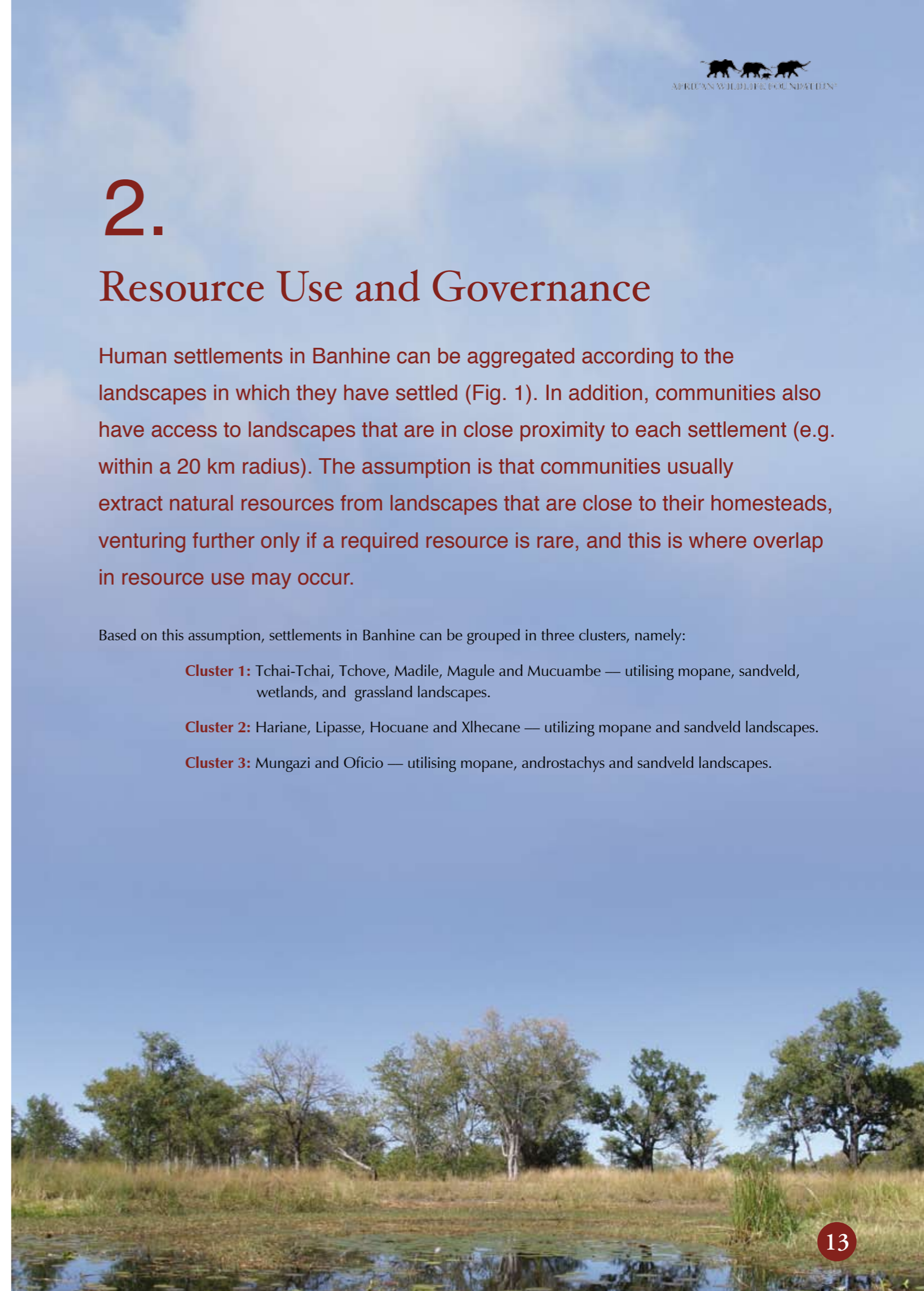
LOCAL MEDICINAL PLANT NAME	NO. VILLAGES UTILIZING IT	TCHAI-TCHAI	HOCUANHE	XIHECANE	HARIANE	MAGULE	MADILE	LIPASSE	MACUAMBE	MUNGAZI	TCHOVE
Monkey orange <i>S. madagascariensis</i>	1	1.6	0	0	0	0	0	0	0	0	0
Compha	1	1.6	0	0	0	0	0	0	0	0	0
Mbatari	1	1.6	0	0	0	0	0	0	0	0	0
Nsale	1	1.6	0	0	0	0	0	0	0	0	0
Gumbanhatsa	1	1.6	0	0	0	0	0	0	0	0	0
Mixiri	1	1.6	0	0	0	0	0	0	0	0	0
Ndzangalangua	1	1.6	0	0	0	0	0	0	0	0	0
Cambeira	1	1.6	0	0	0	0	0	0	0	0	0
Demo	1	1.6	0	0	0	0	0	0	0	0	0
Xifato	1	1.6	0	0	0	0	0	0	0	0	0
Nhuma	1	0	2.3	0	0	0	0	0	0	0	0
Marrumbelane	1	0	2.3	0	0	0	0	0	0	0	0
Chene	1	0	5.1	0	0	0	0	0	0	0	0
Nfexe	1	0	2.3	0	0	0	0	0	0	0	0
Lifuwo	1	0	4.7	0	0	0	0	0	0	0	0
Tsotso	1	0	2.3	0	0	0	0	0	0	0	0
Mudzedza	1	0	2.3	0	0	0	0	0	0	0	0
Chanfuta	1	0	2.3	0	0	0	0	0	0	0	0
Xanguara	1	0	2.3	0	0	0	0	0	0	0	0
Nongo	1	0	2.3	0	0	0	0	0	0	0	0
Chachany	1	0	2.3	0	0	0	0	0	0	0	0
Koswa	1	0	2.3	0	0	0	0	0	0	0	0
Ntsenguda	1	0	2.3	0	0	0	0	0	0	0	0
Mutite	1	0	2.3	0	0	0	0	0	0	0	0
Nfuwo	1	0	2.3	0	0	0	0	0	0	0	0
Pwandu	1	0	2.3	0	0	0	0	0	0	0	0
Monkey orange <i>S. spinosa</i>	1	0	0	2.3	0	0	0	0	0	0	0
Ufuwo	1	0	0	2.3	0	0	0	0	0	0	0

2. Resource Use and Governance

Human settlements in Banhine can be aggregated according to the landscapes in which they have settled (Fig. 1). In addition, communities also have access to landscapes that are in close proximity to each settlement (e.g. within a 20 km radius). The assumption is that communities usually extract natural resources from landscapes that are close to their homesteads, venturing further only if a required resource is rare, and this is where overlap in resource use may occur.

Based on this assumption, settlements in Banhine can be grouped in three clusters, namely:

- Cluster 1:** Tchai-Tchai, Tchove, Madile, Magule and Mucuanbe — utilising mopane, sandveld, wetlands, and grassland landscapes.
- Cluster 2:** Hariane, Lipasse, Hocuane and Xihecane — utilising mopane and sandveld landscapes.
- Cluster 3:** Mungazi and Oficio — utilising mopane, androstachys and sandveld landscapes.



Within each cluster a Natural Resource Committee (NRC) should be established, elected by the communities themselves. The role of NRCs should be to:

- Facilitate community involvement in decision-making regarding sustainable use and monitoring of natural resources in Banhine National Park.
- Create a forum for community-based decisions regarding the management and utilisation of natural resources.
- Participate in micro-zoning of the Park into resource use areas.
- Register, and mobilise communities, and monitor communities' access and sustainable use of natural resources in the Park.
- Represent concerns and suggestions in the Park management decision-making process.
- Resolve conflicts arising from resource utilisation, and infringement of the Park's regulations.

In addition to NRCs, each cluster should establish and legally register a Community Property Association (Associação), which will represent the communities' interests in:

- Investments, and negotiating joint venture partnerships.
- Mobilizing resources with assistance from NGOs and private investors for development of social amenities.
- Mobilizing resources with assistance from NGOs and private investors for the development of alternative livelihood strategies.
- Promoting collectiveness in harnessing equitable sharing of benefits among the community members from conservation enterprises.
- Represent communities' interests in the Banhine NP's Management Board.
- Advocate integration of indigenous ecological and social knowledge into the Park's management systems; and others depending on communities' needs.

These local institutions need capacity building to ensure that they secure continued access and benefit from the Park's development and management, which in turn would provide a strong incentive for sustainable resource management, and delivery of a wide range of environmental services. NGO partners should contribute to local institutional capacity building, mediate conflict resolution in natural resource use — ensuring equitable sharing of benefits between the communities and private investors from biodiversity conservation; and contribute to rural development inputs through fundraising for investments in enterprise and social amenity development, and monitoring contribution of community utilization and development programs towards biodiversity threat abatement, and sustainable rural livelihoods.

2.1 Sustainable Natural Resources Off-take

In section 1.1.5, resources have been categorized according to their demand by communities. In this section, the following restrictions and allowable uses have been recommended as follows:

Category 1:

Demanded by at least 70% of the villages in and adjacent to the park:

- Poles for construction: These resources are abundant outside the Park, therefore, should not be cut inside the Park. This requires community awareness about the restriction and will require effective law enforcement by the Park authorities, supported by traditional leadership, to ensure that trees are not cut for poles. This should also act as a disincentive for communities to live deep in the Park. The value of the Park in sustaining ecosystems and human livelihoods should be regularly communicated to the communities by the Park's officials supported by partners. Communities living outside the Park should be more eligible to receive support and benefits than those resident inside the Park.
- Firewood: Firewood collection is incompatible with the purpose of the Park. Collection of dead wood for instance, removes an important structural component of the ecosystem (e.g. habitat for birds, small mammals, reptiles and some insects), and may provide an incentive for communities to girdle live trees so as to eventually increase the amount of collectable firewood. However, limited collection of dead wood could be allowed for communities that live deep in the Park (e.g. Hocuane and Xlhecane). These communities could be allowed to collect dead wood of $\leq 20\text{cm}$ in diameter. Communities living close to, or on the Park boundary (Tchai-Tchai, Tchove, Madile, Magule, Mucumambe, Hariane, Mungazi and Oficio) should collect outside the Park. There is sufficient firewood outside Banhine NP to satisfy their demand.
 - For the communities living deep in the Park, wood gathering sites, allocation of dead wood, and subsequent prevention of illegal wood collection should be the responsibility of NRCs in collaboration with the Park's management authorities.
 - At least one member of the NRC should accompany wood gatherers to ensure compliance with the specifications for firewood off-take.
- Grass: There is no compelling ecological reason why thatch grass should not be shared with resident communities in the Park. Thatch grass is plentiful, and at the time of harvest, except for providing shelter to some wildlife species, it is of less value as

a wildlife forage resource. To determine the quantity of thatch grass that could be sustainably harvested, a baseline inventory of thatch grass production in the "community utilization zone" should be determined. DNAC should call upon its partners (e.g. an NGO or university of its choice) to assist in establishing baseline grass production in areas zoned for resource utilization. From the estimated production figures (kg ha^{-1}), 50% could be converted into the number of grass bundles that should be allocated to communities' use. In addition:

- The Park authority should distribute the thatch grass allowance between communities within each cluster on a population proportional basis. The population data require regular updating.
- The Park authority in collaboration with each NRC should be responsible for allocating permits to each village's apportioned share of the allowable thatch grass harvest.
- The NRC should report during the grass cutting season the total number of grass bundles collected by each village.
- The Park authority in collaboration with NRCs should monitor the impact of grass collection on the Park's biodiversity, and if adverse impacts are noticed, consideration should be given to rotational harvesting and/or reduction in annual harvest.
- At least one NRC member should accompany grass gatherers to ensure compliance with the grass off-take specifications.
- Access to sacred sites: this is a non-destructive activity which should be allowed. The Park authority supported by its NGO partner should identify and map all sacred sites in the Park and identify users of each site, determine seasons when each site is used, and jointly develop a protocol for accessing these sites in collaboration with NRCs and local traditional leaders.

Category 2:

Demanded by about 60% of the villages:

- **Fruits:** Generally the fruits utilized by the communities in Banhine, such as *Strychnos spinosa*, *Strychnos madagascariensis*, water berry (*Syzigium cordatum*) and others also occur outside the Park; hence communities living close to, or within 10 km of the Park's boundary (Tchai-Tchai, Tchove, Madile, Magule, Mucumambe, Hariane, Mungazi and Oficio) should harvest fruits outside the Park. For those living deeper in the Park, restricted access to fruits should be allowed as follows:
 - Fruit trees are r-selected species whose yield can fluctuate annually, hence it is very difficult to predict and set off-take quotas. Fruits are also consumed by wildlife, and are essential for propagation of the fruit-bearing tree species. Hence a balance needs to be considered when allowing humans to harvest fruits. The Park's officials in collaboration with NRCs will identify fruit trees by species within the utilization zones.
 - Community members should be organized into fruit harvesting groups when fruits are in season, and allowed to harvest fruits that lie within human reach. For fruits that fall on to the ground, about 50% should be removed. This will require strict monitoring of harvesting activities by the NRCs to ensure this rule is observed.
 - At least one game scout or ranger should accompany fruit collectors to ensure their safety and compliance with the fruit collecting specifications.
- **Mud (for house construction):** This is a very unusual demand; communities dig and collect mud from the wetlands, but although the impact of this activity on the wetland ecosystems' integrity has not been established, it can be assumed to be significant. Regardless of this lack of knowledge, digging of soil from the wetlands should be prohibited. Communities should be taught alternative methods of constructing houses. It is the duty of the Park authority to find affordable and environmentally friendly alternative methods for house construction.
- **Traditional medicine:** The Banhine communities have no access to modern medical treatment; consequently, traditional medicine based on herbal prescriptions is the major treatment for diseases and sickness among local residents. Most of the traditional plants are used in mixtures with other herbs to attain their full curative powers. Traditional herbal species are widely distributed both inside and outside the Park and thus do not necessarily conform to resource utilization zoning. The knowledge of traditional medicinal herbs is a closely guarded secret held by only a few within the communities. To ensure sustainable harvesting of traditional medicinal plants, the following are recommended:
 - The Park authority in collaboration with NRCs and partners, should carry out a thorough survey of the Park for the listed medicinal plants (Table 3) and rank them on a relative abundance scale from 1 to 10; where ≤ 5 = rare, or scarce; ≥ 6 = common or abundant.
 - The Park authority in collaboration with NRCs, should allocate a harvest allowance on a demand basis for collection of medicinal plant parts.
 - Allocation of medicinal plant harvest should be contingent on the non-destructive collection of herbal materials as follows:
 - Leaf collection: For plants ranked 6 or greater on the abundance scale, there should be no limit on leaf collection; for plants ranked 5 or less on the abundance scale, no more than 10% of any one plant's leaves should be collected
 - Bark collection: This must be collected in vertical strips, the width of which must not exceed 10% of the circumference of the tree. Trees should be used for bark collection only once.
 - Root collection: No more than one secondary root of an individual medicinal plant should be collected in any one year. A secondary root is defined as the root that branches off the central root extending from the base of the plant stem.
 - Annual herbs: For plants ranked 6 or greater on the abundance scale, there should be no limit on the collection of any part; however for plants ranked 5 or less on the abundance scale, collection should be restricted to the period following the setting and disposal of seed.
 - The NRCs and Park authority should keep records of quantities and species of collected medicinal plants.

Category 3:

Demanded by about 50% of the villages

- **Tree roots:** Communities have developed ingenious methods of harvesting tree roots for food without killing the trees from which roots are collected. The Park authority should learn from the community how it is done and integrate environmentally positive elements into the root harvesting protocol. Communities living close to or within 10 km of the Park's boundary (Tchai-Tchai, Tchove, Madile, Magule, Mucumambe, Hariane, Mungazi and Oficio) should harvest roots for food outside the Park because this resource is abundant outside the Park. For communities deep in the Park, no more than one secondary root of an individual target tree should be collected in any one year.
- **Marula fruits:** These are collected for brewing local beer, practised by a few community members. Community members usually collect fruits that have ripened and fallen to the ground. The Park authority, through NRCs, should identify individuals within each cluster who collect marula fruits for brewing beer and to ensure sustainable collection of the marula fruits, the following should be observed:
 - Community members should be organized into marula-fruit harvesting groups.
 - The relative abundance of marula trees should be established by the Park authority and NRCs in the resource utilization zones.
 - When fruits are in season, the marula-harvesting groups should be allowed during peak fruit season to pick fruits only once.
 - About 50% of the fruits on the ground should be picked, once per season. This will require strict monitoring of harvesting activities by the NRCs to ensure this rule is observed.

Category 4:

Demanded by about 30% of the villages:

- **Palm wine:** The method used in tapping wine is destructive and therefore should be stopped to save the Park's *Hyphaene spp.* The Park authority supported by its partners should explore alternative non-destructive methods of tapping wine. Palm trees, which are targeted for wine tapping, are most common in the grassland and sandveld areas of the Park. We recommend that:
 - The Park's management authority, supported by its partner(s), and NRCs should establish relative abundance of tappable palm trees in the resource utilisation zones.
 - The NRCs should identify wine tappers and organise them into wine-tappers groups.
 - The Park authority, through its partner NGO, should train wine-tappers groups in each cluster in environmentally acceptable tapping methods, and develop a protocol for tapping wine in the areas dedicated to this activity.
 - The Park authority, in collaboration with each NRC, should be responsible for allocating permits to the tappers' groups, and monitor compliance with the agreed protocols for wine tapping in areas dedicated to this activity.
 - The Park authority should encourage the university to conduct research on palm wine quantity, quality and viability as a potential enterprise that could attract investors to its production and marketing.
- **Logging:** This activity is common in the southern part of the Park. A particularly valuable timber is the pod mahogany/chamfuti (*Azelia quanzensis*) which is highly sought after by traders, both within Mozambique and neighboring countries. We recommend that:
 - Logging inside the Park should not be allowed. Outside the Park logging could be done guided by Mozambique's extant legislative requirements.
 - The pod mahogany's seeds can however be collected by communities and used to make necklaces. An allowance of about 50% of the seed fallen to the ground could be collected for this purpose. The Park authority's NGO partner should train communities in making necklaces as an enterprise (see section 2.2 below).

Category 5:

Demanded by ≤ 20% of the villages:

- **Fish:** Digging of lungfish (*Protopterus annectens*) in the Park should be forbidden. This is a rare species which could be endangered by overuse; hence the Park authority must ensure its full protection. Banhine has at least 18 fish species belonging to 10 families. In addition the following controls should be implemented in the Park:
 - The Park authority and the NRCs, especially from the settlement Cluster 1, should zone the wetlands, and assign areas to provide access for fishing.
 - The Park authority in collaboration with the NRCs should allocate fishing permits at the rate of five permits (one permit only per family) per month to fish in the authorized zones. The allowable off-take/bag-limit should be 15 fish per month per family. The allowable off-take should exclude the lungfish.
 - Fishing should be allowed away from tourists' favorite sites.
 - The Park authority should integrate positive aspects of the traditional fishing control mechanisms, but prohibit participation of relatives of the Park's residents; some of whom live as far away as 300 km. Under the current practice the Park's resident communities invite their relatives, exerting an enormous pressure on the Park's fisheries resources.
 - The Park authority and NRCs should record by species, quantities of fish harvested and monitor compliance with the specified fishing prescriptions.
- **Water lily:** This is a very valuable food for the Pygmy Goose (*Nettapus auritus*), in the form of seeds and buds, and is aesthetically appealing to tourists, therefore, it should not be harvested inside the Park for human consumption. Communities may harvest this plant's rhizomes outside the Park. Additionally, communities should be assisted to improve food production (see section 2.2 below). The Park authority should ensure this plant is fully protected in the Park.
- **Land:** Besides what communities already use, no further allocation of land should be allowed in the Park. Communities resident in the Park should be encouraged to relocate outside while those already

resident outside the Park should be given more incentives/benefits than those in the Park (see section 2.2 below).

- **Water:** Specifically demanded by the Tchai-Tchai (for livestock) and Tchove (for people and livestock). Water is a very scarce resource in the area, more especially as the ground-water has high salinity and hence is not suitable for human consumption. The water that collects in the wetlands is potable and sought after by communities and their livestock.
 - For livestock, the Park authority and its partners should mobilize funds for drilling boreholes outside the Park and establish cattle watering points. Similarly the cattle owned by the communities in Cluster 1 should not be allowed to graze in the Park. The Park authority, through its NGO partner(s) should assist the communities in improving pasture outside the Park (see section 2.2 below).
 - For humans, the Park authority, in collaboration with NRCs, should identify sites in the Park's wetlands where communities should draw water for home consumption. This should be an acceptable goodwill gesture in support of a critical community need.

2.1.1 Natural Resources Governance

The communities in Banhine are integral to the Park's management problem, and therefore, should be part of the management solution through a co-management arrangement, in which the Park authority and communities should negotiate, define and guarantee a fair sharing of the management functions, entitlements and responsibilities. In this regard, although the overall jurisdiction for the management of Banhine NP lies with the Park authority, communities through the NRCs and Associações should assist (also see Section 2) in:

- Micro-zoning of the Park and assigning resource use areas.
- Estimating relative abundance of some demanded resources in the Park.
- Organizing and guiding communities in sustainably utilizing the allowed natural resources in the Park.
- Monitoring natural resource use and compliance with the set off-take quotas.
- Representing communities' interests on the Park's management board.

- Mobilizing resources with assistance from NGOs and private investors for development of social amenities.
- Mobilizing resources with assistance from NGOs and private investors for development of alternative livelihood strategies.
- Promoting collectiveness in harnessing equitable sharing of benefits among the community members from conservation enterprises.
- Advocate integration of indigenous ecological and social knowledge into the Parks management systems.
- Others depending on community's needs.

It is expected that co-opting communities in this manner would provide sufficient incentive for them to be allied with, and support the Park's management programs; and hence substantially reduce illegal incursions and use of the Park's protected biodiversity.

The traditional governance structures and environmentally positive indigenous ecological and social knowledge should be fully integrated into the natural resources governance systems. In this regard, both the NRCs and Associações should incorporate members from the traditional leadership structures. These traditional leaders are reservoirs of indigenous knowledge that should be used to the advantage of the Park's management. Of particular note is the traditional regulatory mechanisms followed in accessing sacred sites, and harvesting of tree roots which are none destructive; and hence need farther understanding and incorporation in the resource use protocols.

The NGO partner(s) should facilitate collaboration among the various players and ensure smooth co-management of the Park. NGOs should also play a vital role in building the capacity of local constituencies and ensure that they effectively and efficiently implement their roles within the proposed co-management arrangement.

2.2 Alternative Livelihood Strategies

The communities in and around Banhine can be characterized by the following interrelated deprivations: hunger, dire poverty, and lack of social amenities. The most critical problem having major negative implications on the Park's natural resources is hunger and food insecurity. Besides creating an enormous pressure on the Park's natural resources and biodiversity, it is inhumane to see people struggling to meet their food requirements in the manner communities must in and around Banhine. The Park authority supported by its partner NGO(s), should assist communities to improve food security and household income; focused on:

2.2.1 Subsistence Agriculture

Enhancing subsistence agricultural production by introducing improved⁷ dry-land conservation farming based on improved drought resistant crop varieties, such as: cassava, sorghum, millet, beans and pigeon peas. Partnerships with agricultural research and other agencies, which support dry-land conservation agriculture, should be pursued and encouraged to work with the Banhine communities. Only communities settled outside the Park, within a 5 km radius, should be assisted in improving agricultural production. Some of the drought tolerant crops that should be considered are shown in Table 4. However, selection of these should be guided by careful due diligence on the seed to be supplied to communities. This should be done in consultation with competent institutions, such as ICRISAT, which specializes in production of drought resistant crop varieties. Additionally, the seed from the selected crop varieties should be able to be replanted and be able to tolerate common pests and diseases in the Banhine area. Communities should also be assisted in enhancing the indigenous post-harvest technologies to enable them to cope with increased crop yields.

⁷ Production of crops without irrigation of land with a low average or highly variable rainfall. Dry land farming aims at conserving and utilizing the available rainfall to the fullest extent.

Table 4: Potential drought resistant crops to be promoted around Banhine NP.

DROUGHT RESISTANT CROPS		
COMMON NAME	SCIENTIFIC NAME	⁸ DEGREE OF DROUGHT TOLERANCE
Sorghum	<i>Sorghum bicolor</i>	1.5
Okra	<i>Abelmoschus esculentus</i>	1.5
Pigeon Pea	<i>Cajanus cajan</i>	2.0
Mung Bean	<i>Vigna radiata</i>	2.0
Cassava	<i>Manihot esculenta</i>	2.0
Pearl Millet	<i>Pennisetum americanum</i>	2.5
Lablab Bean	<i>Dolichos lablab</i>	2.5
Tepary Bean	<i>Phaseolus acutifolius</i>	2.5
Mat Bean	<i>Vigna aconitifolius</i>	2.5
Marama Bean	<i>Tylosema esculentum</i>	3.0

2.2.2 Reinforcing Livestock Production through Promotion of Agro-forestry Fodder Technologies

Agroforestry is a management approach that integrates familiar and new agriculture and forestry practices into land management systems which contribute to diversification and sustainability of production. Within each agroforestry system, there is a continuum of options available to landowners depending on their specific goals. For areas around Banhine, we propose integration of *Acacia angustissima*, *Calliandra calothyrsus*, *Gliricidia sepium* and *Sesbania sesban* into the rangelands. These are fast growing (only one year to harvest), farmers would harvest leaves (without killing the plant) and use them to supplement the diets of their livestock (zero grazing). These species are very rich in protein and would improve livestock productivity. It is expected that by improving fodder for livestock, the demand for grazing in the Park, and competition between livestock and wildlife grazers would be reduced. Besides improving pasture, agro-forestry would also consider food crops, especially fruits. The Park authority should establish a partnership with ICRAF, Maputo office to assist in establishing nurseries and teaching community members how to integrate agro-forestry into their farming systems. Agro-forestry should only be introduced to communities' resident outside the Park.

2.2.3 Tourism Development in which Communities should Participate as Partners, through their Associações

The primary focus for this is the Fish Eagle Camp, with six rustic safari-style tents. The process to identify a private partner has already started, and should be pursued to fruition. Banhine's tourism promotion

should be considered in a broader, regional GLTCA context, in which Banhine fits as a transit destination for tourists travelling to the coastal areas of Mozambique, with the main attractions in Banhine being:

- Its tranquil wilderness, sprawling wetlands and grasslands, punctuated by sparse and low human population.
- The cultural exposé of the communities — their way of life, sacred sites, and diverse traditional ceremonies (rain-making, fishing, offering sacrifices to spiritual mediums, etc.).
- Diverse avifauna — with each landscape in the Park offering unique sightings of birds and medium sized mammals. Banhine is one of the very few areas in southern Africa, where tourists will be able to see birds that are typical of both east and southern African biomes.
- Banhine, besides offering accommodation in rustic safari-style tents, presents opportunities to camp in exclusive and isolated wilderness environments.

2.2.4 Wildlife Sanctuary

Establishment of a wildlife sanctuary (Fig. 9) to diversify the tourism product in Banhine. The sanctuary will expand the diversity of large mammals in Banhine by re-introducing mammals such as: tsessebe (*Damaliscus lunatus*), Lichtenstein's hartebeest (*Sigmoceros lichtensteinii*), zebra (*Equus burchelli*), blue wildebeest (*Conchaetes taurinus*), eland (*Taurotragus oryx*), waterbuck (*Kobus ellipsiprymnus*), sable antelope (*Hippotragus niger*), roan antelope (*Hippotragus equinus*), giraffe (*Giraffa camelopardalis*) and buffalo (*Syncerus caffer*) that were exterminated during

⁸ Rated from 0 (no tolerance) to 3 (highest tolerance)

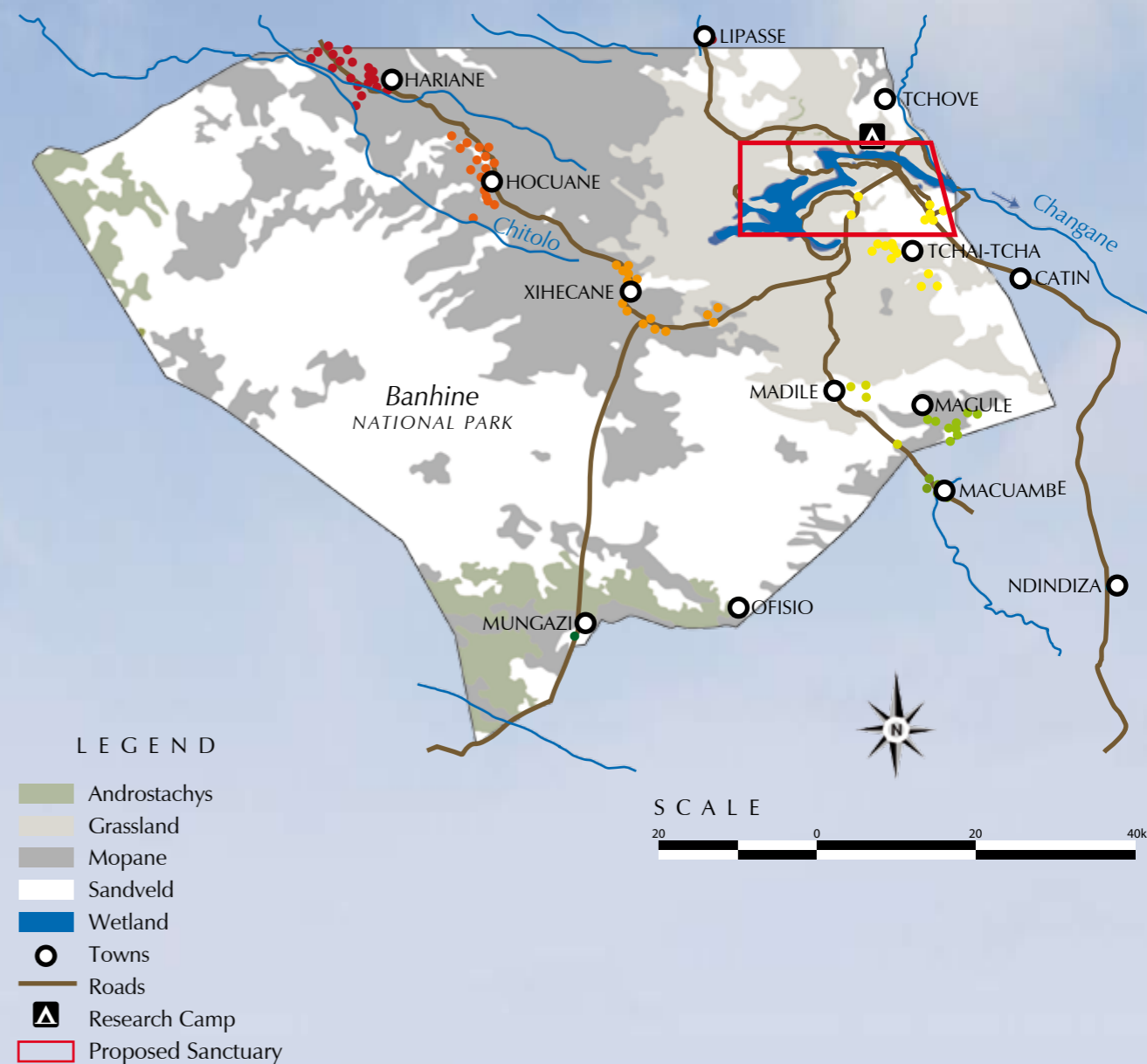


Figure 9: Proposed wildlife sanctuary in Banhine NP.



the political and civil unrest. The proposed size of the sanctuary is 15,700 ha and it coincides partly with the Pio-Cabral former cattle grazing paddocks, which includes the Park Headquarters node as well as the existing Fish Eagle Tented Camp. This area incorporates four of the five landscapes in Banhine (wetland, grassland, sandveld and mopane).

2.2.5 Auxiliary Enterprises

Developing auxiliary enterprises, such as curio production and fashioning. Some communities, though very few, engage in basket making and curio production, however, there is need for quantity and quality improvement. The NGO(s) supporting Banhine, should work with the NRCs, and identify community members that have some skills in producing curios, and assist them in improving their skills. Additionally:

- The resources used to make curios should be identified and characterized based on relative abundance, and distribution in and outside the Park.
- Determine sustainable off-take level for the materials used for making curios.
- Train curio makers in producing high quality products.
- Teach curio makers how to make necklaces from pod mahogany seed.
- Identify markets for the produced curios, and link their marketing to the Fish Eagle Tented Camp.

2.2.6 “Easements for Education”

Introduce “Easements for Education” to improve the quality of schools and education among the communities, and use it as a tool to encourage communities to relocate from the Park. Under the “Easements for Education” initiative, the Park authority supported by its NGO partner/s, should establish a trust using funds donated for conservation. The Park authority would then enter into long-term easement agreements with communities resident in the Park to relocate from the Park and halt illegal use of the Park’s resources. In exchange for this conservation agreement, the trust could generate income that would be used to guarantee construction of good schools, and school fees and expenses for eligible children of the community to a certain age or standard of education. “Easements for Education” could:

- Provide rural communities with assistance to improve their literacy levels and willingness to conserve natural resources in Banhine NP, and by relocating from it.
- Address both short and long-term threats to habitat. By creating a contractual agreement and financial incentives now, the immediate threats which may affect the Park could be mitigated. By investing in education, the long term potential for residents to seek jobs and livelihoods in other sectors, rather than being completely dependent on natural resources, would be developed.
- Provide direct and tangible benefit to individual households, and

benefits both children and adults. Children will have the opportunity to stay in school and have a brighter future. Adults would be free from the anxiety and burden of generating school fees, particularly in the Banhine area where cash is not readily available.

- Provide a direct and meaningful link in people’s perceptions between conservation and education — two of the most critical elements in building sustainable societies.

Establishing a trust and fund-raising for the “Easements for Education” will require dedicated effort by both the Park’s authorities and NGOs and private partners. Multiple sources of funds should be pursued, e.g. donors, private sector, NGOs, World Bank Community Enterprise Fund (CEF) and the 20% revenue share mandated by the Park to contribute to the local communities.

2.2.7 Enterprise Opportunities

Adaptively explore any other enterprise opportunity that may arise in the course of developing the Banhine NP.

3. Community Action Plan

This section outlines the activities that should be undertaken in integrating local communities into the Park’s management, and ensuring that communities sustainably harvest some of the most highly sought-after natural resources, offsetting community pressure on the Park’s resources and furnishing economic opportunities in which the communities can participate in partnership with the state, and/or the private sector, and hence, contribute to easing poverty among the communities.

Implementation of the recommended activities requires dedicated effort by the Park authority to monitor compliance with the rules of sustainable off-take of a wide range of resources demanded by the communities, and innovatively identifying conservation enterprises that can enhance household income among the local communities. This capacity currently does not exist in Banhine NP, but is urgently required to ensure the outlined activities/actions are adaptively implemented, and regularly revised as more knowledge about the relationship between the communities and the Park’s natural resources is gained.

Table 5 outlines activities to be implemented over a four-year period (2010 – 2014). It also allocates entities responsible for implementing the listed actions.

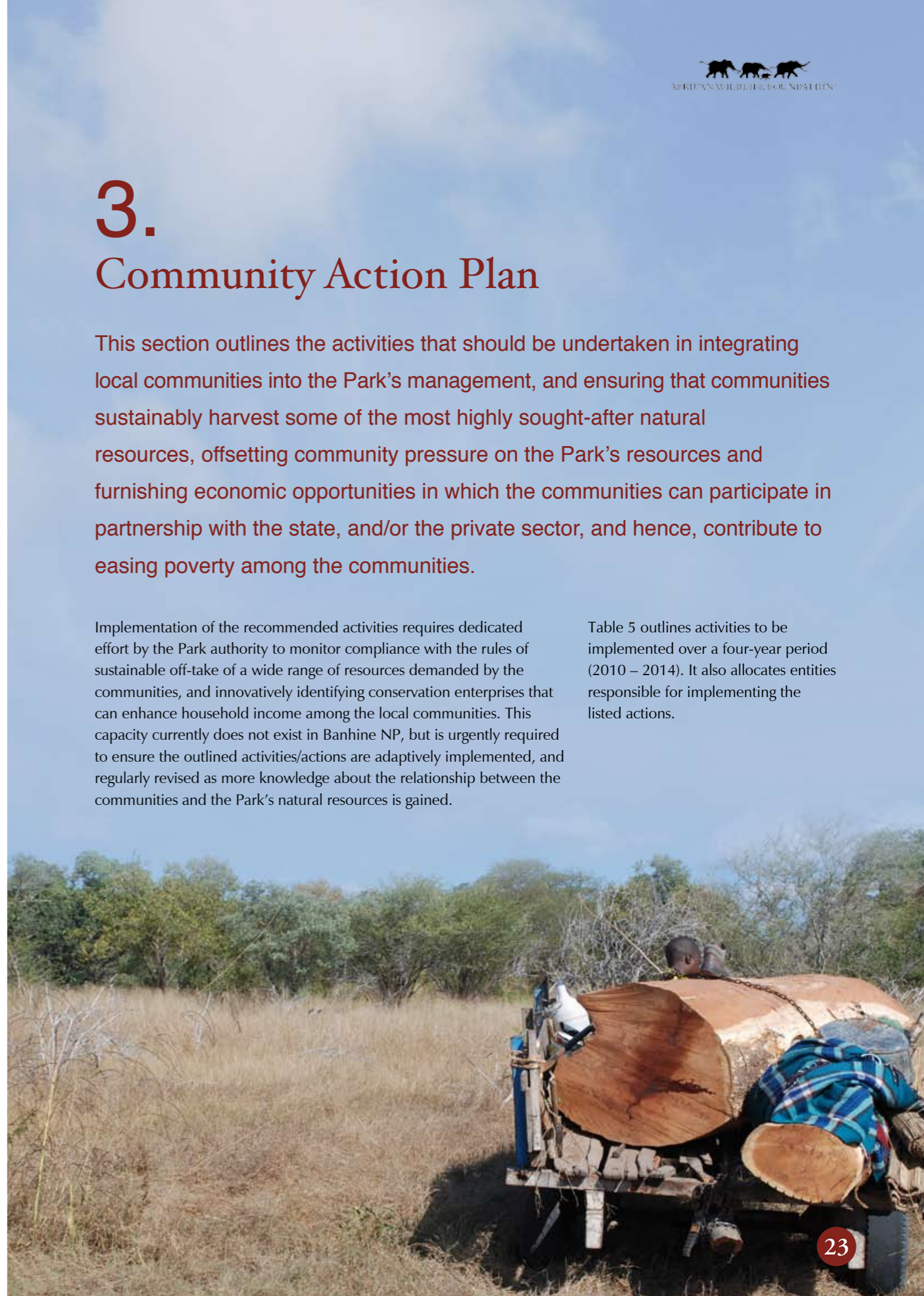


Table 5: Recommended activities and implementation plan.

RECOMMENDED ACTIVITIES AND IMPLEMENTATION PLAN					
ACTIVITIES	IMPLEMENTATION PERIOD				IMPLEMENTING AGENCY
	Yr1	Yr2	Yr3	Yr4	
1. NATURAL RESOURCES USE					
1.1 Facilitate establishment of NRC within each settlement cluster	■				NGO
1.2 Train NRC members in their responsibilities (see Section 3)	■				NGO
1.3 Identify, characterise and map all sacred sites in the Park	■				PA, NGO, NRCs
1.4 Determine relative abundance and distribution of required natural resources	■	■			University, NGO, PA, NRCs
1.5 Facilitate micro-zoning of resource use areas in Banhine NP	■	■			PA, NGO, NRCs, AS
1.6 Implement resource use & access to sacred sites guided by the set protocols (Section 2.1)		■	■	■	PA, NGO, NRCs, AS
1.7 Train NRC members in resource monitoring		■	■	■	PA, NGO, University
2. DEVELOPMENT OF ALTERNATIVE LIVELIHOOD STRATEGIES					
2.1 Establish and register Associação for each community settlement cluster	■	■			NGO, PA
2.2 Train the Associação members in their responsibilities (see Section 3)	■	■			NGO, PA
2.3 Develop improved dry-land agriculture and integrate agro-forestry into local farming systems	■	■	■	■	NGO, ICRAF, AGRIC
2.4 Broker community—private partnership for refurbishment & marketing of tented camp	■				NGO
2.5 Develop proposal for refurbishment of Fish Eagle Tented Camp submit to CEF consideration	■				NGO, MITUR, AS
2.6 Fund-raise for the development of wildlife sanctuary	■	■			MITUR, NGO, AS
2.7 Develop auxiliary enterprises, such as curio production and fashioning			■	■	NGO, PA
2.8 Fund raise and establish a trust for “Easement for Education” and implement		■	■	■	NGO, MITUR
2.9 Scope for viable enterprises that may arise as Banhine NP gets developed		■	■	■	NGO

Continued

ACTIVITIES	IMPLEMENTATION PERIOD				IMPLEMENTING AGENCY
	Yr1	Yr2	Yr3	Yr4	
3. MONITORING USE					
3.1 Design, adapt, train & implement M&E		■	■	■	PA, NGO, AS, NRCs
3.2 Natural Resources Use					
3.2.1 Adapt, train and implement the recommended table for adhering to off-take compliance		■	■	■	PA, NGO, AS, NRCs
3.3 Impact of Allowable use:					
3.3.1 Adapt, train & implement table for monitoring livelihoods		■	■	■	PA, NGO, AS, NRCs
3.4 CAP Implementation Plan					
3.4.1 Quarterly monitoring and give feedback on implementation of the CAP	■	■	■	■	TFCA Unit, DNAC, LG, PG

Note: NGO = Non-governmental organisation; MITUR = Ministry of Tourism; DNAC = Directorate of Conservation Areas; NRC = Natural Resources Committees; AS = Associações; PA = Park Authority; LG = Local Government; PG = Provincial Government; AGRIC = Agricultural Research.

3.1 Sub-projects for Community Enterprise Fund (CEF)

The following sub-projects should be considered for financing under the World Bank’s CEF:

- Improvement of dry land agriculture and integration of agro-forestry into the local farming systems.
- Refurbishment of the Fish Eagle Tented Camp and establishment of auxiliary camping sites.
- Production of curios.
- Establishment of the wildlife sanctuary.
- Establishment of a Trust for “Easements for Education” initiative.

3.2 Partners for Development

The Ministry of Tourism (MITUR) should pursue the following partnerships in implementing the Community Action Plan:

- Private sector: To invest in conservation enterprises, through securing leases from the state/MITUR, and entering into partnership with the local communities through their Associações.
- NGOs: To act as facilitators, local institutional capacity building, mediator of conflict resolution in natural resource use — ensuring

equitable sharing of benefits between the communities and private investors from biodiversity conservation; and contribute to rural development inputs through fundraising for investments in enhancing food security, enterprise and social amenity development; and monitoring contribution of community utilization and development programs towards biodiversity threat abatement, and sustainable rural livelihoods. MITUR should pursue partnership with NGOs through development of memorandum of understanding (MoU) with NGOs of its choice.

- Universities: To conduct valuable research on natural resources characterisation, abundance,

distribution, setting off-take quotas, and evaluating the contribution of natural resource management to rural livelihoods. MITUR should pursue a partnership through development of a memorandum of understanding (MoU) with universities of its choice.

- Communities: As beneficiaries and co-managers of the Banhine NP. Partnership with communities will be through specific lease, or contractual agreements.
- Local government: To ensure that any rural development being pursued in the Banhine area is consistent with the government's development agenda.
- Donors: To fund community programs as outlined in section 3.1. Concerted effort should be made by MITUR and its partners to align particular donors, such as the World Bank and others to Banhine NP, and encourage them to support the Park on a long term basis.

3.3 Implementation Arrangement

The Banhine Park authorities led by the park administrator will be primarily responsible for implementing the Community Action Plan (CAP), as part of the revised Management Plan for the Park. However as there is currently limited community development capacity in the Park, the African Wildlife Foundation (AWF) could second a Community Development Officer (CDO) for a period to be agreed by MITUR and AWF. The seconded CDO would work with the Park Administrator in implementing the CAP.

MITUR should urgently pursue the recommended partnership (see Section 3.2) to allow for effective and efficient implementation of the recommended actions.

4. Monitoring and Evaluation

⁹ Monitoring is a systematic and continuous process of assessing progress and changes caused by the implementation of an activity, usually by means of predetermined indicators, or recurrent questions, while evaluation identifies the broader positive and negative outcomes of an activity, or process, draws conclusions about its overall value, and decides whether its objectives have been met (Guijt 1998).

Figure 10 provides details on the phases and requirements for an effective monitoring programme.

Monitoring and evaluation to be adopted in Banhine should aim at providing comprehensive information on efficiency, relevance, sustainability, impact and effectiveness of the community natural resource utilization and development performance, and by learning through mistakes en route, it should lead to timely corrective action, and by highlighting the success of the efforts it could increase motivation among the affected communities. The guiding principle for selecting indicators is that they should be simple, and help in communicating changes to a wider audience. Indicators should describe and express conditions and represent simplification or approximation of a situation. Besides natural

resource utilisation, baselines have been established for most of the communities' current livelihoods, and these will provide the basis for monitoring changes in subsequent years.

⁹ Irene Guijt (1968). Socio-economic methodologies for natural resources research best practice guidelines: Participatory monitoring and evaluation for natural resource management and research. International Institute for Environment and Development, DFID.

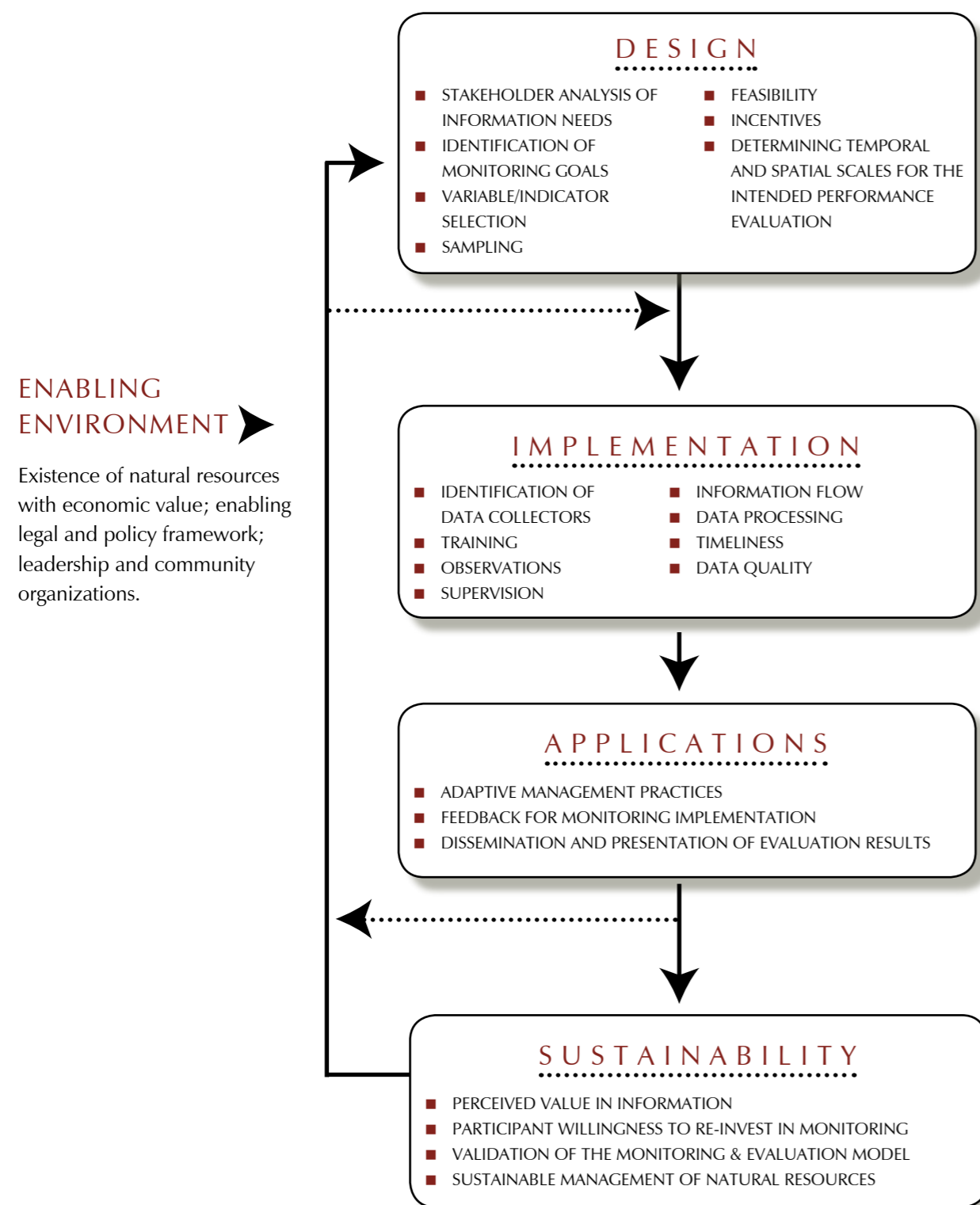


Figure 10: ¹⁰Effective monitoring framework (adapted from Lyons 2001)

¹⁰ Lyons, A. (2000). An effective monitoring framework for community based natural resource management: A case study of the ADMADDE programme in Zambia. MSc. Thesis, University of Florida, USA

4.1 Monitoring Community Resource Use

The main focus in monitoring natural resources utilisation should be on:

- (a) Compliance with the defined harvesting protocols (Table 6).
- (b) Impact, or contribution to sustaining the integrity of ecosystems and biodiversity conservation (Table 7).
- (c) Contribution to rural livelihood development (Table 8).

The Park authority should ensure resource monitors use the prescribed forms as shown in Appendix 1. The collected information/data should be analyzed quarterly and annually, disseminated to all relevant partners, and should adaptively guide resource utilization programs in the Park.

4.2. Alternative Livelihood Development

Changes in local communities’ livelihoods should be monitored based on impact on local communities’ economic, financial, natural, social, human, and physical capital assets. This approach is based on the ¹¹ “Sustainable Rural Livelihoods Framework” described by Scoones (1998). The current baseline on the communities’ capital assets has been established by AWF and incorporated into this plan; hence making it easier to track changes in these aspects over time, e.g. every five years. Table 6a-c should be used in monitoring changes in rural livelihoods. The Park authority should ensure that data collected is analyzed and compared with the current baselines.

4.3 Implementation Plan

The Director of DNAC and Head of the TFCA Unit should be responsible for monitoring implementation of the Action Plan, including the monitoring schedules recommended in this plan. This should be done on quarterly basis, with feedback given to the CAP implementation team on quarterly basis as well.

4.3.1 CAP Implementation Team

CAP will be implemented by the following:

- Park Administrator: Overall in charge and supervisor of all community programs in Banhine NP.
- NGO/Community Development Officer: Responsible for the day-to-day implementation of CAP, including facilitation of the process for establishment of NRs and Associações, mobilisation of local stakeholders, drafting of proposals for accessing funds from CEF and donors, facilitating capacity building efforts, facilitating determination of relative abundance of some natural resources being demanded

by communities, facilitating micro-zoning of the Park to identify resource use areas, update socioeconomic surveys on bi-annual basis, participate in monitoring and evaluation, etc.

- Game Scouts: Accompany resource users and monitor compliance with the set quota, participate in micro-zoning of the Park and carry out law enforcement in general.
- NRCs: See Section 2 for details
- Associações: See Section 2 for details.
- University: Research, monitoring and evaluation.
- Director of DNAC, and Head of TFCA Unit: provide support, supervision of the monitoring and evaluation activities.
- Local government and provincial government representatives: Provide policy guidance.

¹¹ Scoones, I. (1998). Sustainable rural livelihoods: a framework for analysis. IDS working Paper 72.

Appendix

Table 6: Checklist of the protocols on natural resources use in the Park.

NATURAL RESOURCES USE PROTOCOLS			
NATURAL RESOURCES ALLOWABLE USE	ACCEPTED OFF-TAKE PROTOCOLS	NO. NON-COMPLIANCES WITH SET PROTOCOL/ MONTH, OR SEASON	ESTIMATED CONTRIBUTION (%) OF THE RESOURCE EXTRACTED FROM THE PARK TO HOUSEHOLDS
CATEGORY 1 DEMANDED BY ≥70% OF VILLAGES			
POLES	<ul style="list-style-type: none"> No cutting of poles inside the Park. 		
FIREWOOD	<ul style="list-style-type: none"> Collect dead wood of ≤ 20 cm in diameter only by communities living deep in the Park. 		
THATCH GRASS	<ul style="list-style-type: none"> Baseline inventory of thatch grass production in the community utilization zone determined <ul style="list-style-type: none"> 50%, converted into number of grass bundles allocated to communities' use. Thatch grass allowance allocated within each cluster on a population proportionate basis. NRC report during the grass cutting season on total number of grass bundles collected by each village. 		
CATEGORY 2: DEMANDED BY ABOUT 60% OF THE VILLAGES			
MUD FOR HOUSE CONSTRUCTION	<ul style="list-style-type: none"> Collection not allowed in the Park. 		
FRUITS:	<ul style="list-style-type: none"> Community members organize in fruit harvesting groups when fruits are in season. Fruits that lie within human reach should be picked and for those fallen on to the ground, about 50% should be removed. 		
<i>Continued</i>			
NATURAL RESOURCES ALLOWABLE USE	ACCEPTED OFF-TAKE PROTOCOLS	NO. NON-COMPLIANCES WITH SET PROTOCOL/ MONTH, OR SEASON	ESTIMATED CONTRIBUTION (%) OF THE RESOURCE EXTRACTED FROM THE PARK TO HOUSEHOLDS
CATEGORY 3: DEMANDED BY ABOUT 50% OF THE VILLAGES			
TRADITIONAL MEDICINE	<ul style="list-style-type: none"> Rank medicinal plants species on relative abundance scale from 1 to 10; where ≤ 5 = rare, or scarce; ≥ 6 = common or abundant. Leaf collection — plants ranked 6 or greater on abundance scale, no limit on leaf collection; for plants ranked 5 or less on abundance scale, no more than 10% of any one plant's leaves should be collected. Bark collection — must be collected in vertical strips, the width of which must not exceed 10% of the circumference of the tree. Trees should be used for bark collection only once. Root collection — no more than one secondary root of an individual medicinal plant should be collected in any one year. A secondary root is defined as the root that branches off the central root extending from the base of the plant stem. Annual herbs — ranked 6 or greater on abundance scale, there should be no limit on the collection of any part; however for plants ranked 5 or less on abundance scale, collection should be restricted to the period following the setting and disposal of seed. NRCs and Park's authority keep records of quantities for each species of collected medicinal plants. 		
TREE ROOTS	<ul style="list-style-type: none"> Communities living close to or within 10 km of the Park's boundary (Tchai-Tchai, Tchove, Madile, Magule, Mucumambe, Hariane, Mungazi and Oficio) should harvest roots for food outside the Park. No more than one secondary root of an individual target tree should be collected in any one year. 		
MARULA FRUITS	<ul style="list-style-type: none"> Community members should be organized into marula fruit harvesting groups. Relative abundance of marula trees should be established by the Park's authority and NRCs in the resource utilization zones About 50% of the fruits on to the ground should be picked, once per season 		
<i>Continued</i>			

NATURAL RESOURCES ALLOWABLE USE	ACCEPTED OFF-TAKE PROTOCOLS	NO. NON-COMPLIANCES WITH SET PROTOCOL/ MONTH, OR SEASON	ESTIMATED CONTRIBUTION (%) OF THE RESOURCE EXTRACTED FROM THE PARK TO HOUSEHOLDS
CATEGORY 4: DEMANDED BY ABOUT 30% OF THE VILLAGES:			
PALM WINE	<ul style="list-style-type: none"> ■ Establish relative abundance of tappable palm trees in the resource utilization zones. ■ NRCs should identify wine tappers and organize them into wine tappers groups. ■ Train wine tappers groups in each cluster in environmentally acceptable tapping methods & establish protocol for tapping wine in the areas dedicated for the activity. ■ Park's authority & NRCs responsible for allocating permits to the tappers' groups, and monitor compliance. 		
LOGGING	<ul style="list-style-type: none"> ■ Not allowed in the Park. 		
CATEGORY 5: DEMANDED BY ≤ 20% OF THE VILLAGES:			
FISH	<ul style="list-style-type: none"> ■ Digging of lungfish in the Park forbidden. ■ Park's authority and NRCs assign areas that should be accessed for fishing. ■ Allocate fishing permits at the rate of five permits (one permit only per family) per month to fish in the fishing zones. ■ The allowable off-take/bag-limit should be 15 fish per month per family. ■ Park authority and NRCs record quantities by species of the harvested fish, and monitor compliance. 		
WATER LILY	<ul style="list-style-type: none"> ■ No harvesting allowed in the Park. 		
LAND	<ul style="list-style-type: none"> ■ No land should be farther allocated in the Park for communities expansion. 		
WATER	<ul style="list-style-type: none"> ■ Specific sites should be assigned for communities to draw water. 		

Table 7: Impact of allowable natural resource utilization on ecosystems and biodiversity integrity.

NATURAL RESOURCE UTILISATION, ECOSYSTEMS AND BIODIVERSITY INTEGRITY			
	ESTABLISH CURRENT BASELINE	MONITOR CHANGES BI-ANNUALLY	ESTIMATE TRENDS/ CHANGES (POSITIVE OR NEGATIVE)
FLORA	Vegetation cover.		
	Utilized species.		
FAUNA	Population size & distribution of likely species that may be affected by resource utilisation programs.		
	Habitat quality, where harvesting of resources occurs.		

Table 8: Monitoring changes in livelihood capital assets of the communities.

LIVELIHOODS AND CAPITAL ASSETS

CAPITAL ASSET	POTENTIAL VARIABLE/INDICATOR	CURRENT BASELINE	EXPECTED CHANGE	OBSERVED CHANGE	COMMENT ON OBSERVED CHANGES ON THE MONITORED INDICATOR EVERY 3-5 YEARS
1. ECONOMIC/ FINANCIAL CAPITAL ASSETS ESSENTIAL FOR PURSUIT OF ANY LIVELIHOOD STRATEGY	Income, e.g. annual total household incomes	53% earn ≤ MZN/MTn 500/month.	At least 45% of community members earn MTn/MZN 60,000/month in Year 4.		
	Food security	95% of community members run out of food in 5 months.	A least 60% of the community members, both female and male households have sufficient food throughout the year by Year 3.		
	Enterprise development	A least 60% of the community members, both female and male households have sufficient food throughout the year by Year 3. None of the communities engage in any visible conservation.	At least 55% of households, both male & female headed stop to rely on natural resources for food by Year 4. At least 15% of communities participate in some form of conservation enterprise in 2 years.		
2. PHYSICAL CAPITAL	Household assets	46% of the community members have no household assets.	Only 10% have no household assets in Year 4.		
	Supportive Infrastructure/ social amenity	Less than 2% have access to good schools..	At least 10% of the communities have access to good school.		
	Technology	At least 4% of the community have adopted some form of low cost technology, e.g., solar panel, ploughing.	At least 15% adopt some improved technology to enhance livelihoods in Year 3.		

Continued

CAPITAL ASSET	POTENTIAL VARIABLE/INDICATOR	CURRENT BASELINE	EXPECTED CHANGE	OBSERVED CHANGE	COMMENT ON OBSERVED CHANGES ON THE MONITORED INDICATOR EVERY 3-5 YEARS
3. HUMAN CAPITAL	Education	65% of the community members have had no education of any level.	Reduce the number of people, who have never been to school especially those in the age bracket of ≤ 20 years to less than 40% in 4 years.		
	Skills	At least 7% of the community members have some form of informal training/skills.	Increase number of entrepreneurship to about 12% in 4 years time.		
4. SOCIAL CAPITAL	Community governance institutions	Only one modern natural resource governance structure (Associação) has been formed.	3 Associações formed in 1.5 years.		
	Capacity building	There is no Natural Resources Committee in & around Banhine NP. Only one Associação has had some training.	At least 10 NRCs established in 2 years. 3 Associações & 10 NRCs trained in their roles.		

References

Cunningham, A. B. and Wehmeyer, A. S. (2008). Nutritional value of palm wine from *Hyphaene coriacea* and *Phoenix reclinata* (Arecaceae). *J. Economic Botany* (42): 301-306.

Duraiappah, A. (1996). Poverty and environmental degradation: a literature review and analysis. CREED Working Paper Series No. 8. International Institute for Environment and Development, London.

Government of Mozambique: Revised Forest and Wildlife Act, 10/99 of 7th July 1999.

Guijt, I. (1968). Socio-economic methodologies for natural resources research best practice guidelines: Participatory monitoring and evaluation for natural resource management and research. International Institute for Environment and Development, DFID.

Lyons, A. (2000). An effective monitoring framework for community based natural resource management: A case study of the ADMAGE programme in Zambia. M.Sc. Thesis, University of Florida, USA.

Scoones, I. (1998). Sustainable rural livelihoods: a framework for analysis. IDS working Paper 72.

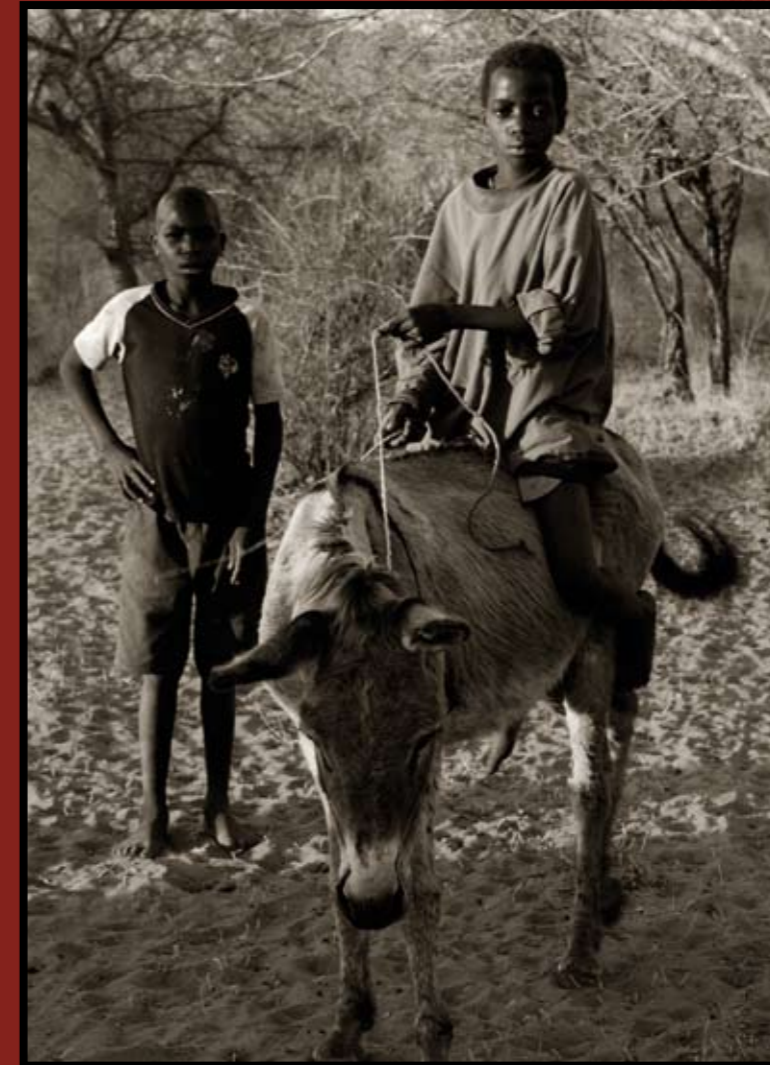


Photo: Simon Munthali

